4000 BC to 1617 AD

Native Americans inhabit watershed

Fishing weirs in Back Bay

1625

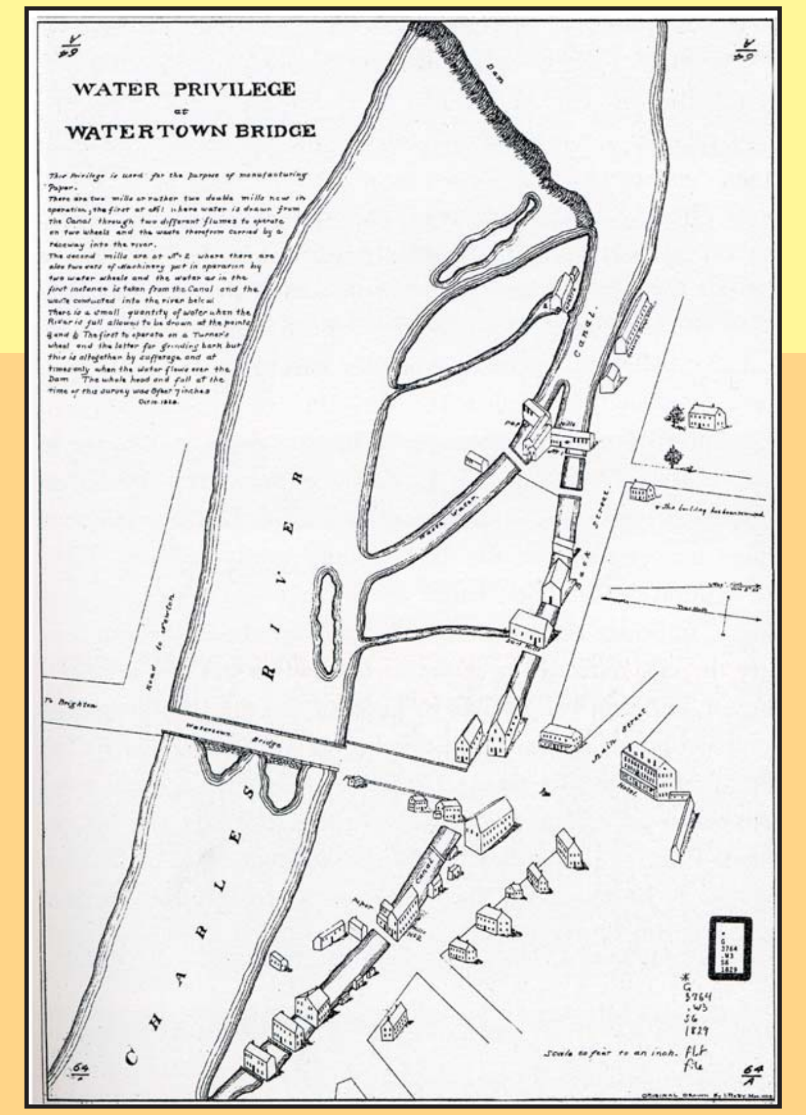
John Blaxton becomes first settler in Boston—building his home near freshwater spring on western flank of Beacon Hill

1630

John Winthrop and Massachusetts Bay Colony joins Blaxton—additional springs used for water supply

1632

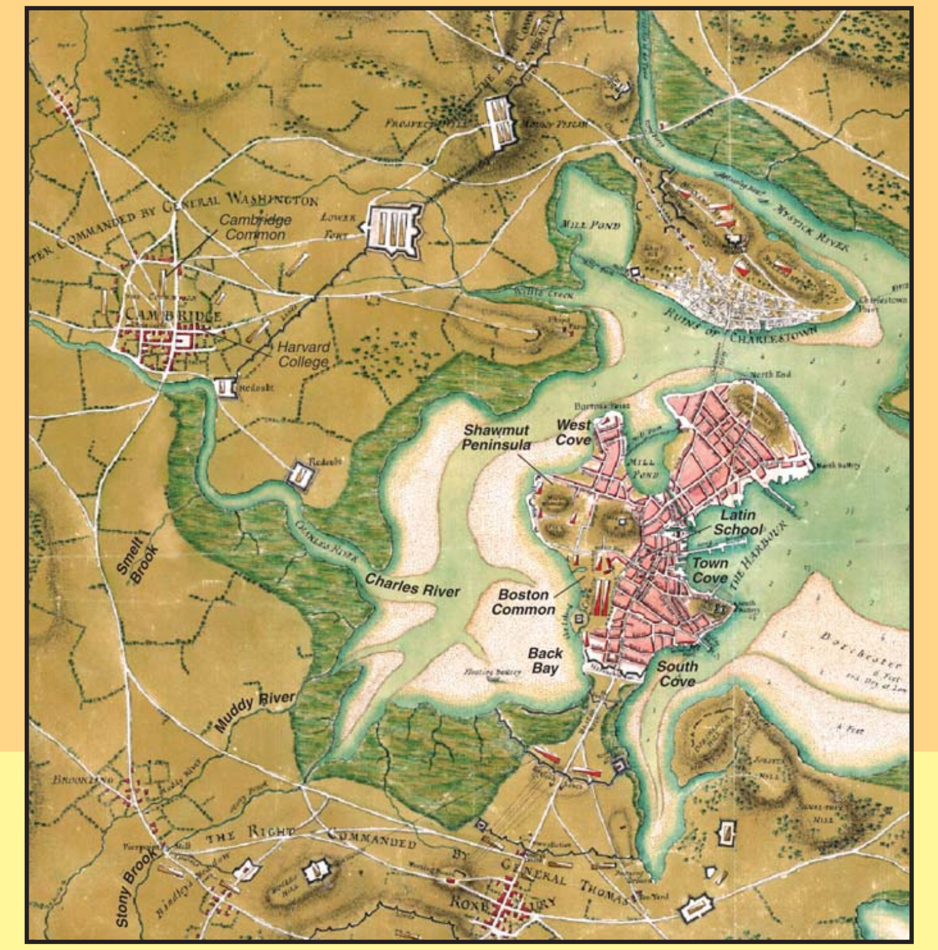
In 1632 the General Court authorized the construction of a weir on the Charles at the fall line in Watertown, which marked the upstream extent of the tidal river—two years later a mill dam was built on the same site



1634

Dam changes flow of river, captures sediments, limits fish migration

Grist mill dam erected at Watertown—first of 43 industrial mills to be built on lower Charles



Late 1700s - present

Boston streets are paved with cobblestones; underground drainage system for gray water created

Paving eliminates recharge of aquifer; springs dry up and become contaminated by privies; private water company brings water into Boston from Jamaica Pond; in 1840 Boston constructs enlarged water supply at lake Cochituate in Natick

Paving of street surfaces and creation of other impervious surfaces continues; turns an "absorbent" landsurface into a "waterproof" land surface; for example, some residential areas of Cambridge are 73% impervious

Runoff carries away contaminants such as bacteria, phosphorus lead and PCBs degrading river, poisoning fish and increasing algal growth; increases flooding; lowers water table in Boston; creating host of problems—even today, buildings on pilings at risk due to dry rot

1799

First filling of marshes occurs by lopping of top of Trimountain (now Tremont) to make Charles St.

Filling eliminates natural esturine habitat, limits water available for assimilating wastes

1840

Introduction of public water supply spurs develop of internal plumbing for waste; waste is conveyed directly to Charles through pre-existing street drains and through newly constructed common sewers carrying storm and sewer water

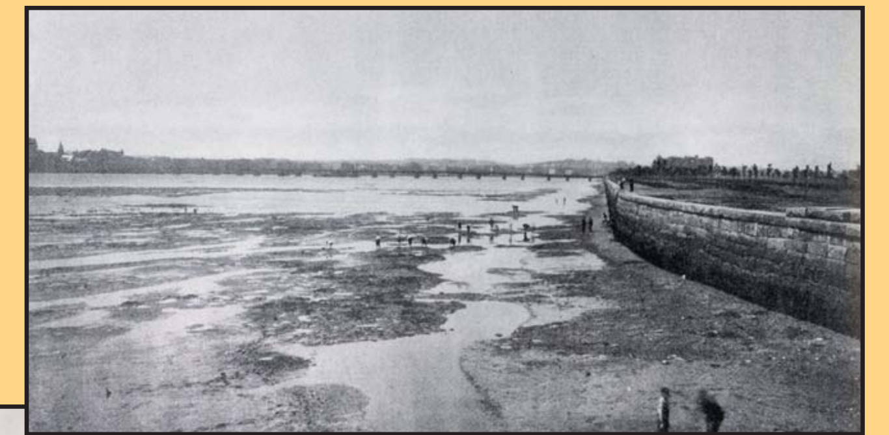
Bacteria load to river increases dramatically

Waste on exposed mudflats causes stench thought to spread disease (before germ theory of disease, illnesses thought to be spread by odors or "miasma")

The Boston Water Celebration on Boston Common, October 25, 1848. The fountain in the background was located in the Frog Pond.

1855-1880s

738 acres of tidal marsh in Back Bay is filled with material from Boston drumlins and then Needham quarries



Goal was to eliminate stench from poorly flushed tidal flats: results in reduced esturine environment, limited assimililative capacity of basin

1878

Construction of first metropolitan sewer creates additional concern over lowered groundwater table; network of groundwater observation wells initiated

Sewer lines begin to drain the groundwater of Boston; in later years, tunnels, subways and increased impervious areas add to problem

1879

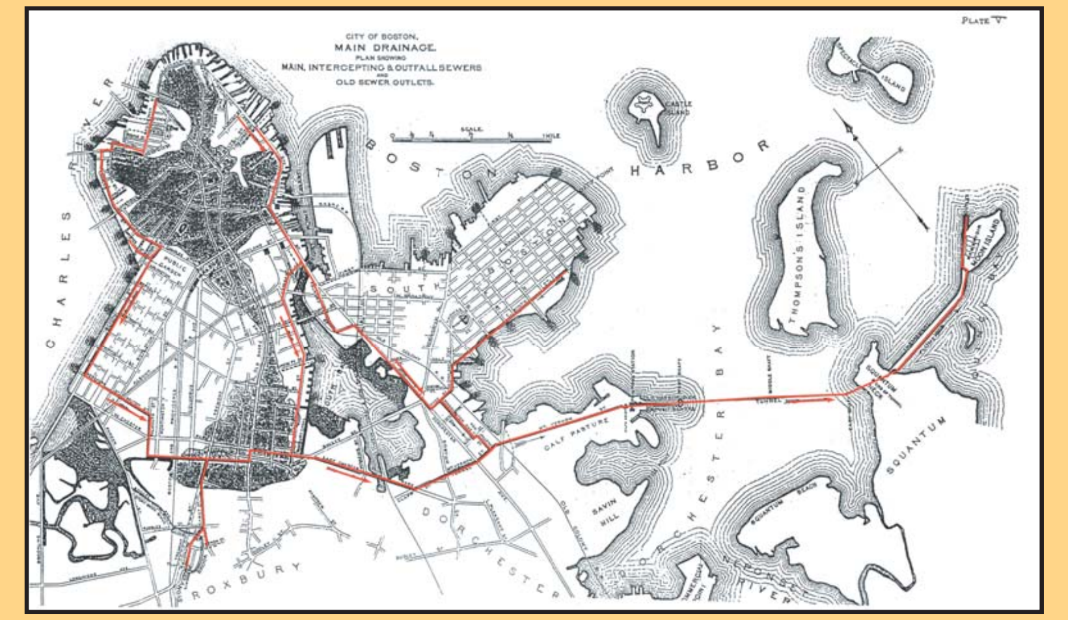
- Boston adopts Olmsted's "Sanitary Improvement of Back Bay"
- Fens is created by filling 90% of 190 acre section of Back Bay west of Gavelly point
- Stony Brook wet weather flow designed to overflow into fens, an artificial marsh with tide gate to keep water elevated
- Muddy River diverted to culvert under Brookline Ave to Charles

- Riverine habitat of Muddy lost
- Combined Sewer Overflow (CSO) discharge into fens remains today
- Constriction of flow causes flooding in lower Muddy, a problem being ameliorated by $100 million Muddy River Restoration project currently

1884

All of back bay—other than portion at entrance of Stony Brook and Muddy River—filled. Reduced river area in combination with sewage load from drains raises public health concerns

Sewer interceptors parallel to shore line conveying waste to Moon Island constructed to address sewage discharge to tidal flats and waters—interceptors designed to overspill into surface waters in large storms, creating "combined sewer overflows" or "CSO's"

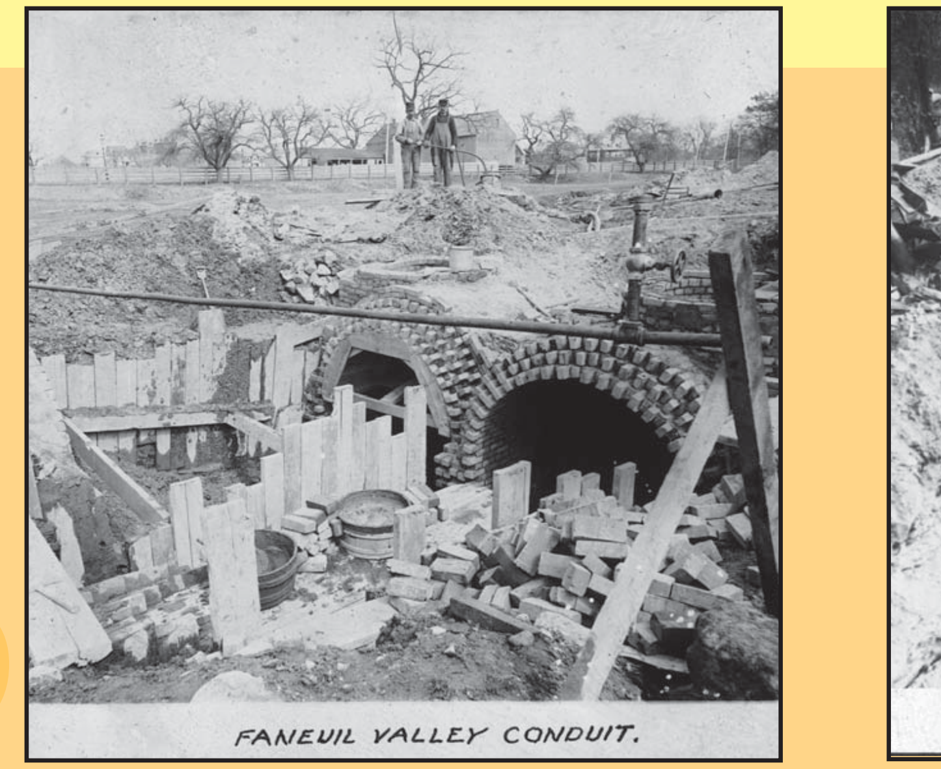


Late 19th, early 20th century

Stoney Brook, largest tributary to Charles is culverted; many of the other major Charles tributaries, including Fanueil Brook, Village Brook, Tannery Brook and parts of Laundry Brook, are also culverted over time

Project to protect public from sewage disease

Culverting of streams eliminates habitat value—sets up streams as sewer conduits



1908

Dam constructed between Boston and E. Cambridge at the locus of the current Museum of Science—this dam is replaced by New Dam at Boston harbor in 1978

Intended to alleviate sewage threat by covering tidal flats, dam eliminated esturine environment and created a settling basin for suspended sediments in water: results in heavily contaminated bottom sediment; anoxic zone created by salt water intrusion from harbor;also eliminates tidal flushing in river and makes the "fens solution" unworkable as a result

1978

New dam constructed at mouth of harbor to control flooding

1988

MWRA creates its CSO program

Lower Charles had 19 CSO's discharging 1.7 billion gallons per year into lower Charles, 150mgy untreated

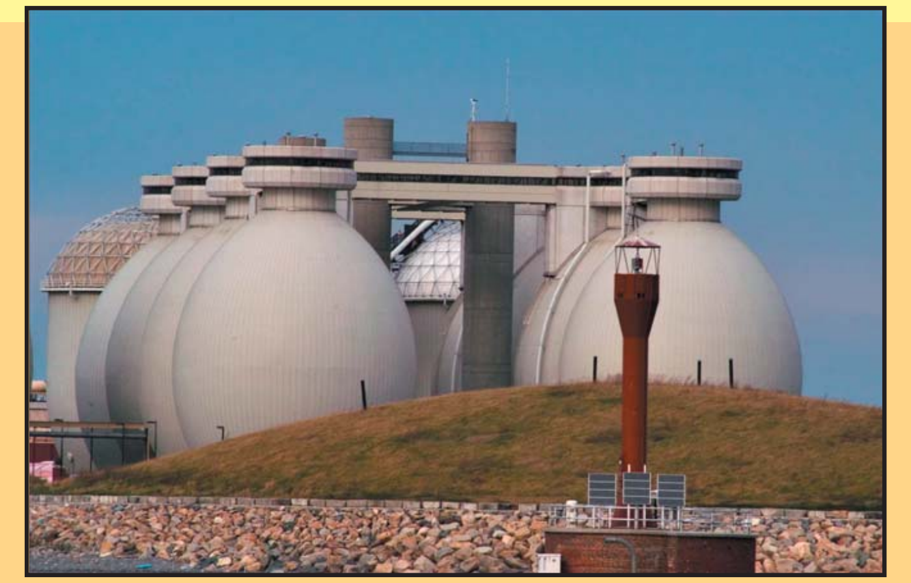
1995

EPA issues orders to eliminate illicit discharges in city storm drains

Clean Charles Initiative Launched with report card grade: D

2000

Deer Island Plant and outfall tunnel complete



Greatly expanded capacity and secondary treatment at Deer Island reduces CSOs to Charles and improves water quality in Boston Harbor

May 2005 report card issued: B+

MWRA has completed most of its 1997 CSO control plan

Well over 1MGD of illicit discharges have been removed

Under orders issued in the fall of 2004, municipalities are required to eliminate all known connections by Earth Day 2005; CSO flows in lower Charles have been reduced by 90%

October 2006

Separation of Stoney Brook will be complete

Stony Brook is the largest remaining source of bacteria to the lower Charles

May 2008

- *All illicit connections will be removed*
- *Solution to Millers River*
- *Daylighting of Muddy River*

Municipalities with known problems are currently under orders to find and eliminate problems through comprehensive, top-down investigation