



**Massachusetts Water Resources Authority**

***Presentation to***

***River Stewardship Council***  
**On Sudbury Reservoir System Flood Control**

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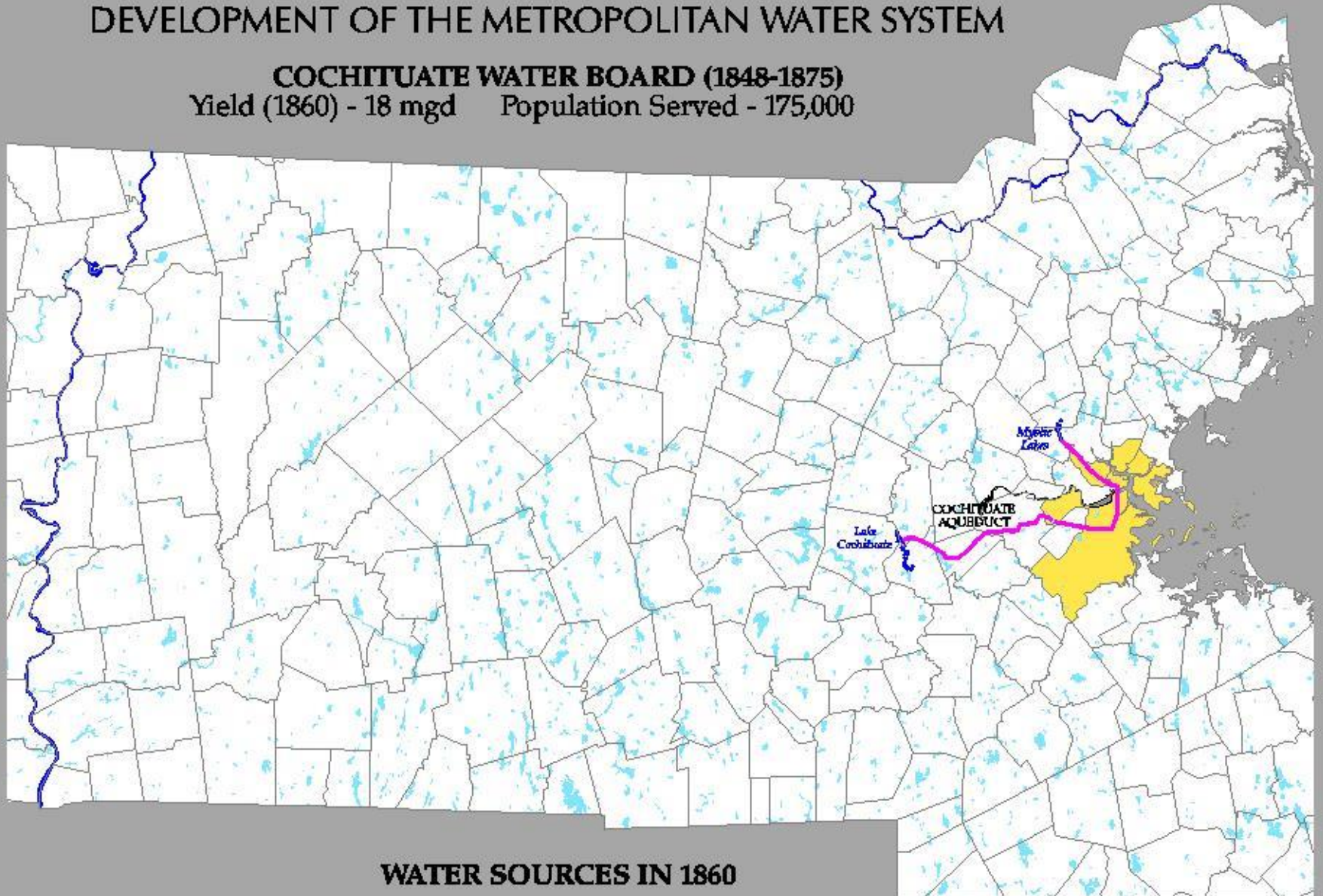
# Overview

- Brief History of the Water System
- Sudbury Reservoir System: An emergency component of the MWRA Water Supply System
- How the system is operated to balance inflows and outflows
- Statutory Releases
- MWRA Flood Control Operations

# DEVELOPMENT OF THE METROPOLITAN WATER SYSTEM

## COCHITUATE WATER BOARD (1848-1875)

Yield (1860) - 18 mgd    Population Served - 175,000

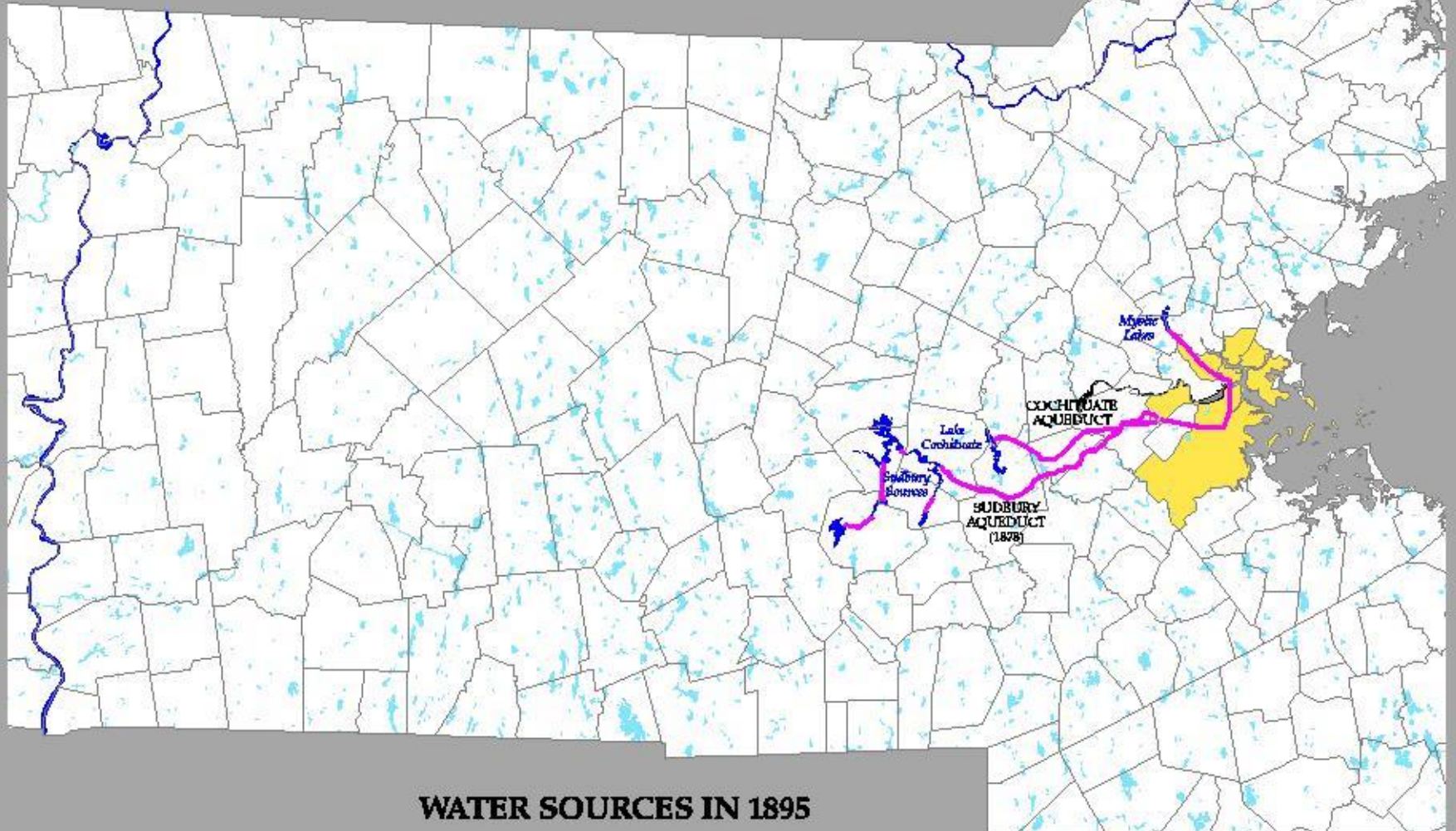


**WATER SOURCES IN 1860**

# DEVELOPMENT OF THE METROPOLITAN WATER SYSTEM

## BOSTON WATER BOARD (1875-1895)

Yield (1895) - 69 mgd    Population Served - 600,000

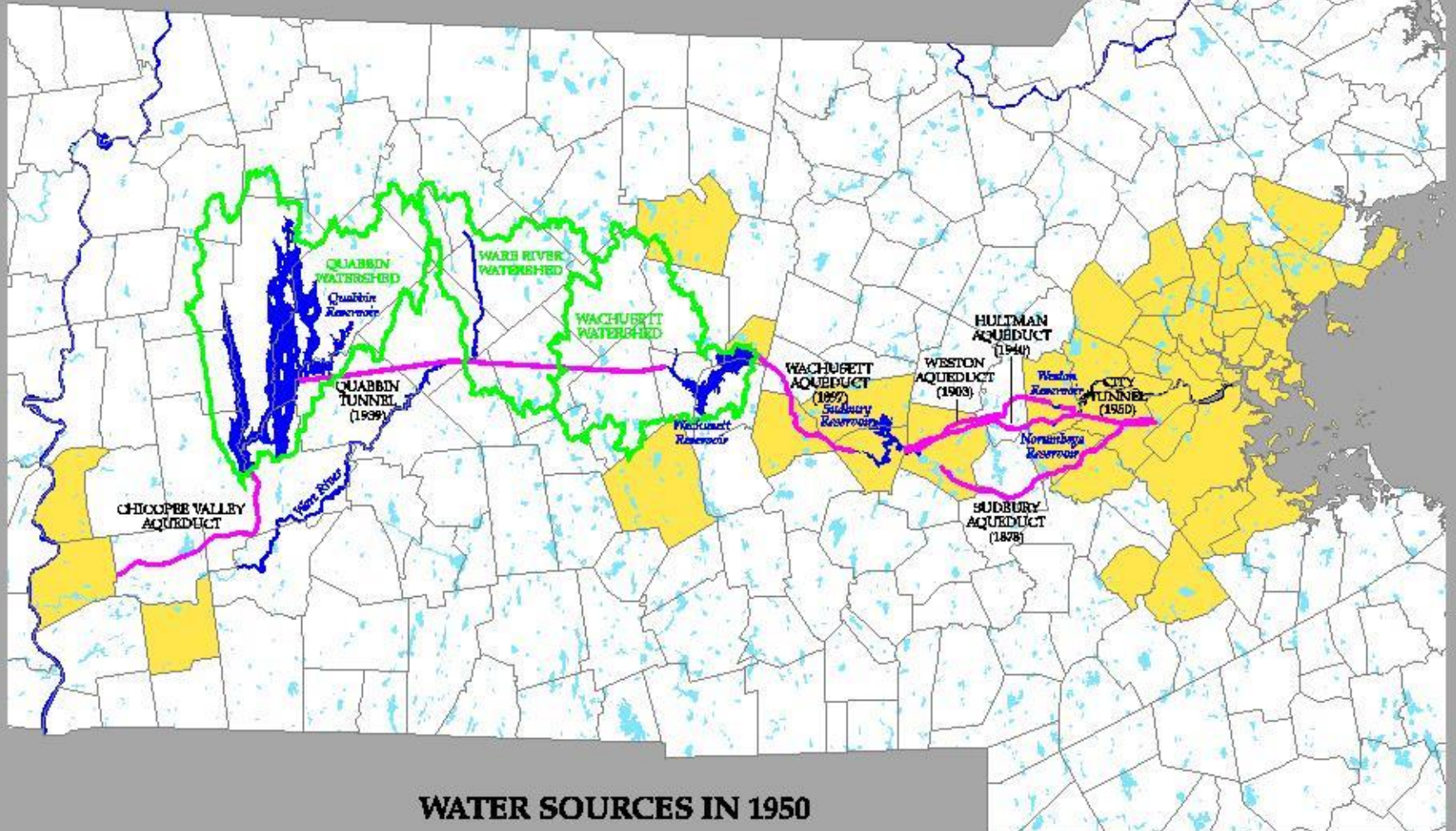


**WATER SOURCES IN 1895**

# DEVELOPMENT OF THE METROPOLITAN WATER SYSTEM

**METROPOLITAN DISTRICT COMMISSION (1919-1984)**

Yield - 320 mgd    Population Served - 2 million

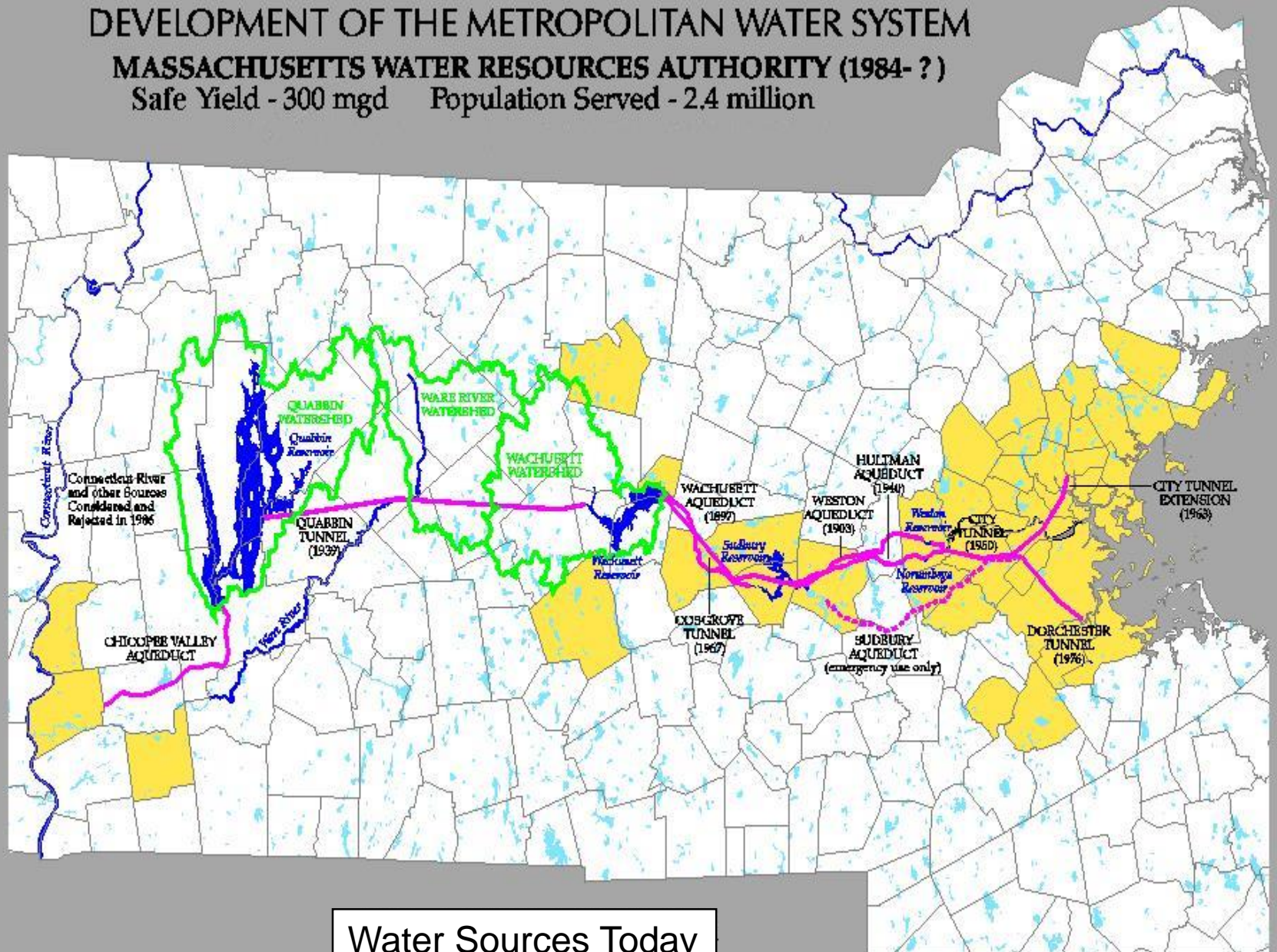


**WATER SOURCES IN 1950**

# DEVELOPMENT OF THE METROPOLITAN WATER SYSTEM

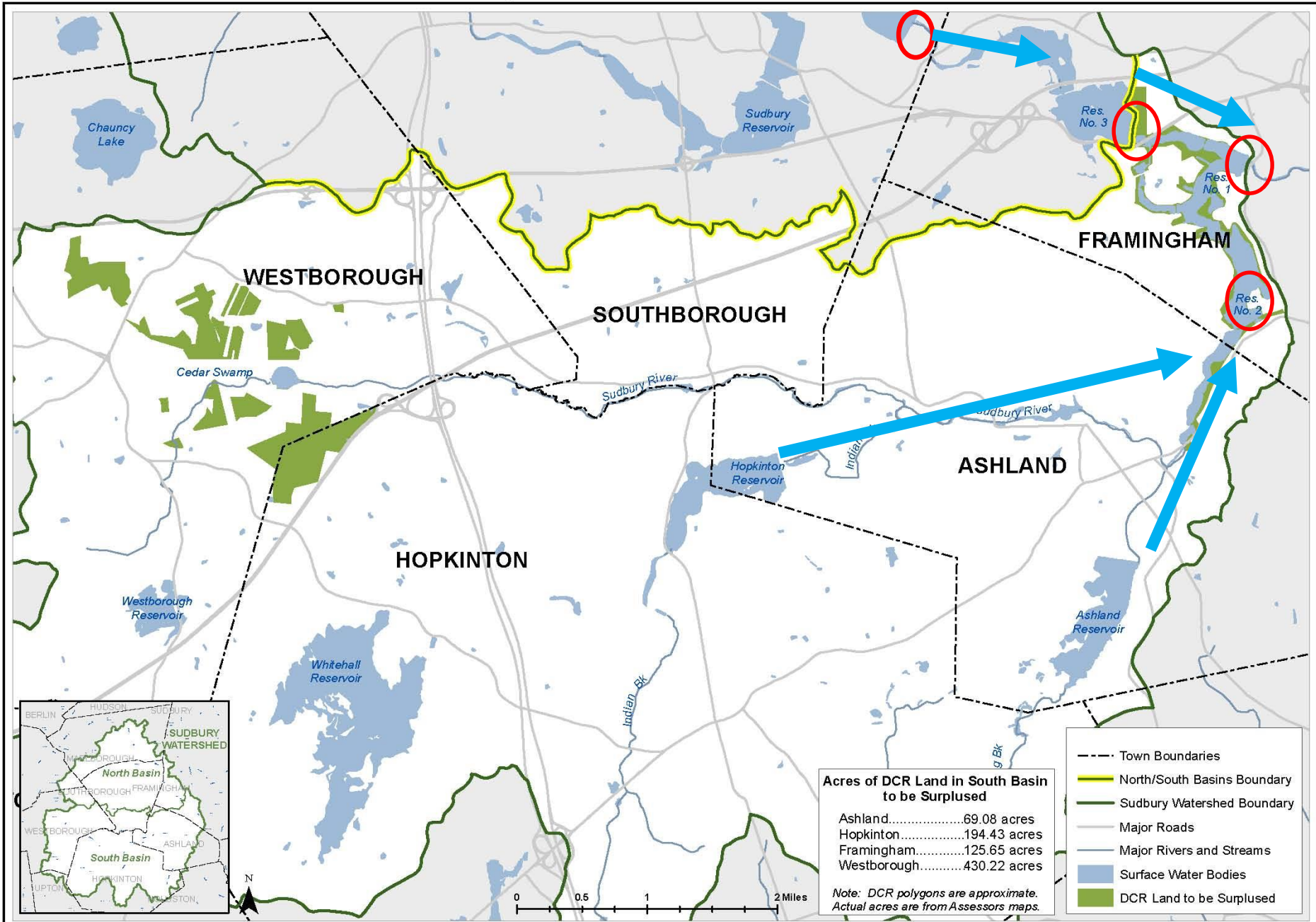
MASSACHUSETTS WATER RESOURCES AUTHORITY (1984- ?)

Safe Yield - 300 mgd    Population Served - 2.4 million



Water Sources Today

# Sudbury Watershed - South Basin





# Reservoirs and Watersheds

## **MWRA Flood Control**

- Sudbury Reservoir
  - 22 sq. mi. watershed
  - Storage = 7.2 BG
  - 40 MG/ 0.1 ft.
  
- Foss Reservoir (a/k/a Framingham Res.#3)
  - 5 sq. mi. (included in Sudbury watershed at 27 sq. mi.)
  - Storage 1.2 BG
  - 8 MG/ 0.1 ft.

## **Run of River (release ops. from Stearns Gatehouse meet Statutory Release of 1.5 MGD to Sudbury River)**

- Stearns Reservoir (a/k/a Framingham Res. #1)
  - 75 sq. mi. watershed
  - Storage = 311 MG
  - 4 MG/ 0.1 ft
  
- Brackett Reservoir (a/k/a Framingham Res. #2)
  - 45 sq. mi. watershed
  - Storage = 562 MG
  - 3.6 MG/ 0.1 ft



# Sudbury Flood Control System

## Stearns Reservoir



Primary Gate is # 2

Secondary Gate # is 1

## Brackett Reservoir



## Sudbury Reservoir

Primary Gate is MSG #7



## Foss Reservoir

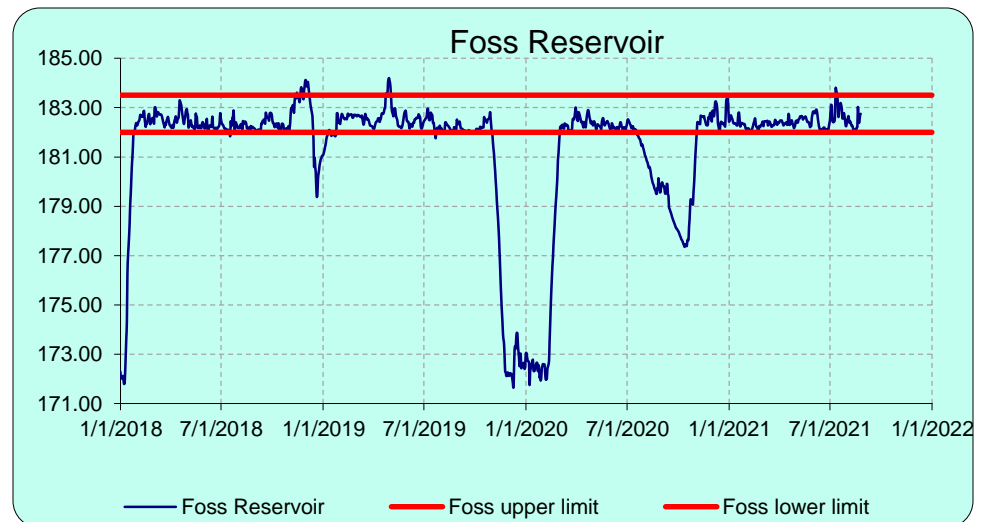
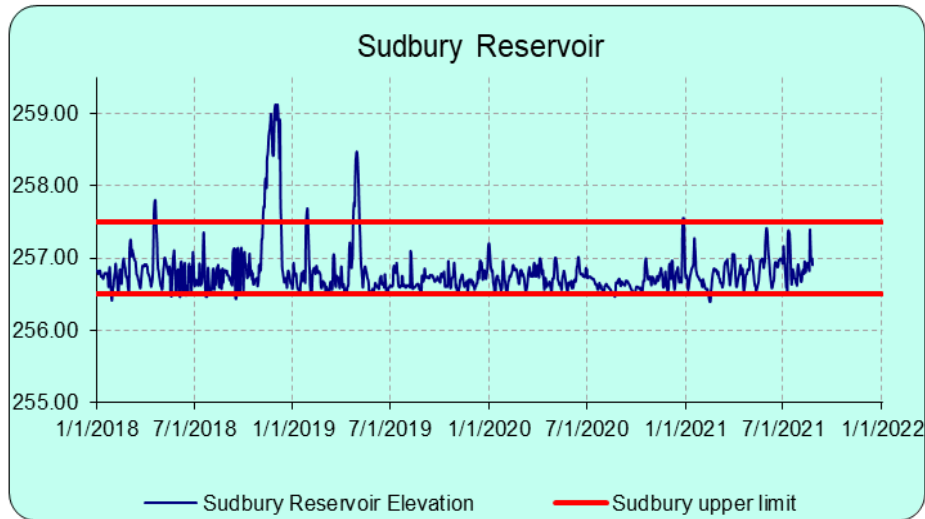


Primary Gate is gate # 2

Secondary Gate is gate # 4



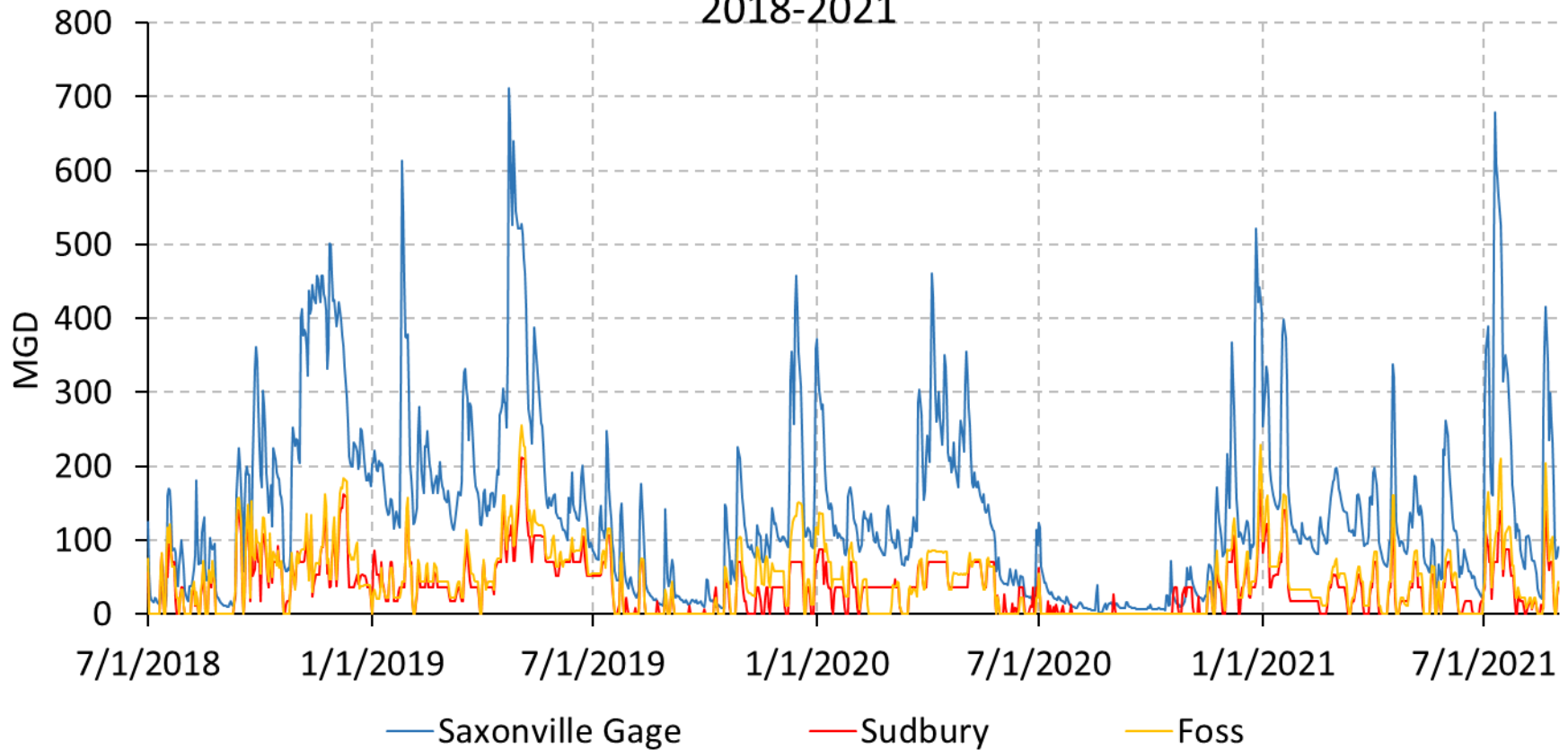
# Sudbury System Operating Bands balance inflow and outflow





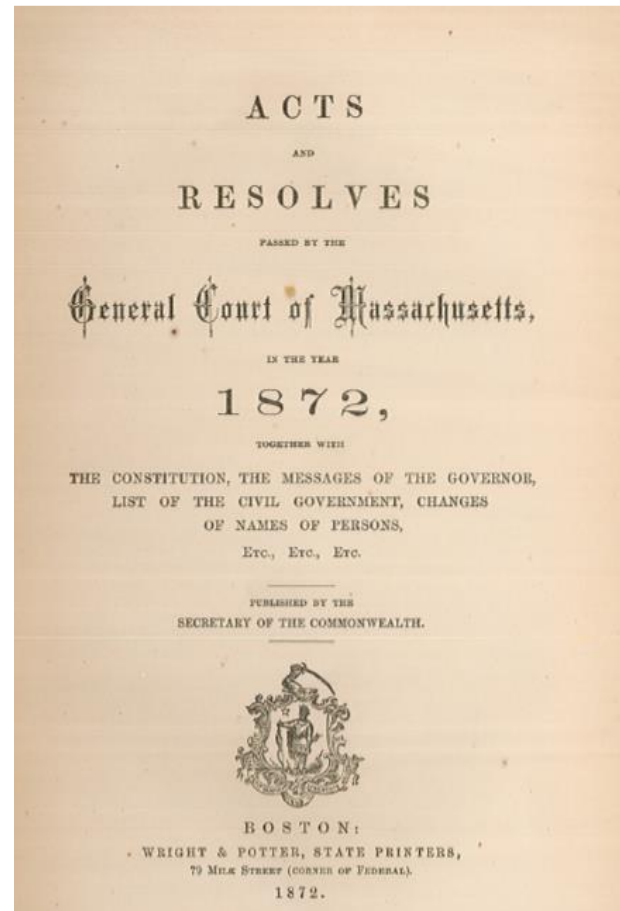
# Seasonal River Flow and Sudbury System flows

Sudbury System Releases & Saxonville Gage Flow  
2018-2021





# Statutory Releases



4. Sudbury (C. 177, Acts of 1872)

- A. Amount to the Sudbury River below Framingham Reservoir Dam I to maintain a flow of at least 1.5 MGD.



## Foss Gatehouse routine release location from No. Sudbury watershed to Stearns Reservoir





# Stearns Reservoir Dam – typical run of river and point of discharge to the Sudbury River



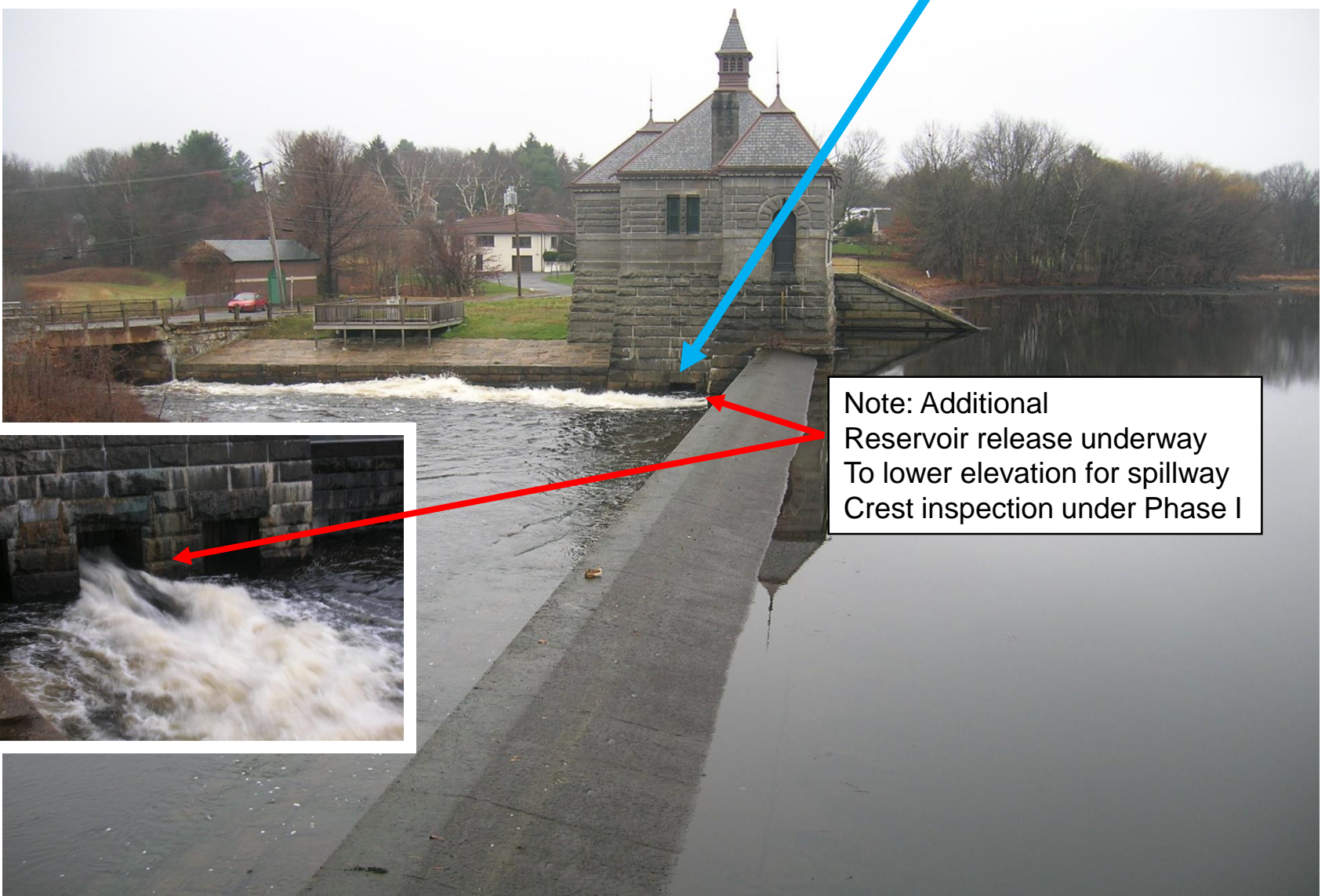


## Brackett Reservoir Dam – typical run of river from So. Sudbury watershed to Stearns Reservoir





# Stearns Spillway – falls off w/ statutory release via “cellar window.”



Note: Additional Reservoir release underway To lower elevation for spillway Crest inspection under Phase I







## Sudbury Reservoir/Foss Reservoir Flood Control S.O.P.

- Objective: To operate water storage and release in the Sudbury Reservoir and Foss Reservoir to maintain proper operating elevations and infrastructure integrity, and prevent downstream impacts during releases into the Sudbury River during seasonal and episodic wet weather events.
- Flood-season release operations are based on forecasted precipitation events (summer/fall hurricane and tropical storms, and spring snowmelt/wet weather events) with model yield. Include NWS/NOAA and USGS forecast and real time website links for conditions monitoring.

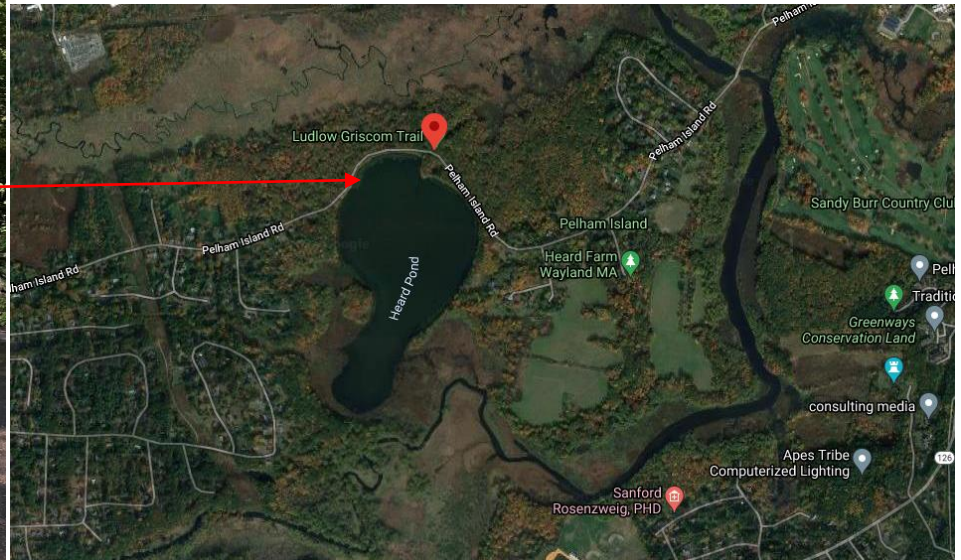


## Sudbury Flood Control Components

- Current elevations at Sudbury Res. and Foss Res. (primary drivers), Stearns Res. and Brackett Res.
- Precipitation Forecast
- Antecedent conditions
- Downstream conditions in Sudbury River @ Saxonville Gage
- Downstream Pelham Island Road conditions in Wayland



# Pelham Island Road = downstream “canary”





Thank You!





# Additional photos of Sudbury System in Flood Flow 2010



# Sudbury Spillway April 2010 Flood Flow





# Foss Spillway April 2010 flood flow





# Saxonville Dam at 800 cfs -- “Action Stage”







# Saxonville Dam at 800 cfs – “Action Stage”





# Saxonville Dam at 925 cfs on 4/4/05 – “Flood Stage”





# Flooding upstream of USGS Gage Saxonville

