

Water Conservation

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How We Got Here and Where are We Going

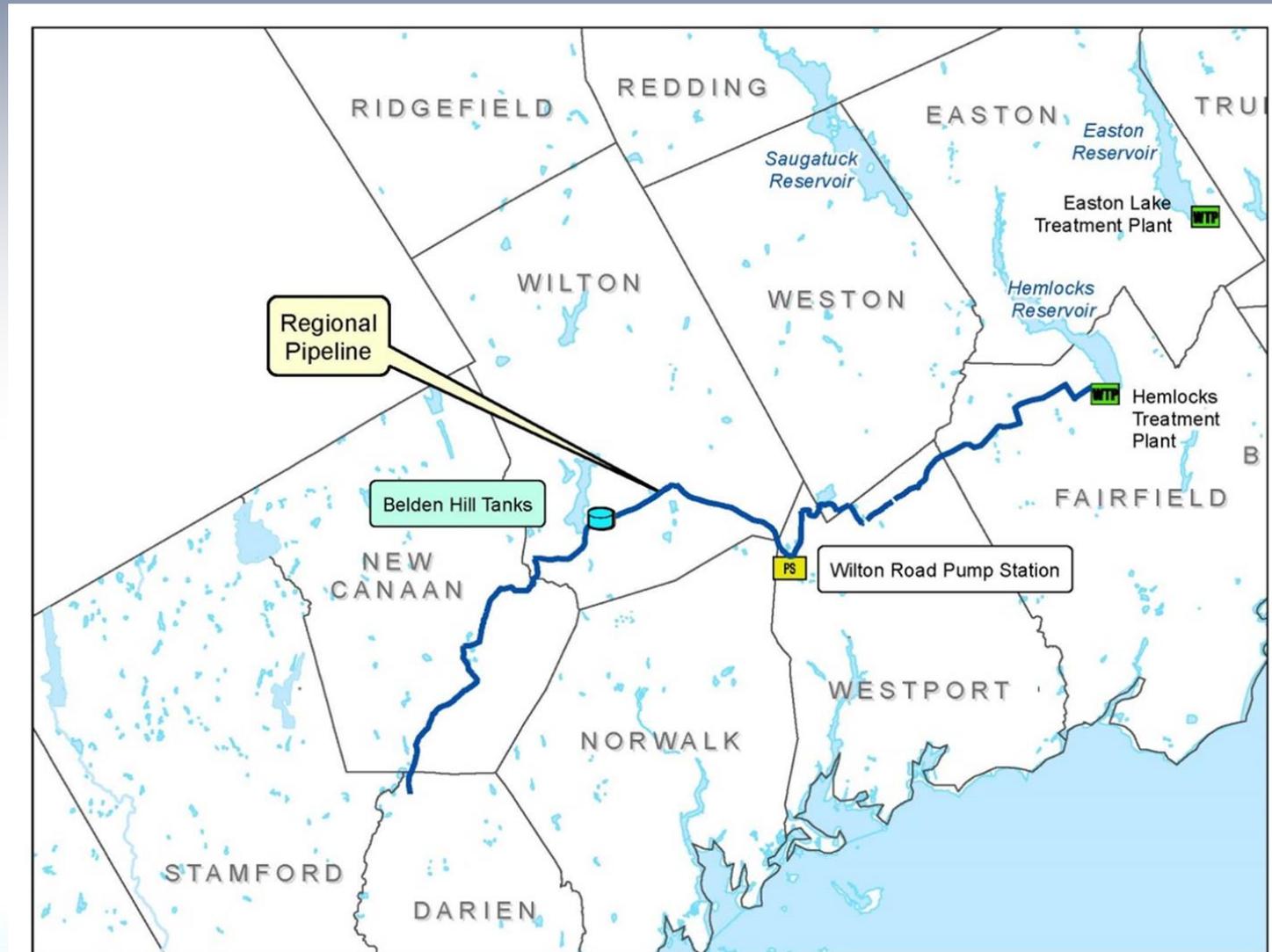
October 23, 2017

Jeff Ulrich
Director of Supply Operations

Bargh Reservoir



Infrastructure Improvements

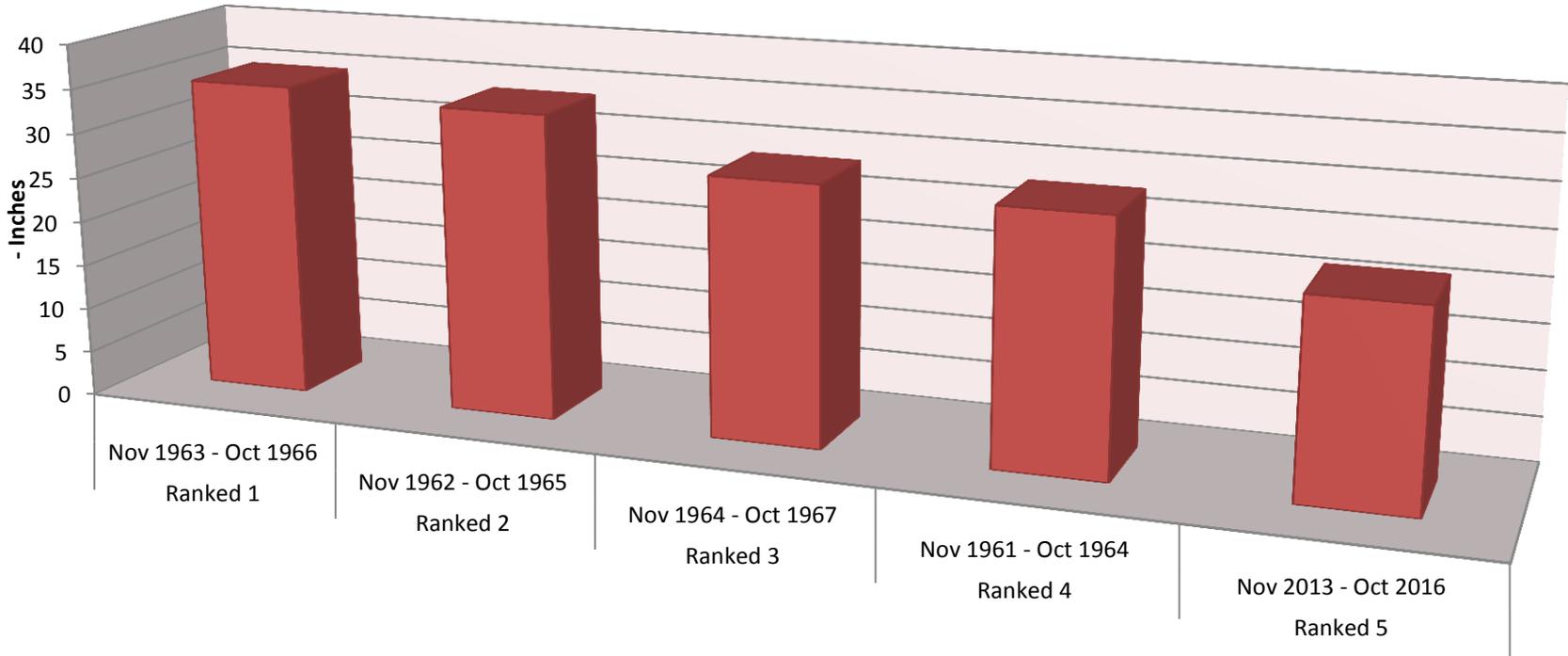


Water Transmission Improvements

- North Ave Tank – 2018/2019
- Newtown Turnpike Water Main - 2017
- Long Meadow Road and Aran Hill Road Water Mains - 2017
- Route 1 Water Main - 2017
- Hills Point Road - 2017
- Myrtle Avenue - 2018
- Iliff Pump Station to West School Tank - 2017
- Extend SWRP further into Stamford - 2019

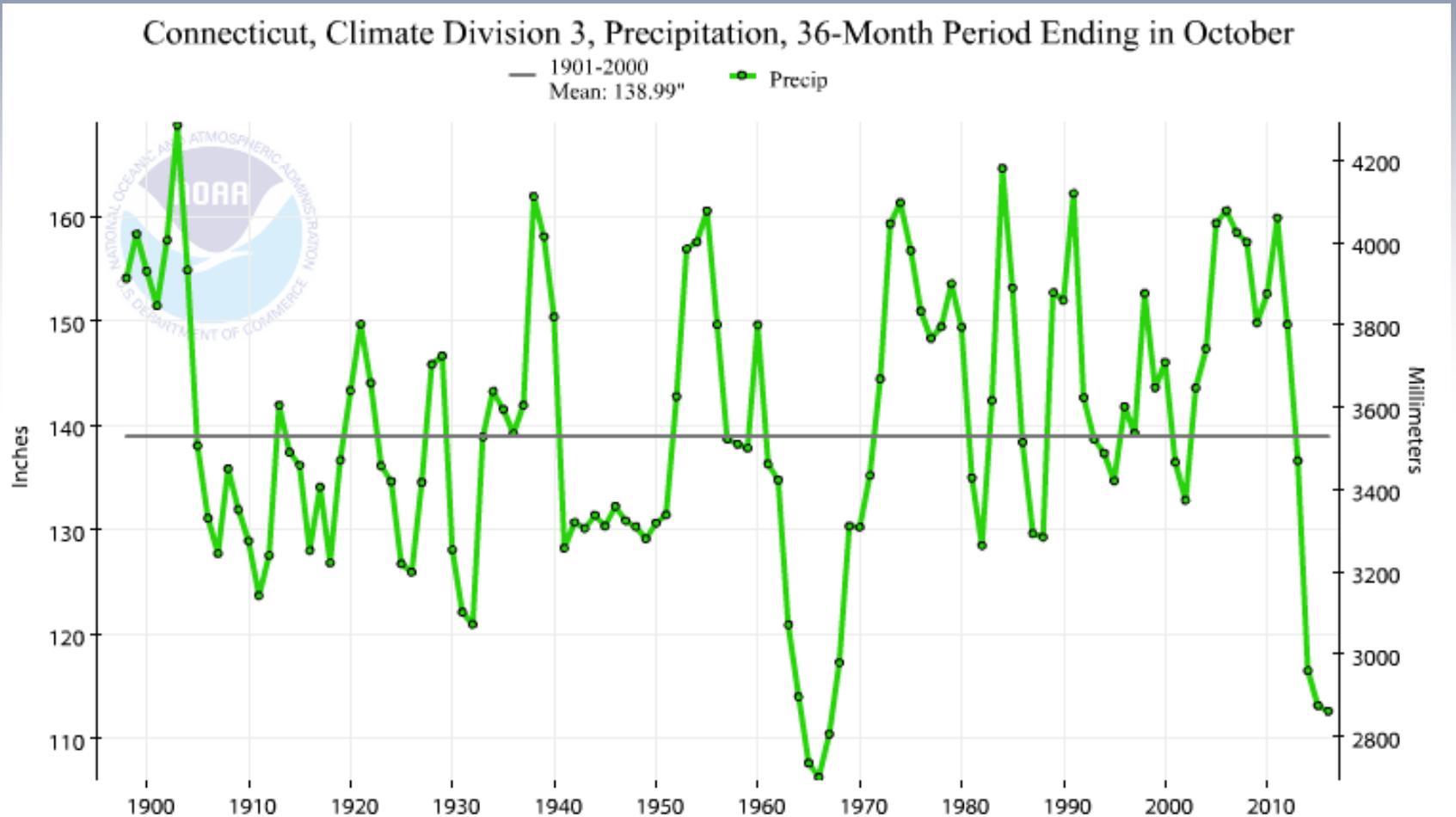
Precipitation Deficit

Nov 2013 to Oct 2016 - 5th Greatest Precipitation Deficit – Based on NOAA Data

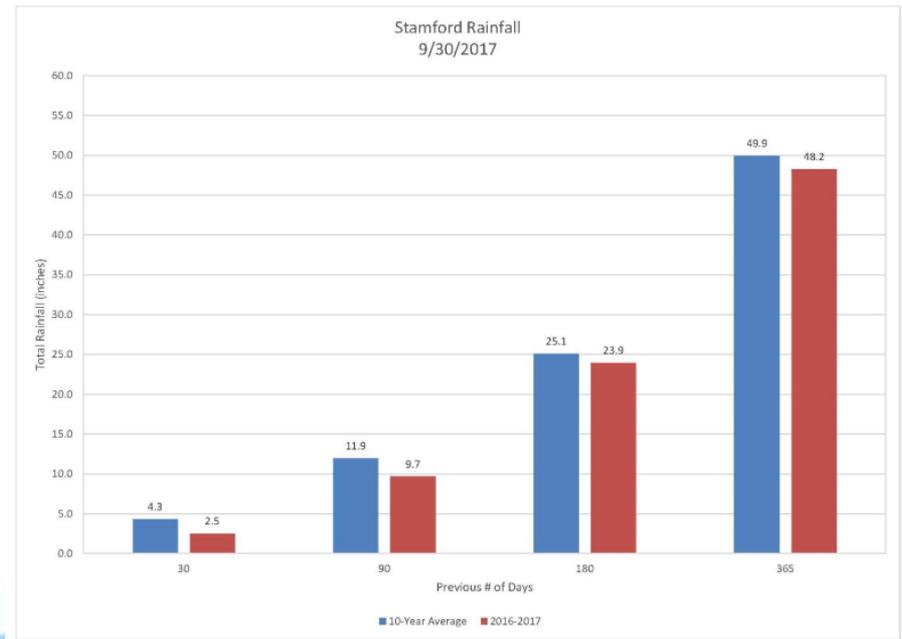
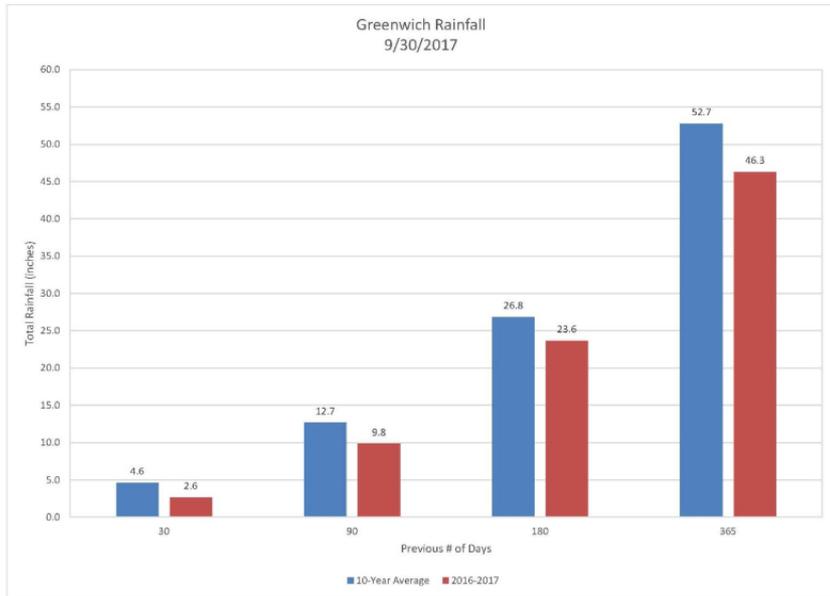


Ranked by Greatest Deficit per 36 month time period since 1895

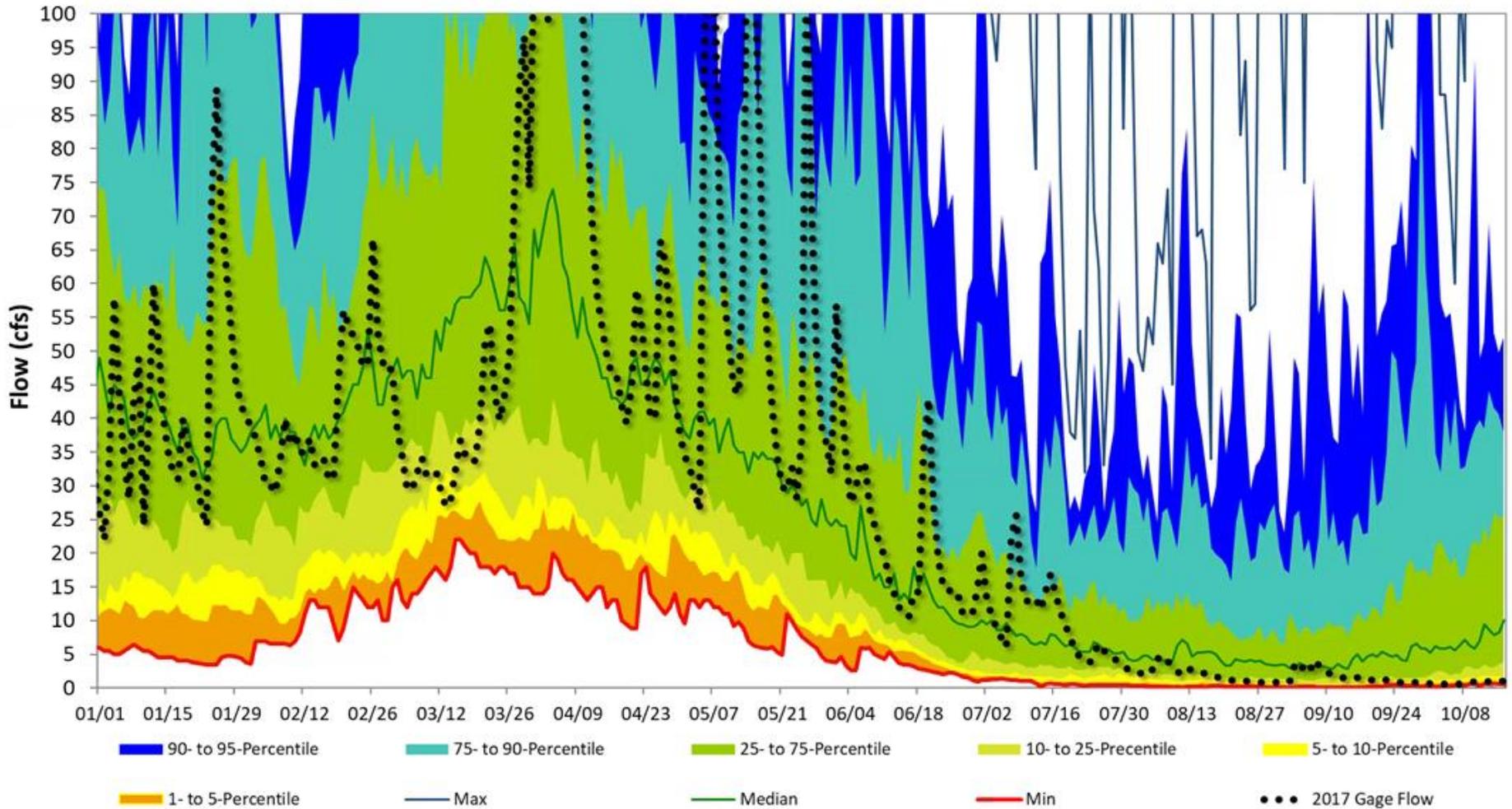
Precipitation Deficit



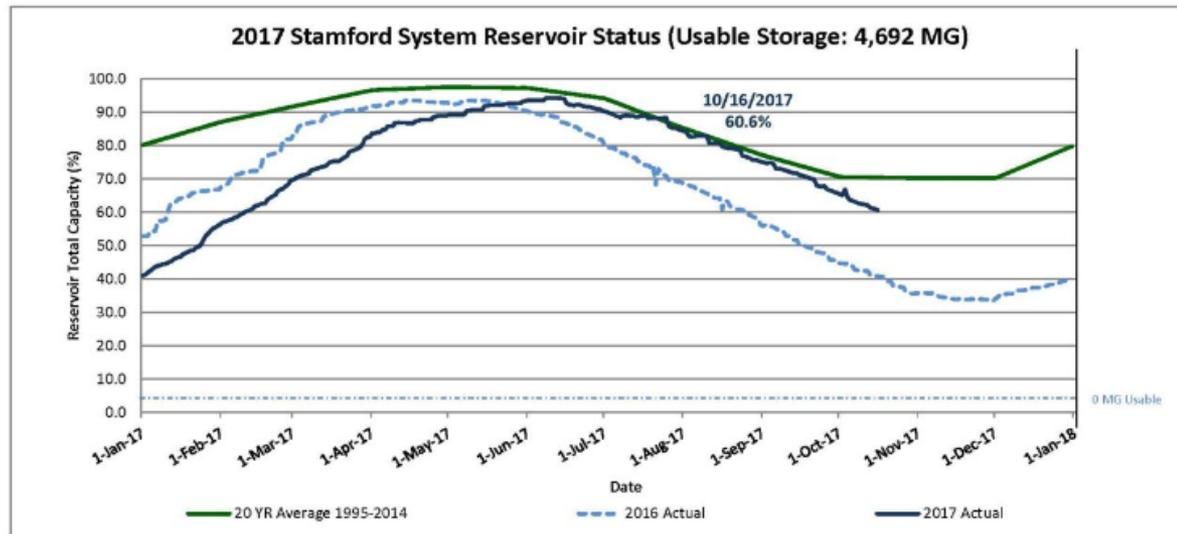
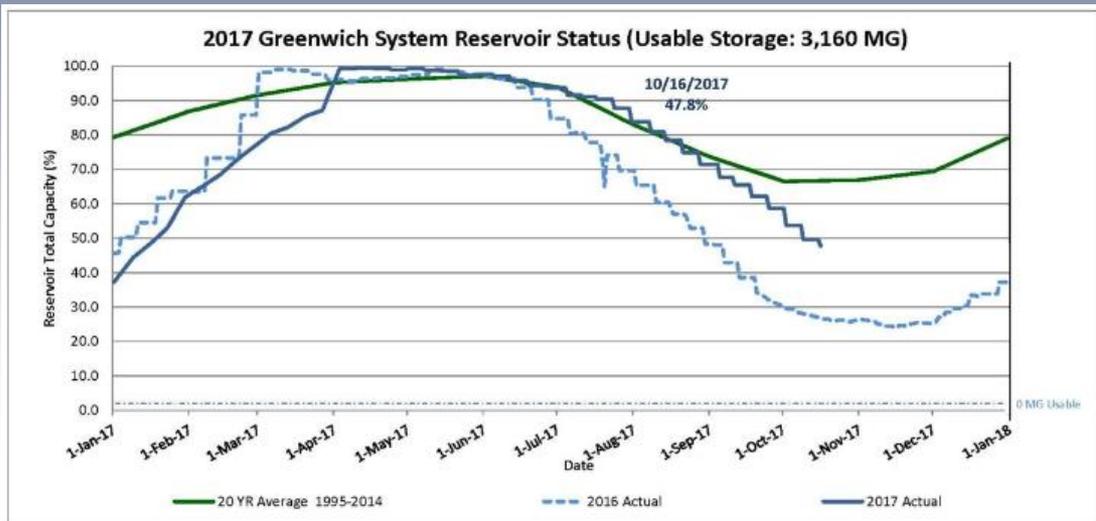
Rainfall



Saugatuck Stream Flows

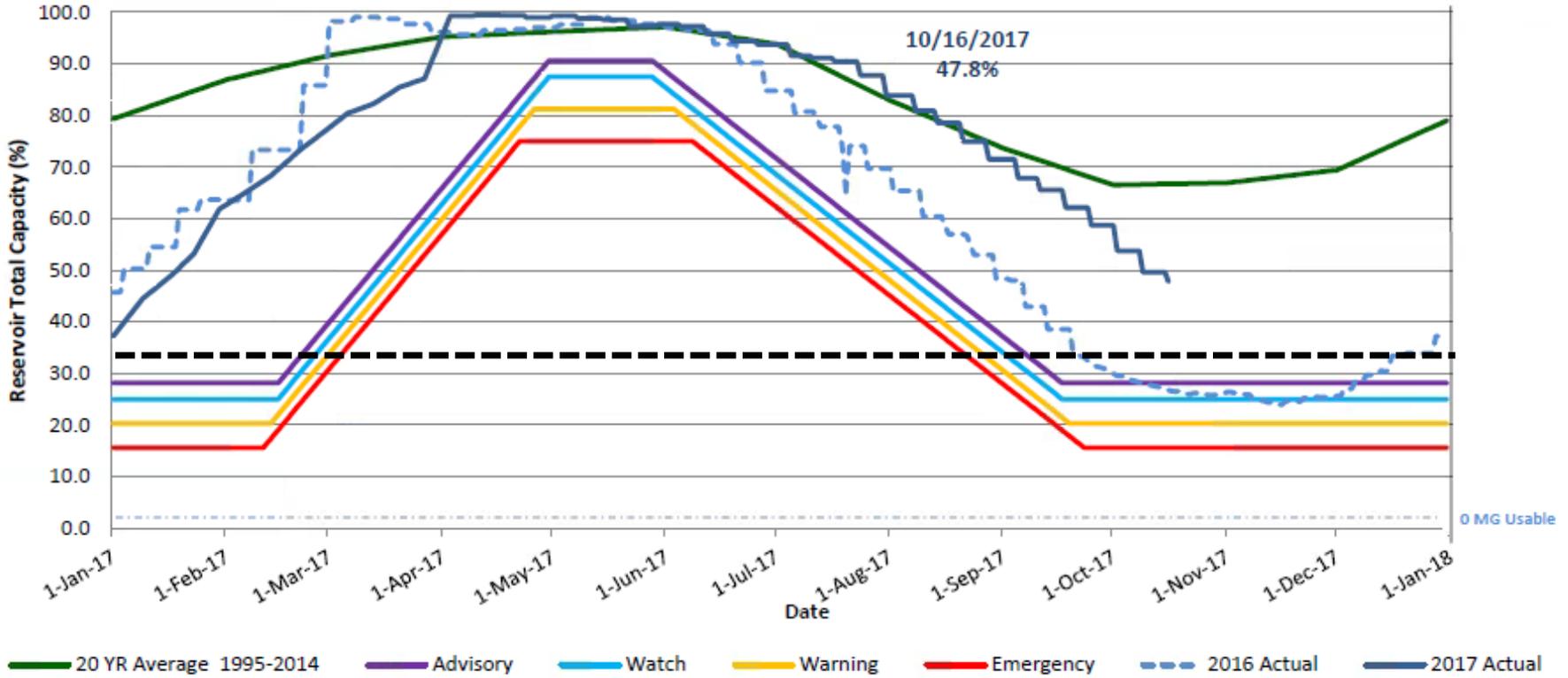


Current Reservoir Levels

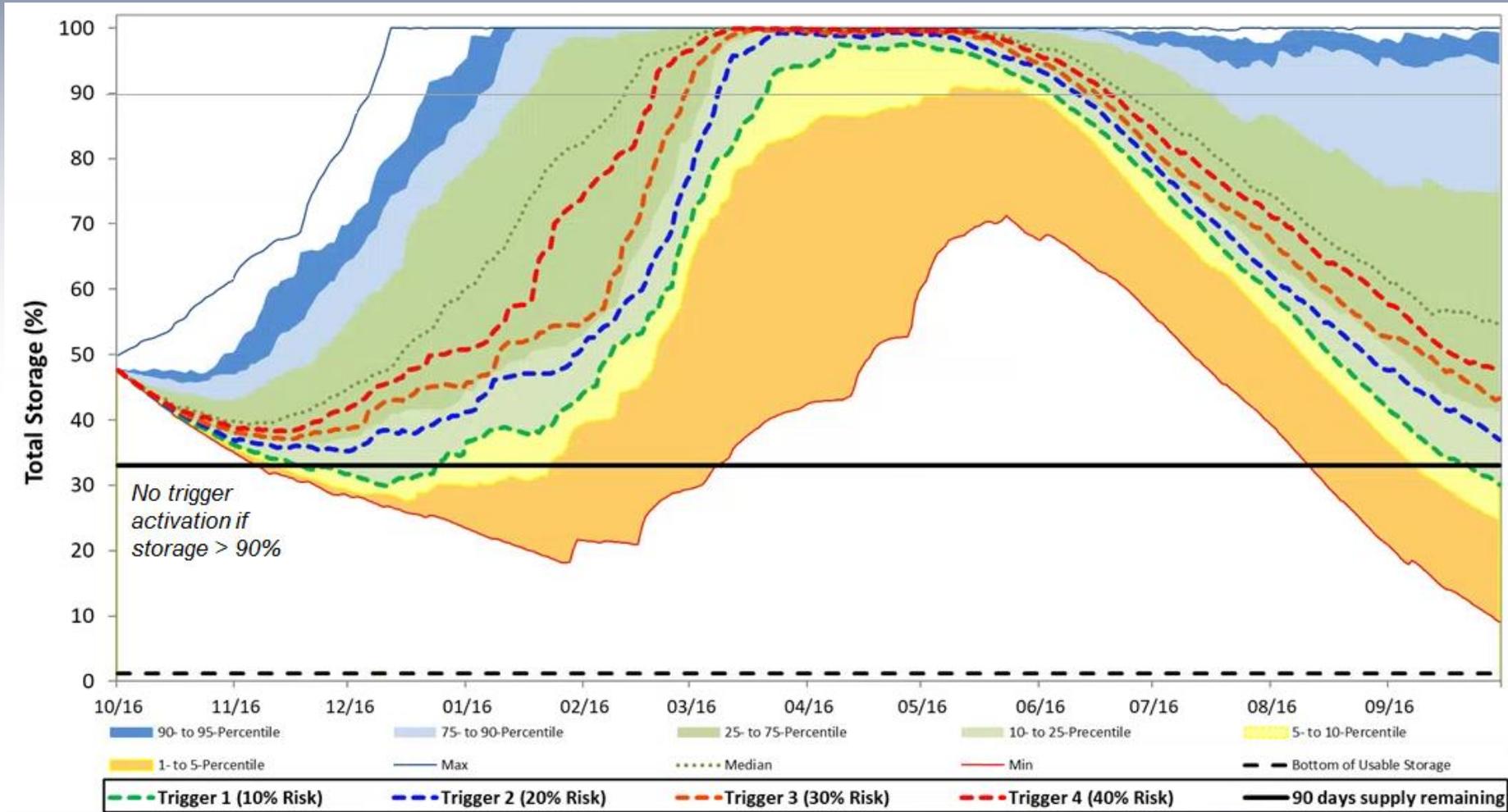


Revised Triggers

2017 Greenwich System Reservoir Status (Usable Storage: 3,160 MG)

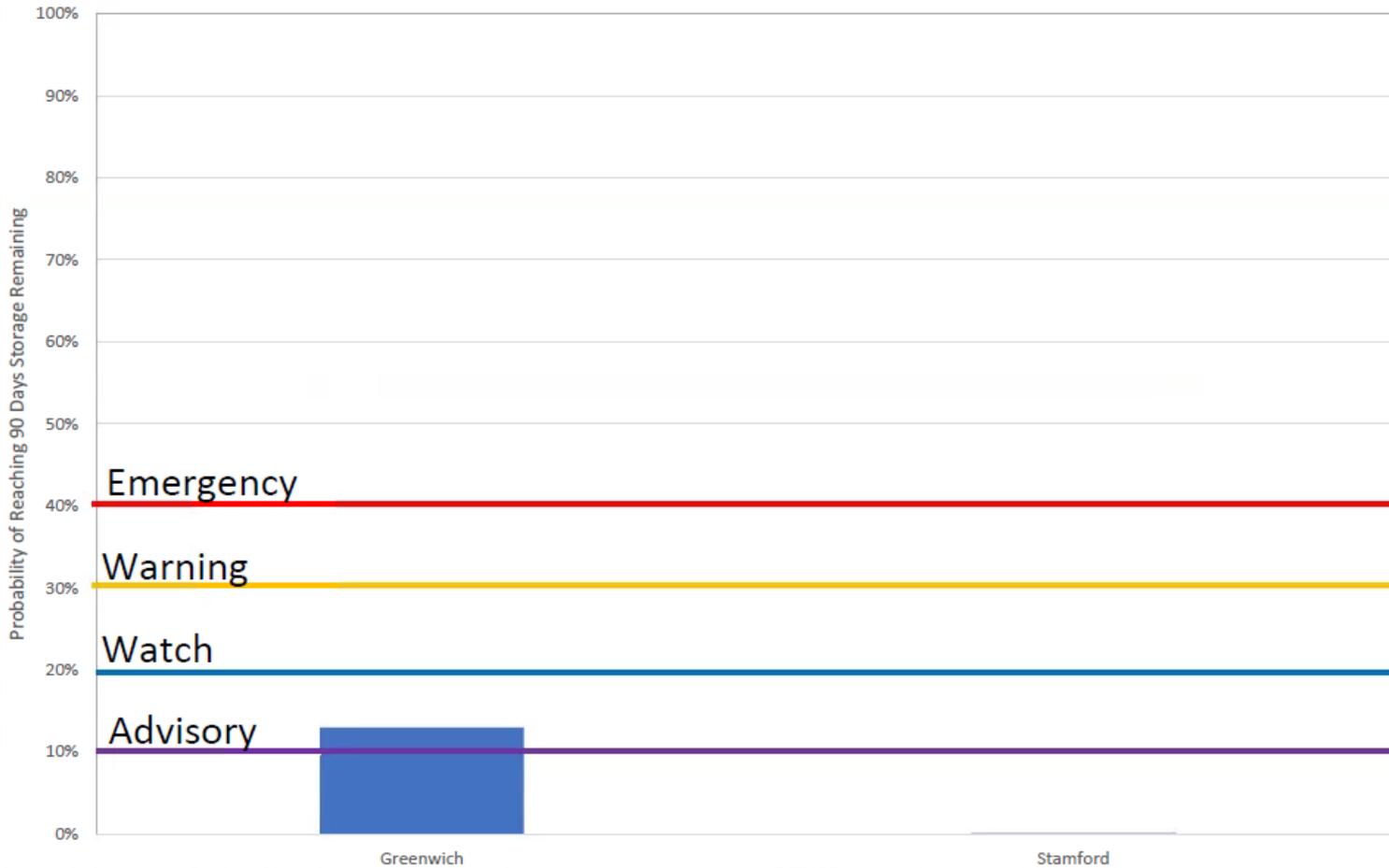


New Drought Trigger - Forecast



New Drought Status

Stamford/Greenwich Drought Status
10/19/17



Notes: 1. Stamford, Darien, New Canaan and Greenwich drought status based on EITHER reservoir system hitting a trigger.
2. Based on reservoir levels as of 10/16/17

Water Conservation

- Already started down this road
- Southwest Fairfield County Demands
 - Southwest Regional Pipeline Expansion
- Streamflow Regulations
 - 10 years out
 - Loss of 15 MGD

CT Single-Family (SF) Customer Water Use Analysis

- Average SF 83 GPCD
 - Median SF = 62 GPCD
- CT SF average is below U.S. average domestic 88 gpcd
 - 7 CT systems are above the national average
- Top 1% SF avg. 693 GPCD, 8 times higher than U.S. avg.
 - #1 highest account averages 4,932 GPCD (12,873 GD/acct)
- Bottom 50% avg. 37 GPCD, about 1/3 U.S. avg.
 - Weekenders, seasonal, part-time residents, for sale and under foreclosure, small households, homes with private well augmentation, and “Super savers”

CT Single-Family (SF) Customer Water Use Analysis

Above

National Average

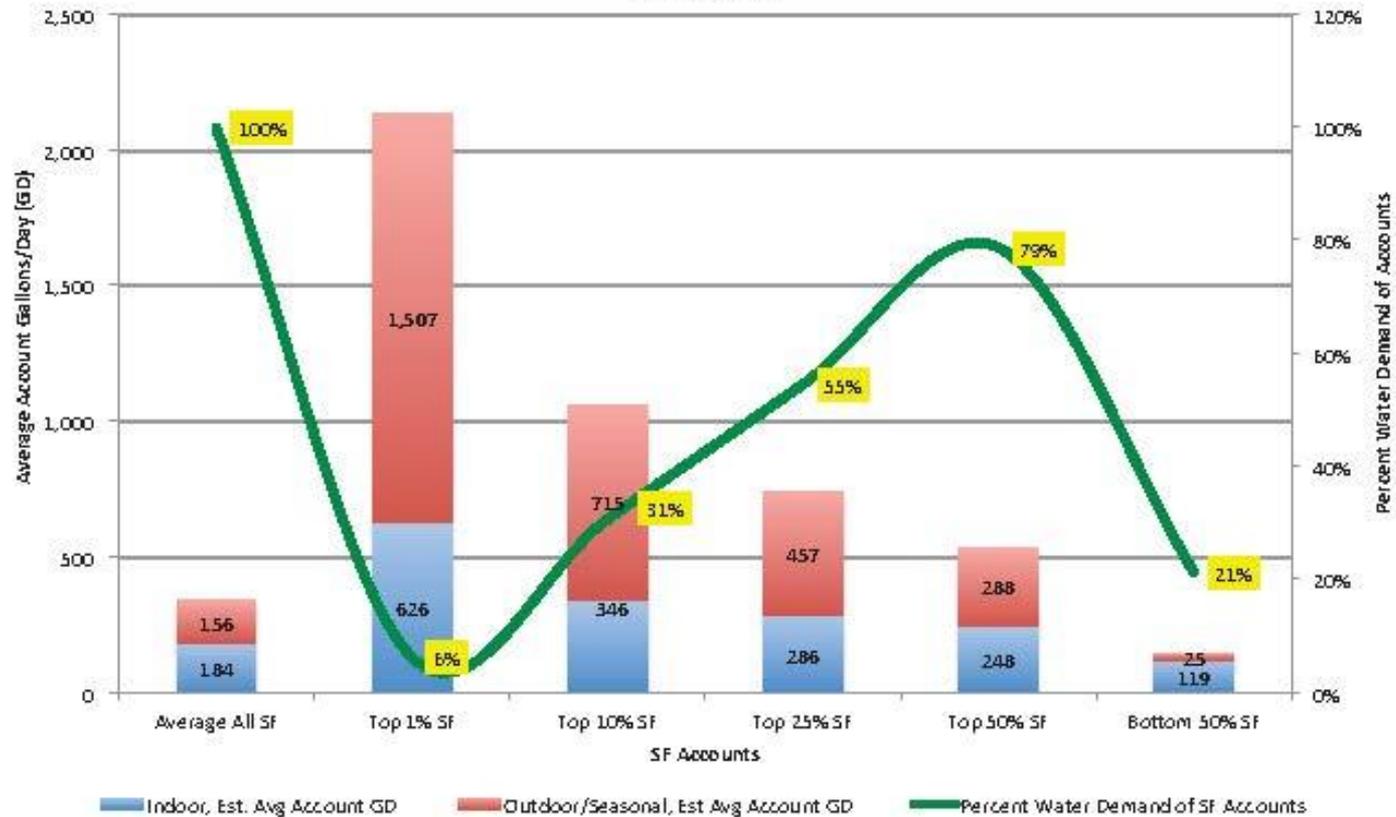
Below

City/Town/System	Average No. Active Accounts†	Percent Water Demand of All SF Accounts†	Average Annual Demand, MG/YR	Avg. Monthly Demand, MG/MO	Avg. Daily Demand, MGD	Avg. Account Use, Gal/MO	Avg. Account Use, GPD	Avg. Account Winter Indoor Use, Annual GPC	Avg. Account Seasonal Outdoor Use, Annual GPC	Avg. Account Seasonal Outdoor Use, Est. Annual Percent	Avg. GPCD	Est. Volume of Seasonal Outdoor Water Demand, Annual MGD
Weston (GB)	4,101	0%	7.5	0.5	0.0	5,385	306	232	274	54%	94	0.0
Greenwich	4,101	15%	966.5	63.9	0.4	1,622	82	205	177	46%	46	2.5
Darien	3,770	6%	15.8	9.7	0.0	0,338	340	84	56	46%	30	0.9
Westport (GB)	3,868	8%	047.6	7.3	0.9	845	24	78	46	45%	24	0.3
New Canaan	3,213	3%	31.8	7.6	0.9	605	83	76	07	38%	08	0.3
Norwalk	3,076	0%	07.3	0.6	0.0	056	65	50	15	44%	01	0.0
Stamford	6,914	12%	505.5	25.5	0.1	747	44	94	50	21%	33	0.9
Easton (GB)	1,081	1%	1.1	0.6	0.2	020	31	68	63	27%	8	0.1
Fairfield (GB)	8,335	11%	459.2	21.6	0.0	632	18	63	55	25%	84	0.0
West Suffield-West Service	2,14	0%	6.5	0.4	0.0	423	11			0%	1	-
Simsbury	3,014	3%	59	0.0	0.0	962	96	45	51	26%	5	0.3
Ridgefield	2,693	1%	84.6	5.4	0.5	713	88	59	29	15%	2	0.1
Bridgeport, City of (GB)	20,129	11%	350.7	12.6	0.7	592	84	78	6	3%	0	0.1
Trumbull (GB)	2,087	6%	300.9	6.7	0.2	522	82	50	31	17%	0	0.4
Wilton (GB)	399	0%	9.4	0.0	0.2	509	81	41	40	22%	9	0.0
Monroe (GB)	3,853	2%	40.5	0.0	0.0	201	71	45	26	15%	6	0.1
Shelton (GB)	3,576	5%	53.2	4.4	0.8	147	69	48	22	13%	5	0.2
Stratford (GB)	6,133	8%	60.1	0.0	0.6	959	63	53	10	6%	2	0.2
Beacon Falls (Valley)	1,127	1%	5.6	0.5	0.2	849	59	44	16	10%	1	0.0
Seymour (Valley)	3,327	1%	87.9	5.7	0.5	707	55	41	13	9%	9	0.0
Bethel (Chimney Heights)	342	0%	8.4	0.4	0.1	672	54	46	7	5%	9	0.0
Salisbury	318	0%	0.3	0.5	0.1	106	35	13	22	16%	2	0.0
Newtown	1,734	1%	5.3	0.1	0.2	099	35	09	26	19%	2	0.0
Birchwood	391	0%	4.4	0.4	0.0	035	33	13	19	15%	1	0.0
Litchfield	344	0%	5.3	0.8	0.1	001	32	20	12	9%	0	0.0
Mystic	704	1%	71.2	4.3	0.5	851	27	07	20	16%	9	0.1



Darien Water Usage – 2012 to 2014

Figure 3-13. Darien, CT: Single-Family (SF) Customer Accounts, Average and Percentile Indoor and Outdoor/Seasonal Gallons Per Account Per Day, 2012-2014



Darien Water Statistics

Average Usage (SF)	130 gpdpc	716 MG/year
Estimated Winter Usage (SF)	70 gpdpc	385.5 MG/year
Estimated Outdoor Usage (SF)	60 gpdpc	330.5 MG/year

Findings

- Most Customers are Water Efficient
- Small Number of Users in each Customer Class are Very Large Users
- Outdoor Water Use offers a Large Potential for Savings
- Conservation Efforts should be focused on:
 - Very High & High Users in each Customer Class

University of Colorado Study

Outdoor Water Use Restrictions

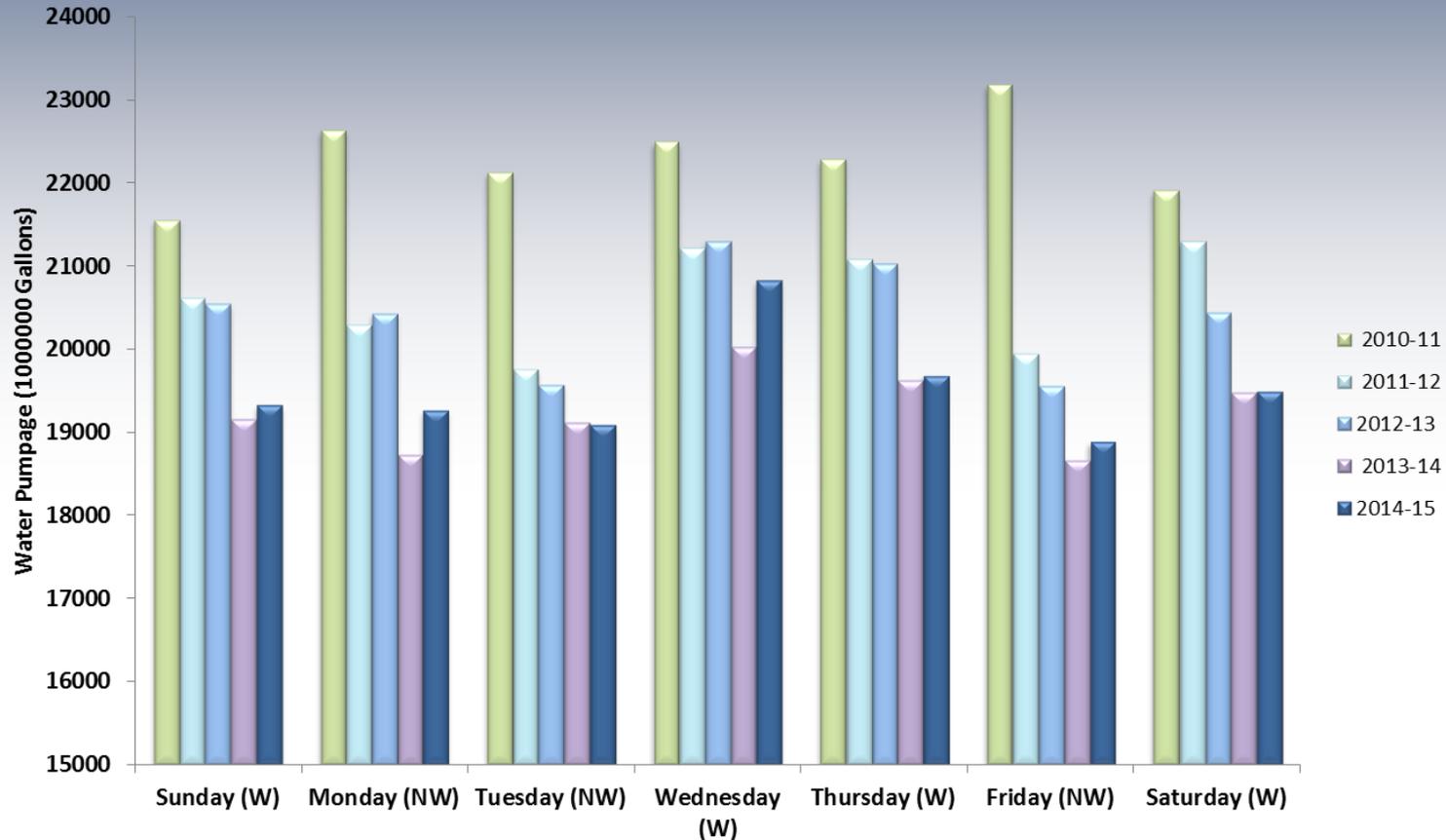
- Voluntary watering restrictions “just didn’t help that much”
 - Two cities saved only 3%, two others experienced increased water use
- Three days per week – “increase in water use”
- Every-third-day schedule: 14% water savings
- Mandatory twice-a-week schedule: 30% water savings
- Mandatory once-a-week schedule: 53% savings

North Texas Weather



- Rainfall
 - 36" average
 - 19" in 2005; 62" in 2015
- Summer 92° average (June-Aug)
- Prone to drought
 - Drought of record 1951-56
 - 22" average annual rainfall
 - Average of 36 days over 100°
 - Most recent drought of 2010-2012
 - 29" average rainfall
 - Average of 45 days over 100°
(Record set in 2010 of 71 days)

Dallas Water – Twice Weekly Demands



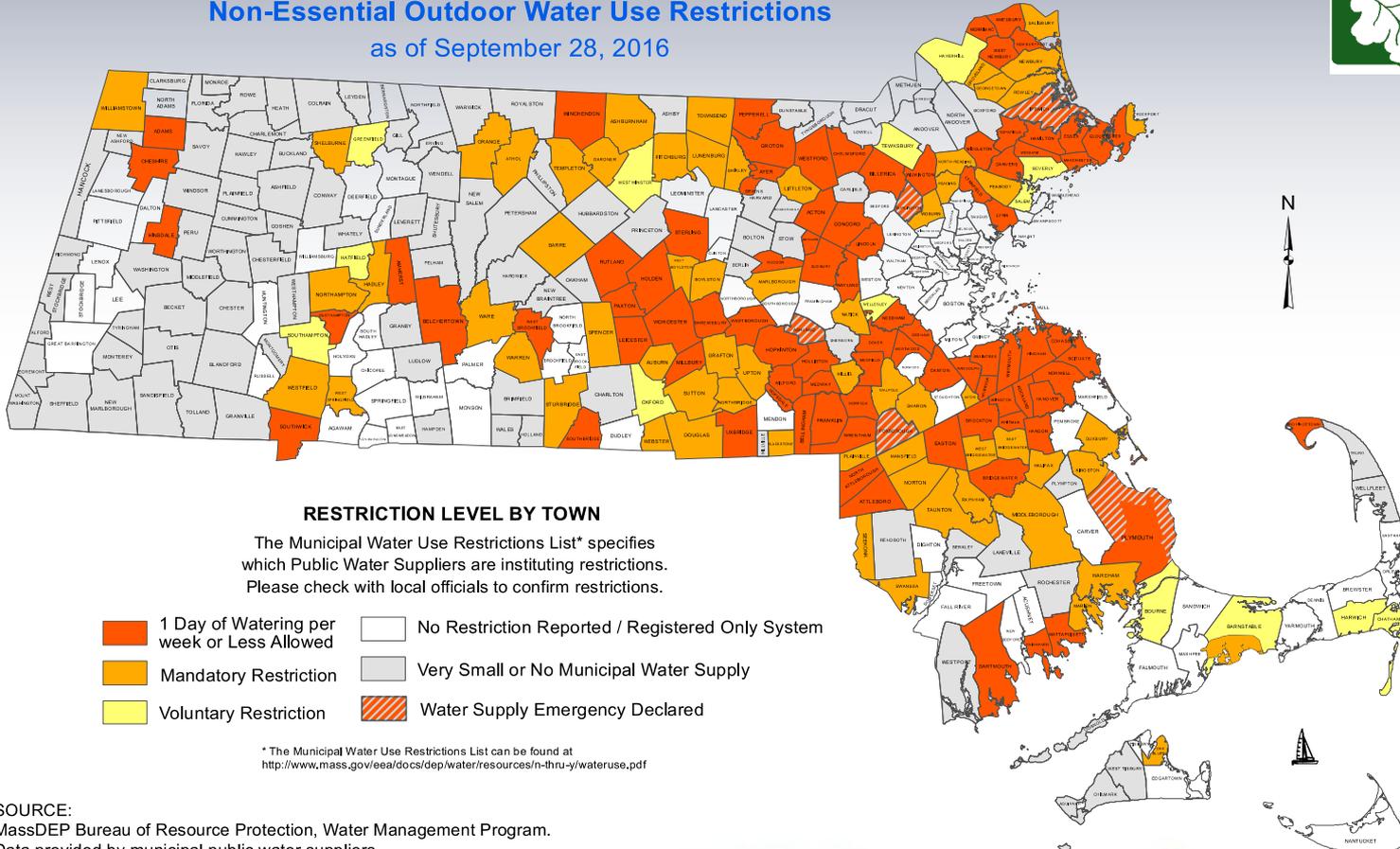
- Since implementation, overall water demand is 13% lower
- On watering days, demand is an average of 10% lower
- On non-watering days demands are 25 to 40 MGD less, or about 16% lower than on watering days

Massachusetts Restrictions

CURRENT MUNICIPAL WATER USE RESTRICTIONS

Non-Essential Outdoor Water Use Restrictions

as of September 28, 2016



RESTRICTION LEVEL BY TOWN

The Municipal Water Use Restrictions List* specifies which Public Water Suppliers are instituting restrictions. Please check with local officials to confirm restrictions.

- 1 Day of Watering per week or Less Allowed
- Mandatory Restriction
- Voluntary Restriction
- No Restriction Reported / Registered Only System
- Very Small or No Municipal Water Supply
- Water Supply Emergency Declared

* The Municipal Water Use Restrictions List can be found at <http://www.mass.gov/eea/docs/dep/water/resources/n-thru-y/wateruse.pdf>

SOURCE:
 MassDEP Bureau of Resource Protection, Water Management Program.
 Data provided by municipal public water suppliers.
 For more information contact MassDEP Water Management Program at 617-292-5706.

MassDEP GIS Program
 9/28/2016

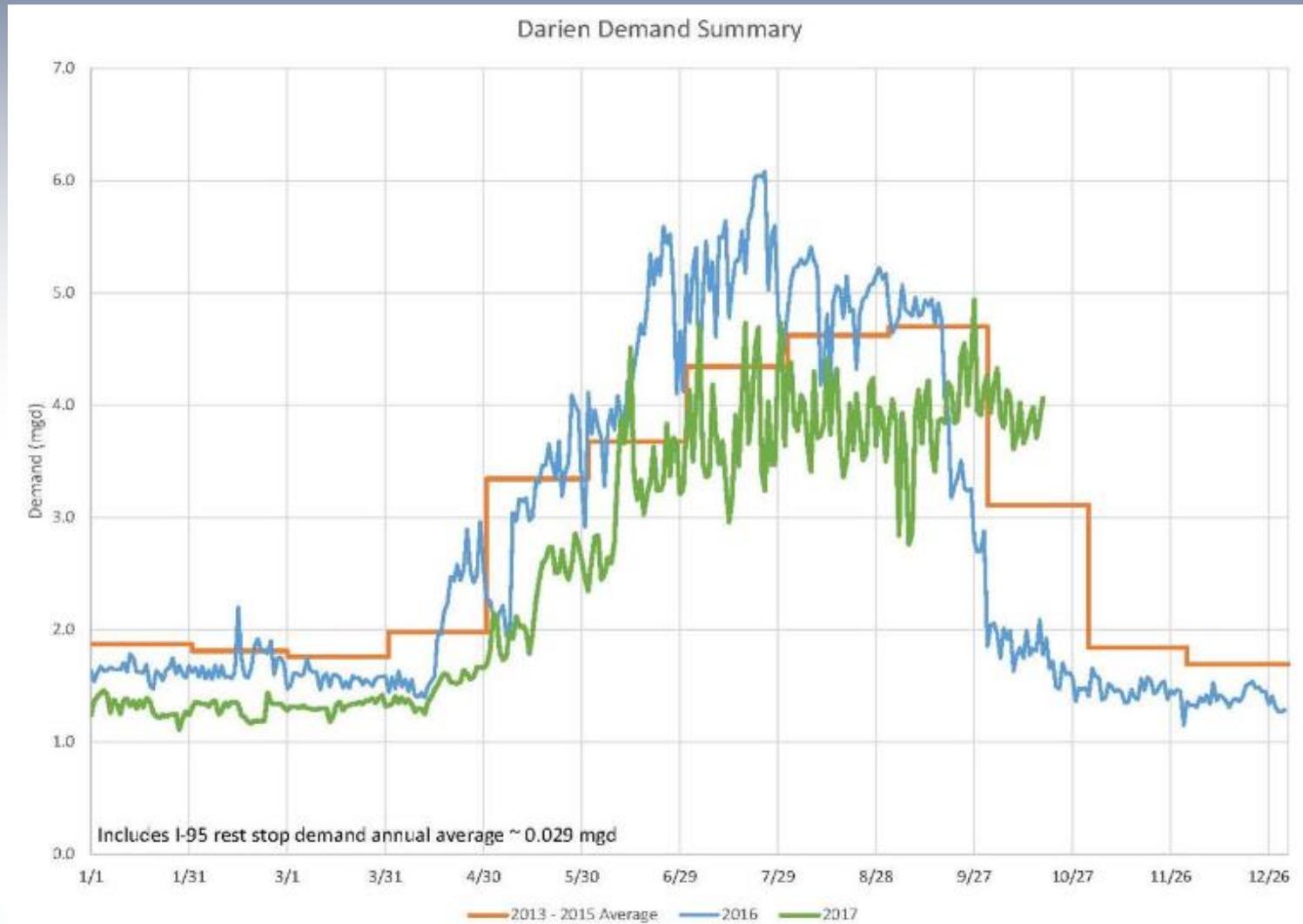
2 Day per Week Irrigation Policy

- Using Dallas Program as a model
- 2 Days per week maximum
 - Even addresses – Sundays and Wednesdays
 - Odd addresses – Saturdays & Tuesdays
- Applies to:
 - Automatic/buried irrigation systems
 - Hose sprinklers
- Doesn't apply to:
 - Handheld watering, drip irrigation, soaker hoses
- Variance process

Variations

- **New Plantings**
 - Exempt for 5 weeks
 - Not applicable in July or August
 - Permit to be posted onsite
- **Large Property**
 - Minimum 3 Acres
 - Requires calculations completed by licensed irrigation contractor
 - Site inspection and report by Aquarion subconsultant
 - 15% water use reduction requirement – residential/commercial
 - Permit to be posted onsite
- **Special Circumstances**
- **Apply through Aquarion website**

Darien 2016 & 2017



Enforcement /Variances

- Darien
 - 1st Violations – 354
 - 2nd Violations 40
 - New Planting Variances – 77
 - Large Property Variances - 3

- Other Towns
 - 1st Violations – 932
 - 2nd Violations – 55
 - New Planting Variances – 112
 - Large Property Variances - 22

Summary – Conservation

- Outdoor water use provides the largest potential for savings
- Irrigation is becoming pervasive
- Grass will survive
- Right thing to do
- Reduce the potential for future droughts
- Customer Education required
- Enforcement required
- Roll out to high irrigation towns over the next few years.

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*2017 May thru Sept demands
are down 15% compared to 2014-2016
600+MG of savings*