

Managing Water in Connecticut

A Report on the Study of Water Resources Planning in the State

In accordance with Section 3 of Public Act No. 07-4 of the June Special
Session

An Act Implementing the Provisions of the Budget Concerning General
Government

December 31, 2008

Prepared by the Office of Policy and Management
for the General Assembly's Energy and Technology and Appropriations Committees

Table of Contents

	<u>Page</u>
Executive Summary	1
Sustaining Connecticut's Water Resources	4
Water Resources and the State Plan of Conservation & Development	5
Task 1 Review and prioritize the recommendations and the goals of the Water Planning Council developed prior to October 1, 2007	8
Task 2 Compile information from other reports or studies regarding water resources planning in the state	11
Task 3: Establish a mechanism to perform an in-depth analysis of existing statutes and regulations of the Department of Environmental Protection, the Department of Public Health and the Department of Public Utility Control for areas of overlapping and conflicting or inefficient procedures	17
Task 4 Review and summarize other states' regulatory programs and structures, relating to water resource planning, including, but not limited to, their approaches to water allocation	19
Task 5 Identify processes and funding needs for the evaluation of existing water diversion data and approaches to basin planning projects and coordinate water data collection from, and analysis among, the Department of Environmental Protection, the Department of Public Health, the Department of Public Utility Control, the Office of Policy and Management and the United States Geological Survey, and recommend supplemental data collection, as appropriate	25
Task 6 Evaluate existing water conservation programs and make recommendations to enhance water conservation programs to promote a water conservation ethic and to provide for appropriate drought response and enforcement capabilities	30
Task 7 Identify funding requirements and mechanisms for ongoing efforts in water resources planning in the state	36
Conclusion	39

Executive Summary

Section 3 of Public Act 07-4 of the June Special Session, An Act Implementing the Provisions of the Budget Concerning General Government, directs the Office of Policy and Management (OPM) to report annually on the study of water resources planning in Connecticut. The Act specifically requires OPM to:

- 1) Review and prioritize the recommendations and the goals of the Water Planning Council developed prior to October 1, 2007
- 2) Compile information from other reports or studies regarding water resources planning in the state
- 3) Establish a mechanism to perform an in-depth analysis of existing statutes and regulations of the Department of Environmental Protection, the Department of Public Health and the Department of Public Utility Control for areas of overlapping and conflicting or inefficient procedures
- 4) Review and summarize other states' regulatory programs and structures, relating to water resource planning, including, but not limited to, their approaches to water allocation
- 5) Identify processes and funding needs for the evaluation of existing water diversion data and approaches to basin planning projects and coordinate water data collection from, and analysis among, the Department of Environmental Protection, the Department of Public Health, the Department of Public Utility Control, the Office of Policy and Management and the United States Geological Survey, and recommend supplemental data collection, as appropriate
- 6) Evaluate existing water conservation programs and make recommendations to enhance water conservation programs to promote a water conservation ethic and to provide for appropriate drought response and enforcement capabilities
- 7) Identify funding requirements and mechanisms for ongoing efforts in water resources planning in the state

Each of these subject areas is covered in detail in subsequent chapters.

Connecticut, like a number of other states, has long recognized the importance of its water resources. Numerous laws and regulations have been promulgated over the years to address the water resources responsibilities of state agencies in managing the myriad needs of Connecticut's water users. However, the state continues to struggle with developing a comprehensive approach to evaluating and managing the competing uses of its water resources. This report attempts to provide recommendations for guiding a long-term, orderly planning effort that is based in fiscal reality.

It is important to recognize that the availability of water is unpredictable. The effects of "climate change" only heighten the complexity of managing the state's water resources, especially when the timing and amount of precipitation has fluctuated widely in recent years. It is easy to forget that 2008 began with the state emerging from a Drought Advisory declared by Governor Rell in October 2007. At that time, parts of Connecticut were experiencing serious water supply concerns after several months of below-normal precipitation.

While 2008 was one of the wettest years on record for the Greater Hartford area, this past year has been a stark reminder of how much the supply of water can vary from place to place and from year to year in Connecticut. During the twelve-month period ending November 30, Groton received only 82% of its average precipitation level compared to 151% of average for Hartford. Annual totals can also mask important seasonal variations. Willimantic received its average precipitation level for the past twelve

months, but only 77% of normal level during July and August, which would increase demand for irrigation water. Groton was even drier, receiving only 57% of its average precipitation level in July and August, yet storms and heavy rains caused severe crop losses in the Connecticut River Valley during those months. State water resources policy must have the flexibility to deal with such variations.

Water supply planning attempts to address variations in supply and demand within and between years, so that the water resources important to the state's quality of life, economy and environment are appropriately managed. Since current calculations are based on past experience, relatively small changes in the amount or timing of precipitation can have a large effect on the supply of and demand for water.

One of the fundamental requirements for improving the state's water resources planning and conservation efforts is to collect better information about water availability. As will be described later, that effort could entail significant costs. Given the state's current fiscal situation, however, there are certain structural issues that can be addressed at this time without the need for additional funding. Ongoing efforts by two of the agencies involved in water resources planning are especially important and can help define the scope of future activities that will require funding.

Completion of the Department of Environmental Protection's (DEP) minimum stream flow regulations is a critical component of the state's water resources management. Not only can the regulations offer better protection for some of the state's most sensitive streams, but they will also add a sense of certainty to the water allocation process. Beyond the direct impact of the regulations, the process of developing the regulations is providing the state with additional information on, and different perspectives about, water resources. Both the regulations themselves and the process of developing them will help identify the additional water data that are needed for effective water resources planning.

The Department of Public Health (DPH) is currently reviving the state's Water Utility Coordinating Committee (WUCC) process, which encourages local decision-making regarding public water distribution. That process would be improved, however, by increasing public representation. OPM recommends that state statutes be updated to include: 1) that the chief elected official or designee of each municipality in a WUCC's area is a member; 2) that a representative of each Local Health District in the WUCC's area is a member; and 3) that representation of public water systems be limited to community water systems, as it had been prior to an expansion in the federal definition of a public water system.

The DEP and DPH, along with the Department of Public Utility Control (DPUC) and the Office of Policy and Management (OPM), comprise the Water Planning Council (WPC). The General Assembly created the WPC in 2001 to "address issues involving the water companies, water resources and state policies regarding the future of the state's drinking water supply." As part of that effort, the WPC established the Water Planning Council Advisory Group (WPCAG), representing a wide range of water interests, to provide research and advice on issues as directed by the WPC.

OPM believes it would be beneficial at this time for the WPC to create a specialized workgroup to identify statutory, regulatory, procedural and other impediments to comprehensive water resources planning. The new workgroup's first task should be to evaluate coordination among the agencies' water resources activities, looking for overlapping, conflicting or inefficient requirements.

OPM believes a significant part of the perceived coordination problem results in large part from uncertainties regarding stream flow requirements. To counter this, the new workgroup should identify inefficiencies that would not be resolved by completion of the minimum stream flow regulations. To address this problem, the workgroup might consider procedures such as those promoted by the Department of Labor's LEAN Government Services to identify and correct inefficient systems. DEP has successfully used LEAN reviews to improve other processes, such as coastal permitting and the review of engineered control variances.

Another priority for the workgroup would be to deal with the state's restriction against releasing water supply and distribution information that is critical for public planning. A 2003 budget implementer bill

enacted by the General Assembly exempted a broad range of public water supply plan information from public disclosure, including "*inspection reports, technical specifications and other materials that depict or specifically describe critical water company operating facilities, collection and distribution systems or sources of supply.*" This impedes the public's access to information critical for water resources management. While certain information in water supply plans must be protected, the restriction is too broad. In fact, DPH cannot release basic information about water supply sources and distribution even to a legislator representing the district including a water company or its reservoir or wellfield.

Given the security ramifications, OPM recommends that the workgroup collaborate with the Department of Public Works and the Department of Emergency Management and Homeland Security to find a solution that can withhold information that should be protected, while making other information available. As noted by the then Director of Water and Community Programs at the Rural Community Assistance Partnership,

[W]ater resources security and sustainability should be thought of in tandem. Water that is safe from terrorist attack but either vulnerable to contamination from industrial, agricultural, or domestic pollutants or unavailable due to misuse or mismanagement is equally a threat to public health and safety. The quest for security of water systems, however, may undermine the potential for community-level water resources sustainability if it is premised on limiting information and decision-making authority over water resources to authorized personnel.

Gasteyer 2004, p 31

The public needs to have a better understanding of the state's water resources and conservation methods. The underlying problem with improving Connecticut's water resources planning process is the difficulty of gaining a consensus to solve a problem that many do not yet recognize as a problem. One wet year can erase memories of previous years' droughts and people in a community receiving above-normal rainfall do not feel water shortages experienced in a community bypassed by rain. Water resources planning is especially difficult because there are many different uses and expectations for the state's waters. Connecticut faces increasing conflicts over its water resources and those conflicts cannot be resolved without an open and comprehensive planning process.

Sustaining Connecticut's Water Resources

Connecticut's goal for water resources planning should be to attain sustainability. That means more than guaranteeing water will flow whenever someone in the state turns on a faucet. Although that is many people's most direct encounter with water, the state's water resources also must sustain the state's economy and environment.

In a 1967 lecture to the Connecticut Institute of Water Resources, the Dean of the University of Wyoming's College of Law said,

Let me suggest some of the problems which may arise in Connecticut, for they have long existed in the West where water is short and they are occurring with greater frequency throughout the eastern states. Growing cities find themselves dependent on streams and aquifers that are inadequate for present and future demands. ... Engineers find physical solutions for these problems. ... But these solutions create other problems. In Connecticut one real one would be the legal one-the water rights of the diverters, storers and importers might be tenuous and insecure. Other problems are practical-large diversions or reservoirs may inflict harm on prior users. They may impair fishing and recreational, even scenic and historical values. ... A good comprehensive water use code could make an important contribution to Connecticut at this time, and insure that the development of her water sources would proceed along desirable lines. It will be argued by some people that since Connecticut's water resources are quite large, and since so little of her streams are presently being used, there is now no "need" for a water law. But if Connecticut waits until serious disputes arise, if legislation is delayed until emergencies demand it, people will be hurt. Expensive and unnecessary litigation will arise, uncertainties will be created, investments will be lost. ... In states where a "wait and see" attitude has prevailed, the pattern has often been a haphazard and piecemeal treatment of particular water problems, urged by persons with special interests who are able to capture the ear of busy legislators. Such legislation can be unfair in its preferential treatment of particular activities and disregard of other groups with similar or opposite interests. It can actually hinder overall economic activity more than it helps. In particular, the interests of the public have too often been forgotten in such piecemeal legislation. On the other hand, in states which have considered the overall problem, a comprehensive water code has proven to be a most effective way of encouraging economic growth. Such a code permits all the various water-related activities to grow at their own speed, and in their own direction but always with some consideration for other activities and interests.

(Lectures on Law in Relation to Water Resource Use and Development
Report No. 2 of the Connecticut Institute of Water Resources, 1967, p 10-11)

He advocated a complete overhaul of that state's water laws, but the most important message for today is the interrelationship of social, economic and environmental dependence on water resources. Those factors must be considered together for Connecticut's water resources to be sustainable.

Sustainable water resources management requires a broad perspective and a responsive management system. The General Assembly's Program Review and Investigation Committee, in its 2003 *Stream Flow* report, suggested the use of Adaptive Management, "a systematic process for continually improving management policies and practices by learning from the outcomes of operational programs." OPM believes the proposed WPC workgroup can be a mechanism for fostering adaptive management, particularly for 'active' adaptive management, which the *Stream Flow* report described as employing "management programs that are designed to experimentally compare selected policies or practices, by evaluating alternative hypotheses about the system being managed."

Water Resources and the State Plan of Conservation & Development

Referring to the state's conservation and development planning activities in general, the Conservation and Development Policies Plan for Connecticut 2005-2010 (C&D Plan) explains,

This process is no small task, given the myriad of opinions and perspectives held by a socially and economically diverse population of 3.5 million citizens spread across 169 municipalities. Furthermore, the state's 15 regional planning organizations (RPOs), Native American tribal entities, involved government agencies, and a variety of special interest groups also play critical roles in this process.

Water resources planning has a central role in two of the six Growth Management Principles identified in the C&D Plan;

Conserve and Restore the Natural Environment, Cultural and Historical Resources, and Traditional Rural Lands

Protect and Ensure the Integrity of Environmental Assets Critical to Public Health and Safety

Not only does water resources planning have an important role in the C&D Plan, conservation and development planning has an important role for water resources. One long-accepted goal of planning is to protect the quality of public water supplies in the face of development pressures, but development can also affect the quantity of water available for public supplies. By creating impervious surfaces and otherwise disrupting the natural flow of water, development reduces groundwater recharge. Not only does that increase stormwater runoff and the accompanying water quality problems, but also results less groundwater is available to sustain water supplies and the environment during dry periods.

According to a Rhode Island Water Resources Board report, new development in that state during 1961 – 1995 reduced the state's potential water supply by an amount that would supply 250,000 – 600,000 residents. Rhode Island's population increased by only 150,000 during that period but, like in Connecticut, the amount of developed land increased at a much greater rate than the population. Furthermore, that new development generally is of a form that increases the demand for water while it reduces the supply.

Large lot, single family housing results in higher water consumption, particularly in the summer months. For instance, a water company serving suburban communities west of Hartford must provide 2½ times more water in July than in February, with the difference generally accepted to be water for lawns, pools and other non-essential uses. Averaged across the year, such uses increase the demand on that company's water sources by nearly 50% over the lowest water use months. Companies serving older, more densely-developed residential areas face much smaller increases in demand during the summer months.

Not only do Connecticut's newly developing areas use more water per capita than areas developed previously, they are not well-served by existing infrastructure. As the state's cities grew in the 19th and 20th Centuries, they secured the best sources of water and created systems to divert water many miles to supply urban centers. Rapidly-developing areas beyond those cities have limited options for public water supplies, even though they are often closer to the cities' water sources than the cities.

In addition, many of Connecticut's core urban areas have seen declining populations over the last sixty years while the more rural and suburban water supply areas have seen corresponding and dramatic increases in population. This has led to a decrease in the demand for water in these larger urban areas, while at the same time the demand for local water has skyrocketed in the traditional water supply areas. This change, together with an increase in statewide per capita water usage over the last sixty years presents real challenges to water suppliers as existing infrastructure not only has aged but may be located to divert water to areas based on historically outdated water planning assumptions.

Different parts of the state may have different perspectives on and expectations for water resources. The C&D Plan acknowledges the "growing awareness among many municipalities of their larger role and responsibility toward the overall economic and environmental health of their region" and states that, "Creating an ethic of regional coordination is key to the successful implementation of all the growth management principles." While water resources planning must address local and regional interests, water is a shared resource subject to a number of federal and state laws, resulting in the need for state oversight and coordination of many aspects of water planning.

While public participation is a critical aspect of planning, participation opportunities are often limited in water resources planning. Many aspects of water resources planning are highly technical and, as with other planning efforts, there are perceived advantages and disadvantages from efforts to increase public participation. The benefits and challenges are identified in the following:

Pros and Cons of Involving the Public in Watershed Management

<i>Pros</i>	<i>Cons</i>
<i>Knowledgeable citizens stand a better chance of making informed environmentally friendly decisions</i>	<i>Enlargement of bureaucracy resulting in a slowing down of the management process</i>
<i>Creation of a watershed and environmentally-oriented identity and voting bloc</i>	<i>Increased conflict over issues that have not been, nor need to be raised</i>
<i>High-profile public support of environmental work which brings pressure to bear upon politicians to offer financial support for future projects</i>	<i>Misinterpretation of raw data or information resulting from a lack of expertise in watershed issues or lack of consideration of multiple complex variables</i>
<i>Infusion of unique ideas in watershed management arising from diverse participant backgrounds</i>	<i>Potential dissemination of incorrect data and information resulting in poor decisions on a watershed-wide basis</i>
<i>Freedom of Information Act requests are met, while minimizing labor costs</i>	<i>Cost to fund public outreach campaign ("clearinghouse" method should minimize cost)</i>
<i>Reduction of duplication of work by connecting stakeholders</i>	<i>Legal liability as information is used for unanticipated purposes</i>
<i>Opportunities to improve public health through increased public awareness of hazards</i>	<i>Political liability as controversial issues are brought to light</i>
<i>Exposing issues, thereby putting social pressure on those who may damage the watershed via pollution, etc.</i>	<i>Substitution of generalized information for specific consultation</i>
<i>Fostering a sense of shared responsibility in preservation and restoration of a shared watershed</i>	<i>Potential to cause panic or lower property values as problems are taken out of context or misplaced</i>

William James Smith, Jr., Water International 27(4): p 561
 The clearinghouse approach to enhancing informed public participation in watershed management utilizing GIS and internet technology
<http://gis.unlv.edu/bismi/SmithStakeholdersGISinternet.pdf>

The lack of public consensus is a fundamental impediment to assuring that the state's waters are managed in a sustainable manner. The following sections of this report address issues raised by the General Assembly and, in the discussions of how to promote water resources planning and conservation, public participation must have a prominent role.

Task 1

Review and prioritize the recommendations and the goals of the Water Planning Council developed prior to October 1, 2007

Public Act 01-177, and subsequently Public Act 02-76, created the Water Planning Council (WPC) to "address issues involving the water companies, water resources and state policies regarding the future of the state's drinking water supply." The four agencies comprising the WPC are the Departments of Public Utility Control (DPUC), Environmental Protection (DEP), Public Health (DPH), and the Office of Policy and Management (OPM). The Acts require the WPC to study and report annually on the following eleven issues, in consultation with representatives of water companies, municipalities, environmental and agricultural groups, and other water users:

- 1) The financial viability, market structure, reliability of customer service and managerial competence of water companies;
- 2) fair and reasonable water rates;
- 3) protection and appropriate allocation of the state's water resources while providing for public water supply needs;
- 4) the adequacy and quality of the state's drinking water supplies to meet current and future needs;
- 5) an inventory of land and land use by water companies;
- 6) the status of current withdrawals, projected withdrawals, river flows and the future needs of water users;
- 7) methods for measurement and estimations of natural flows in Connecticut waterways in order to determine standards for stream flows that will protect the ecology of the state's rivers and streams;
- 8) the status of river flows and available data for measuring river flows;
- 9) the streamlining of the water diversion permit process;
- 10) coordination between the Departments of Environmental Protection, Public Health and Public Utility Control in review of applications for water diversion; and
- 11) the procedure for coordination of planning of public water supply systems established in sections 25-33c to 25-33j, inclusive, of the general statutes.

The WPC created three committees to assist in this task: 1) a Water Resource Management Committee; 2) a Water Utility Committee; and 3) a Technical Management Committee. Each committee included a wide range of experts and interested parties.

In its January 2003 report to the General Assembly, the WPC highlighted three overarching needs to better manage Connecticut's water resources: 1) A need for a revised water allocation procedure; 2) A need to secure adequate, stable resources for water allocation management; and 3) A need to reframe the current management structure governing water policy. The WPC acknowledged that that each required further research and that the solutions would be long-term and implemented in stages.

The WPC went on to make eight initial recommendations:

- 1) Adopt a Water Allocation Policy Planning Model;
- 2) Continue the Source Water Assessment Program;
- 3) Improve Water Supply Planning and Source Protection;
- 4) Revise Stream Flow Regulations;
- 5) Enhance Conservation Measures;
- 6) Improve the Business Relationship between Water Utilities and State Regulatory Agencies;
- 7) Improve Small System Assistance; and
- 8) Advance the Water Utility Coordinating Committees Planning Process.

These initial recommendations were further divided into twenty-six action items that more fully address the eleven issues that the General Assembly originally assigned to the WPC. Some of the action items have been completed, but most are of an ongoing nature. A summary of these action items can be found in the WPC's annual reports to the legislative committees of cognizance.

Given the amount of time that has elapsed since the WPC committees developed their initial recommendations, it would be beneficial at this time to re-evaluate those recommendations. The WPC might consider consulting with its advisory group in this endeavor. Actions that OPM considers to be the highest priorities are discussed below.

The WPC's Water Allocation Policy Planning Model (WAPPM) is the fundamental issue encompassing all of the state's overarching water policy needs. The WAPPM includes a number of action items which, due to their complexity and cost, have yet to be completed. A significant effort will be required to evaluate and address the state's existing authority to develop and implement the WAPPM. The WPC should evaluate the legal framework for water resources management and consider possible changes, such as adjustments to existing authorizations and, as needed, modification of agency functions and organization. DPH is currently reviving one of those efforts, the Water Utility Coordinating Committee (WUCC) process, but that process would benefit from legislative changes to increase public representation.

The WPC also recommended revisions to both the Diversion Act and Stream Flow Standards. As will be discussed later, certain legislation proposed to improve the Diversion Act failed in 2004. However, legislation that passed in 2005 expanded the Minimum Stream Flow requirements beyond just stocked streams to regulate flows of all Connecticut streams. Also, in 2005, DEP began monitoring the Pomperaug River Pilot Study as a basin assessment tool and model as a first step in implementing the WAPPM.

Another priority is to narrow the state's restriction against releasing water supply and distribution information that is critical for public planning. A 2003 budget implementer bill enacted by the General Assembly exempted a broad range of public water supply plan information from public disclosure, including "*inspection reports, technical specifications and other materials that depict or specifically describe critical water company operating facilities, collection and distribution systems or sources of supply.*" This impedes the public's access to information critical for water resources management. Certain information in water supply plans must be protected, but the restriction is too broad and, in fact, basic water supply information cannot even be released to legislator representing the district including a water company or its reservoir or wellfield. The solution will require collaboration with the state's Departments of Public Works and Emergency Management and Homeland Security.

To further improve the state's water resources management, the requirements for registered diversions should be strengthened. The issues of registered and permitted diversions are discussed in Task 5 of this report and it is clear that many aspects of registered diversions must be addressed to have an effective planning process. In particular, there needs to be standard methods for measuring flow from registered diversions, a requirement for annual reporting of monthly cumulative withdrawal data, and regular fees for registered diversions. DEP believes its current efforts to develop stream flow regulation will shed light on registration issues and help set the direction for future efforts regarding such diversions.

The DEP's proposed stream flow regulations are expected to address the full range of stream flows, to better maintain the structure and function of aquatic ecosystems. Given their importance to the water allocation process, the stream flow regulation development process should be strongly encouraged. Not only can such regulations better protect habitat, they can also add certainty to the diversion permitting process; something all involved consider beneficial.

Water allocation will be greatly simplified if the state can reduce demand for water through enhanced conservation efforts addressed in Task 6 of this report. For example, seasonal conservation pricing, which entails charging higher rates for higher consumption during the months when water supplies are especially stressed, is one such potential tool for encouraging conservation and can be designed to have

no effect on the cost of water for basic needs. Further study of the use of seasonal conservation pricing should be conducted, in order to assess the potential benefits and impacts to various water users.

One potential use of additional moneys generated by conservation pricing is to support the rehabilitation of aging water system infrastructure. In discussing the advantage of requiring water providers to plan and prioritize needed infrastructure work, a 2007 report by a WPCAG workgroup said:

... if utilities are required to undertake the Planning, Selection and Prioritization, and Budget tasks, as recommended, they will be obligated to confront the facts and identify their current and future budget needs in a consistent, transparent and defensible manner. In so doing, it will be difficult for utilities – and their respective governing bodies – to ignore their fiduciary responsibilities by continuing to defer or underfund needed infrastructure maintenance and replacement projects. Consolidating utilities' efforts in this area will also highlight the statewide need for adequate investment and identify the magnitude of any resource gap.

Connecticut's PA 07-139 is an important step towards dealing with the state's aging water infrastructure. As authorized by that public act, DPUC evaluated the infrastructure needs and finances of water utilities and prioritization criteria. As a result of that effort, it has created the Water Infrastructure Conservation Adjustment (WICA), a new program that enables utilities to more readily recover costs for certain infrastructure improvements with bill surcharges. Although it does not solve the entire infrastructure problem, it significantly improves the existing system and addresses one of the WPC's action items.

In Connecticut and around the country, there has been inadequate funding for infrastructure rehabilitation. This has resulted in water prices being artificially low, since the full system costs were not included. Remedying the situation will inevitably result in increased costs. To the extent that cost increases can be designed to enhance conservation, there can be a long-term benefit, both environmentally and fiscally.

Given the current fiscal situation, OPM sees no prospect of additional funding in 2009 for those priority recommendations that require significant funding. The following section of this report, which describes past water planning efforts in Connecticut, shows funding to have been a limiting factor in past planning efforts. For that reason, an adequate funding stream would be beneficial.

Task 2

Compile information from other reports or studies regarding water resources planning in the state

Connecticut's water resources planning efforts are routinely traced back to the severe drought years of the 1960s, but dry weather was only one factor. The state's population grew by 20% during that decade, providing further impetus for the water planning efforts begun at that time. Those efforts faltered during the 1970s, a relatively wet period, but also a decade in which population growth slowed to 2.5%. The availability of water is as much an issue of demand as of supply.

A historical review, however, shows the state's need for water resources planning was recognized much earlier than the 1960s. Not surprisingly, interest in water resources has risen during droughts and declined soon after. Water resources planning is a challenging process and, without backing from state leaders, the effort is too readily abandoned as other needs arise.

Solutions to the problems of water resources management do not come neatly packaged, ready-made and conveniently labeled ... Conservation of water requires a delicate balance of uses, allocation of water resources, detailed knowledge of the availability and location of water and a very considerable amount of foresight, planning, judgment and finally – arbitrary decisions.

State Water Commission, 1950

Nearly sixty years later, the state still needs to determine the availability of water and balance competing needs. Then, with foresight, planning and judgment, Connecticut can begin making the difficult decisions needed to sustain the state's waters now and into the future.

The Early Years of Water Planning in Connecticut

As the state's population and economy grew in the 19th and early 20th Centuries, local water sources proved inadequate or were contaminated, so cities reached out into rural areas to secure the abundant clean water available there. By 1927, the Chief Engineer of the Hartford Board of Water Commissioners pointed out that the state's methods of allocating water resources were haphazard. He noted that the problem limited the ability of smaller communities to obtain a water supply and increased their cost. He recommended efforts be made to conserve the state's water resources and to encourage cooperation among the communities within natural physical boundaries.

Some of the same water resources issues that remain unresolved today, such as the inadequate water supplies available to some municipalities and the benefits of conservation and watershed-based planning, were already being discussed in 1927. Three years later, following consecutive years of drought, the State Water Commission said,

As to the remaining availability of the waters of the State, but little is known. Along the courses of streams projects have been developed as best suited special interests and profit. No attempt has been made to coordinate these projects that the water supply concerned be allotted to more than one practicable and beneficial use. At the present time this condition of affairs may seem unimportant, but, as the water resources of the State become more and more appropriated, the folly of indifference to the manner in which this indispensable factor in the development of the State has been inconsiderately developed will become apparent. The question may well be asked as to how this unfortunate condition may be obviated in the future.

Report on the Water Resources of Connecticut
pursuant to Special Act 427, Chapter 413, 1929, p 17

The State Water Commission went on to recommend the collection of precipitation and flow data for the state's rivers and streams, as well as information regarding their current or future use. The Commission had not only highlighted the haphazard allocation of water resources, but also pointed out the need for better information regarding the existing use and future availability of water. Those currently remain the two fundamental issues confronting water resources planning. The foresight is even more striking when one considers the state's population was less than half of what it is today.

The State Water Commission also recommended it be given "general supervision over the waters of the State, including surface, sub-surface and percolating waters, to the end that the same may be economically, prudently, and fully conserved and developed for public use (p 35)." It further recommended the creation of a statewide water coordination board, including representatives of each commission, department and bureau involved in water resources, and noted the existence of such entities in New York, New Jersey and Pennsylvania.

The State Water Commission essentially recommended the creation of an entity comparable to today's Water Planning Council in 1930 and, between its report and the earlier comments by the Chief of the Hartford Board of Water Commissioners, essentially all the pressing water resources issues still existing in 2008 had been identified. In 1936, however, the director of the state Department of Health's Bureau of Sanitary Engineering discounted the state's need for water supply planning. He noted how other states had begun detailed planning, but said such measures were not needed in Connecticut because of "far-sighted policies developed for the future of our large public water supply systems, accompanied to some extent by fairly effective planning by water works management of smaller suppliers (Connecticut Society of Civil Engineers Annual Report, 1936, p 22)." After another drought in 1941, however, he acknowledged, "It would greatly help in water supply planning if more water works men kept records of their stream flows, gains and losses of reservoir storage, and water consumption, which may be tied in to compute dry weather yields from watersheds."

The 1941 Drought and its Effect on Water Supplies in New England - a Symposium
Journal of the New England Water Works Association 56(2), 1942, p 253

The on-again, off-again interest in water resources planning continued and the State Water Commission's 1950 report to the President's Water Resources Policy Commission addressed a broad range of water resources issues. A 1955 Special Act established the Water Resources Commission (WRC) to study the state's water resources and laws. The General Assembly further directed the WRC to study the water needs of different groups "with particular reference to the greatest good to the people (Journal of the House 1957, p 191)." The WRC's report to the legislature included compilations of existing data and the state's water laws. Recognizing the need for better data, the WRC also embarked on an effort, carried forward by the United States Geological Survey and others, to acquire better information about surface and ground waters and to assess water resources of the state's major river basins.

In 1963, the Connecticut Development Commission's Interregional Planning Program issued its Technical Report 124. That report, although not a plan itself, was a compilation of available water information, including that being generated in response to the WRC's efforts, for the use of program staff doing statewide analyses. The state subsequently endured its major drought of 1964-1965 and that set the standard for drought in Connecticut.

In response to the extended drought, 1967's PA 477 directed state agencies to develop a Long-range Plan for Management of Water Resources. The effort was further motivated by the state's then rapid growth. The state's population in 1970 was 1 million more than it had been in 1950, an increase of 50%, and the state projected that its population would increase by another 2 million by 2000. That drought, in combination with the state's then rapid growth, was the impetus for planning efforts that continue to this day.

Connecticut Water Resources Planning Project

Prompted by the memorable drought and a rapidly growing population, the General Assembly formed the Interagency Water Resources Planning Board (IWRPB) from the agencies that are now the DEP, DPH and OPM and also funded new staff for the water planning effort. That effort was known as the Connecticut Water Resources Planning Project. In addition to considering water supply, water quality, and flood management concerns, each of which had inspired planning work at one time or another, the new planning project would also consider factors such as aquatic habitat, energy, recreation, and agriculture.

The new planning project was divided into five stages: 1) Inventory of existing conditions; 2) Projection of needs and identification of future deficiencies; 3) Identification of alternatives for satisfying the deficiencies; 4) Evaluation of alternatives; and 5) Plan preparation. The project not only brought relevant agencies together and funded new staff, but it also supported regional water and sewer planning efforts, leading to the completion of a number of regional plans. Given the successful efforts of regional planning organizations and the continuing efforts of the United States Geological Survey, the project was able to tap into water resources information unavailable to previous planning efforts.

The IWRPB issued a Phase I report in 1971, generally fulfilling the first two steps of the process and a portion of the third. Work continued on the remaining steps and draft reports were prepared, but a decision was made to merge that effort with the ongoing development of the State Plan of Conservation and Development. As the nearly 20% population growth of the 1960s declined to only 2.5% during the 1970s, the state's comprehensive planning efforts were re-oriented towards more realistic growth projections.

The IWRPB did, at different times, try to restart the separate water planning effort and its staff completed a draft plan, addressing water quality and quantity, flood management, water-based recreation, aquatic habitat, power generation and navigation. The board decided more information was necessary before the plan could be issued. As time passed, the IWRPB planning effort lapsed and its water planning staff focused on their other duties in the various agencies.

Water Planning Initiatives of the 1980s and 1990s

Drought returned again in 1980 - 1981 and the legislature created the Water Resources Task Force (WRTF), which would meet during 1982-1984 and issue a report in 1985. The WRTF had a narrower scope than previous planning efforts and, as would be the case for the state's subsequent water planning efforts, it focused on public water supplies. The first result of the WRTF was PA 84-330, which addressed the proliferation of small water companies and concerns regarding the viability of undercapitalized, inadequate systems. The WRTF subsequently recommended a new, regionalized planning process that led to Public Act 85-535, "An Act Concerning a Connecticut Plan for Public Water Supply Coordination".

The WRTF modeled the new "Connecticut Plan" on Washington's Public Water System Coordination Act. Since its creation, the Connecticut Plan has been administered by DPH. It is intended to solve a number of problems by coordinating planning for public water supply systems. The state was divided into seven regions each of which would have a Water Utility Coordinating Committee (WUCC) comprised of water utilities and planning officials. DPH would convene the WUCCs and each would be empowered to assess water supply issues within its area and to develop utility exclusive service areas and a coordinated, regional water supply plan. Each WUCC would meet periodically to update its plan in accordance with changes in populations, needs and system capacities. As envisioned by the WRTF, a WUCC's coordinated water system plan would have two components: 1) individual utility water supply plans; and 2) an overarching, area-wide plan. Projections of population and water demand, plus the availability of supply, would be the basis for each WUCC's planning.

Due to expanded federal definitions after release of the WRTF report, WUCC membership is now extended to public water systems which serve 25 or more people or have 15 or more service connections. There are now thousands of eligible water systems, a number which is not conducive to an effective planning process. Furthermore, the WUCC process does not specifically include municipalities, except in those limited instances when the municipality is the owner of a public water system. Most municipalities have no voting rights in the WUCC process, other than through representation by their Regional Planning Organization.

The WRTF's final report said, "(DPH) must look at consistency of (the WUCC's) plan with land use plans for the town and region, if they exist, and address major problems, potential conflicts and other impediments in implementing the plan. (DPH) should review town comments on the plan in regard to consistency with land use. The major criteria for approval should be will the plan provide for orderly development of pure and adequate water supplies as necessary." To date, however, WUCCs have tended to focus on assigning exclusive service areas to individual utilities. Exclusive service areas, furthermore, appear to be treated as "franchise areas," where a utility is *entitled* to serve, rather than as areas in which they are *required* to serve.

Where a public water supply need is within a utility's exclusive service area, but beyond where the utility wants to extend its water main, the WRTF had anticipated the utility would provide service, perhaps managing a satellite system. However, there is often little interest in doing so. Foreseeing this issue, the WRTF's final report noted "A clear understanding of the distinction, if any, between water utility franchise areas vs. water utility service areas is necessary." It also added, "If 'franchise' vs. 'service area' distinction is an impediment, legislation should attempt to resolve the problem, by having clear statutory definition of these terms and their application (p11)."

Soon after the first three WUCCs were convened, the General Assembly passed PA 89-327, An Act Establishing a Water Resources Policy. The Act, like other recent state water planning efforts, focused only on public water supplies and stated the following to be state goals and policies:

- 1) *To preserve and protect water supply watershed lands and prevent degradation of surface water and groundwaters;*
- 2) *to protect groundwater recharge areas critical to existing and potential drinking water supplies;*
- 3) *to make water resources conservation a priority in all decisions;*
- 4) *to conserve water resources through technology, methods and procedures designed to promote efficient use of water and to eliminate the waste of water;*
- 5) *to prevent contamination of water supply sources or reduction in the availability of future water supplies;*
- 6) *to balance competing and conflicting needs for water equitably and at a reasonable cost to all citizens; and*
- 7) *to reduce or eliminate the waste of water through water supply management practices.*

PA 89-327 added that OPM would coordinate DEP, DPH and DPUC in a review of each agency's authority regarding the seven newly established goals and policies and in the preparation of a Memorandum of Understanding (MOU). The goal of the MOU was to avoid agency overlap and redundancy in regards to water conservation issues and emergency contingency plans. The MOU would be subject to public review and comment prior to its completion. The OPM, finally, would coordinate the agencies' development of recommendations for statutory and regulatory changes necessary to implement the MOU or to ensure consistency with the state's new goals and policies.

During 1995-1997 DPUC, as authorized by PA95-174 and 96-153, studied a wide range of water planning

issues and, as a result of that review, submitted three reports to the General Assembly. In particular, DPUC was directed to identify legislative action and incentives needed to:

- 1) ensure that all residents of the state have a reliable, safe supply of quality water,
- 2) facilitate improvement of troubled or nonviable water systems,
- 3) improve the quality of water service to consumers,
- 4) minimize increases in rates due to compliance with state and federal water quality and related regulations,
- 5) streamline and reduce the cost of regulating water companies, and
- 6) achieve economies of scale in supplying water to consumers.

Diversion 2000, Stream Flow and the origin of Water Planning Council

The next step in the state's water resources planning was DEP's 2000 Report to the General Assembly on *State Water Allocation Policies Pursuant to Public Act 98-224*, commonly referred to as the *Diversion 2000* report. The General Assembly had asked DEP to provide information regarding a number of issues, including: 1) the number of diversions and amount of water withdrawn; 2) an assessment of whether existing allocation policies adequately protected water resources while providing for public water supply needs; and 3) a method for allocating water. *Diversion 2000* examined DEP's water management programs and recommended the establishment of a task force to foster the development and implementation of a comprehensive water allocation system.

The *Diversion 2000* report was followed in 2001 by the two-day Connecticut Instream Flow Conference, which sought to determine what was known about Connecticut's river and stream flows and how such information could guide water resources planning. The first half of the conference was titled "Water Conflicts in Connecticut: Balancing Needs" and the second was "Working Toward a Connecticut Instream Flow Standard." The conference identified a number of challenges that water resources planning must overcome and found that the lack of basic water resources information and the lack of effective, comprehensive water allocation policy were underlying problems.

With the stress on the state's water resources becoming more apparent, the Legislative Program Review and Investigation Committee (LPRI) decided to investigate the issue of stream flow and issued its report titled, *Stream Flow*, in 2003. Like the DEP's and the instream flow conference's reports, *Stream Flow* is not itself a planning document, but sections do address the state's planning efforts.

The LPRI's *Stream Flow* report acknowledges both the benefits and the shortfalls of the WUCC system. The report also points out that the 1967 IWRPB law remained in effect and that DEP, DPH and OPM are still required to sustain statewide water resources planning process. The report noted that some aspects of that had been incorporated into other planning processes, such as the recently established WPC, but stated, "... a comprehensive, statewide water resources plan with the specific components required by statute is not in place." It goes on to note, as mentioned previously, that the state's current water resources planning is focused on public drinking water and adds, " The absence of comprehensive, coordinated planning only perpetuates an ad hoc approach to determining instream and out-of-stream water requirements, not based on a clear direction for meeting all demands on water resources. A structured water resource allocation system with comprehensive planning as a primary component is needed in Connecticut."

In their report, LPRI recommended the WPC determine whether a regional water planning structure would be more effective than the WUCC system and, if so, how to integrate it into a statewide planning structure. The report also recommends the WPC assume responsibility for the long-range water resources plan required by Section 22a-352 of the Connecticut General Statutes, integrating WUCC plans, the State Conservation and Development Policies Plan and any other available documents necessary for a statewide plan. It also recommends the WPC establish a more functional regional planning structure than the WUCC process and to explore other ways to integrate the state's water resources planning. DEP and DPH are directed to determine whether individual utility water supply plans

and the WUCCs' integrated plans provide the information necessary for the DEP's diversion program and for water resources management in general.

Throughout this period, various organizations sponsored conferences with names including *Connecticut Instream Flow Conference*; *Connecticut Water Law Conference: Balancing Needs for Fish and Faucet*; and *Connecticut Water Policy: Adopted or Orphaned?* A point commonly raised at such gatherings was a need to change how state agencies coordinate their water resources management procedures. As is discussed in the following section, there has been progress in these issues and further progress is expected during 2009.

Task 3

Establish a mechanism to perform an in-depth analysis of existing statutes and regulations of the Department of Environmental Protection, the Department of Public Health and the Department of Public Utility Control for areas of overlapping and conflicting or inefficient procedures

The Water Planning Council's (WPC) initial report to the General Assembly acknowledged that better coordination was needed among state agencies involved in public water supply planning. While there have been recent proposals to consolidate the state's water resources planning efforts into a single entity, OPM believes that improved coordination among the WPC agencies is beginning to yield positive results.

Generally speaking, administration, oversight and regulation of water resources in the state are undertaken as follows:

- DEP administers most water resources and water quality laws relative to mitigating the impacts to the state's water resources.
- DPH oversees the purity and adequacy of the state's drinking water supplies.
- DPUC regulates private water companies supplying water to 50 or more consumers

Many state statutes and regulations dealing with water resources originate in federal laws, such as the Clean Water Act and Safe Drinking Water Act, and the federal government provides funding directly to state agencies to enforce many such requirements. A Congressional Budget Office (CBO) report about national water system infrastructure noted, "Water pipes and treatment plants last for decades. Consequently, today's infrastructure represents a cumulation of investment choices and maintenance practices over many years past, and today's investments will affect operating costs and service quality for many years into the future."

Future Investment in Drinking Water and Wastewater Infrastructure
Congressional Budget Office 2002, p 43

Given infrastructure's role in promoting economic growth and public health and safety, water supply decisions made today will affect the state's residents, communities and environment for generations to come.

There is no question that those seeking to use the state's water resources face significant procedural hurdles, but state agencies face comparable difficulties in reviewing those requests. Water supply plans that rely on new sources of water can satisfy Public Health Codes enforced by DPH but, when the time comes to apply for a diversion permit, DEP might be unable to approve it because of conflicting water demands or because of inadequate information about the potential effects of water withdrawals.

The state regulatory agencies have different obligations, therefore some conflicts are unavoidable. However, OPM believes these conflicts can be minimized with better information on the state's water resources. For example, most of the state's water diversions are considered exempt from the state's permitting process, making it difficult to ascertain the amount of water that might be available for other uses. Furthermore, the state's minimum stream flow regulations are still under development by DEP.

In light of the uncertainties about water resources and needs, DEP makes conservative decisions regarding the further availability of water. The resulting permitting process can be unpredictable, time consuming and expensive. The problem is multifaceted and the solution must be, too.

The long-term goal, broadly speaking, should be to front-load the water supply planning and diversion permitting processes. That way, those requesting state approvals and agencies reviewing those requests can identify potential problems and solutions up front, rather than through a long, piecemeal process. OPM believes the long-term goal can be achieved through a combination of short- and long-term actions.

In the short term, OPM recommends a two-prong approach. First, every effort must be made to complete the DEP's minimum stream flow regulations. Not only can those regulations provide more certainty to the diversion permitting process, but also the ongoing regulation development process will provide information and perspective on all the related issues. The more comprehensive those regulations are, the greater certainty they will provide. Furthermore, although wholesale reorganization of state agency water planning efforts is not considered a desirable solution at this time, OPM recognizes that further effort will be needed to identify and resolve overlapping, conflicting or inefficient procedures.

The organizational review requires not only the in-depth analysis of existing statutes and regulations as noted by the General Assembly, but also the analysis of agency procedures and of permit applications, reports and other information reviewed by the agencies. OPM believes that the WPC is in the best position to identify key individuals to staff a workgroup that would be tasked with this effort.

This workgroup should give consideration to following procedures similar to those used by the CT Department of Labor's LEAN Government Services Program. DEP has utilized LEAN training for some of its staff and LEAN reviews have been used to improve the procedures of several programs. The workgroup might adopt a similar approach to evaluating work processes and encouraging a free flow of ideas to develop solutions. Since LEAN reviews are typically conducted within a single agency, it is critical that this interagency assessment have the support of each WPC member agency.

In the longer-term, Connecticut must address its lack of adequate data for basin planning as well as questions regarding diversions. Collecting the necessary data will require a significant investment of time and resources. In 2009, OPM expects there will be further progress as some of the diversion issues might be addressed in the stream flow regulation process. These issues are discussed later in this report.

Task 4

Review and summarize other states' regulatory programs and structures, relating to water resource planning, including, but not limited to, their approaches to water allocation

In 2006, the Office of Legislative Research completed a report on Watershed Planning (OLR Report 2006-R-0070) which discusses numerous states' approaches to water resource planning. The report describes programs in Florida, Maine, Massachusetts, New Hampshire, Ohio, Pennsylvania, Rhode Island, Utah, and Vermont.

Water laws and government structures vary dramatically from state to state, so direct comparison of different states' regulatory programs and water allocation is tricky even among states that might appear similar. Connecticut's system of water law, like that in other eastern states, is based on common law, which Connecticut, like many other states has modified by a Diversion Act. The western states, which have confronted water limitations from the time of their settlement, use a very different legal structure, known as prior appropriation. In addition to differing systems of water law, states differ in their organization of government. Connecticut, notably, lacks a layer of elected government between the municipal and state level. Since many states rely on county or other regional government to manage one or more water issues, their programs do not necessarily translate well here.

Washington: the origin of Connecticut's WUCC process

The State of Washington served as a model for Connecticut's Water Utility Coordinating Committee (WUCC) process that was developed in the 1980s. Washington, however, is able to rely on its strong system of county governments to administer the regional process. Lacking Washington's system of elected county officials overseeing county agencies, Connecticut instead has relied on Regional Planning Organizations (RPOs) to fulfill the same role in its WUCCs. RPOs, however, do not have the same authority or direct public representation as elected county governments. In addition, a municipality can only be a voting member of a Connecticut WUCC if it owns a water company.

Legislation proposed, but not passed, in 2006 sought to improve public representation in the WUCC process. It would have added a representative from each municipality to the WUCC and also would have restricted public water system representation to those serving at least 250 service connections or 1000 or more people. The justification for such a restriction was that, when the WUCC process was created, only community water systems were considered public water systems. Since then, an expanded federal definition has resulted in the inclusion of the state's numerous non-community systems, such as the many convenience stores and other facilities served by their own wells.

Since non-community systems were never intended to be part of the WUCC process, but smaller community systems were, OPM recommends the statutes be updated to limit public water system representation to community systems, without any size restriction. OPM also recommends that, as proposed in 2006, municipalities be included as WUCC members, even if they do not own a public water system. Finally, the state has been encouraging towns to join local health districts and, given their strong local public health role, OPM recommends they also be members of WUCCs.

The WUCC process, which was originally designed for Washington's system of strong county government, does not provide adequate public representation in Connecticut. That demonstrates one of the difficulties of translating the details of other state's procedures into Connecticut's water planning process. It might be more beneficial to consider how other states establish water planning processes. Two states, Maine and Oregon, have recently begun comprehensive water resources planning efforts and might be good role models for Connecticut.

Maine: a new water planning process

In 2007, Maine enacted An Act Concerning the Sustainable Use of and Planning for Water Resources. The new legislation creates a Water Resources Planning Committee (WRPC) which, at a minimum, must include six representatives of state agencies, five members representing various water users and a member with expertise in the environment and conservation. The WRPC is to focus its research and planning efforts on watersheds already stressed by water demands, but it is also directed to continue compiling and analyzing water use information for the entire state. The new act also establishes a three phase planning process for the WRPC and, in the first phase, the WRPC is to focus on:

- (a) collecting and reviewing information regarding water withdrawal activities;*
- (b) Coordinating state water resources information; and*
- (c) Identifying watersheds at risk by refining the watersheds-at-risk analysis previously performed by the Maine Geological Survey, including:*
 - (i) Conducting appropriate water resource investigations in watersheds at risk;*
 - (ii) Considering projected increased water use by population, agricultural irrigation, commercial users, industrial users and other users in refining the watersheds-at-risk analysis;*
 - (iii) Considering seasonal use in refining the watersheds-at-risk analysis;*
 - (iv) Considering potential effects of climate change when refining the watersheds-at-risk analysis;*
 - (v) Considering the effects of anticipated future water quality classification changes on the availability of water for withdrawal when refining the watersheds-at-risk analysis;*
 - (vi) In establishing priorities for such investigations, seeking input from the user community, from towns dealing with multimunicipal aquifers and from towns with significant local aquifers; and*
 - (vii) Developing guidelines for consistency in investigations*

In the second phase of Maine's new water planning process, the WRPC is directed to "focus on convening planning groups in watersheds at risk or regions encompassing multiple watersheds at risk to develop water use management plans for water withdrawals." Based on the varied needs of individual watersheds and regions, planning groups are to include participants representing a several state agencies and members of the public representing a number of water-related interests.

The third phase is intended for those situations in which water use management plans developed in the second phase are unable to correct the over-allocation of a watershed's or region's water resources. In those situations, the WRPC is directed to "recommend a process to resolve issues." In addition to the three-phase planning process, the WRPC also must provide guidance to municipalities and develop water resources educational materials. Furthermore, it must perform an annual review of state policy regarding:

- (1) Conservation of water resources;*
- (2) The development of regional sources and solutions to water use issues;*
- (3) Incentives for stewardship of water resources; and*
- (4) Impacts of surface water quality improvements on water withdrawal opportunities.*

Oregon: a role model for how to begin a water planning process?

Oregon has recently started a very open and public water resources planning process. Noting that it is one of only two western states without a long-term water supply plan, Oregon's comprehensive water supply planning effort began with five public forums held during late 2008. Those forums were held across the state and were intended to identify issues and goals for the near-term, mid-term and long-term management of the state's water. Although Connecticut and Oregon have very different water laws and

don't share all of the same water concerns, the open education and input-seeking process might be a good strategy for Connecticut to undertake. Oregon's public forums were to include regional and state-wide water issues such as:

- *Climate change impacts on water resources, water demands and management*
- *Water storage, both surface water and groundwater, as well as opportunities for enhancing natural storage (restoration of wetlands and floodplains)*
- *Market-based mechanisms for meeting future needs (e.g. voluntary transfers, reallocation)*
- *Environmental and instream flows*
- *Water reuse and conservation*
- *Protection and restoration of water quality and aquatic/riparian ecosystems*
- *Exempt groundwater wells*
- *How Federal agencies impact water management in Oregon*

The forums were also intended to gain a better perspective on local concerns, such as, but not limited to :

- *Meeting water quality requirements*
- *Restoration of environmental flows and instream water rights*
- *Water and energy linkages*
- *Collection, conveyance, and distribution infrastructure*
- *Economics of water management*
- *Aquifer depletion/limited groundwater supplies*
- *Future water needs (agricultural, municipal, domestic, industrial, tribal, environmental, etc)*

The forums included presentations by a wide range of experts and facilitated discussions. The goal of the forums was three-fold:

- *Foster a network of citizens engaged in realizing a sustainable water vision for Oregon*
- *A white paper synthesizing the results of the roundtable discussions that would be of assistance to the Oregon Water Resources Commission in its development of a strategic water plan for Oregon*
- *Presentations to the Oregon Water Resources Commission and subsequently to the Oregon Legislature in 2009 and to other interested parties regarding what was learned through the roundtables relative to adaptive, integrative and sustainable water management*

Massachusetts

Unlike Connecticut, Massachusetts has not split its major water supply programs between an environmental and a health agency. Although many point to Massachusetts as a model for how Connecticut could combine the drinking water activities of the DEP and DPH in one agency, DEP's Commissioner came from Massachusetts and has said Massachusetts faces many of the same issues.

The Massachusetts Department of Environmental Protection (Mass DEP), like Connecticut's DEP, has many environmental responsibilities related to water resources. It also regulates new source approvals, water supply treatment and distribution, and water quality monitoring, like Connecticut's DPH. The Mass DEP, however, must coordinate other aspects of water resources with the state's Water Resources Commission (Mass WRC) and the Massachusetts Department of Conservation and Recreation (Mass DCR).

It is the Mass WRC that has primary responsibility for developing, coordinating and overseeing the state's water planning and policies. In particular, the Mass WRC is responsible for new water resource policies, the state's Interbasin Transfer Act, which addresses transfers of water or wastewater between the state's 28 river basins, and for prioritizing projects for funding under U.S. Army Corps of Engineers programs. The Mass DCR's provides staff support for WRC activities.

The Mass DCR administers a lakes and ponds program similar to Connecticut's DEP, and it also serves as the coordinating office for the National Flood Insurance Program. The Mass DCR also regulates well drilling and oversees the state's well driller registration program; activities that are overseen in Connecticut by the Department of Consumer Protection. Unlike any Connecticut agency, Mass DCR also has direct management responsibility over certain water supply watersheds.

Policy and planning efforts in Massachusetts go beyond those in Connecticut in part because of the previously mentioned Massachusetts Interbasin Transfer Act (ITA), which has been in effect since 1984. Originally known as "An Act to Protect the Connecticut River," it now applies to the transfer of water or wastewater between river basins within the Commonwealth. There are exceptions, however, and transfers of less than one million gallons per day may be granted a more streamlined review. Having a number of roles beyond Connecticut's WPC, Mass WRC requires substantial technical support, which is provided by Mass DCR. In particular, Mass DCR assists in conducting research, developing policy, reviewing ITA applications and maintaining administrative records.

One aspect of Massachusetts' water planning is the subject of much controversy. The state has issued policy and guidance documents regarding the state's Water Management Act, imposing strict conservation standards. The Massachusetts Waterworks Association and others consider some of the requirements to be unattainable. They claim that the underlying science is flawed and that the requirements impose an unfair economic burden. At the same time, some environmental organizations consider the policy inadequate to protect some stressed stream basins.

Attempting to evaluate the controversy, the Massachusetts legislature established a blue ribbon panel to evaluate the policy. At the end of the allotted time, the panel reported back that, "... the process failed to achieve a consensus regarding the effectiveness of the Mass DEP guidance policy or bridge the gap between the parties' perspectives." Following negotiation, the panel reported agreement on the following points:

- *that withdrawals could exacerbate low flow conditions in some circumstances,*
- *that the riverine environment and the water suppliers benefit in the long run by reducing and eliminating non-essential use of water during low flow periods,*
- *that better communication and participatory involvement in guidance policy and rule-making could forestall future discord;*
- *that additional resources are vital to educating the public about the impact of its water use on streams,*
- *that there will be a cost in time and money to the suppliers, which cost can be subsidized by the state, to implementing the correct BMP's to optimize the performance of the water systems*

However, the panel also reported that it was unable to reach agreement on the following points:

- *the appropriate residential per capita per day limits and the connection to stream stress status*
- *the length of time given to suppliers to meet standards*
- *enforcement forbearance by Mass DEP*

The panel's report said there had been progress even regarding the points of disagreement, but there were deep-seated differences and the panel's deadline did not allow the time necessary for further negotiation. Massachusetts' experience highlights some of the hurdles Connecticut will also face in water resources planning.

The first point of disagreement highlighted in the panel's report actually points out two issues that should guide Connecticut's own planning efforts:

- 1) Residential daily water use limits are an inherently controversial issue, although they are an important component of a drought response plan. OPM, however, believes that any water planning effort that relies on such a strategy for long-term conservation is not currently achievable in Connecticut.

Instead, the use of conservation rates, which are discussed further in Task 6, might be a more palatable and effective method for reducing the demand on water resources.

Mass DEP's guidance does mention conservation rates as one of the available options for water systems unable to achieve the specified water use reductions, but OPM believes that Connecticut should instead use pricing as a central part of the state's water resources management. Mass DEP's guidance also mentions other conservation strategies and such strategies, which are discussed in Task 6, can have a significant effect on water demand, especially at the times when streams and ground water are most significantly depleted.

- 2) The issue of stream stress is the second aspect of disagreement in the panel's report and that is especially relevant to Connecticut at this time. Since one point of contention was that some view Massachusetts' criteria for identifying stressed stream basins to be flawed, it seems critical to establish criteria through a rigorous public process. OPM believes that the DEP's ongoing stream flow regulation development process can help limit such controversy here and allow for an easier resolution of conflicts among different water uses.

The Massachusetts Waterworks Association issued a white paper in response to the Mass DEP policy and guidance and it identified the blue ribbon panel evaluate the following:

- *all stresses on watersheds and stream flows*
- *methods to restore stream flows including stormwater restoration*
- *impacts of water withdrawal limitations on municipal finances*
- *impacts of water withdrawal limitations on health and water quality*
- *impacts of seasonal water limitations on seasonal and tourist communities*
- *impacts of water withdrawal limitations on the economic prosperity and growth rates*

The Association also sought for the blue ribbon panel to recommend "appropriate regulatory, legislative, funding and budgetary solutions." Given the extent of disagreement, it is important to recognize that one point that was agreed upon was that "better communication and participatory involvement in guidance policy and rule-making could forestall future discord." OPM recommends that Connecticut's water resources planning effort emphasize these aspects.

Rhode Island

Rhode Island has a very advanced water planning structure dating back to the drought years of the 1960s. At face value, given the state's proximity and many similarities to Connecticut, it might appear to be a good example of water resources planning for Connecticut to emulate. However, Rhode Island has taken a very different approach to water resources since it and Connecticut each confronted drought and rapid growth in the mid 1960s. Rhode Island created what would become its Water Resources Board (RI-WRB) in 1964 and, in 1970, created Water Resources Board Corporate (Board Corporate). Those entities have broad authority in the planning, management and development of the state's public water supplies.

Not only does the RI WRB have a longer history and broader representation than any such entity in Connecticut, but there is no Connecticut equivalent to the Board Corporate. The Board Corporate is a quasi-public corporation, authorized to issue revenue bonds, and can establish new public water supply facilities, including wells, well fields, reservoirs and transmission or distribution systems. Furthermore, it is authorized to lease such facilities and sell water. The Board Corporate has the power to issue revenue bonds for the purpose of carrying out the mission of the Water Resources Board.

The RI WRB and Board Corporate work with agencies including the state's Department of Environmental Management, Department of Health and the state's Public Utilities Commission, but are independent of those agencies, except that two agency representatives are among the thirteen voting members of the Board. The RI WRB's notes that its "primary responsibility is to ensure that sufficient water supply is available for present and future generations, apportioning available water to all areas of the state, if necessary."

The RI WRB's online statement of goals and strategies details a number of projects that are currently underway or, depending on the availability of funding, are expected to be within five years. Those projects include:

- *Supplemental water supply investigations in two areas*
- *Integration of water supply plans with municipal comprehensive planning*
- *Water treatment facility upgrades*
- *Statewide emergency interconnection program*
- *Assess potential benefits of the voluntary consolidation/regionalization of local water systems*
- *Long range water allocation planning*
- *RI Water Information Network*
- *Road/bridge replacement or upgrade in a water management area*
- *Small systems assistance*
- *Citizens Advisory Group*
- *Water education program*

The scope of the RI WRB's activities exceeds that of Connecticut's WPC, but Rhode Island is apparently rethinking its water resources planning structure. RI WRB's staffing has been cut and there appears to be an effort to move the RI WRB into the state's Department of Environmental Management. Although the RI WRB and Connecticut WPC share many goals, the RI WRB, with its hands-on role, has had more ability to fund and implement its plans. Consequently, it is difficult to compare Connecticut's and Rhode Island's water planning and allocation efforts directly. OPM intends to monitor the situation during the coming year to understand the implications for Connecticut.

Nevertheless, Rhode Island's "penny per hundred program" might be one model for generating funding for drinking water-related activities. Rhode Island has major suppliers set aside one cent per hundred gallons to fund land acquisition or water quality improvement. No less than 55% of that amount can be spent for land acquisition.

What to conclude from other states' experiences

Although there is much to be gained from considering the water planning programs of other states, OPM believes that their planning processes are more important to Connecticut than the solutions they have chosen. There are too many differences in laws, history and circumstances and it is important to avoid comparing apples to oranges. What is clear is that a strong and fair water resources management is dependent on both good information and an open planning process. OPM recommends that the WPC workgroup discussed in Task 3 address these issues after evaluating the state's existing water resources programs.

Task 5

Identify processes and funding needs for the evaluation of existing water diversion data and approaches to basin planning projects and coordinate water data collection from, and analysis among, the Department of Environmental Protection, the Department of Public Health, the Department of Public Utility Control, the Office of Policy and Management and the United States Geological Survey, and recommend supplemental data collection, as appropriate

As the state seeks to enhance its water resources management, it has to improve its processes to develop the basic information necessary for water planning. In particular, future planning will require improved mechanisms for evaluating water diversions and the water flow necessary to support stream habitats. Better information will be necessary to do it well. In 1930, recognizing that effective water planning required thorough knowledge of the state's water resources and their use, the State Water Commission recommended the following information be collected and kept up to date for all of Connecticut's rivers and streams:

- 1) Source, course, mouth, length, drainage area, topography, channel and profile
- 2) Conditions of rainfall and runoff
- 3) Extent stream is or might become used as domestic or industrial supply
- 4) Degree to which polluted and cause(s)
- 5) Extent of present or future flood risk and possible mitigation measures
- 6) Feasibility of water power
- 7) Navigation potential if not under Federal control
- 8) Non-navigation uses if under Federal control

Years of surveys, aerial photography, and satellite imagery, combined with the power of Geographic Information Systems (GIS), allow us to quickly identify the source, drainage area and other geographic information about the state's rivers and streams. Federal interest and funding during the intervening years have led to the collection of detailed information regarding pollution, flooding, hydropower and navigation. In 2008 as in 1930, however, not enough is known about "conditions of rainfall and runoff" and the "Extent stream is or might become used as domestic or industrial supply." Furthermore, we now understand the need for comparable information about the state's groundwater, given the better understanding of its connection with surface waters and because of the state's increased reliance on wells.

Diversion permitting information needs

DEP has statutory authority to oversee diversions of the state's waters. The state's existing process for regulating diversions is widely viewed as being too cumbersome, preventing the rational allocation of the state's water resources, and not adequately protecting the environment. A quick glance at the issues to be considered for new diversions shows the scope of review. In reviewing a diversion permit, DEP must consider a number of factors:

- The effect of the proposed diversion on related needs for public water supply including existing and projected uses, safe yield of reservoir systems and reservoir and groundwater development;
- The effect of the proposed diversion on existing and planned water uses in the area affected such as public water supplies, relative density of private wells, hydropower, flood management, water-based recreation, wetland habitats, waste assimilation and agriculture;

- Compatibility of the proposed diversion with the policies and programs of the State of Connecticut, as adopted or amended, dealing with long-range planning, management, allocation and use of the water resources of the state;
- The relationship of the proposed diversion to economic development and the creation of jobs;
- The effect of the proposed diversion on the existing water conditions, with due regard to watershed characterization, groundwater availability potential, evapotranspiration conditions and water quality;
- The effect, including thermal effect, on fish and wildlife as a result of flow reduction, alteration or augmentation caused by the proposed diversion;
- The effect of the proposed diversion on navigation;
- Whether the water to be diverted is necessary and to the extent that it is, whether such water can be derived from other alternatives including but not limited to conservation;
- Consistency of the proposed diversion with action taken by the Attorney General, pursuant to sections 3-126 and 3-127; and
- The interests of all municipalities which would be affected by the proposed diversion.
- In making a decision on an application, the Commissioner shall consider: 1) capital expenditures and other resource commitments made prior to July 1, 1982, in connection with a proposed diversion, but such expenditures or commitments shall not be binding in favor of such proposed diversion; and 2) proposed diversions recommended in any water supply plan developed pursuant to section 25-32d or coordinated water system plan prepared pursuant to section 25-33h in the same manner as proposed diversions not recommended in any such plan.

Solving the diversion dilemma

Although the diversion permit process does appear to encompass all factors that could conceivably relate to water allocation or environmental protection, relatively few diversions are subject to that process. Most, instead, were registered years ago and are outside of that permitting process. Registered diversions receive no comparable review and have no comparable reporting requirements, so the permitting process cannot yield the necessary results. A new system of diversion regulation will be a critical component of any successful water planning and allocation process, but the range of possible outcomes is intimidating to anyone involved in or affected by the existing process. In discussing registered diversions during a panel discussion at a 2005 conference, an executive of one of the state's largest water providers said,

You can't expect those with registrations to agree to some reformation without letting us know what's on the other side of the curtain. In a situation where one has piecemeal solutions, without knowing what's coming afterwards, it's very difficult to ask somebody to give up something, revise something and modernize something, without knowing what's going to take its place.

The Connecticut Water Law Conference, Fish & Faucet: Ensuring a Healthy Future

That comment shows the concerns of those who have registered diversions, but also reflects the comparable concerns of regulators, planners, environmental organizations and others. Each desires an improved planning and allocation process, but is wary of surrendering what the existing process provides them without knowing what new process might be on the other side of the curtain. Given that very reasonable concern, it is imperative that changes to the diversion process be orderly and transparent, rather than relying on quick fixes.

The inadequacy of the state's existing allocating system is very visible in the Quinnipiac River basin. The Quinnipiac River watershed, as of the time of the Diversion 2000 report, had 91 registered diversions, authorized for a total of 92.8 million gallons per day (mgd), as compared to the 27.5 mgd total of 12 permitted diversions. Water supply diversions accounted for 44% of the diversions and 66.7% of the authorized volume. Agriculture accounted for 16.3% of the authorized volume, while industrial use accounted for 15.4%, and recreational use, primarily for golf course irrigation, accounted for 1.6%.

The DEP has pointed out that, even though the registered or permitted diversions in the Quinnipiac River watershed are not fully used, more water is diverted than the system can support. The effects of the diversions are seen in the Quinnipiac's tributaries, where authorized withdrawals exceed baseflow in 3 of 7 major tributaries and approach baseflow in three others. Inspections during dry periods found some streams were reduced to pools of standing water or were completely dry. Streams not known to be subject to diversions maintain populations of trout and other cold water species, while streams with diversions can only support such species during years of above-average precipitation.

Although many of the Quinnipiac River's tributaries are over-allocated, DEP noted that flow in the lower river appears to be increasing, perhaps due to discharges from municipal sewage treatment plants. Although water stayed within the same river basin and, in fact, base flow in the lower section of the river might have increased because of the upland diversions, diverted water was bypassing upland streams. This highlights the fact that downstream flow measurements cannot adequately describe what is occurring throughout a river basin.

Given that most of the Quinnipiac's diversions are registered, but not permitted, they are not subject to the current diversion permitting process and their environmental impact will have to be addressed by new minimum stream flow regulations. Further regulation of registered diversions might have to wait until the development of an improved water planning and allocation process has proceeded far enough that everyone can see what is on the other side of the curtain.

In its 2003 report to the Water Planning Council (WPC), the WPC's Advisory Group (WPCAG) recommended the creation of a new water allocation system. The WPCAG believed it required a new water management agency structure that could immediately focus on developing a science-based allocation mechanism, ensuring that the needed data are available for consistent local, regional and state planning, and ensuring adequate funding for its activities. OPM does not agree that reorganization of the current agency structure is warranted at this time, but the remainder of this recommendation remains as valid today as it was in 2003. Funding issues will be discussed in Task 7, but it is clear that Connecticut needs a better allocation system, which can only be implemented with better data.

State-wide basin screening

Some of the first steps to achieving the WPCAG's recommendations have already been taken. The WPC's Water Allocation Policy Planning Model (WAPPM) notes the need for a mechanism to evaluate water resources of the state's stream basins. In 2006, Special Act 06-9, An Act Concerning Water Basins, subsequently directed the Connecticut Institute of Water Resources (CIWR) to study three basins to advance water allocation policy and planning modeling efforts in the state. CIWR contracted with the University of Connecticut's Center for Land Use Education and Research (CLEAR) to develop a geospatial database to support water planning at the basin level. The initial tasks are to acquire, organize and assess the numerous datasets to generate summary statistics for watersheds. The results of this project should provide useful insight moving forward relative to the quality and quantity of data available such that OPM may gain an understanding of any gaps that may exist, as well as whether this database will be suitable as a possible centralized repository for state.

The ultimate goal is to be able to evaluate where water availability is inadequate for current and future demands and how the allocation of water in one basin influences the availability of water for allocation in other basins. Lacking such information, the state's current allocation process is inefficient and requires

excessive efforts by applicants for diversion permits and by regulators reviewing them on a site-by-site basis. Even with that large investment of resources in the current process, too little is known about cumulative effects.

While standardizing and strengthening the process of evaluating diversions for those submitting and reviewing applications, the basin screening tool also can make the water resources planning process more transparent for municipalities, residents and organizations. By focusing the work at the detailed level of subregional watersheds, furthermore, the tool allows for the analysis of water resources at different scales from subregional basins within municipalities to regional or statewide reviews.

Stream flow regulations

In addition to the benefits to be gained from completion of the watershed GIS database, DEP is developing new stream flow regulations which are another critical component of basin planning. Not only can those regulations provide more certainty to the basin planning and diversion permitting processes, but the ongoing regulation development process will provide information and perspective on all the related issues.

While the basin assessment and regulation development processes will greatly assist the basin planning process, the missing piece of the puzzle is the lack of adequate stream flow data. The WPC's Stream Gage Network Workgroup evaluated this issue in 2003, and recommended that Connecticut needs a scientifically defensible stream gaging network. However, a major impediment continues to be the cost of creating such a network. Funding issues are addressed in Task 7.

The United States Geological Survey has conducted a number of water resources investigations in Connecticut, dating back to the 1950s. That work focused on major river basins and, although the results are valuable for a number of other purposes, they have less value for water supply purposes in Connecticut than in other states. Connecticut does not allow water that receives wastewater discharges to be used for public water supply, so major rivers studied by the USGS cannot be considered for water supply purposes. That is the reason for the state's focus on upland streams and their associated groundwater. Instead of being able to focus on the availability of water in a few large rivers, Connecticut must consider hundreds of subregional basins.

The stream flow regulation development process currently underway will assist in identifying specific requirements for basin screening and of the necessary gaging network. As is described in Task 3 of this report, OPM recommends a workgroup be assigned by the WPC to perform an in-depth analysis of the state's water allocation process. The initial mission of that workgroup is to identify statutory, regulatory, procedural and other impediments to the work processes, but that review can lead seamlessly to the review of needed water allocation mechanisms. The review of current requirements and procedures proposed for 2009 can be followed by similar evaluation approaches to basin planning and requirements for gaging and other data collection.

Private water supplies

In addition to the public water supply issues currently being addressed, there are also increasing concerns about the possible effects of private wells or the availability of water in areas where private wells are intended. DPH estimates that there are 400,000 private wells in Connecticut and that more than 500,000 residents are served by those wells. Many are so dispersed that there is no feasible alternative water supply, but others are in more densely developed areas and could tap public supplies if there were a decline in water availability or quality. Private wells, therefore, might represent a large class of future demand on public water supplies if the quantity or quality of water available to them declines.

DCP receives a few thousand permit requests per year, although not all are for domestic use. In 1969, the General Assembly passed well drilling legislation that, among other things, required drillers to submit detailed reports for each well, including geological information. That apparently was a result of a

consultant's study the previous year that had highlighted the state's inadequate knowledge of the potential availability and quality of groundwater for water supply purposes. The consultant pointed out that registering well drillers and requiring reports to be submitted for each well would allow for the analysis of water yield and geologic information necessary in order to determine areas requiring further study.

Although the need for such information was one of the motivations behind the well drilling legislation, there has been too little use of the reports for that purpose and no systematic analysis. Without oversight of the submitted information, the quality of the submitted water yield and geologic information is suspect and a potentially valuable source of water resources information from tens of thousands of well locations has been lost.

Given the uncertainties of private water supply wells, Section 51 of Public Act 08-184 requires DPH, in consultation with DEP and DCP, to convene a working group to study and make legislative recommendations to ensure that new development to be served by a private well will have an adequate quantity and quality of water available to them. Although the focus will be on private water supplies, and not the public supplies addressed by much of Connecticut's water resources planning, the parallel efforts will need to address many of the same issues and information gaps. If it leads to the submission of better geologic information in well completion reports and a systematic review of that information, it will be a valuable addition to the state's planning efforts.

Task 6

Evaluate existing water conservation programs and make recommendations to enhance water conservation programs to promote a water conservation ethic and to provide for appropriate drought response and enforcement capabilities

Water Conservation and Drought Response: Two Different Issues

A water conservation program and a drought response program both have similar aims; to reduce water use, but they are two different issues. The Santa Barbara County (CA) Water Agency explains the difference as:

The goal of most water efficiency programs is to achieve lasting improvements in water use efficiency that do not negatively affect the quality of life of water users. On the other hand, the desired outcome of drought contingency efforts is to dramatically reduce water demands during a short-term crisis (usually caused by prolonged droughts or some other emergency) that may require drastic changes in habits for a short time.

Santa Barbara County Regional Water Shortage/Drought Management Plan, 2007, p 14

Water efficiency or conservation efforts can reduce the threat brought about by drought by reducing the long term demand for water but are not, by themselves, adequate responses to droughts or other water emergencies. Similarly, drought contingency efforts such as water use restrictions, do not, by themselves provide for long term water conservation.

In the aftermath of Connecticut's 1941 and mid-1960s droughts, engineers noted that the best time to gain acceptance of system improvements and conservation measures is immediately after a drought. Drought responses, however, deserve careful planning and careful consideration of their possible ramifications. Although politically expedient, system improvements and conservation measures implemented after or in the throes of a drought might be contrary to the long-term interests of the state and municipalities.

Conservation is widely viewed as beneficial, but not all system "improvements" are so viewed. An expanded water system, for instance, can have a major impact on aquatic habitat and recreational resources, so its approval requires a deliberative public process. Furthermore, municipal, regional and state planning efforts attempt to guide water system infrastructure development because of its role in the location and character of growth. Water system expansions have long-lasting ramifications and the urgency of a drought has been used elsewhere to gain acceptance of infrastructure fostering locally-undesired growth. Through the efforts of the WPC, Connecticut has sought to avoid the need for certain actions during a drought that might be regretted afterwards.

Model Municipal Water Use Restriction Ordinance

The Interagency Drought Workgroup established by the WPC created a new website (www.ct.gov/waterstatus) dedicated to tracking the water conditions in the state, promoting water conservation, and providing timely information to the public. Workgroup members regularly monitor conditions to assess trends in various drought indicator criteria set forth in the Connecticut Drought Preparedness and Response Plan. In October 2007, Governor Rell issued a Drought Advisory, based on the Workgroup's recommendation following several months of excessively dry conditions. Fortunately, after increased precipitation and lower demand, Governor Rell was able to lift the Drought Advisory in January 2008.

The WPC followed up on recent drought concerns by issuing a Model Municipal Water Use Restriction Ordinance in 2008. The Model Ordinance was sent to appropriate municipal officials and health district leaders and also is available on the state's water status website.

The Model Ordinance is intended to serve as a guide for municipalities wishing to develop an ordinance that will restrict the use of water supplied by a water company during emergencies and temporary periods of high demand. The model ordinance was developed in consultation with the WPC agencies and the WPCAG, therefore it includes input from a broad range of perspectives.

The Model Ordinance recommends that municipalities coordinate their activities when water systems cross municipal boundaries and that they ensure consistency among water companies when a municipality is served by more than one provider. The Model Ordinance also recommends that a memorandum of understanding be developed in advance among all such parties.

Although not specifically included in the Model Ordinance, municipalities and water companies are encouraged to educate residents in advance so they understand why water use restrictions might be necessary and are aware of the process and restrictions they might face. That initial outreach, plus continuing communication, will increase the effectiveness of water use restrictions when they are needed (WPCAG 2008).

A significant limitation of the Model Ordinance is that it does not provide restrictions for those using water from a source other than a water company. In its comments regarding a draft of the model ordinance, the WPCAG noted that the application of such an ordinance could be confusing in a municipality having numerous private wells. Private well users can have a significant impact on shared water resources, so municipalities should adapt their water use restriction ordinance to suit their local needs. There are many demands upon the state's water resources and the state should also plan for further drought response measures that may be necessary in the future.

Given the possible economic or public health impacts of a water use restriction, the state recommends that municipalities consider including exemption procedures in their ordinances that are designed to encourage the efficient use of water. San Diego, for instance, provides an exemption from water restrictions for those certified by its Guaranteed Water for Industry Program. That enables certain users which need a reliable supply to be exempt from restrictions if they implement best management practices for potable water use and use non-potable water to the extent possible. In San Diego, the non-potable water is reclaimed water, so participation is limited to those with access to the reclaimed water distribution system.

Although the Model Ordinance is an improvement over the current system, its implementation might be more effective if the current state-level drought alert authorizations are updated to allow for regional alerts. Past experience shows that drought conditions in one part of the state can be accompanied by ample water supply elsewhere. Alerts should be targeted to those parts of the state actually experiencing drought, so that alerts match what people observe and avoid creating an impression that a drought alert can be a false alarm. Since federal drought data are available at a county level, the Interagency Drought Workgroup will evaluate potential updates to the state's drought response plan that would allow for county-level alerts.

Water Conservation Measures

Water conservation measures, unlike drought response actions, seek a long term reduction of water use and include actions to limit the loss or waste of water or land management changes to accomplish the same. Water conservation has been identified as a national goal since the 1960s. According to 2008's federal HR 3957, however, public demand for water increased by 209 percent in the US during 1950 – 2000, a period the population increased by less than 90 percent. The resolution adds that, by 2013, 36 states anticipate local, regional or statewide water shortages.

HR 3957 identifies four elements to foster conservation. Those include conventional technological solutions, such as water storage and distribution improvements, but also techniques to use rainwater, stormwater, and greywater as resources, instead of conveying them away as wastes. The resolution also mentions the ability of watershed planning to improve water quality, conservation, and supply. Another non-technological approach is to address "behavioral, social, and economic barriers to achieving greater water use efficiency." Water conservation efforts already underway in Connecticut are consistent with the broad scope of HR 3957.

Water conservation encompasses a broad range of issues and can have a broad range of positive effects. In discussing drinking water supplies, the State Conservation and Development Policies Plan says:

Using existing water wisely, developing new sources, expanding appropriate interconnections between systems, increasing storage capacity, and conservation are all needed to ensure the efficient utilization of Connecticut's natural resources. Water conservation must be an integral part of water supply planning, as it is an important component of protecting against water shortages and of minimizing the social, environmental, and economic costs of developing new water supplies. Conservation will achieve savings in energy, treatment, and capital costs for water and wastewater facilities.

The WPC and state agencies have long recognized the need to enhance water conservation and they continue to address conservation issues. Some conservation issues have a narrow focus, such as the failed 2007 legislation which sought to require that all new lawn irrigation systems include rain detectors or an early WPC and WPCAG review of the potential benefit of an appliance labeling and rebate program. Addressing the peak demand for water during summer, a WPC subcommittee noted that a water-wise landscape program would be appropriate, as Connecticut is an intensively landscaped state.

Not only does land use influence the demand for water, it influences the supply. With the same broad view of conservation as is identified in HR 3957, the WPC has noted that:

Land use activities within aquifer recharge areas can adversely affect not only the quality of groundwater supplies but also the quantity of water available in an aquifer. Impervious surfaces can accelerate surface water runoff and decrease aquifer recharge. Adequate recharge of groundwater and proper management of surface water runoff to allow more infiltration will also result in increased summer water levels in rivers and wetlands. In some watersheds, increased recharge may offset the negative impacts associated with public water withdrawals by adding more water to the system. To ensure adequate recharge of ground water supplies, local planning and zoning commissions should consider the development of town regulations to require better practices that facilitate groundwater recharge. Such practices are promoted by groups such as the University of Connecticut's NEMO (the Non-point source Education for Municipal Officers) program.

Land use techniques to increase the availability of water are described in HR 3957 as:

Low impact: a strategy that manages rainfall at the source using uniformly distributed decentralized micro-scale controls to mimic a site's predevelopment hydrology by using design techniques that infiltrate, filter, store, evaporate, and detain runoff close to its source.

Soft path: a general framework that encompasses—(A) increased efficiency of water use; (B) integration of water supply, wastewater treatment, and stormwater management systems; and (C) protection, restoration, and effective use of the natural capacities of ecosystems to provide clean water.

The low impact and soft path approaches can be beneficial where appropriate because they can increase stream base flows and reduce the degradation of surface waters. However, their implementation must be selective and carefully managed to avoid degrading groundwater quality.

Conservation efforts are advancing in Connecticut, but some western states, with their more visible and long standing concerns for water, are good models for improvements. California's water conservation measures include implementation of the fourteen Best Management Practices (BMPs) of the California Urban Water Conservation Council (CUWCC). The CUWCC's BMPs range from residential water surveys and plumbing retrofits to variable rate metering and billing, combined with a number of educational or outreach programs. The CUWCC is also studying potential BMPs and may conduct demonstration projects for further evaluation. BMPs are cost-effective practices that are considered appropriate for all urban water suppliers at all times. Nearly 100 water agencies and environmental groups signed CUWCC's original memorandum of understanding (MOU) agreeing to implement the BMPs, and membership has grown to nearly 400.

Although additional measures are necessary for short-term drought response, implementation of BMPs results in more efficient water use. Among those mentioned by the Santa Barbara County Water Agency are rebates or other incentives to replace fixtures, landscaping changes, the prohibition of some water uses and water pricing strategies. There are numerous strategies for conserving water and the real measure of success is the reduced demand for water, not the number of fixtures replaced or the number of new prohibitions.

The Role of Pricing in Conservation

One conservation strategy with a long record of success is pricing. As noted in the 1927 annual report of Connecticut Society of Civil Engineers, the chief engineer of the Hartford Board of Water Commissioners said, "The installation of meters is the best curb for needless waste." He mentioned that Waterbury metered its system in 1919-1920 and per capita water consumption, which had been 138 gallons per day in 1919, was down to 82 gallons per day by 1926. He added that metering in Middletown in 1915 cut the city's water consumption rate in half. Even in 2009, however, some Connecticut water providers still do not meter and many send bills so infrequently that customers do not realize how much their use varies during the year.

Outdoor water use in summer can lead to a substantial increase in consumption, at the very time water supplies and aquatic habitats are most stressed. As the WPC noted in 2002:

Although summer demand is primarily for lawn irrigation, water storage and treatment facilities must be scaled up to meet this seasonal demand. As a result, the marginal cost of supplying water in the summer is often higher than for winter months since treatment costs are higher for the larger volumes of water required to meet summer demand. Water rates in Connecticut, however, average the costs of delivering water throughout the year and do not reflect the increased costs of supplying water when supplies are often at their seasonal low.

Seasonal conservation rates have been touted as a promising conservation measure, raising the price of water in summer to reflect the higher economic and environmental cost of providing it, but infrequent billing hides the relationship. A 1984 federal study, described in a recent Georgia water policy working paper (available at <http://www.aysps.gsu.edu/WP2005-002residentialwaterdeman.pdf>), found that water consumption by metered and unmetered households was similar in winter but that unmetered users' consumption increased more in summer, so the price signal appears to have a greater effect on the more discretionary use of water outdoors in summer.

Rate increases can encourage conservation, but a 2005 report of the Federal Reserve Bank of Boston's New England Public Policy Center mentions that a survey of a number of economic studies found that a 10% increase in water rates reduced industrial consumption by only 5-8% and residential consumption by only 2-4%. Changes in industrial and commercial consumption depend on the nature of the businesses, since some have much more limited ability to reduce consumption, especially if they have already implemented conservation measures. Although other studies found relatively small changes of residential water consumption with increasing price, a study in Delaware found conservation rates reduced

residential demand in summer by 8.2% with a 10% increase in price (report available at: <http://faculty.unlv.edu/wjsmith/smithtest/WEJ85.pdf>).

Conservation rates appear to have different effects on residential demand, depending on household income levels. People with higher incomes reduced their consumption much more than lower income users, perhaps reflecting that the larger water consumption by higher income people includes more discretionary uses, such as lawn watering. A solution could be to establish a level of water use considered necessary for essential needs and to only apply higher prices to the use above that amount.

A water company seeking to modify its rates is required to provide DPUC a plan for promoting water conservation by the company's customers, so conservation is already a part of the DPUC's process (Sec 16-19). DPUC, furthermore, already is expected to consider water conservation and prudent management of the natural environment, so conservation oriented rates conform to its mission (Sec 16-19e). The final consideration is for revenue-neutrality, in which a change in rate structure for the purpose of conservation should not decrease or increase a water company's earnings. Ensuring revenue-neutral rates requires detailed study for each provider because of the differences between each provider's customer base.

In addition to the other challenges of establishing conservation rates, the WPC noted in 2002 that the low frequency of meter reading and billing makes it difficult to document water consumption during a peak season. Delayed billing, furthermore, fails to provide customers with appropriate feedback at the time they can modify their use of water. Some water providers cannot readily change to more frequent meter reading and billing, either due to equipment or accounting issues or, for some municipal water companies, due to billing cycle restrictions. In 2002, the WPC recommended further study to determine how such surcharges would affect rates and whether it would also be beneficial to evaluate the costs of making such rates feasible throughout the state.

The WPC also noted the possible benefit of linking water bills to sewage treatment bills. Higher water consumption increases the disposal cost as well as the supply cost and the WPC pointed out that some communities in Connecticut use a customer's water consumption in winter as the basis for sewer use billing. Doing so negates the effect of outdoor water use in summer months, but many communities in other states bill for sewage relative to water consumption throughout the year. Sewer bills ordinarily exceed water bills, so allowing sewer costs to reflect increased water consumption in summer can further discourage outdoor water use in summer.

The use of conservation rates is a powerful demand management tool and would have to be implemented with care. Done correctly, higher prices during summer months can allow for the implementation of billing rates that reduce consumption without increasing water bills of low income customers and while remaining revenue-neutral for the water provider. Water conservation-oriented rates will only reduce long-term water demand with adequate and long-term outreach. Not only is it necessary to increase consumers' understanding of water conservation, outreach also can show consumers that they have a vested interest in conservation and encourage an environmental ethic (refer to report at <http://faculty.unlv.edu/wjsmith/smithtest/WEJ85.pdf>).

Conservation by Suppliers

Although there is much to be gained by demand side conservation, supply side conservation by regulated water utility providers can yield more direct and quantifiable results than those realized by the many consumer conservation measures. Among supply side measures is the establishment of limits for unaccounted-for water. Unaccounted-for water includes not only water that leaks from the system or is lost to unauthorized uses, but it also includes water used for any un-metered purpose, such as fire fighting or system maintenance.

Section 19-13-B102(s) of the state's Public Health Code requires suppliers to establish a program that can reduce the amount of unaccounted-for water, including the following elements: calibration of supply

and main line meters; calibration of consumer meters; pipeline flow measurements; leakage surveys; and inspection of bleeders. Nationally, thresholds for acceptable levels of unaccounted-for water can range up to the 20%, at which point Pennsylvania requires a water company to “be prepared to demonstrate by way of substantial evidence that their experience is both normal and reasonable.” Some states establish different unaccounted-for water standards for systems, based on the type or size of the system.

As noted in a 2007 Office of Legislative Review research report, conservation should be considered a priority and public water systems should be encouraged to adopt or enhance their policies for metering, water auditing and reduction of unaccounted-for water. The Water Planning Council's 2008 Report to the General Assembly indicated that it believed the DPH was able to satisfy the need to increase supply-side master and distribution system metering to allow for the recognition of unaccounted-for water. The WPC noted the advantages of strengthening that requirement, especially for providers seeking new sources of supply, since that is an issue that must be addressed in the diversion permitting process. In instances where water providers already have extra supply and treatment capacity, however, it can be difficult to encourage conservation.

Recommendation: Seasonal Conservation Pricing Pilot

There are many options for enhancing water conservation and, given that a number of the state's waters are highly stressed during the season of highest water consumption, seasonal conservation rates are a promising tool. Top down command and control methods, while appropriate in emergencies such as a severe drought or other water system failure, have little place in a long term strategy. Seasonal conservation rates, on the other hand, in tandem with a range of outreach efforts, offer the potential to gain the desired water savings without requiring additional local and state resources for monitoring and enforcement. Given that not all areas currently face serious seasonal shortages, OPM recommends the state support the establishment of seasonal conservation pricing pilot programs by providers facing water stresses or those obtaining water from stressed watersheds.

Task 7

Identify funding requirements and mechanisms for ongoing efforts in water resources planning in the state

The Water Planning Council has developed a Memorandum of Understanding (MOU) for the purpose of specifying the fiscal and administrative responsibilities of each member agency in support of the Council's mission, including the retention of an Administrative Manager. To date, the Water Planning Council has retained two staff people to support its operations and to work to coordinate issues of an interagency nature.

Defer new funding needs

As the Water Planning Council (WPC)'s Water Allocation Subcommittee reported in 2002:

Any serious attempt at rational and effective water allocation is doomed to failure without adequate and stable funding and staffing ... the ultimate social and environmental costs of the lack of an integrated, rational water allocation and protection process may be far greater than the costs of implementing one.

Given the current financial situation, now is a difficult time to seek new funding mechanisms to augment the state's water planning initiatives. Similar situations in the past have brought earlier water planning efforts to a halt and that needs to be avoided. Instead, 2009 will be a time to identify the next steps of the water resources planning process. Those cannot be known until some ongoing activities are completed. The DEP's stream flow regulation development process, in particular, will provide a lot of information regarding the issues to be addressed in the next stage of water resources planning, including requirements for data collection. That will be the time to determine specific funding requirements

As discussed in Task 3, OPM believes the best course for the immediate future is to establish a workgroup through the WPC that will begin by evaluating agency planning and regulation processes. That will prepare the group for addressing the impending stream flow regulations and their impact on future planning efforts. At that point, it will be possible to better evaluate funding requirements of the planning process, appropriate funding mechanisms and any cost saving opportunities.

In seeking future funding, it will be critical to demonstrate that new activities are necessary, that the proposed funding source is adequate for the purpose, and that such funds will be used as proposed. Commenting at a 2005 WPC meeting about a proposal to fund watershed land acquisition with a water bill surcharge, an industry representative said her constituents were concerned that such a fund could be raided in the future for other purposes. She also said the amount of money generated by the tax would have been inadequate for the stated purpose and added that the WPC strategic plan had not identified that as a priority issue. An open planning process can lay the groundwork necessary to create a strong proposal and to gain needed funding.

Potential sources for future funding

There are many potential funding mechanisms. Although it did not make specific recommendations or endorse any specific mechanisms, the WPC's Water Allocation Subcommittee's 2002 report lists a number of possible funding mechanisms. The subcommittee's list is reproduced below to illustrate the breadth of options:

- *Ad valorem* taxation (based on property valuation)
- Bottled water deposit

- Recreation fee; e.g., boating, fishing, or other enjoyment use fees assessed through current registration or licensing processes.
- Individual sewer use fee; flat fee assessed to POTW or other community sewer users.
- Individual septic pump-out fee; flat fee assessed to private septic owners upon pump-out and disposal.
- Wastewater discharge fee; assessed to regulated (permitted) discharges.
 - Permit application fee
 - Annual fee (Flat)
 - Annual fee (Quantity-based)
- Public water use fee; flat fee assessed to community water system users.
- Private well user fee; flat fee assessed to individual domestic well owners at time of drilling.
- Water diversion/discharge permit application fees
- Water diversion fees; assessed to regulated diversions
 - Permit application fee
 - Annual fee (Registrations, Permits)
 - Annual fee (Flat)
 - Annual fee (Permitted/Registered quantity based)
- Enforcement
 - Fines and Supplemental Environmental Projects (SEPs)
- Clean Water Fund
- Safe Drinking Water Act
 - State Revolving Loan Fund
- Automatic lawn irrigation system fee
- Conservation fees
- Excess use fees
- Peak user fees

Florida authorizes *ad valorem* taxation, with its Water Management Districts and their subsidiary Basin Board is authorized to impose assessments of up to 1 mill in their areas. Water Management Districts are regional entities in Florida with taxing authority, so that a funding scheme cannot be directly transferred to Connecticut, which lacks such an entity. As discussed in Task 4, each state's water issues, laws and government structure differ too greatly to allow for simple comparisons, but *ad valorem* taxation does offer the possibility of a broadly-based revenue structure. An additional advantage is that it would reach those who do not use public water supplies but still rely on the state's water resources efforts.

The WPC previously attempted to better fund the diversion permit process with 2004's HB 5237, An Act Implementing Recommendations of the Water Planning Council Regarding the Connecticut Water Diversion Policy Act. That would have required an annual fee of \$1,000 to \$10,000 for each registered diversion. The bill failed, in part, due to the lack of explanation regarding how the resulting funds would be used.

Current fees for the review of diversion permits range from \$1,800 for a diversion of up to 500,000 gallons per day (gpd) to \$6,000 for a diversion of 2,000,000 gpd. Given the duration of the permits and magnitude of review some require, the current permitting fees are inadequate and do not allow for broader water resources planning, of which diversions are a critical component. OPM, therefore, recommends that diversion permit fees be increased or restructured to contribute a more appropriate share to water resources planning.

OPM believes annual fees as proposed in 2004 are not unreasonable for many diversions, given the value of water diverted and the consequences for other users and the environment. Gathering broad-based support for such fees, however, will require detailed planning to demonstrate the necessity of whatever fees are collected and how they will contribute to the state's planning and allocation efforts. Given that more than 1,800 diversions are registered, the fees proposed in HB 5237 could have yielded \$2 million or more annually.

Another potential funding mechanism could be comparable to Rhode Island's "penny per hundred program." That program requires major suppliers to set aside one cent per hundred gallons delivered for funding land acquisition or water quality improvement projects. Rhode Island long ago established a strong water planning effort and, given its different pattern of land use and water supply management, its resources are best dedicated to such purposes. Connecticut, on the other hand, might use a similar funding strategy to contribute to its own priority water planning needs.

Conclusion

Connecticut, through the Water Planning Council (WPC), has the basic state-level structure necessary for comprehensive water resources planning. While that structure requires the coordination of myriad public, private and regulated stakeholders, OPM believes that current efforts underway, as well as new actions recommended in this report, will continue to improve the manner in which the state's water resources are managed and yield positive results in the coming years.

Connecticut is not alone in its water planning effort. A session of the American Water Resources Association's 2008 meeting described the range of states' efforts:

Across the United States, our state governments are in different evolutionary stages when it comes to formal state-wide water planning. While some have not yet begun, other states are in their fourth or fifth decade of planning. The impetus behind water supply planning is likewise varied, with states responding to growing pressures, including: legislative mandates, Endangered Species Act (ESA) listings, drought, climate change conditions, and projected population growth. Our changing times are reflected in the process of creating these plans, with ever-increasing emphasis on public participation and integrated water management concepts. Some results are quite prescriptive, while others provide more general guidance.

According to a participant, the session included a "Top Ten List for Future State Water Planners":

- 1) *Start by Developing a Vision. A product that is cost-effective and that resonates with policy-makers is one in which participants brainstorm what they want the landscape to look like in 20 or 50 years, putting recommendations up front and identifying benchmarks that help get there. By comparison, plans often start with data collection and a gap analysis, which is resource intensive and controversial.*
- 2) *Develop a Political Plan. This is the piece that will make a technically good plan into a politically acceptable plan. It includes the development of an overall game plan and identifies up front which issues may be deal makers versus deal killers.*
- 3) *Build a Solid Foundation on Water Law. Planners must convey how they plan to allocate any "new" water (i.e., have water laws in place and well understood). Certainty helps build and maintain support during the planning process.*
- 4) *Establish Funding Sources. Planning is not a one-time effort. On-going funding is a key ingredient to ensure buy-in, participation, quality, and implementation of each plan. Find a dedicated funding source, but also leverage additional funding. Integrated planning that includes quality and quantity, water and land, etc., helps leverage additional funds from the federal government, foundations, etc.*
- 5) *Employ an Open, Transparent Process. Give stakeholders plenty of opportunities to suggest goals, methodologies, data sources, and content. Post documents on-line so they are easy to access. Establish Advisory, Stakeholder, and/or Technical Groups that will ensure a wide range of perspectives and expertise.*
- 6) *Turn Challenges into Opportunities. Challenges such as droughts, floods, climate change conditions, population growth, or other water-related events provide opportunities to establish or strengthen a water plan. Water challenges can provide needed insights and political support to improve plans and their implementation.*
- 7) *Collaborate across Political Boundaries. Planning is an inherently political process and must account for the fact that multiple counties, states, and even countries depend on water from the same river basins, watersheds, and aquifers.*

- 8) *Use Regional Partnerships to Create Local Solutions.* In states with limited financial resources, supporting a series of disconnected local projects is no longer practical. Foster region-wide or basin-wide partnerships that will account not just for water quantity, but also water quality, ecological needs, land-use planning, and other factors.
- 9) *Standardize Data Sets and Methodologies.* Robust, state-wide forecasting tools, water budgets, and program evaluations require access to data sets that are developed with standardized methodologies. Use incentives to encourage the adoption and sharing of these methodologies.
- 10) *Strive for Consistency (and Flexibility)!* Provide a sense of continuity by building upon the work begun in previous plans and studies. At the same time, those with a background in planning recognize that times change, leaders change, and so does climate. Address important issues of the day to keep your plan relevant. As much as anything, this process is about managing “change,” not just managing “water.”

OPM recognizes the complexity of the tasks before the Water Planning Council, and will work with its member agencies to ensure that the next revision of the State Plan of Conservation and Development (C&D Plan) provides an effective means to coordinate and implement their actions in a consistent manner. OPM will also make every effort during the public outreach phase of the next State C&D Plan revision process to seek input from all potential stakeholders on the types of water resources guidance that would be useful to municipalities and regional planning organizations when they update their plans of conservation and development.

As indicated previously in this report, OPM anticipates progress in various ongoing efforts, such as DEP's minimum stream flow regulations, in 2009. OPM recommends that the state's water resources planning efforts focus on issues that can be addressed in the near term without additional financial resources. OPM believes that the recommendations in this report build upon past and ongoing efforts, and will result in a stronger water resources planning foundation to better address future needs.

In summary, OPM recommends the following:

- 1) The WPC should evaluate and address the state's existing authority to develop and implement the Water Allocation Policy Planning Model (WAPPM). That should include an assessment of the legal framework for water resources management and the identification of possible changes, such as adjustments to existing authorizations and, as needed, modification of agency functions and organization. OPM does not believe reorganization of the existing agency structure is warranted at this time. (Reference: Task 1)
- 2) The DEP should strengthen the requirements for registered diversions to foster an effective planning process. In particular, there should be standard methods for measuring and reporting flow from registered diversions and regular fees. DEP current efforts to develop stream flow regulation should shed light on registration issues and help set the direction for future efforts regarding such diversions. (Reference: Tasks 1)
- 3) The WPC should re-evaluate the issues raised and recommendations made by its past committees dating back to 2002. This effort should help to make the WPC's annual report more robust and informative. (Reference: Task 1)
- 4) The WPC should create a new workgroup to identify statutory, regulatory, procedural and other impediments to comprehensive water resources planning. The workgroup should begin by evaluating inter-agency coordination of water resources activities, as well as the state's restriction against releasing water supply information necessary for public water resources planning. Due to the potential security ramifications, OPM recommends that the workgroup collaborate with the Departments of Public Works

and the Emergency Management and Homeland Security to find a solution that can withhold information that should be protected, while making other information available. (Reference: Task 3)

5) The General Assembly's Public Health Committee should consider updates to Sec. 25-33f (b) of the Connecticut General Statutes to enhance public representation in WUCCs by including: 1) that the chief elected official or designee of each municipality in a WUCC's area is a member; 2) that a representative of each Local Health District in the WUCC's area is a member; and 3) that representation of public water systems be limited to community water systems, as it had been prior to an expansion in the federal definition of a public water system. (Reference: Task 4)

6) The WPC should identify and select one or more potential candidate water utilities for the development of a seasonal conservation pricing pilot program. Factors for consideration in the selection of potential candidates might include whether: 1) the utility has the necessary metering and billing infrastructure already in place; 2) the utility has stressed source water supplies or obtains water from stressed watersheds; and 3) the utility is large enough to provide statistically significant results. Water allocation will be greatly simplified if the state can reduce demand for water through conservation strategies, such as seasonal pricing. One potential use of additional moneys generated by seasonal conservation pricing would be to support the rehabilitation of aging water system infrastructure. (Reference: Task 6)

7) Defer new funding needs for water resource planning until minimum stream flow regulations are completed. Both the regulations themselves and the process of developing them will help identify the additional water data that are needed for effective water resources planning. (Reference: Task 7)

In addition to these seven recommendations, Connecticut must eventually address the lack of adequate data for basin planning. That will require a dedicated new funding source. After the efforts described in Recommendations 2 and 7 better define stream flow and diversion data requirements, OPM recommends that diversion fees be increased or restructured to contribute a more appropriate share to water resources planning.

OPM believes annual fees as proposed in 2004 are not unreasonable for many diversions, given the value of water diverted and their consequences for other users and the environment. Gathering broad-based support for such fees, however, will require detailed planning to demonstrate the necessity of whatever fees are collected and how they will contribute to the state's planning and allocation efforts.

Without adequate water resources data, the state's allocation process is inefficient and requires too much effort by applicants for diversion permits and by regulators reviewing them on a site-by-site basis. Even with the large commitment of time and money to the current process, too little is known about the cumulative effects of the state's water allocation. Adequately funding the state's water resources planning, including statewide basin screening, will allow the state and its municipalities to plan for current and future needs.

One other issue that the state's water planning effort must consider is the use of private wells. Private wells supply a significant portion of the state's population and are especially important to rural communities. However, too little is known about the availability of local availability of water and the impacts of new wells. Section 51 of Public Act 08-184 requires DPH, in consultation with DEP and DCP, to convene a working group to study and make legislative recommendations to ensure that new development to be served by a private well will have an adequate quantity and quality of water available to them.

Although that working group is to address private water supplies, and not the public supplies that have been the focus of much of Connecticut's water resources planning, the parallel efforts face many similar issues and data gaps. If the private well effort can lead to the submission of better geologic and yield data for new wells and a systematic evaluation of that information, it will be a valuable addition to the state's planning efforts.