Senate Committee on Environment and Agriculture
and
Senate Committee on Government Oversight

WATER FOR TOMORROW:

FROM PLANNING TO IMPLEMENTATION

Findings and Recommendations from the
Joint Hearings on Water Related Issues

June 6, 2007

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To the Honorable Members of the Senate

Report of the Committees on Government Oversight and Environment and Agriculture

Regarding Water Supply, Distribution and Infrastructure Issues

Dear Colleagues:

The Senate Committees on Government Oversight and Environment and Agriculture are pleased to submit this report to the Senate. We were privileged to undertake a broad assessment of Rhode Island's water supply issues and the distribution and infrastructure challenges associated with those supplies. The series of six oversight hearings were extremely informative and provided Committee members with a depth of knowledge and understanding of water related issues facing the state prospectively. The record of these hearings is summarized in this report and provides the basis for recommended legislative actions for this session.

There is not a water supply crisis today—overall Rhode Island is in adequate shape—however, serious problems could easily develop in the future unless new approaches to water resource protection, water supply, and water use are put in place. Throughout the hearing process, witnesses strongly urged that action be taken now in order to avoid crisis in the near future. While the needed changes are significant, they are not radical. Making those changes will help secure Rhode Island's future as a good place to live and to make economic development investments.

Through the hearings, a number of challenges were identified that could influence the availability and safety of the drinking water supply for the future. These include:

- Development continues to take place in areas without substantial water supplies and storage capacity, which places greater demands on existing manufacturing-era systems, especially the Providence Water Supply Board system. There is little coordination of water supply availability and development planning.

- Summer residential outdoor water use adds to demand when rainfall is less; this places stress on water supply systems and diminishes system reliability.

- The number of water supplies is fewer today than just a decade ago. The Scituate Reservoir is now the primary supply for more than 60% of the state's population. From a systems perspective this increases risk.

- The storage capacity of the Scituate reservoir is being used to meet routine demand; average daily demand during the summer months is now, routinely, substantially above safe daily yield.

- The infrastructure inherited from the manufacturing-era is aging.

- Commitments to eco-system protection have increased. Levels of pollution and resource use that were accepted during the state's manufacturing era are no longer acceptable. Economic development and environmental protection are now more complementary than conflicting.

These challenges can be addressed with strategic investments, coordinated and efficient regulatory functions and responsible water use. The desired outcomes are straightforward, to:

1. Provide adequate water supplies to meet Rhode Island needs, including reasonable seasonal use.

2. Secure system reliability by establishing back-up and supplemental supplies and increasing storage reserves.

3. Protect environmental functioning, ground water system replenishment, stream flows and wetlands adequate to support diverse aquatic life.

In sum, the time has come to move from planning and analysis to implementation. This report provides the analysis in support of the above goals and they are expanded upon further. The recommendations provided are from testimony received during the hearing process. While the Committee does not endorse each and every recommendation, these recommendations provide insight into how Rhode Island could address the many challenges identified.

All actions taken now will decrease the potential of water supply shortages, infrastructure failures and regulatory barriers that impact future water availability.

The findings and recommendations build on the analysis undertaken last year by the Special Commission to Study All Aspects of the Kent County Water Authority. The Committees are also cognizant of the work being done currently in the House of Representatives and the Commitment of the Carcieri Administration to address water resource issues. Executive agencies were generous with their time and knowledge of issues.

While there are genuine challenges ahead, the Committee findings reveal that Rhode Island is in adequate shape to address these challenges. The technology, data, management and financing of water systems are healthy but need some upgrades and realignment. Most of the environment and aquatic habitats affected by water supply systems are relatively stable and with appropriate management can continue to function, there are a few places, such as the Hunt-Potowamut, where correction is now needed. Finally, Rhode Island is blessed with high quality drinking water that does not require significant treatment; many other jurisdictions have costly treatment to improve the baseline water quality. As we move forward to adopt legislation that builds on these strengths it is easy to believe that the actions taken today will support a vibrant quality of life for all Rhode Islanders into the future.

Respectfully submitted,

J. Michael Lenihan
Chair
Senate Committee on Government Oversight

V. Susan Sosnowski
Chair
Senate Committee on
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MAJOR FINDINGS

Bad News

- Rhode Island has very limited or no back up supplies to augment existing water supplies in the event of periods of drought, contamination, infrastructure failures or inefficient use. Ground water supplies can be the first to be impacted by these events due to the nature of the hydrology of a watershed area, the storage capacity of a groundwater supply and the recharge rates when that water is withdrawn from the ground. Surface waters are impacted differently by many but not all of these events, however, a significant portion of the State's water users (60%) rely on a sole surface reservoir for water supplies.

- Rhode Island's water supply, storage and distribution infrastructure is aging and will require significant financial reinvestment to rebuild to be reliable in the current century. While every water supply system has different infrastructure characteristics, a reoccurring condition is a greater financial need to rebuild infrastructure than current water rates can support within the timeframe the improvements are needed.

- Rhode Island governance and management of water is fragmented and there are varying degrees of regulatory enforcement at federal, especially state and local levels. This fragmentation has resulted in institutional hurdles to approving new water supplies, confusion and hesitation from businesses wanting to locate or expand in the state, piecemeal implementation of state programs and regulations regarding water supply management and distribution, and patchwork solutions to problems that have statewide impact.

Good News

- Rhode Island currently has high quality water that is readily available under normal conditions for drinking and other purposes.

- Government agencies, water suppliers, non-government organizations and higher education institutions have extensive data available related to water that could be synthesized and provided to decision makers on a regular and in many cases, real-time basis.

- Rhode Island has most of the organizational capabilities that are needed to finance, manage and expand water supplies provided that there is realignment and restructuring of its governance systems.

- Rhode Island knows which water systems are stressed and has opportunities and options being developed to provide relief to these systems on a case-by-case basis instead of a one size fits all approach.

- Rhode Island water education programs are having an impact and there are examples of water reuse and conservation activities being implemented by major corporations, farmers and municipalities.

Rhode Island's Water Supply

Identified Challenges:

- New supplies must be approved for meeting short-term demands.
- Storage capacity must be increased in order to provide long-term supply reliability.
- There are limited back up water supplies available to communities in the event of emergencies or system failures.
- There is over reliance on the Providence Water Supply to meet growing demands.

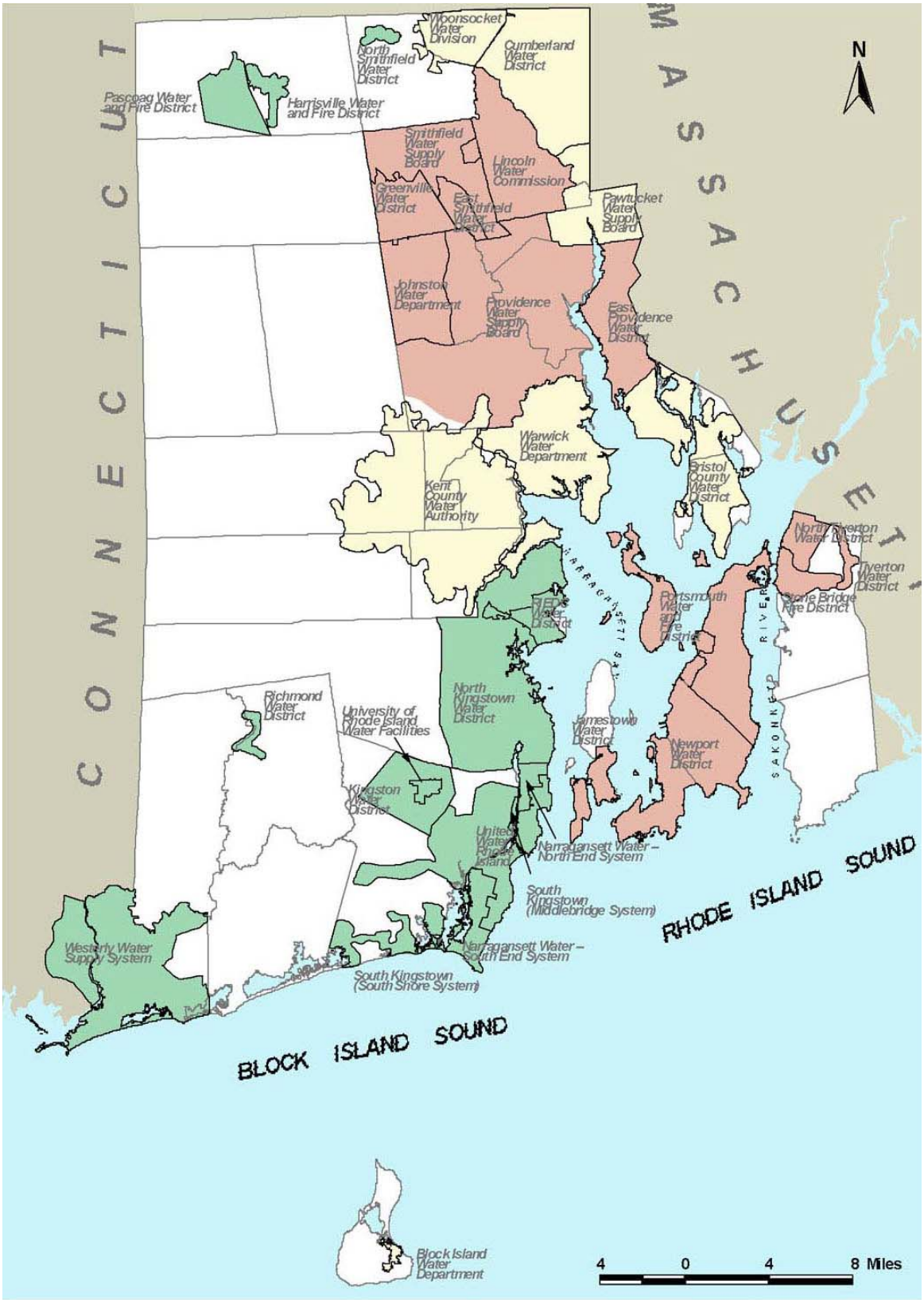
Actions Recommended by Witnesses:

- Integrate water resource and water supply capacity into land use planning and economic development decision-making.[1]
- Provide for and support development of back-up, supplemental, and enhanced water supplies, including Big River Management Area wells (4-5 mgd), Shad Factory Reservoir and Bristol County Water Authority treatment facilities (2 mgd), Lonsdale Wells (2.4 mgd).[2]
- Optimize and balance use of existing supplies, such as the surplus supply available in the Pawtucket water system (9 mgd).[3]
- Maintain the Scituate Reservoir as the primary drinking water supply storage capacity in the state.[4]
- Work with small water suppliers to improve infrastructure and possibly combine smaller systems where efficiency and reliability can be improved.[5]

Status of Water Supply:

Rhode Island's public water supply system serves 88% of the State's population by delivering approximately 119 million gallons of water per day to customers. There are thirty (30) major public water suppliers. In addition to these thirty major suppliers there are approximately four hundred fifty (450) small public water systems with fifteen or more connections. The map on the following page provides a general overview of the major public water supply areas in the state and the sources of water those systems depend on.

[1] Testimony of Dan Varin and Juan Mariscal, Water Resources Board, February 7, 2007.
[2] Testimony of Dan Varin and Juan Mariscal, Water Resources Board, February 7, 2007.
[3] Synthesis of testimony of Henry Meyer, RI Water Works Assoc., January 24, 2007, and of Dan Varin and Juan Mariscal, Water Resources Board, February 7, 2007.
[4] Synthesis of testimony of Henry Meyer, RI Water Works Association, January 24, 2007 and of Pam Marchand of Providence Water Supply Board, January 31, 2007.
[5] Testimony of June Swallow, Department of Health, February 28, 2007.

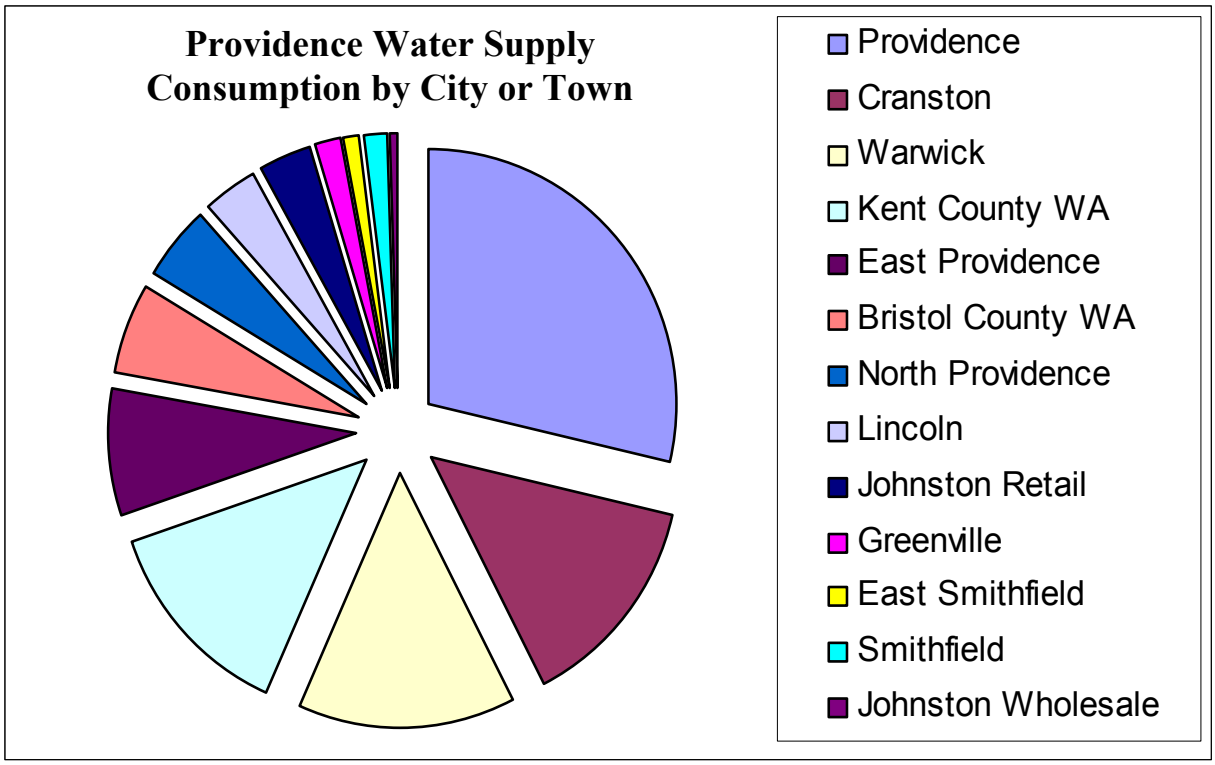

CONNECTICUT
MASSACHUSETTS
N
Woonsocket Water Division
North Smithfield Water District
Cumberland Water District
Pascoag Water and Fire District
Harrisville Water and Fire District
Smithfield Water Supply Board
Lincoln Water Commission
Greenville Water District
East Smithfield Water District
Pawtucket Water Supply Board
Johnston Water Department
Providence Water Supply Board
East Providence Water District
Warwick Water Department
Bristol County Water District
Kent County Water Authority
North Tiverton Water District
Tiverton Water District
Stone Bridge Fire District
Portsmouth Water and Fire District
NBWD Water District
NARRAGANSETT BAY
SAKONNET RIVER
Richmond Water District
University of Rhode Island Water Facilities
North Kingstown Water District
Jamestown Water District
Newport Water District
Kingston Water District
United Water Rhode Island
Narragansett Water – North End System
South Kingstown (Middlebridge System)
Narragansett Water – South End System
Westerly Water Supply System
South Kingstown (South Shore System)
RHODE ISLAND SOUND
BLOCK ISLAND SOUND
Block Island Water Department
4 0 4 8 Miles
LEGEND
SURFACE WATER SUPPLY (SW)
GROUND WATER SUPPLY (GW)
COMBINED SW & GW
WATER DISTRICT BOUNDARIES
AREAS NOT SERVED BY PUBLIC WATER SYSTEMS
AREAS CURRENTLY SERVED BY MAJOR PUBLIC WATER SUPPLIERS IN RHODE ISLAND
MAP BY THE RHODE ISLAND WATER RESOURCES BOARD
August 1, 2002
ConnDEP
Additional data provided by water suppliers

As the table below illustrates not all of the water available in the state is used for residential or commercial purposes. It is important to keep in mind that much of the water used for thermoelectric purposes is not potable and could not be used for drinking water without significant treatment.

Rhode Island Water Use by Purpose[6]
(Excluding water used for recreation purposes)

Domestic, industrial, and irrigation	136 mgd	32%
Thermoelectric power production*	293 mgd	68%
Total	429 mgd	100%
*Includes brackish and other non-potable water		

Most of the State's public drinking water supply comes from the Providence Water Supply Board (PWSB). The PWSB is required by law to provide one hundred fifty (150) gallons of water per person per day to: Foster, Glocester, North Providence, Smithfield, Johnston, Lincoln, Burrillville, Warwick, Cranston, Bristol County Water and East Providence. This means the system is currently serving approximately 600,000 people and providing ninety (90) million gallons of water per day. The PWSB also provides water on a wholesale basis to the Kent County Water Authority. The graph below[7] provides a summary of the consumption of this water by the cities and towns that are either wholesale or retail customers.



[6] "Rhode Island Drinking Water Supply Resources: Data & Program Information Summary", RI Water Resources Board, February 7, 2007, Sec. 1 p. 1.
[7] Providence Water Supply Board PowerPoint presentation, February 7, 2007.

Although a significant portion of the State's population, approximately 60%, relies on the surface reservoir supply in Scituate, there are a number of large and small suppliers that rely on groundwater resources for water supply. Groundwater resources are at a greater risk of being impacted during times of drought, by over withdrawal from streams and rivers, and by contamination. This risk creates a greater dependency on the surface reservoir supplies owned by the PWSB. Many public water systems rely on the supplies of the PWSB to provide backup and emergency water during times when systems are stressed. As stated in testimony by Henry Meyer, of the RI Water Works Association, on January 24, having one water supply to provide back up and emergency resources is a high risk and dangerous policy for the management and reliability of Rhode Island's public water.

In order to improve the long-term reliability of the state's water supply, Rhode Island must create a portfolio of water resources that can be used to meet customer needs and peak demands. Some of the options available to implement in the near-term include the: development of wells in Big River, reactivation of the Lonsdale Wells in Lincoln and improvements to the Bristol County Water Authority's treatment plant and pipeline. These measures can provide additional water supply in a relatively short time frame.

The Water Resources Board notes that there are three initiatives to increase water supplies. In Big River, five wells have been proposed that would provide approximately 5-7 million gallons of water per day at a cost of $30-$35 million dollars for the wells, treatment and transmission of water. This would likely reduce the stress on the Kent County water supply. The second project is in Lincoln and would reactivate the Lonsdale wells, 2 total, to produce 4-6 million gallons per day at a cost of approximately $8.25 million. Finally, a third project supported by the BCWA is to upgrade the Shad Factory pipeline and the treatment facility to provide an additional 2 million gallons per day at a cost of $9 million. If these three projects were implemented they could reduce the demand on the Scituate Reservoir, which would provide more reliability in the public water supply system. The Reservoir could then have more water in reserve stored in the event of emergencies or drought. All three projects are in the planning stages and would require an approximately $50 million investment.

While the three projects above provide shorter-term solutions to water supply challenges there are other alternatives that can be studied for longer-term implementation. Since Rhode Island is the "Ocean State", desalination was presented as an alternative to traditional surface water and groundwater supplies. Desalination technology has improved significantly over the past two decades and the cost of constructing a facility and then supplying water has fallen as a result.

There are a number of issues that must be considered in Rhode Island if a desalination project is considered to be a viable alternative. According to testimony given by representatives of Metcalf & Eddie, these issues include but are not limited to[8]:

- Cost- desalination costs compared to using traditional water sources, pretreatment requirements and the variations between brackish and seawater, and finally energy costs associated with running a desalination operation.
- Environmental- the location of the facility and its possible impacts on aquatic habitats and estuarine environments, and the water quality that needs to be maintained.

[8] Testimony of Larry W. Vande Venter, V.P. Water Practice Leader and Betsy Shrene-Gibb, V.P. Technology Director-Environmental Science, Metcalf & Eddie, March 14, 2007.

- Public- what populations will be served by a desalination facility, how will the water rates compare to traditional sources, what growth management principles will be applied and what environmental impacts could be perceived.

Each of these issues would have to be carefully considered if desalination were to be explored as a viable alternative for water supply in Rhode Island. As the state analyzes its future water supply portfolio, desalination could become a more attractive option. The more options that are considered for future water supplies, the more reliable the state's water systems become.

In order for Rhode Island's public water supply to become more reliable it must build redundancy into the supply system. Proposals for addressing water issues in the state must take into account the improvement the proposals make to the redundancy of the water supply systems. Redundancy includes:

- Adequate supply of water
- Ample storage capacity of water supplies
- Quality treatment and monitoring
- Efficient and reliable infrastructure systems

Seasonal Water Use

Identified Challenges:

- Outdoor summer water use by residential customers has been increasing significantly since the 1980s.
- Public water users that are subject to seasonal watering programs have raised questions of equity among different water supply systems.
- Water conservation practices have not been promoted at a mainstream level to have an impact on average daily demand.

Actions Recommended by Witnesses:

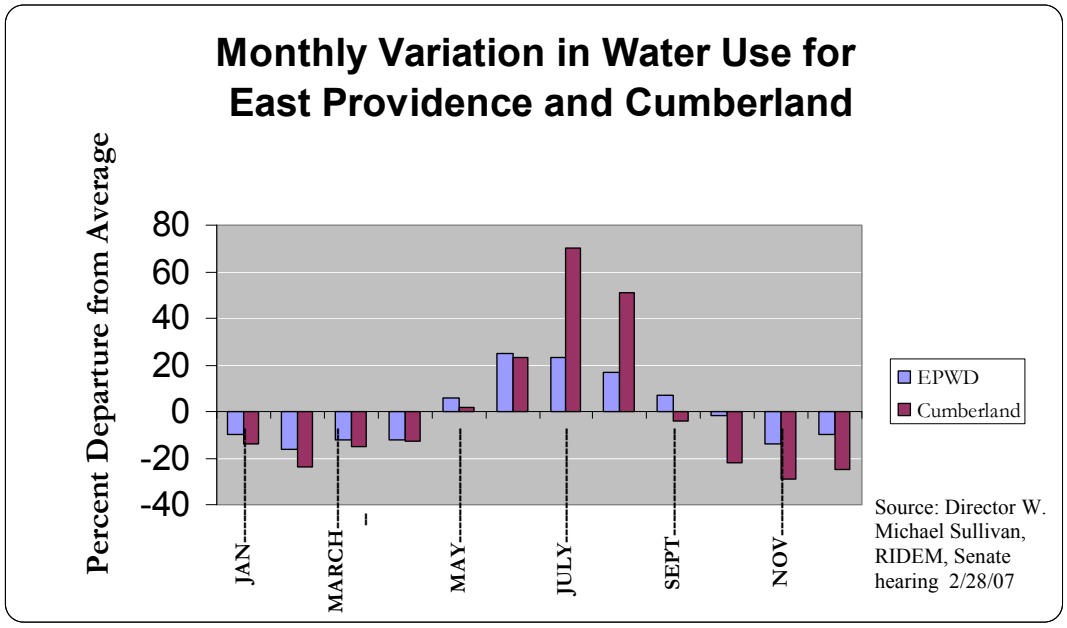
- Accommodate seasonal usage in a manner that aligns summertime use with safe daily yield.[9]
- Establish seasonal watering programs that provide consistency among neighboring communities using public outreach and education.[10]
- Adjust pricing structures to recognize the value of water during peak use periods of the summer.[11]

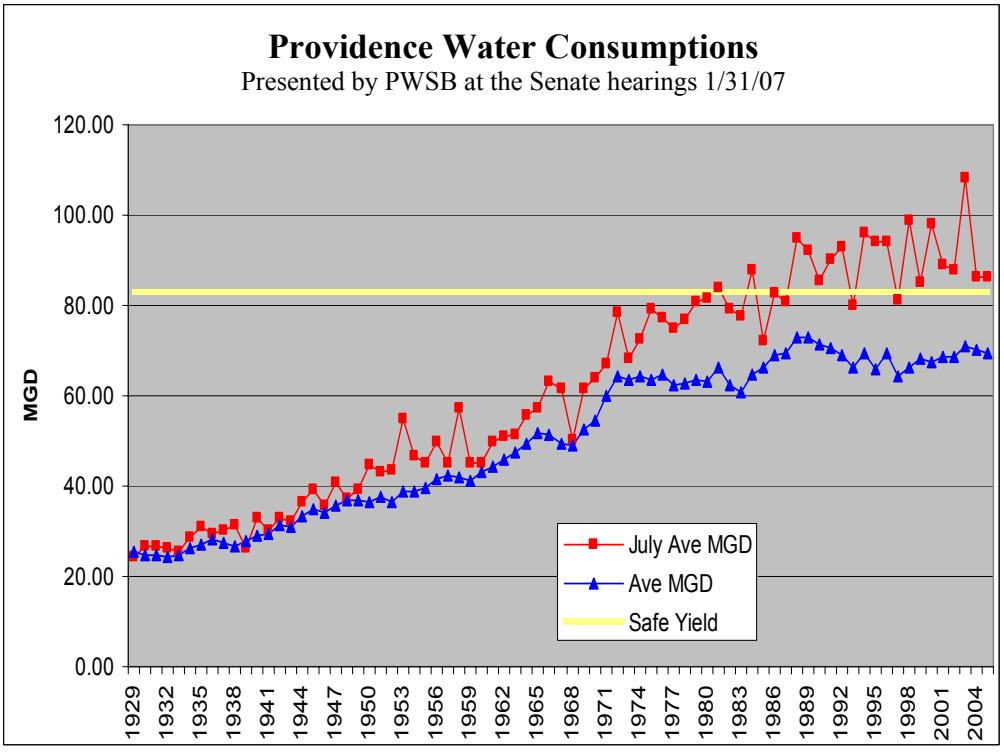
[9] Testimony of Pam Marchand, Providence Water Supply Board, January 31, 2007.
[10] Testimony of the Water Security Coalition, March 3, 2007.
[11] Testimony of W. Michael Sullivan, Department of Environemtnal management, February 28, 2007.

Status of Seasonal Water Use:

Seasonal water usage has been increasing dramatically since the early 1980s. In some cases this just means customers cannot water their lawns every day. In other cases when the water is most needed by agricultural customers to preserve crops, there is inadequate supply for irrigation.

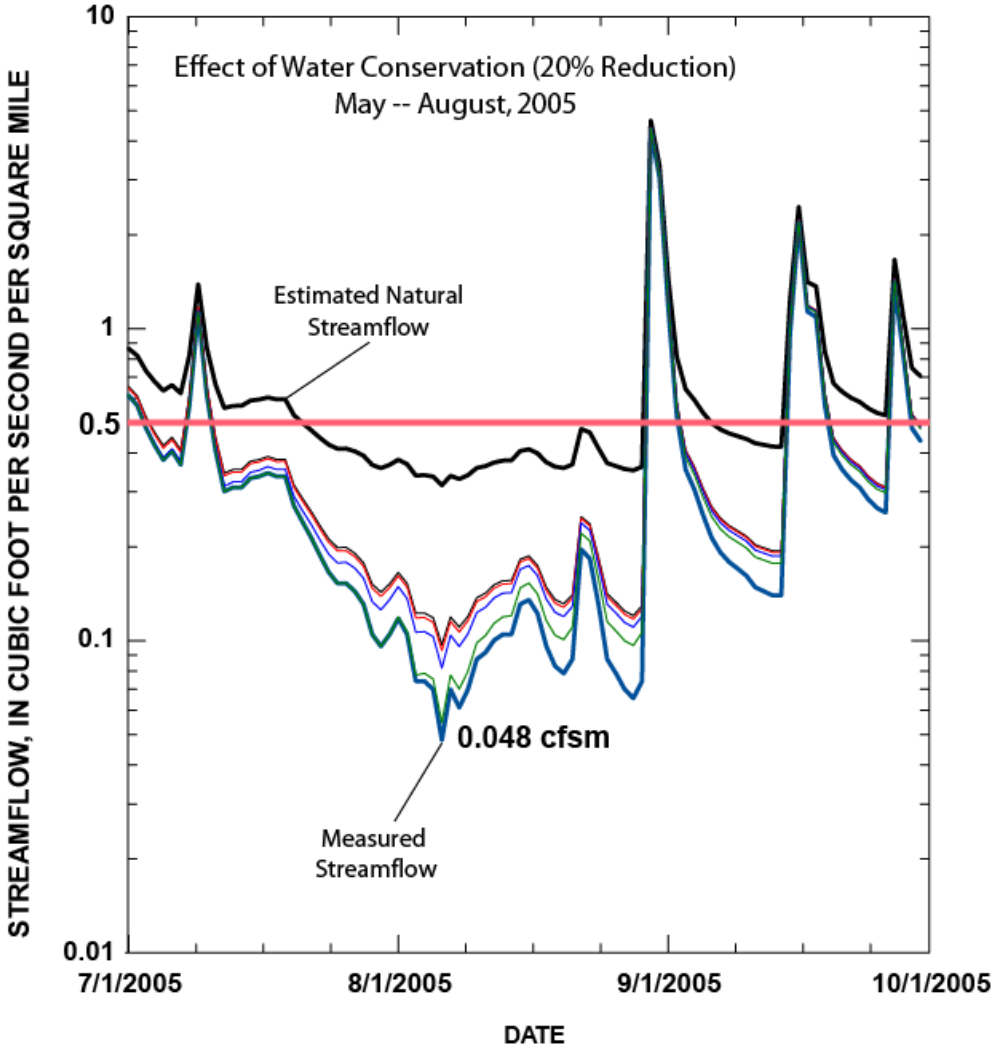
There are two major factors that contribute to the seasonal demands on a system and the ability to provide water to meet those demands. The first factor is the watering of lawns in residential areas on a regular and frequent basis. This demand coincides with the driest and hottest times of the year. The second factor is the withdrawal of water from rivers, streams and groundwater sources at times when recharging these sources is at its lowest. Both of these factors contribute to the peak demand levels of systems and the concern that Rhode Island's water supply may be inadequate to meet future needs. However, as noted these stresses are only evident during the months of June, July and August. Most of the systems function below safe yield throughout the rest of the year.





The graphs on this page illustrate the summer demands on public water systems. These demands can vary from urban to suburban communities and reflect the uses that are prevalent in those communities.

Reduction in summer time use can have a significant impact on stream and river flows. The US Geological Survey has the ability to model what would happen to stream flow if a 20% reduction in use were required. This model also illustrates how instituting that requirement at the beginning of the summer can have a greater effect than when the system becomes stressed.



Source: USGS, RI Senate Oversight hearing 3/14/07

Water Recharge, Conservation and Reuse

Identified Challenges:

- Increased impervious surfaces have caused changes in groundwater supplies, stream and river flows, water quality and aquatic habitats.

- Projected development and growth could use low-impact design techniques but there are no standards or requirements for using these techniques.

Actions Recommended by Witnesses:

- Require new development to maintain groundwater recharge levels to predevelopment levels on-site.[12]

- Require low-impact design techniques to be the primary method of stormwater control.[13]

Impacts of Water Recharge:

Historic development patterns in Rhode Island coupled with current construction practices have decreased the amount of water entering the ground and have increased the amount of water directly entering streams in developed areas. According to the "Draft Stormwater Manual Chapters" prepared by RIDEM the four major types of impacts to downstream waters and waterways from urban development are:[14]

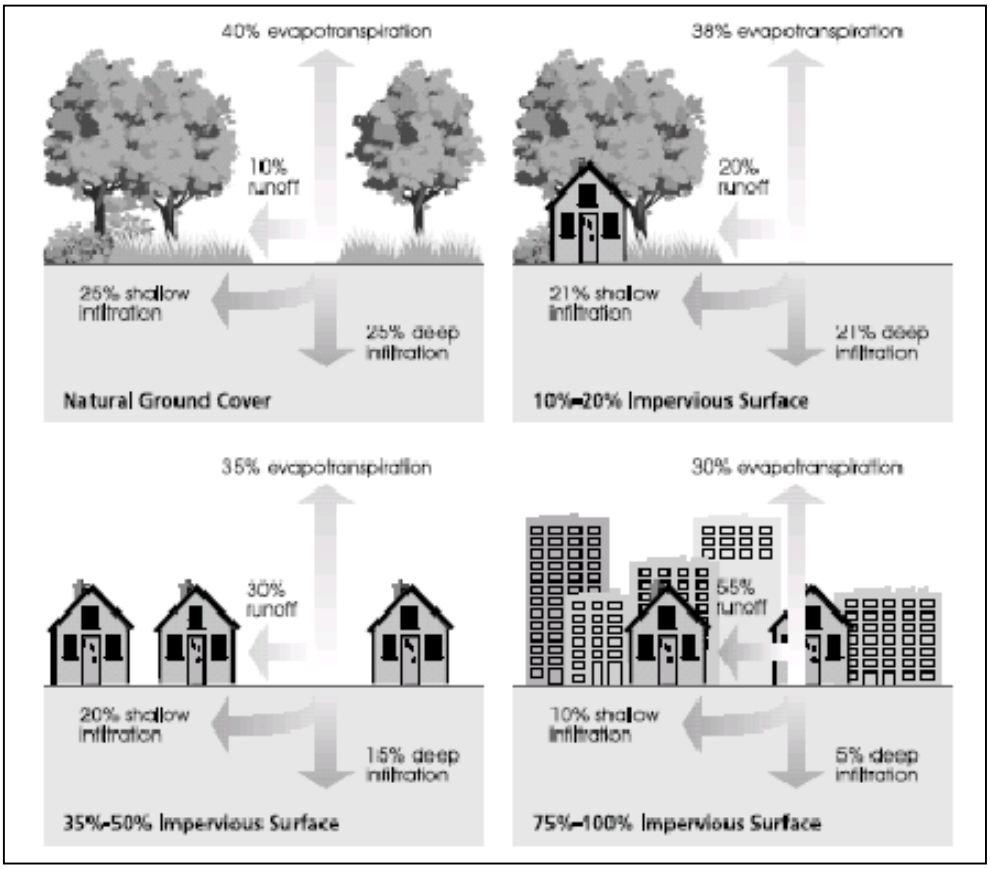
- Changes to stream flow.
- Changes to stream geometry.
- Water quality impacts.
- Degradation of aquatic habitats.

When impervious surfaces are constructed, such as parking lots and rooftops, water from rain and snow are not being absorbed into the ground and entering the natural water cycle. The natural water cycle cleanses pollutants, recharges groundwater and supplies streams, rivers and lakes. Impervious surfaces create stormwater runoff that is dumped directly into water bodies instead of being filtered through the ground.

The projected amount of new development for Rhode Island over the next few decades could significantly increase the amount of stormwater runoff. The pictures on the following page illustrate the impacts of natural water recharge versus stormwater runoff created by impervious surfaces. The depth of infiltration of water into the ground changes significantly with the amount of impervious surface above. The level of stormwater runoff that is directed to streams and rivers also increases significantly with the amount of impervious surface.

[12] Written Testimony of Matt Auten, Environment Rhode Island, March 28, 2007.
[13] Written Testimony of Matt Auten, Environment Rhode Island, March 28, 2007.
[14] "Draft Stormwater Manual Chapters", http://www.dem.ri.gov/programs/benviron/water/permits/ripdes/stwater/, located at the bottom of the page on the left.

Impervious Surface Impacts on Groundwater Recharge and Stormwater Runoff [15]



RIDEM has drafted a manual to address the impacts of stormwater runoff. "The purpose of this manual is to provide guidance on the measures necessary to protect the waters of the State of Rhode Island from the adverse impacts of postconstruction stormwater runoff. The guidance provided in this manual is applicable to new development, redevelopment, and upgrades to existing development."[16]

Typical Impervious Coverage of Land Uses

Land Use	Percent Impervious Cover
Commercial and Business District	85
Industrial	72
High Density Residential (i.e., 1/8 ac zoning)	65
Medium-High Density Residential (i.e., 1/4 ac zoning)	25
Medium-Low Density Residential (i.e., 1/2 ac zoning)	38
Low Density Residential (i.e., 1 ac zoning)	20

Source: Adapted from USDA Soil Conservation Service, 1986.

[15] "Draft Stormwater Manual Chapters", RIDEM, May 2006, p. 11, http://www.dem.ri.gov/programs/benviron/water/permits/ripdes/stwater/.
[16] "Draft Stormwater Manual Chapters", RIDEM, May 2006, p. 5

Conservation and Reuse Activities:

Throughout the hearing process there were a number of conservation and reuse projects highlighted that demonstrate the capabilities of people, businesses and municipalities to implement these types of projects. The projects highlighted include:

- Schartner Farms Greenhouse, rainwater storage for watering and cooling use,
- Amgen cooling tower water re-circulated through the system,
- North Kingstown planning and zoning amended to reduce non-pervious surfaces, and

These water reuse projects vary greatly in size and demonstrate the application of both simple and sophisticated water collection techniques. In the case of Shartner Farms Greenhouses, a rainwater collection system was installed using gutters that collect water from the rooftop and then store the water under the greenhouse in large tanks. This water is then used to water the plants and vegetation inside the greenhouse as well as to cool the greenhouse through a water-cooling system. Amgen has instituted a water conservation program that has reduced its daily water usage from a projected 1.2 million gallons per day to a projected 800,000 gallons per day. In addition, Amgen implemented a water-recycling program in its manufacturing facility. The facility now recycles 120,000 gallons of water back into the facility. This represents a recycling rate of 24%.

The North Kingstown Town Manager submitted written testimony that outlined how the Town has adopted a number of programs to conserve and reuse water. One such program is the Town is modifying its existing land use regulations to incorporate reduced lawn sizes. It is also incorporating the use of water conservation and reuse techniques into its land use regulations.

A number of presenters at the Senate hearings suggested various techniques to reduce residential water consumption. Decreasing outdoor water use in the summer was the most frequently suggested measure to conserve water. Some communities have already adopted mandatory watering programs in the summer that require lawn watering on particular days throughout the community. It was also suggested that the amount of watering a lawn requires is much less than the typical residential lawn receives.

The Water Resources Board (WRB) has identified two priority areas that could support water conservation efforts statewide.[17] First, the WRB would like to set a 65 gallon per day per person water use standard. Current information suggests that in some areas residential water use can be more than 100 gallons of water per day per person. Second, the WRB would like to enhance outreach and education. The WRB wants to create a water education program to develop a conservation ethic in the state and to inform public officials and the general public on the need to protect and preserve the state's water resources. The information and technology is already available in the state to support these and other efforts.

[17] "Rhode Island Drinking Water Supply Resources: Data & Program Information Summary", RI Water Resources Board, February 7, 2007, Sec. 1 p. 4-5.

Water Withdrawals

Identified Challenges:

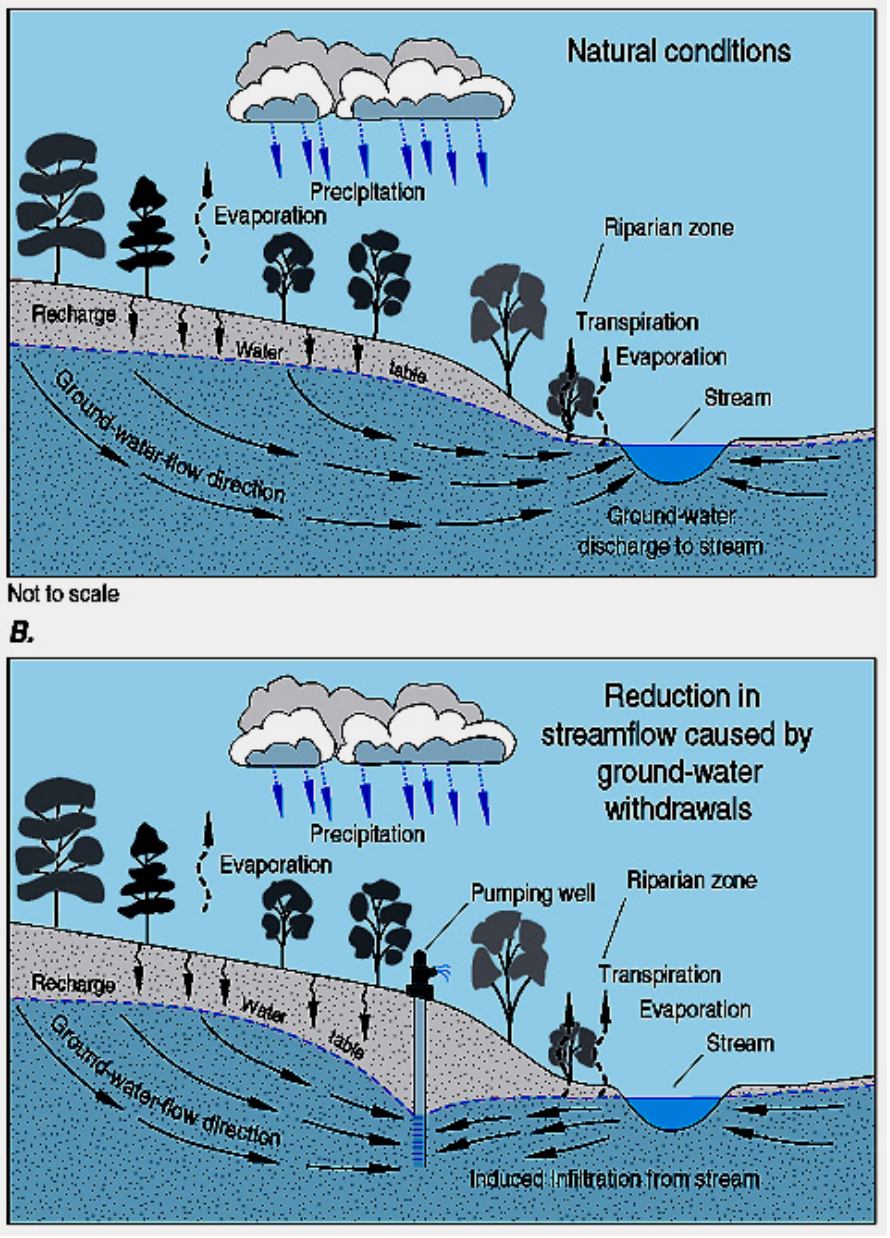
- Water withdrawal from groundwater sources can have negative impacts on streams and rivers that rely on groundwater discharges to maintain flow.
- The location of groundwater withdrawals can have a greater impact on flow the closer to the stream or river the withdrawal is located.
- Aquatic habitats can be significantly altered or lost if stream and river flows fall below safe levels.

Actions Recommended by Witnesses:

- Enable DEM to adapt and use as appropriate, stream flow standards that have been implemented in Connecticut and elsewhere.[18]

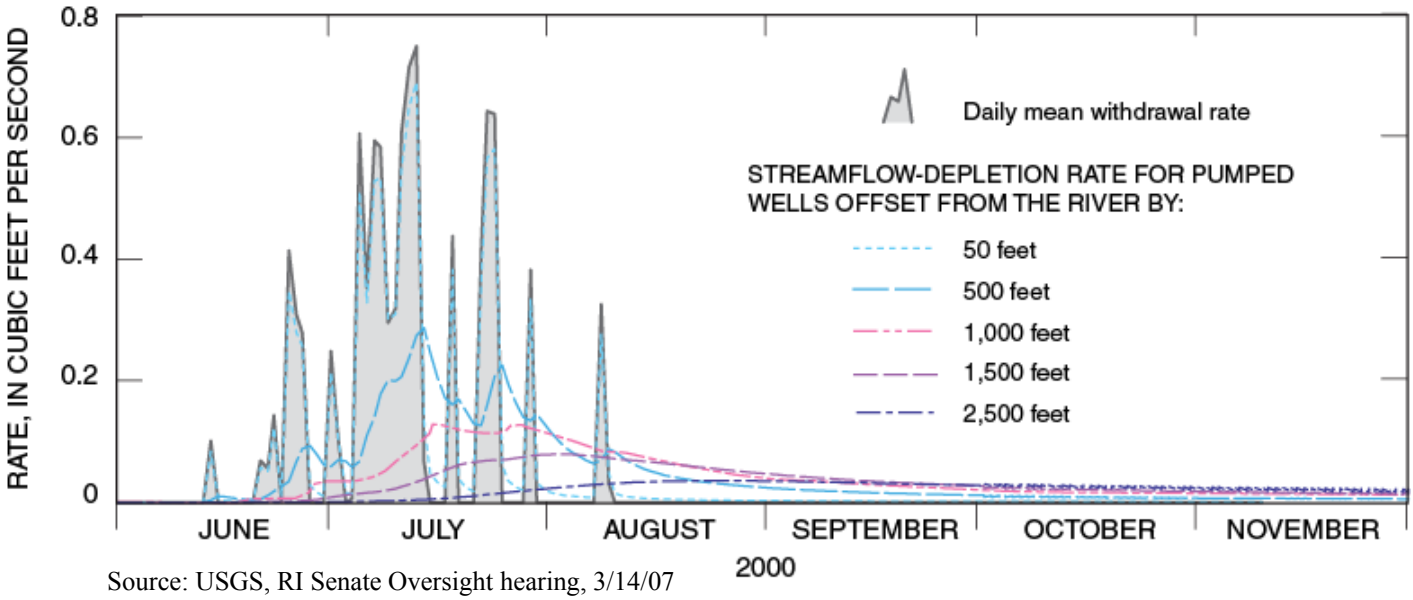
Impacts of Water Withdrawals:

Groundwater resources are at significant risk of being compromised during the summer months when rainfall is at its lowest and demands are highest. Rivers and streams rely on rainfall to maintain an adequate flow to support aquatic habitats and life. When wells withdraw water from the ground that would otherwise supply rivers and streams the ability of these rivers and streams to flow at safe levels is diminished. This in turn creates diminished supply capacity in the groundwater source that is pumped to customers. This illustration provides a summary of this phenomenon.[19]

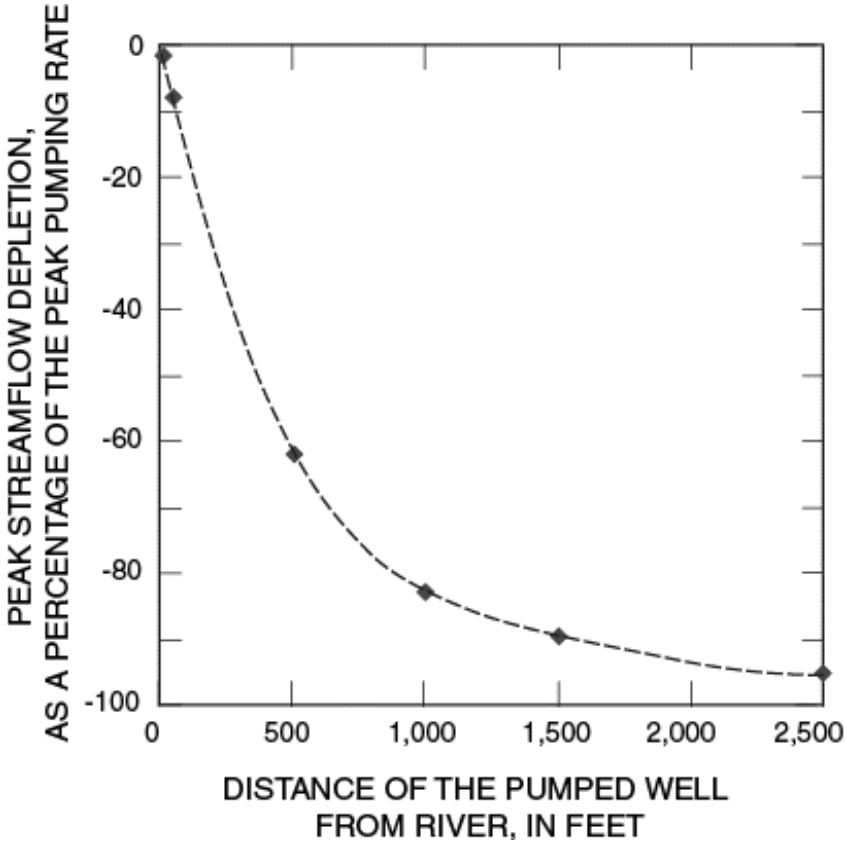


[18] Testimony of the Water Security Coalition, March 7, 2007.
[19] Testimony of Director W. Michael Sullivan, RI DEM, February 28, 2007.

The USGS has been studying the impacts that well withdrawals have on stream and river flow and has concluded that the further the well is located from the flow, the less of an impact it will have on the flow levels. The two graphs below illustrate that the location of wells from a stream can significantly impact the flow of that stream. The further a well is located from a stream the less of an impact it has on the flow of that water body.



Source: USGS, RI Senate Oversight hearing, 3/14/07



Source: USGS, RI Senate Oversight hearing 3/14/07

Infrastructure Systems

Identified Challenges:

- Water distribution systems throughout the state are from the manufacturing era in the early 1900s and are in need of complete replacement.
- Water distribution systems throughout the state require upgrades and significant maintenance to keep pace with development patterns.
- Financing options for public water supply systems are limited when it comes to replacing and upgrading infrastructure.

Actions Recommended by Witnesses:

- Increase funding for infrastructure reinvestment, with priority to leak detection and repair and reduce the leakage portion of non-account water by one half.[20]
- Enable the Clean Water Finance Agency to make grants to small community water systems to secure water supply integrity.[21]

Status of Infrastructure Systems:

For purposes of this report water supply infrastructure is defined as all of the components necessary to store, treat and distribute water to customers. The age of most of the water supply infrastructure in Rhode Island requires that it be significantly upgraded or replaced over the next fifty years. Water rates charged by public water suppliers will not provide the level of funding needed to update and replace these aging systems.

Existing financing mechanisms must be expanded in order to provide more options to a wider range of systems. The sophistication of water suppliers can vary greatly and this needs to be recognized when funds are granted or loaned.

The Providence Water Supply Board has made significant investments in the infrastructure systems. These include a total of $51 million of improvement over the last four years including: $12 million for the water treatment plant, $7 million for the reservoirs, pump stations and dams, $16 million for transmission, $10 million for meters and $6 million for facilities. However these recent improvements are just a portion of the significant investments that need to be made. These additional investments include: $70 million for water treatment plant, $140 million for the 90 miles of pipes and valves, $20 million for buildings and $70 million for lead services.

The Providence infrastructure needs are just an example of the significant financing that will be needed in the near future for almost every public water supply system. The table on the following page provides a recent analysis of what each major water supplier has projected its costs to be for infrastructure improvements. This table illustrates the unprecedented reinvestment that needs to be made in order to ensure reliability and safety for the water supply systems of the state into the future. The table on pages 21and 22 illustrate the water rates that suppliers rely on in order to finance system improvements.

[20] Synthesis of testimony of Dan Varin and Juan Mariscal, Water Resources Board, February 7, 2007 and of Director W. Michael Sullivan, DEM, February 28, 2007 and of questions asked specifically by Senator Blais.
[21] Testimony of June Swallow, Department of Health, February 28, 2007.

Rhode Island Public Water System Infrastructure Capital Needs

System	Period	Treatment	Pumping	Transmission/Distribution	Storage	Other	Total
Bristol County Water Authority	2003-2022	$ 1,600,000	$ 50,000	$ 23,000,000	$ 840,000	-	**$ 25,490,000**
Cumberland	2006-2023	$ 318,600	$ 267,823	$ 3,856,400	$ 30,000	$ 272,823	**$ 4,745,646**
East Providence	2006-2023	-	-	$ 37,825,000	-	-	**$ 37,825,000**
East Smithfield	2002-2016	-	-	$ 860,000	$ 30,000	-	**$ 890,000**
Greenville	2004-2023	-	$ 50,000	$ 1,458,000	-	$ 200,000	**$ 1,708,000**
Harrisville	2003-2022	-	$ 416,915	$ 799,230	$ 444,196	$ 1,273,708	**$ 2,934,049**
Jamestown	2003-2022	$ 4,050,000	$ 34,000	$ 2,166,500	$ 123,625	$ 10,000	**$ 6,384,125**
Johnston	2003-2022	-	-	-	$ 300,000	-	**$ 300,000**
Kent County Water Authority	2003-2022	$ 13,882,300	$ 1,962,200	$ 92,646,000	$ 2,172,200	$ 5,927,300	**$ 116,590,000**
Kingston	2002-2011	$ 800,000	-	$ 595,000	$ 450,000	$ 400,000	**$ 2,245,000**
Lincoln	2003-2022	-	-	$ 2,533,600	$ 1,220,000	$ 246,400	**$ 4,000,000**
Narragansett	2003-2025	-	$ 75,000	$ 792,622	$ 800,000	$ 75,000	**$ 1,742,622**
Newport	2005-2025	$ 28,854,636	-	$ 75,190,349	$ 3,000,000	-	**$ 107,044,985**
North Kingstown	2004-2023	-	$ 110,000	$ 2,763,000	$ 2,195,000	$ 1,814,000	**$ 6,882,000**
North Tiverton	2003-2022	-	$ 100,000	$ 2,165,000	$ 1,500,000	$ 675,000	**$ 4,440,000**
Pascoag	2004-2023	-	-	$ 500,000	$ 559,000	$ 110,000	**$ 1,169,000**
Pawtucket	2001-2020	$ 59,000,000	$ 160,000	$ 64,493,450	$ 3,500,000	$ 465,000	**$ 127,618,450**
Portsmouth	2006-2025	-	$ 2,006,000	$ 6,158,200	$ 1,051,000	$ 335,000	**$ 9,550,200**
Providence	2006-2025	$ 62,480,000	$ 4,545,000	$ 161,275,000	$ 3,005,000	$ 10,720,000	**$ 242,025,000**
Quonset Development Corporation	2003-2022	$ 376,000	-	$ 2,956,000	$ 258,000	$ 8,000	**$ 3,598,000**
Smithfield	2003-2022	-	$ 25,000	$ 2,050,000	$ 724,100	$ 180,000	**$ 2,979,100**
South Kingstown		-	-	-	-	-	**-**
Stone Bridge	2002-2021	$ 37,857	$ 10,200	$ 1,555,423	-	$ 77,144	**$ 1,680,624**
United Water - Rhode Island	2004-2023	$ 404,000	$ 425,000	$ 11,240,000	$ 1,028,000	$ 561,000	**$ 13,658,000**
University of Rhode Island		-	-	-	-	-	**-**
Warwick	2003-2022	-	$ 35,000	$ 11,082,950	$ 1,735,500	$ 75,000	**$ 12,928,450**
Westerly	2006-2025	-	$ 30,000	$ 4,530,000	$ 482,000	$ 590,000	**$ 5,632,000**
Woonsocket	1999-2018	$ 20,150,000	$ 683,500	$ 35,045,350	$ 6,482,000	$ 120,000	**$ 62,480,850**
		$ 191,953,393	**$ 10,985,638**	**$ 547,537,074**	**$ 31,929,621**	**$ 24,135,375**	**$ 806,541,101**
		Treatment	**Pumping**	**Transmission/Distribution**	**Storage**	**Other**	**Total**

Compiled in January, 2007 by the Rhode Island Water Resources Board from Water Supplier Infrastructure Replacement Plans filed with the Rhode Island Dept. of Health

RHODE ISLAND WATER RESOURCES BOARD
ANNUAL SURVEY OF RHODE ISLAND WATER RATES: 2006
RHODE ISLAND WATER SUPPLIERS: RESIDENTIAL RATES
as of 11/15/2006

Water Supplier	Billing Rate	Service Charge	Annual Fee based on the use of 200gpd (73,000 gallons/yr) includes State Water Surcharge
Block Island Water Company	Jan- Mar $12.50/1000gals. Apl-June $19.00/1000gals. July-Sept $25.00/1000gals. Oct-Dec $12.50/1000gals.	N/A	$1,280.57
Bristol County Water Authority	1-15 HCF: $2.127/HCF 16-30 HCF $6.012/HCF 31-255 HCF $4.579/HCF 256-600 HCF $2.127/HCF	$48.93 Quarterly	$544.08
Cumberland Water Department	0-50k: $3.98/1000gals. 50-200k: $5.06/1000gals.	$30.00 Semi-Annually	$396.70
East Providence Water Dept.	$2.45/HCF	$40.00 Annually	$300.42
East Smithfield Water District	$2.70/1000gals.	$30.00 Annually	$248.42
Greenville Water District	$2.19/1000gals.	$52.25 Annually	$233.44
Harrisville Fire District	$3.88/1000gals (retail) $2.63/1000gals (wholesale)	$12.50 Quarterly	$354.56
Jamestown Water Division	0-5k gals= $0.00 5k-9999= $3.43 10k-14999= $3.70 15k-19,999= $4.69 20k-49,999= $6.53 50k-99,999= $7.99	$45.92 Quarterly, Includes minimum usage	$453.56
Johnston Water Control Facility	$2.25/HCF	N/A	$240.91
Kent County Water Authority	$3.542/HCF	$8.20 Quarterly	$399.80
Kingston Water District	$1.68/HCF	$138.71 annual= $31 capital	$354.99
Lincoln Water Commission	$55.00/unit to 20kgals. 20k-75k $2.05/1000gals. Over 75k $3.24/1000gals.	$20.00 Annually	$204.97
Narragansett Water Dept.	60-95 HCF $1.62/HCF 95-130 HCF $2.21/HCF over 130 HCF $2.81/HCF	$134 Annually Includes minimum usage of 44,880 gals.	$231.12
Newport Water Department	$4.07/1000gals.	$13.25 Tertiary	$358.18
North Kingstown Water Dept.	$2.40/1000gals.	$13.49 Quarterly	$250.48
North Smithfield Water Dept.	$4.53/1000gals.	$25.00 Quarterly	$452.01
North Tiverton Fire District	$3.98/HCF	N/A	$409.74
Pascoag Utility District	Over 500 HCF $1.35/HCF HFD Surcharge $1.83/HCF	$38.50 Quarterly includes minimum usage	$458.66
Pawtucket Water Supply Board	$2.903/HCF	$5.66 monthly	$372.55

Water Supplier	Billing Rate	Service Charge	Annual Fee based on the use of 200gpd (73,000 gallons/yr) includes State Water Surcharge
Portsmouth Water & Fire Dist.	0-20k gals= 2.49/1000gals. 20-60k $2.93/1000gals. 61-100k $3.73/1000gals.	$20.00 Annually	$256.81
Providence Water Supply Bd.	$1.958/HCF	$12.19 Quarterly	$261.17
Richmond Water Supply Sys.	Over 30,000gals $3.10/1000gals.	$100.00 Quarterly Includes minimum usage	$254.62
Smithfield Water Supply Board	$2.30/1000gals.	$40 Annually	$229.22
South Kingstown Water Dept.	First 5000 Cu ft= $140 Excess $2.27/ 100 Cu ft	N/A	$281.96
Stone Bridge Water District	$3.90/1000gals.	$5 Quarterly	$326.02
United Water Rhode Island	$1.94/HCF	$17.26 Quarterly	$280.18
Warwick Water Department	$1.789/HCF	$8.25 Quarterly	$228.91
Westerly Water Department	$43 first 18 k (semi), excess $3.24/HCF	N/A	$274.02
Woonsocket Water Dept.	$3.24/HCF	$19.88 Quarterly	$417.04
		Average Annual Residential Rate **Less Block Island**	**$357.07** **$324.09**
Quonset Development Corp. (Commercial & Industrial Only)	First 7500 gal/month @ $48.62; then $2.21/1000gal/month	N/A	$604.76

Notes:

- Some suppliers charge on the basis of gallons; some on the basis of cubic feet of water consumed.
- HCF = hundred cubic feet- There are 748 gallons per 100- cubic feet of water
- The approximate average amount of water used by a single-family home is 200 gallons per day (gpd) which equals 73,000 gallons per year. Rates shown in this table are calculated using 73,000 gallons per year (97.59 HCF)
- State Water Quality Protection Surcharges are included. Based on the use of 200 gpd (or 73,000 gallons per year) these charges equal $21.32

Overview of Non-Account Water Issues:

One area of contention during the hearing process was the definition of non-account water. According to Rhode Island General Laws 46-15.3-21, "Non-account water shall be defined as the difference between the metered supply and the metered consumption for a specific period including an allowance for firefighting. No estimates for non-metered usage, except for the firefighting allowance, shall be included in the calculation of accounted for water." Non-account water can include water for hydrant flushing and fire protection, well development, water quality monitoring and host of other non-metered uses. Non-account water can also include water that leaks out of the transmission system due to infrastructure failures.

As set forth in Water Supply Policies for Rhode Island, "A stated goal of system management shall be to minimize non-account water and to strive to achieve and maintain less than 15% non-account water."[22] According to a survey conducting in 2007 by the Water Resources Board of all major water suppliers, non-account water ranges from a high of 31% to a low of .51%. This range illustrates that more study has to be done on how non-account water is estimated and how estimation can be done on a consistent statewide basis. As suggested by the Kent County Water Authority at the hearing on March 14, "We recommend that this Committee consider a standardization of reporting of non-account water very similar to what the Public Utilities Commission utilizes in their annual reports so that this issue can be nullified."

Regulation and Governance of Water

Identified Challenges:

- There is fragmented and disconnected state authority for water supply planning and development.
- There is diverse local land use planning and zoning that has created a patchwork system of policies statewide.
- There are no common goals and strategies to network water suppliers and water supply systems at a local or state level.

Actions Recommended by Witnesses:

- Coordinate State agency regulatory functions similar to how the Energy Facilities Siting Board works.[23]
- Provide for coordinated planning among state agencies for current and future water supplies.[24]
- Encourage land use planning policies at the local level that consider water supply as a criterion for approval or denial of projects. Utilize the USGS Water Atlas (release date July 2008) when planning and implementing projects at the local level.[25]

Regulation and Governance of Water:

Federal Authority

US Army Corps of Engineers [waters of the US, including wetlands]. Under section 404 of the Federal Clean Water Act, the Army Corps of Engineers has jurisdiction over activities that dredge or fill waters of the United States, including wetlands (33 CFR Part 320). A permit is required for alteration of wetlands identified as important; the Army Corps of Engineers review is conducted in consultation, as appropriate, with the U. S. Fish and Wildlife Service, the National Fisheries Service, the Environmental Protection Agency (EPA), and the Soil

[22] *Water Supply Policies Plan*, State Guide Plan Element 721, http://www.planning.state.ri.us/landuse/pdf/721.pdf
[23] Testimony of Elia Germani, Public Utilities Commission, February 7, 2007.
[24] Testimony of Ames Colt, RI Bays, Rivers and Watersheds Coordination Team, March 14, 2007.
[25] Testimony of Dan Varin and Juan Mariscal, Water Resources Board, February 7, 2007 and testimony of Robert Breault, USGS, March 14, 2007.

Conservation Service of the U.S. Department of Agriculture. The Army Corps permitting activity is subject to the National Environmental Policy Act, therefore an Environmental Impact Statement may be required.

State Authority

RI Department of Health (DOH) [water potability]: The Department of Health has basic responsibility under RI law for assuring the purity and potability of public drinking water supplies and has lead responsibility for administering the Federal Safe Drinking Water Act in Rhode Island. Section 46-13-2.1 of the General Laws specifies that, "No person shall operate or maintain a public drinking water supply system unless the system is approved by the director of health." Department of Health regulations hold "no person shall develop, maintain, or operate a public water supply system unless said system is approved by the Director. Furthermore, all public water systems must be developed, operated, and maintained in accordance with the requirements and the provisions of these regulations in order for a public water supply system to maintain approval by the Director" (*emphases added)*. http://www.health.state.ri.us/

RI Water Resources Board (WRB) [water supply infrastructure]: The Water Resources Board engages in water supply planning and oversees water supply infrastructure development. Section 46-15-2 of the General Laws provides that, "No municipal water department or agency, public water system, including special water districts or private water company, engaged in the distribution of water for potable purposes shall have any power: (1) To acquire or take a water supply or an additional water supply from an existing approved source; 2) To take or condemn lands for any new or additional sources of water supply or for the utilization of supplies; unless plans have been approved by the Water Resources Board, after review by the Department of Health and the State Planning Council.

The Water Resources Board is also the state agency responsible for, "the proper development, protection, conservation and use of the water resources of the state," (RIGL 46-15.7), including the establishment of water supply facilities (RIGL 46-15.1-4). In 2002, it established the *Water Allocation Program Advisory Committee* that developed recommendations for "fair and equitable water allocation," and managing ground and surface water withdrawals, among other management considerations. It is important to note that these recommendations were formulated before the arrival of major users like Amgen. In Addition, the WRB Corporate is authorized, "to purchase, hold or dispose of real estate, make contracts, apply and contract to the US an others, to establish, operate and maintain or lease to others or to contract with others water supply facilities, to purchase and sell water (RIGL 46-15. 1-1). This legislative authority comes to bear on water resource development activities currently undertaken by the KCWA.
http://www.wrb.state.ri.us/index_curr.htm

RI Department of Environmental Protection (DEM) [natural resource protection]: The Department of Environmental Management has broad authority, "To supervise and control the protection, development, planning, and utilization of the natural resources of the state,…" (RI GL 42-17.2(a)). DEM administers both Rhode Island statutes pertaining to water quality, wetlands protection, and fish and wildlife and delegated Federal authority (RI G.L. 46-12-2), including significantly the Federal Clean Water Act. Developments that would alter wetlands or affect water quality require DEM review and approval. DEM's surface water regulations apply to all of the surface waters of the state and to, "all activities which will likely impact water quality and/or activities that will likely cause or contribute to flow alterations."
http://www.dem.ri.gov/

RI Public Utilities Commission (PUC) [reasonable and adequate rates]: The business of, "operating water works and furnishing supplies of water for domestic, industrial, and commercial use" is considered a public utility function and the Public Utilities Commission has powers to supervise and regulate the conduct of private water works and public water works that are significantly multi-municipal. http://www.ripuc.org/

State Planning Council [planning for water supply, drought management and rivers classification]: Rhode Island General Laws 42-11-10 (7)(d) calls for the creation of a State Guide Plan as follows, "The state guide plan shall be comprised of functional elements or plans dealing with land use; physical development and environmental concerns; economic development; housing production; energy supply, including the development of renewable energy resources in Rhode Island, and energy access, use, and conservation; human services; and other factors necessary to accomplish the objective of this section. The state guide plan shall be a means for centralizing, integrating, and monitoring long-range goals, policies, plans, and implementation activities related thereto." There are currently four Guide Plan Elements that deal with water issues including: Water Supplies Policy Plan, Water Emergency Response Plan, Rivers Policies and Classification Plan and Rhode Island Drought Management Plan. http://www.planning.state.ri.us/publist/online.htm

Local Authority

In addition to the federal and state agencies that have regulatory authority over water supplies, there are thirty major water supply systems that have the authority to develop, maintain and operate water supply systems. The table below illustrates the diverse governance structures in place for these thirty suppliers.

Governance of the Thirty Largest Water Systems that Deliver 90% of the 136 mgd[26]

Category	Number of Systems
Municipal Departments that produce and deliver water regionally (Pawtucket, Providence, Newport, Woonsocket)	4
Municipal Departments that purchase water and deliver it within a municipality (East Providence, Johnston, Lincoln, Narragansett, Portsmouth, Smithfield, South Kingstown, Warwick)	8
Municipal Departments that produce and deliver water within the municipality (Block Island, Cumberland, Jamestown, North Kingstown, Richmond, Westerly)	6
Regional authorities covering two or more municipalities (Kent Count Water Authority, Bristol County Water Authority)	2
Special districts, usually serving part of one municipality (East Smithfield, Greenville, Harrisville, Kingston, North Tiverton, Pascoag, Quonset Development Corporation, Stone Bridge, URI @ Kingston)	9
Private Companies (United Water Rhode Island)	1
TOTAL	30

[26] "Rhode Island Drinking Water Supply Resources: Data & Program Information Summary", RI Water Resources Board, February 7, 2007, Sec. 1 p. 1.

Data and Knowledge of Water Supply Issues

Rhode Island agencies, organizations and higher education institutions have extensive data available related to water that could be synthesized and provided to decision makers on a regular and in many cases, real-time basis.

Name	Type of Entity	Available Information
Department of Environmental Management	State Agency	Aquatic habitats, watershed based management, best practices nationwide for conservation, reuse, recycling and stream flow
Department of Health	State Agency	Water quality, infrastructure needs
Public Utilities Commission and Division of Public Utilities	Quasi-Judicial Agency	Pricing structures, trends of costs, revenues and infrastructure needs
Water Resources Board	State Agency	Water Supply, distribution systems, water demands and local governance structures
The RI bays, Rivers and Watersheds Coordination Team	State Agency	Monitoring data, best practices of watershed based management
RI Clean Water Finance Agency	State Agency	Financing options and infrastructure needs
US Geological Survey	Federal Agency (Non-regulatory)	Statewide and location specific hydrological data, historical data, technological tools
RI Water Works Association	State Organization of Major Water Suppliers	Supplier data, water demand and infrastructure needs
RI Economic Policy Council	State Business Organization	Projected economic development needs and potential
The Nature Conservancy	National Nonprofit Organization	Land conservation programs to protect water supplies and habitats
The Audubon Society	National Nonprofit Organization	Land conservation programs to protect water supplies and habitats and environmental advocacy programs
Providence Water Supply Board	Major Public Water Supplier	Primary water source data, water distribution services and maintenance practices
RI Farm Bureau	State Membership Organization	Agricultural needs, demands and best practices
Water Security Coalition	Coalition of Non-Governmental Organizations	Water monitoring data, national perspective of policies and programs and environmental advocacy
Metcalf & Eddie	Private Consulting and Engineering Firm	Desalination experience, technology, Big River data
Utilities Contractors Association	Private Labor Organization	Infrastructure failure, reinvestment needs and experience rebuilding