



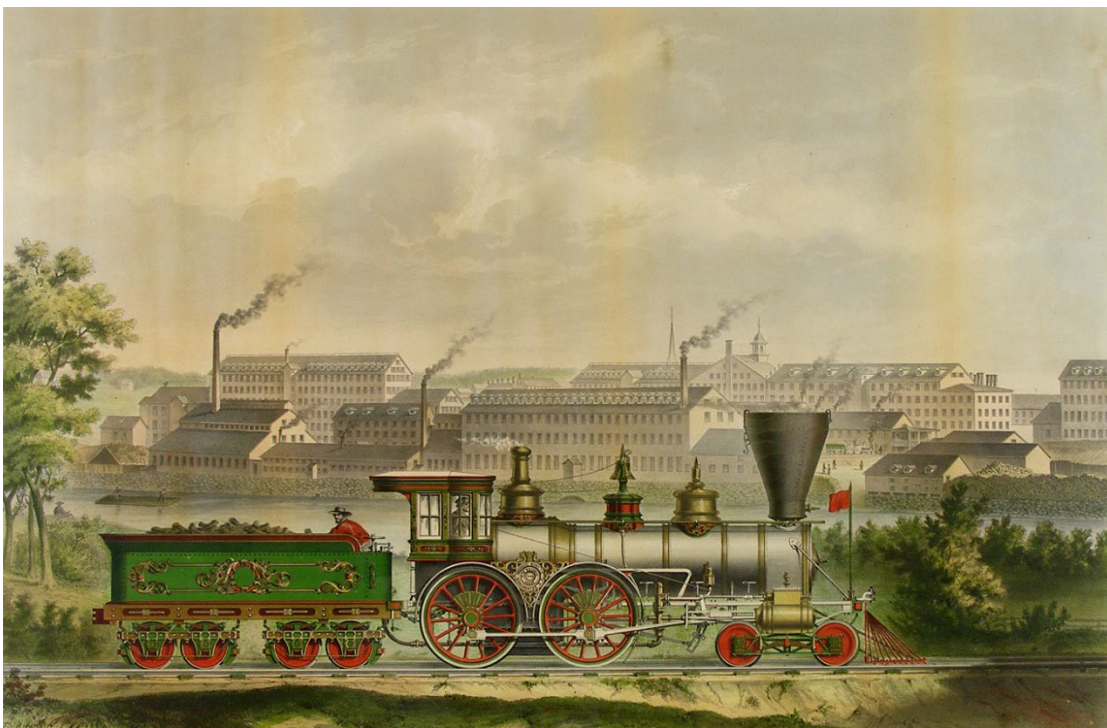
Lesson 14.1: Neglected Waterways

## Industrialization Image Set



Trash on the Street Outside Tenement, 1912

Source: National Child Labor Committee collection, Library of Congress



Amoskeag Locomotive, circa 1856

Source: New Hampshire Historical Society





Lesson 14.1: Neglected Waterways



Trolley Cars from Manchester, circa 1910  
Courtesy of the Goffstown Historical Society

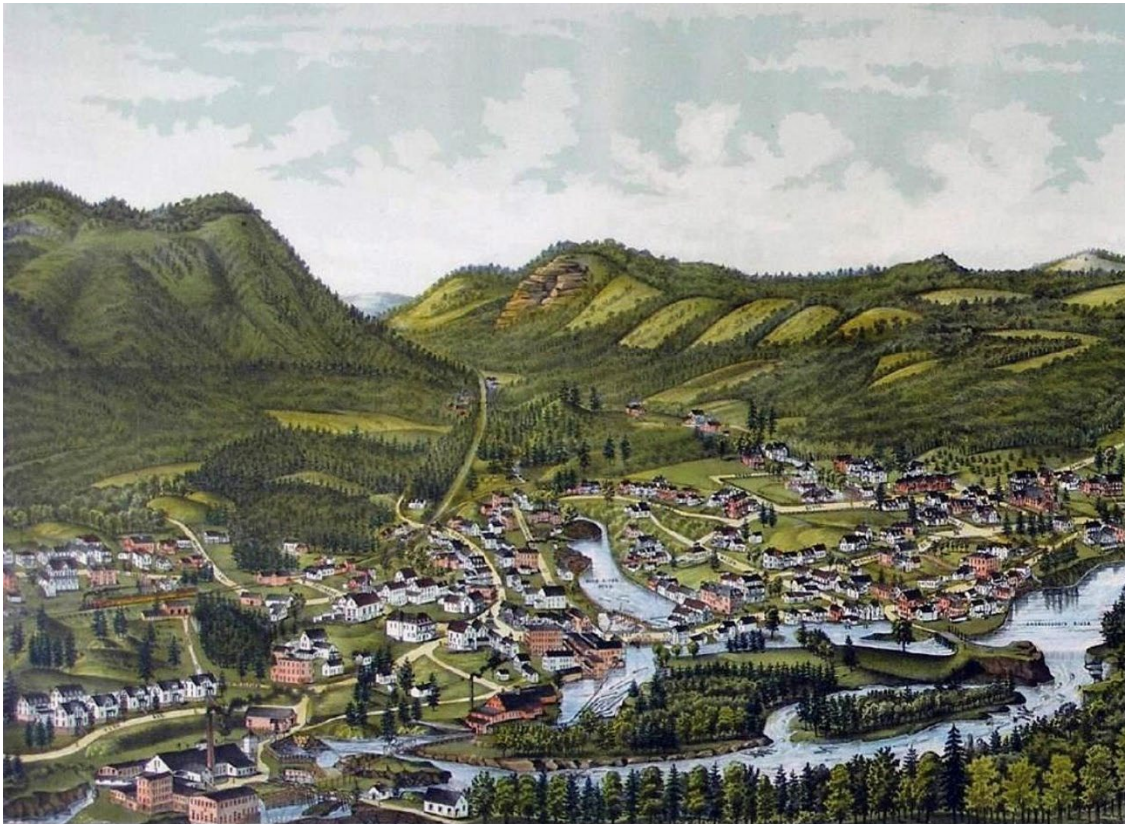


New York the Wonder City, 1918  
Courtesy of the New York Public Library Digital Collections





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Bird's Eye View of Berlin Mills, 1888  
Source: New Hampshire Historical Society



Patrol Wagon, 1887  
Courtesy New York Public Library Digital Collections





Lesson 14.1: Neglected Waterways



Pile of Trees from Logging, circa 1894–1948  
Source: New Hampshire Historical Society

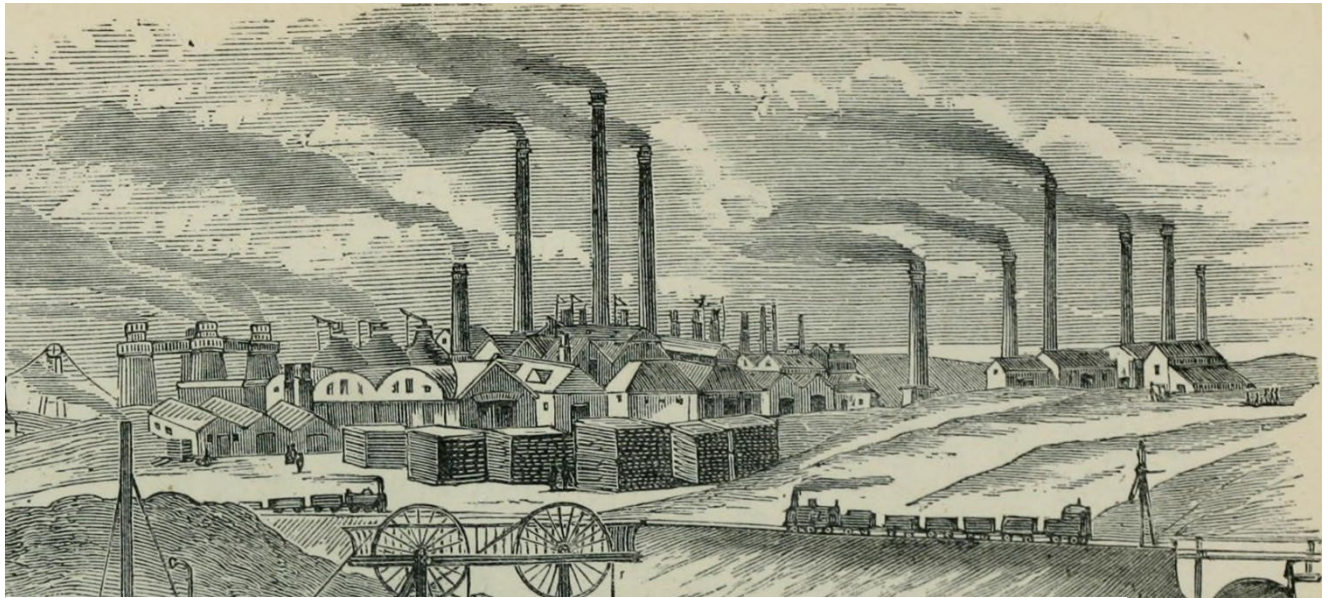


Dump on the Banks of the Nashua River, 1973  
Source: Records of the Environmental Protection Agency,  
U.S. National Archives and Records Administration





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Factories During the Industrial Revolution, circa 1873  
Digitized by Robarts Library, University of Toronto, for flickr's The Commons

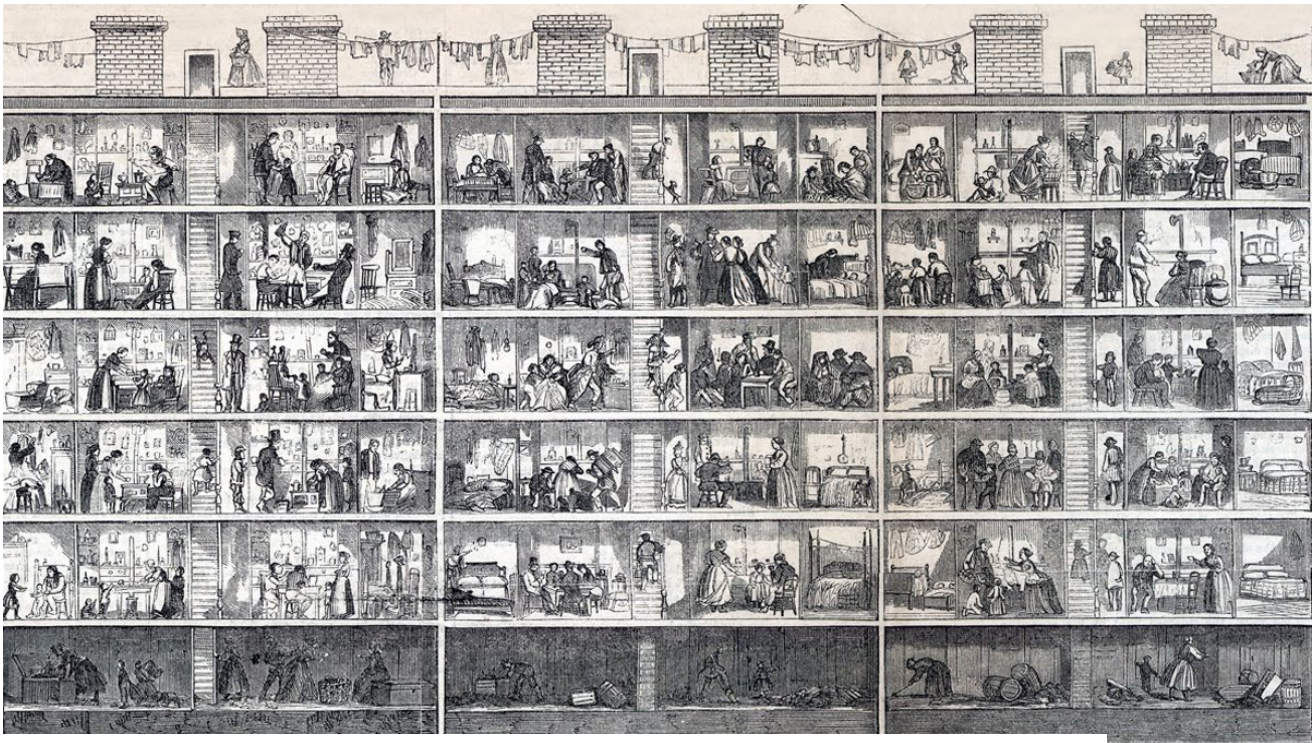


Women Working at the Amoskeag Manufacturing Company, undated  
Courtesy of the Manchester (NH) Historic Association





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Side View of Tenement Living, 1865  
From *House Divided: The Civil War Research Engine* at Dickinson College

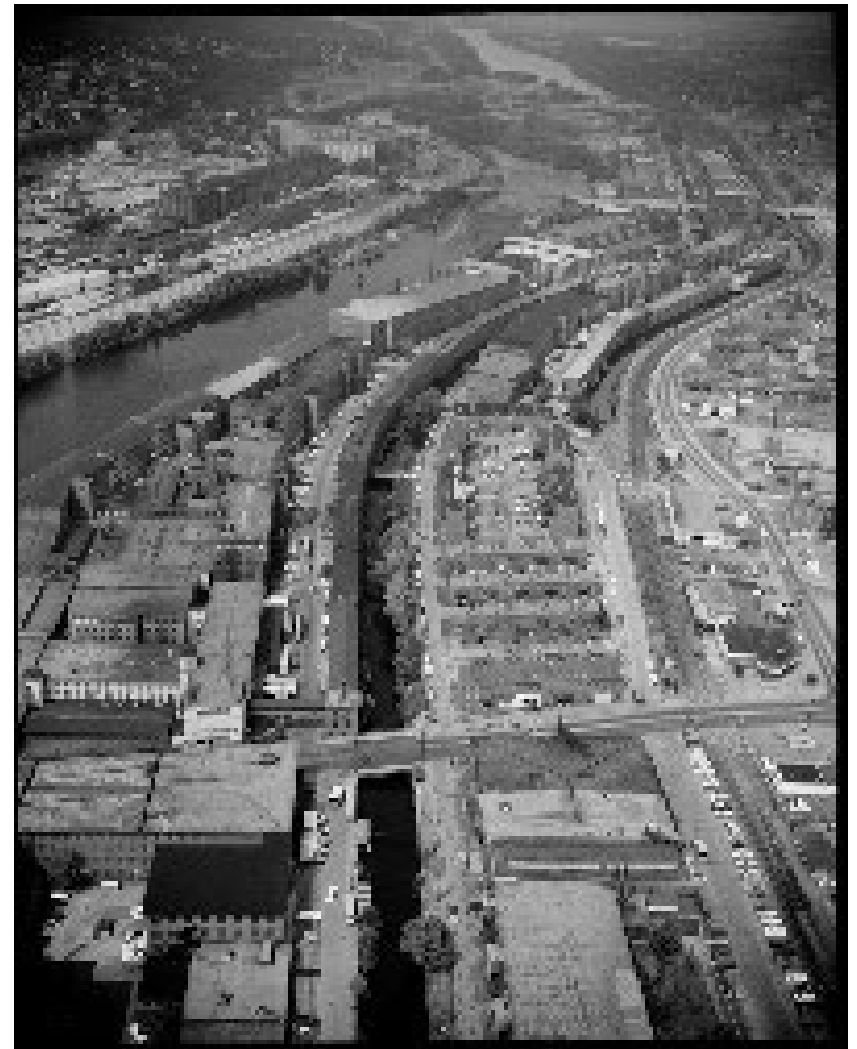


Amoskeag Fire Engine, 1914  
Courtesy of the Manchester (NH) Historic Association

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Immigrants Arriving at New York, 1917  
Source: New Hampshire Historical Society



Aerial View of Manchester, 1967  
Courtesy of the Library of Congress



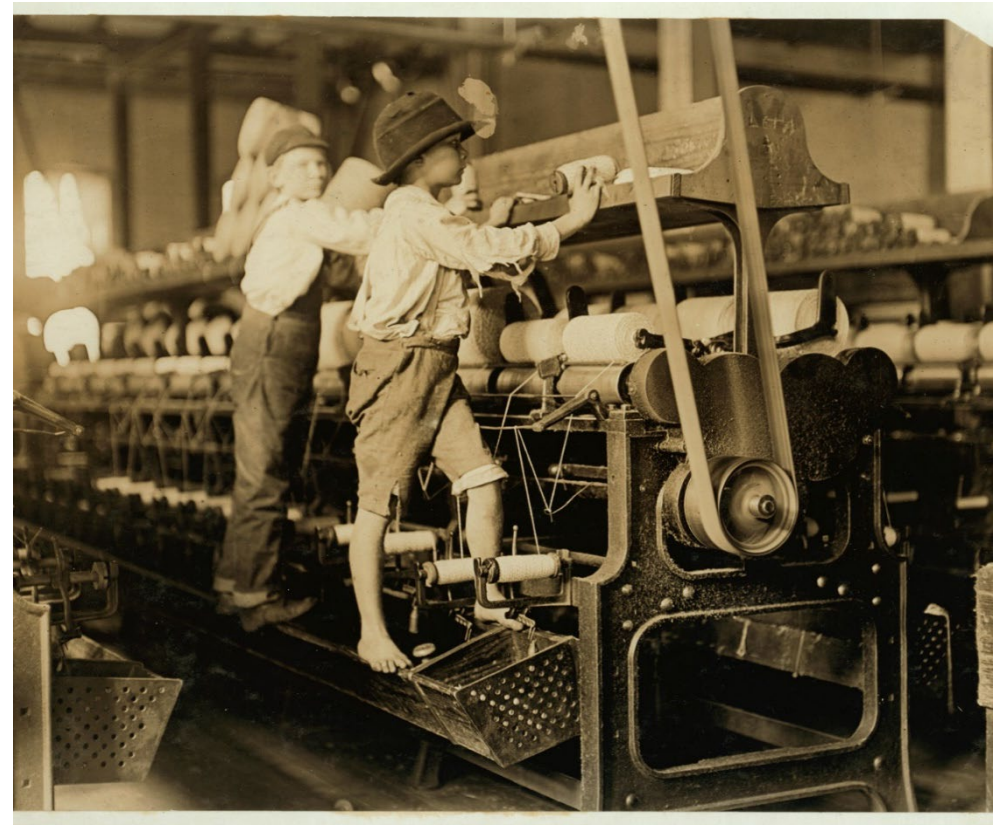


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PLEASE GIVE ME A PENNY.

Asking for Charity, 1881  
Source: Google Books





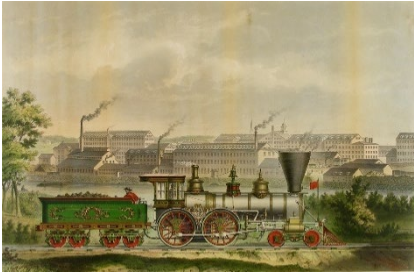

Children Working in a Textile Mill, 1909  
Source: National Child Labor Committee collection,  
Library of Congress, Prints and Photographs Division





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**Answer Key:** Note that “answers” don’t have to match exactly as long as students can defend their claims

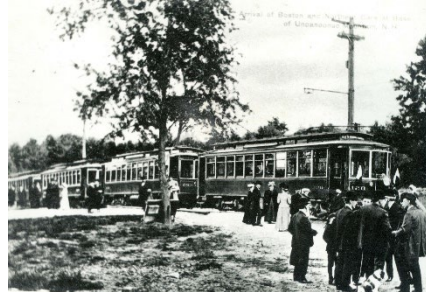
Positives of Industrialization		Negatives of Industrialization	
Jobs in new industries: Women working at the Amoskeag Manufacturing Company, undated		Living conditions overcrowded: Side View of Tenement Living, 1865	
Transportation expanded: Amoskeag Locomotive, circa 1856		Poor sanitation in cities: Trash on the Street Outside Tenement, 1912	





Lesson 14.1: Neglected Waterways

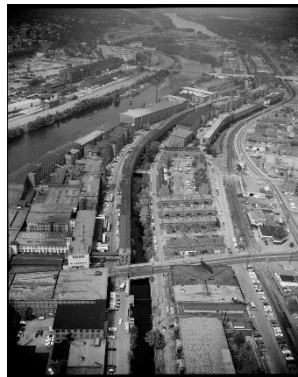
New technology like lights and streetcars:  
Trolley Cars from Manchester, circa 1910



Disease and crime grow in cities:  
Patrol Wagon, 1887



New infrastructure like schools and bridges:  
Aerial View of Manchester, 1967



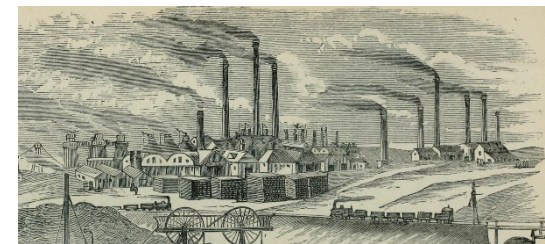
Gap between rich and poor grows:  
Asking for Charity, 1881



New public services like hospitals and fire:  
Amoskeag Fire Engine, 1914



Air pollution grows:  
Factories during the Industrial Revolution, circa 1873







Lesson 14.1: Neglected Waterways

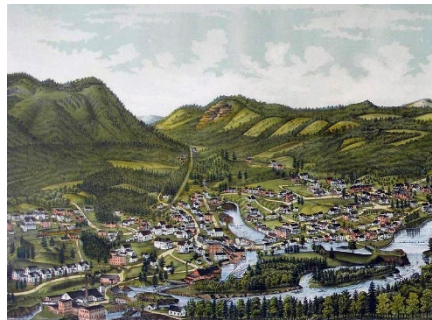
Culture and entertainment available:  
New York the Wonder City, 1918



Industry logging clears land:  
Pile of Trees from Logging, circa 1894–1948



Cities and towns develop:  
Bird's Eye View of Berlin Mills, 1888



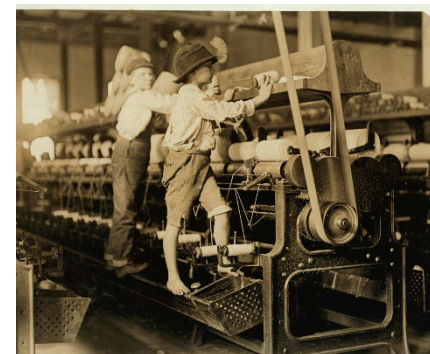
Water pollution:  
Dump on the Banks of the Nashua River, 1973



Diversity increases with immigration:  
Immigrants Arriving at New York, 1917



Bad working conditions:  
Children Working in a Textile Mill, 1909







Lesson 14.1: Neglected Waterways

Positives and Negatives of Industrialization Labels		
<b>Positive: Jobs in new industries</b>	<b>Negative: Living conditions overcrowded</b>	<b>Positive: Culture and entertainment available</b>
<b>Positive: Transportation expanded</b>	<b>Negative: Poor sanitation in cities</b>	<b>Negative: Water pollution</b>
<b>Positive: New technology like lights and streetcars</b>	<b>Negative: Disease and crime grow in cities</b>	<b>Negative: Bad working conditions</b>
<b>Positive: New infrastructure like schools and bridges</b>	<b>Negative: Gap between rich and poor grows</b>	<b>Positive: Cities and towns develop</b>
<b>Positive: New public services like hospitals and fire</b>	<b>Negative: Air pollution</b>	
<b>Positive: Diversity increases with immigration</b>	<b>Negative: Industry logging clears land</b>	

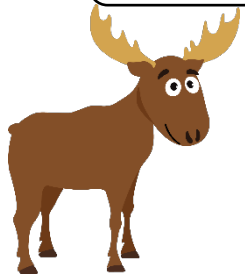




## *A River Ran Wild* Discussion Questions

- Long ago...

1. What was the river like long ago?



2. How did the Nashua people treat the river?

- The Nashua people...

- The forests were turned into farmland because...

3. Why were the forests turned into farmland?



Lesson 14.1: Neglected Waterways

- The river powered the machines...

4. How did the river power the machines of the settlers and the industries?

5. How did the people pollute the river because of the Industrial Revolution?

- The people...

- The river became healthy again because...

6. What caused the river to become healthy again?



# WATER POWER

The first textile mills in New Hampshire were powered by water. People built them next to rivers. But how did people use the power of the river to run the machines?

**1** Find a powerful river and build a **dam**. The dam will slow the water down and turn that part of the river into a pond. This is called a **mill pond**.

MILL POND

**2** Cut a **head race** to the mill. A head race is a narrow channel of water that flows quickly downhill to a mill. The water in the head race turns the **waterwheel** by pushing against big paddles.

DAM

**4** Gears on each floor connect the main shaft to each floor's **power train**. The power train turns the **pulley**, which is made of a wheel and a leather belt.

MAIN SHAFT

GEARS

PULLEY

POWER TRAIN

**5** Each pulley is attached to a machine. As the pulley turns, it moves the parts of the machine. The machine now has power to make it run!

**3** When the waterwheel turns, it turns the **gears**. The turning of the gears spins a thick pole called the **main shaft**. The main shaft goes up through all the floors of the building.

MAIN SHAFT

WATERWHEEL

GEARS

WATERWHEEL

# STEAM POWER

Steam power was one of the most important new technologies in the 1800s. It was much stronger than water power and made machines in factories move faster.

**1** Find a powerful river and build a **dam**. The dam will slow the water down and turn that part of the river into a pond. This is called a **mill pond**.

MILL POND

**6** The gas from the engine cools down. It condenses back into water. A pipe takes the water back **out** into the mill pond.

OUT

**2** Build an **intake pipe** to bring water from the pond to the factory. The water goes into the **boiler**. The fire in the boiler, powered by wood or coal, boils the water.

DAM

**4** Gears on each floor connect the main shaft to each floor's **power train**. The power train turns the **pulley**, which is made of a wheel and a leather belt.

MAIN SHAFT

**3** When the water boils, it turns to gas. The gas is pushed into the **engine**. The gas pressure makes the engine move. A metal bar turns a wheel attached to some **gears**. Turning the gears spins a thick pole called the **main shaft**. The main shaft goes up through all the floors of the building.

ENGINE

BOILER

INTAKE PIPE

GEARS

PULLEY

POWER TRAIN

**5** Each pulley is attached to a machine. As the pulley turns, it moves the parts of the machine. The machine now has power to make it run!





### *A River Ran Wild Discussion Questions*

- Long ago... **beavers, turtles, and fish swam in the river. It was so clear you could see the bottom. It ran through big forests.**

1. What was the river like long ago?

2. How did the Nashua people treat the river?

- The Nashua people... **only killed what they needed. They saw a rhythm to their lives and asked forgiveness when they did violence. They used natural resources for what they needed. They lived for generations with the river.**

- The forests were turned into farmland because... **settlers came and cut down the forests to tame the land. They killed many wolves and beaver. They planted crops and called the land their own. They put up fences and took hunting and fishing rights away from the Nashua people.**

3. Why were the forests turned into farmland?



Lesson 14.1: Neglected Waterways

- The river powered the machines... **by having the powerful water turn a wheel that brought power to the machines. The river was dammed in many places so that the flow of water could be controlled to run the machines. Once steam power was invented, the river water was collected and boiled to steam. The steam made an engine go to power the machines.**

4. How did the river power the machines of the settlers and the industries?

5. How did the people pollute the river because of the Industrial Revolution?

- The people... **dumped leftover materials from the machines into the river. Leftover pulp, dye, and fiber was put in the river and the current washed it downstream. Chemicals and plastics were also put in the river. All this made the fish and wildlife sick. The river became clogged and ran more slowly. It smelled and was different colors. Pollution made it dark and dirty.**

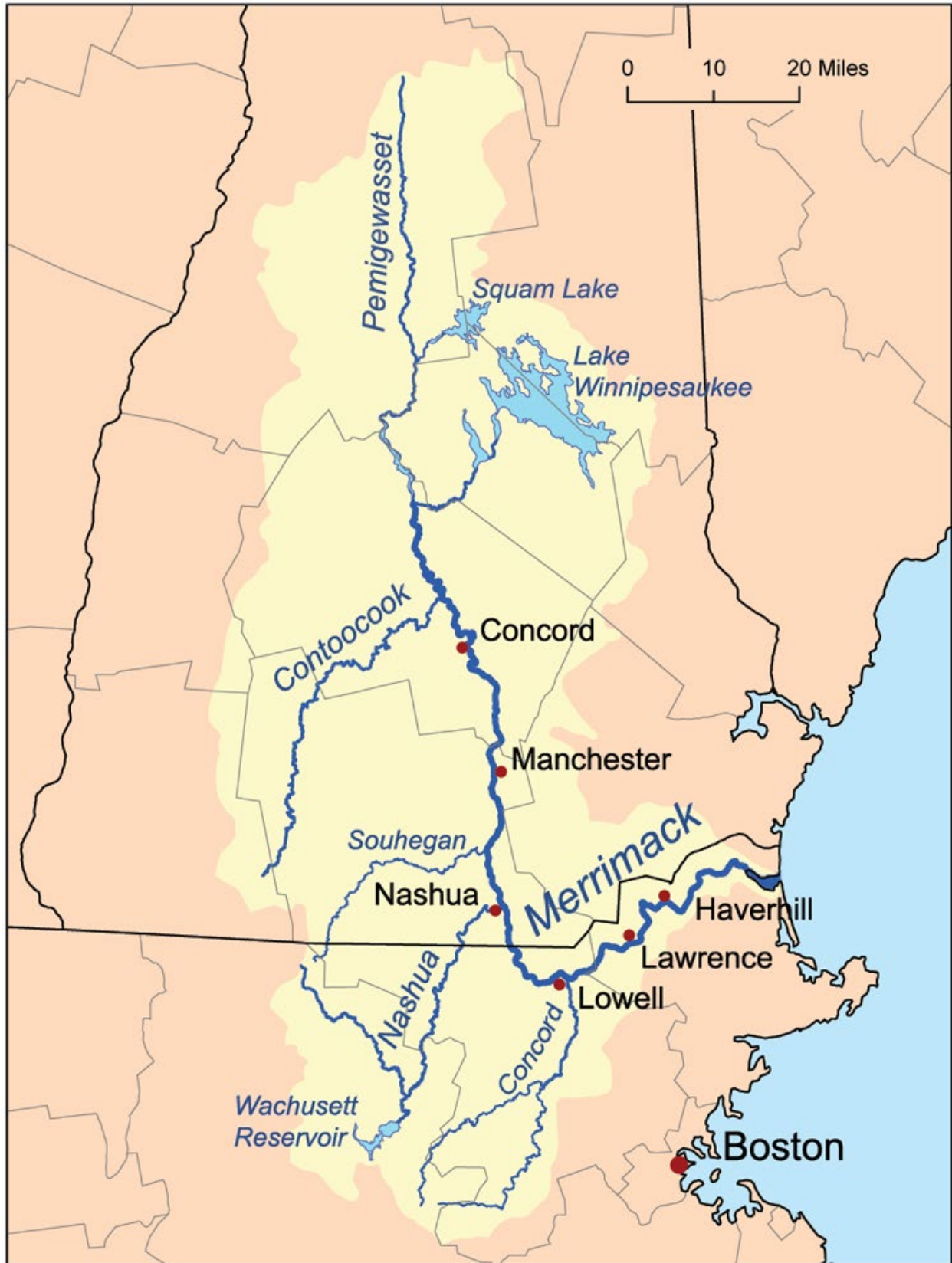
- The river became healthy again because... **Marion and other people traveled and talked to people of the river's history. They all signed petitions and sent letters to politicians. They protested with jars of dirty water. New laws were passed, the paper mills processed the water properly, and the factories stopped dumping waste. The current slowly cleaned the river again and it was clear.**

6. What caused the river to become healthy again?





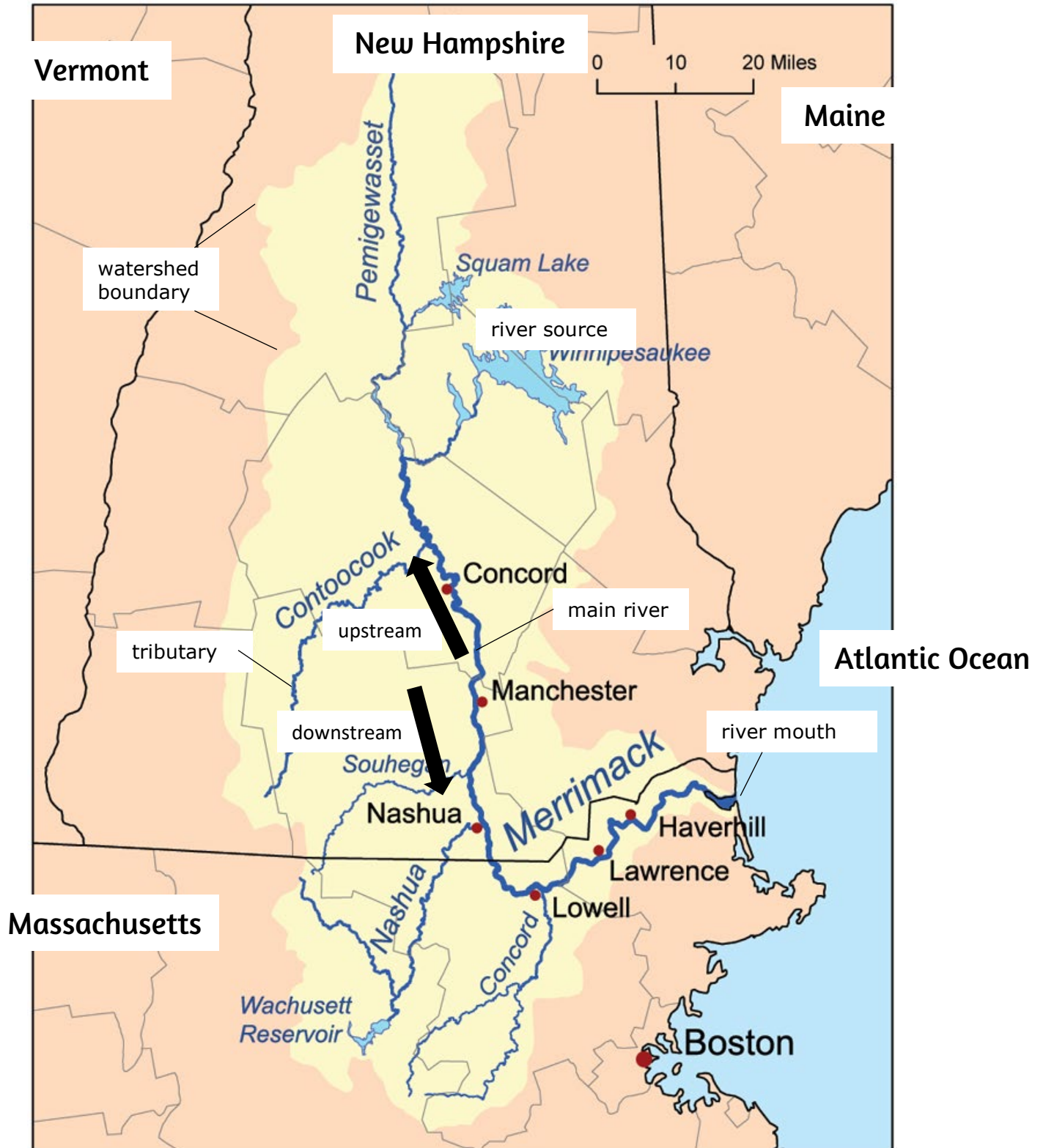
Lesson 14.1: New Hampshire's Waterways



Merrimack River Watershed, 2007  
Source: Wikimedia Commons



Lesson 14.1: New Hampshire's Waterways



Merrimack River Watershed, 2007  
Source: Wikimedia Commons

**watershed:** (noun) the area of land that drains into a particular river or body of water





Lesson 14.1: New Hampshire's Waterways

Vocabulary

watershed

tributary

watershed boundary

river source

main river

river mouth

upstream

downstream





Pollution from one source	Pollution from a wide area
"Point source pollution"	"Nonpoint source pollution"





## Kinds of Pollution

<b>Pollution from one source</b>	<b>Pollution from a wide area</b>
<b>"Point source pollution"</b>	<b>"Nonpoint source pollution"</b>
<p>Factory that dumps waste from machines into a river</p> <p>Sewage that isn't treated put into the river</p> <p>Factories that use water inside machines and then discharge the water, which now has chemicals, into the river</p> <p>Wastewater treatment plants that aren't working properly or are overburdened during seasonal flooding</p> <p>Trash from businesses or homes</p> <p>Large animal farms that produce a lot of animal waste</p>	<p>When rainwater washes over land and roads and brings pollutants into waterways, it is called <b>runoff</b></p> <p>Runoff from the road into waterways can come from oil from engines, salt from roads, trash, or particles of tires</p> <p>Runoff from people's land into waterways can come from dog waste, trash, chemicals like pesticides, and fertilizer from farming</p> <p>Acid rain from the chemicals in the atmosphere comes from factories and power plants (but it can't be traced to a single source)</p>