



***MWRA Reservoir Water Withdrawals
VS
Deer Island Wastewater Flows***

Comparison of 2014 Flows

**Water Supply Citizens Advisory Committee
Wastewater Advisory Committee**

February 16, 2016



MWRA Service Area

- MWRA provides wholesale water and wastewater services to over 2.5 million customers in 61 communities
- MWRA delivers an average of 200 million gallons per day to its water customers, with a peak demand of 350 million gallons
- MWRA collects and treats an average of 350 million gallons of wastewater per day, with a peak capacity of 1.2 billion gallons





MWRA Water System

51 Customer Communities

2.2 Million People Served

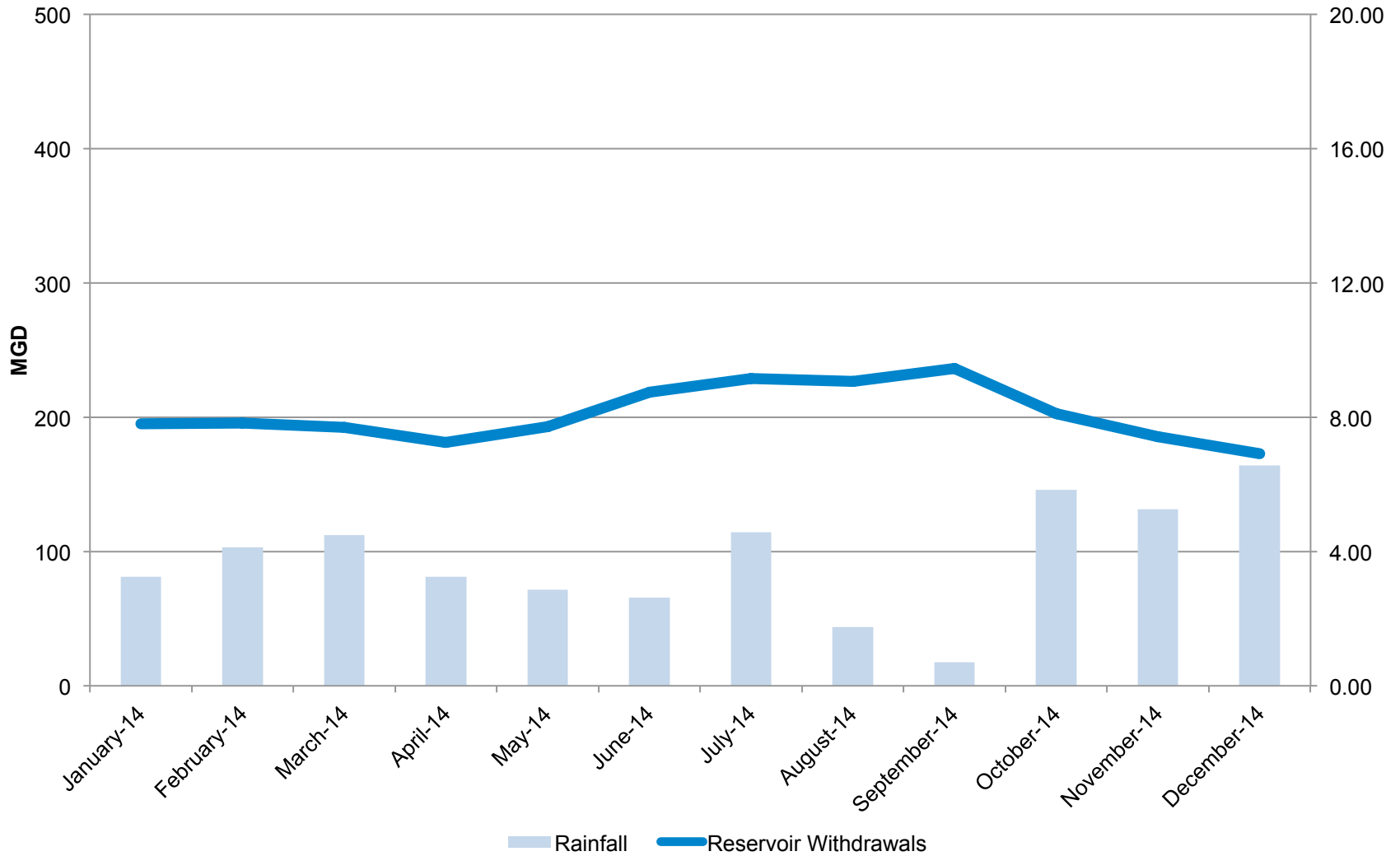
200 MGD Average Flow





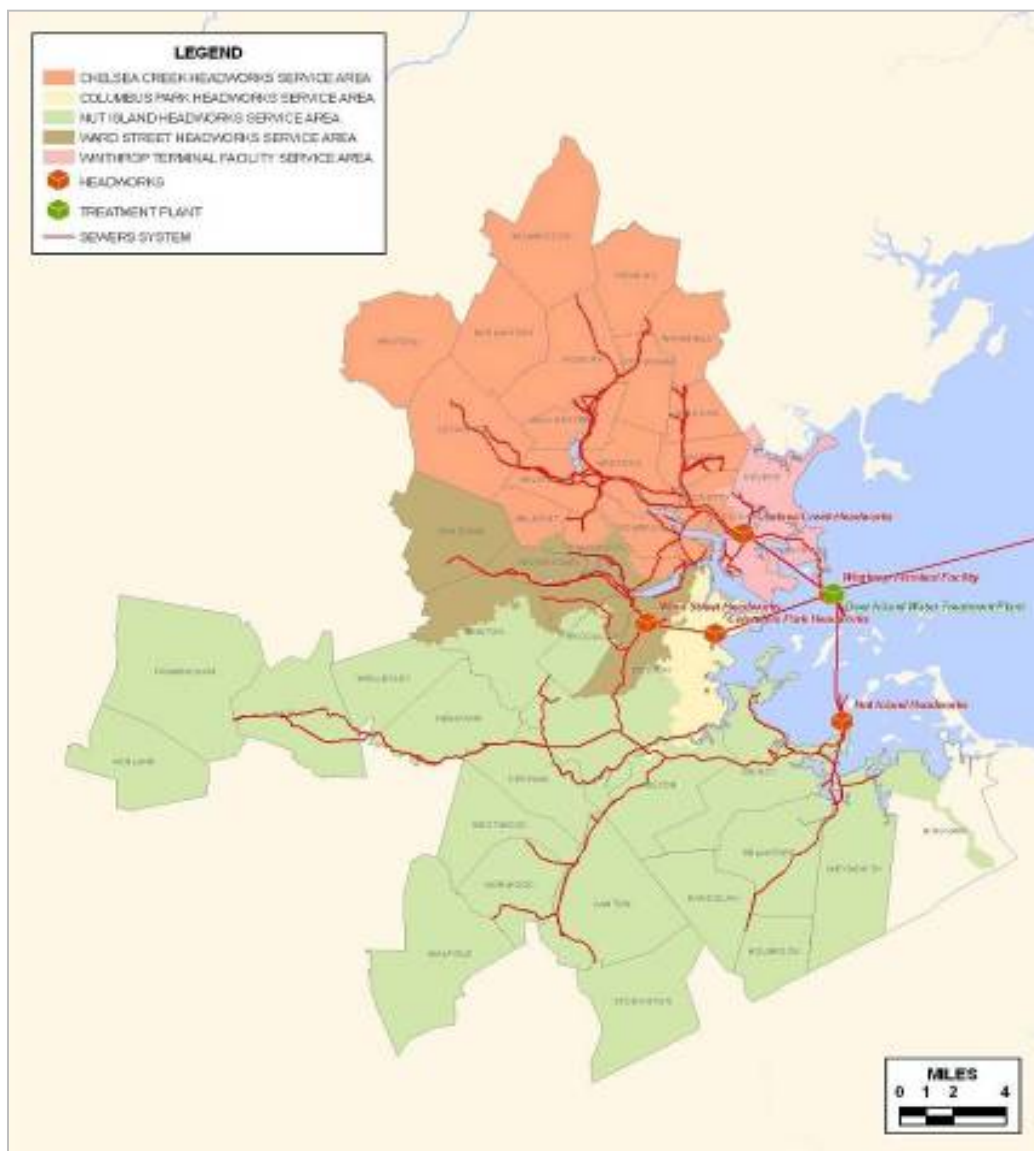
MWRA Reservoir Withdrawals

MWRA Reservoir Withdrawals 2014 – 203 MGD Average





MWRA Sewer System



43 Customer Communities

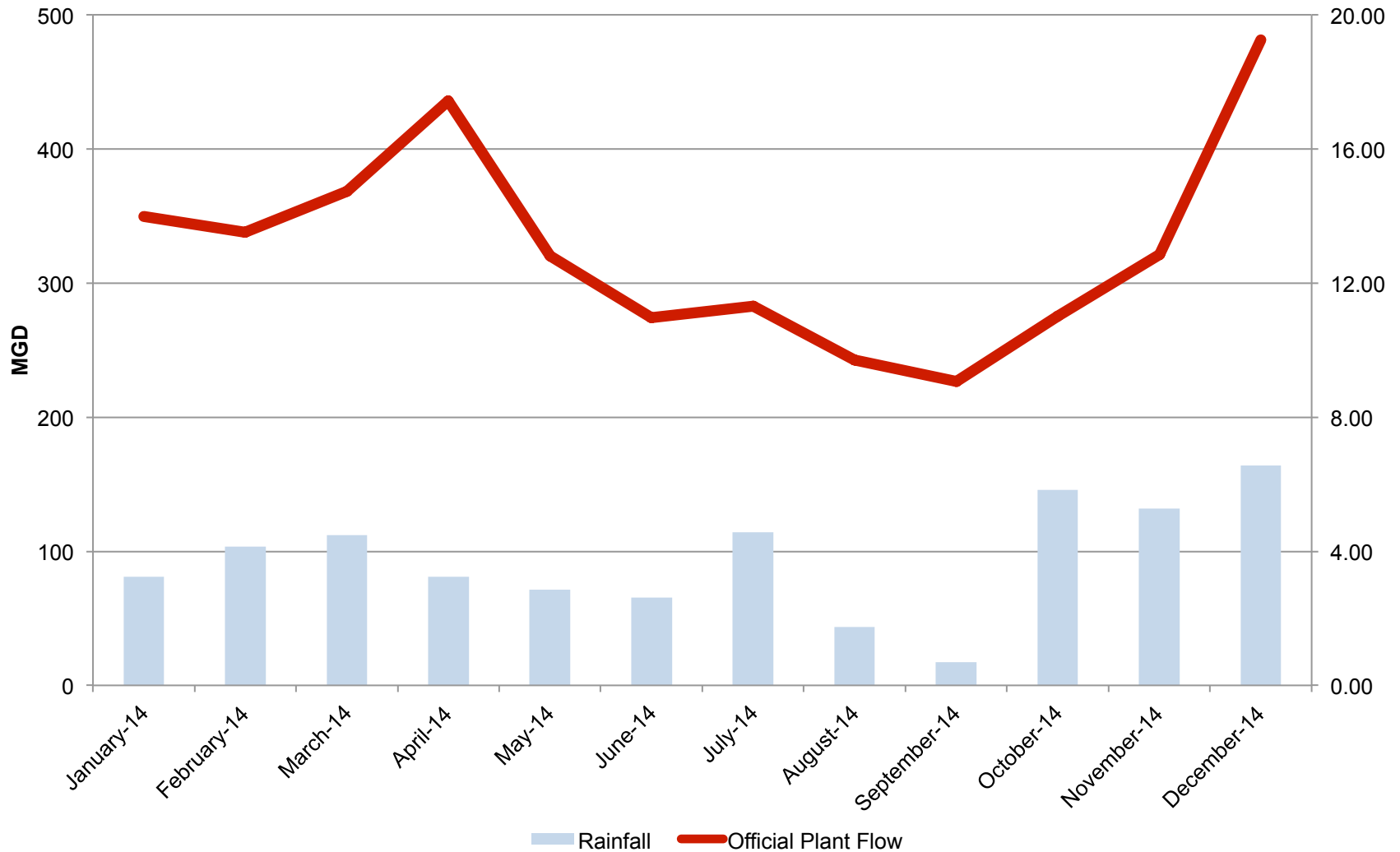
2.2 Million People Served

350 MGD Average Daily Flow



Deer Island Plant Flow

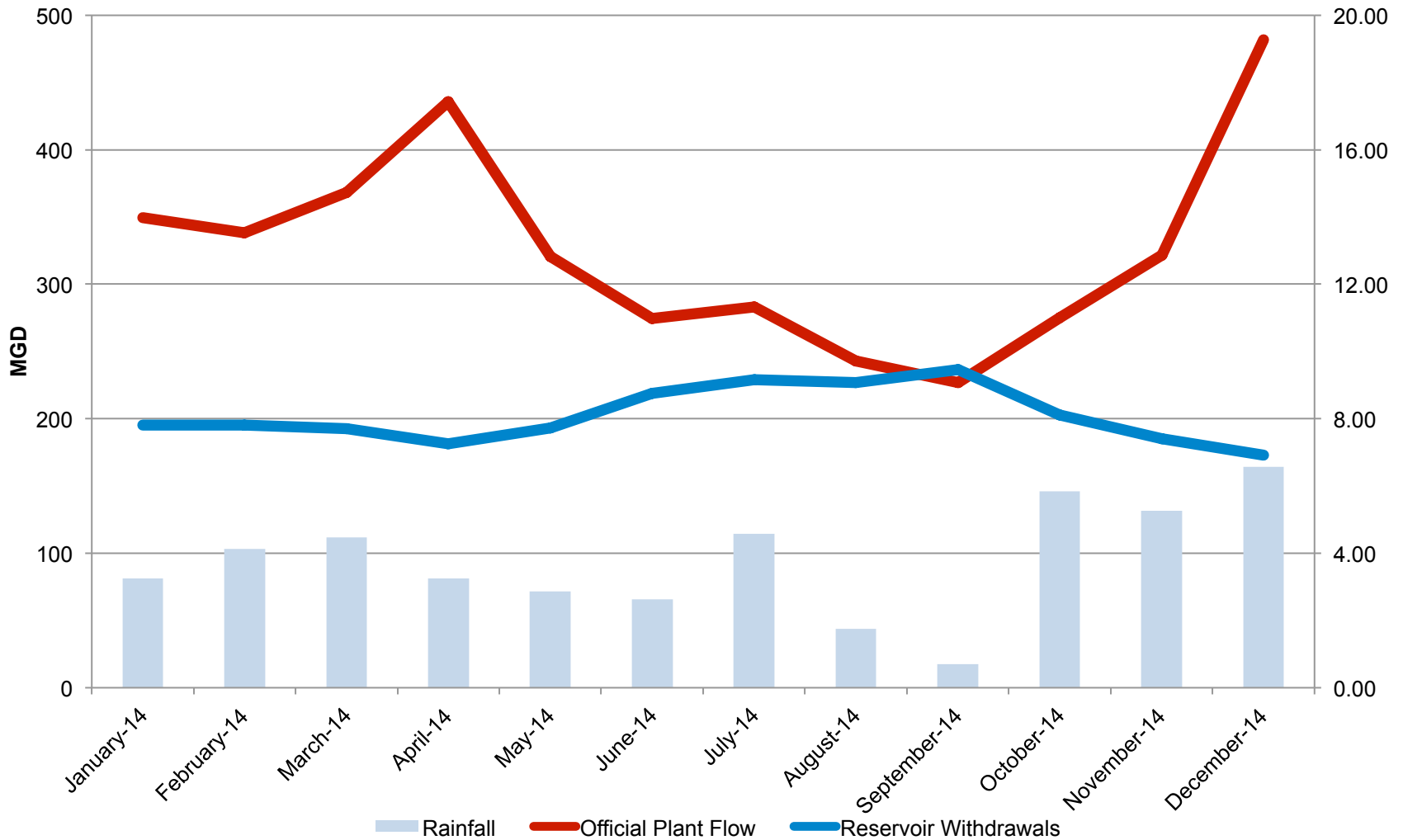
Deer Island Flow 2014 – 326 MGD Average





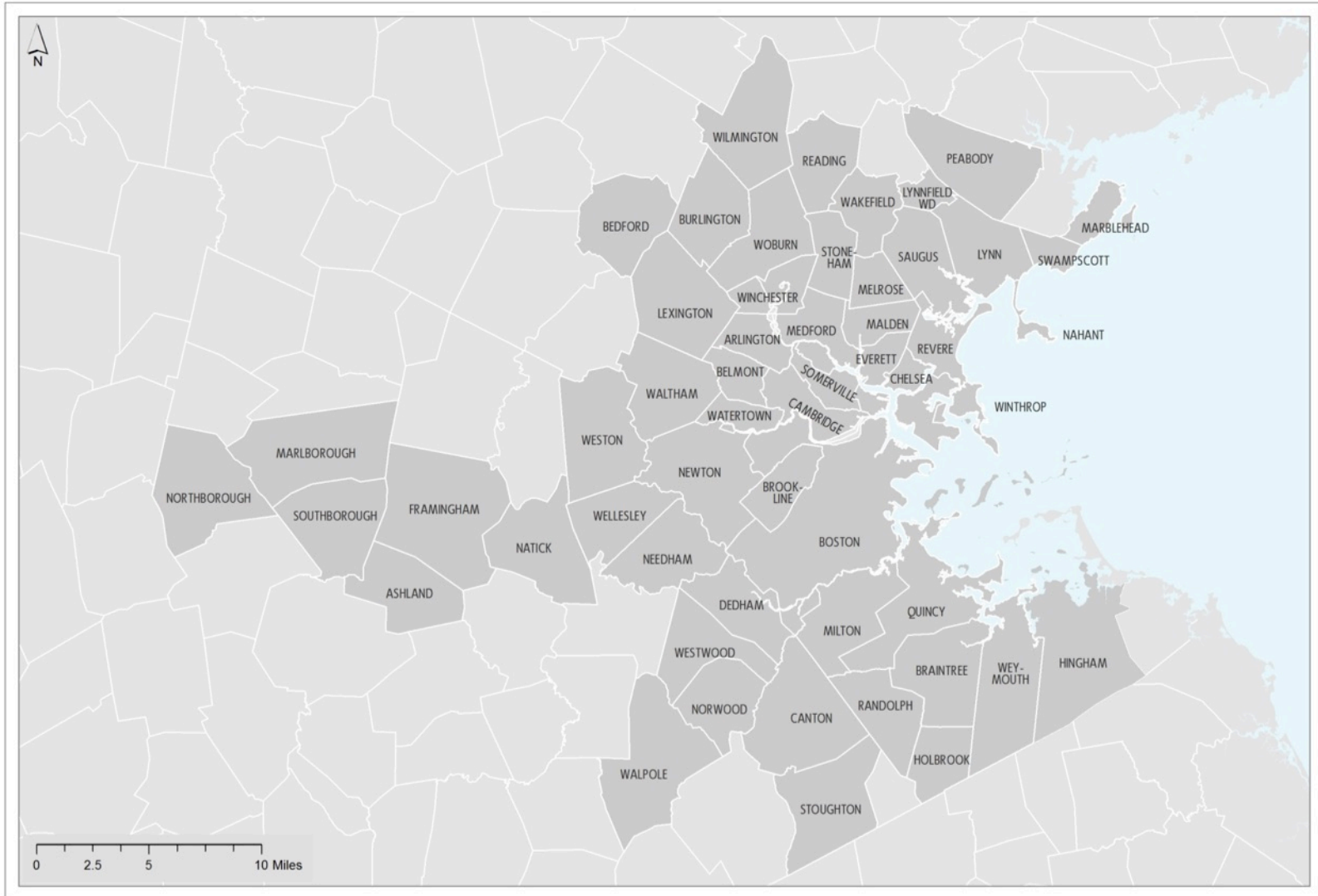
MWRA Reservoir Withdrawals and Deer Island Flow

MWRA Reservoir Withdrawals and Deer Island Flow 2014





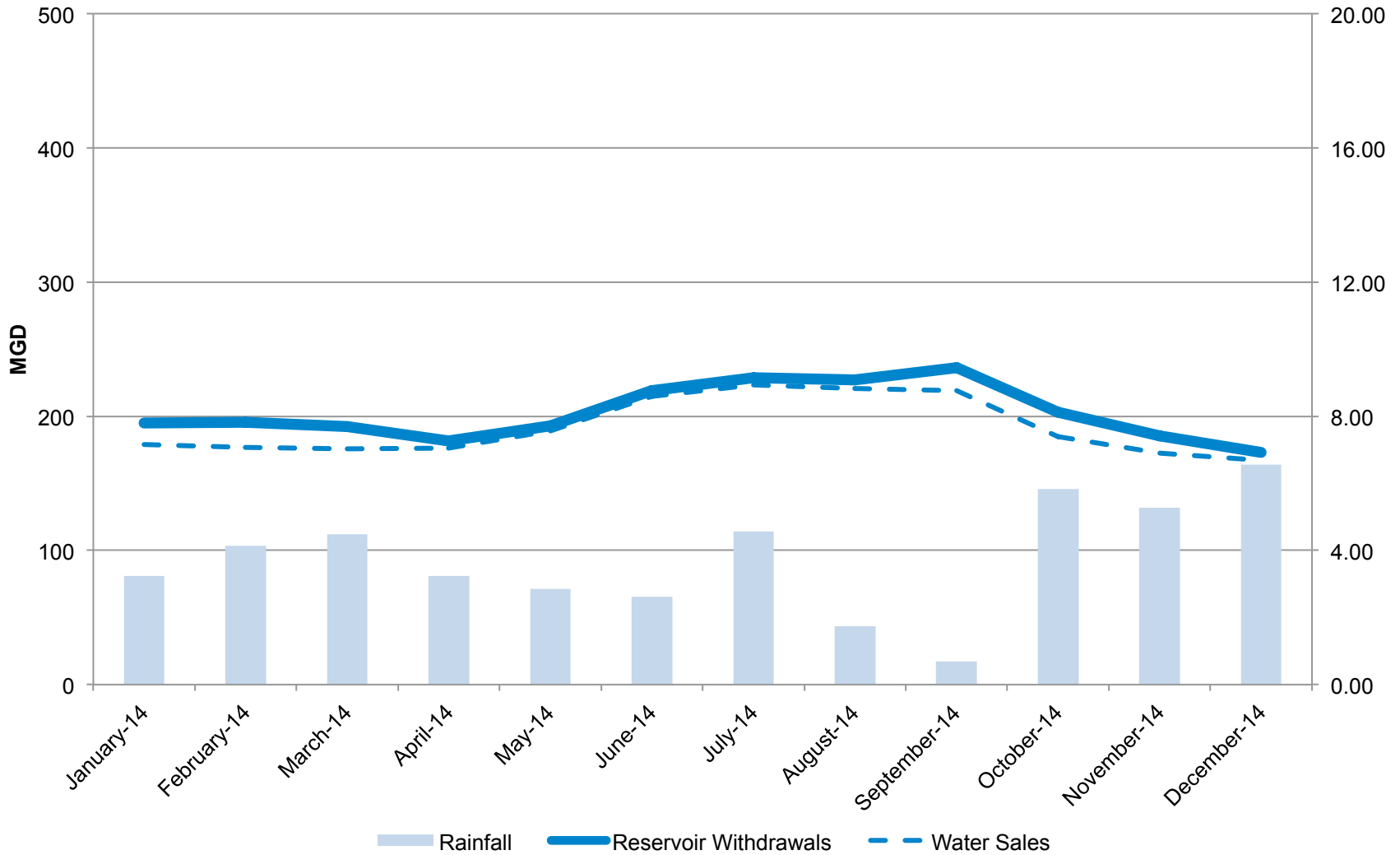
MWRA Metro Area Customer Communities



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MWRA Reservoir Withdrawals and Water Sales 2014





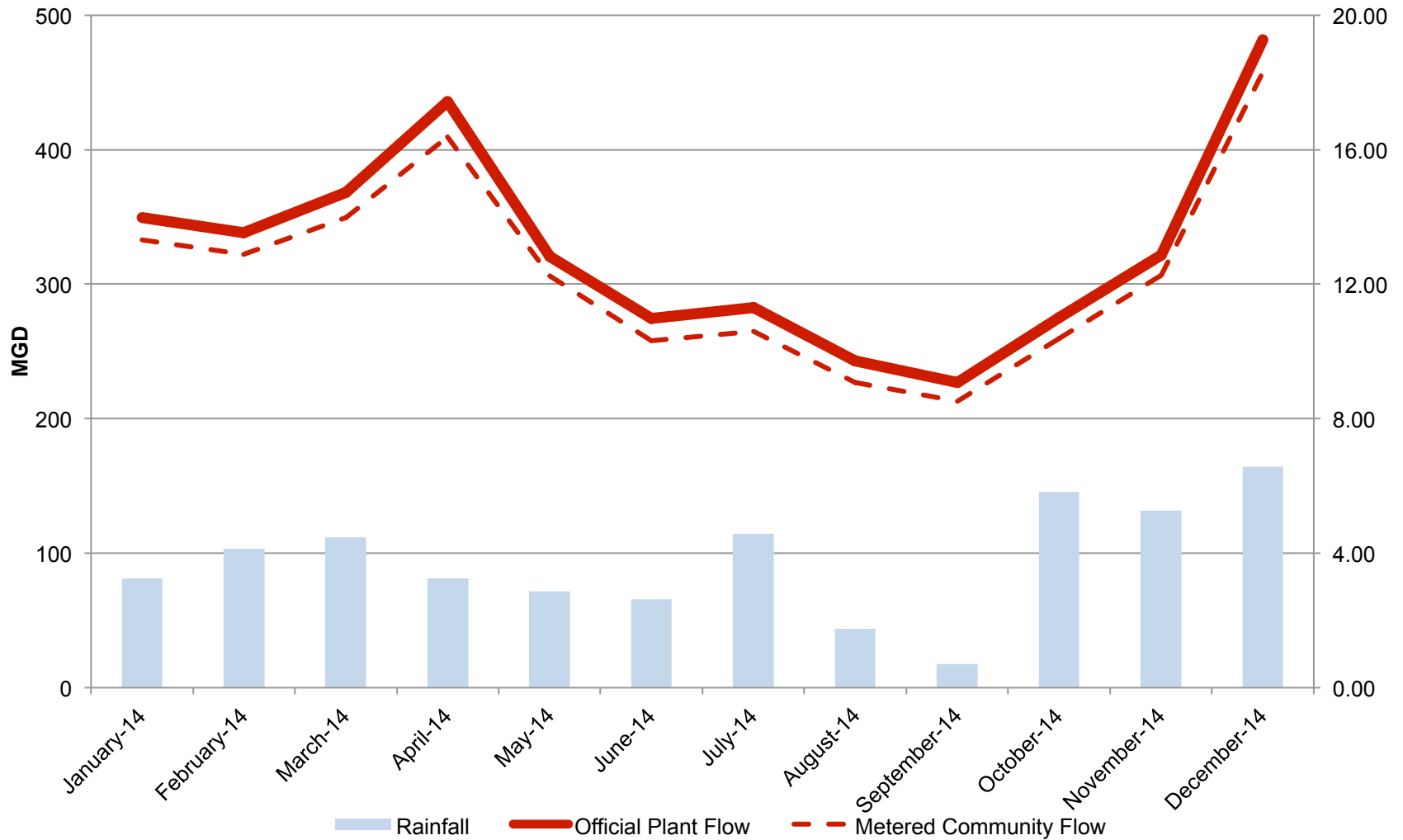
Difference between Reservoir Withdrawals and Water Sales

- Average Difference = 11 MGD
- MWRA Water Use for Maintenance and Construction
 - Pipeline Dewatering and Disinfection
 - Tank Draining and Disinfecting
- Leaks in MWRA Distribution System
- Potential Metering Differences
 - Metering at Carroll Water Treatment Plant and CVA Transmission
 - 175 Community Water Rates Meters



Deer Island Flow and Metered Community Flow

Deer Island Flow and Metered Community Flow 2014



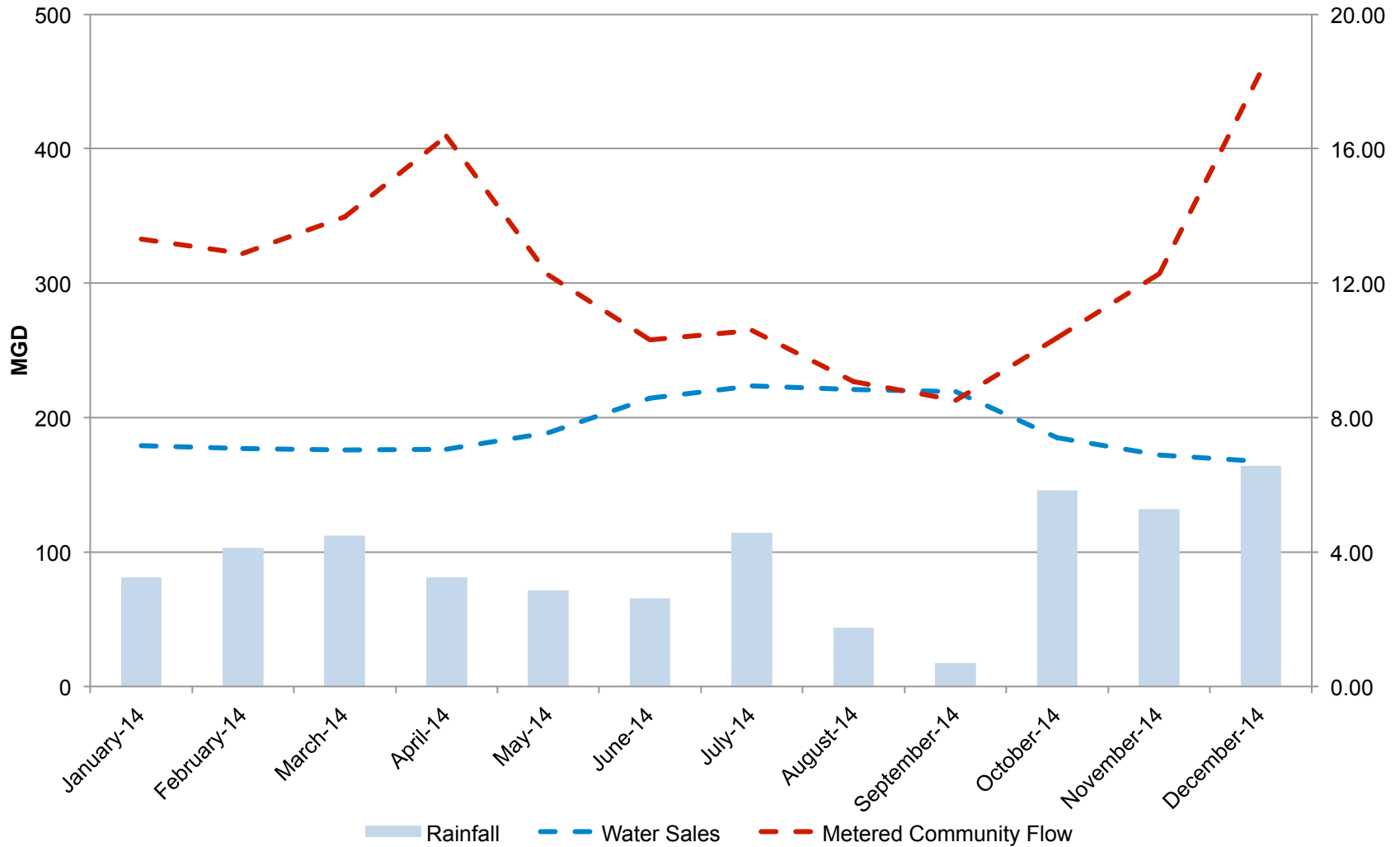


Difference between Deer Island Flow and Metered Community Flow

- Average Difference = 17 MGD
- Subtraction of Infiltration into MWRA Interceptors
 - Mathematical Proration (using inch-miles) for portion of MWRA Interceptors upstream of Community Sewer Rates Meters
- Potential Metering Differences
 - Metering at 3 Deer Island Facilities (North Main PS, South System PS, Winthrop Terminal HW)
 - 189 Community Sewer Rates Meters



Water Sales and Metered Wastewater Flow 2014





Group 1 - Blue

Fully Supplied Water and Full Sewer Communities

Arlington

Belmont

Boston

Brookline

Chelsea

Everett

Framingham

Lexington

Malden

Medford

Melrose

Milton

Newton

Norwood

Quincy

Reading

Revere

Somerville

Stoneham

Waltham

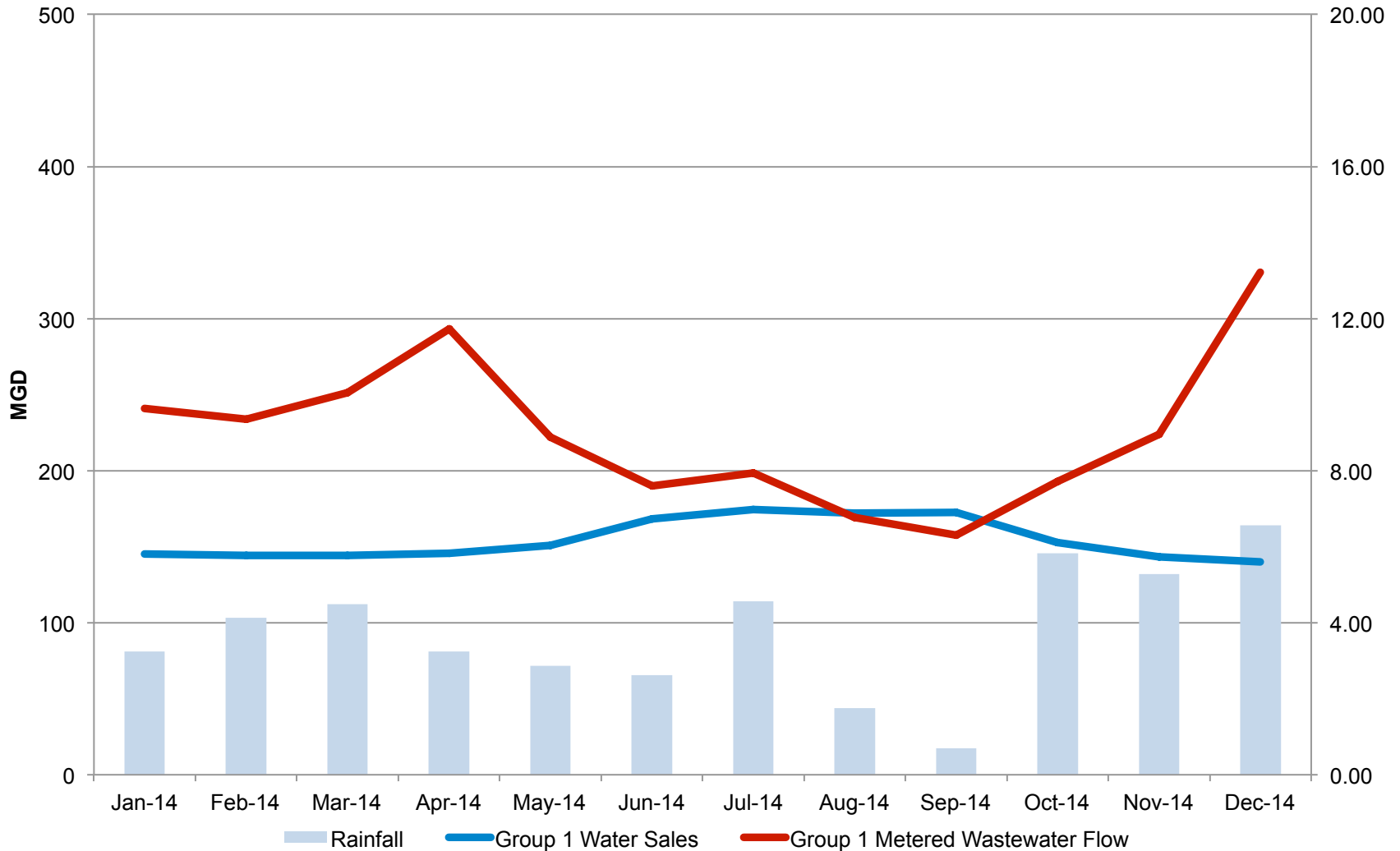
Watertown

Winthrop



Group 1

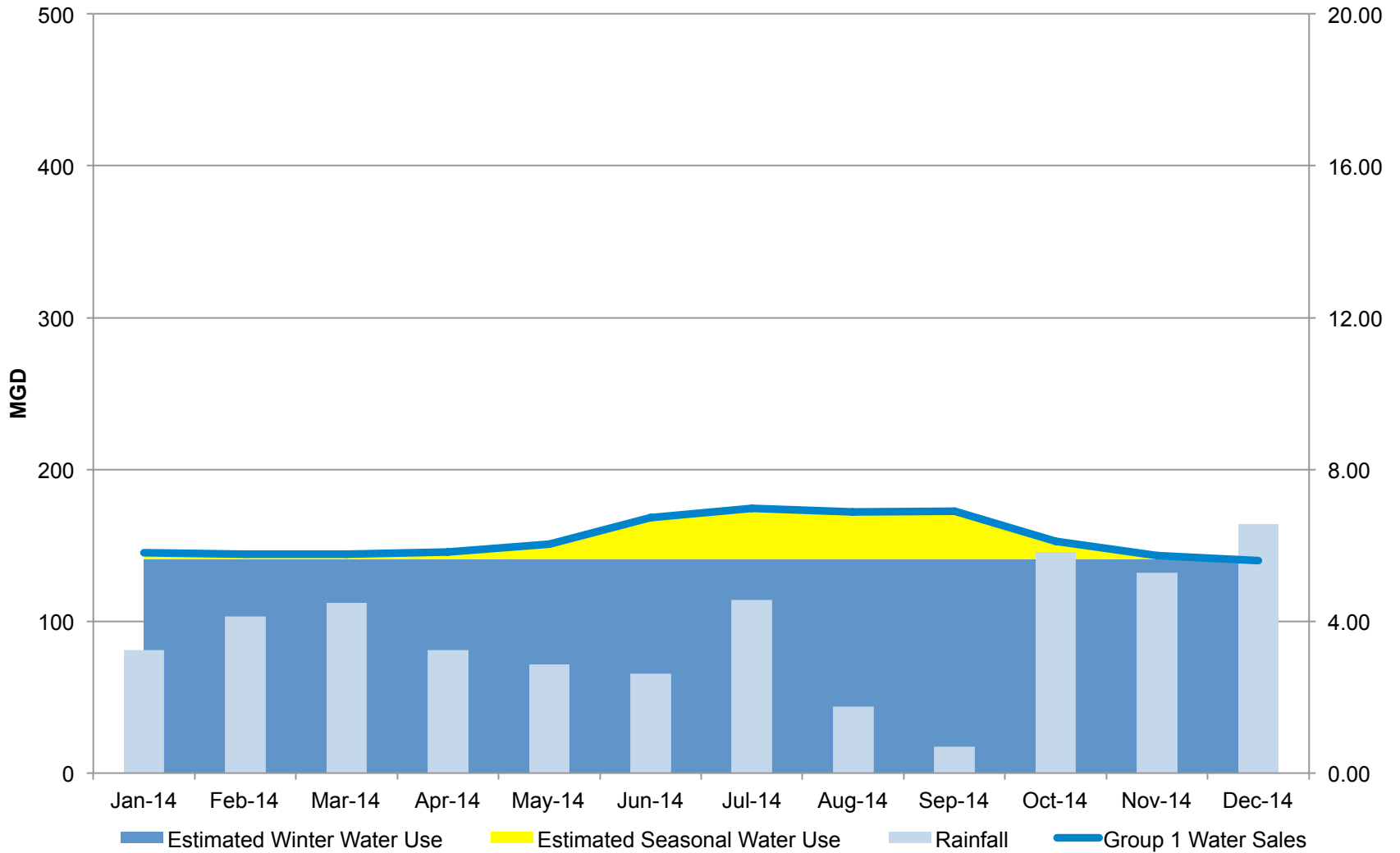
Group 1 Water Sales and Metered Wastewater Flow





Group 1

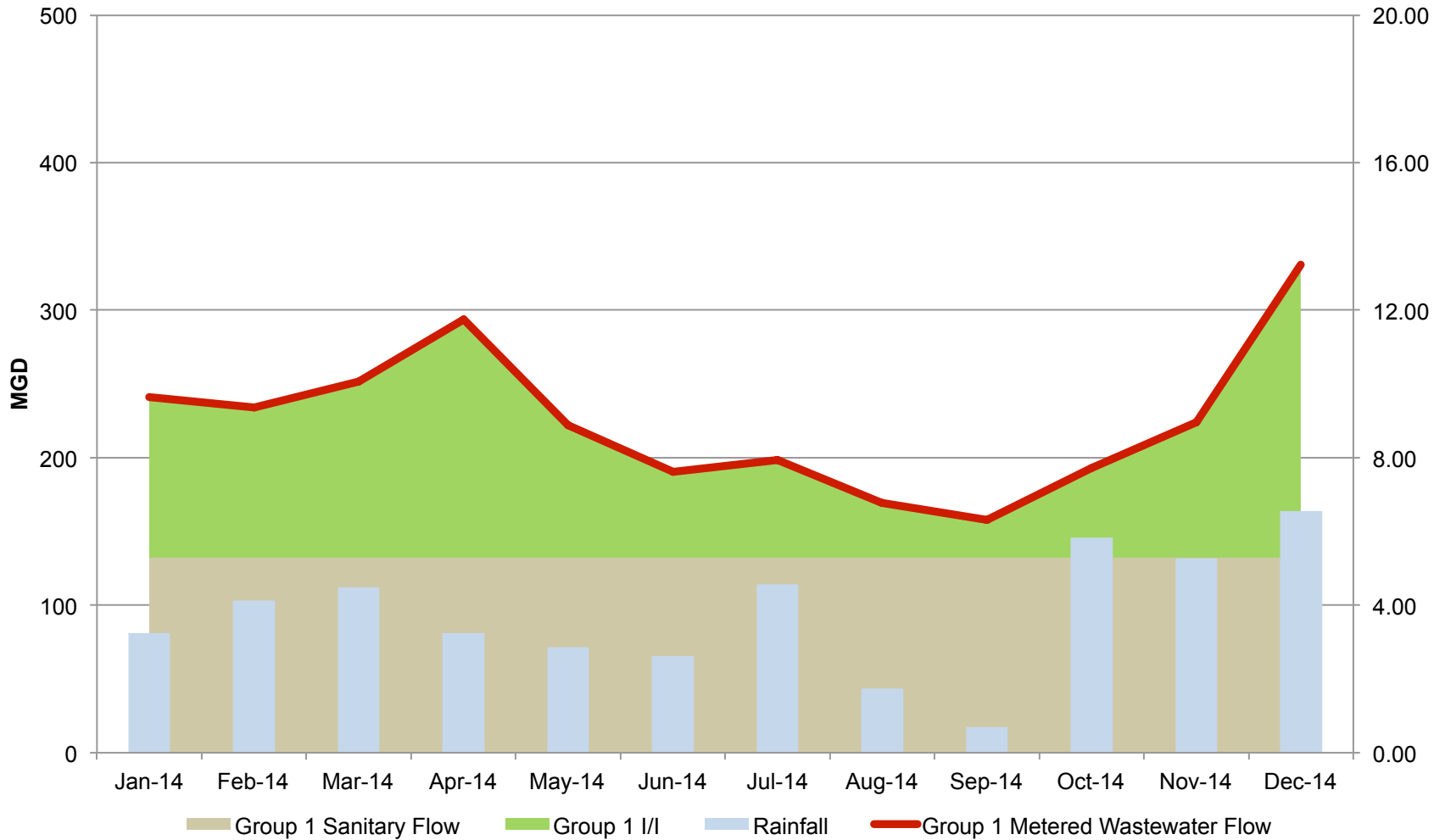
Group 1 Water Sales - Estimated Seasonal Use





Group 1

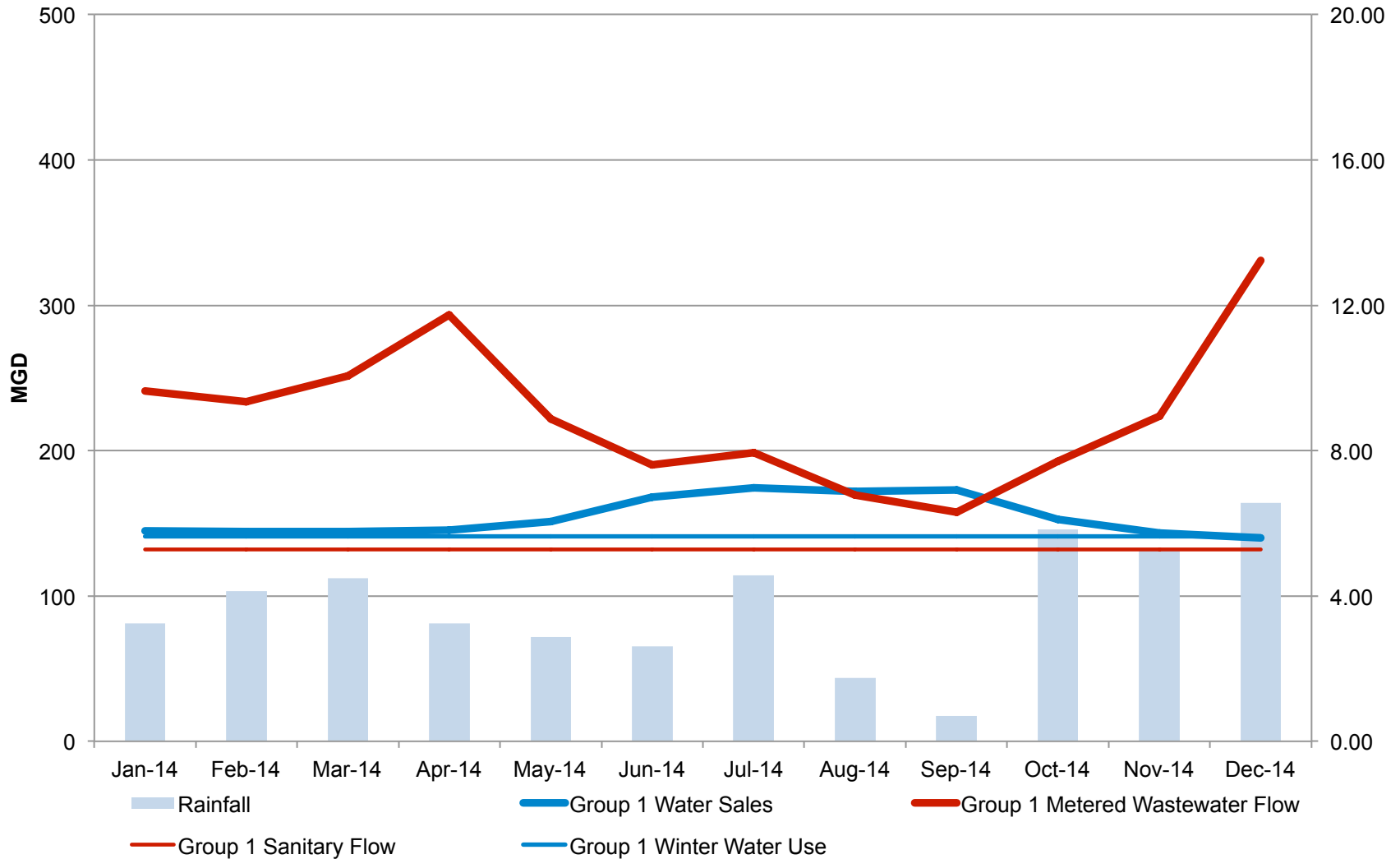
Group 1 Metered Wastewater Flow - Estimated Seasonal Flows





Group 1

Group 1 Estimated Winter Water Use vs Sanitary Flow





Partially/Emergency Supplied MWRA Water (and locally supplied water) and Full Sewer Communities

Bedford

Cambridge (Emergency)

Canton

Dedham-Westwood Water District

Needham

Stoughton

Wakefield

Wellesley

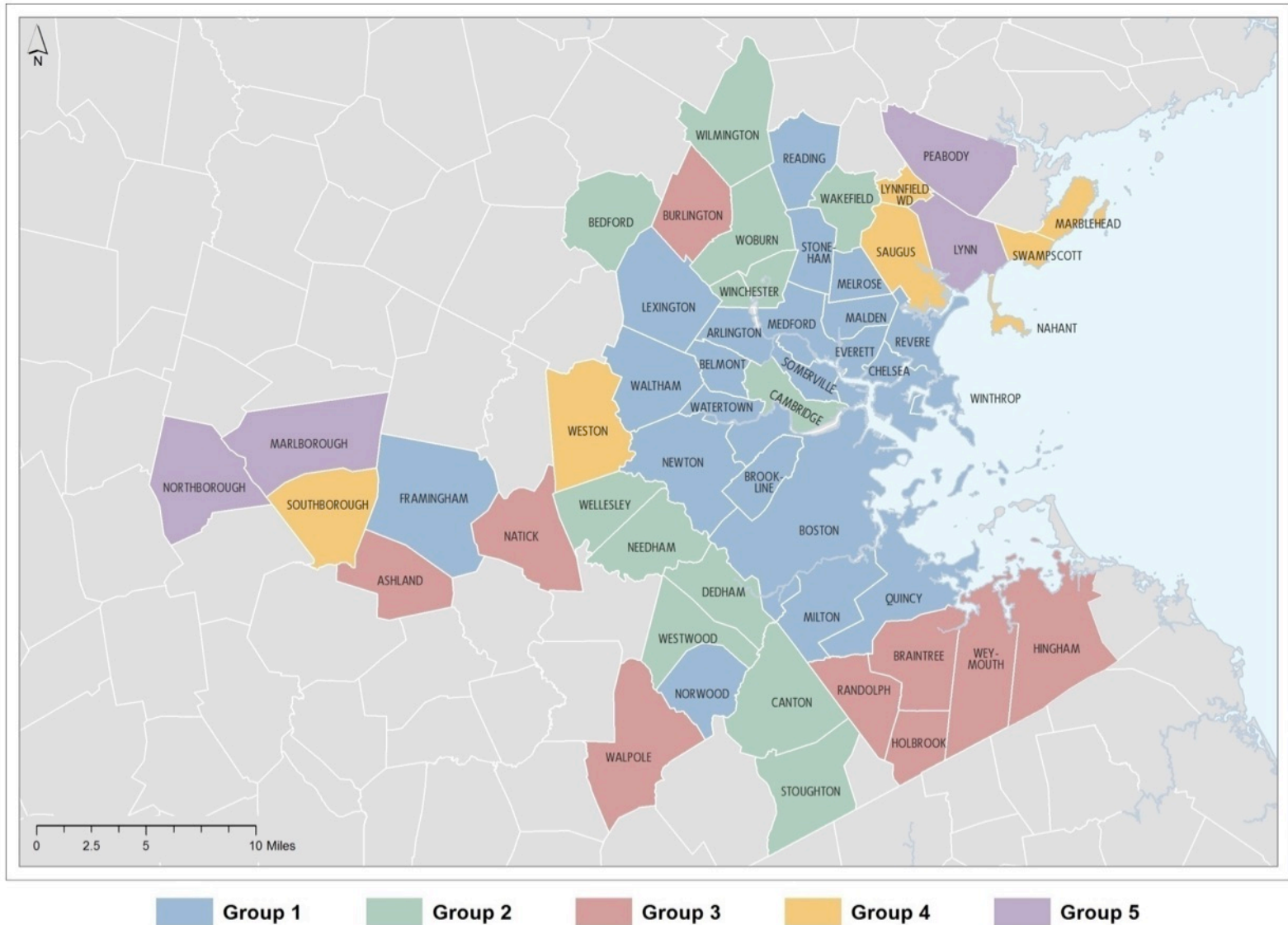
Wilmington

Winchester

Woburn



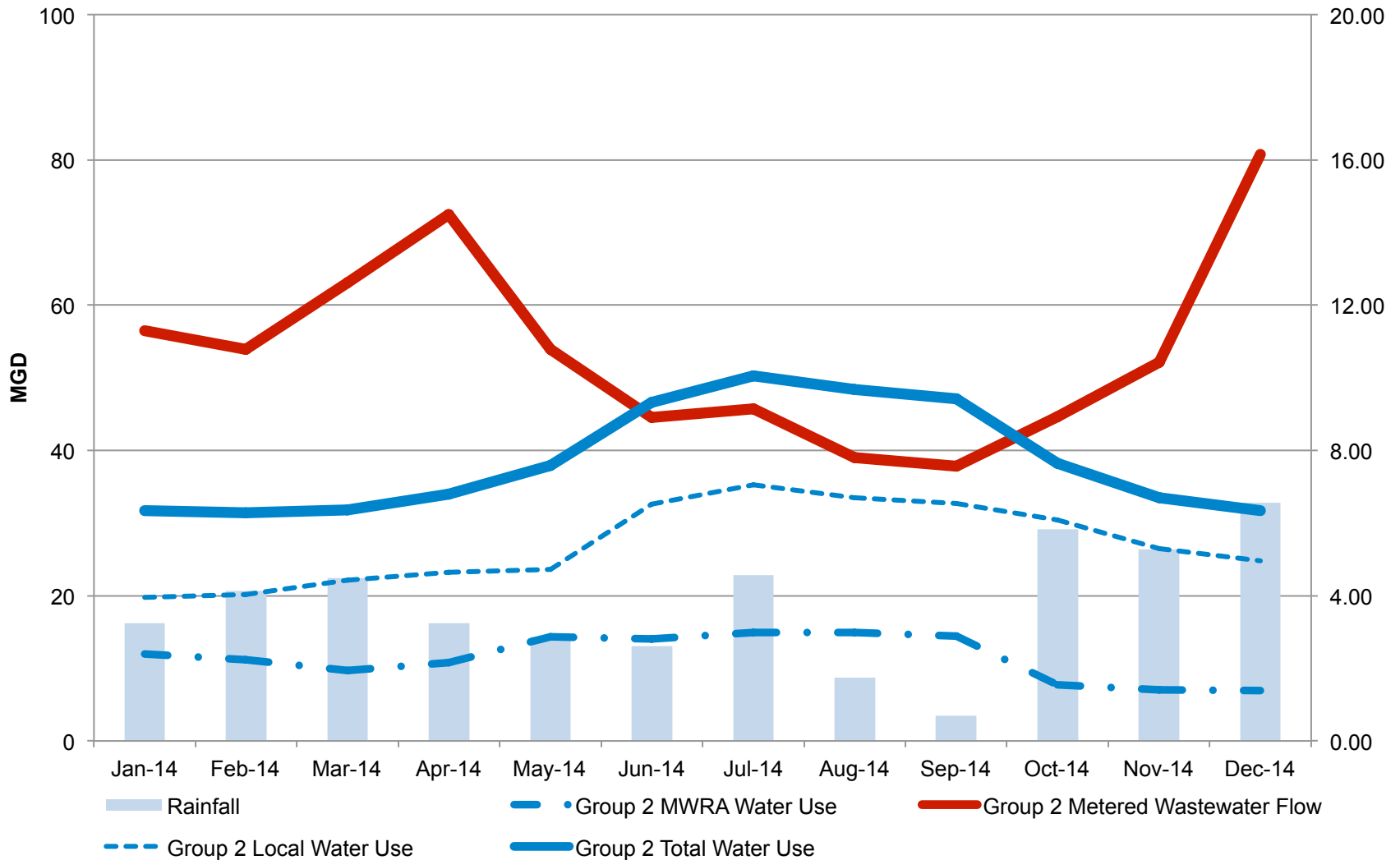
Five Customer Community Groupings





Group 2

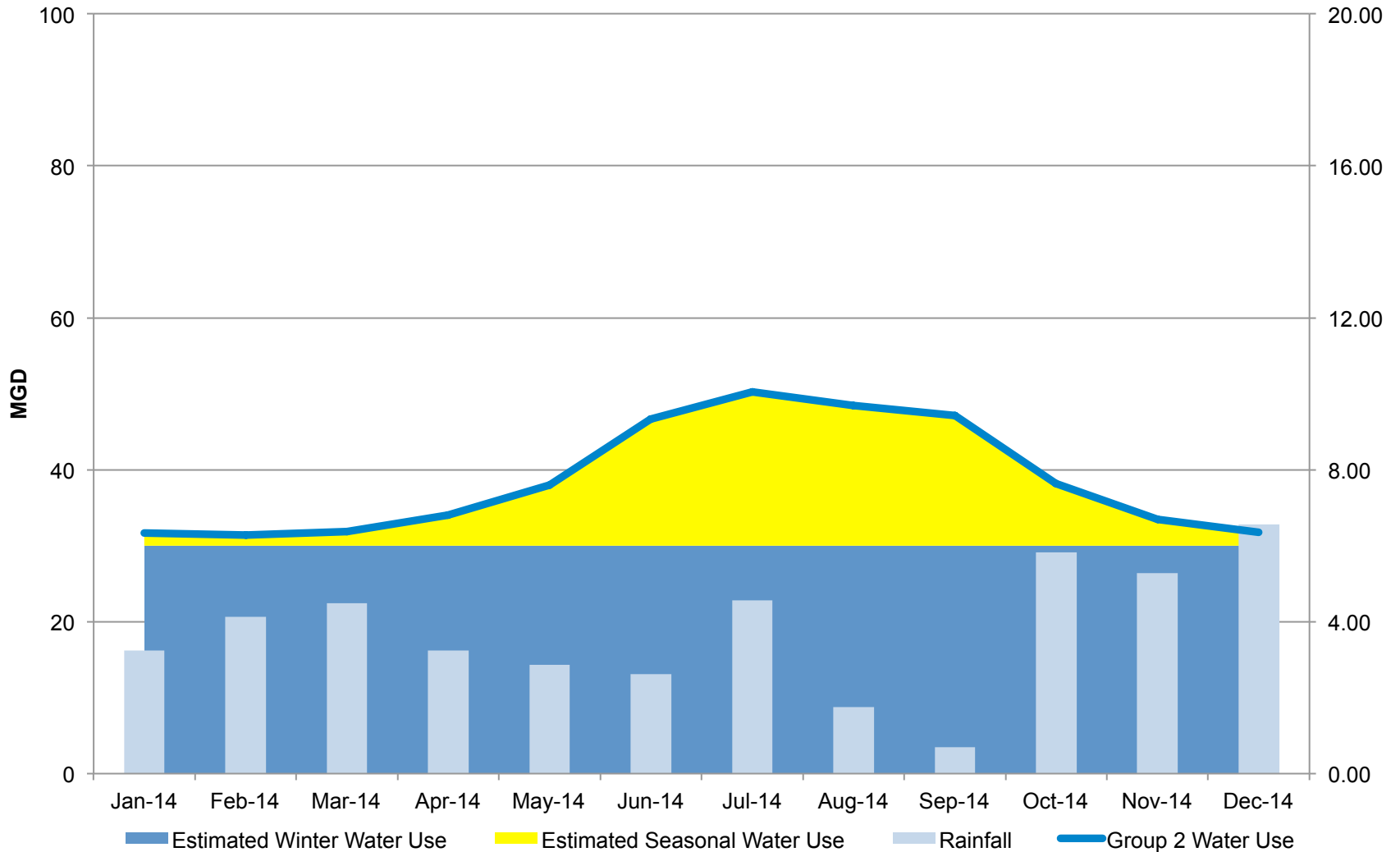
Group 2 Water Use and Metered Wastewater Flow





Group 2

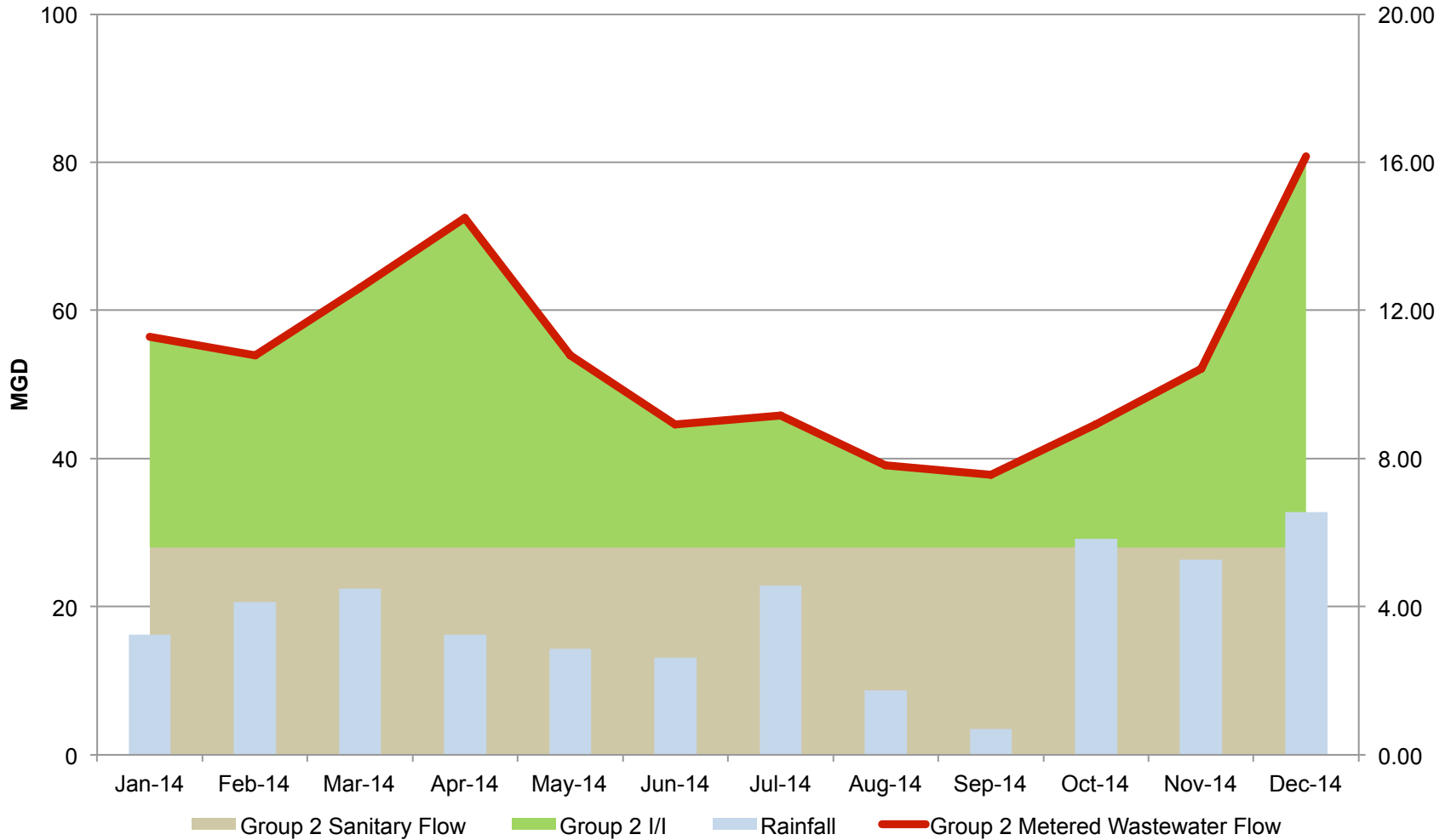
Group 2 Water Use- Estimated Seasonal Use





Group 2

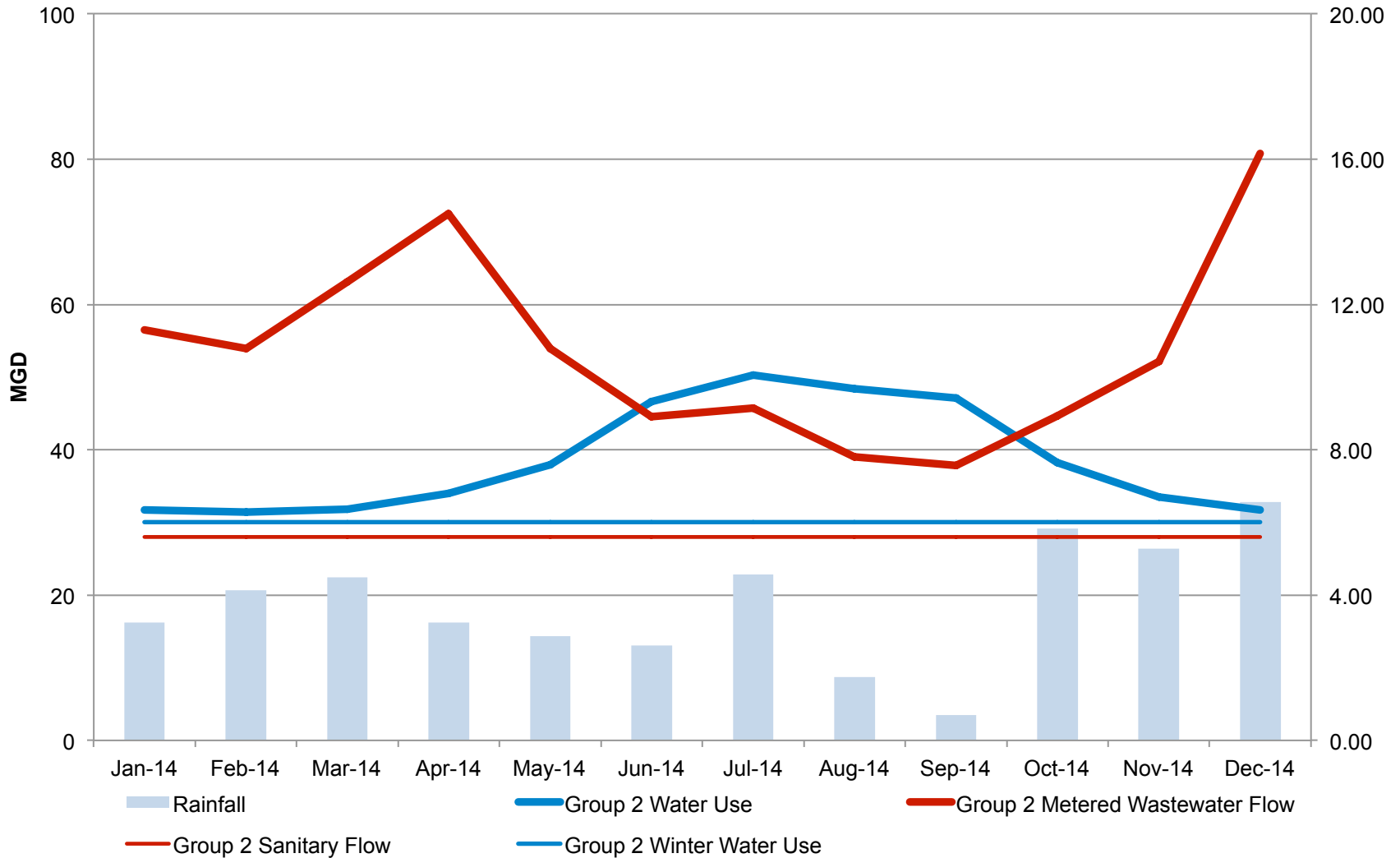
Group 2 Metered Wastewater Flow - Estimated Seasonal Flows





Group 2

Group 2 Estimated Winter Water Use vs Sanitary Flow





Full Sewer Only Communities (Locally Supplied Water)

Ashland

Braintree

Burlington

Hingham

Holbrook

Natick

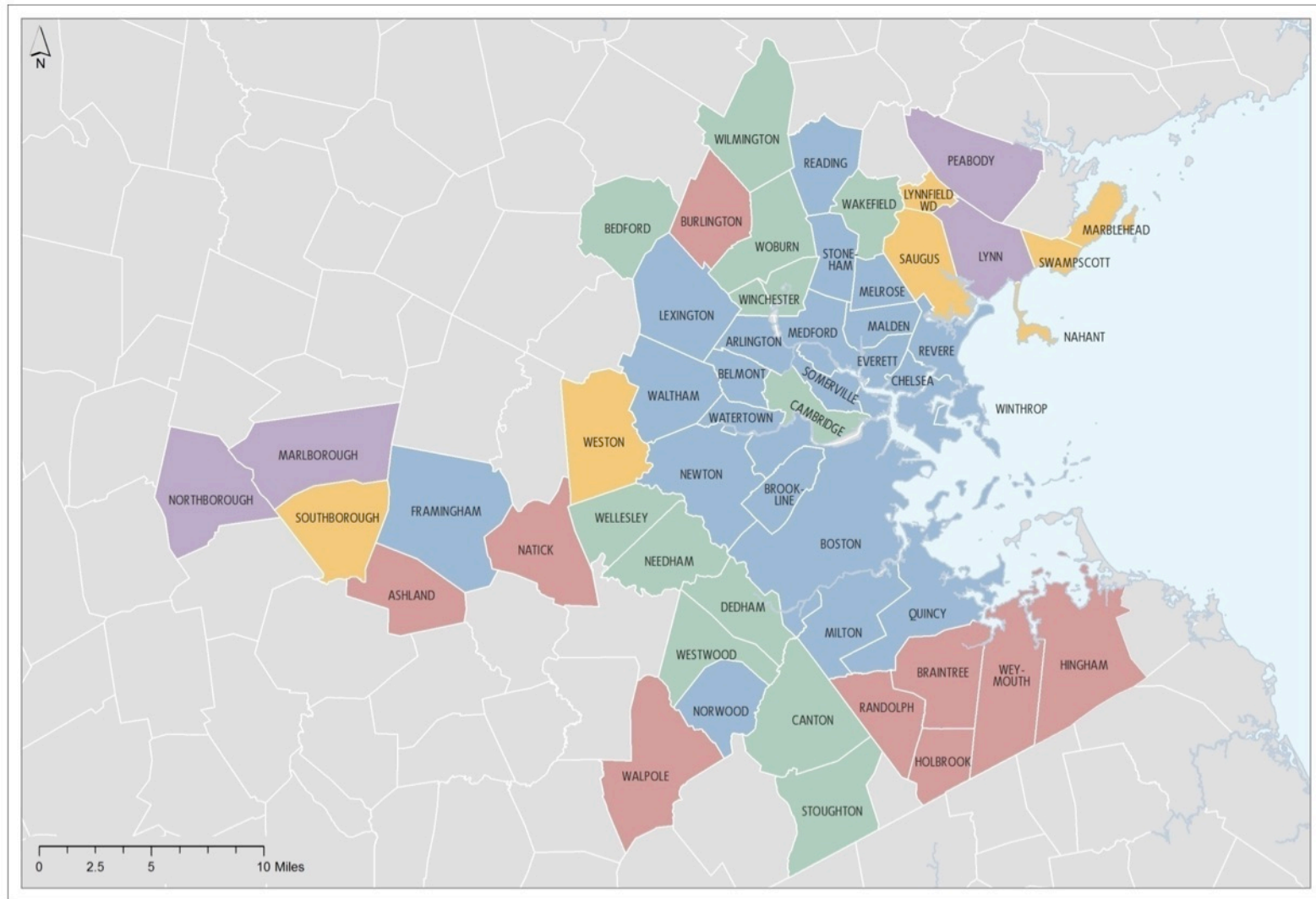
Randolph

Walpole

Weymouth



Five Customer Community Groupings



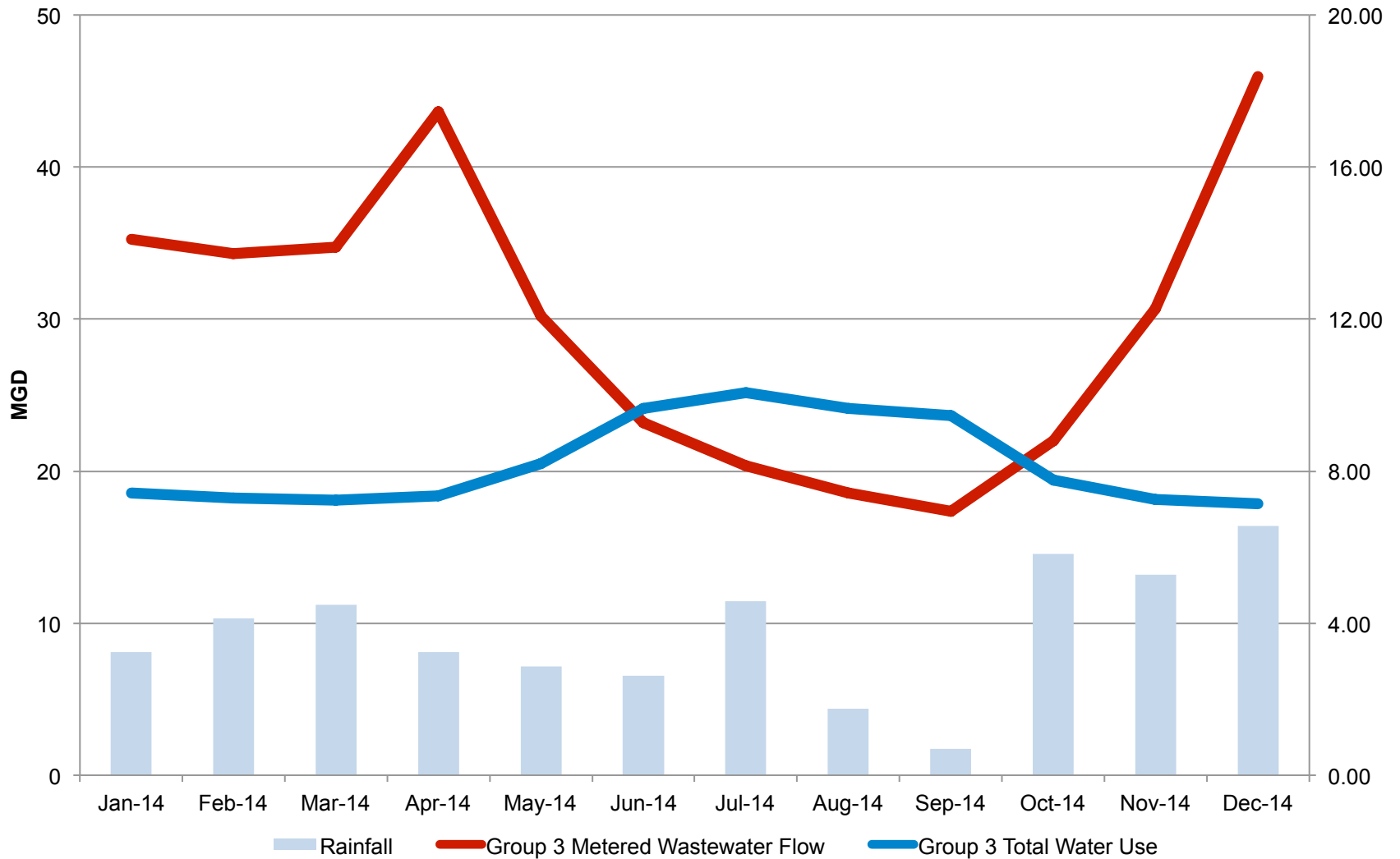
Group 1 Group 2 Group 3 Group 4 Group 5

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Group 3

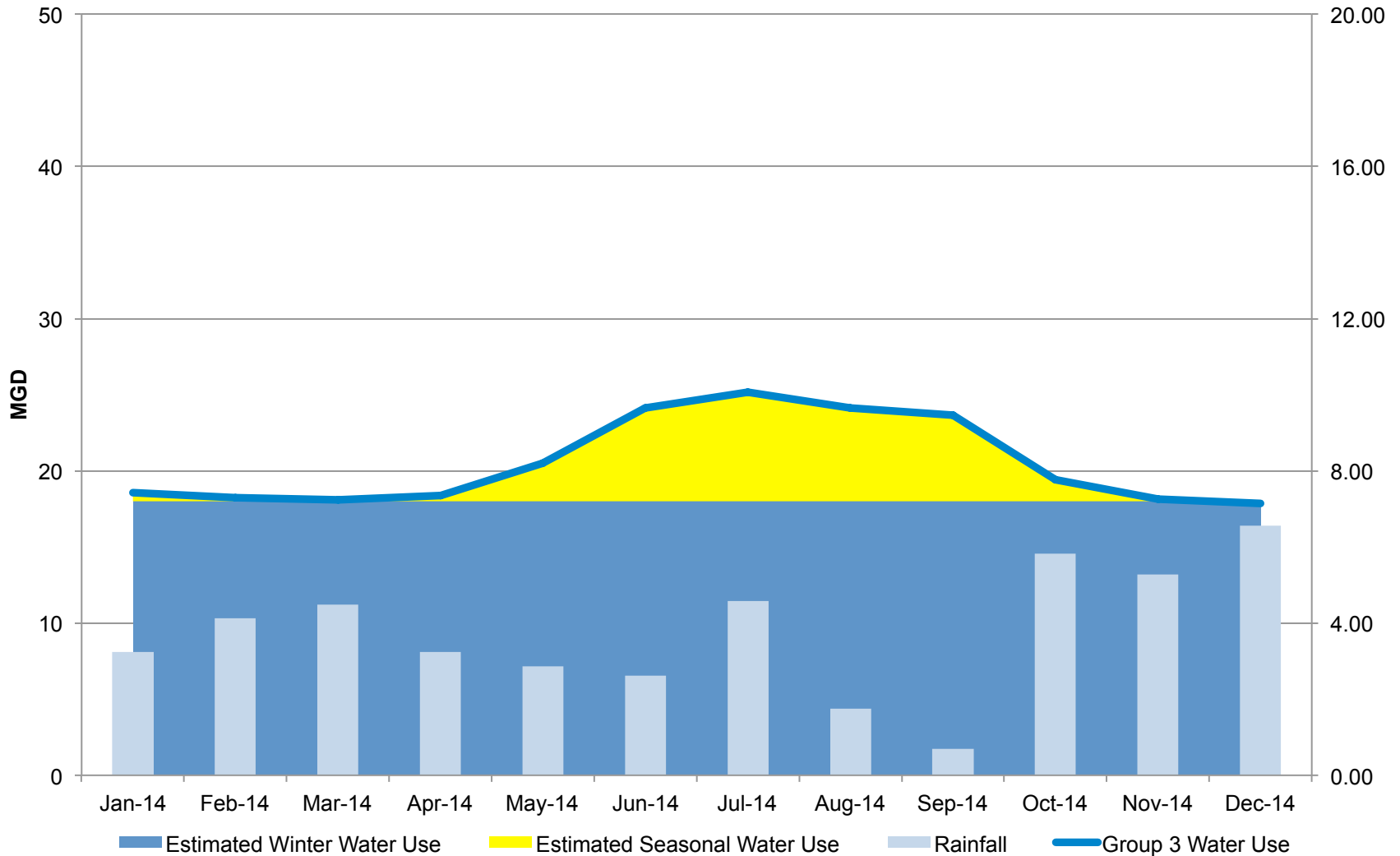
Group 3 Water Use and Metered Wastewater Flow





Group 3

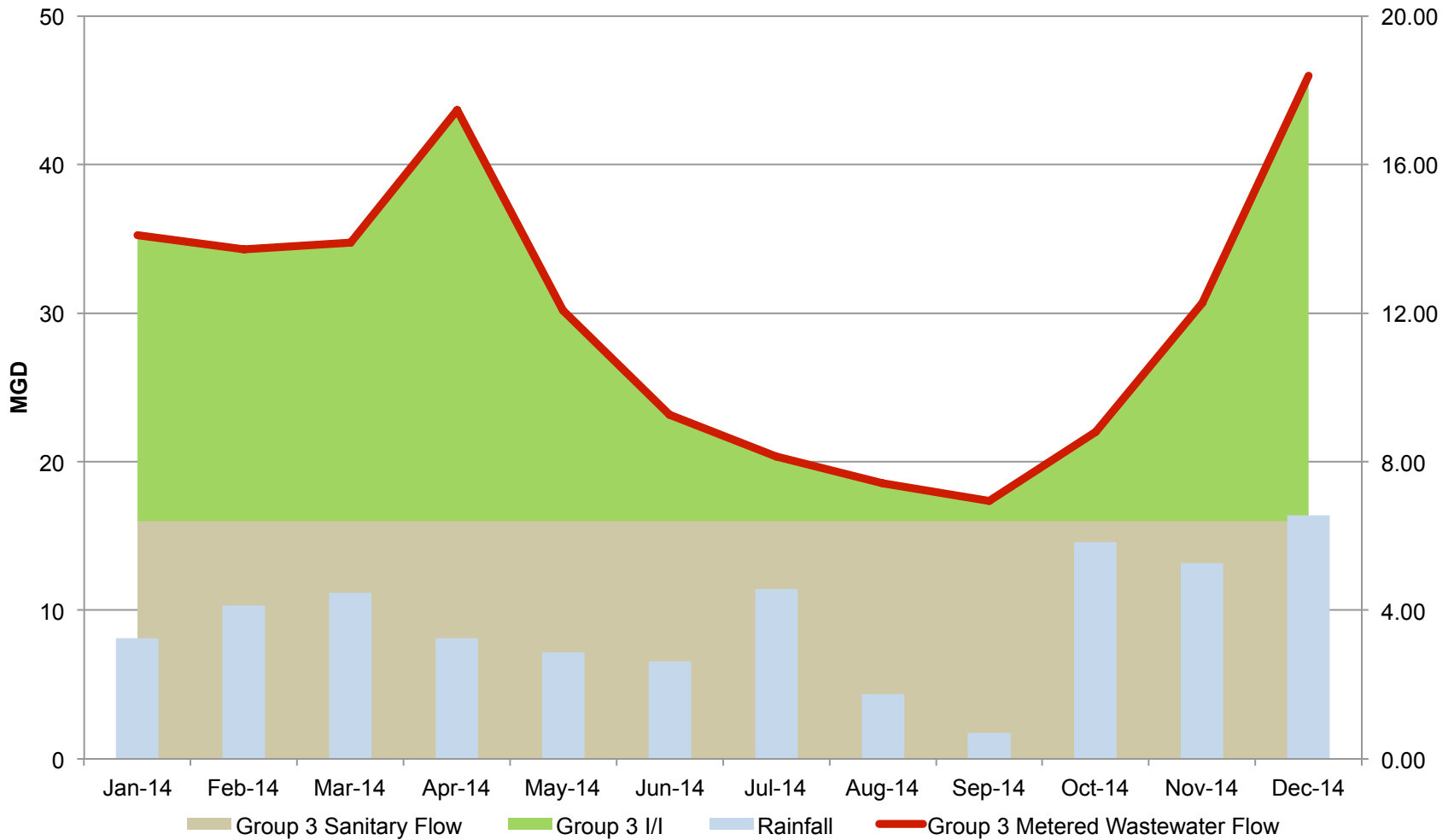
Group 3 Water Use- Estimated Seasonal Use





Group 3

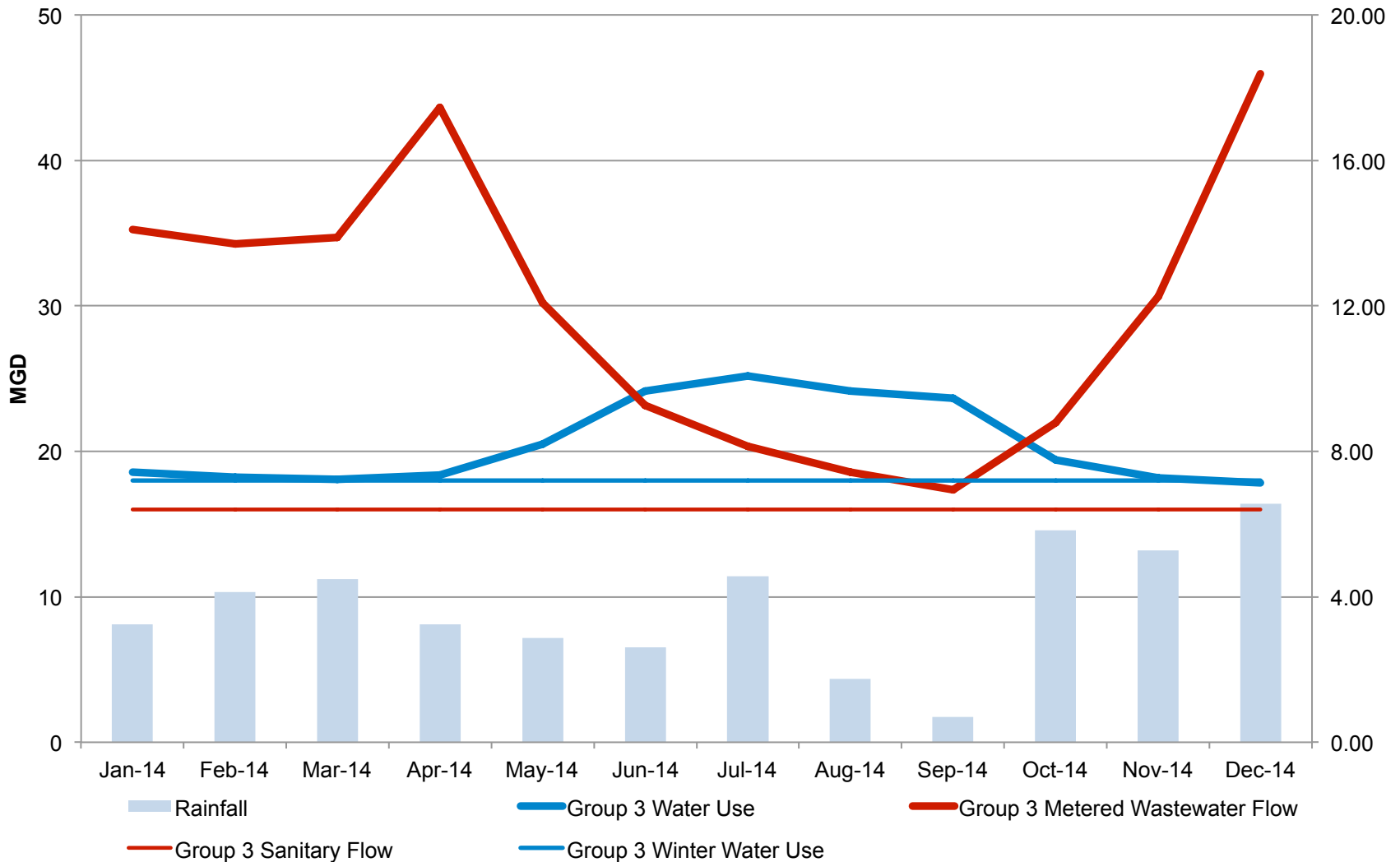
Group 3 Metered Wastewater Flow - Estimated Seasonal Flows





Group 3

Group 3 Estimated Winter Water Use vs Sanitary Flow





Fully Supplied Water Only Communities

Chicopee (CVA Water)

Clinton (Raw Water)

Lynnfield Water District

Marblehead

Nahant

Saugus

South Hadley F.D. #1 (CVA Water)

Southborough

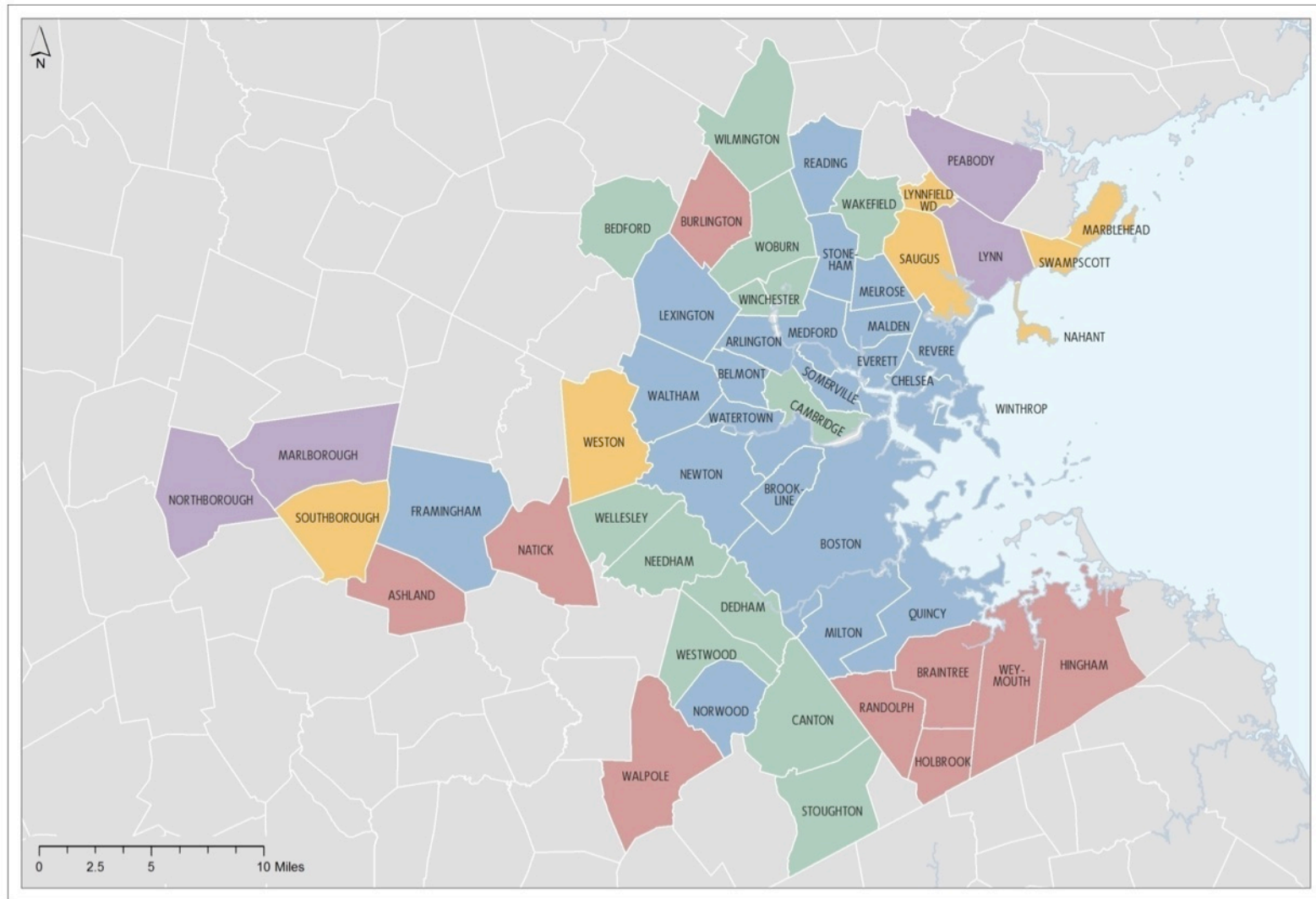
Swampscott

Weston

Wilbraham (CVA Water)



Five Customer Community Groupings



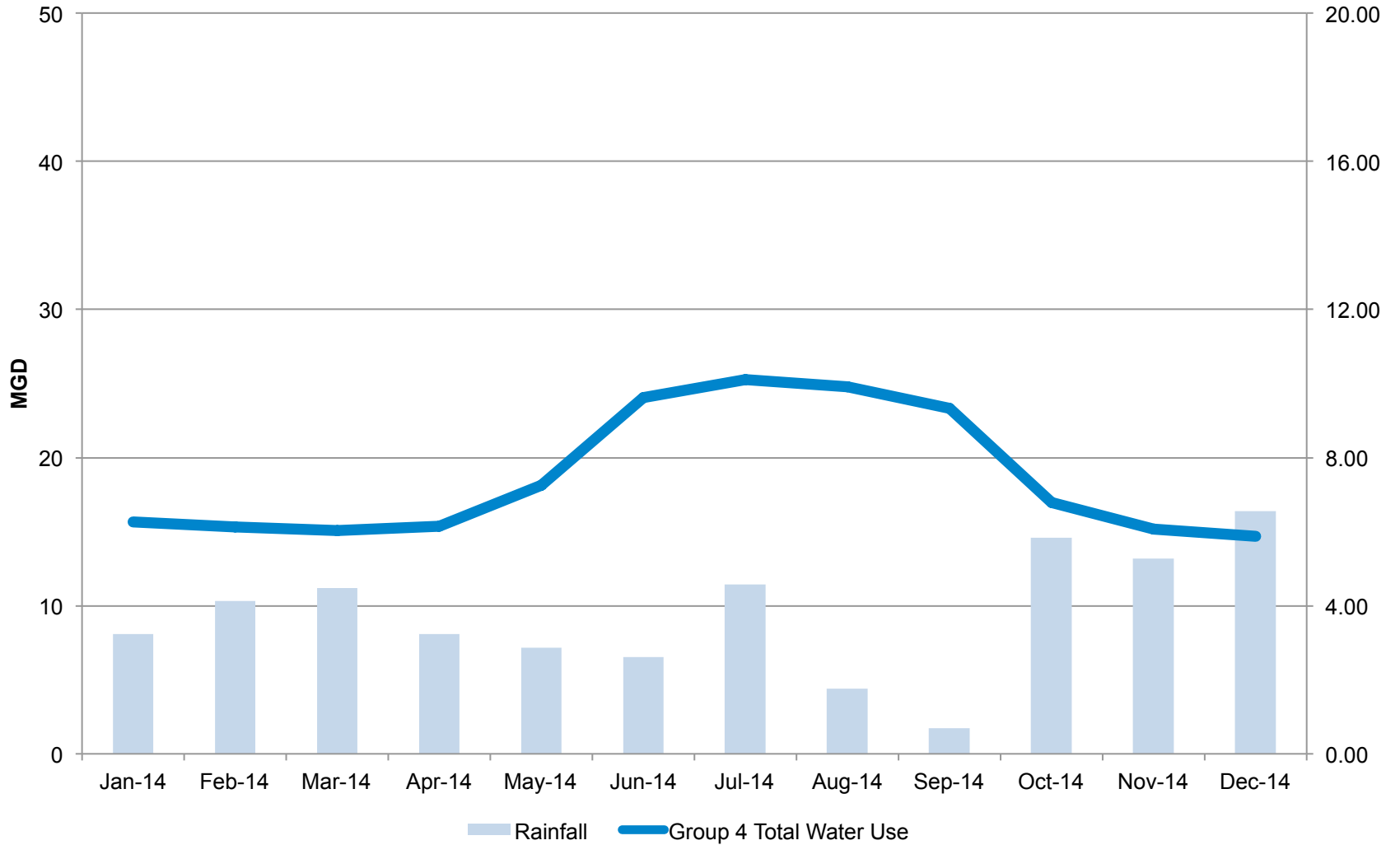
Group 1 Group 2 Group 3 Group 4 Group 5

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Group 4

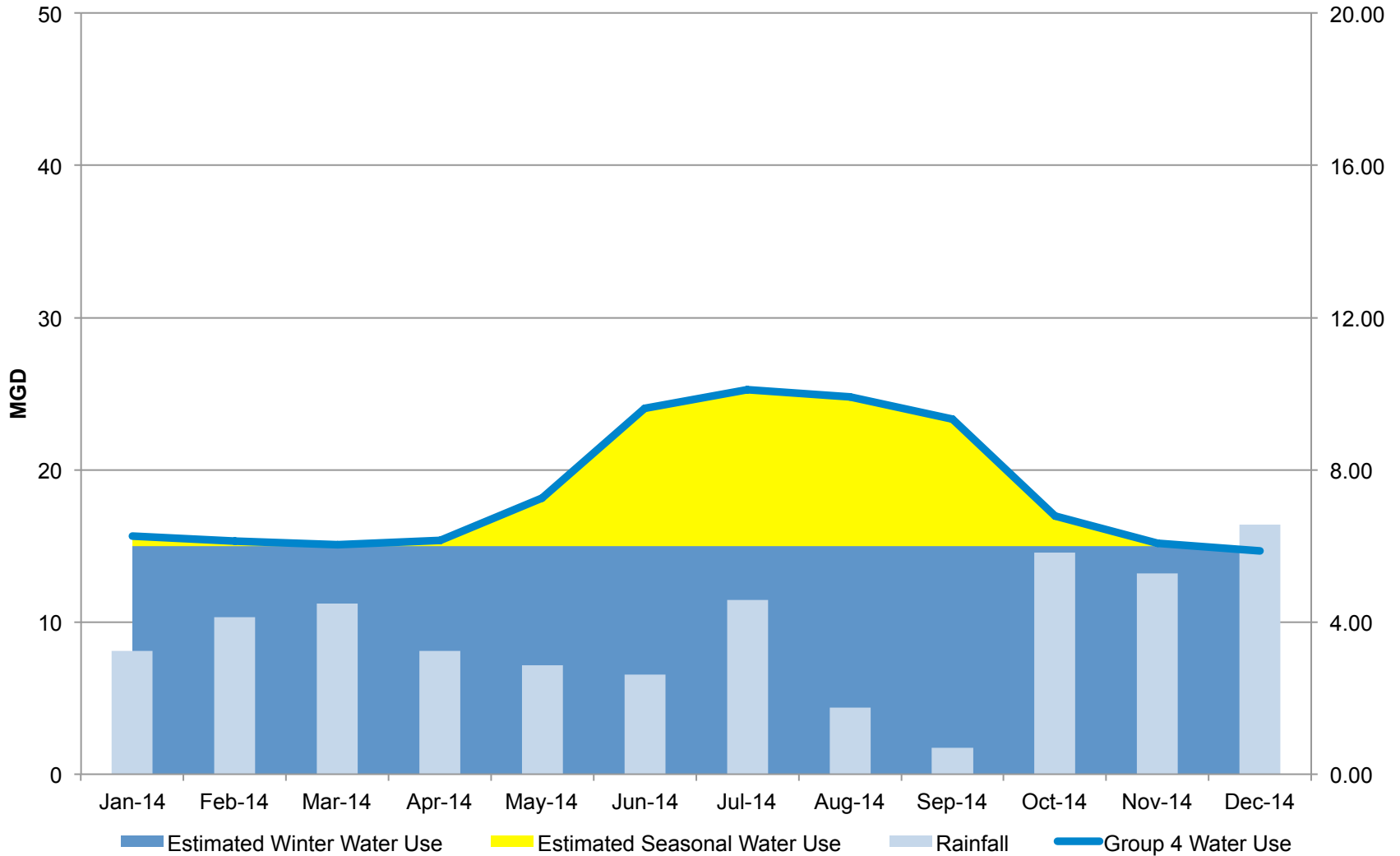
Group 4 Water Use





Group 4

Group 4 Water Use - Estimated Seasonal Use





Fully Supplied Water Only Communities

Chicopee (CVA Water)

Clinton (Raw Water)

Lynnfield Water District

Marblehead

Nahant

Saugus

South Hadley F.D. #1 (CVA Water)

Southborough

Swampscott

Weston

Wilbraham (CVA Water)

Wastewater Treated By:

Chicopee WWTP

MWRA Clinton AWWTP

Local Septic Systems

South Essex Sewer District WWTP

Lynn WWTP

Lynn WWTP

South Hadley WWTP

Local Septic Systems

Lynn WWTP

Local Septic Systems

Springfield WWTP



Group 5 - Purple

Partially/Emergency Supplied MWRA Water Only Communities And Other Water Revenue Customers

Leominster (Raw Water)

Lynn (G.E. Plant only)

Marlborough

Northborough

Peabody

Worcester (Raw Water/Emergency)

Other Water Revenue Customers

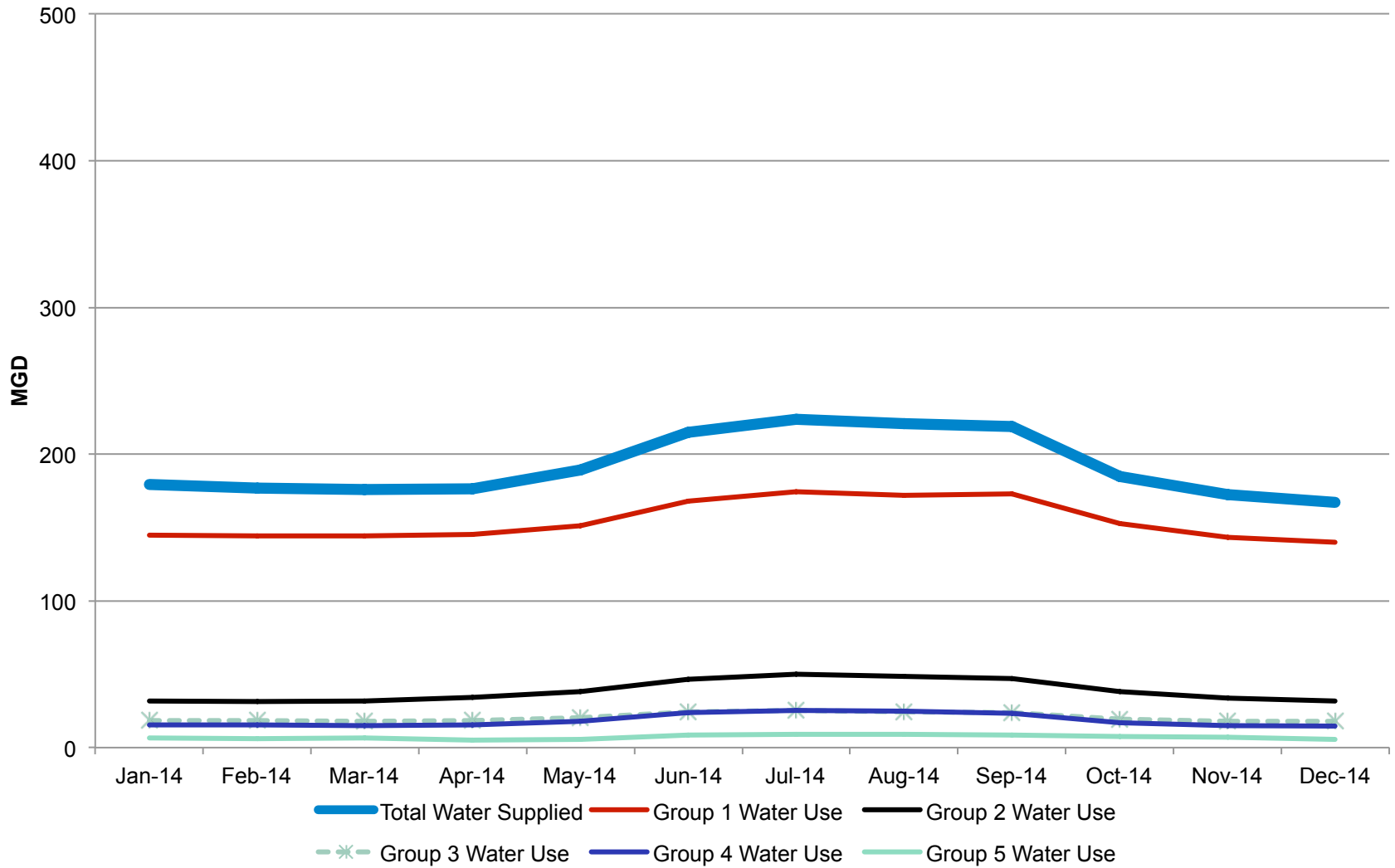
- DCR Parks and Pools
- Stone Zoo
- Deer Island WWTP

**Group 5 2014 Average
Water Sales = 7 MGD
(4% of Total Sales)**



Summary/Total Water Use

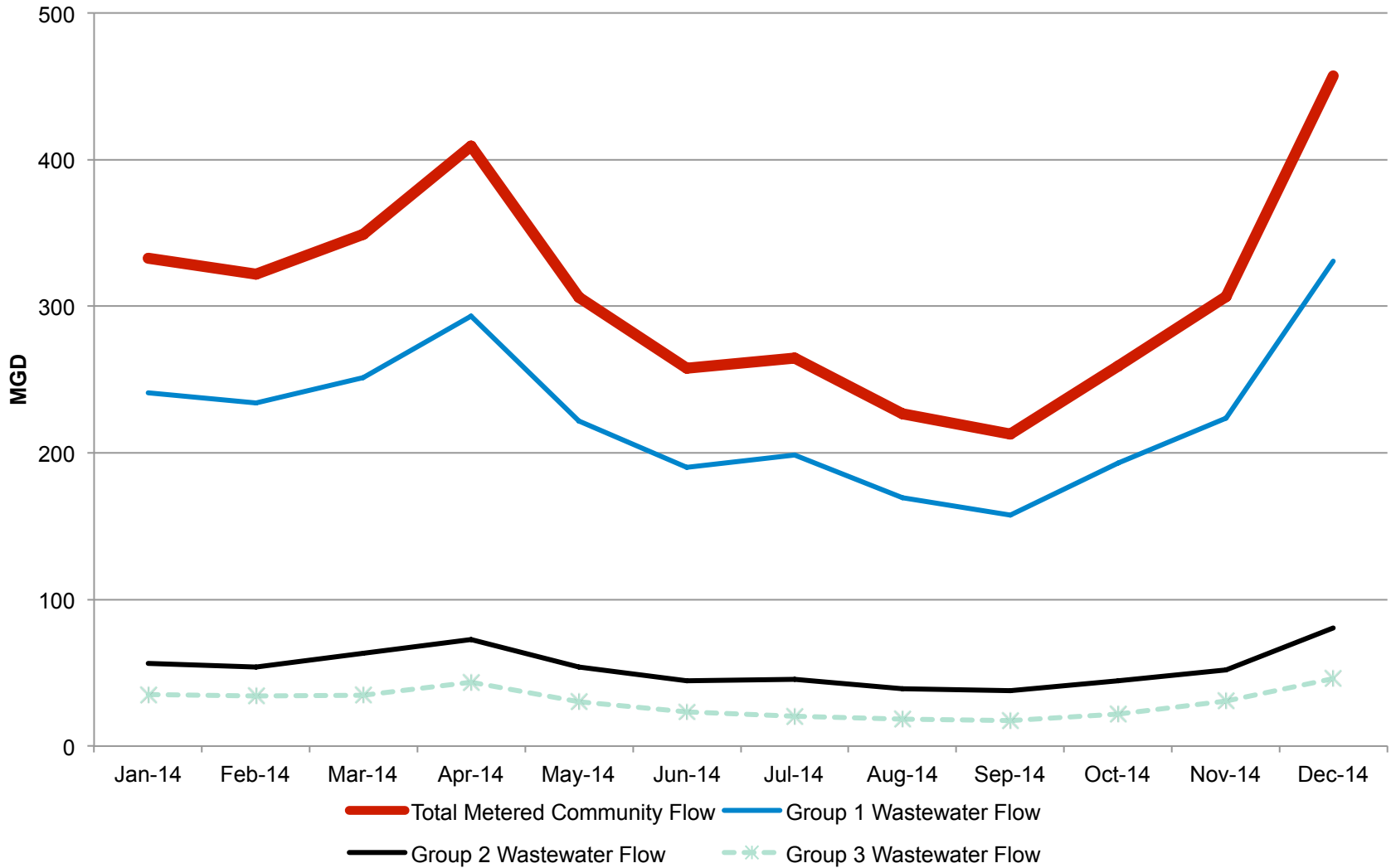
Total Water Use - Groups 1 through 5





Summary/Metered Community Wastewater Flow

Total Metered Community Flow - Groups 1 through 3

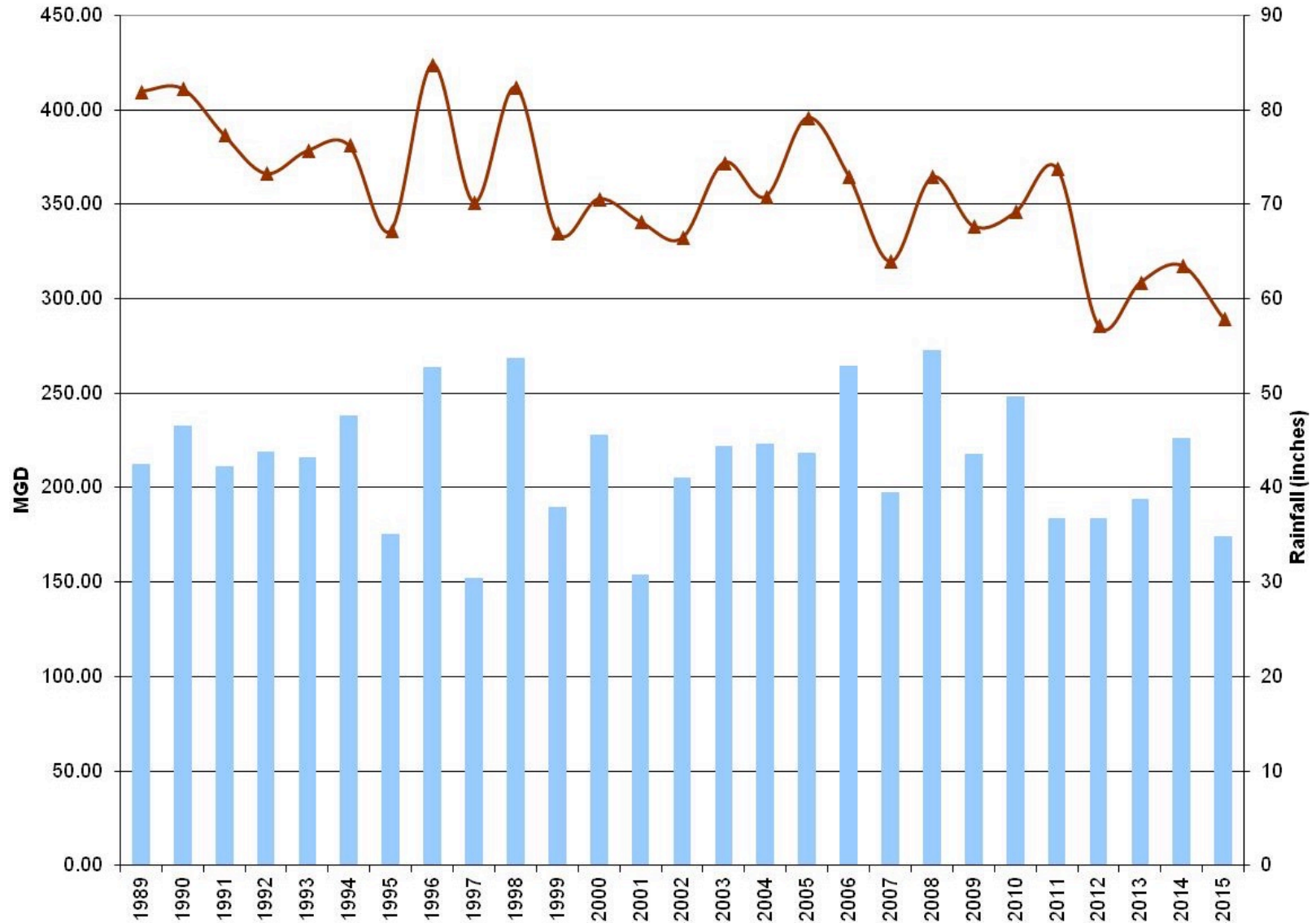




Long Term Wastewater Flow Trends

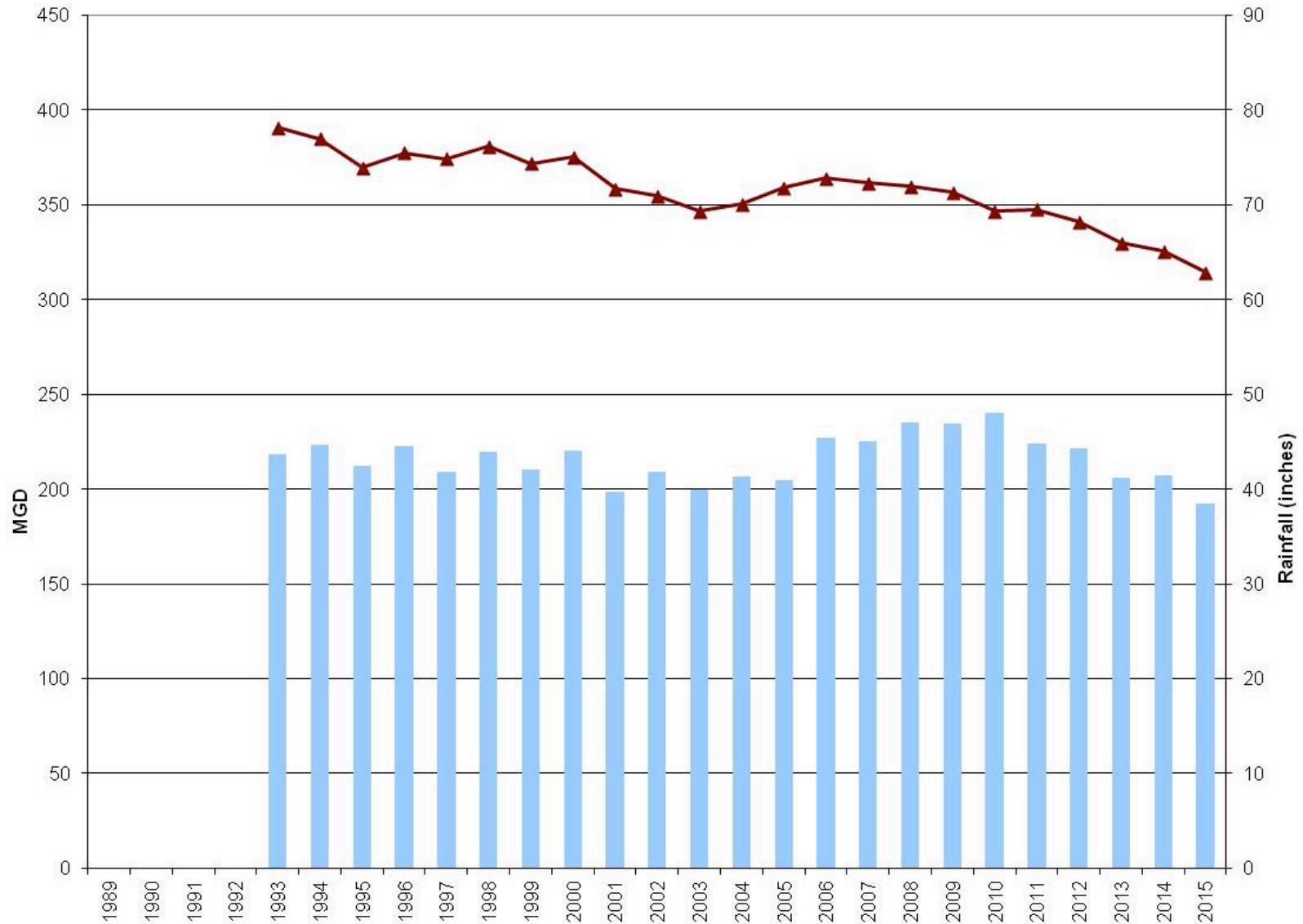


Long-Term Regional Wastewater Flow





Five Year Running Average Regional Wastewater Flow







Massachusetts Water Resources Authority

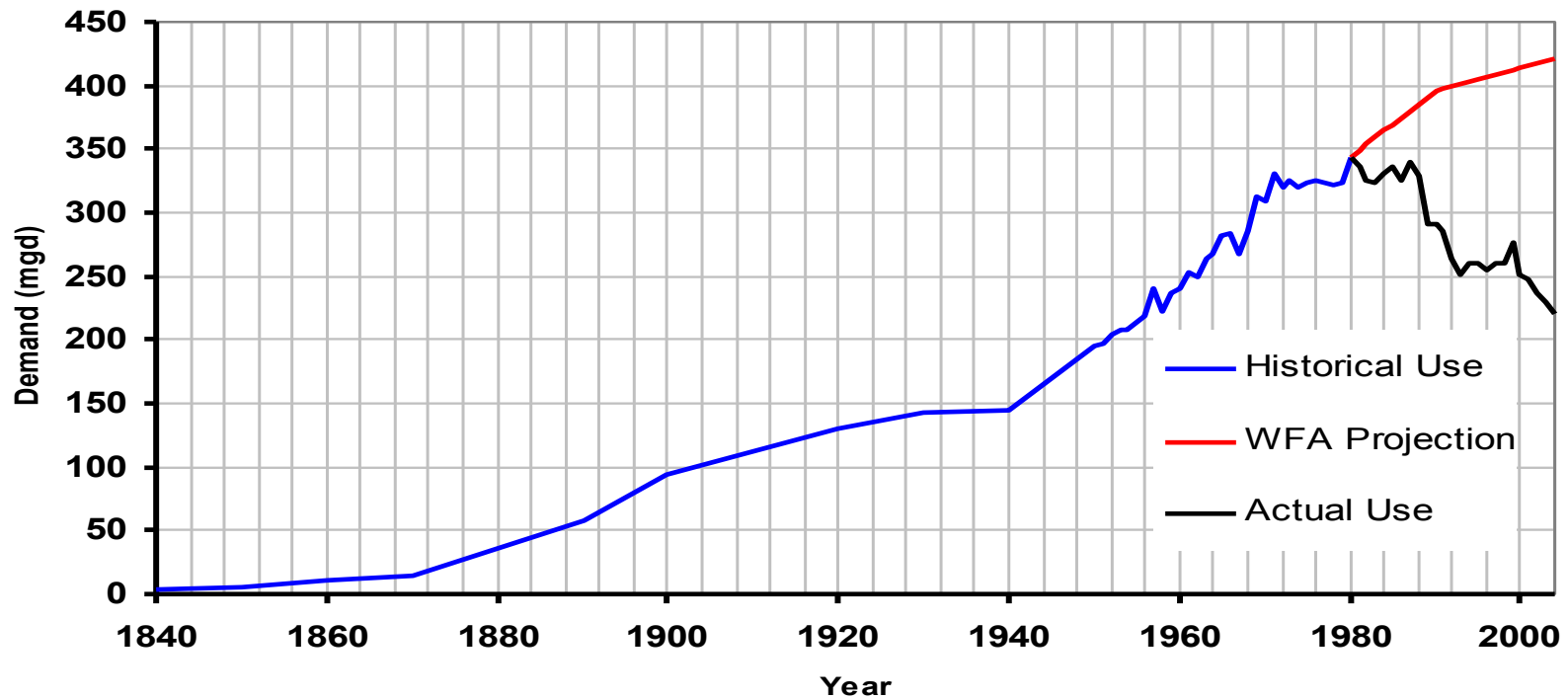
2015 Water Use Trends

**WAC/WSCAC Presentation
February 16th, 2016**



Where MWRA Started From, And Where We've Ended up

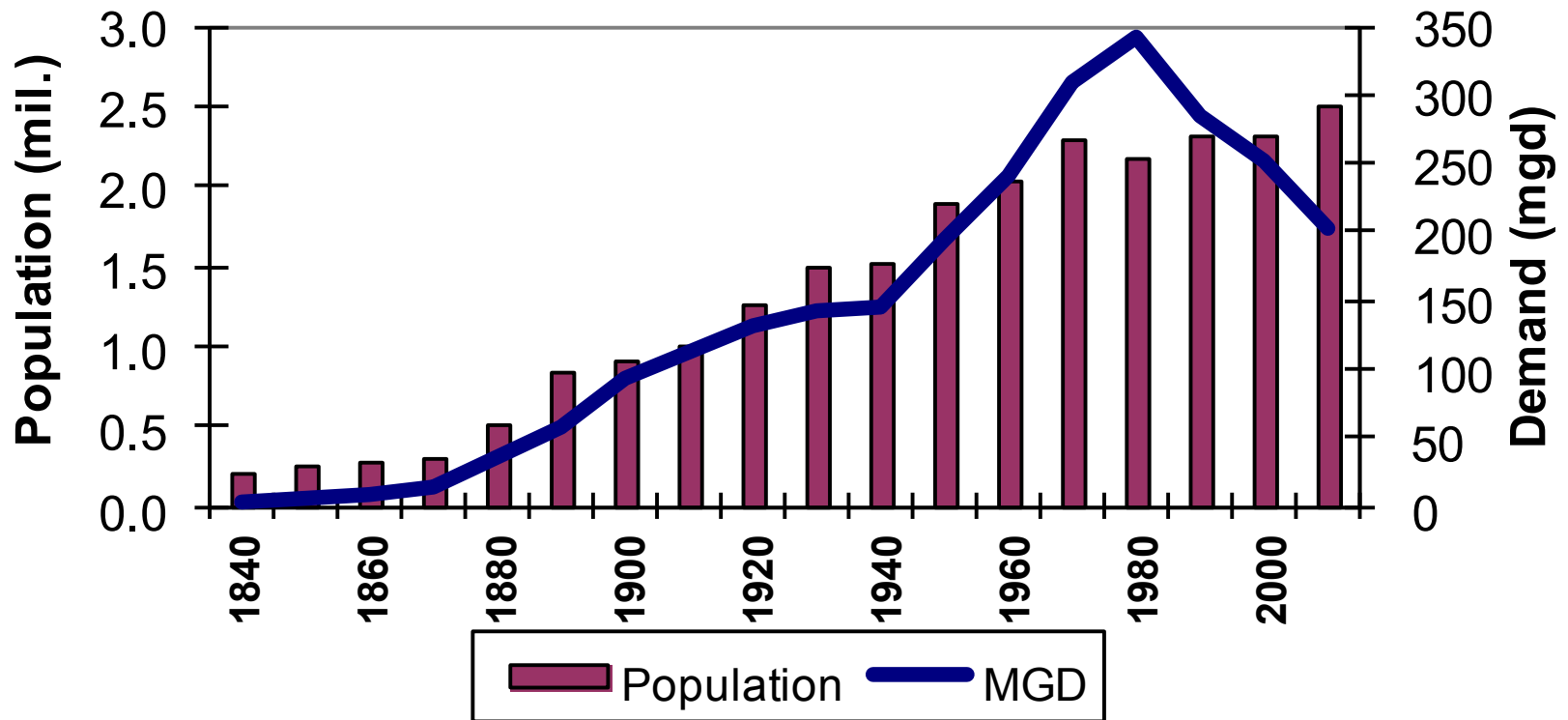
MWRA Demand





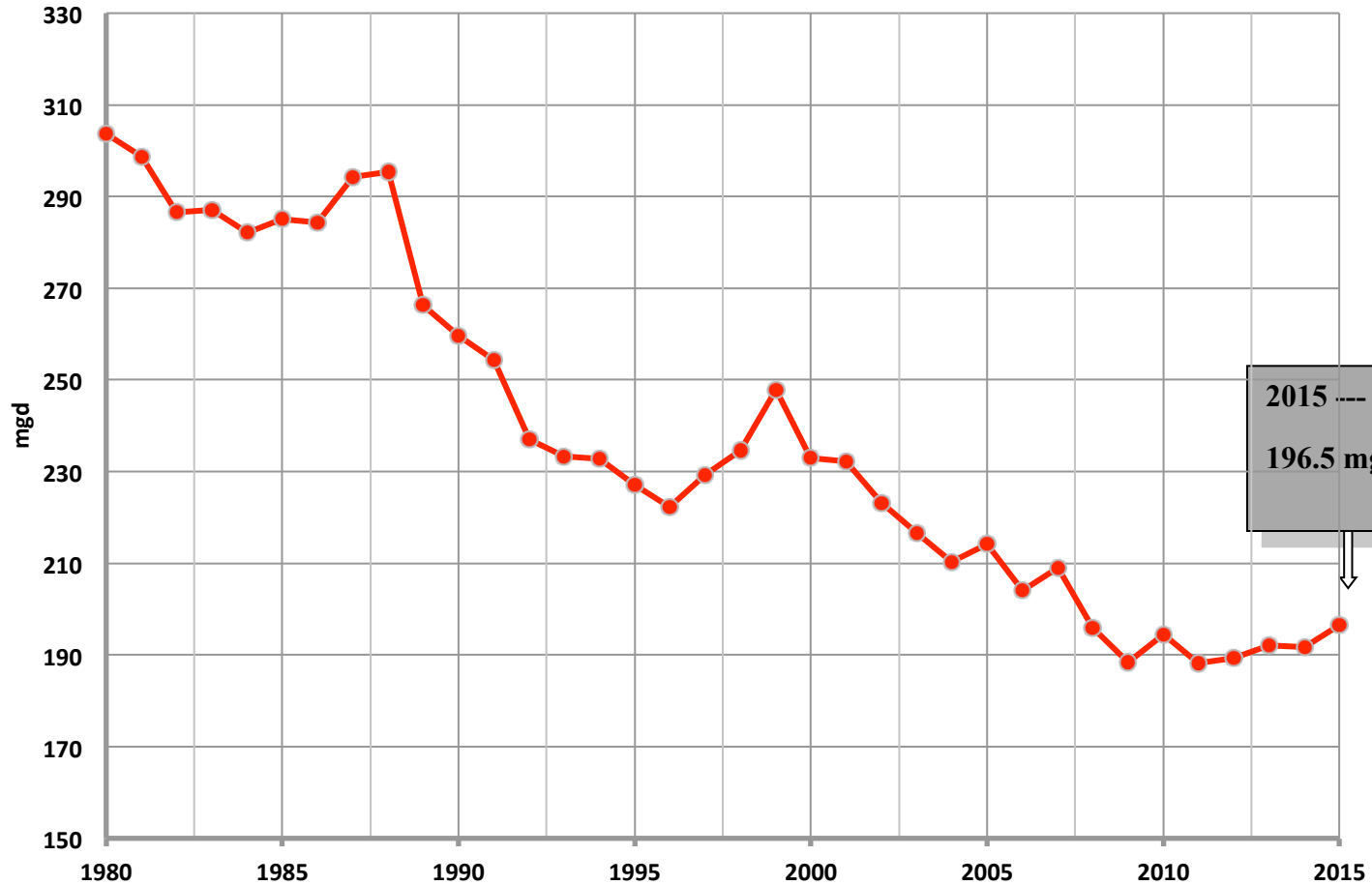
Demand Declining Despite Steady or Increasing Population

MWRA System Water Demand vs. Population



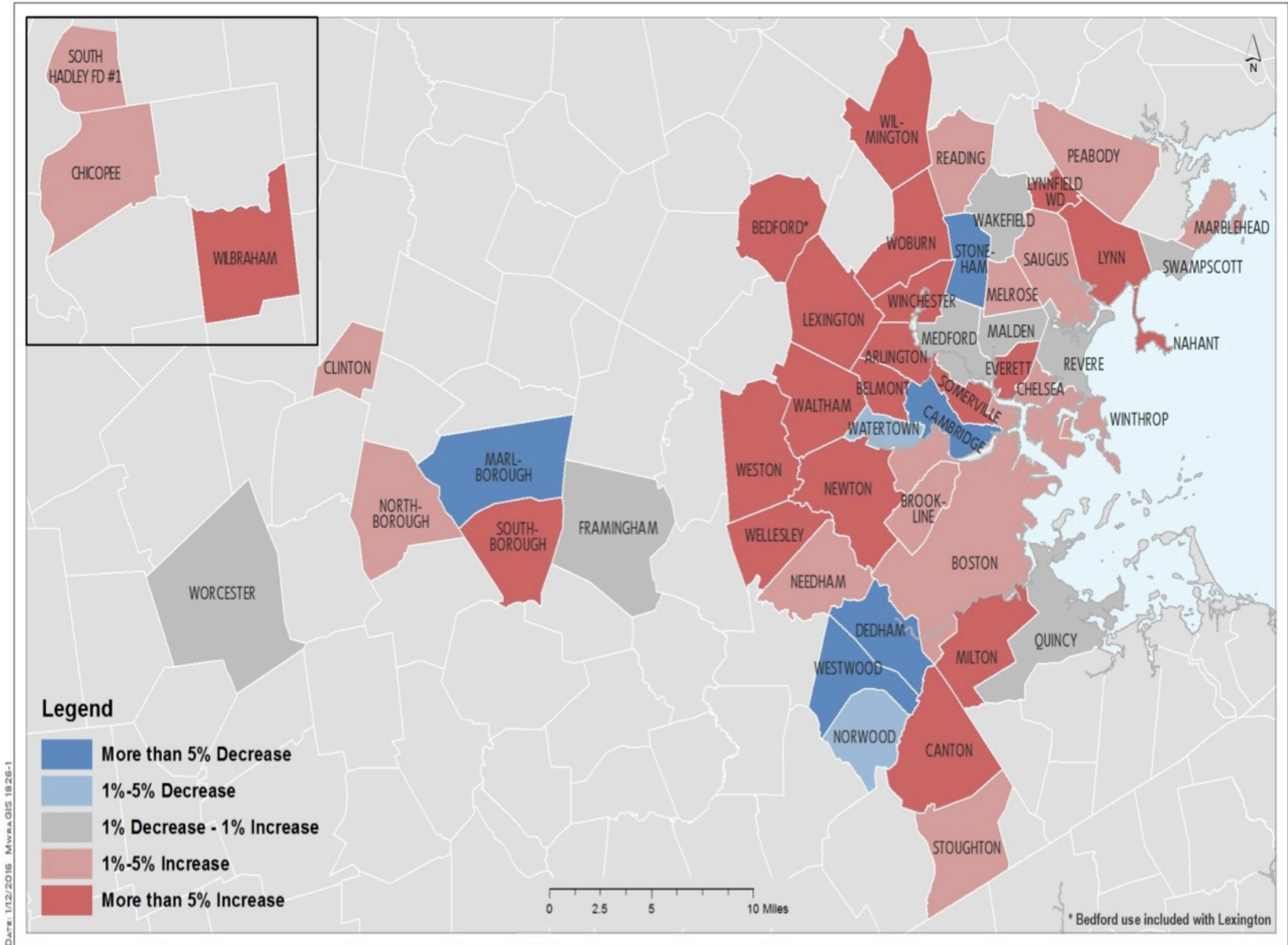


2015 Water Consumption By Communities: 4.8 mgd (2.5%) higher than last year.



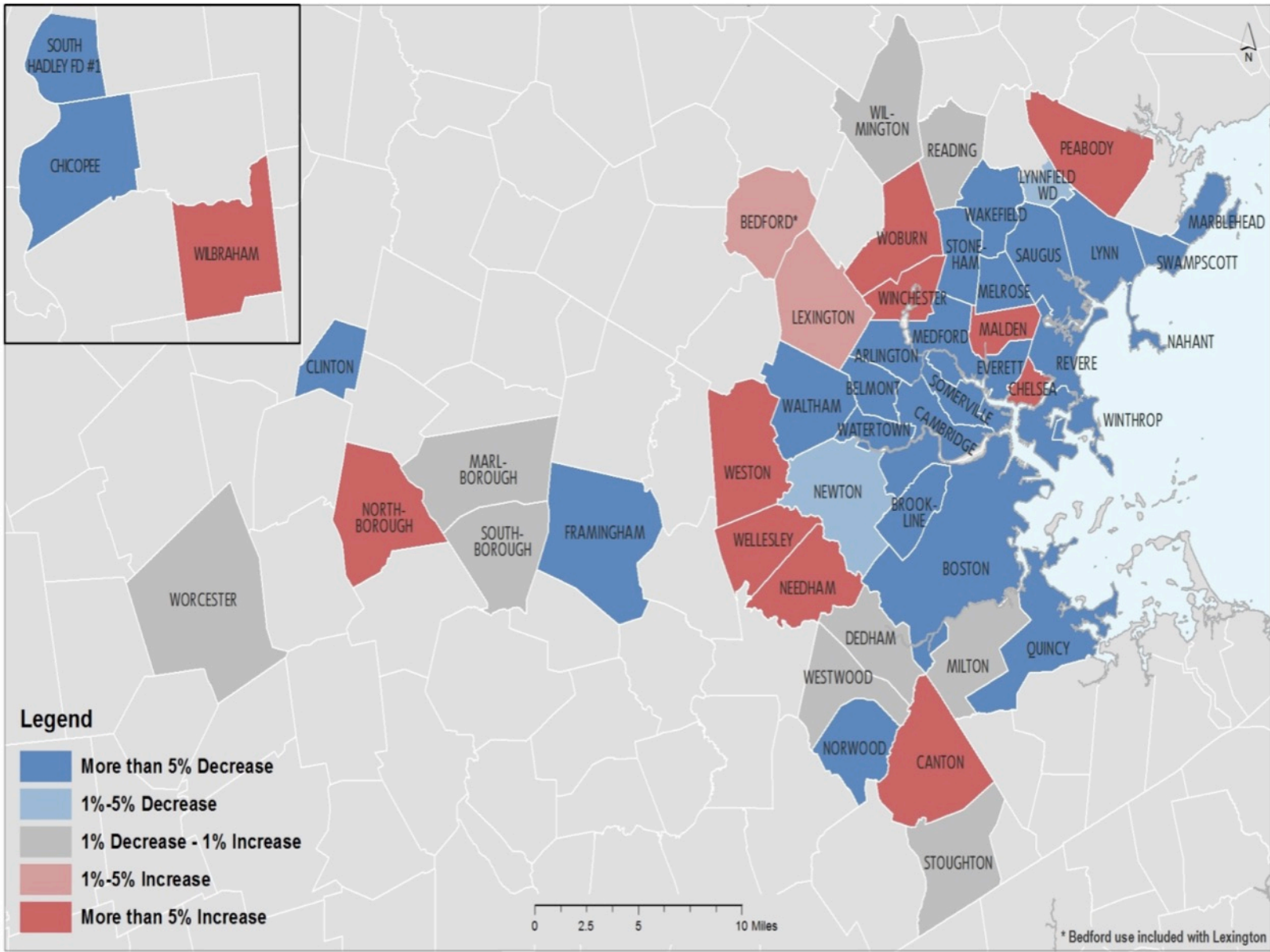


MWRA Water Use Comparison 2014 and 2015





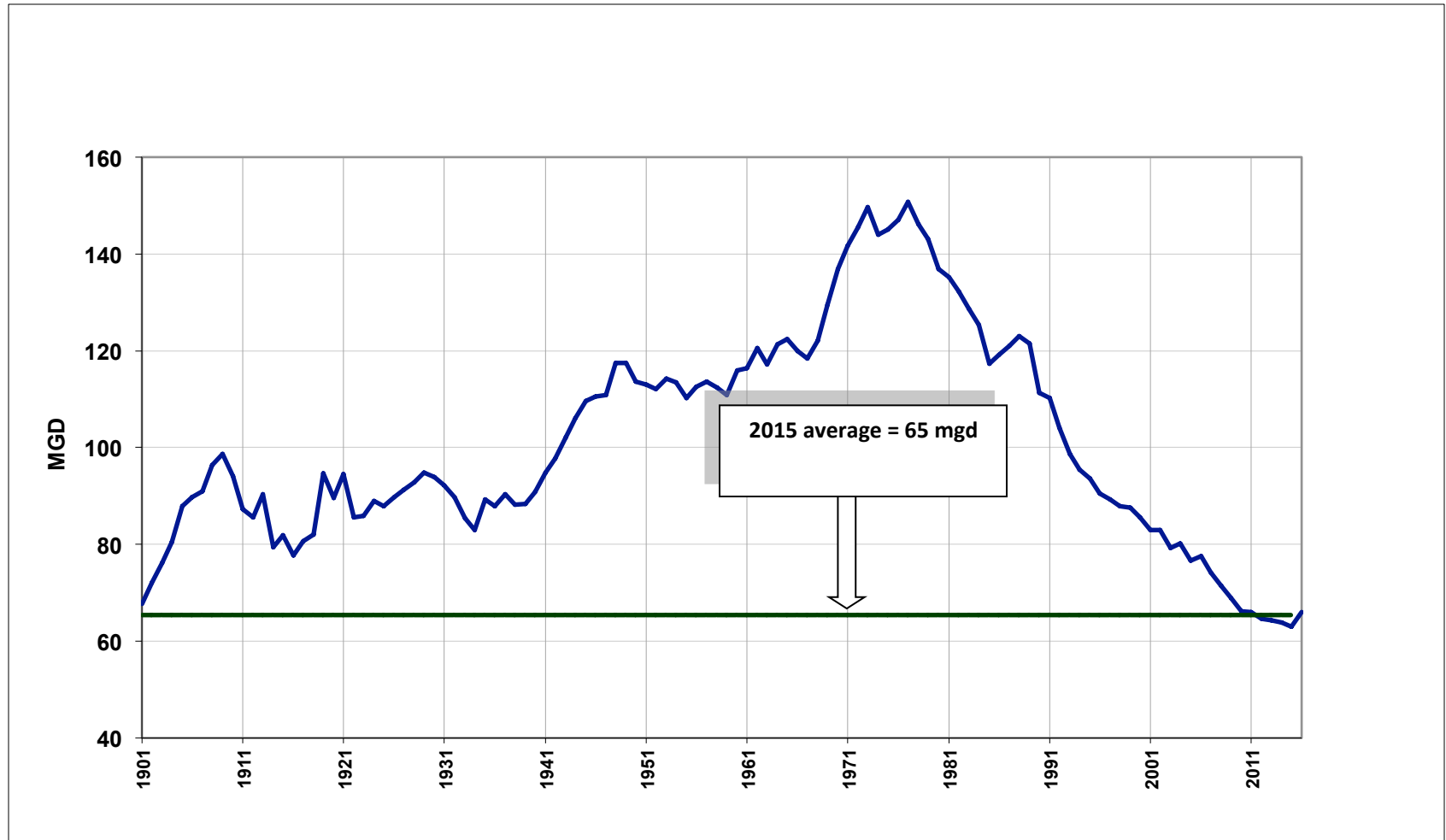
MWRA Water Use Comparison 1990 and 2015



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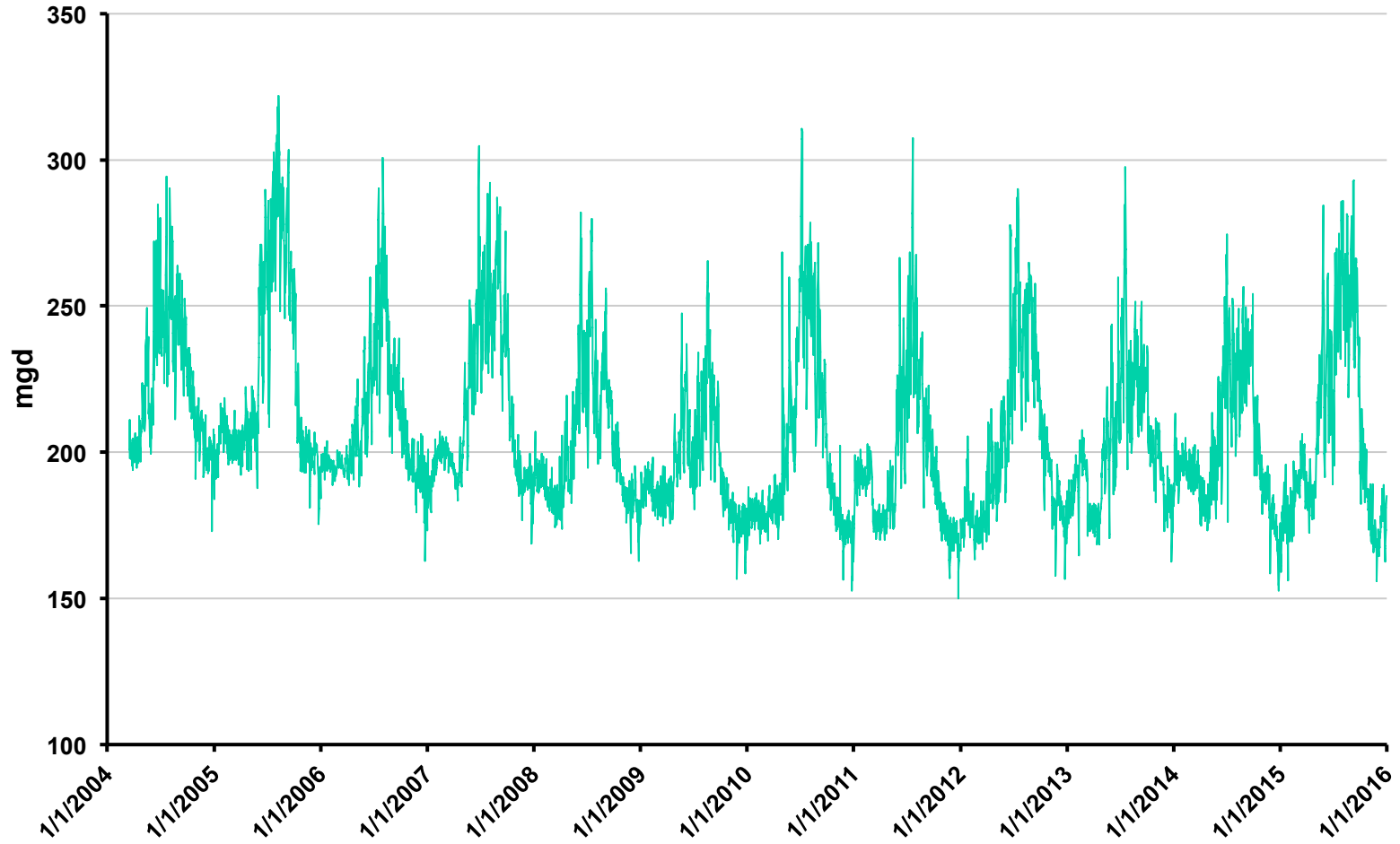


City of Boston Water Use 1900-2015



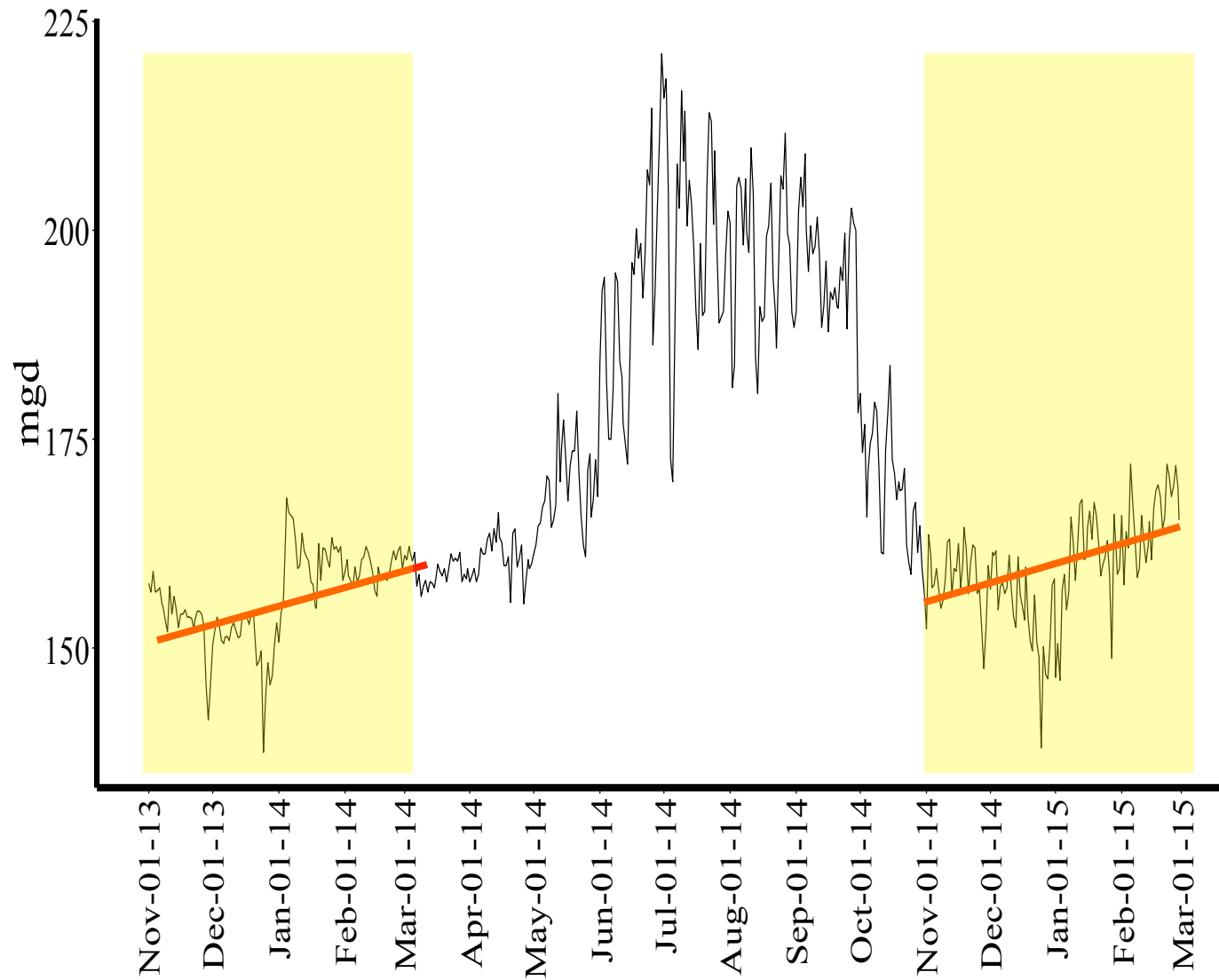


System Demand 2004 to 2015





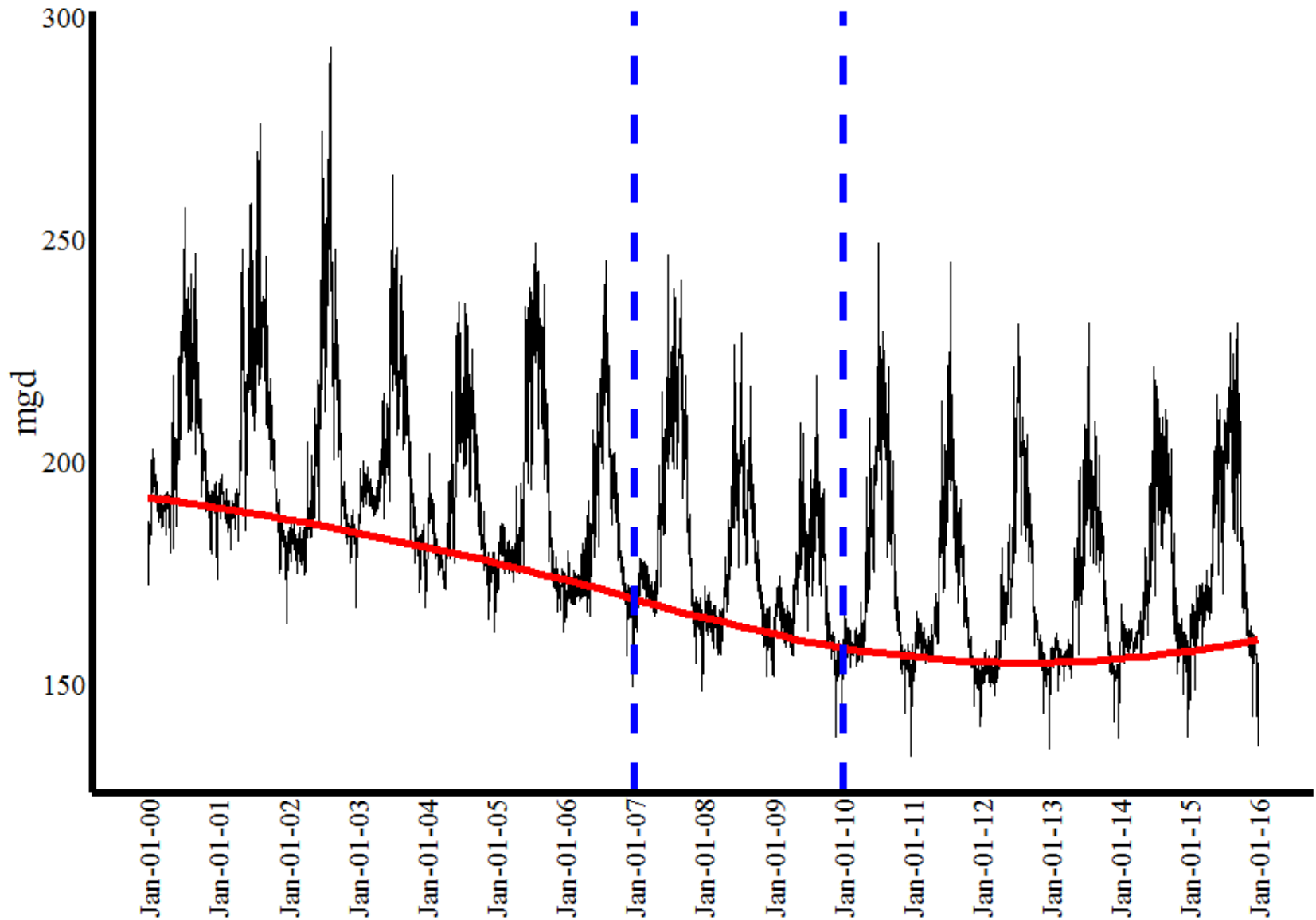
Computation of Base Use





Fully Supplied Communities Demand 2000-2015

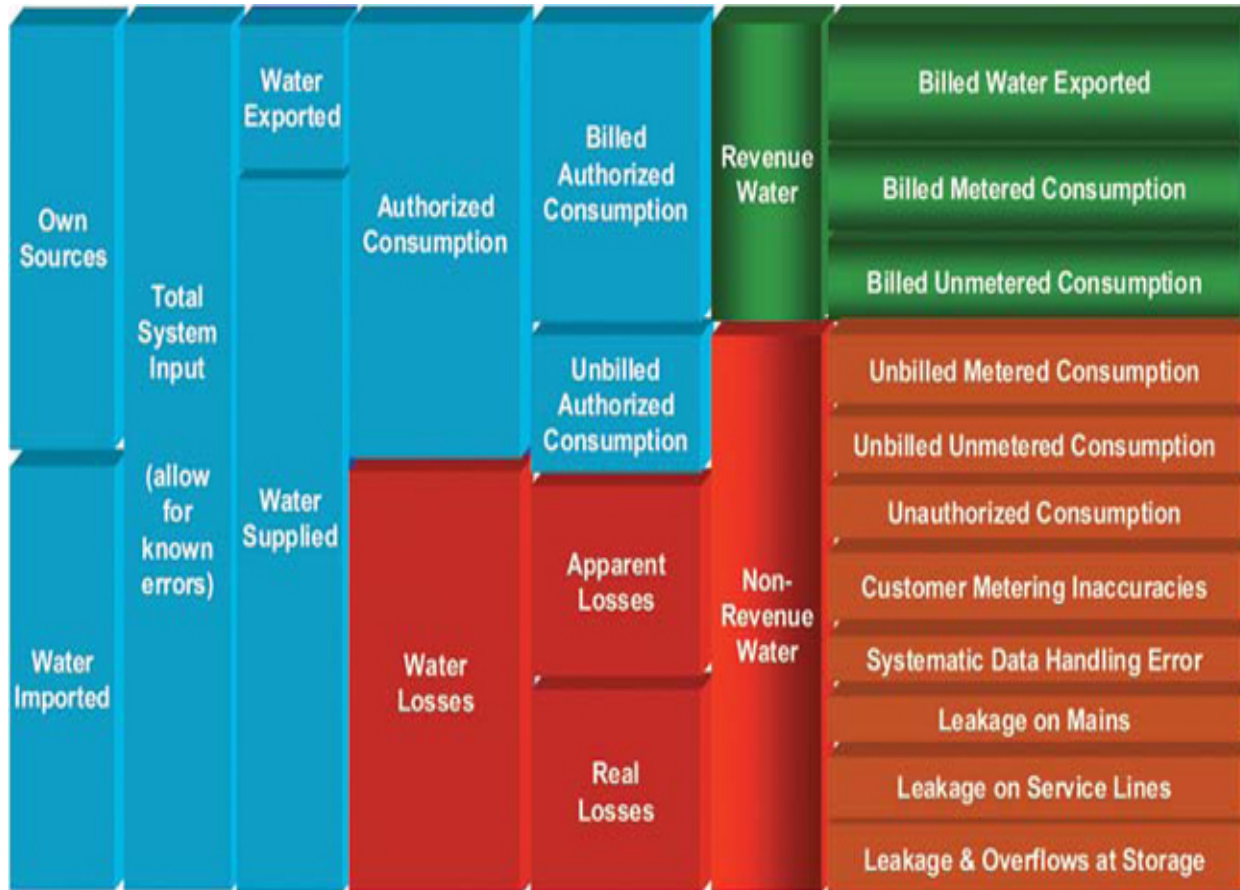
Daily Demand with Base Use Estimate





Unaccounted for Water

AWWA Water Balance

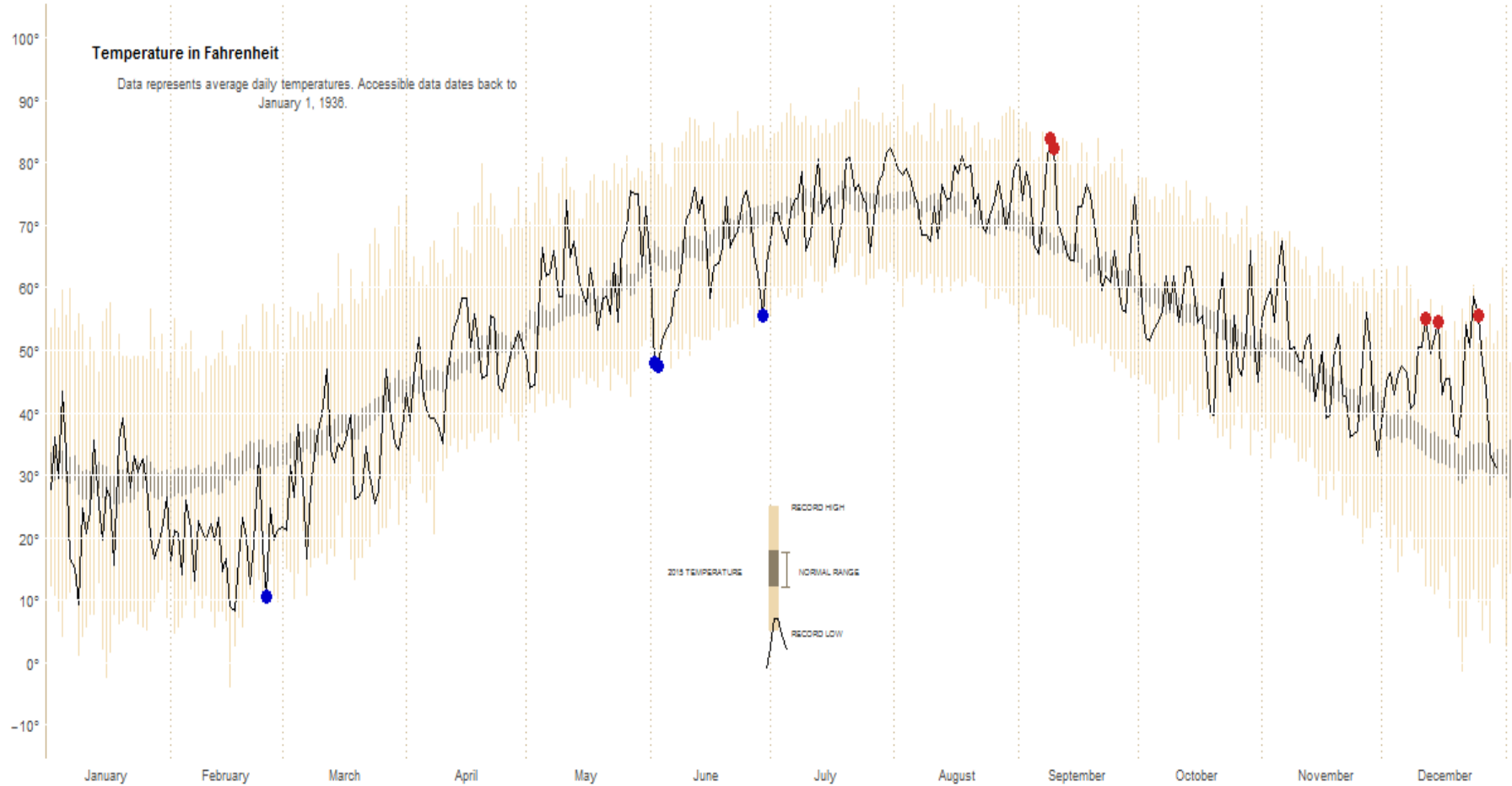


| | Fully Supplied | City of Boston |
|-------------|----------------|----------------|
| 1987 | 32.0% | 34.0% |
| 1995 | 17.3% | 20.8% |
| 2014 | 16.0% | 8.5% |



2015 Had Unseasonably Cold Winter Temperatures

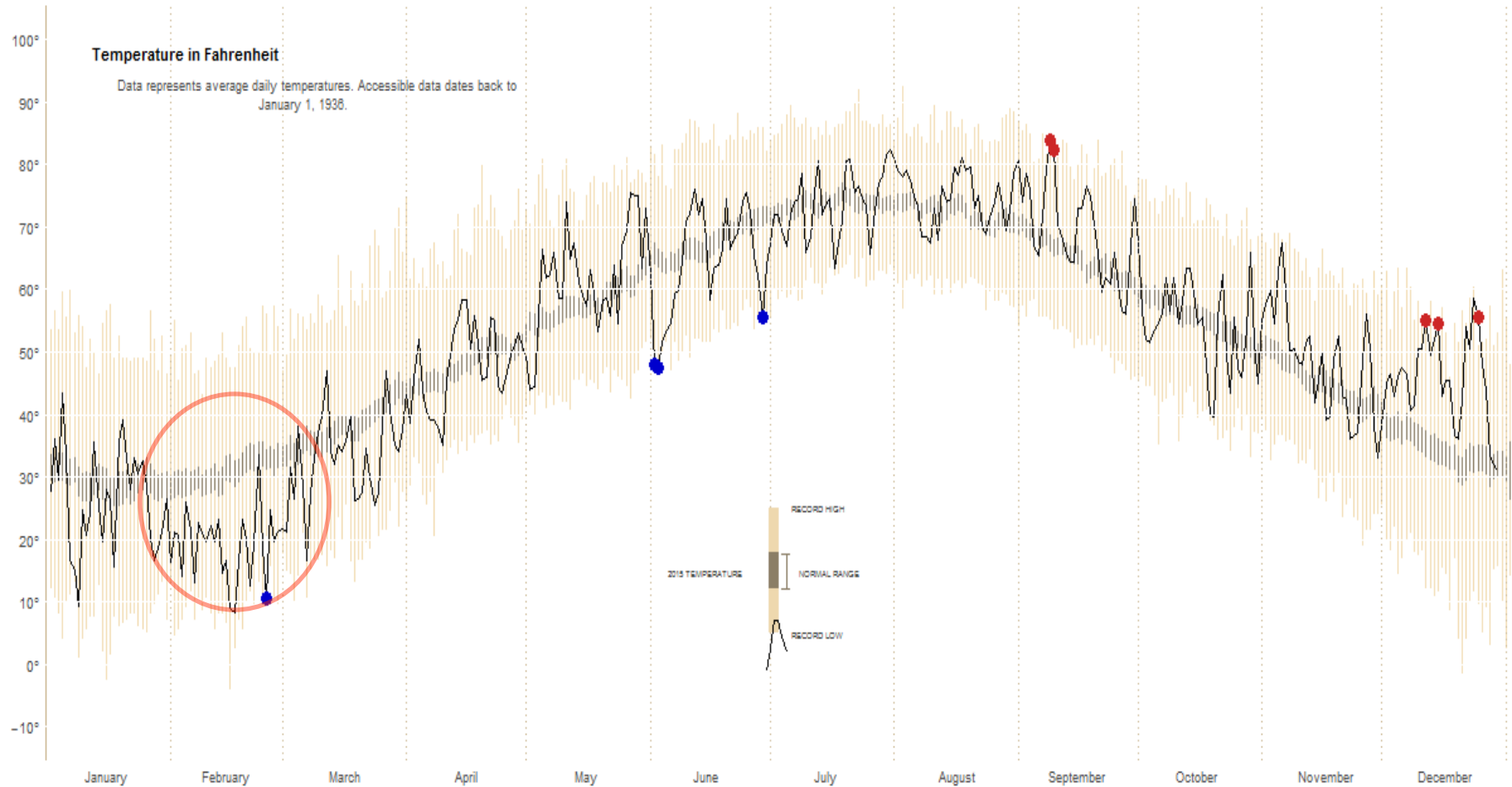
Boston's Weather in 2015





2015 Had Unseasonably Cold Winter Temperatures

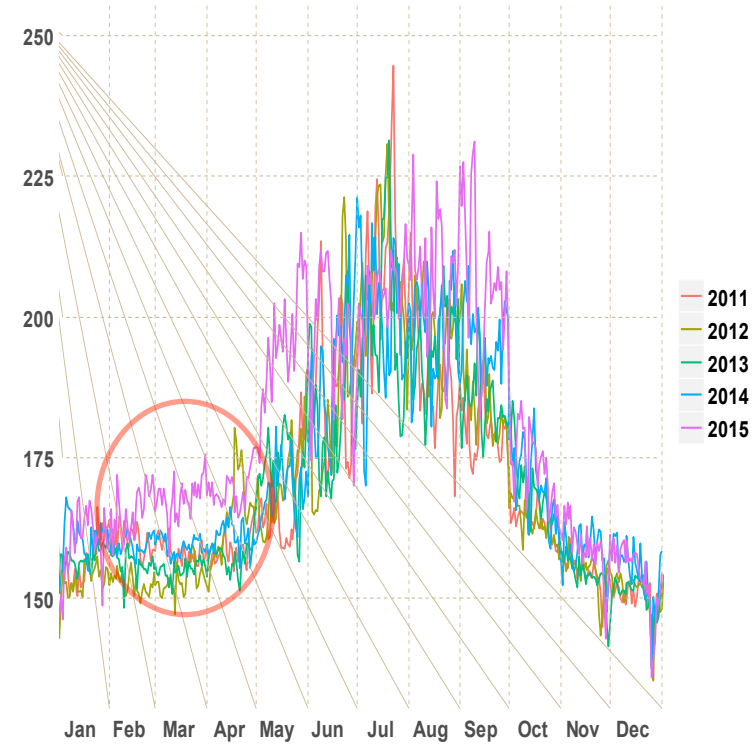
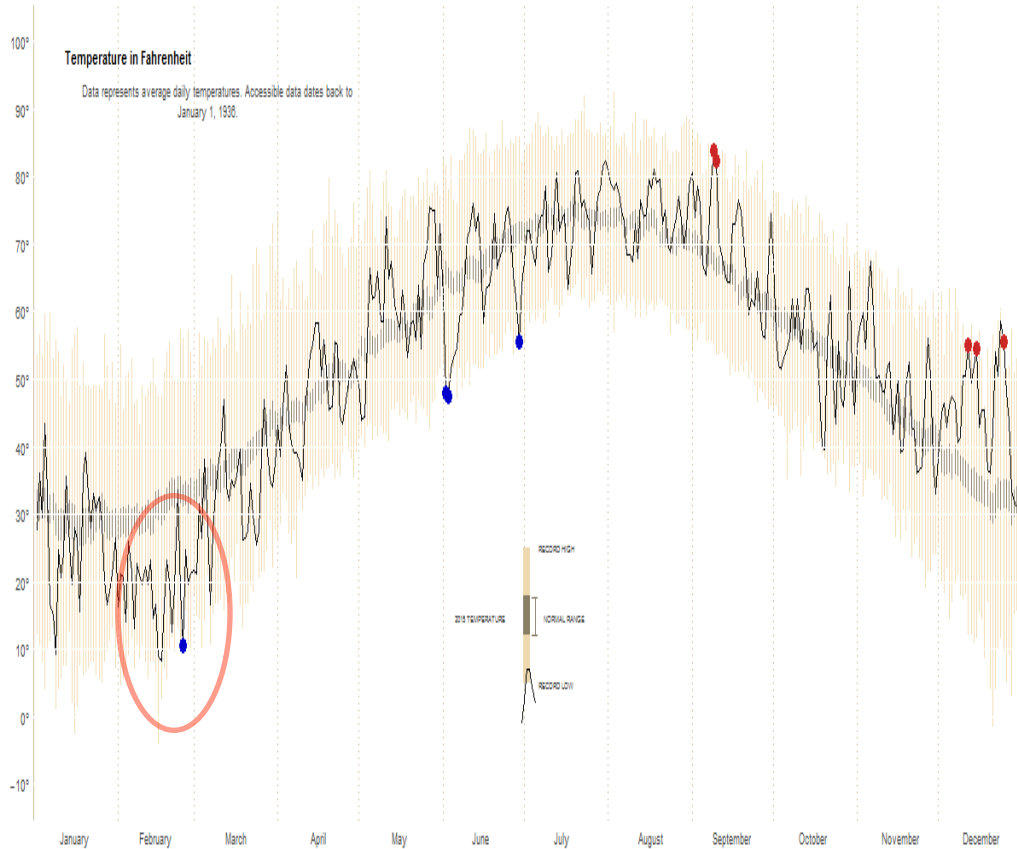
Boston's Weather in 2015





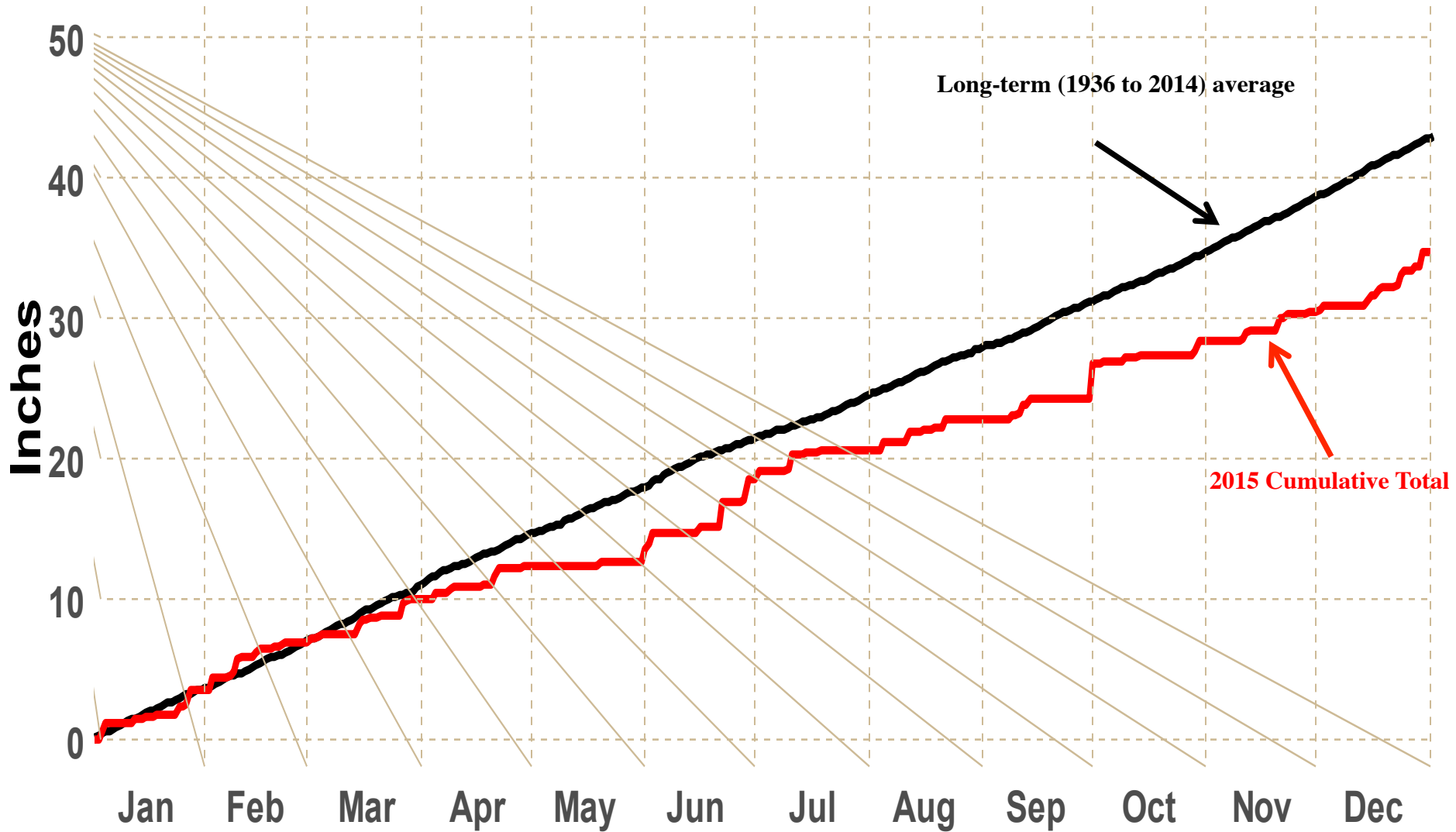
Cold Temperatures Led to Higher Usage

Boston's Weather in 2015



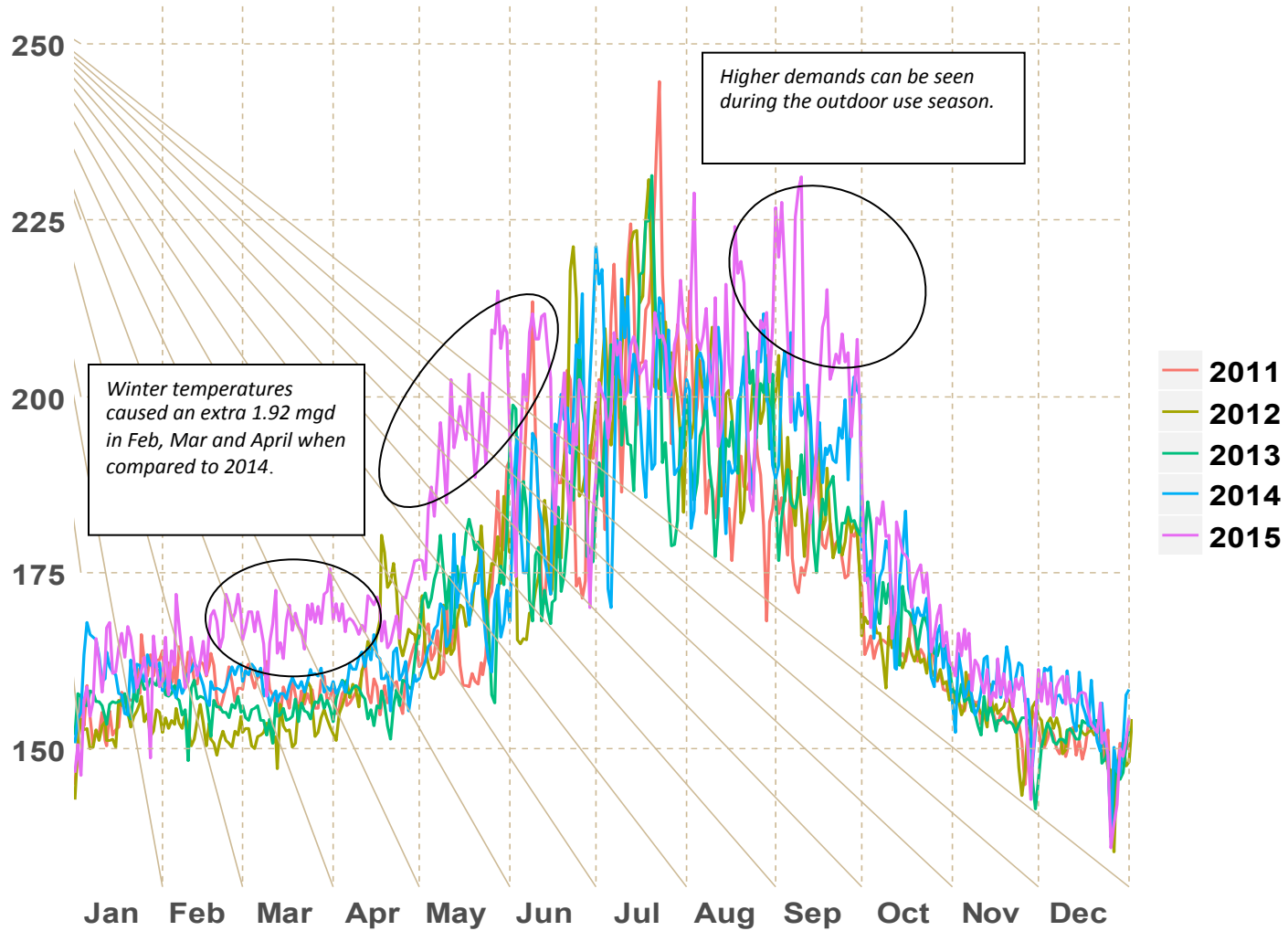


Logan Airport Daily Cumulative Rainfall



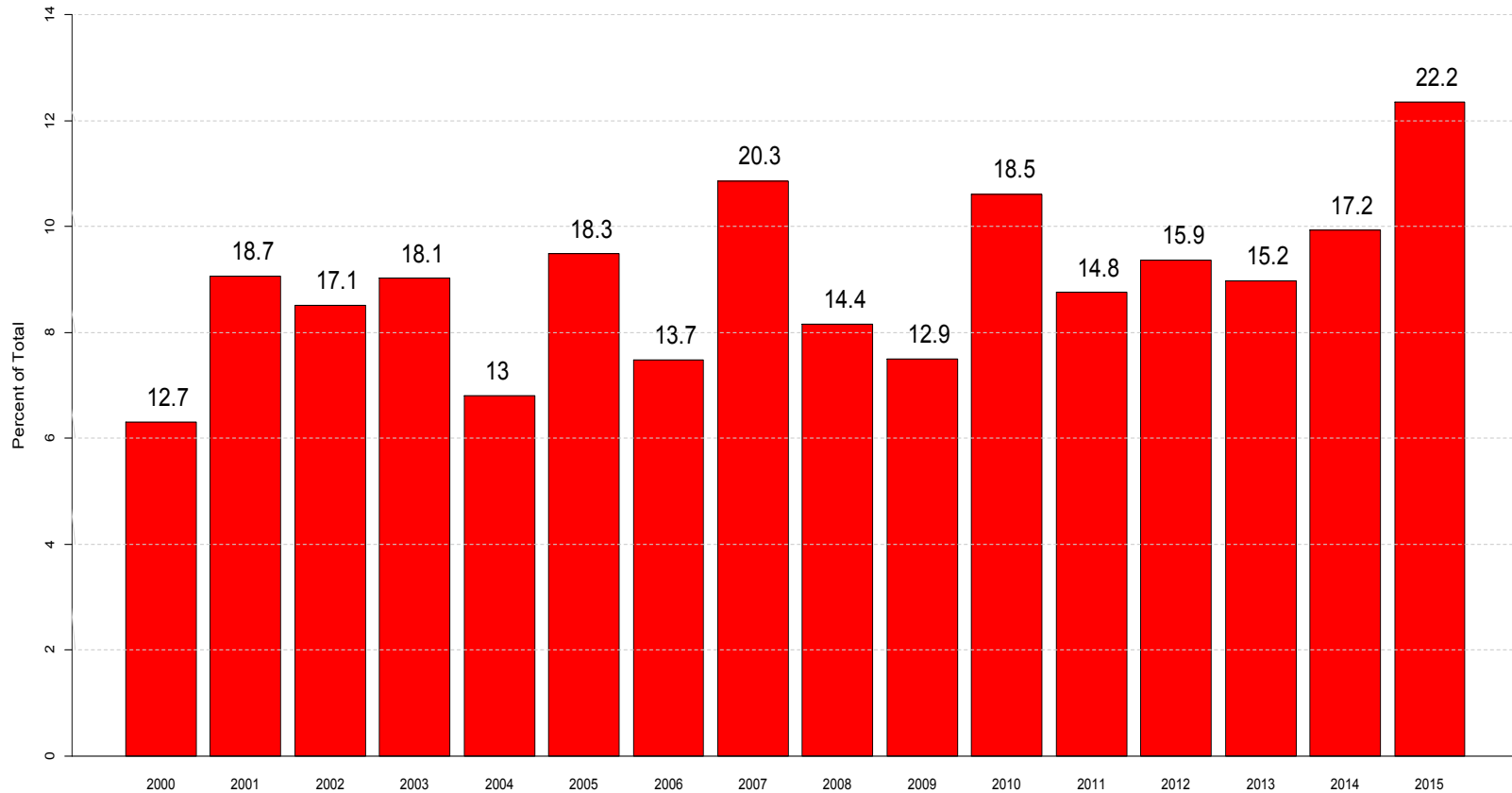


Unseasonably Cold Winter Temperatures and Drier Summer Impacted Demand



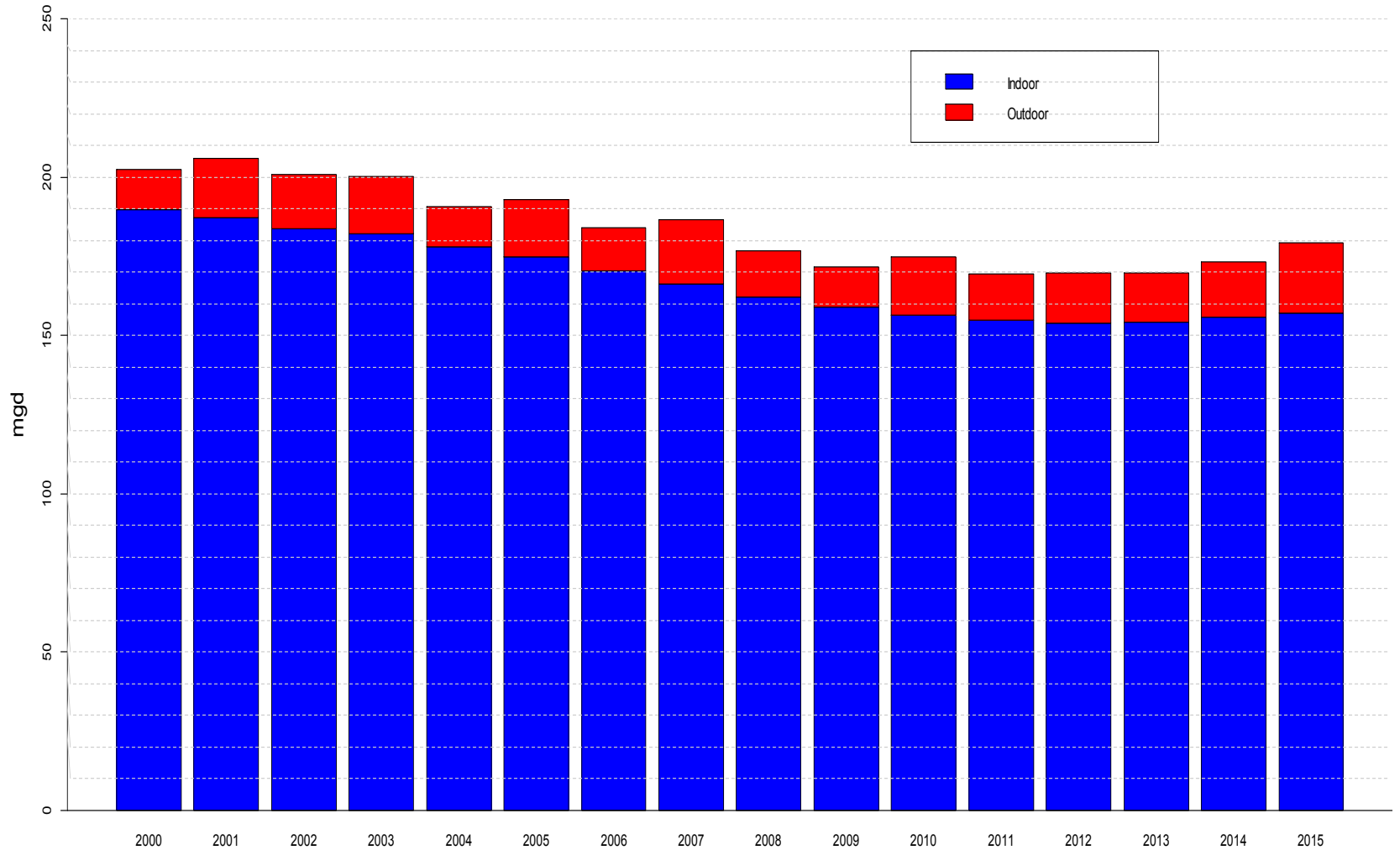


Fully Supplied Communities Seasonal Use (Labels show demand in mgd)



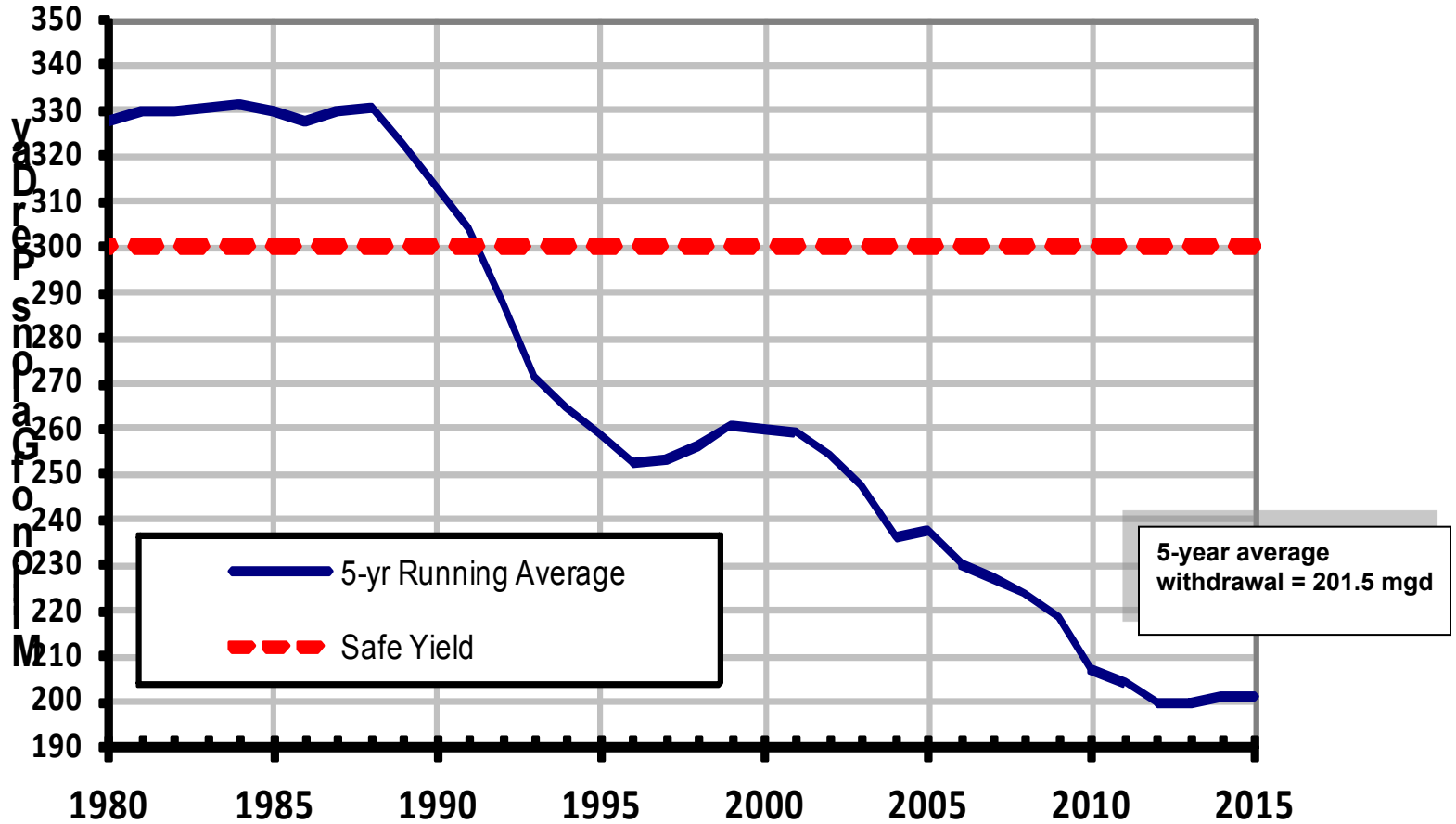


Fully Supplied Communities Annual Demand Components



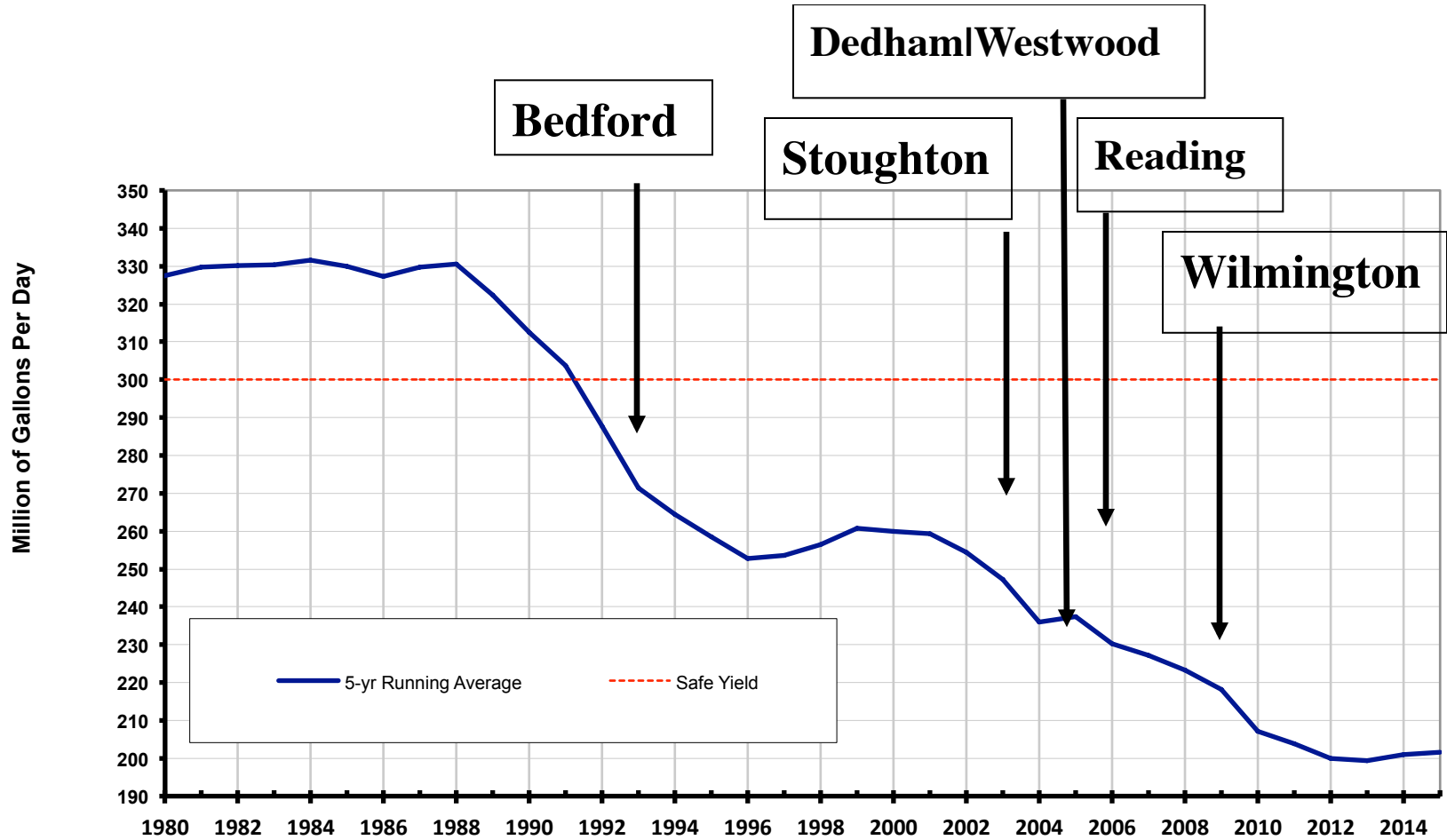


Five-Year Running Average Total Reservoir Withdrawals Slight Increase



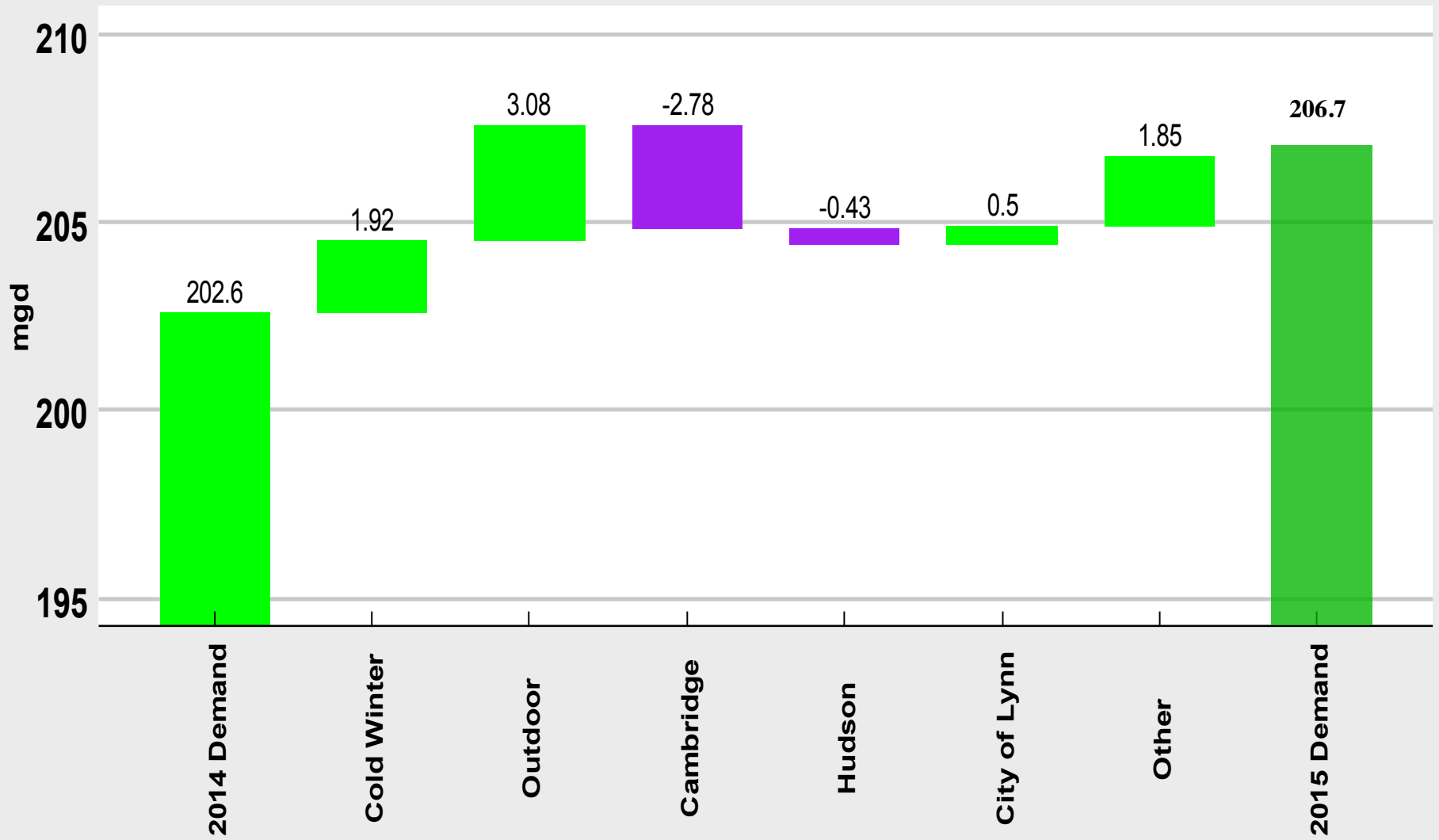


Demand Has Dropped Dramatically, Even with New User Communities



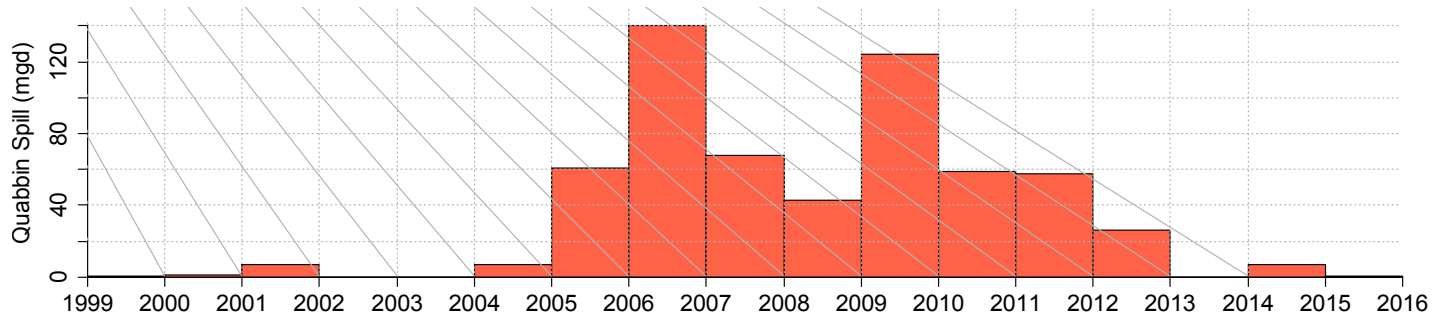
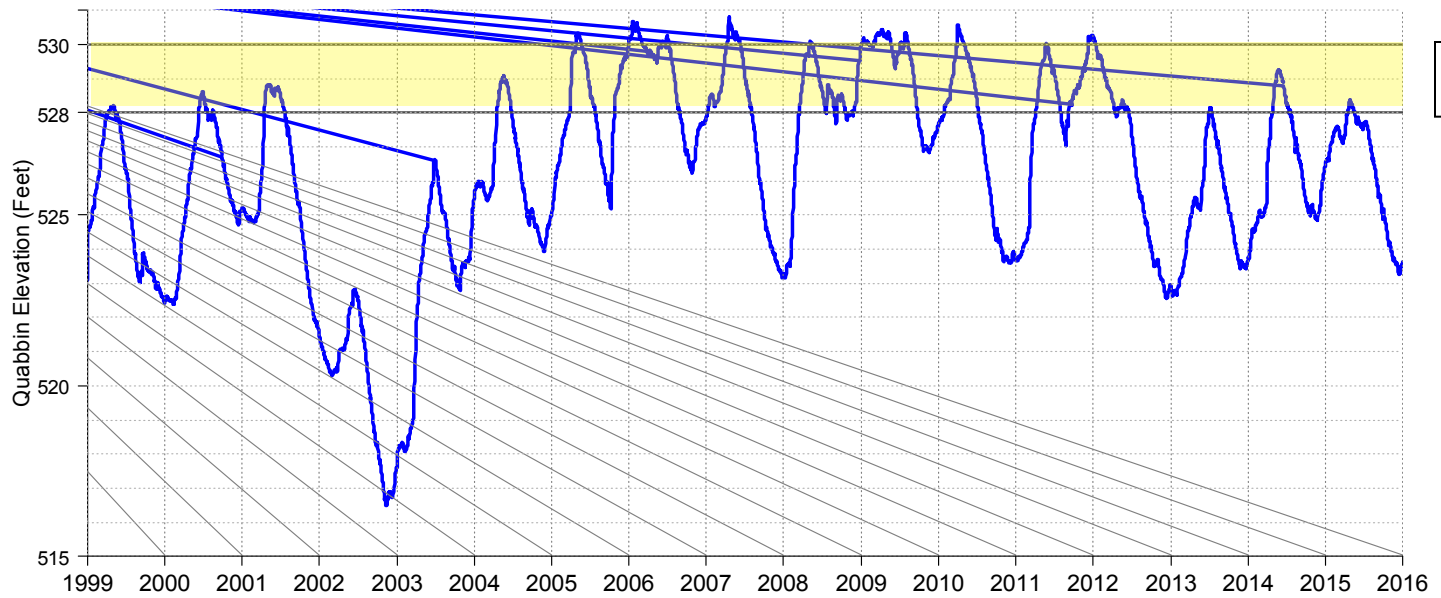


2015 Demand



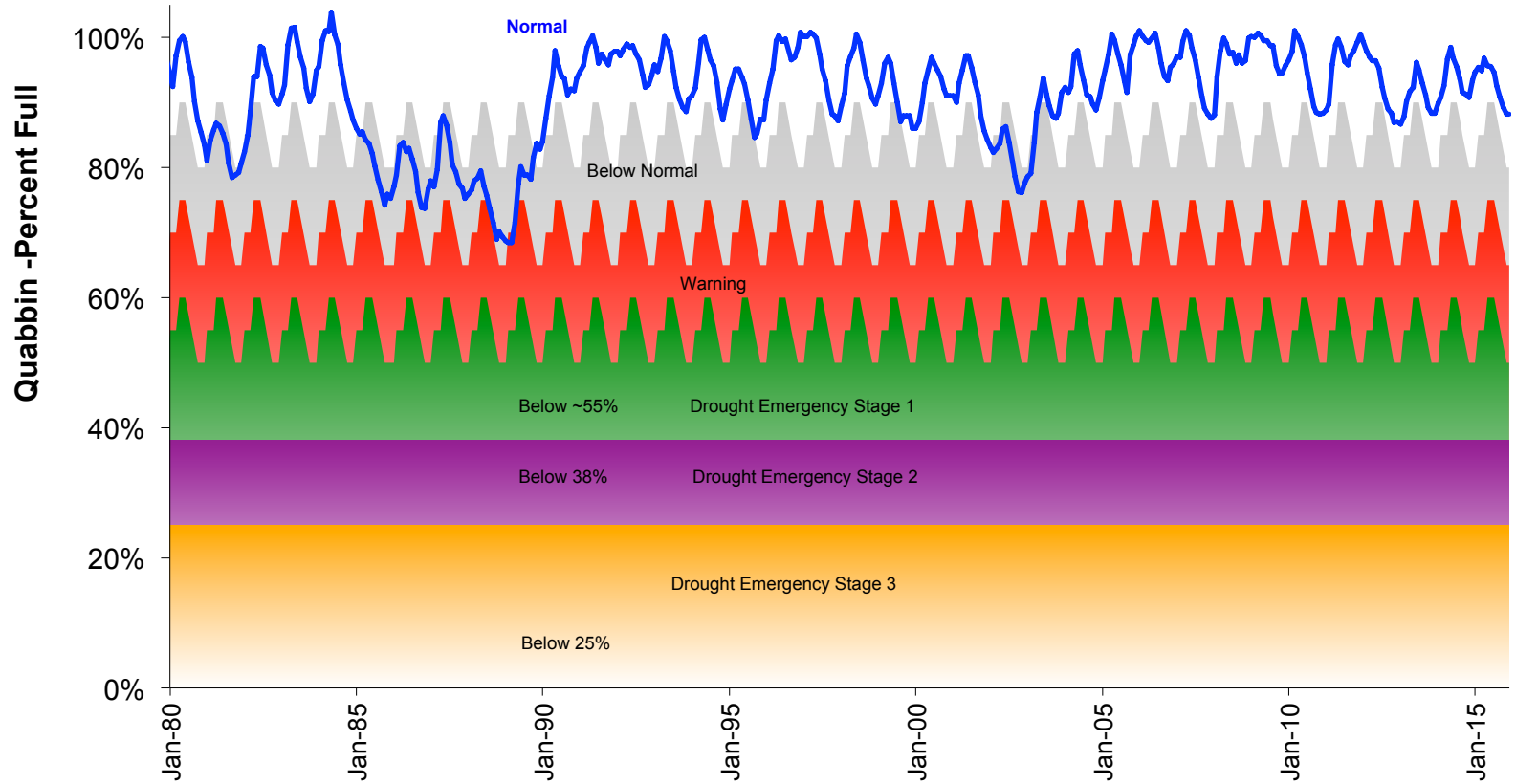


Quabbin Elevation with Quabbin Spill Volumes





Quabbin Reservoir Still In Normal Operations Band





Withdrawals, Spills and Releases (Quabbin, Wachusett and Ware)

