State of Rhode Island and Providence Plantations
Water Resources Board
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Summary of Current Conditions

(Monthly Data through April 30, Selected Updates through May 3, and Forecasts)

Prepared by WRB Staff May 3, 2012

This document is intended to provide Drought Steering Committee (DSC) members with background and current conditions information needed to assess and potentially recommend assigning a drought level. WRB staff plan to provide additional current information and web access to real time stream flow and groundwater information. Representatives from US Geological Survey and the National Weather Service have confirmed their attendance. WRB staff acknowledge the US Geological Survey and the National Weather Service with special acknowledgement to Nicole Belk (NWS), Gardner Bent and Greg Granato (USGS).

BACKGROUND

The Rhode Island Drought Management Plan charges the Water Resources Board with water conditions monitoring and coordination of Drought tracking and response activities. The Plan also establishes the DSC which is advisory to the Board. On an ongoing basis, WRB staff work closely with experts, and stakeholders to evaluate conditions. If conditions warrant, WRB staff convene the DSC. Four major "indices" are used in determining the drought level. Three of the four "triggers" must be met to declare a drought phase. However, the time of year can influence the indices and the process.

On April 12, the DSC met. At that time two of the four major indices had been met. There were concerns about agricultural and environmental impacts resulting from dry conditions particularly given the time of year. Water suppliers reported normal to above normal operating conditions for the time of year. The Committee decided to meet again in early May to assess conditions. The Committee is advisory to the WRB. On April 20 the Water Resources Board met and authorized WRB staff to work with the DSC to assess conditions, recommend an Advisory to the Governor, if warranted and follow up as needed and consistent with the Drought Plan.

Major Drought Indices and "Triggers" for Advisory

Precipitation	**Streamflow**	**Groundwater**	**PDI**	**Drought Phase**
2 month cumulative below 65% of normal	3 consecutive months below normal	At least 2 out of 3 months below normal	-2.0 to -2.99	Advisory

SUMMARY OF CURRENT MONTHLY CONDITIONS as of April 30 (Detailed data attached)

Major Indicators

1. Precipitation-Two and three month cumulative deficit is below 65% which **meets the Advisory criteria.**
2. Stream flow- Three consecutive months below normal which **meets the Advisory criteria.**
3. Groundwater Levels- Two Months below normal which **meets the Advisory criteria.**
4. Palmer Drought Index (PDI) - Normal (mid-range -1.99-+1.99) which **does not meet the Advisory criteria.**

Summary: Three of the four major indicators meet the threshold for issuing a Drought Advisory.

Other Considerations

Precipitation Timing- April brought continued dry conditions until a major precipitation event April 22-23 brought significant rain ranging from 2.5 – 3.9 inches across the state. This was followed closely by a 0.5 inch event and several days of cooler wetter weather with intermittent showers.

Precipitation Forecasts- The 6-10 and 8-14 (May 11-17) day forecasts as of May 3 indicate the probability of below normal temperatures and normal to above normal precipitation.

http://www.cpc.ncep.noaa.gov/

Water Supply

Water Supply Reservoir Levels - The current (May 3) Scituate Reservoir Elevation (feet) 285.21 (104.8 % of Capacity).

Timing/Seasonal Considerations

The downward trends in groundwater and low flows for surface water are of concern for agricultural ecological, and groundwater water supply as we enter a season when these sectors typically require more resources.

Crop Moisture

As of April 30 the weekly crop moisture index was in the +2.0- +2.9 (wet) category.
http://www.cpc.ncep.noaa.gov/products/analysis_monitoring/regional_monitoring/cmi.gif

Fire Danger- low as of May 3, 2012 (National Weather Service, Taunton).

US Drought Monitor- This is a weekly map updated every Thursday by the National Drought Mitigation Center. WRB staff worked very closely with NDMC to review the national indicators and develop RI indicators. The US Drought Monitor acknowledges that it focuses on broad-scale conditions and that local conditions may vary. The May 3, 2012 map shows RI and most of CT and MA in moderate drought conditions. Parts of CT and MA remain in severe drought conditions. The national map continues to classify the conditions as short term (typically < 6 months) with impacts to agriculture, grasslands. http://droughtmonitor.unl.edu/monitor.html . For more information see http://drought.unl.edu/MonitoringTools/USDroughtMonitor.aspx .

Our Neighbors- Connecticut held their interagency drought workgroup meeting on April 24 and decided to meet again in May. They are planning to meet on May 16. Massachusetts met on May 3 and is considering an advisory in two of their drought regions pending more data on the status of small index reservoirs.

ATTACHMENTS:
RI Drought Regions
Precipitation Data through April 30, 2012
Streamflow Data (April Statewide Map and example gage information)
Groundwater Data (April Statewide Map and well data examples)
Palmer Drought Index (A description of the Index and the most current monthly value).
Drought Advisory Actions (from the RI Drought Management Plan)


N
North East Region
North West Region
Central East Region
Central West Region
Eastern Region
Southern Region
New Shoreham Region
RHODE ISLAND SOUND
BLOCK ISLAND SOUND
3 0 3 6 Miles
LEGEND
DELINEATED DROUGHT REGIONS
RHODE ISLAND TOWN BOUNDARY
Figure 724-(4)
RHODE ISLAND DROUGHT REGIONS
MAP BY THE RHODE ISLAND WATER RESOURCES BOARD
ConnDEP

Rhode Island Precipitation
National Weather Service Taunton, MA
Preliminary Precipitation Data (inches) by Drought Region
Past 12 months ending April 2012
Includes CoCoRaHS data

RI 1 month April 2012	Rainfall	Departure	Percent	Normal
Northwest	3.36	-1.34	71	4.70
Northeast	4.20	-0.53	89	4.73
Central West	3.68	-0.92	80	4.60
Central East	3.86	-0.50	89	4.36
Eastern	2.81	-2.01	58	4.82
Southern	3.66	-1.38	73	5.04
New Shoreham	3.70	-1.34	73	5.04

RI 2 month Mar-Apr 12	Rainfall	Departure	Percent	Normal
Northwest	5.05	-5.10	50	10.15
Northeast	6.16	-3.59	63	9.75
Central West	5.43	-4.33	56	9.76
Central East	5.65	-3.72	60	9.37
Eastern	4.68	-5.82	45	10.50
Southern	5.41	-5.17	51	10.58
New Shoreham	5.44	-5.14	51	10.58

RI 3 month Feb-Apr 12	Rainfall	Departure	Percent	Normal
Northwest	6.18	-7.93	44	14.11
Northeast	6.78	-6.52	51	13.30
Central West	6.45	-6.91	48	13.36
Central East	6.70	-5.96	53	12.66
Eastern	5.92	-8.35	41	14.27
Southern	6.76	-7.51	47	14.27
New Shoreham	6.90	-7.37	48	14.27

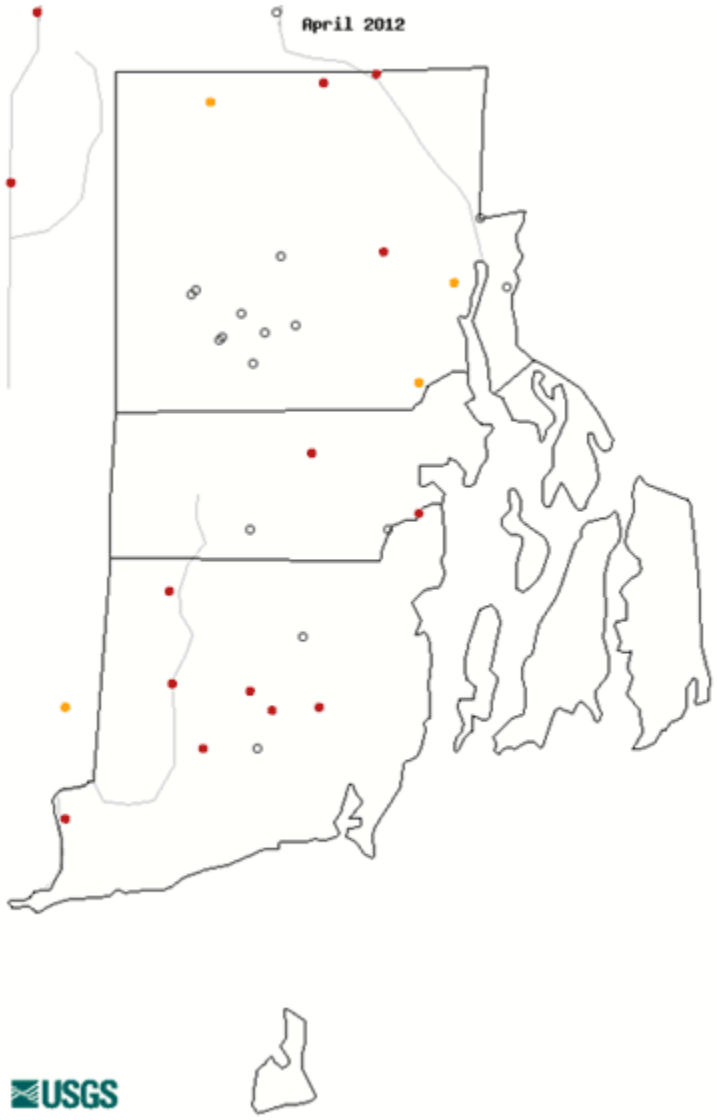
RI 6 month Nov 11-Apr 12	Rainfall	Departure	Percent	Normal
Northwest	18.94	-9.25	67	28.19
Northeast	19.32	-7.58	72	26.90
Central West	19.90	-6.88	74	26.78
Central East	19.46	-5.79	77	25.25
Eastern	18.69	-8.08	70	26.77
Southern	20.07	-8.07	71	28.14
New Shoreham	20.40	-7.74	72	28.14

RI 12 month May 11-Apr 12	Rainfall	Departure	Percent	Normal
Northwest	55.87	2.17	104	53.70
Northeast	54.68	3.26	106	51.42
Central West	55.80	5.03	110	50.77
Central East	52.19	5.01	111	47.18
Eastern	48.79	0.25	101	48.54
Southern	52.70	-0.17	100	52.87
New Shoreham	51.90	-0.97	98	52.87

April 2012 Water Conditions

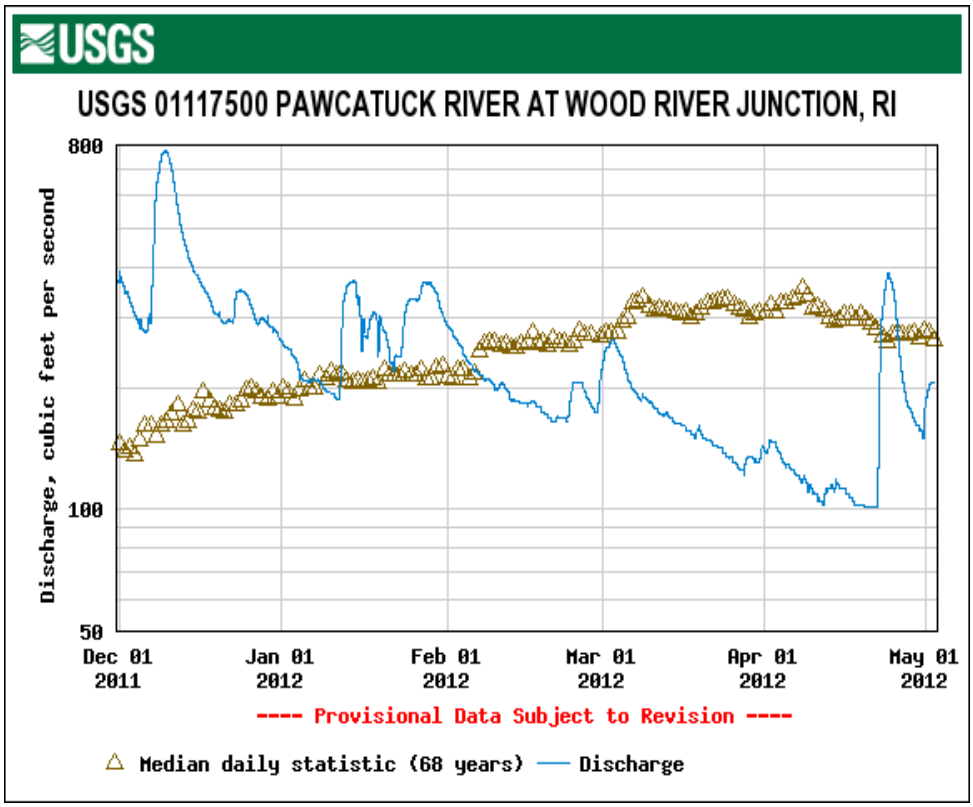
Rhode Island Surface-Water Conditions

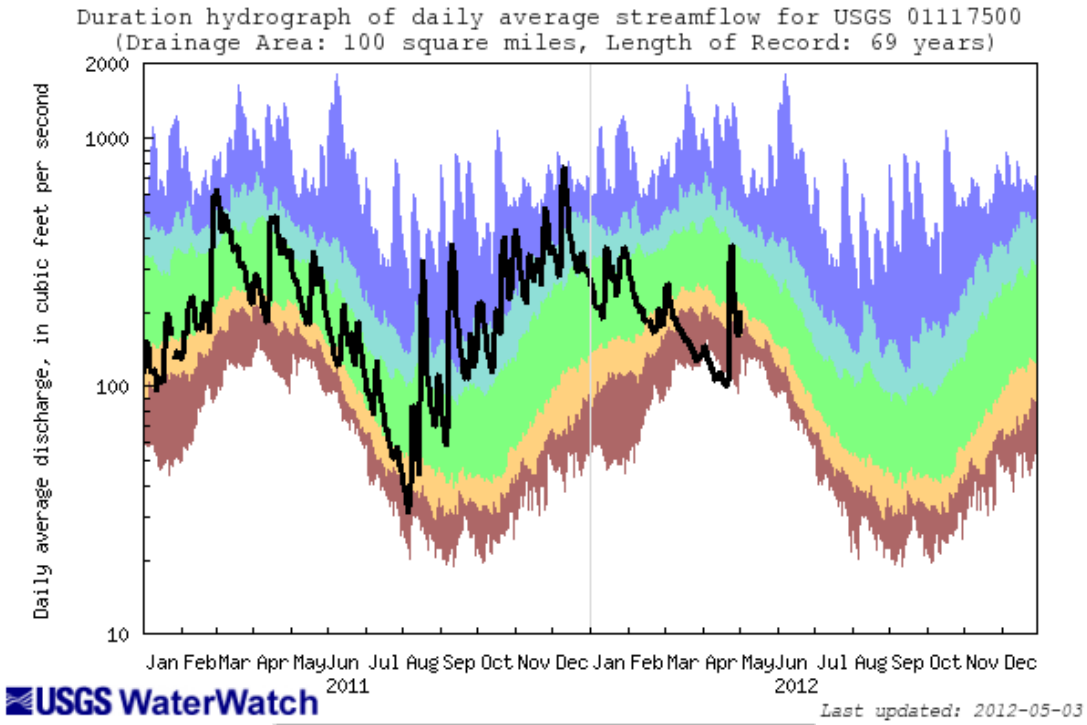
Map of monthly streamflow compared to historical streamflow for the month of the year.



Explanation - Percentile classes						
Low	<10	10-24	25-75	76-90	>90	High
	Much below normal	Below normal	Normal	Above normal	Much above normal	

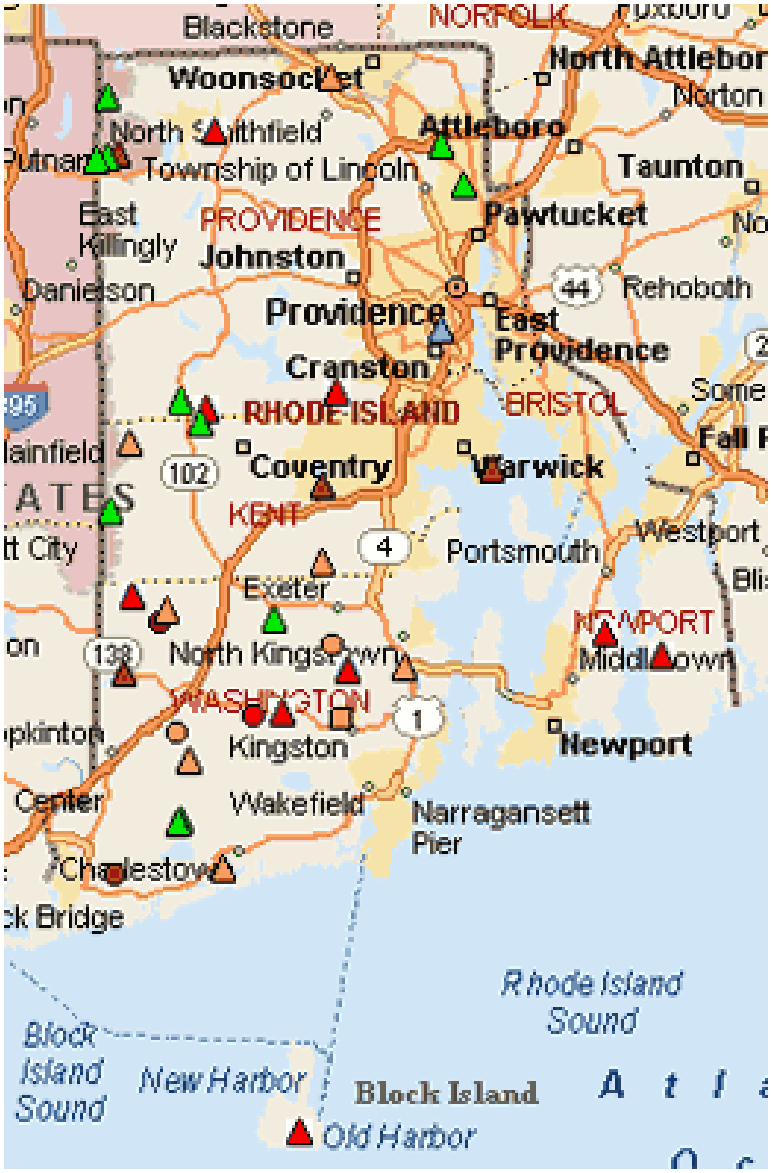
Surface Water Trends and Current Conditions
Selected Data from the Pawcatuck River at Wood River Junction





April 2012 Water Conditions

Rhode Island Groundwater Conditions

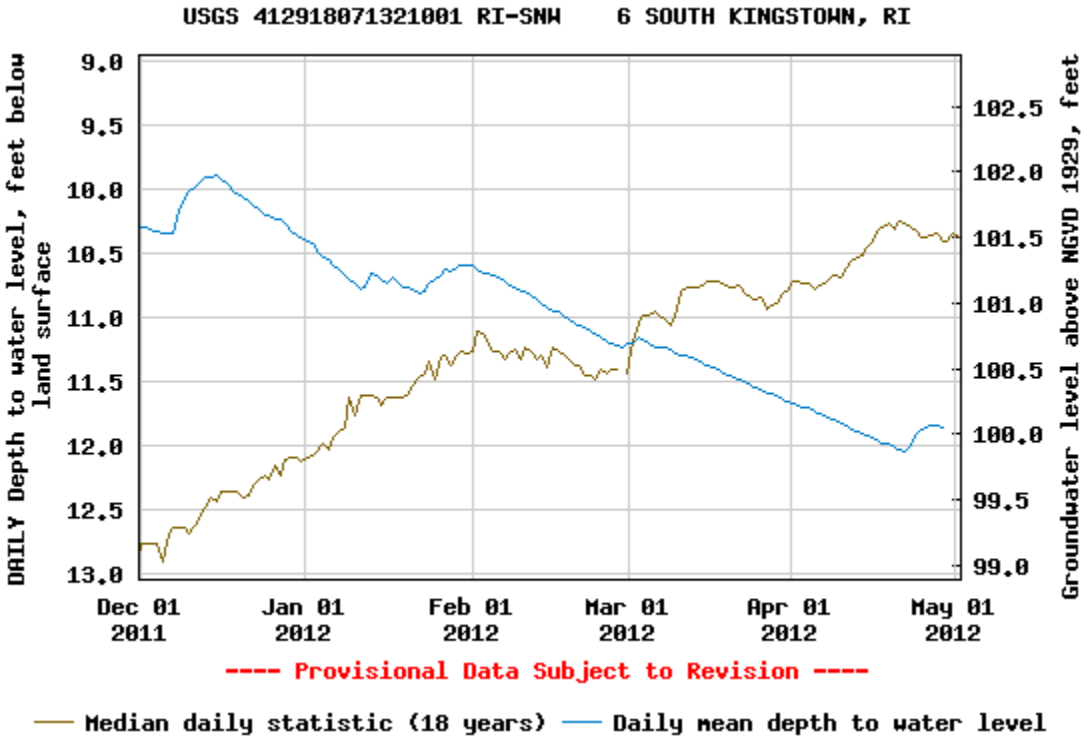


Explanation - Percentile classes								
								Real Time
								Continuous
New Low	<10 Much Below Normal	10-24 Below Normal	25-75 Normal	76-90 Above Normal	>90 Much Above Normal	New High	Not Ranked	Periodic Measurements

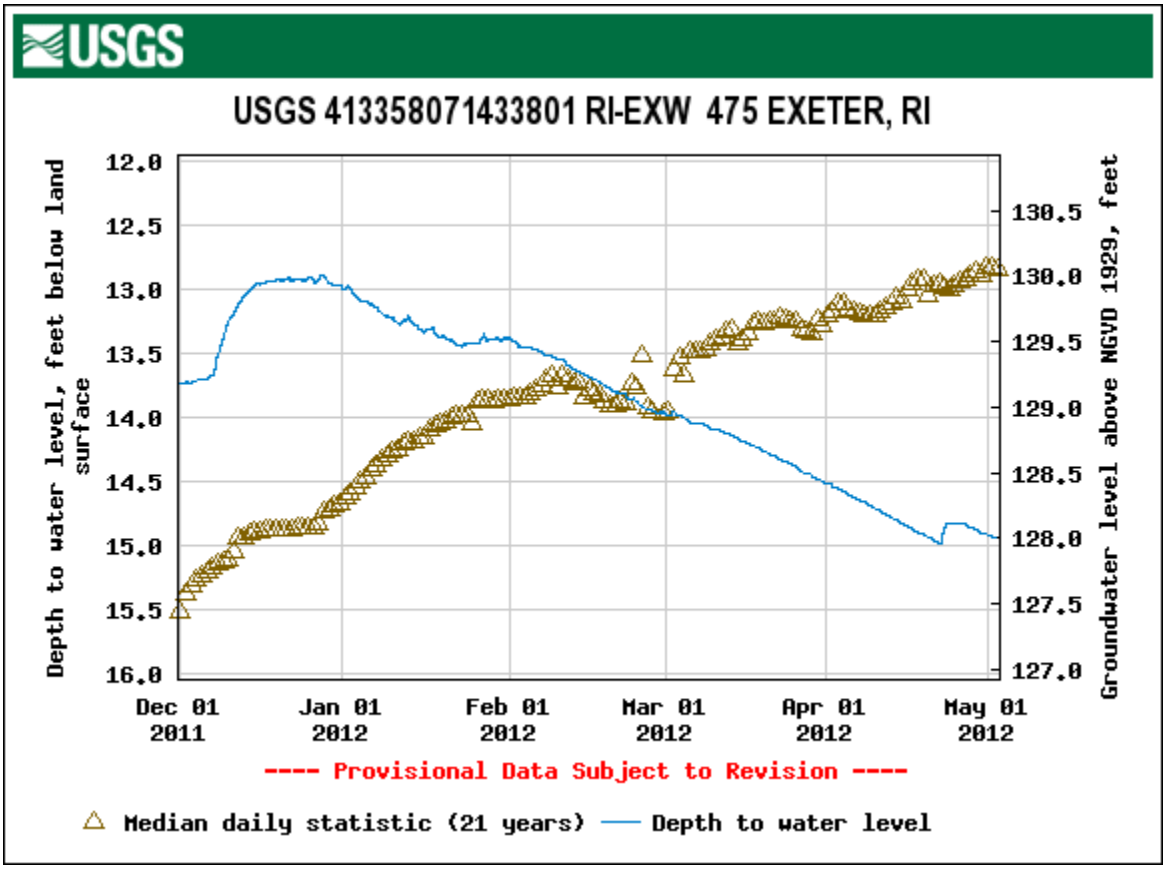
Note: Well levels were measured on April 30 and May 1. A number of the sites that are measured periodically are shown as green or "normal" because they were compared to May values. WRB and USGS staff re-evaluated each well in comparison to the April values for the final monthly status. USGS also performed a weighted analysis of the wells that have served over the years as the index sites for the drought regions. The final determination for the month of April is that statewide groundwater levels are classified as below normal for the month.

Ground Water Trends and Current Conditions
Selected Data from Southern Rhode Island

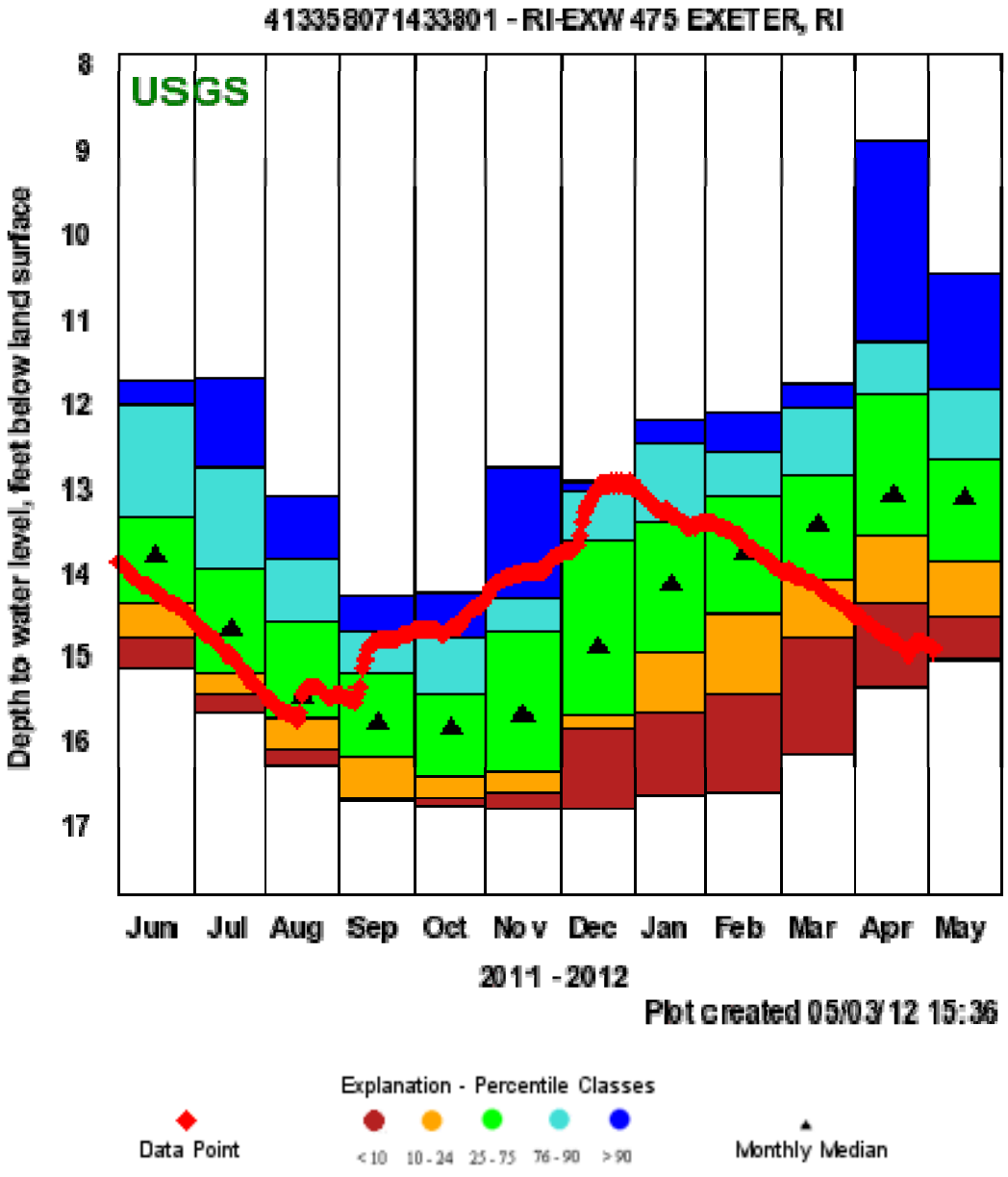
Example 1: South Kingstown USGS Observation Well (Continuous Data Site)



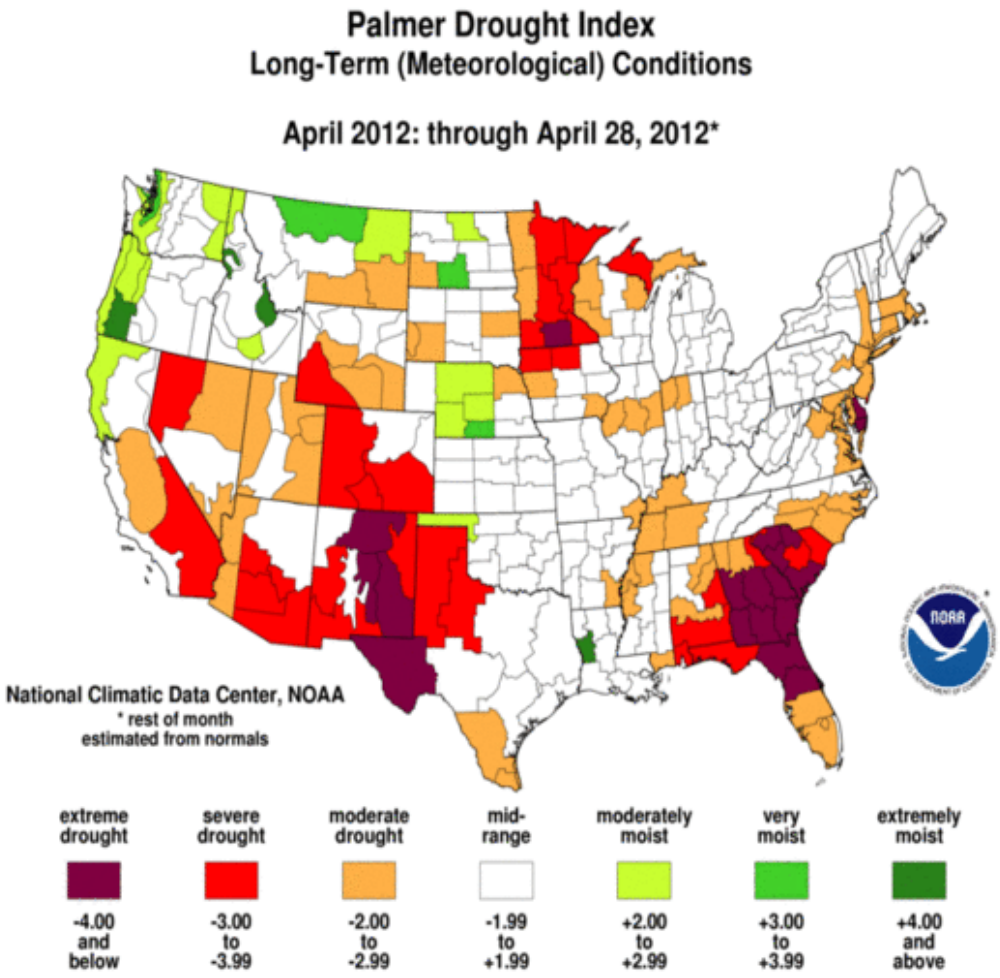
Example 2: Exeter USGS Observation Well (Real Time Data Site) Measurements Compared to the Median



Example 2 (Continued)
Measurements Compared to "Normal" and Median



Note: For the Drought level determinations the 25-75 percentile class is "normal".



From the National Drought Mitigation Center
http://drought.unl.edu/Planning/Monitoring/ComparisonofIndicesIntro/PDSI.aspx
For additional information see also
http://www.ncdc.noaa.gov/oa/climate/research/prelim/drought/palmer.html#drought

Overview: The Palmer is a soil moisture algorithm calibrated for relatively homogeneous regions.

Who uses it: Many U.S. government agencies and states rely on the Palmer to trigger drought relief programs.

Pros: The first comprehensive drought index developed in the United States.

Cons: Palmer values may lag emerging droughts by several months; less well suited for mountainous land or areas of frequent climatic extremes; complex—has an unspecified, built-in time scale that can be misleading.
Developed by: W.C. Palmer, 1965.

Weekly maps: from the Climate Prediction Center
http://www.cpc.ncep.noaa.gov/products/analysis_monitoring/regional_monitoring/palmer.gif

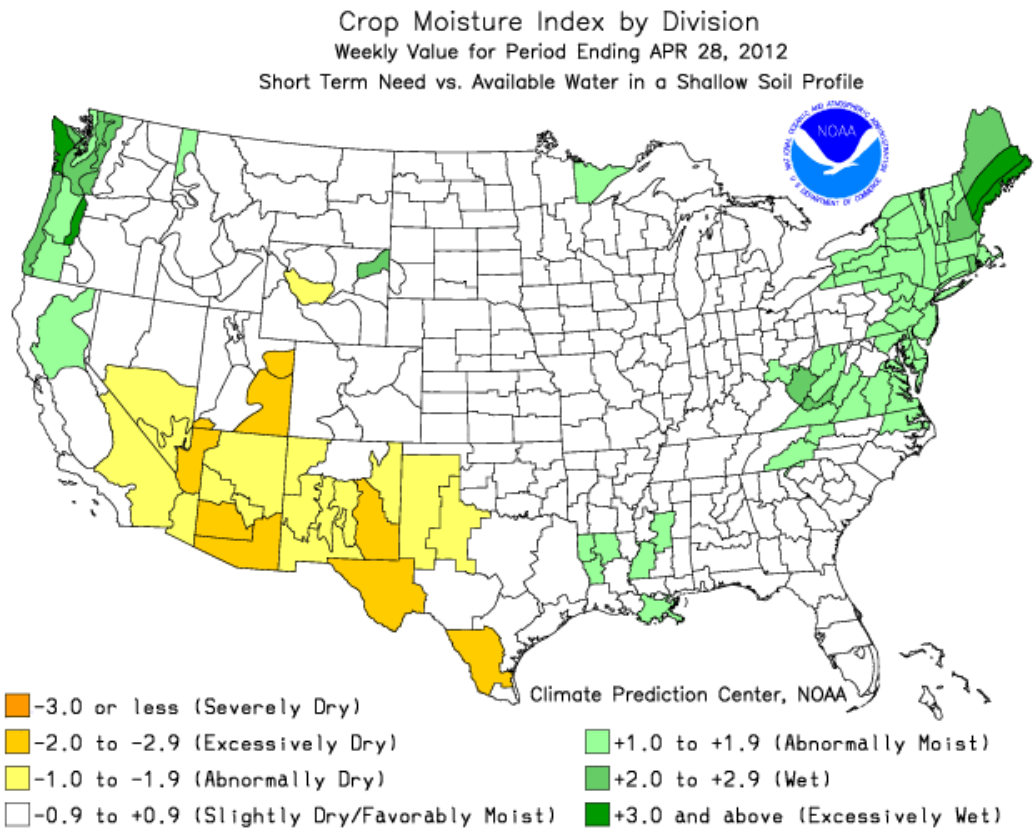
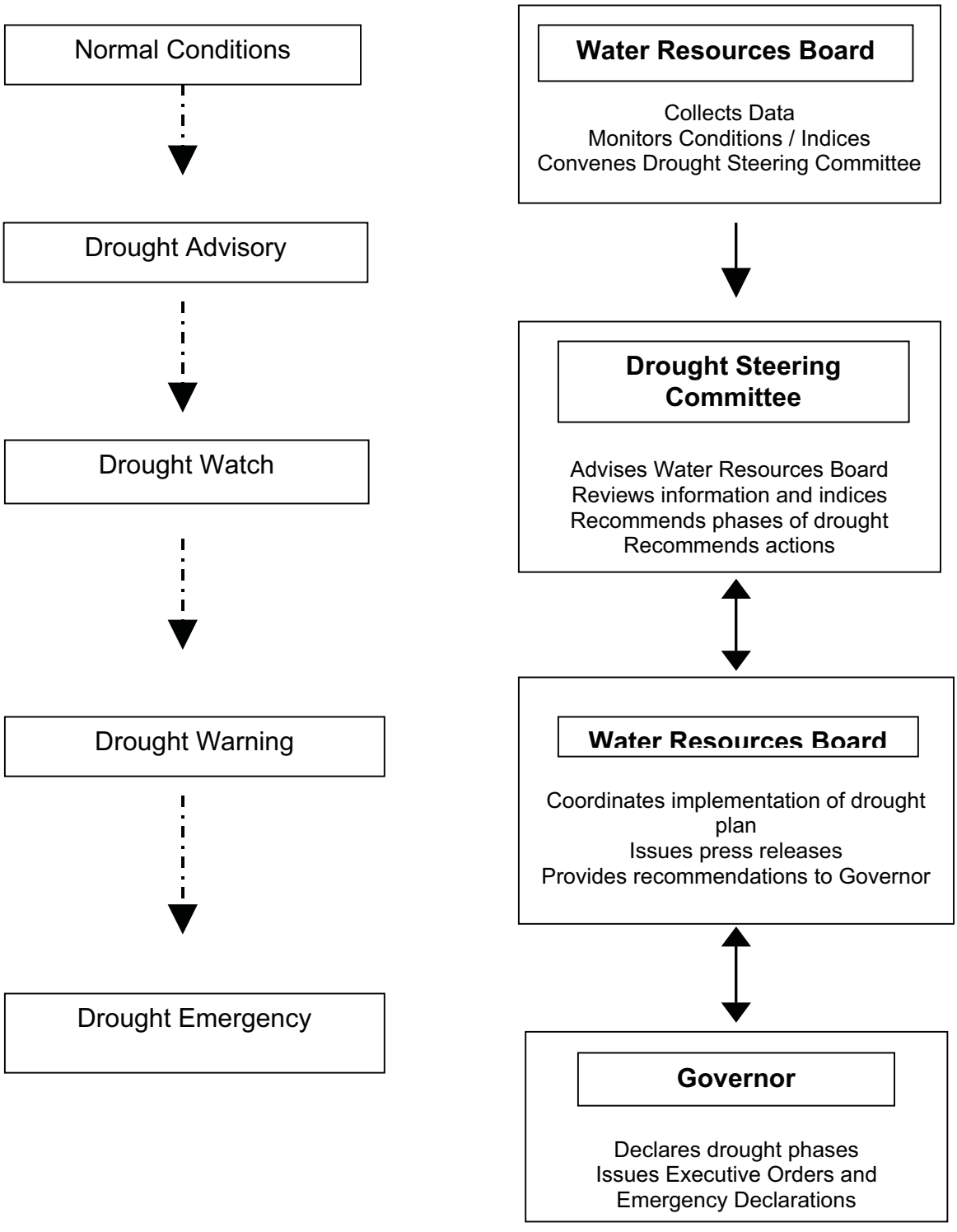

Crop Moisture Index by Division
Weekly Value for Period Ending APR 28, 2012
Short Term Need vs. Available Water in a Shallow Soil Profile
NOAA
Climate Prediction Center, NOAA
-3.0 or less (Severely Dry)
-2.0 to -2.9 (Excessively Dry)
-1.0 to -1.9 (Abnormally Dry)
-0.9 to +0.9 (Slightly Dry/Favorably Moist)
+1.0 to +1.9 (Abnormally Moist)
+2.0 to +2.9 (Wet)
+3.0 and above (Excessively Wet)

Figure 724-(3)
Rhode Island Drought Management Process



04-08 Rhode Island Drought Management Actions

This section describes the drought management actions for each of the five phases of drought. The process evolves from general information collection and sharing under normal or drought advisory conditions to preparation and declaration of an emergency situation by the Governor for drought emergencies. All response actions in early phases of drought will be continued in later phases of drought as needed. A given drought action phase can change in one of three ways:

1. If conditions worsen and reach the criteria for the next most severe drought phase, the drought severity level will be increased accordingly.

2. If conditions persist but do not reach the next phase, the drought phase will be held constant.

3. If conditions begin to improve the drought phase may be reduced.

In all cases, the Water Resources Board, as advised by the Drought Steering Committee, will recommend to the Governor whether conditions warrant a change in drought phase. Once the precipitation index triggers a drought phase of warning or emergency, conditions must improve beyond the previous level to reduce the drought phase. Table 724-(5) Rhode Island Drought Management Actions on the following pages lists the actions to be undertaken during the five phases of drought.

Table 724-(5) RHODE ISLAND DROUGHT MANAGEMENT ACTIONS
Drought Phase: **Normal**
1. WRB collects basic weather and hydrological data. 2. USGS monitors surface and groundwater levels. 3. WRB works with municipalities on drought related contingency plans and to adopt drought related ordinances.
Drought Phase: **Drought Advisory**
1. WRB communicates with public, municipalities and water suppliers about dry conditions. 2. WRB convenes Drought Steering Committee and recommends to the Governor to declare an advisory phase. 3. WRB develops press announcements as advised by the Drought Steering Committee. 4. WRB collects information and advises Drought Steering Committee on list of water restrictions. 5. WRB coordinates regular meetings of the Drought Steering Committee to review information and circulate educational materials. 6. WRB works with DEM and USGS in order to expand data collection and monitoring. 7. WRB forwards “Current Conditions” report to the Drought Steering Committee, general public, municipalities and major water suppliers. 8. WRB develops and recommends statewide voluntary conservation measures and begins public awareness campaign on water conservation. 9. WRB works with the DEM and USGS to measure stream flow and groundwater levels and to relay this data to farmers, golf courses, other water users and watershed councils in the affected watershed(s). 10. DEM-Agriculture mails listing of water conservation techniques to farmers, requests farmers to conserve, and initiates appropriate steps of the Drought Response Plan for Agriculture (See Appendix E). 11. WRB offers technical assistance to water suppliers to enhance efficiency of their major users