RI Water Resource Board

- Goal: Reliable supply to sustain the resources and provide water for people and the environment in the long term

An Overview

- A Scientific Foundation for water resource management
- Stream gages and observation wells
- WRB/USGS studies and investigations
- Water Availability
- Drought indicators
- Water Use
- Water Management

Stream Gages

http://ri.water.usgs.gov

- The statewide stream-gaging network has been continuously collecting streamflow data for more than seventy years.
- For example, Streamflow has been measured for the Pawcatuck River at Wood River Junction (USGS station number 01117500)since 1940.
- The network is jointly funded by the USGS, WRB, DEM, and others.

Observation Wells

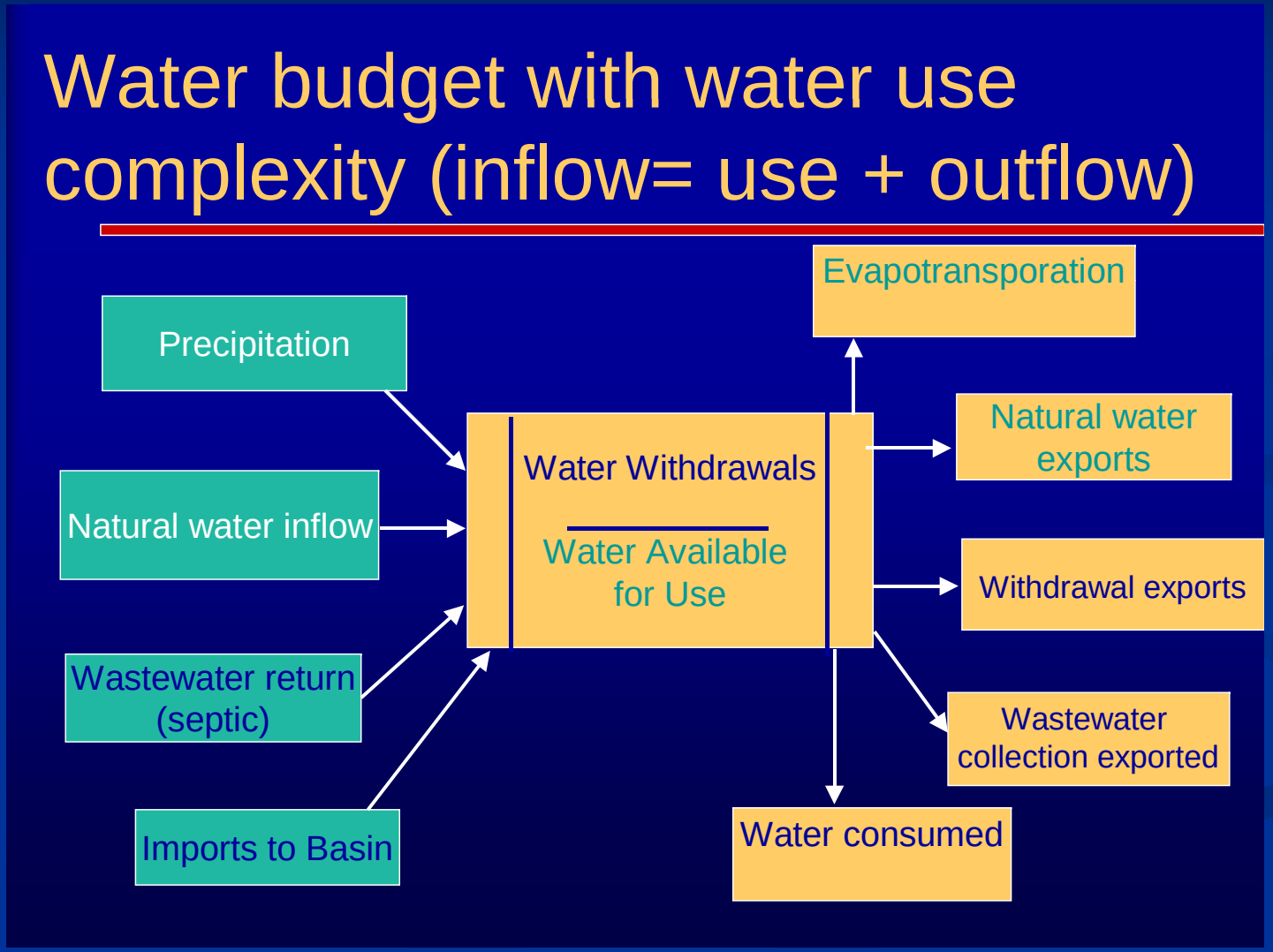
- Ground water levels have been measured in South County Rhode Island since 1950. The data are available in near real-time on the World Wide Web,
- http://ri.water.usgs.gov.

Water Availability- Inventory of State Water Resources

- Stream statistics in progress and Safe yield estimator planned in the future
- Nine basin studies
  - What's a basin/watershed?
  - Estimated Gross yield- how much is there? It depends
    - Precipitation
    - Timing- percentiles (average year, dry year), seasonal
    - Conservative- June, July, August and September.
  - Basin Accounting

Water Availability- Inventory of State Water Resources

Water budget with water use complexity (inflow= use + outflow)

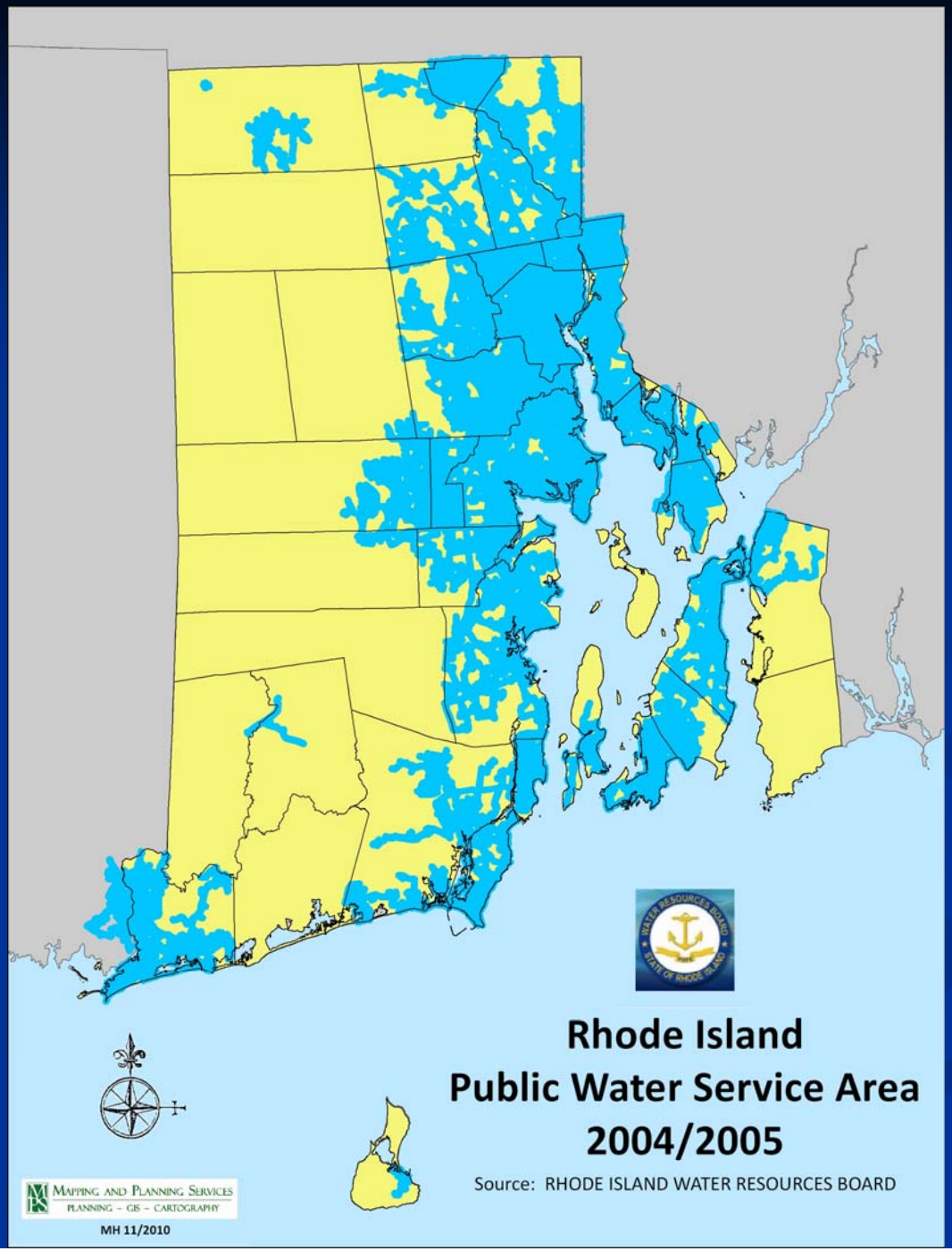


Water Availability- Inventory of State Water Resources

- Sustainable/safe yield- The policy question-How much should we use?
- RIGL 46-15.7-2 defines safe yield as a sustainable withdrawal that can be continuously supplied from a water source without adverse effects throughout a critical dry period with a one percent (1%) chance of occurrence, or one that is equivalent to the drought of record, whichever is worse
- What are adverse effects? What are the indicators?

Water Models

- Big River
  - Hydrology, HSPF model, optimization, revised model to evaluate wetlands
- Pawcatuck
  - Partnered with NRCS
  - HSPF model and selected groundwater modeling
- Blackstone-HSPF
- HAP-existing groundwater model and drought modeling under development
- Future models planned


Rhode Island
Public Water Service Area
2004/2005
Source: RHODE ISLAND WATER RESOURCES BOARD
MAPPING AND PLANNING SERVICES
PLANNING - GIS - CARTOGRAPHY
MH 11/2010

Water Use

- Large ("Major") public water suppliers
- Withdrawal data and metered data
- State wide average day demand for 2005 is roughly equal to 1990.
- Water used for residential purposes is a larger part of the total water use especially in suburban areas of the state.
- Residential demand for water increases in the summer due to increased outdoor water use, increased summer population.

Watersheds

Water districts

Supply distribution

Municipalities

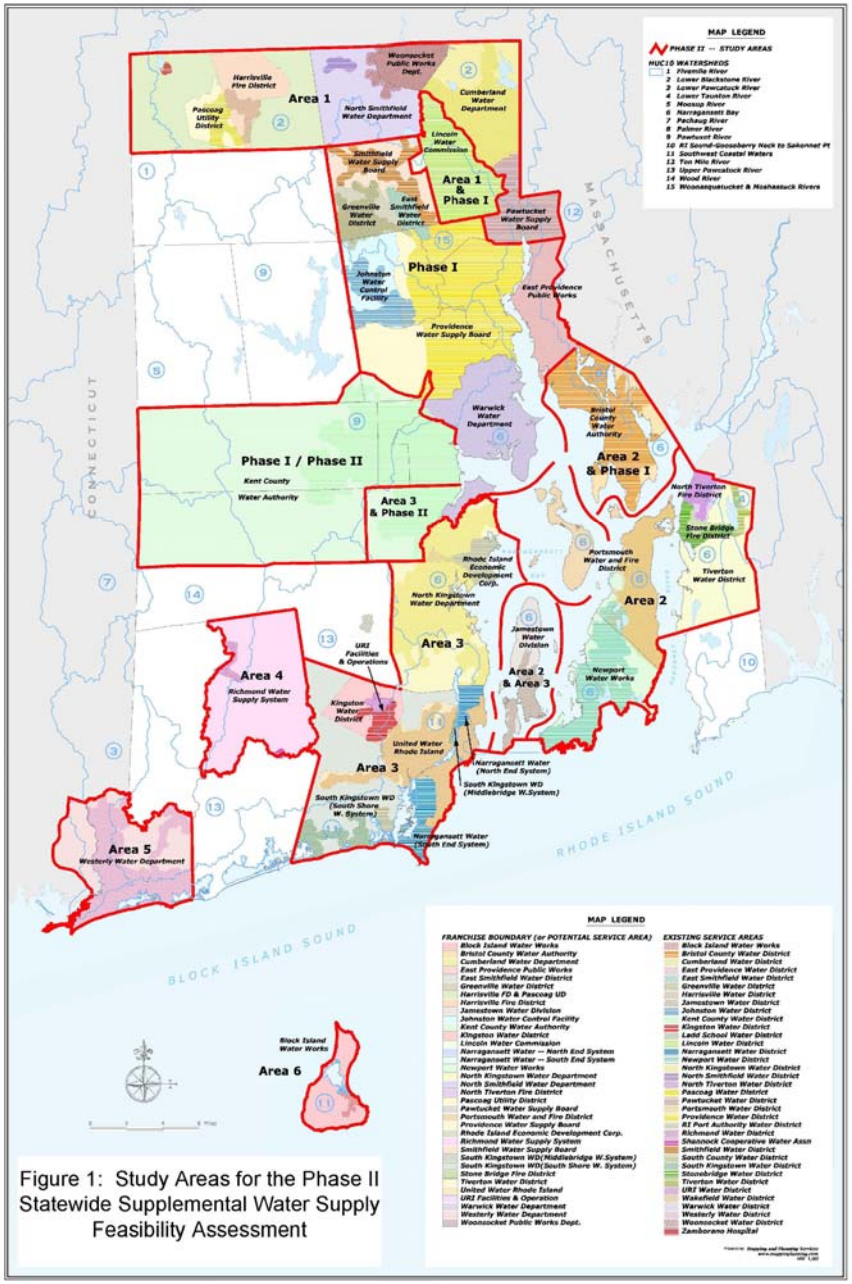


Figure 1: Study Areas for the Phase II Statewide Supplemental Water Supply Feasibility Assessment

Drought Indicators

- Precipitation
- Streamflow
- Groundwater
- Palmer Drought Index/SPI
- Water Supply information (reservoirs and wells)

Drought Indices

Table 724-(3) Rhode Island Drought Indices and Phases

Drought Phase	Palmer Drought Index +	Crop Moisture Index	Precipitation +	Ground Water** +	Stream flow +	Reservoirs**
Normal	-1.0 to -1.99	0.0 to -1.0 Slightly Dry	1 month below normal	1 month below normal	2 consecutive months below normal	Reservoir levels at or near normal for the time of year
Advisory	-2.0 to -2.99	-1.0 to –1.9 Abnormally Dry	2 month cumulative below 65% of normal	At least 2 out of 3 months below normal	3 consecutive months below normal	Small index Reservoirs below normal
Watch	-3.0 to -3.99	-2.0 to –2.9 Excessively Dry	1 of the following criteria met: 3 month cum. < 65% or 6 month cum. < 70% or 12 month cum. < 70%	4-5 consecutive months below normal	At least 4 out of 5 consecutive months below normal	Medium index Reservoirs below normal
Warning	-4.0 and below	> -2.9 Severely Dry	2 out of 3 of the above criteria met: 3 month cum. < 65% and 6 month cum. <65% or 6 month cum. <65% and 12 month cum. <65% or 3 month cum. <65% and 12 month cum. <65%	6-7 consecutive months below normal observation wells recording monthly record lows	At least 6 out of 7 consecutive months below normal	Large index reservoirs below normal
Emergency	-4.0 and below	> -2.9 Severely dry	Same criteria as Warning and Previous month was Warning or Emergency	>7 months below normal observation wells recording monthly record lows	>7 months below normal	Continuation of previous month's conditions

Current Conditions

RI 1 month October 2010	Rainfall	Departure	Percent	Normal
Northwest	4.64	-0.31	94	4.95
Northeast	5.00	0.87	121	4.13
Central West	4.24	-0.13	97	4.37
Central East	4.59	1.05	130	3.54
Eastern	4.72	1.06	129	3.66
Southern	3.87	0.09	102	3.78
New Shoreham	3.61	-0.17	96	3.78

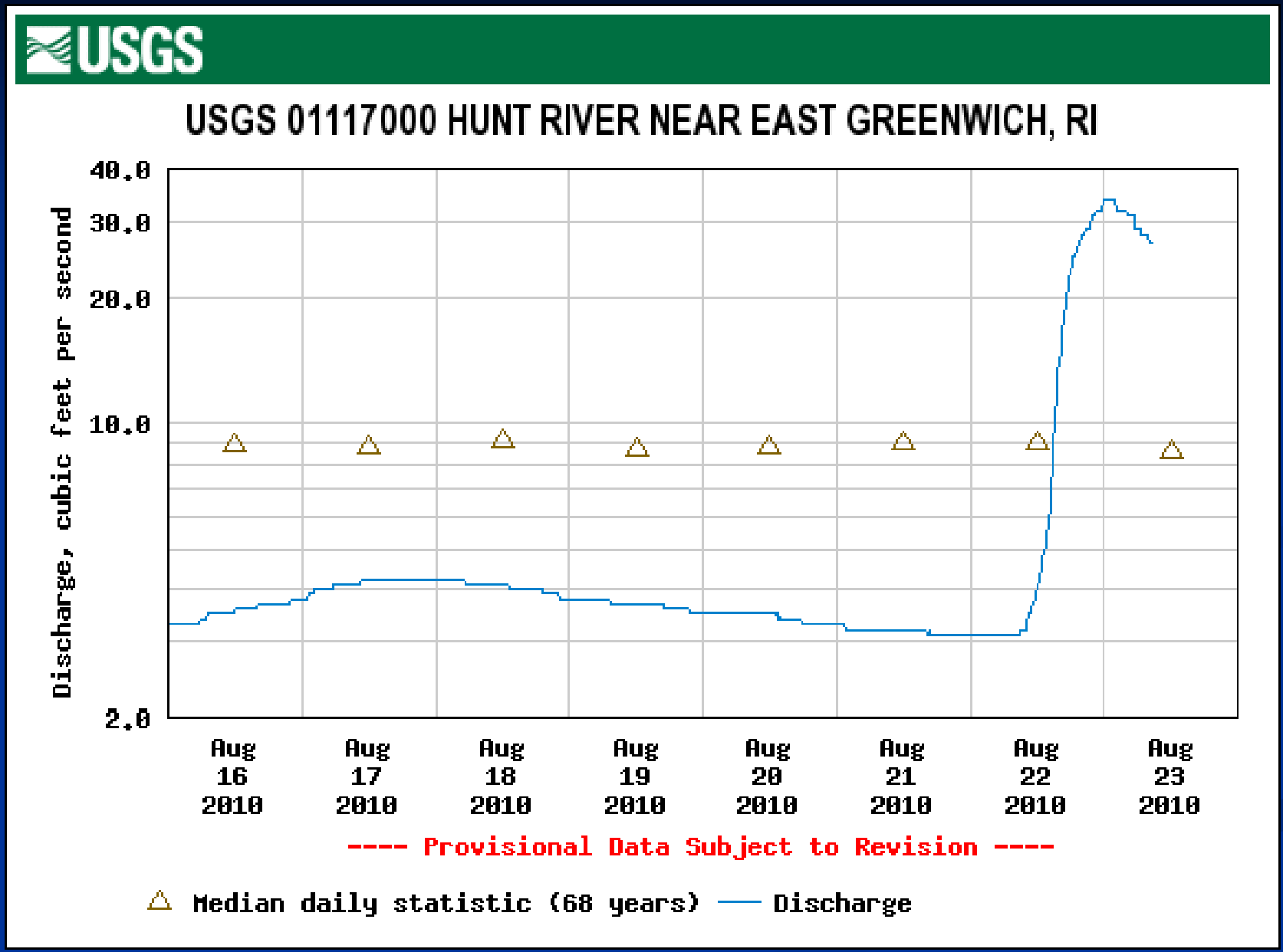
Groundwater conditions

Explanation - Percentile classes (symbol color based on most recent measurement)								
								○ Real Time
Low	<10	10-24	25-75	76-90	>90	High	Not Ranked	□ Continuous
	Much Below Normal	Below Normal	Normal	Above Normal	Much Above Normal			△ Periodic Measurements

http://ma.water.usgs.gov/drought/droughtgw.html

August Conditions

RI 1 month August 2010	Rainfall	Departure	Percent	Normal
Northwest	3.80	-0.71	84	4.51
Northeast	4.59	0.34	108	4.25
Central West	4.04	-0.42	91	4.46
Central East	2.42	-1.48	62	3.9
Eastern	2.22	-1.93	53	4.15
Southern	2.98	-1.27	70	4.25
New Shoreham	3.09	-1.16	73	4.25


USGS
USGS 01117000 HUNT RIVER NEAR EAST GREENWICH, RI
Discharge, cubic feet per second
40.0
30.0
20.0
10.0
2.0
Aug 16 2010
Aug 17 2010
Aug 18 2010
Aug 19 2010
Aug 20 2010
Aug 21 2010
Aug 22 2010
Aug 23 2010
---- Provisional Data Subject to Revision ----
Median daily statistic (68 years)
Discharge

DROUGHT INDICATORS

- TIMING
- DURATION
- IMPACTS
- DATA COLLECTION CONSIDERATIONS

Summary Thoughts

- Support of statewide stream and groundwater monitoring
- Available data, data gaps and lessons learned
- Models
- Using the Statewide inventory of water use and availability
- Water Conditions monitoring for drought
- Conservation, land use and a lawn watering policy