



Infiltration and Inflow Control Massachusetts Regulatory Framework



Bureau of Water Resources
Massachusetts Department of Environmental Protection

Overview



- ❖ Sanitary Sewer Overflows
 - *Public Health Problem!!*

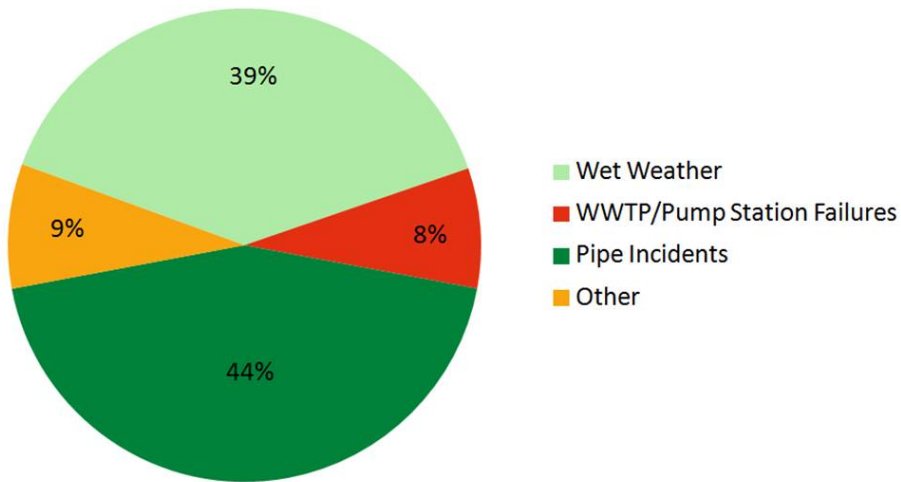
- ❖ Sewer Authorities in MA
 - *Must have program to remove Infiltration/Inflow*

- ❖ MassDEP issued updated I/I Guidance in May 2017

SSO Problems



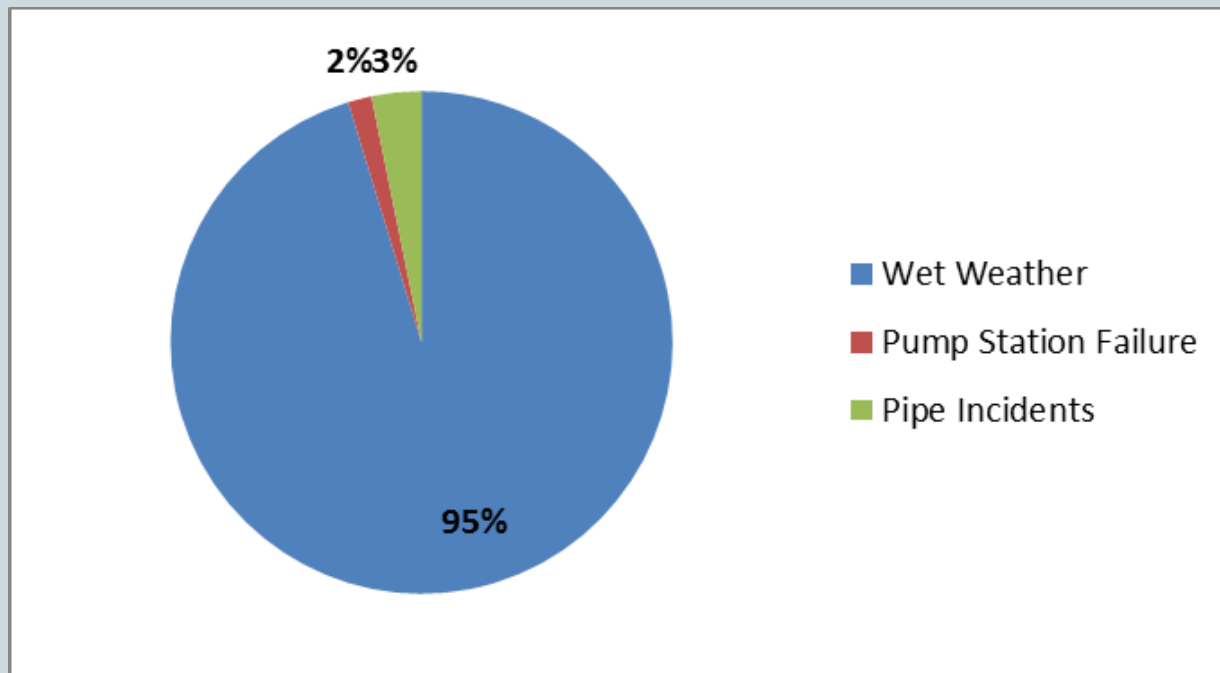
- Since 2006 in MA Northeast Region...
 - > 3,800 events in 70 communities



SSO Volumes

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- But.....looking at SSO volume by cause...



Over 650 million gallons in SSO!

SSO's create Public Health Risks!!

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Infiltration

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- groundwater entering sewers, service laterals, or manholes through defects and joints in the system.



Inflow

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*Over 19,000 disconnected in Boston
So far!!*

- Stormwater or surface waters entering the sewer system through drains, catch basins, roof leaders, manhole covers, and flows from sump pumps connected to the sewer.

Regulatory Requirements



- **Regulatory Requirements 314 CMR 12.04(2):**
- Develop and implement an *ongoing* I/I program:
 - Identify and eliminate “excessive” Inflow/Infiltration sources
 - Focus on inflow sources
 - Phased evaluation of sewer system consistent with MassDEP Guidance
 - I/I mitigation for new connections for CSO and tributary systems

Regulatory Requirements - Mitigation

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- For CSO/tributary systems, including MWRA member communities:
 - 4:1 I/I mitigation requirement for all new connections > 15,000 gpd
 - Up to sewer authority to establish program, including:
 - ✦ Design flows
 - ✦ Direct removals or Fees

NepRWA Sewer Banking guidance at
<https://www.neponset.org/projects/publications/>

Regulatory Requirements



By December 2017 submit I/I Analysis:

- To address excessive I/I based on MassDEP's *Guidelines for Performing I/I Analyses and Sewer System Evaluation Surveys*
- Assess the risk for sanitary sewer overflows for the 5-year 24 hour storm

Many MWRA communities well into implementation phase!

2017 Guidance - I/I Abatement Programs

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- Guidance establishes four step approach:
 - Infiltration and Inflow Analysis – **by 12/31/2017**
 - Sewer System Evaluation Survey
 - Sewer System Rehabilitation
 - Post-Construction Monitoring

*Alternative approaches may
be proposed!*



Elements of I/I Analysis

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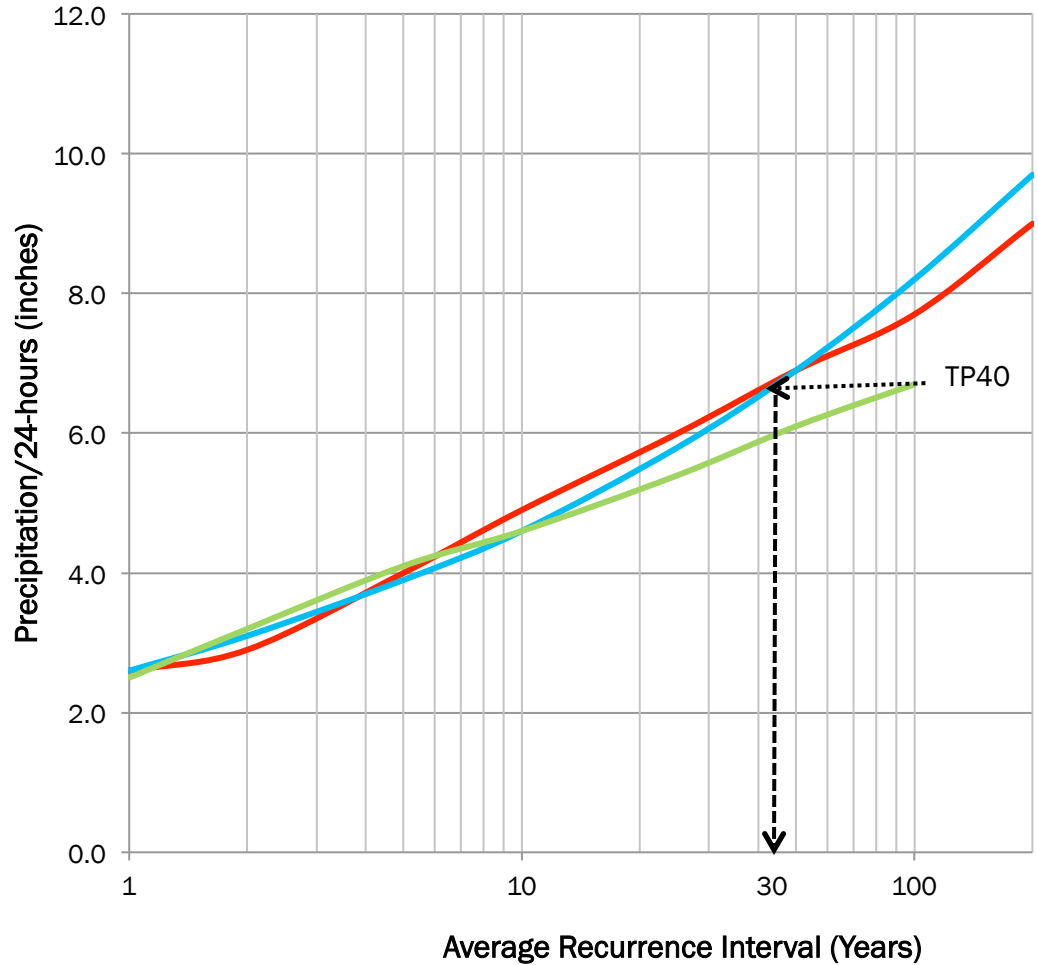
- Inventory of Sewer System
- Flow Monitoring (3/1 – 6/30)
- Manhole inspections (10%)
- GW monitoring
- Rainfall Monitoring (min 2 gauges, 1/3-4 miles²)
- Flow Data Analysis:
 - ✦ Sanitary
 - ✦ Infiltration (peak and average)
 - ✦ Inflow (correlating to storm size)

SSO Analysis – 5 Year Storm

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- National Oceanic and Atmospheric Administration Atlas 14, Volume 10
 - ✦ 5 Year 24-hour event:
 - 4.61 inches of rain
 - Peak intensity of 0.73 inches/hour
- Wet Weather SSO event assessment
 - ✦ Review wet weather SSO event history vs. storm events

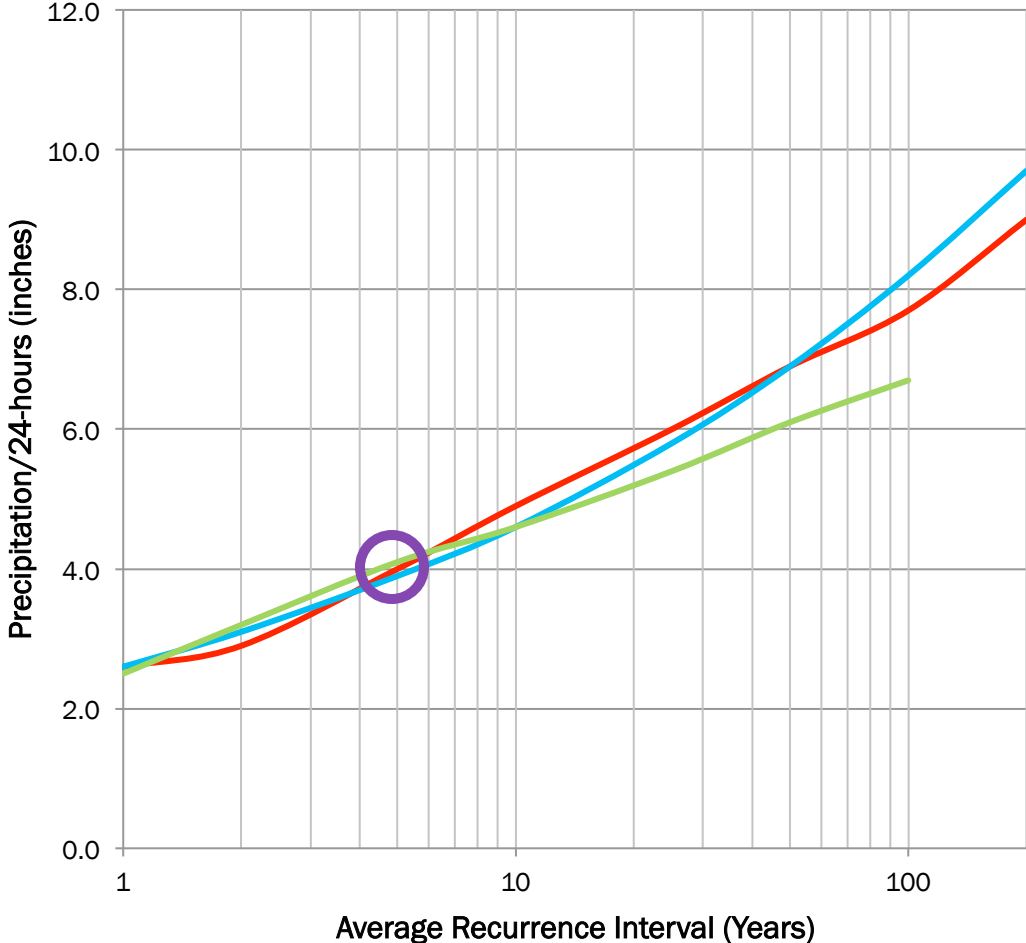
Massachusetts - Statewide Average Change in 100-Year 24-hour Duration Storm



The TP40 (1961) 100-year storm is now approximately a 30-year storm!

- NOAA 14 MA STATEWIDE MEAN (1-year PDS, Others AMS)
- NRCC MA STATEWIDE MEAN
- TP40 BY COUNTY FROM NRCS STORM VALUES IN TR55 MEAN

Massachusetts - Statewide Average 5-Year 24-Hour Duration Storm



The 5-year 24-hour storm though is still approximately the same.

- NOAA 14 MA STATEWIDE MEAN (1-year PDS, Others AMS)
- NRCC MA STATEWIDE MEAN
- TP40 BY COUNTY FROM NRCS STORM VALUES IN TR55 MEAN

I/I Analysis Report

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- I/I Analysis Report Recommendations:
 - Sewer System Evaluation Survey (SSES).....
 - Infiltration: *Prioritize subareas with highest infiltration for further investigation – initially those > 4,000 gpdim*
 - Inflow: *Further investigation of subareas comprising 80% of total inflow to system*

Sewer System Evaluation Survey

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- SSES: More intense I/I investigation to identify Specific Sources

Infiltration: *Flow Isolation, CCTV*

Inflow: *Smoke testing, Dye testing, Property inspections*

SSES targets removal of Excessive I/I

2016 Guidance - When is I/I Excessive?

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- “Excessive” I/I:
 - Contributes/causes SSO’s for events up to 5 year storm
 - Infiltration which can be cost-effectively be removed from the sewer system
 - Public and private inflow sources, unless technically infeasible or cost-prohibitive

Private Inflow Removal

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- Sewer regulations must prohibit connection of inflow sources
- Can have BIG impact, but often avoided:
 - ✦ Sump pumps
 - ✦ Roof leaders
 - ✦ drains
- Requires property inspections



Technically Infeasible or Cost-Prohibitive?

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- Factors:
 - Private inflow causing/contributing to SSOs?
 - Costs to utility/property owner for removal
 - Creation of nuisance conditions

If frequent SSO's, rigorous private inflow identification/removal will be required!

Where are MWRA Communities?

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- 6 of 34 NERO/MWRA Communities under MassDEP I/I Removal Order or MassDEP/EPA Consent Decree due to SSO's
- Most all others have done I/I work, BUT some communities still with high I/I and SSO issues.

Funding Sources

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- *SRF Funds Are Available – 2% Loan Program*
 - *SRF funds studies and construction work*
 - *Competitive process*

- *Massachusetts Water Resources Authority*
 - *Boston metro/area, 43 communities*
 - *I/I Community Support Program – 75% grants*
 - *information at <http://www.mwra.state.ma.us/comsupport/ii/iiprogram.html>*

Questions?

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MWRA Average Flows vs. Rainfall

