

A Healthier Bay

Watch the segment online at <http://education.savingthebay.org/a-healthier-bay>

Watch the segment on DVD: Episode 4, 39:39–41:33

Video length: 2 minutes 12 seconds

SUBJECT/S

Science

History

GRADE LEVELS

4–5

6–8

CA CONTENT STANDARDS

Grade 5

Earth Sciences

3.d. Students know that the amount of fresh water located in rivers, lakes, underground sources, and glaciers is limited and that its availability can be extended by recycling and decreasing the use of water.

Grade 6

Life Sciences—Ecology

5.e. Students know the number and types of organisms an ecosystem can support depends on the resources available and on abiotic factors, such as quantities of light and water, a range of temperatures, and soil composition.

VIDEO OVERVIEW

San Francisco Bay is healthier now than it once was.



In this segment you'll learn:

- what the U.S. Geological Survey has found out about the health of the Bay after monitoring it for four decades.
- about the largest local freshwater input into the South Bay—the San Jose / Santa Clara Water Pollution Control Plant.
- how wastewater treatment plants have limited the amount of pollutants that get into the Bay.

TOPIC BACKGROUND

Beginning in the 1880s, many cities constructed simple sewage systems that took wastewater from homes and businesses and dumped it directly into the nearest body of water; here in the San Francisco Bay Area, that meant the Bay itself. With the increase in indoor plumbing and appliances between 1900 and 1950, more and more wastewater was being generated. In the South Bay specifically, canneries produced incredible amounts of organic waste during and after World War II. The discharge of organic waste and raw sewage, coupled with population growth and decreased water flow into the Bay from creeks, resulted in a very polluted South Bay.

In 1946, the U.S. Congress passed the Water Pollution Control Act to help protect the nation's water. In 1949, California passed the Dickey Water Pollution Control Act, which established the State Water Quality Control Board and nine regional boards. The Dickey Act meant that cities would have to comply with state regulations or face fines and criminal and / or civil suits. Palo Alto was the first city in the San Francisco Bay Area to build a water treatment plant, in 1934. In the years that followed, many other Bay Area cities also constructed treatment plants. The San Jose / Santa Clara Water Pollution Control Plant was built in 1956. Today the plant serves 1.5 million people and can treat 167 million gallons of wastewater per day.

With the advent of sewage treatment, the health of marine life in the Bay has improved, and the Bay poses fewer threats to human health. However, pollution is still a critical problem in San Francisco Bay and around the world.

VOCABULARY

benthos

the sediment at the bottom of a body of water

contaminant load

the amount of toxins in an organism

effluent

outflow

monitor

to study or examine over time

sediment (suspended)

small minerals suspended in the Bay water

wastewater

sewage

PRE-VIEWING ACTIVITIES

- What do you know about sewage? As a class, take this quiz on sewage: <http://www.kqed.org/quest/television/quest-quiz-sewage>
- Make a list of sources of wastewater. How many things can you think of?

FOCUS QUESTIONS FOR VIEWING

- How long has the crew of the USGS boat *Polaris* tracked the health of the Bay? *four decades*
- What are two things that the USGS monitors? *the amount of sediment in the water and the contaminant load in the creatures that live in the Bay's mud*
- What is the South Bay's single largest freshwater input? *the San Jose / Santa Clara Water Pollution Control Plant*
- In the 1950s, how much untreated raw sewage was discharged per day into the Bay? *250 million gallons*
- In 2000, 6.5 million residents produced how many gallons of wastewater per day? *more than 500 million gallons*
- Despite an increase in wastewater, how has the amount of pollutants going into the Bay changed since the 1950s? *It is a fraction of what it once was.*
- How much money has been spent around San Francisco Bay on water treatment? *\$4 billion*

POST-VIEWING QUESTIONS

- Is water quality still a problem in San Francisco Bay? Why or why not?
- What factors contribute to overall water quality?
- How does pollution affect human health?
- What other pollutants are there besides sewage? How do those pollutants get into the Bay?
- What is stormwater? How is stormwater different from wastewater?
- How can you prevent pollution from getting into the Bay?
- Do you think it is possible to completely restore the health of the Bay?

ABOUT THE AUTHOR

Phaela Peck is a science teacher, environmental educator, and writer based in San Francisco. She has an M.A. in environmental education and has developed curricula for numerous science and environmental education organizations in the Bay Area.

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POST-VIEWING ACTIVITIES

- Explore where the sewage from your school goes. Where is it treated? Does it end up in the Bay? How long does it take to get there? Draw a map detailing the path of the sewage.
- Research the water quality of the creek nearest your school site. Conduct class water quality experiments if possible. What animals and plants live in the creek? Are they pollution-tolerant or pollution-intolerant?
- Investigate ways to help improve the water quality of the Bay. Design posters or short videos to educate others.

ADDITIONAL RESOURCES

San Francisco Bay Regional Water Quality Control Board, California Environmental Protection Agency

<http://www.swrcb.ca.gov/rwqcb2/>

Learn more about water quality control in the San Francisco Bay region, including information about wastewater and stormwater.

San Jose / Santa Clara Water Pollution Control Plant, Environmental Services, City of San Jose

<http://www.sanjoseca.gov/esd/wastewater/water-pollution-control-plant.asp>

This website provides more information about the San Jose / Santa Clara Water Pollution Control Plant as well as tips on pollution prevention and water conservation.

The History of the San Jose / Santa Clara Water Pollution Control Plant:

Celebrating Over 50 Years of Service, Amy Fonseca and Paul Prange, Environmental Services, City of San Jose

http://www.piersystem.com/posted/1823/WPCP_History.258975.pdf

Read about the history of the San Jose / Santa Clara Water Pollution Control Plant.

Wastewater System Map, San Francisco Public Utilities Commission

http://sfwater.org/mto_main.cfm/MC_ID/14/MSC_ID/117/MTO_ID/218

This map of San Francisco's wastewater system shows how wastewater flows by gravity to one of two treatment plants in the city.

"Wastewater Woes: Sewage Spills in SF Bay," *QUEST*, KQED Public Broadcasting

<http://www.kqed.org/quest/television/wastewater-woes>

This *QUEST* episode addresses the continuing problem of sewage spills in San Francisco Bay.

Water Quality of the San Francisco Bay, USGS

<http://sfbay.wr.usgs.gov/access/wqdata/index.html>

Find out more about the crew of the *Polaris* and water quality monitoring in San Francisco Bay.

CREDITS

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NARRATOR: For the past four decades, the crew of the United States Geological Survey ship *Polaris* has tracked the health of San Francisco Bay monthly, monitoring everything from the amount of sediment in water to contaminant loads in the creatures that live in the Bay's mud.

HEATHER PETERSON: Historically, the sewage effluent in the South Bay was quite toxic, and over the years they've cleaned that up. And the critters in the benthos have shown us—by the way they've changed as a community, have changed to show us—a healthier system.

NARRATOR: In the wake of the federal Clean Water Act, the South Bay's single largest local freshwater input is no longer one of its rivers or creeks. It's the sprawling San Jose / Santa Clara sewage treatment plant.

DALE IHRKE: Prior to the 1950s, there was no wastewater treatment in the Bay Area at all. In the 1950s, there were about 2.5 million residents in the Bay Area discharging about 250 million gallons per day of raw sewage into the Bay untreated. And in 2000, there were about 6.5 million residents in the Bay Area discharging almost double that, over 500 million gallons per day. Yet because of wastewater treatment plants like this one, the amount of pollutants going into the Bay is a fraction of what it was back in the 1950s.

STEVE RITCHIE: We went through a big effort over 20 to 30 years to build new and efficient sewage treatment plants and actually get rid of a lot of the little, old, inefficient ones. So there was a major investment on the order of \$4 billion in treatment around San Francisco Bay.