



# Where Have All The Mills Gone?

Helaine Hager

# The evolution of pollution from point source



# To non-point source pollution



# Corliss Steam Engine Works

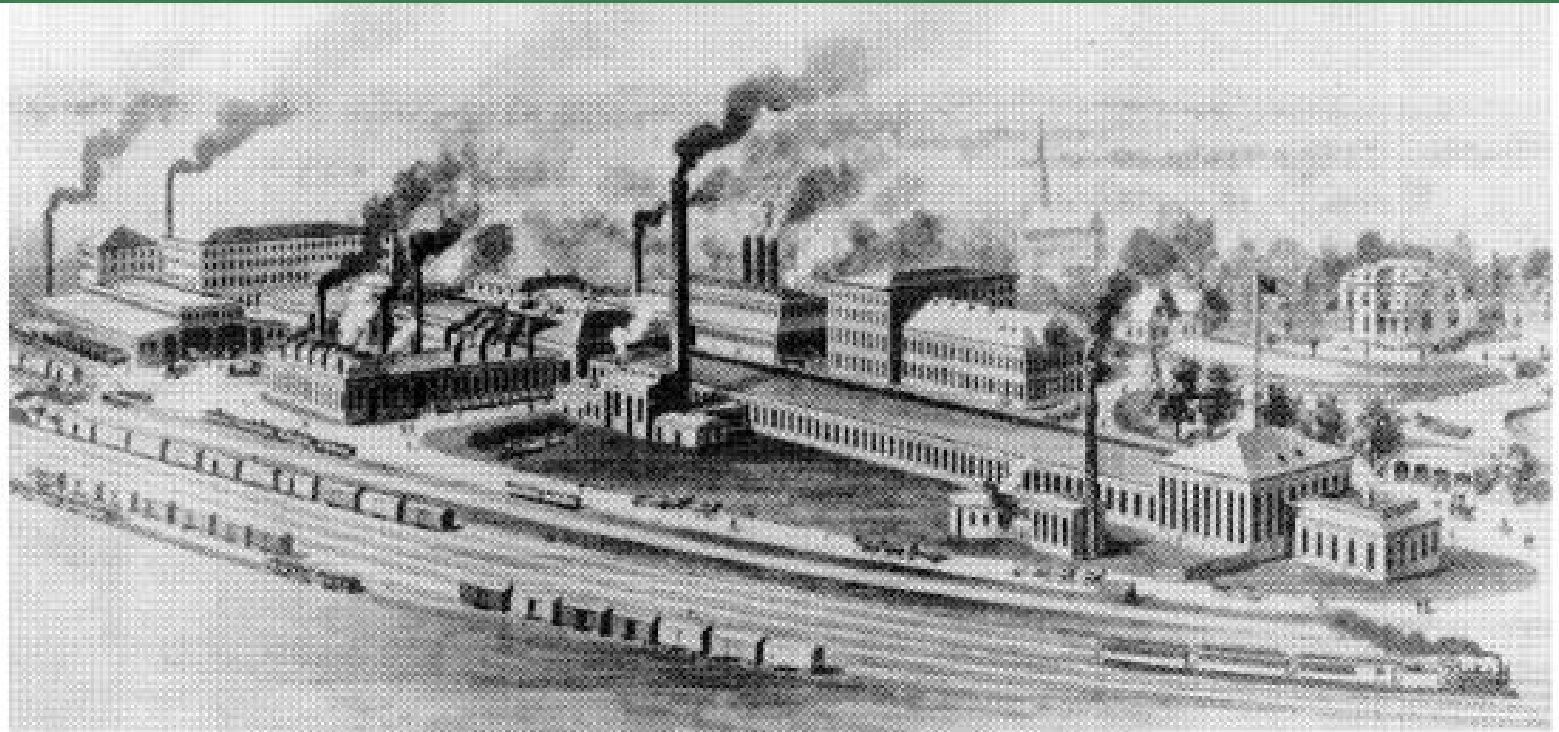
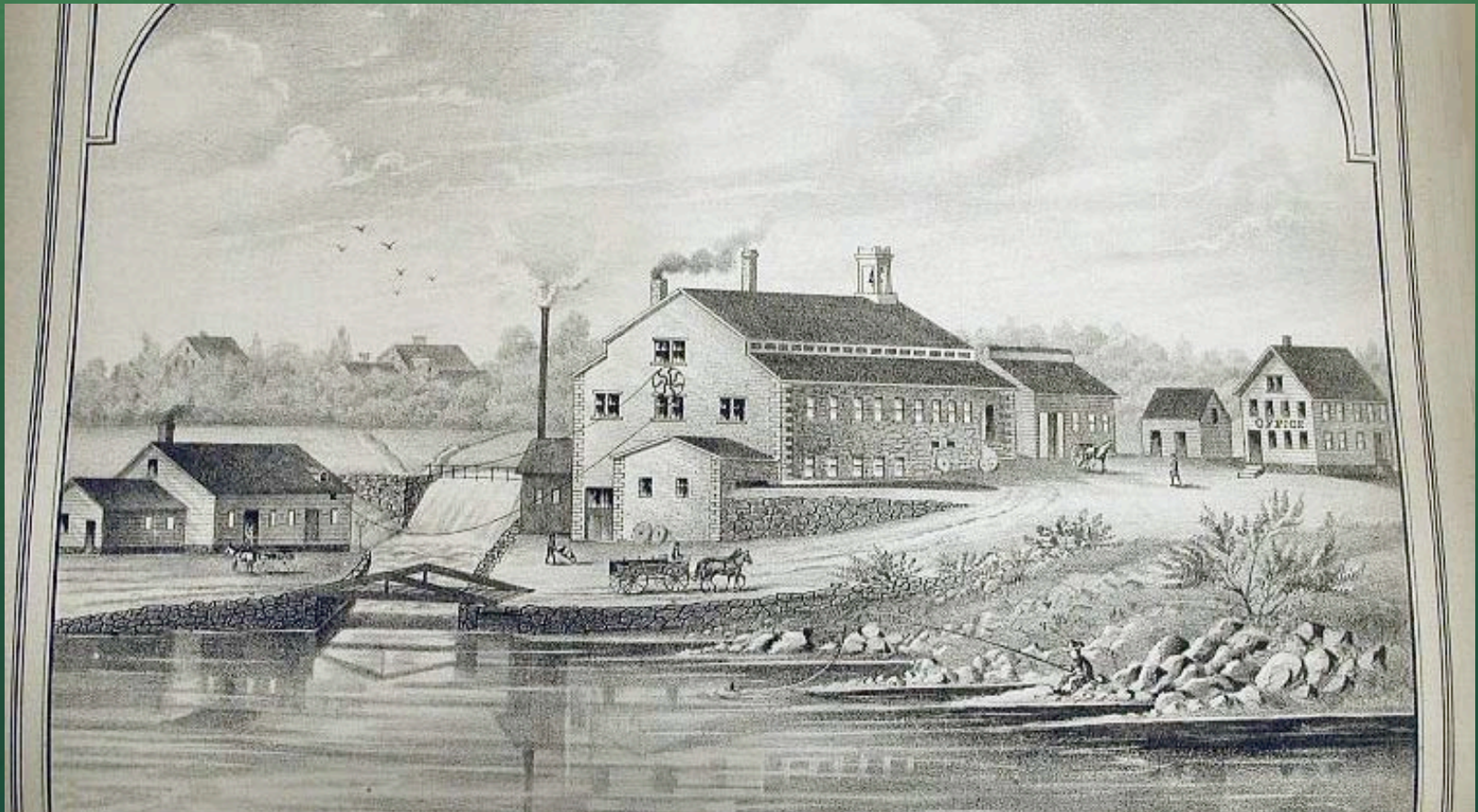


FIGURE 4.29. The Corliss Steam Engine Works in Providence, **Rhode Island**. This picture dates from the time when smoke emissions were considered a sign of prosperity. (From *Rhode Island Industries Catalogued and Illustrated* [Providence:

# Hopkins Spindle Mills Burrilville, RI



# State Board of Health 1898

“purified before it is discharged into the river”

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STATE BOARD OF HEALTH.

[1898.

The following communication was received in answer :

OFFICE OF STATE BOARD OF HEALTH, STATE HOUSE,  
BOSTON, November 4, 1898.

To the State Board of Health of *Rhode Island*, Providence, R. I.

GENTLEMEN:—The State Board of Health received from your Board on July 28, 1898, a communication stating that as a result of a recent inspection of the Ten Mile river made by your Board in the towns of Attleborough and North Attleborough it was found that a number of factories and mills and the town of Attleborough were delivering their wastes, both from vaults and from the processes of manufacture, into the river, which is the source of water supply of the town of East Providence in *Rhode Island*. You request the assistance of this Board in the removal of these sources of contamination and ask if any action can be taken by this Board in the matter, legally or otherwise. Accompanying your communication were memoranda of the inspection referred to.

The Board has caused an examination of the valley of the Ten Mile river to be made by its engineer, and has carefully considered the results of previous examinations of the stream and its water-shed. From the information recently collected it appears that at the present time the sewage from as many as 4,500 people in the villages of Lebanon Mills, Kents Mills, Hebronville, Dodgeville, Attleborough, Robinsonville, Attleborough Falls, North Attleborough, Plainville, and South Attleborough is discharged directly into the stream or its tributaries, and that large amounts of sulphuric acid, nitric acid, hydrochloric acid, ammonia, spent dyes, and other substances used in the various manufactories are discharged into the river. Gas-wastes, wastes from a rendering establishment at which dead animals are disposed of, and wastes from a tannery also enter the stream.

Numerous chemical analyses of samples of water collected from this river at two points, one above North Attleborough and the other above Attleborough, were made several years ago, and the results were published in a special report of this Board, entitled “Examination of Water Supplies,” published in 1890.

In this report it is stated that the pollution of the river at Attleborough was sufficient to render the water taken directly from the river unfit for drinking. No analyses of the water of the river below Attleborough were made at that time, but analyses made in more recent years have shown that the river is polluted to a much greater degree below the town than it is above.

1898.]

SECRETARY'S REPORT.

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The sewage discharged from the Attleborough sewers is the most serious pollution of the stream that exists at the present time, and the Board has already called the attention of the town of Attleborough to the objection to disposing of sewage by discharging it directly into the stream, and some action has been taken by the town looking to the removal of the sewage from the river and its purification upon land. If, however, the sewage of the town of Attleborough should be purified before it is discharged into the river, while a great improvement in the sanitary condition of the stream will be affected, the stream would, nevertheless, continue to be, in the opinion of this Board, a very dangerous source from which to take water for drinking or other domestic uses. Moreover, on account of the large population within the water-shed of the stream, and the numerous villages and mills widely scattered throughout this water-shed, it is impracticable, in the opinion of this Board, to prevent the pollution of the stream by sewage and manufacturing wastes to such an extent as to render the water safe for drinking.

The Board considers that the pollution of the river to the present degree is very objectionable from a sanitary standpoint, and that in the interests of the people of this valley further pollution of the stream should be prevented and the sewage of Attleborough, which is now discharged into the stream, should be removed therefrom and purified. The Board will urge the purification of the stream as rapidly as practicable, but, as already stated, it is not practicable in its opinion to render the water of the river below Attleborough suitable for drinking.

By order of the Board,

SAM'L W. ABBOTT,  
*Secretary.*

PAWTUXET RIVER.

At a meeting of the Board held on November 10, 1898, the following communication was received from the Joint Committee on Filtration of the common council of the city of Providence :

(copy.)

CITY OF PROVIDENCE,  
CLERK OF COMMITTEES DEPARTMENT,  
CITY HALL, October 29, 1898.

To the State Board of Health.

GENTLEMEN:—The Joint Special Committee of the City Council on Fil-

The annual **pollution** from manufacturing wastes at Waterbury was placed as follows:

<i>Polluting materials discharged from manufactories in Waterbury, Connecticut.</i>	
	Pounds.
Free acids .....	500,000
Metal salts .....	2,500,000
Alkaline salts .....	75,000
Soup .....	50,000
Fatty matters .....	200,000
Total .....	3,325,000

A large amount of interesting recent information in regard to river **pollution** in the United States is now available, but lack of space precludes further reference to it in this place.<sup>1</sup> The examples given will serve to illustrate the immense amount of polluting wastes that are daily being thrown into the rivers.

#### SEWAGE PURIFICATION AT MANUFACTURING ESTABLISHMENTS.

In England the **pollution** of streams from manufacturing wastes became very serious many years ago, and as the result of careful consideration of this special phase of stream **pollution** a number of sewage-disposal plants have been devised, especially with reference to purifying the sewage of each manufacturing establishment at the mill. A large amount of information in regard to such plants, with detailed plans, may be found in the fourth report of the Rivers **Pollution** Commission. As American examples, a number of cases cited by Mr. Clark in his report to the Massachusetts drainage commission, together with several recent ones, may be mentioned.

(1) The Wansuch **Mills** at Providence, **Rhode Island**, manufacture woolen and worsted goods extensively. The yearly amount of refuse contained in the waste **water** from this mill is stated to include about 64,000 pounds of dyestuffs, 1,000,000 pounds of alkali, 4,000 pounds of acid, 53,000 pounds of fuller's earth, and 400,000 pounds of grease. The waste **water** which contains this polluting material, and which originally flowed directly into West River, is stated as about 400,000 gallons a day. A dyeing and bleaching company located on the stream below the Wansuch **Mills** brought suit, alleging serious injury to its operations. After protracted litigation the supreme court granted a permanent injunction. In compliance with the injunction attempts were made to purify the waste **water** before permitting it to enter the river. For this purpose an acre and a half of land was prepared for filtration

<sup>1</sup> See the annual reports of the several State boards of health. The annual reports of the Provincial Board of Health of Ontario may also be referred to. As further illustrating the **pollution** of streams by mill wastes, reference may be made to the Eighty-third Annual Report of the Philadelphia Water Department (1885), pages 208, 209, where the detail of the daily wastes from an extensive carpet, blanket, and cloth mill may be found. The same data are also given on page 64 of Sewage Disposal in the United States. See also the report of the Second Rivers **Pollution** Commission.

by making furrows 4 feet apart on the surface. This process was fairly successful when first tried, but the land soon became clogged on the surface. The filtration process was then abandoned, although it seems clear from present information that with a larger area it could have been made successful. Purification by chemical precipitation was then adopted and has, so far as known, been continued since. For this purpose a set of six connected basins was excavated on the land previously used for filtration.

It is stated that about a barrel of lime is added to each 100,000 gallons of waste before pumping to the precipitation basins. This addition is made rudely, without either previously grinding or slacking the lime. The mill wastes flow continuously through the basins, with most of the deposition taking place in the first basin. The effluent from the last basin is said to appear to the eye about as foul as when it enters; this apparently indicates, in view of the satisfactory results gained elsewhere, defects in the practical management of the process. In the beginning sulphate of alumina was used as a precipitant, at a cost of about \$6,000 per year for the whole amount treated, which, however, was considered too great an expense.

(2) At the Loraine **mills**, Saylesville, **Rhode Island**, a method of wool scouring is practiced by which the grease is recovered and most of the dirt is eliminated from the wash **water** before it is permitted to escape. The results at this mill indicate the recovery of about a ton of grease from each 18,000 pounds of wool washed. The cost of the plant for accomplishing this, not including buildings, was \$2,500. The process is considered remunerative.

(3) Two **mills** in Millbury, Massachusetts, each scouring about 1,000 pounds of wool per day in the grease, retain the first scour in vats, which are cleaned periodically and their contents used as fertilizer. The process is considered remunerative at these **mills**.

(4) At the woolen **mills** of Robert Bleakie & Co., Hyde Park, Massachusetts, about 3,000 pounds of wool are scoured daily, the refuse from which, together with sewage and dyeing wastes, flows into a settling basin, whence the effluent passes into the stream. The settling basin consists of a cemented structure 80 feet long, 10 feet wide, and 3.5 feet deep; it is cleaned at intervals and the sludge is used for fertilizer, yielding for this purpose an estimated value of several hundred dollars a year.

(5) At Maxwell's tannery, Winchester, Massachusetts, a mechanical filter is used for straining bark and coarse lime from tannery wastes. The filter consists of a wooden box about 4 feet wide, 2 feet deep, and 60 feet long, divided into compartments filled with hay, through which the waste **water** filters. The effluent generally is clear, but of a deep mahogany color.

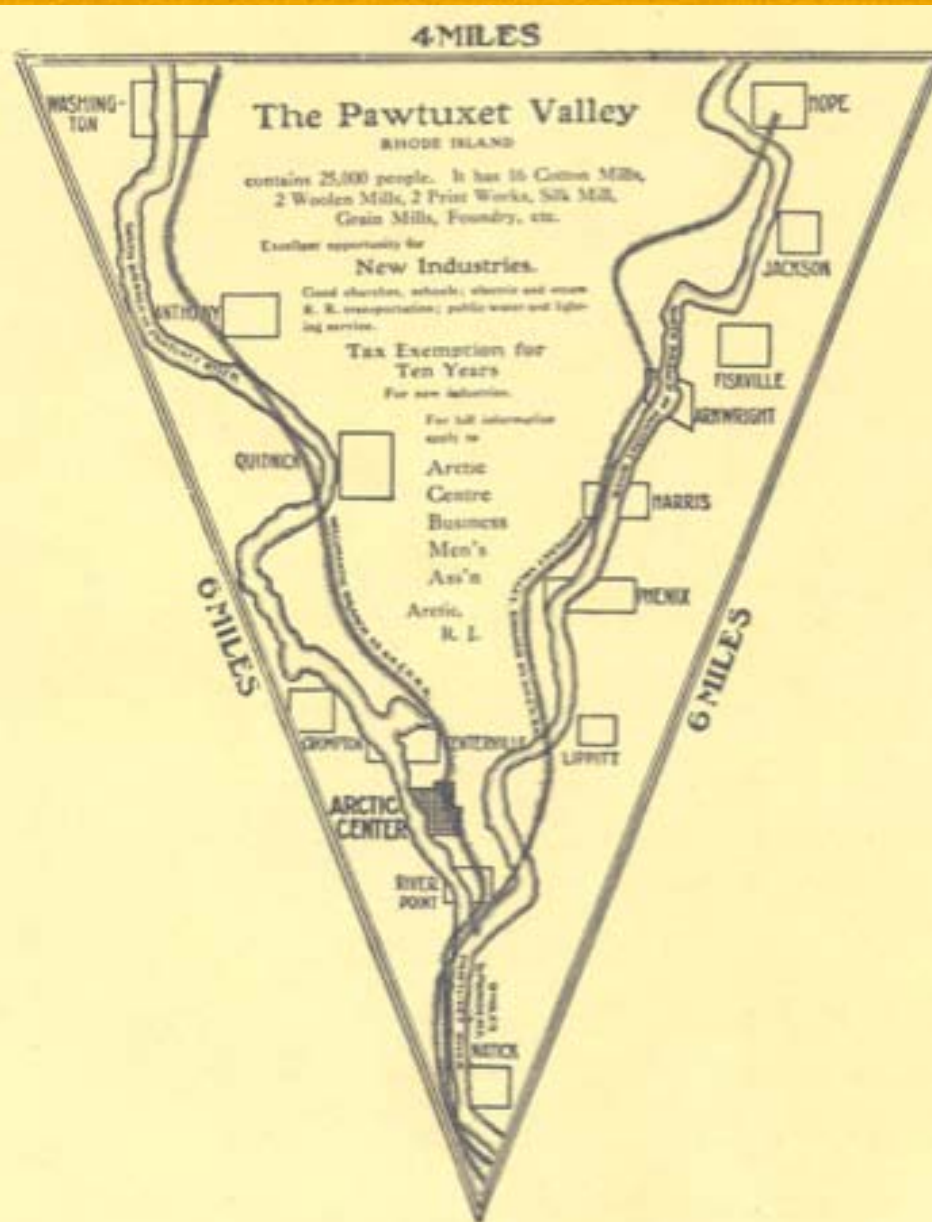
(6) The Nemasket **mills** at East Taunton, Massachusetts, applied to the State board of health in 1891 for advice with reference to disposing

# Litigation due to down river effects

(1) The Wansuch Mills at Providence, Rhode Island, manufacture woolen and worsted goods extensively. The yearly amount of refuse contained in the waste water from this mill is stated to include about 64,000 pounds of dyestuffs, 1,000,000 pounds of alkali, 4,000 pounds of acid, 53,000 pounds of fuller's earth, and 400,000 pounds of grease. The waste water which contains this polluting material, and which originally flowed directly into West River, is stated as about 400,000 gallons a day. A dyeing and bleaching company located on the stream below the Wansuch Mills brought suit, alleging serious injury to its operations. After protracted litigation the supreme court granted a permanent injunction. In compliance with the injunction attempts were



# Mills in the Pawtuxet Valley



## Pawtuxet Valley

- 25,000 People
- 16 Cotton Mills
- 2 Woolen Mills
- 2 Print Works
- Silk Mill
- Grain Mills
- Foundry

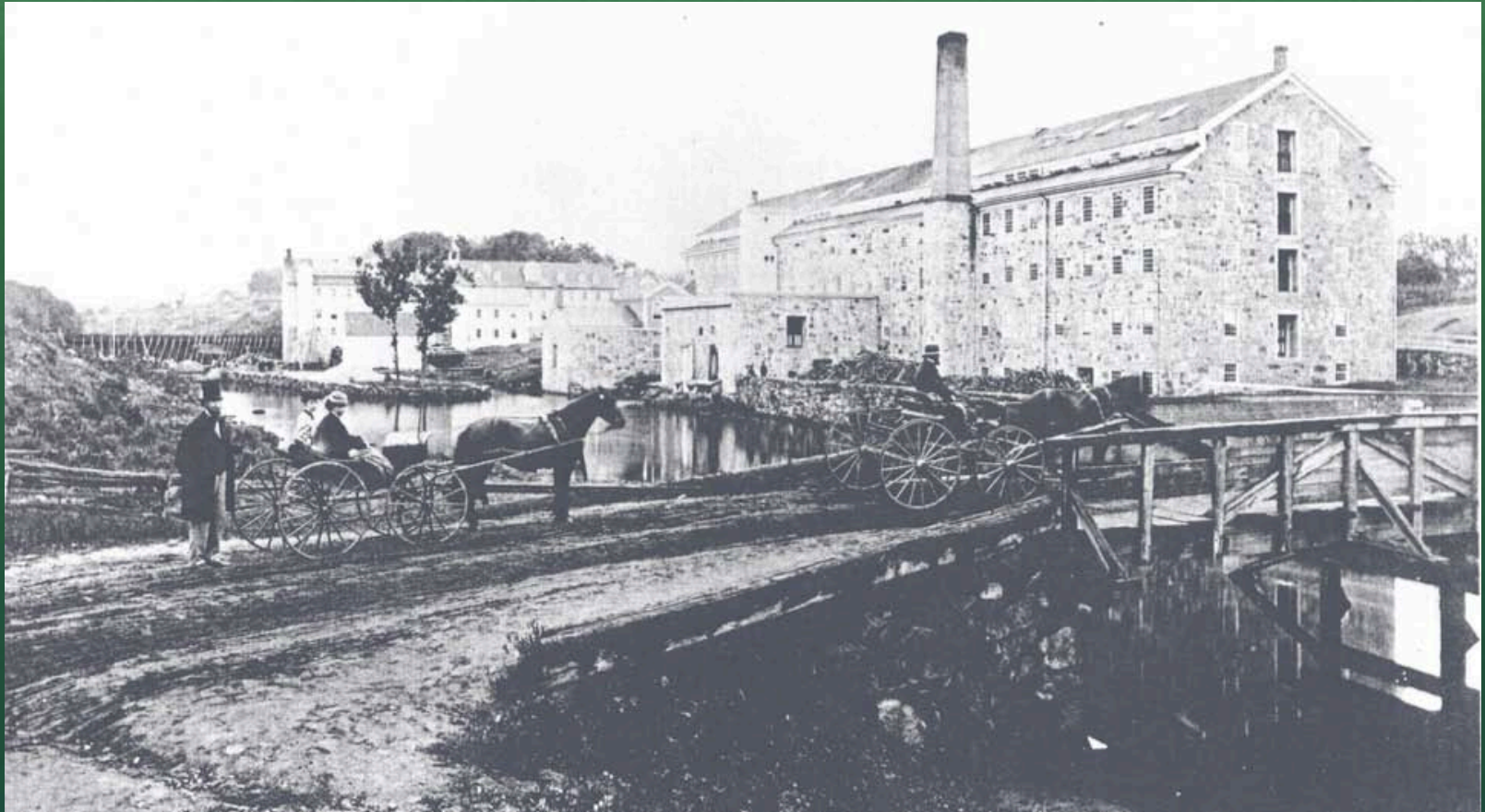
# Royal Mills 1890's



# History of a Mill

- 1821: First dam and textile mill built on the Pawtuxet river location
- 1890: Royal Mill originally built
- 1903: Knight Co. largest cotton manufacturer in the world
- 1913: Peak cotton production for B.B. & R. Knight; 7,000 workers, 22 mills (Royal Mill 3rd largest)
- 1919: Fire collapses tower into mill
- 1920: Royal Mill rebuilt and modernized
- 1921: B.B. & R. Knight move “Fruit of the Loom” cotton production to Royal Mill
- 1922: Devastating New England textile workers strike; 33 weeks
- 1935: B.B. & R. Knight Co. bankrupt, Royal Mill closed
- 1936: Royal Mill purchased by Saybrooke Manufacturing Co, wool fabrics produced for about ten years < 1990’s: Royal Mill called home by numerous and various manufacturing tenants, most not lasting long
- 1993: Property closed and vacated

# Royal Mills



# Royal Mills- 1890



# Strike of 1922



# Royal Mills Today



# What has changed?





Before



After



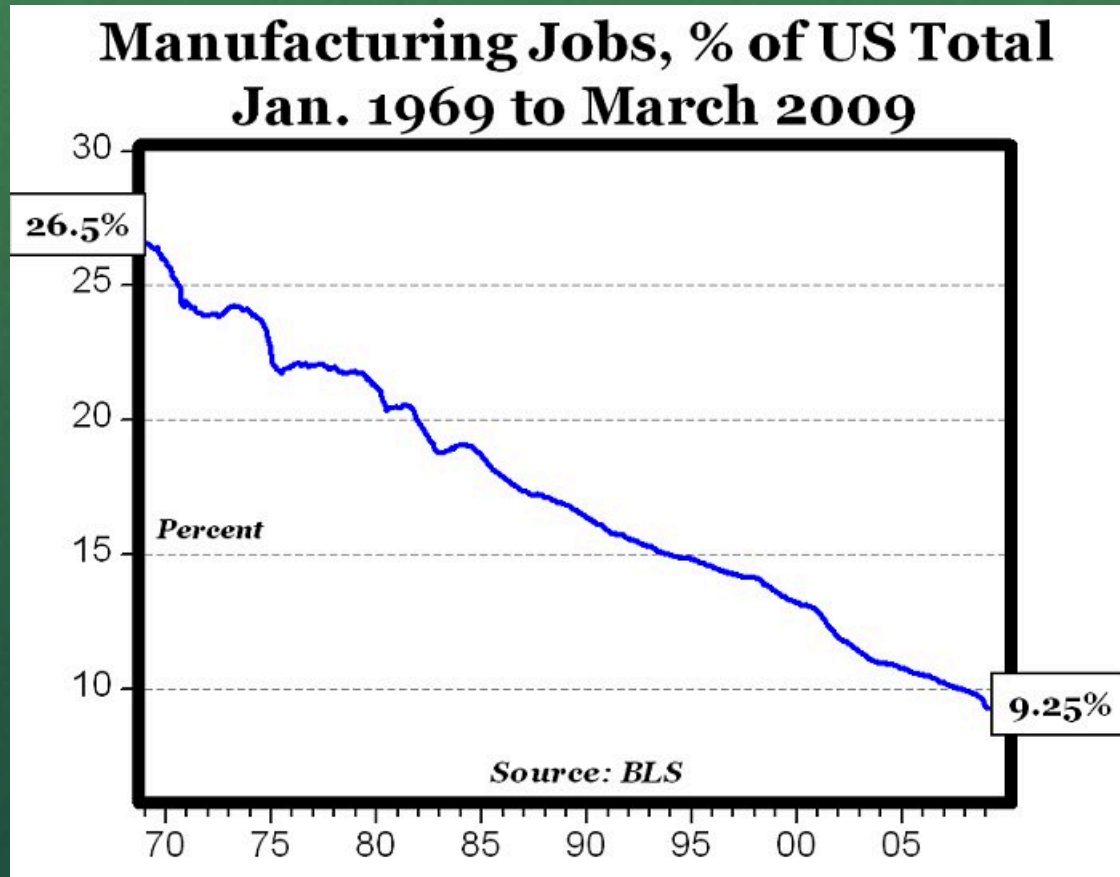
# Condos and Apartments



# Clean water?

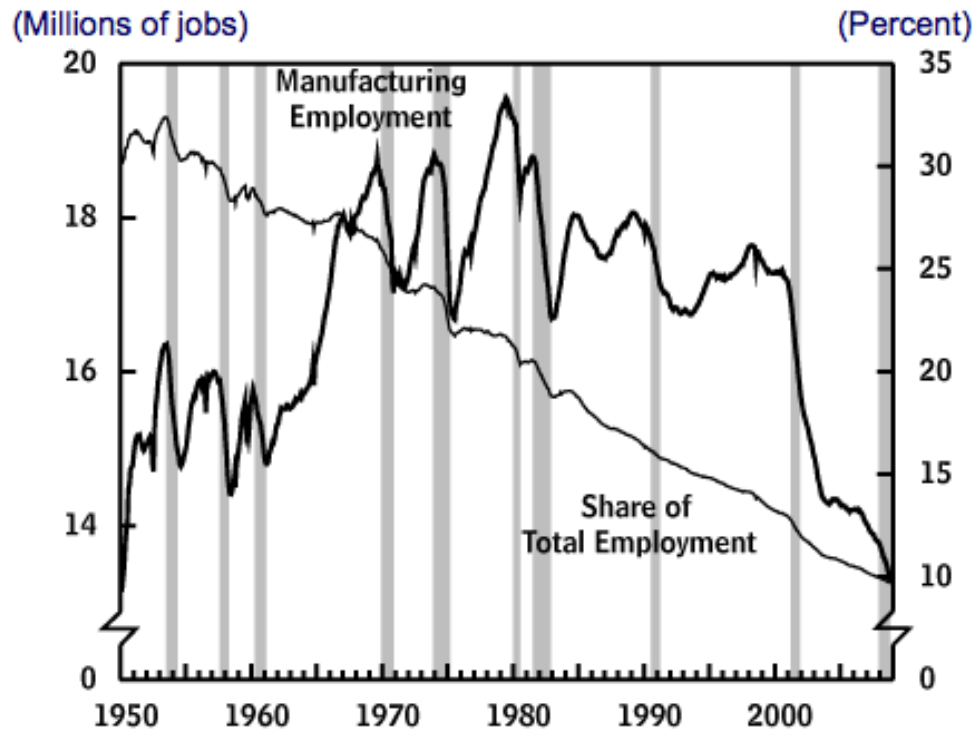


# Decreased Manufacturing



# Decrease from about 1/3 workers

## Manufacturing Employment

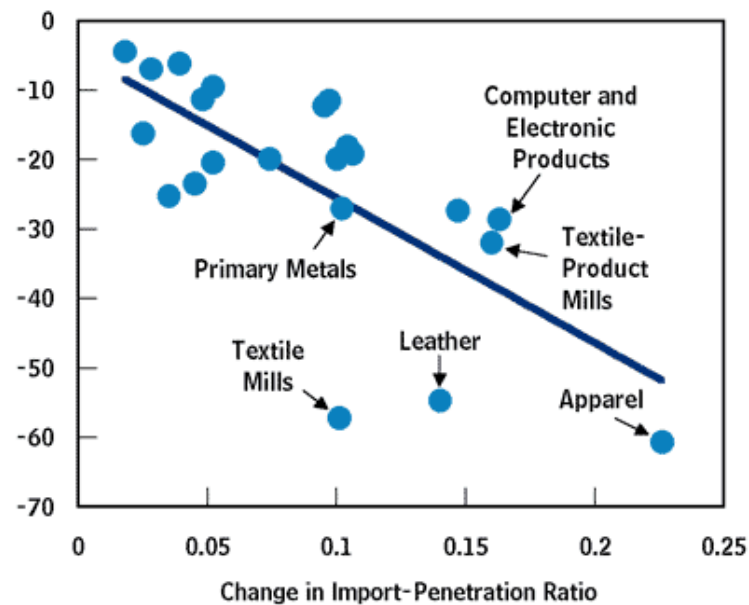


Source: Congressional Budget Office based on data from Department of Labor, Bureau of Labor Statistics.

**Figure 4.**

### Changes in the Import-Penetration Ratio and Employment, by Manufacturing Subsector, 1999 to 2007

(Percentage change in employment)

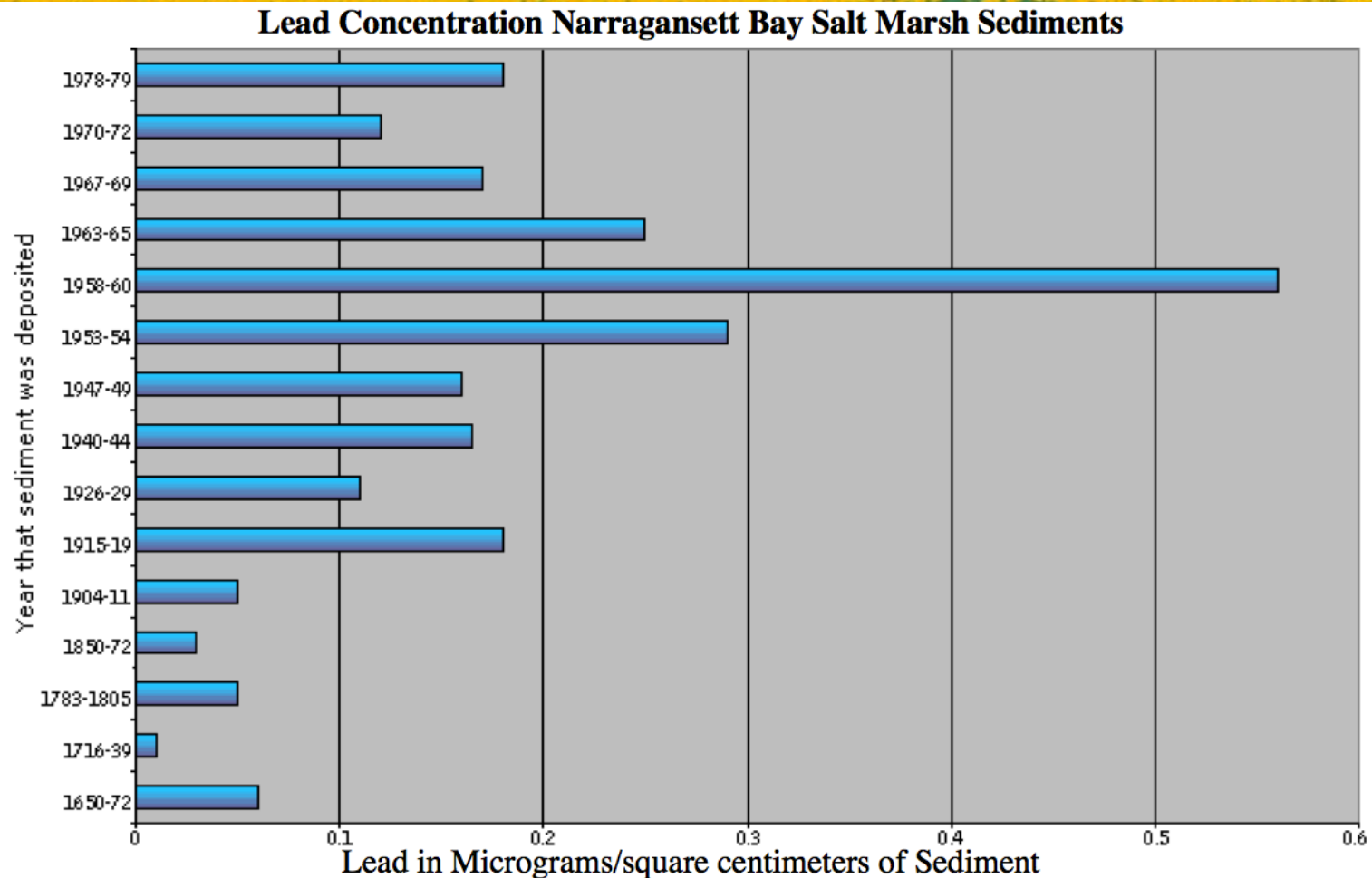


Source: Congressional Budget Office based on data from Department of Labor, Bureau of Labor Statistics, and Department of Commerce, Census Bureau.

Notes: The manufacturing sector comprises 21 subsectors, as identified by the North American Industry Classification System. Key subsectors are highlighted here.

The import-penetration ratio is the ratio of imports to domestic demand.

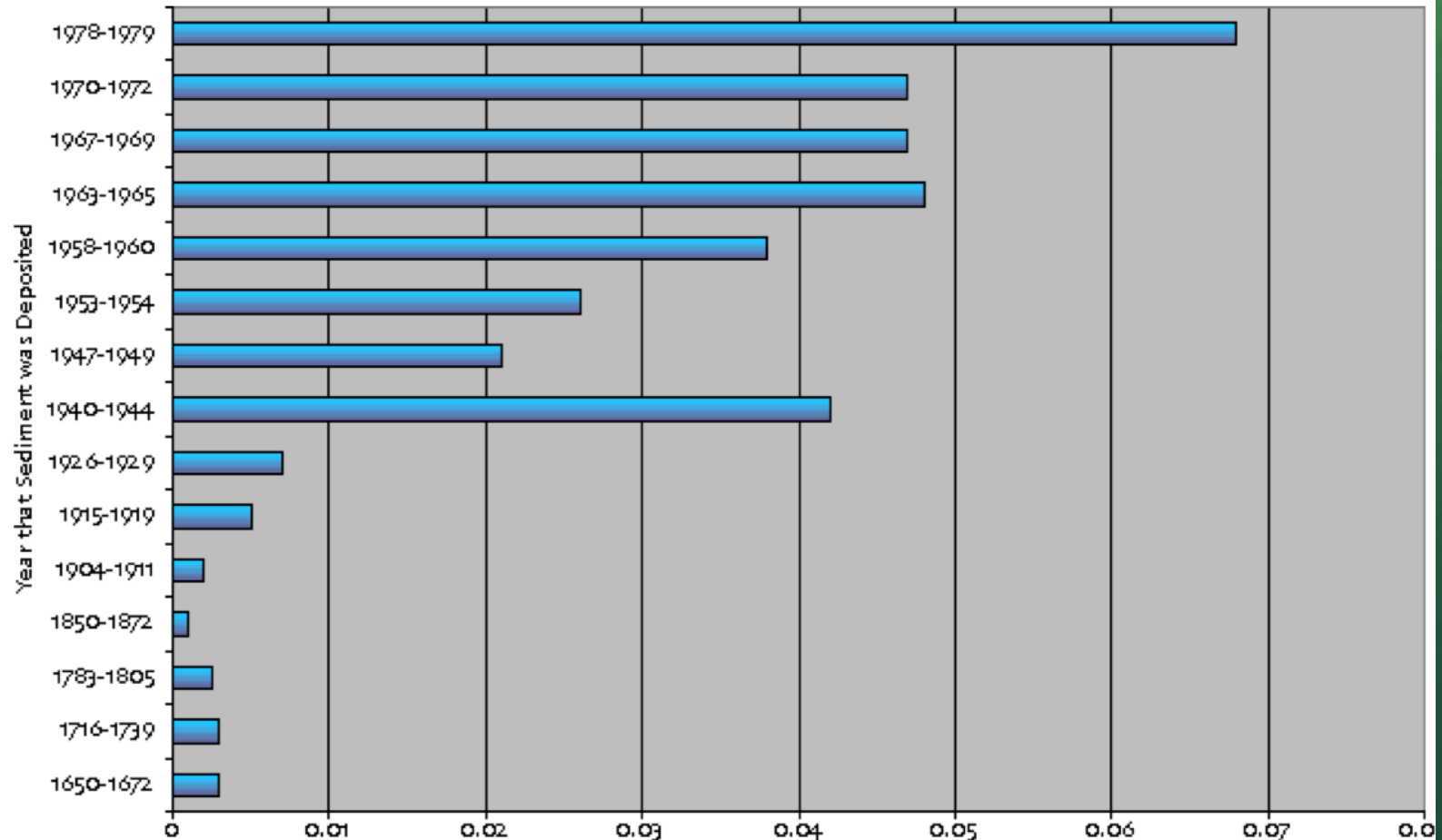
# Lead in Dye Stuffs



Data was adapted from S. Bricker Urso and S.W. Nixon, *The Impact of Human Activities on the Prudence Island Estuarine Sanctuary as Shown by Historical Changes in Heavy Metal Inputs and Vegetation*, URI Graduate School of Oceanography, final report to the Narragansett Bay Estuarine Sanctuary Scientific Committee, 1984.

# Silver in Jewelry

**Silver Concentration Narragansett Bay Salt Marsh Sediments**



Data was adapted from S. Bricker Urso and S.W. Nixon, The Impact of Human Activities on the Prudence Island Estuarine Sanctuary as Shown by Historical Changes in Heavy Metal Inputs and Vegetation, URI Graduate School of Oceanography, final report to the Narragansett Bay Estuarine Sanctuary Scientific Committee, 1984.



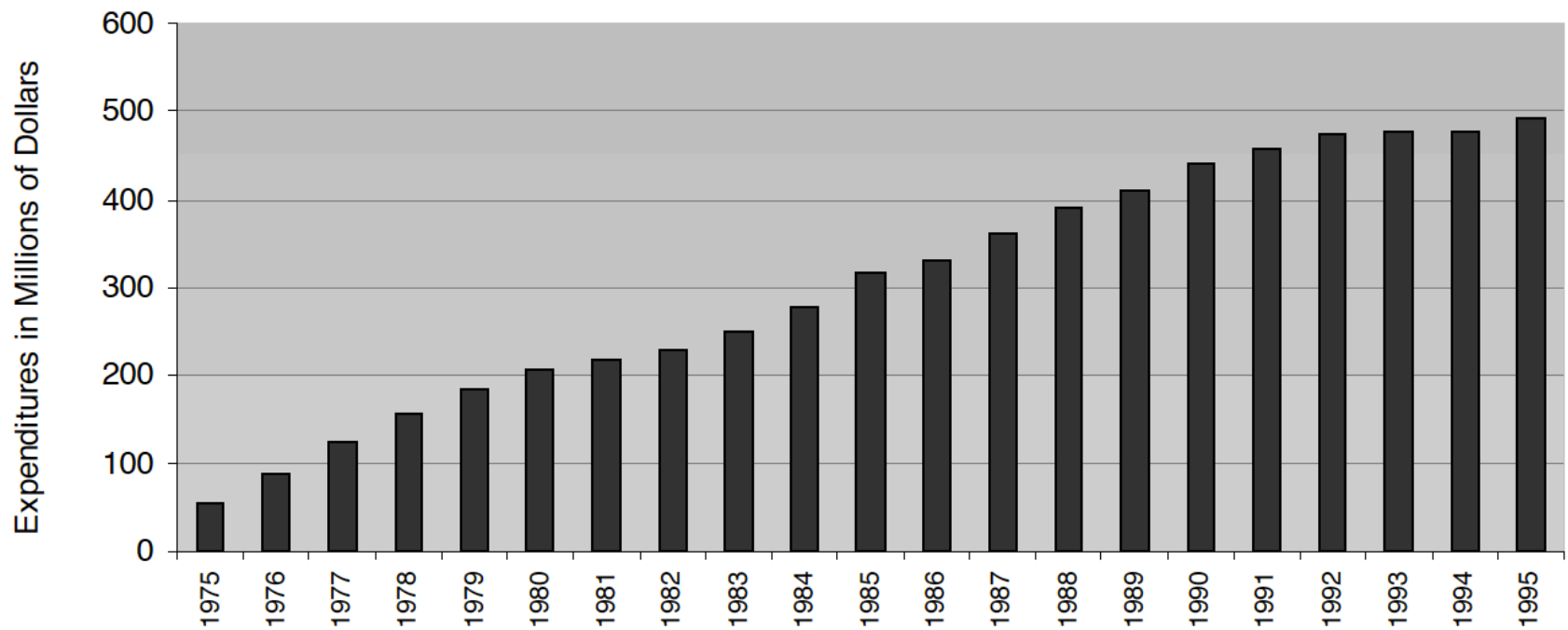


Controlling  
point  
sources vs  
nonpoint  
sources

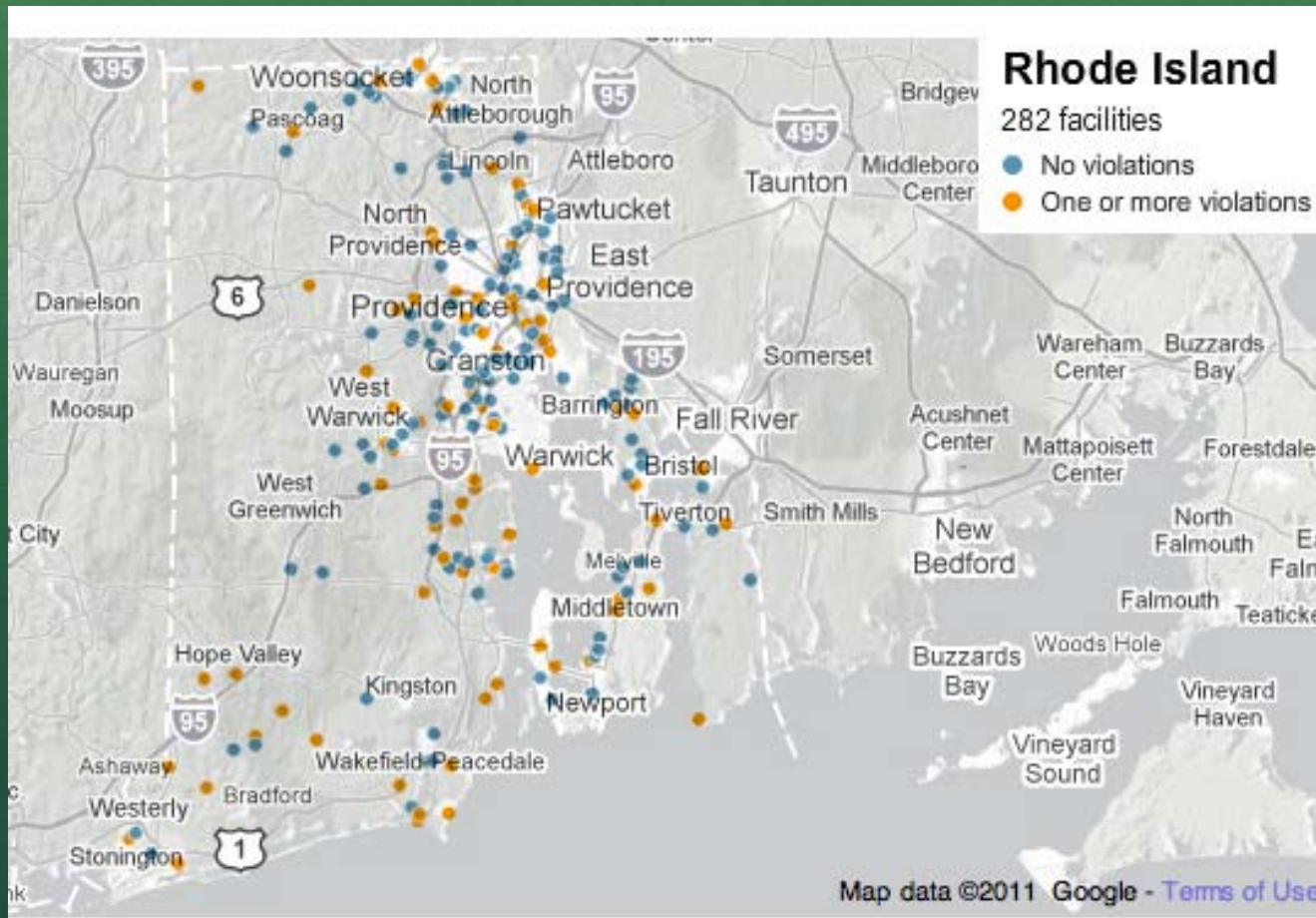


# Combine Non-point Sources

Expenditures for Major Wastewater Treatment Facility Improvements  
(running total from 1973)



# Discharge Sources










# Top 15 Violators

## Rhode Island

1-15 OF 282

« PREVIOUS

NEXT »

FACILITY NAME	CITY	LAST INSPECTED	▼ VIOLATIONS	FINES
 Kenyon Industries, Inc	Shannock	Sept. 24, 2008	200	\$0
 Woonsocket Water Treatment Plant	Woonsocket	Jan. 7, 2005	198	\$0
 Tiverton High School	Tiverton	Dec. 16, 2008	166	\$0
 Wrec, Precision Park, LLC	North Kingstown	Jan. 29, 2009	142	\$0
 Newport WPCF	Newport	Dec. 10, 2008	138	\$0
 East Providence WPCF	East Providence	Dec. 15, 2008	126	\$0
 Veolia Water Cranston WPCF	Cranston	Feb. 2, 2009	106	\$0
 Clariant Corporation	Coventry	Sept. 24, 2008	105	\$0
 Bradford Dyeing Assoc. Inc.	Bradford	March 27, 2008	91	\$0
 Nbc Bucklin Point WWTF	East Providence	March 28, 2008	91	\$0
 East Greenwich WWTF	East Greenwich	Dec. 9, 2008	82	\$0
 Warren WWTF	Warren	Dec. 30, 2008	75	\$0
 Nbc Field's Point	Providence	Aug. 26, 2008	70	\$0
 Westerly WWTF	Westerly	Dec. 17, 2008	69	\$0
 Bristol WPCF	Bristol	Dec. 23, 2008	65	\$75,000

22 facilities could not be mapped but are included in this list.

# Next 15 Violators

## Rhode Island

16-30 OF 282

« PREVIOUS

NEXT »

	FACILITY NAME	CITY	LAST INSPECTED	▼ VIOLATIONS	FINES
	<b>West Warwick WWTF</b>	West Warwick	Dec. 30, 2008	65	\$0
	<b>Woonsocket WWTF</b>	Woonsocket	March 21, 2007	63	\$0
	<b>Strawberry Field Estates, Inc.</b>	Warwick	Aug. 15, 2008	61	\$0
	<b>Sprague Energy Corporation</b>	Providence	Oct. 28, 2008	56	\$0
	<b>Smithfield Wastewater Treatment Plant</b>	Smithfield	Sept. 30, 2008	52	\$0
	<b>Lawton Valley Water Treat Plnt</b>	Portsmouth	June 5, 2008	48	\$0
	<b>New Shoreham WPCF</b>	New Shoreham	June 17, 2008	47	\$0
	<b>Briarcliff Manor Nursing Home</b>	Johnston	June 24, 2003	43	\$0
	<b>Jamestown WWTF</b>	Jamestown	Dec. 10, 2008	39	\$0
	<b>Ridem/Carolina Trout Hatchery</b>	Carolina	May 19, 2005	37	\$0
	<b>Ridem/Lafayette Trout Hatchery</b>	Lafayette	May 19, 2005	35	\$0
	<b>Arkwright Advanced Coating, Inc.</b>	Fiskeville	Dec. 5, 2003	34	\$0
	<b>Pawtucket Water Treatment Plant</b>	Pawtucket	July 21, 2006	34	\$0
	<b>Ridem/Perryville Trout Hatchry</b>	Perryville	May 19, 2005	34	\$0
	<b>Riedc/Quonset WWTF</b>	North Kingstown	Dec. 9, 2008	31	\$0



## Kenyon Industries, Inc

[← BACK TO LIST](#)

6 Sherman Avenue Pob 115, Shannock, Rhode Island 02875

### 0 Total Fines

Total inspections: 5

Last inspection: Sept. 24, 2008

Classification: Finishers of Textiles, NEC

### 8 Enforcement Actions

Last enforcement: June 2, 2008

Formal enforcement: 1

Informal enforcement: 7

### 200 Violations

This facility has been out of regulatory compliance 12 of the past 12 quarters.

**2004** 41 effluent violations

**2005** 50 effluent violations  
6 compliance schedule violations  
4 other\* violations

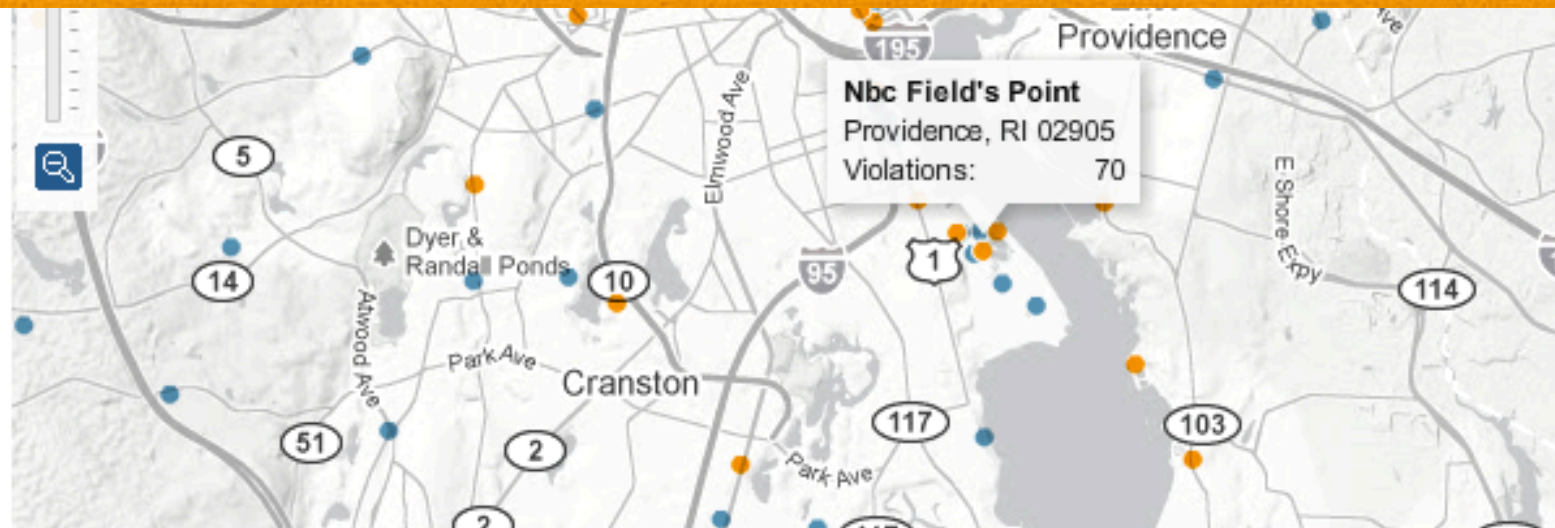
**2006** 24 effluent violations  
34 permit violations  
1 unrelated to permit violation

**2007** 19 effluent violations

**2008** 21 effluent violations

\*E.P.A. data reports reporting/monitoring violations, but do not indicate any actual discharge of pollutants. In most cases, required reports were not filed, which results in automatic violations.

View detailed information from the [Environmental Protection Agency](#). Note: There are no mandated limits for power plant discharges into waterways for many common chemicals such as arsenic, lead and mercury. However some facilities are monitored for these pollutants by state regulators and report the findings to the E.P.A.



**Nbc Field's Point**  
 Providence, RI 02905  
 Violations: 70

[← BACK TO LIST](#)

## Nbc Field's Point

2 Ernest Street, Providence, Rhode Island 02905

### \$0 Total Fines

Total inspections: 11  
 Last inspection: Aug. 26, 2008  
 Classification: Sewerage Systems

### 5 Enforcement Actions

Last enforcement: Feb. 7, 2007  
 Formal enforcement: 2  
 Informal enforcement: 3

### 70 Violations

This facility has been out of regulatory compliance 12 of the past 12 quarters.

**2004** 9 effluent violations  
 1 other\* violation

**2005** 14 effluent violations  
 19 permit violations  
 5 compliance schedule violations

**2006** 5 effluent violations

**2007** 6 effluent violations

**2008** 11 effluent violations

\*E.P.A. data reports reporting/monitoring



- A representative of the Rhode Island Department of Environmental Management, Angelo S. Liberti, wrote the following when asked to provide or verify figures regarding the state's enforcement of the Clean Water Act:
- A large percentage of the minor facilities listed as having Category I violations were a result of missing discharge monitoring reports (DMRs). In many cases, when the permittees responded to the informal enforcement actions issued by DEM, the DMRs demonstrated that there were no violations of effluent limitations. Therefore, DEM ran reports to determine the number of facilities that were still in Category I or II noncompliance after the DMRs were submitted or it was determined that data could not be provided and enforcement was not appropriate. Below is a table that shows the number of minor facilities remaining in noncompliance after the DMRs were received.
- RIDEM is diligent about including monitoring for pollutants of concern, water quality based limits and entering permit requirements and monitoring data for minor facilities into ICIS. You will find that many states fail to enter any data for minor facilities in PCS or ICIS and other have a much smaller number of permit limits and monitoring requirements (i.e. fewer opportunities for violations). Also many of RI's minor facilities have very little potential for environmental harm (i.e. contact cooling water discharges). These and other factors make it difficult to draw meaningful comparisons between states using EPA's national databases

# Providence Journal

Monday

April 4, 2011

\$1.00

Home Delivery  
401.277.7600

ENVIRONMENT | WASTE TREATMENT

## Cesspools given notice



THE PROVIDENCE JOURNAL / FRIEDA SQUIRES

**Mary Gagnon**, of 72 Sea View Ave., North Kingstown, her daughter Jean Gagnon, right, and her dog, Lenox, look out at the bay in March. The Gagnons have to replace their cesspool with a new septic system.

Property owners with cesspools near ocean being notified they must get a septic system or tie in to sewer if possible

By **RICHARD SALIT**  
JOURNAL STAFF WRITER

All that stands between Mary Gagnon's tiny front yard and the blue-gray waters of Narragansett Bay is a narrow dirt road and the rocky beach where she likes to go swimming. Seals that frequent nearby Rome Point sometimes swim by.

It's this natural beauty that lured her to North Kingstown's Wild

old Cape. Gagnon knew it had a cesspool, much like her old house. Atop its cover, she placed a rock engraved: "Without the thorns, the roses can't be sweet."

The cesspool, however, has become thornier, and more painful, than she anticipated.

Recently, Gagnon received a letter from the state Department of Environmental Management informing her that she must replace

## In Portsmouth, 300 owners told waiting might be their best move

Residents are advised to hold off on making septic improvements until state, town can forge compromise

By **RICHARD SALIT**  
JOURNAL STAFF WRITER

**PORTSMOUTH** — Cesspool owners in this coastal town are caught in the middle of an escalating battle between the town and the state.

for failing to address chronic discharge of sewage from storm-water pipes in Island Park and Portsmouth Park. The agency fined the town \$186,019 and ordered it to build a sewer system.

Portsmouth, which has



04.03.2011

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