









Report
to the
Water Resources Coordinating Board
upon the
Feasibility of Development
of
Water Supply Resources of Rhode Island
August 1957

METCALF & EDDY
ENGINEERS
BOSTON, MASSACHUSETTS

REPORT

TO

HIS EXCELLENCY

CHRISTOPHER DEL SESTO

GOVERNOR OF RHODE ISLAND

Recommending

Legislation for the Acquisition of

RESERVOIR SITES

FOR

FUTURE WATER SUPPLY

STATE WATER RESOURCES

COORDINATING BOARD

FEBRUARY 1960

WHAT GOOD IS AN EMPTY GLASS?

Or a house, or an industrial plant, or a vegetable garden, or a fire hydrant, without water?

None whatever!

Water shortages happen here in Rhode Island. Water use in many communities had to be curtailed in the 1964 summer months. And water shortages will get worse until we do something about them.

Adequate water supply attracts industry—means more jobs. There's the future to plan for! Between 1950 and 1960 water consumption for the five principal Rhode Island systems rose 15%. It will continue to climb as population and industry grow.

Today we have around 860,000 people in Rhode Island. Experts predict that by 1980 the figure will be between 1,050,000 and 1,180,000. Two hundred thousand more people will need water! Today the average rate of use in the five principal Rhode Island cities is 130 gallons per day per person. By the time our children grow up it will be even higher!

"Let's do something about it—like getting water out of the ocean."

Desalting ocean or brackish water is economically feasible only when there's no less expensive way to get fresh water—in desert places, for instance—and if one can pay the price! Desalinated water production costs are as much as 15 times those of Providence production costs. Mr. Holton, Chief Engineer of the Providence Water Supply Board, recently estimated an industrialist's annual water bill of \$47,000 would cost \$617,000 if it had involved desalinated water. Not many industries would stay in Rhode Island—let alone come here!—at that price.

"Let's use our underground water supplies."

Rhode Island has important ground-water supplies. Our geological surveys of these supplies are extensive. However, experience has demonstrated that large demands for water supply are best—and most economically—served by surface reservoirs. Ground water adequately fills smaller needs. We need both.

"Then what do we do?"

Fortunately, in Rhode Island we still have a few untapped sources for large quantities of good, clean pure water. But a delay in acquiring the necessary reservoir areas can be costly. Already the delay since the 1960 proposal has added more than half a million dollars to the cost of acquisition! This increase will accelerate rapidly in the near future because of large industrial and residential development in these areas.

This is what the Water Reservoir Bond Issue is all about. It enables Rhode Islanders to act now for their future needs.

A well-known, respected, independent engineering firm has found these sites perfect for our purposes. Wood River forms an ideal catchment area; Big River an ideal catchment and storage basin. Used together they will yield more than 60 million gallons per day.

Until construction, the entire area will be under the jurisdiction of an agency appointed by the Governor—possibly Parks and Recreation. Reservoir development takes years from planning to realization. Recreation now, water supply later when needed. This is true conservation of natural resources.

"But the sites are too far away!"

No! Acquisition of the Big River-Wood River sites will benefit communities throughout the State—even towns

across Narragansett Bay. Way back in 1915 a few far-sighted people saw that Providence would eventually need the Scituate reservoir system. Even after 40 years that system is providing fine water to more than half the people of the state. By 1980 more reservoir area will be needed. Big River and Wood River will satisfy this statewide need!

DID YOU KNOW THAT

In the average home with running water we use water in the following amounts.

We use 5 gallons daily to wash, shave and brush our teeth.

Every minute a shower runs, 5 gallons are used.

Every flush of the toilet requires 5 to 7 gallons.

A load of laundry can use as much as 55 to 60 gallons of water for all 3 cycles—suds and 2 rinses.

Automatic lawn sprinklers use as much as 400 gallons per hour. Air conditioners, swimming pools, garbage disposals and automatic dishwashers put a heavy demand on the water supply.

It is expected that the population of Rhode Island will climb between 21.8% and 37.1% by 1980.

Yet we are already short of adequate water supply in many parts of Rhode Island!

We need to act now for an ample supply of good, pure water for the future.

IT'S YOUR WATER RESERVOIR BOND ISSUE

APPROVE
REJECT

Big River-Wood River Reservoir Site Acquisition State Bonds not exceeding \$5,000,000

(Chapter 133—Public laws of 1964)

"Shall the action of the general assembly, by an act passed at the January session, 1964, the short title of which is the 'Big River-Wood River reservoir site acquisition act,' granting authority for the issuance of bonds and temporary notes of the State in an amount not to exceed five million dollars (\$5,000,000), to finance the acquisition by the State of sites for the Big River-Wood River reservoirs and distribution facilities related thereto be approved and the issuance of bonds and temporary notes authorized in accordance with the provisions of said act?"

Quick reasons why we need these reservoir sites

Everybody needs good, clean water. Your children's future health and welfare demand it.

Rhode Island's population is climbing. The use of water is climbing even faster.

Present unpolluted supplies are dwindling.

To solve the problem: The Water Reservoir Bond Issue provides for the purchase of Big River reservoir site and 8 parcels in the Wood River reservoir area.

These sites are recommended by qualified, independent consulting engineers for purchase as your water insurance.

Their acquisition now protects you against exorbitant costs and assures a supply of pure water in the future.

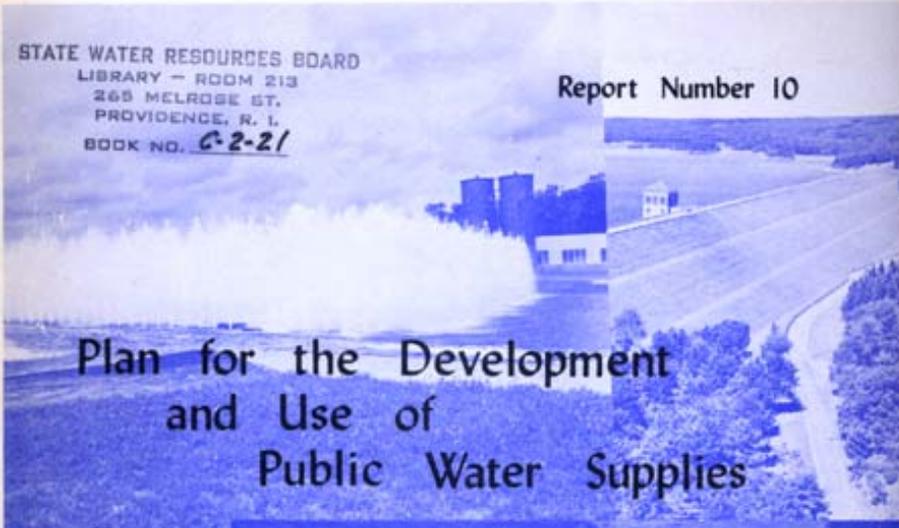
Wood River watershed forms an ideal water collecting area with a safe yield by itself of 25.6 million gallons per day. Big River watershed is ideal as a storage area with a safe yield by itself of 26.4 million gallons per day. When the water from Wood River reservoir is diverted to and stored in Big River reservoir the natural advantages of each are exploited to give a combined safe yield of 60.5 million gallons per day.

The bond issue guarantees—before it is too late—that the acquired areas will be available as drinking water reservoirs.

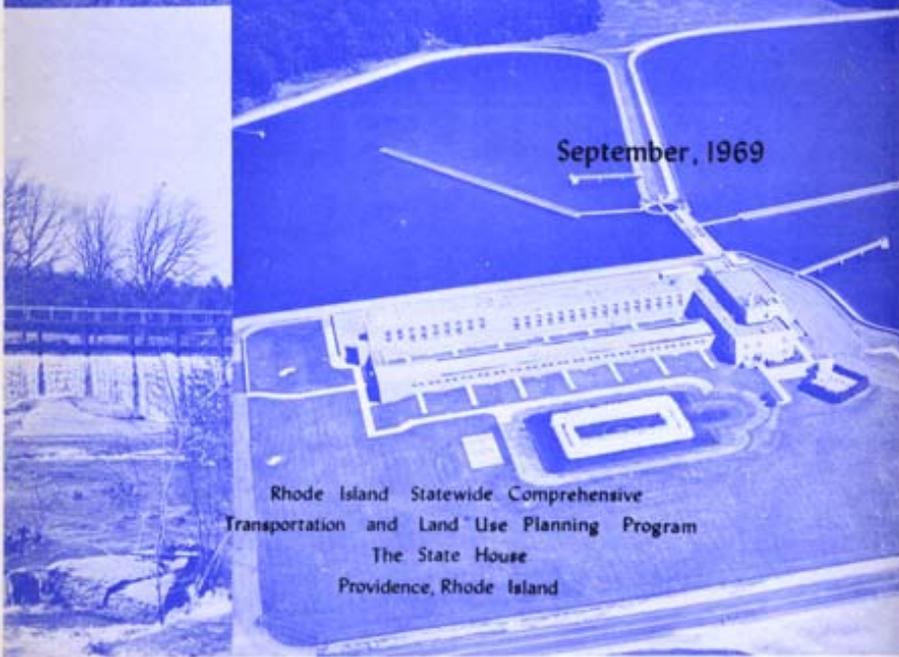
The acquired sites will also serve as recreational areas for years before construction of the reservoirs.

STATE WATER RESOURCES BOARD
LIBRARY - ROOM 213
265 MELROSE ST.
PROVIDENCE, R. I.
BOOK NO. C-2-21

Report Number 10



Plan for the Development
and Use of
Public Water Supplies



September, 1969

Rhode Island Statewide Comprehensive
Transportation and Land Use Planning Program
The State House
Providence, Rhode Island

1969 Plan for the Development and Use of Public Water Supplies Water System Supply Management Issues

- Political boundaries
- Topographical Features
- Supply Quantity Inadequacies
- Supply Quality Inadequacies
- Availability of Funds
- Lack of Coordination Among Suppliers
 - East Providence - Bristol County Water Company
 - Kent County Water Authority - City of Warwick

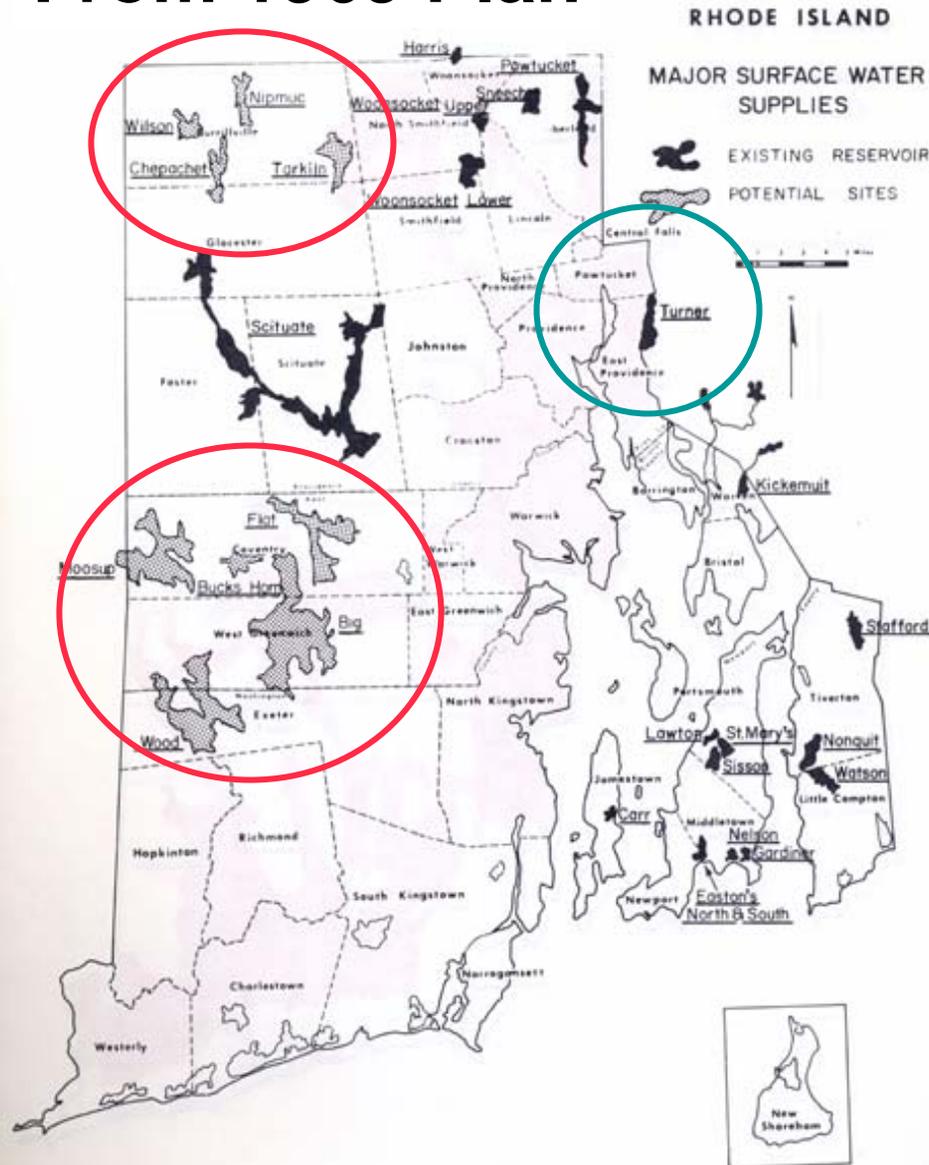
1969 Plan for the Development and Use of Public Water Supplies Groundwater Potential

- “Unless extensive groundwater deposits are concentrated in relatively small areas, their usefulness as major future sources of public supplies will be limited.”
- “Unless the quality of these sources is fairly good, their value will be negligible.”

1969 Plan for the Development and Use of Public Water Supplies Groundwater Potential

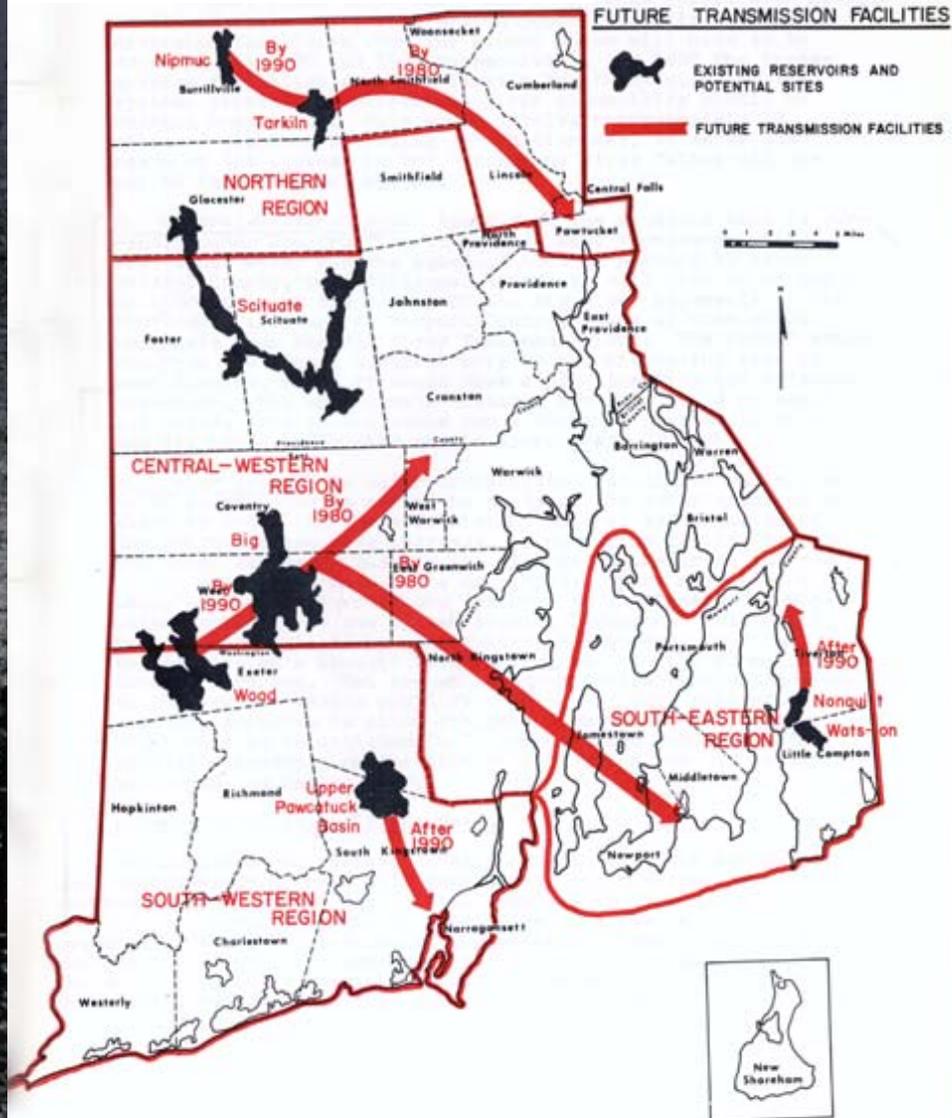
- “A great deal more study and testing must be done before the full potential of ... groundwater sources can be realized.”

From 1969 Plan

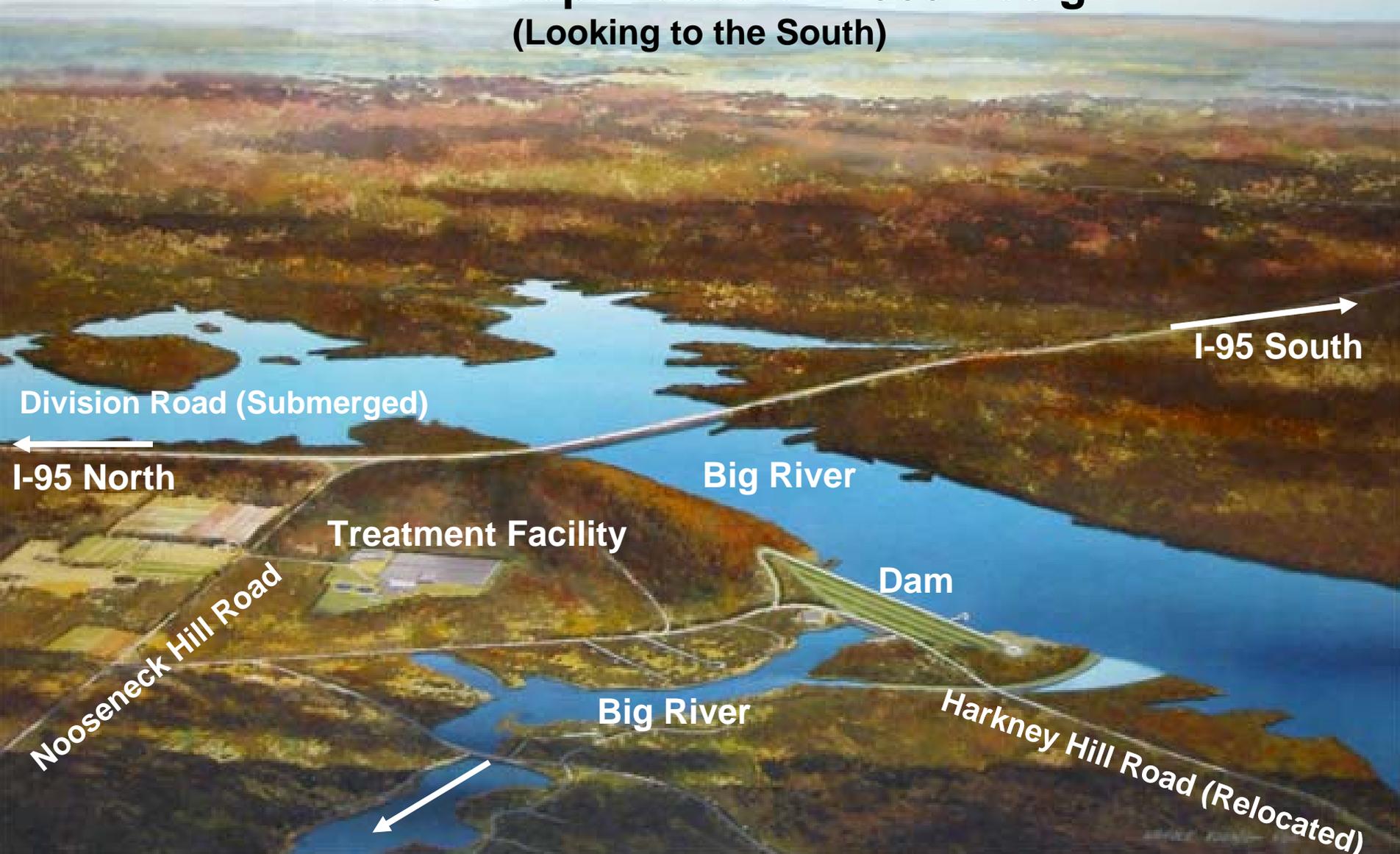


From 1969 Plan

RHODE ISLAND



Rhode Island Water Resources Board
Big River Reservoir
Artist Concept Based on 1989 Design
(Looking to the South)



I-95 South

Division Road (Submerged)

I-95 North

Big River

Treatment Facility

Dam

Nooseneck Hill Road

Big River

Harkney Hill Road (Relocated)

RECOMMENDATION TO PROHIBIT
CONSTRUCTION OF THE BIG RIVER RESERVOIR
PURSUANT TO SECTION 404 (c) OF THE CLEAN WATER ACT

U.S. Environmental Protection Agency
Region I

October 1989

EPA Veto

Stated Reasons

- Wetlands and Other Environmental Impacts
- “any (water supply) need that does exist can be met at far less environmental and economic cost than the proposed (Big River Reservoir) project

EPA Consultant

Suggested Alternative Actions

- Update water use and capacity projections
- Implement Demand Management Programs, including:
 - Pricing (Not All Suggestions Listed)
 - Conservation
 - Drought Management
- Implement Supply Management Programs, including:
 - Groundwater development
 - Develop new surface water impoundments
- Do Not Abandon Existing Supplies



Water Supply Analysis for the State of Rhode Island

Final Report to Rhode Island Water
Resources Coordinating Council—
Summary

Arthur D Little



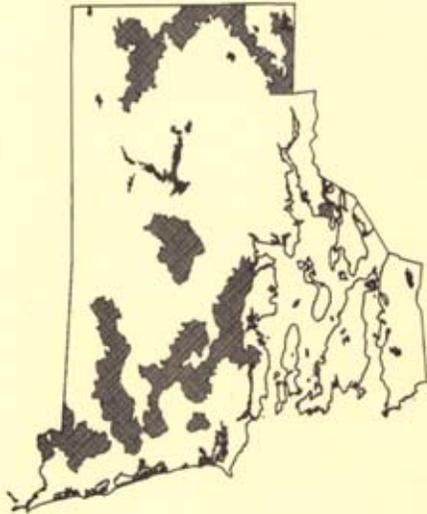
By
Arthur D. Little, Inc.
Beta Engineering, Inc.
CH2M HILL
H₂O Engineering
Consulting Associates, Inc.
Wallace, Floyd, Associates, Inc.

October 1990

Reference 63851

Report Number 77

WATER SUPPLY PLAN FOR RHODE ISLAND



State Guide Plan Element 722

December, 1991

STATE GUIDE PLAN ELEMENT 721
REPORT NUMBER 61

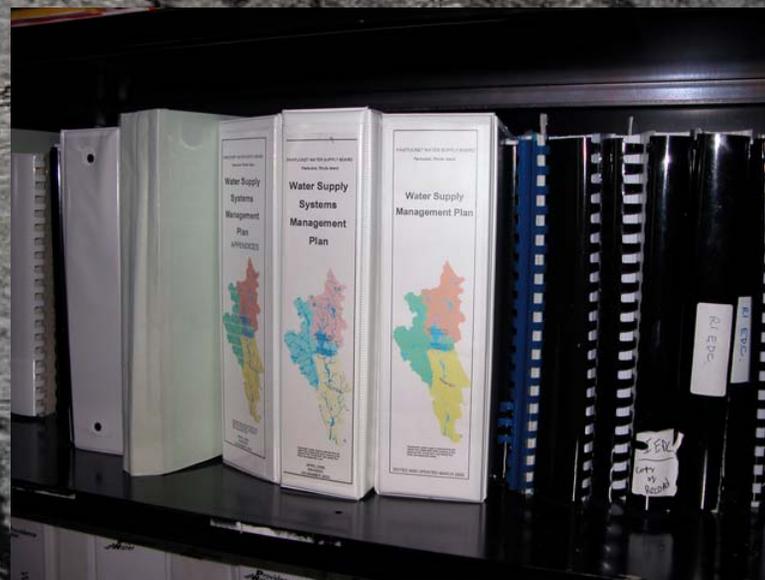
WATER SUPPLY POLICIES FOR RHODE ISLAND



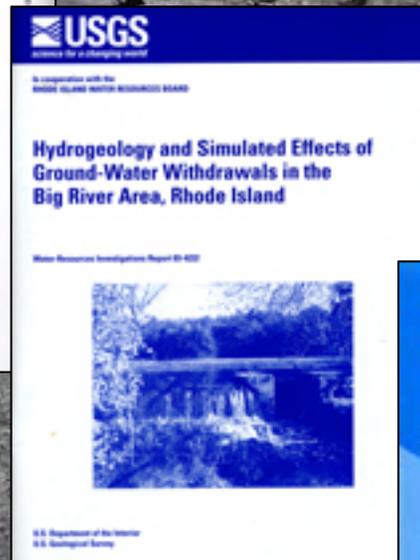
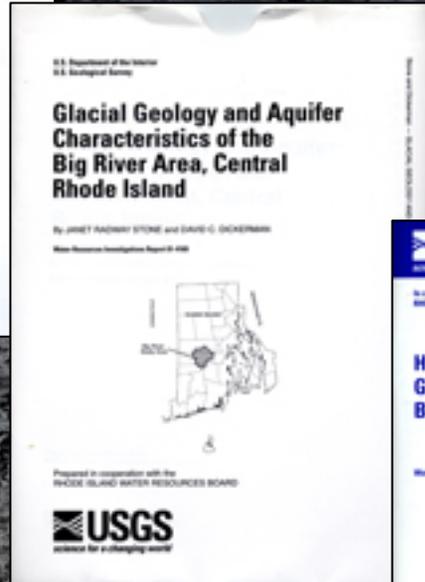
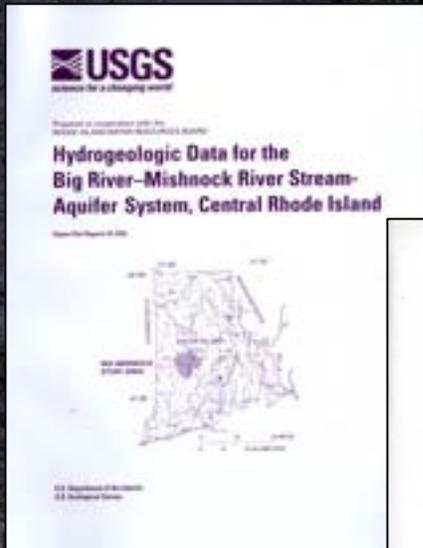
STATEWIDE PLANNING PROGRAM
SEPTEMBER 1997

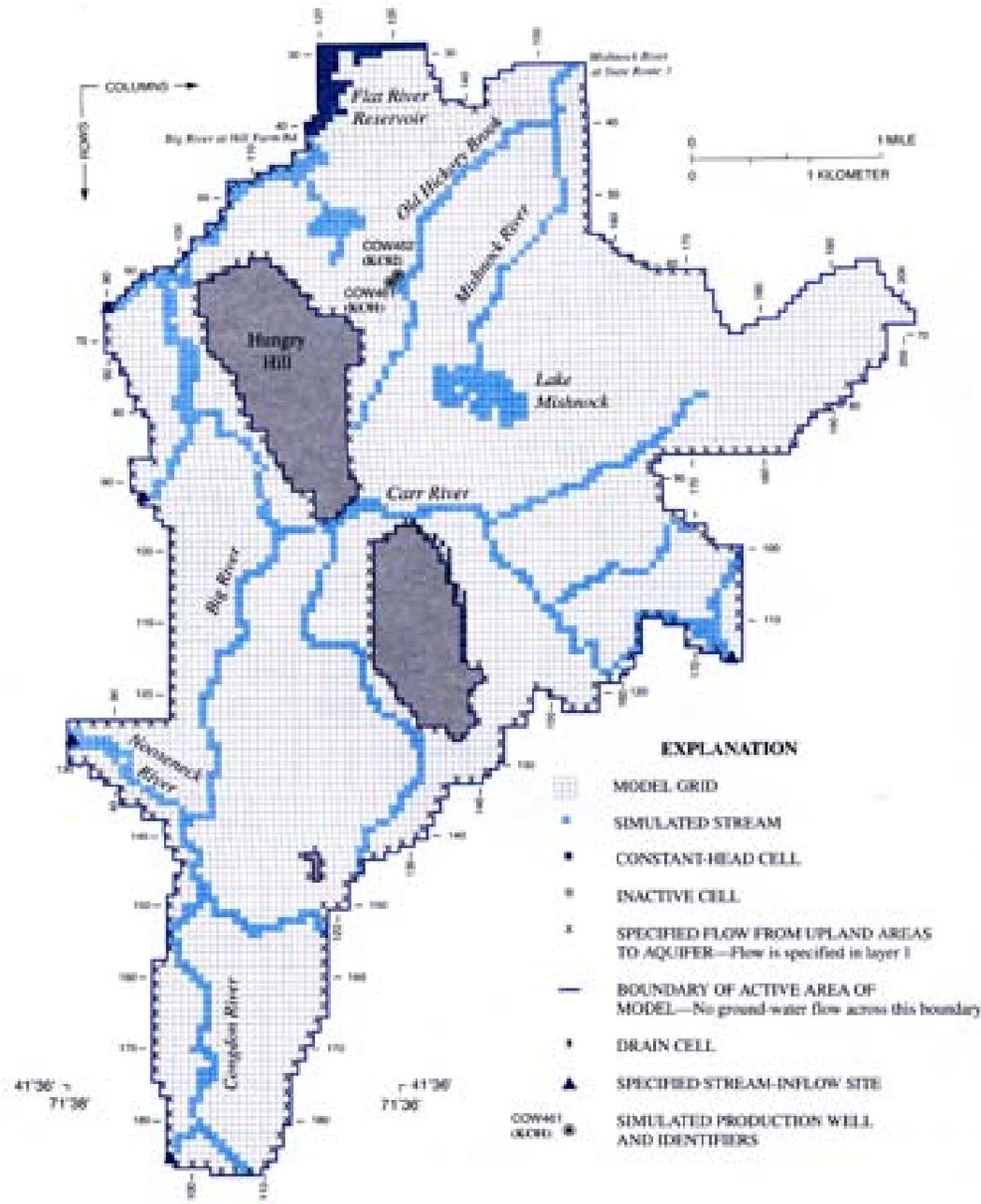
Water System Supply Management Plans

- 1992: Legislative Requirement enacted
- 1997: Responsibility transferred to WRB from DEM
- Plans submitted every 5 years
- Updates required every 30 months



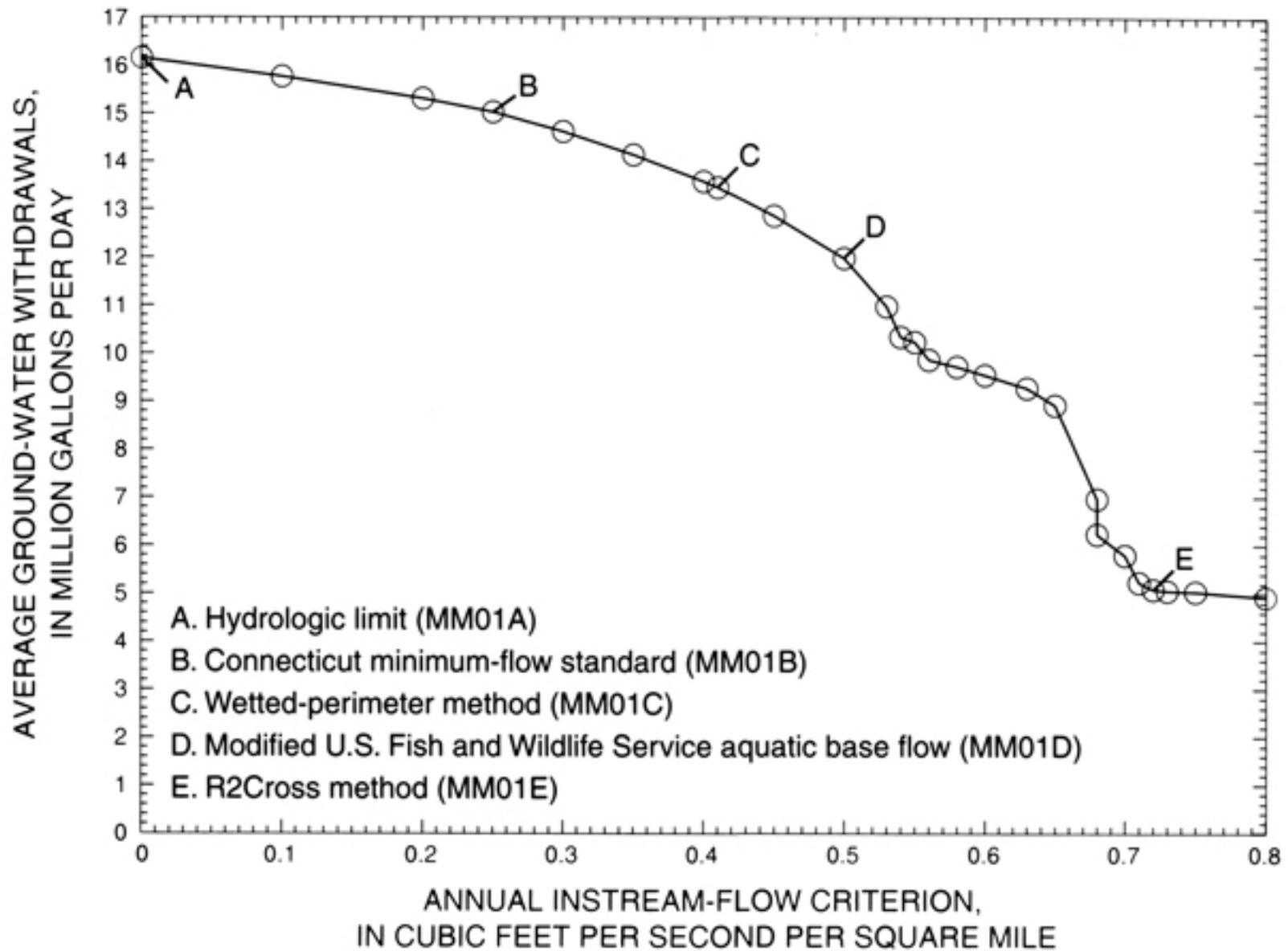
Big River Groundwater Studies





EXPLANATION

-  MODEL GRID
-  SIMULATED STREAM
-  CONSTANT-HEAD CELL
-  INACTIVE CELL
-  SPECIFIED FLOW FROM UPLAND AREAS TO AQUIFER—Flow is specified in layer 1
-  BOUNDARY OF ACTIVE AREA OF MODEL—No ground-water flow across this boundary
-  DRAIN CELL
-  SPECIFIED STREAM-INFLOW SITE
-  SIMULATED PRODUCTION WELL AND IDENTIFIERS





Prepared in cooperation with the
RHODE ISLAND WATER RESOURCES BOARD

**Estimated Water Use and Availability in the Pawtuxet and
Quinebaug River Basins, Rhode Island, 1995–99**



In cooperation with the
Rhode Island Water Resources Board

**Water Use and Availability in the
Woonasquatucket and Moshassuck River Basins,
North-Central Rhode Island**



In cooperation with the Rhode Island Water Resources Board

**Estimated Water Use and Availability in the Pawcatuck
Basin, Southern Rhode Island and Southeastern
Connecticut, 1995–99**



In cooperation with the
Rhode Island Water Resources Board

**Water Use and Availability in the
Woonasquatucket and Moshassuck River Basins,
North-Central Rhode Island**



In cooperation with the
RHODE ISLAND WATER RESOURCES BOARD

**Estimated Water Use and Availability in the
Lower Blackstone River Basin, Northern
Rhode Island and South-Central
Massachusetts, 1995–99**

Water-Resources Investigations Report 03-4190



U.S. Department of the Interior
U.S. Geological Survey



In cooperation with the
Rhode Island Water Resources Board

**Estimated Water Use and Availability in the South Coastal
Drainage Basin, Southern Rhode Island, 1995–99**



Scientific Investigations Report 2004-5288

U.S. Department of the Interior
U.S. Geological Survey

Scientific
U.S. Department
U.S. Geological

Scien
U.S. Dept
U.S. Geol

Water Use and Availability Studies

Water Use and Availability, Block Island, Rhode Island, 2000

*By A.I. Veeger, N.D. Vinhateiro, M. Nakao and P.A. Craft
Department of Geosciences
University of Rhode Island*



RIGS REPORT 03-01
Prepared in Cooperation with the
Rhode Island Water Resources Board
2003

Water Use and Availability, Jamestown, Rhode Island, 2001

*By A.I. Veeger, S. O'Brien and K.E. Ware
Department of Geosciences
University of Rhode Island*



RIGS REPORT 05-01
Prepared in Cooperation with the
Rhode Island Water Resources Board
2005

Drought Management Planning

THE DROUGHT OF '99

Will there be enough water?

Agencies differ over need for conservation

By **PETER B. LORD**
Journal Staff Writer

In West Warwick and Coventry, the local water authority aggressively enforces restrictions on outdoor water use and it does so every summer, not just because the region is struggling with a severe drought.

Just up the road in Cranston and Providence, there are no limitations. You can water your lawn whenever you want, as much as you want.

And in Bristol County, where summer water bans were as predictable as the Fourth of July parade, this year, for the first time, there are no limits at all. In fact, the Bristol County Water Authority has purchased newspaper ads telling customers

DROUGHT UPDATE

A-8

"For the first time in nearly two decades, we can say with a degree of certainty that there will be no restrictions on outdoor water use this summer."

All three localities draw varying amounts of water from one key source, the vast Scituate Reservoir system.

But the rules on how you use the water, and the price you pay, vary from town to town. In this tiny state, there are nearly three dozen major water suppliers and hundreds of smaller ones, and all operate at the whim and judgment of whatever town council, mayor or board is in charge.

As the drought worsens, a clash in philosophies is emerging between the Rhode Island Water Resources Board, which is charged with coordinating water supplies and water conservation efforts throughout the state, and the Providence Water Supply Board, the city department that owns the Scituate Reservoir and delivers water either directly or through local water departments to roughly 600,000 Rhode Islanders.

Since June, the state Water Resources Board has been advising water companies to impose conservation measures.

"I think we're in a very serious situation, and one that is going to require everybody to participate," says M. Paul Sams, general manager of the state board.

Many small water companies have complied.

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of certainty that there will be no restrictions on outdoor water use this summer."

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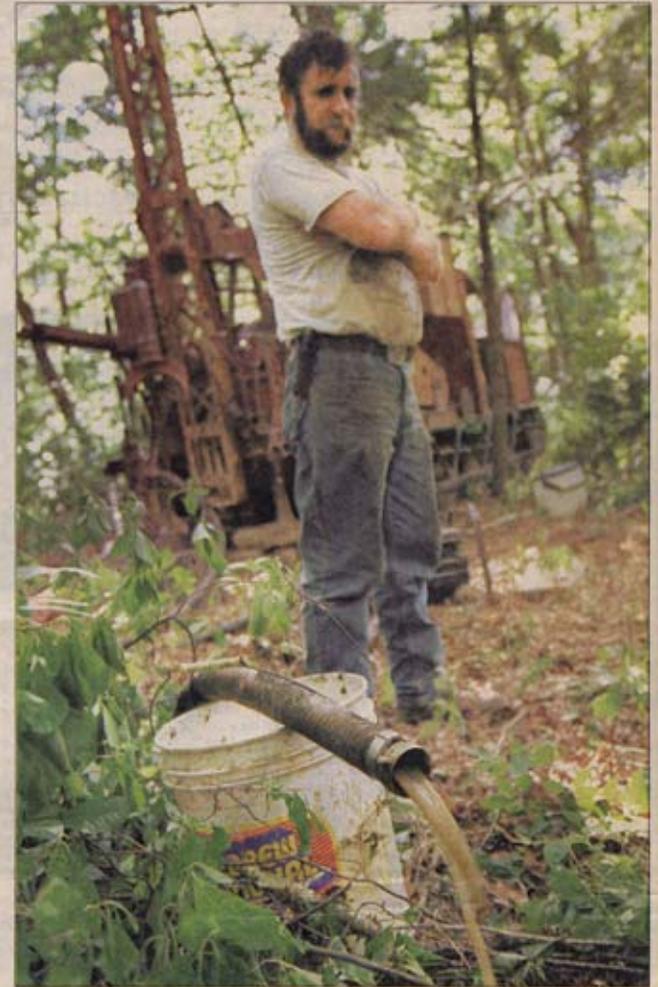
But the rules on how you use the water, and the price you pay, vary from town to town. In this tiny state, there are nearly three dozen major water suppliers and hundreds of smaller ones, and all operate at the whim and judgment of whatever town council, mayor or board is in charge.

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Journal photo by JOHN FREDANI

DIGGING IN: Maynard Marin, of R.E. Chapman Drilling Co., attempts to extract water from a 91-foot-deep test well in Coventry, near Routes 3 and 95.

Turn to **WATER**, Page A-8

RHODE ISLAND DROUGHT MANAGEMENT PLAN

JUNE 2002



Scituate Reservoir, Scituate, RI, June, 2000

Water Resources Board

STATEWIDE PLANNING PROGRAM
Rhode Island Department of Administration
Information Services
One Capitol Hill, Providence, RI 02908
www.planning.state.ri.us

Post Drought Evaluation Report

Drought is an insidious hazard of nature. Although it has scores of definitions, it originates from a deficiency of precipitation over an extended period of time, usually a season or more. This deficiency results in a water shortage for some activity, groups, or environmental sector. Drought should be considered relative to some long-term average condition of balance between precipitation and evapotranspiration (i.e., evaporation + transpiration) in a particular area, a condition often perceived as "normal." It is also related to the timing (i.e., principal season of occurrence, delays in the start of the rainy season, occurrence of rains in relation to principal crop growth stages) and the effectiveness of the rains (i.e., rainfall intensity, number of rainfall events).



Drought should not be viewed as merely a physical phenomenon or natural event. Its impacts on society result from the interplay between a natural event (less precipitation than expected resulting from natural climatic variability) and the demand people place on water supply. Human beings often exacerbate the impact of drought. Recent droughts in both developing and developed countries and the resulting economic and environmental impacts and personal hardships have underscored the vulnerability of all societies to this "natural" hazard.

-What is a Drought? (Excerpt from the National Drought Mitigation Center website (<http://www.znuu.ari.edu/dmcc/>))

Prepared by the Rhode Island Water Resources Board
For the Rhode Island Drought Steering Committee
June 2003

Emergency Interconnections

Rhode Island
Water Resources Board



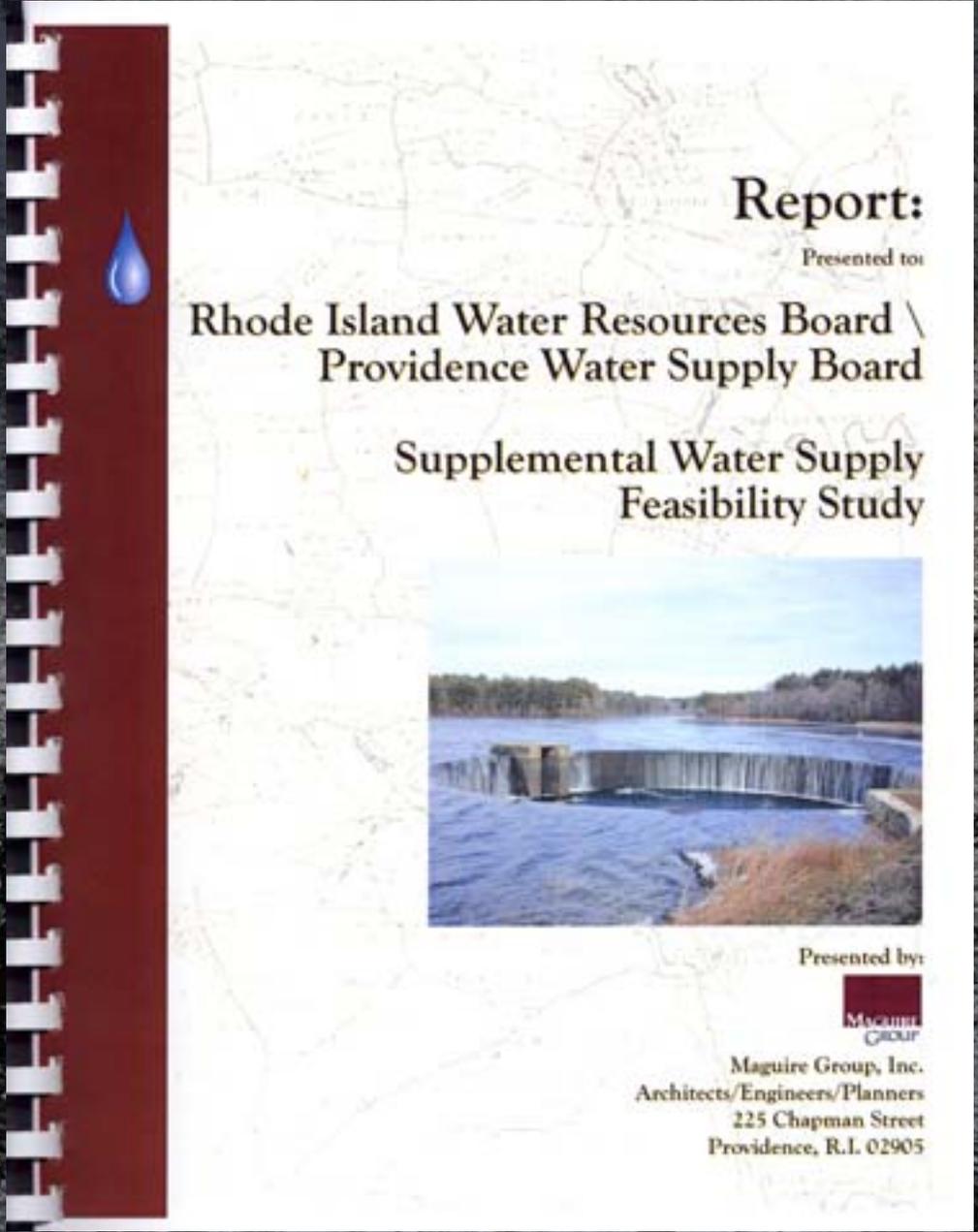
EMERGENCY WATER SYSTEMS INTERCONNECTION STUDY

EXECUTIVE SUMMARY

September 2000

Magnaire Group Incorporated
Engineers • Planners
225 Chapman Street
Providence, RI 02905





Report:

Presented to:

Rhode Island Water Resources Board \
Providence Water Supply Board

Supplemental Water Supply Feasibility Study



Presented by:



Maguire Group, Inc.
Architects/Engineers/Planners
225 Chapman Street
Providence, R.I. 02905

Rhode Island Water Resources Board Legislative Declaration

RIGL 46-15.7

Management of the Withdrawal & Use of the Waters of the State

(4) The Water Resources Board is the state agency which manages the withdrawal and use of the waters of the state of Rhode Island

Rhode Island Water Resources Board Water Management Program

- **Water Allocation Program Advisory Committee Created in June 2002**
- **Interdisciplinary group (60 – 150 persons)**
 - **Public agencies: federal, state, local**
 - **Water Suppliers**
 - **Affected Users & Businesses**
 - **Community & Environmental Groups**
 - **Academics**

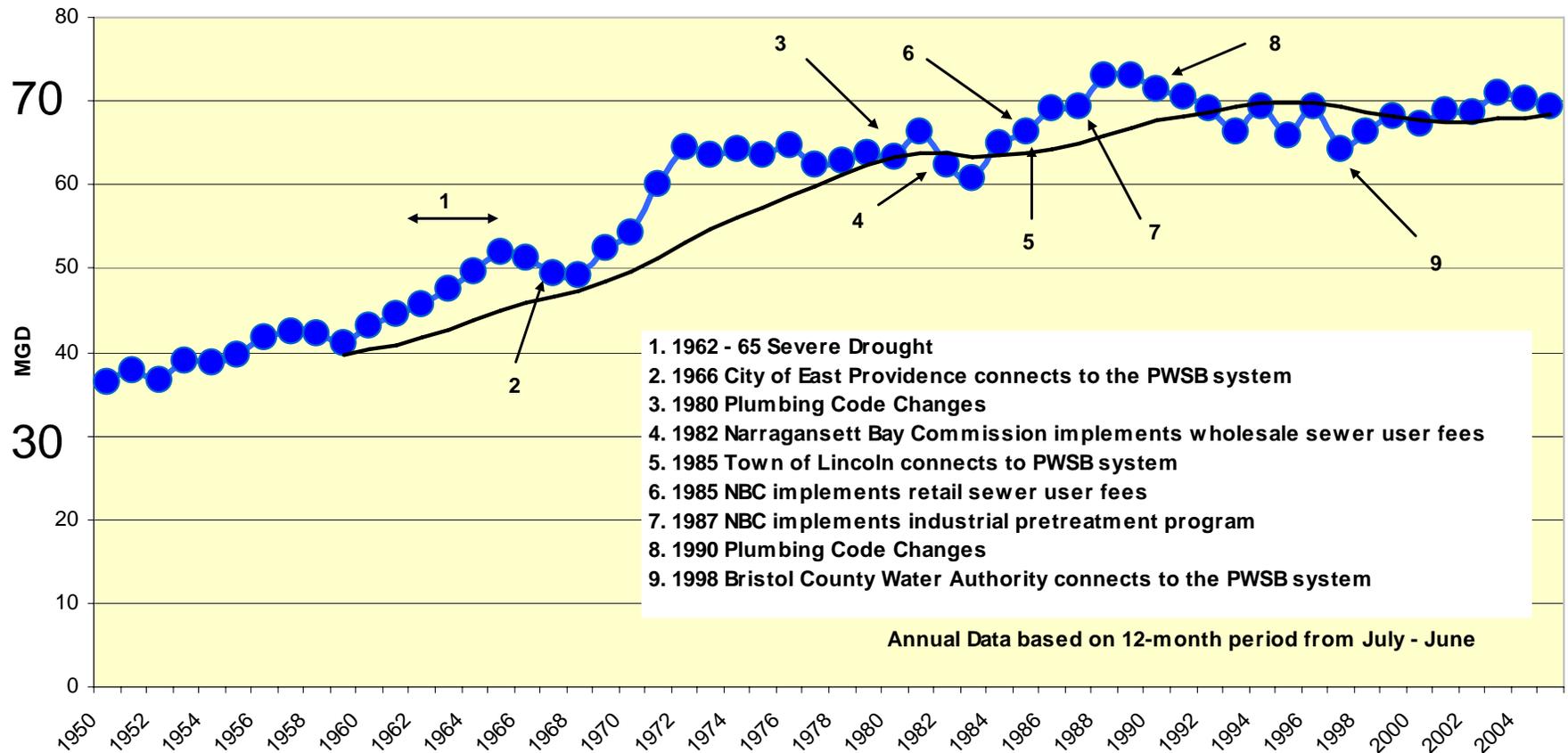
RIWRB Water Management Program Adopted Recommendations

- **Priorities Water Use Policy**
- **Water Management Program (Watershed-Based)**
- **Water Use Reporting**
 - **Mandatory for Major Suppliers**
 - **Voluntary for Minor and Self Suppliers**
- **Streamflow Working Group**
- **Develop Collaborative Education Program**
- **15-person Implementation Team**



Rhode Island Water Resources Board PWSB Scituate Reservoir

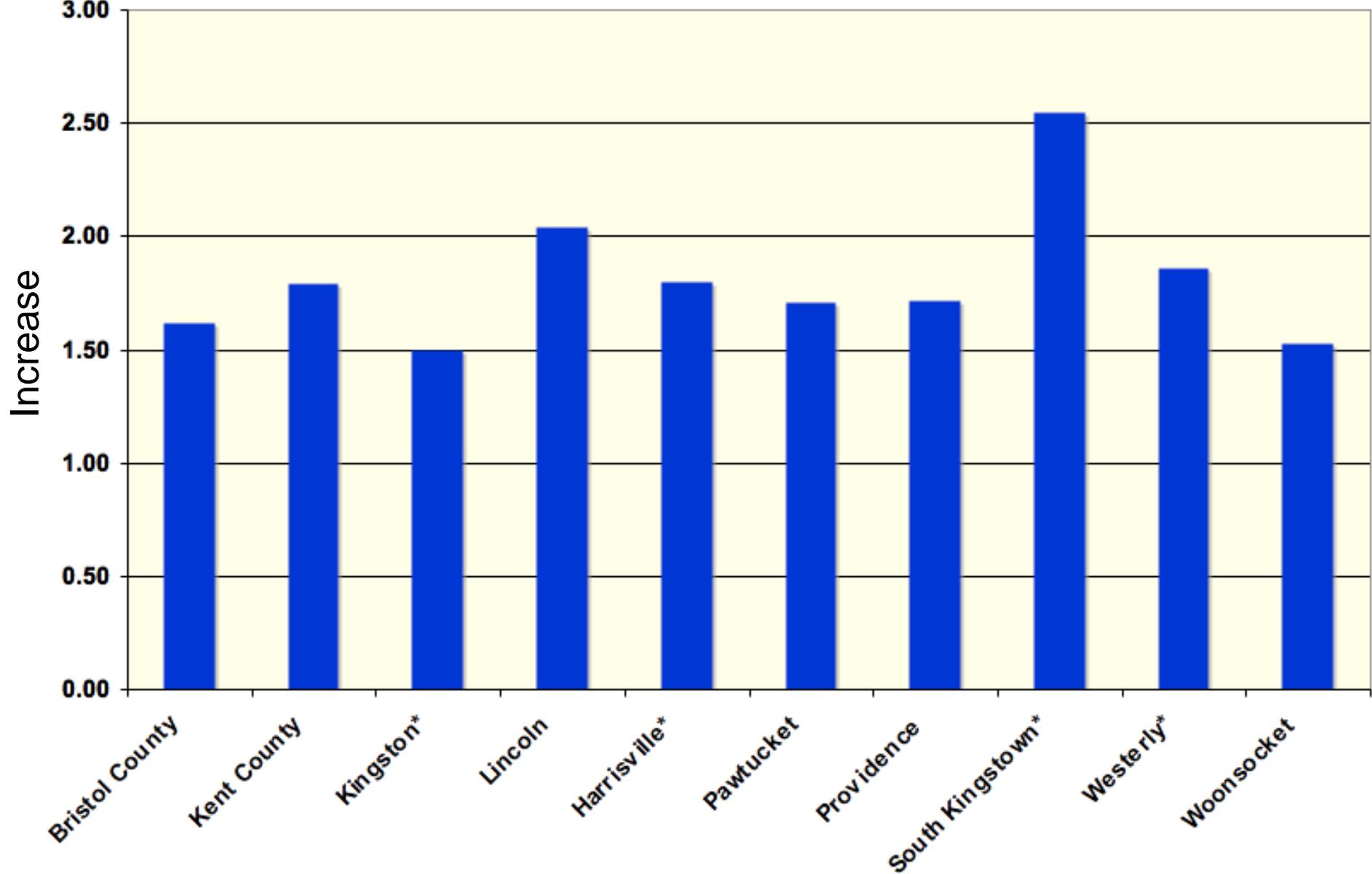
Average Daily Demand, MGD: 1950 - 2004



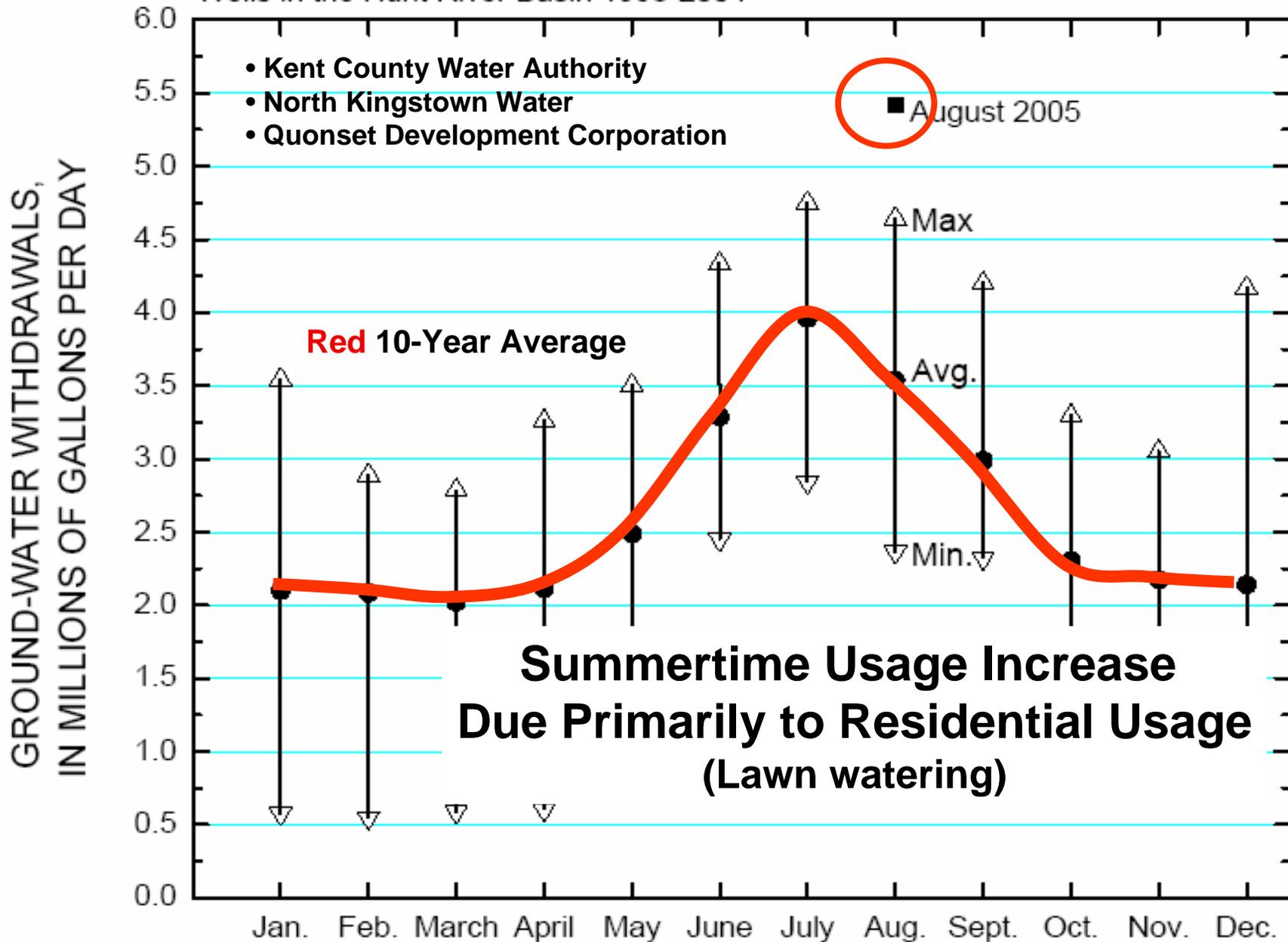
Line graph shows 10-year moving average

Updated 9/12/2006

Maximum Daily Flow VS. Average Daily Flow



Wells in the Hunt River Basin 1993-2004



Rhode Island Water Resources Board Priorities

- **Provide Sufficient Resources to the WRB to address water protection, use, management and conservation issues:**
 - **Funding**
 - **Staffing**

Continued ...

Rhode Island Water Resources Board Priorities

- **Development of Water Management System**
 - Provide Water Data to Cities & Towns
 - Relate new Land Development Projects to Water Availability
 - Amend State Land Use Plan to include Water Related Factors (Adopted)

Continued ...

Rhode Island Water Resources Board Priorities

- **Big River Management Area**
 - **Establish Variable & Sustainable Level for Withdrawal of Groundwater in the BRMA**
 - **Determine Who & How to Develop BRMA Groundwater**
 - **Reduce/Eliminate Trash Dumping at BRMA**

Continued ...

Rhode Island Water Resources Board Priorities

- **Reduce Outdoor Summertime Use**
 - Lawn watering
 - Garden watering
 - Car washing
 - Swimming pools
 - Bathing
- **Reduce Excessive Residential Water Use**
 - Objective 65 gpcd
 - Manage and Reduce Peak Usage

Continued ...

Rhode Island Water Resources Board Priorities

- **Implement Water/Wastewater Reuse & Recycle Programs**
- **Consolidate/ Regionalize Water Systems**
- **Implement Collaborative Water Education Program**

Rhode Island Water Resources Board Next Steps ... ?

- **Change the Way We Manage Water**
- **Can't Assume Water will be Available**
- **Treat Water as the Priority Issue for the State**
- **Address/Modify Residential Use Patterns**
- **Support Land Use Planning Changes**
- **Institute Reuse & Recycling**
- **Implement Statewide Water Awareness Programs**
- **Implement RIWRB Priorities**