

# WYLAND FOUNDATION<sup>®</sup>

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## Go A Little Deeper - "What Happened Here?"

..... *Salton Sea – Saving a "Drying" Species* .....



### **OBJECTIVE:**

Students will learn about the conservation efforts of many to save the Salton Sea. Students will learn about the creation and history of the Salton Sea, as well as focus on current environmental threats to this curious hydrological phenomenon. Then focus on what can be done to ensure the proper management of this fresh source of water for many of the desert species that live in and around this man-made watershed. Students research other areas around the country where environmental impacts have taken a toll on sensitive watersheds and the waterways that lead into them. Finally, students will debate in a Socratic Seminar on what they can do every day to help manage and keep watersheds healthy and clean.

### **PURPOSE:**

To educate students on past and current plights of several different watersheds, and what threatens their existence, as well as the many different management methods being done to ensure their health and sustainability. Students will then debate on best practices to ensure the healthy management of a local watershed in their community.

### **VOCABULARY:**

Salton Sea, Watershed, Watershed Management, Agricultural Runoff, Pesticides, Fertilizer, Oxygen Depletion, Rate of Evaporation, Algae, Environmental Collaboration, Pollutant, Nonpoint Source of Pollution, Erosion, Sediment, Nutrient, Grazing, Irrigation, Riparian Ecosystem, Conservation, Buffer

### **TIME NEEDED:**

1 – 1.5 hours

(30-45-minute Class Prep, Background Research and Socratic Seminar; 30 -45-minute Lab Activity)

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## CLASS PREP AND BACKGROUND RESEARCH:

1. In a class setting or in small groups, have students view the videos below. Allow time for student's reactions as well as questions afterwards.

<https://www.youtube.com/watch?v=PGb5viMIAfI>

Salton Sea Documentary 2015: California's Sea: A Date with Destiny (10:59 min)

<https://www.youtube.com/watch?v=BKsK13NDkpg>

The Salton Sea, A Desert Saga (10:03 min)

<https://www.youtube.com/watch?v=BiVFSSuNQuc>

Saving the Salton Sea (8:15min)

<https://www.youtube.com/watch?v=-OqrZG-EBaQ>

Should This Lake Exist? (7:15 min)

<https://www.youtube.com/watch?v=sxM52hJgHWI>

The Salton Sea Is Shrinking and Exposing Toxic Dust (9:58 min)

<https://www.youtube.com/watch?v=QacWdm3lFjA>

Future Conditional: The Salton Sea: Crown Jewel of Biodiversity in Trouble (9:59 min)

<https://www.youtube.com/watch?v=sfGsGqw-Ksk>

The Salton Sea (A Brief Documentary) (6:08 min)

2. Ask students what they think about the history of the Salton Sea, especially of how it began versus how it looks today? What has happened? How? Have students discuss their answers first with a classmate, limiting the discussion to one minute per student, and switching to allow the other a chance to speak as well for one minute.





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**3.** Ask students what they think about the history of the Salton Sea, especially of how it began versus how it looks today? What has happened? How? Have students discuss their answers first with a classmate, limiting the discussion to one minute per student, and switching to allow the other a chance to speak as well for one minute.

**4.** Read the Introduction section below together as a class and pay particular attention to the vocab terms, "Watershed". Ask students what does it mean to manage a watershed? How does that make them feel when they see what the Salton Sea looks like today versus in the beginning when it was cleaner? Discuss how important it makes humans in the management of healthy water sources of a nation.



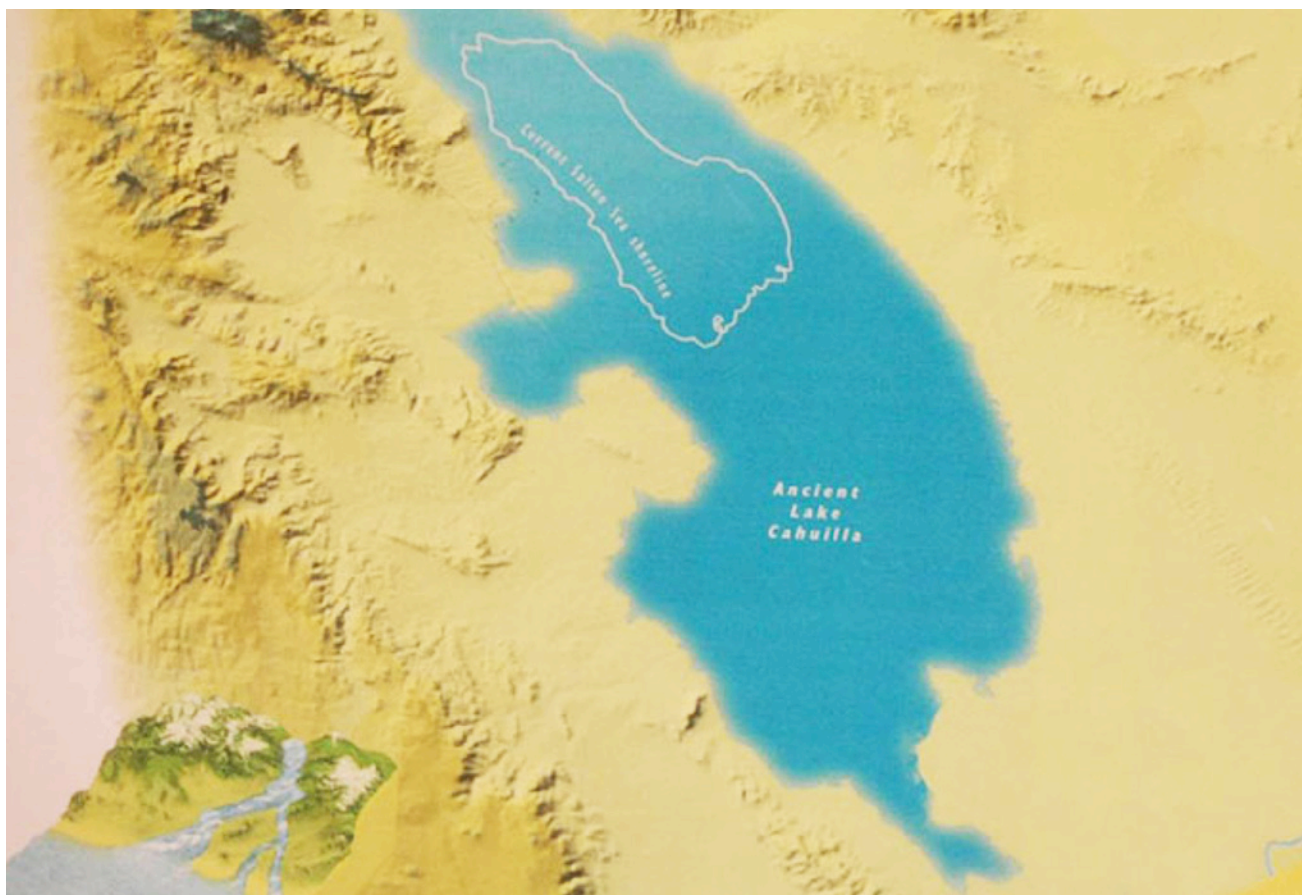
**5.** Next, have students look up pictures on their IPADS or on a computer of other environmentally polluted waters/watersheds in the United States. If allowed, print photos of each to post in a central spot in the classroom for all to see. Place sticky notes under each photograph showing their health levels from 1-5 (1 = pristine, clean, well-managed, and healthy; 5= devastated, polluted, not well-managed, or unhealthy).



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## INTRODUCTION:

4.4 million years ago, the Salton Sea was actually part of the Gulf of California until silt from the Colorado River eventually blocked off the gulf and separated the region from the Pacific Ocean. Ancient Lake Cahuilla (below) was much larger than the current sea, and dried up around 400 years ago.



Between, 1905 and 1907, the Salton Sea was accidentally created when the Colorado River broke through diversion canals of a local irrigation system, flooding, and eventually completely covering, several buildings associated with a salt mining operation in the area, ultimately creating a 15- by 35-mile lake. Salt deposits many feet deep eventually mixed with the water and created the new "Salty Sea", miles inland from any actual ocean. As the Colorado River still runs through here, each year, 600 more tons of dissolved salts and minerals continue to be deposited into the Salton Sea. Resorts then sprung up for the rich and famous and the new inland sea was used for sport boat racing and as a "cool" desert getaway for wealthy tourists, as the buoyancy of the salt-packed water led to many record-breaking speedboat races witnessed by a select elite.



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The Salton Sea Recreation Area, which was created in 1955, was one of the largest State Parks in California at the time. Then, it boasted the most concentrated and diverse bird population in the world, but has since collapsed due to many environmental threats from nearby agricultural sources. The current flow of water has dwindled and future water measures have reduced the inflow to a mere trickle due to diverted waters elsewhere. Without immediate intervention, the projected date for the Salton Sea's demise into mere wasteland is projected at 2018. With no drainage outlet, almost zero yearly rainfall, and runoff flowing in from nearby farms, the sea is now polluted with pesticides, and even saltier than the Pacific Ocean.

Furthermore, periodic oxygen depletion in the sea kills fish and washes their decomposing bodies onto beaches, where they shrivel in the sun. The sand eventually becomes covered in layers of broken fish skeletons. Even more disturbing, the land used around the inland sea has also been used as a test bombing site for the atomic bomb in the 1940's, when the U.S. Navy operated a test base along the southwest shore, and which is today abandoned and quartered off from the public due to possible "unexploded bombs".

As agricultural runoff continues to pour in at a rate of 6 feet per year, at about the same rate of evaporation, the sea lingers on, surprisingly not drying up like expected. And as salt and fertilizer do not evaporate, the water has turned darker and darker over the years. Algae fed off of the enormous amounts of decaying matter, and fish began to die off, as oxygen stores were depleted by the algae. Birds ate the rotting fish and died of food poisoning. Year after year of this kind of die off led to passionate disagreements about what should be done with the Salton Sea. Some people advocated for diverting agricultural runoff elsewhere to allow the Sea to dry up naturally. Others wanted to see the Sea as a continued stopover point part for the migration of birds, and vowed to clean it up once and for all. Still others felt that nothing was truly wrong with the sea; that the media was sensationalizing things again. To this day, scientists, politicians and bureaucrats can still not decide what to do with the Salton Sea and it will most likely require environmental collaboration like none California has experienced before.

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## **Part II: WATERSHED MANAGEMENT METHODS SOCRATIC SEMINAR ACTIVITY:**

- 1.** Break students into 6 groups and hand each an Environmental Disaster Card (#1-6; See Attached). Each card describes a historical, past or present, environmentally polluted or threatened watershed. Instruct students to silently read about the facts on the front side of their card and to analyze the picture together afterwards as a group. Next, have students read through the conservation suggestions on the back side and decide which ones would be the best to enact or follow to fix the threat(s) described on the front side of their card.
- 2.** Next, have students face off with another group and give each one – two minutes to describe their card's environmental threat(s) to their watershed to the other group. It is important that each group decide on ONE person who will speak for the group to the other group. The other group must take notes and not interrupt. If interruptions do occur, add 5 seconds to the group speaking to make up for lost time. Then, after each group has gone, give each group one minute to organize a summary of what they heard while taking notes. Then have the group assign one new person in each group be the spokesperson who will then read back their summary to the other group. Again, no interruptions should occur, only listening.
- 3.** Rotate each group so that each gets a chance to listen to the other 5 groups, while presenting their environmental threat(s) to their watershed from their card and then summarizing the other group's threat(s). Each summary should be no longer than one minute max.
- 4.** Finally, announce to the class that each group will now argue which watershed management methods on the back side of their card would be the most important to enact or to follow for ALL the threats combined that they learned about today from each other. Each group is to choose one new person to be their first speaker. Let the students know that each group will get a turn, decided by randomly chosen numbers (1-6). The groups that are not speaking must take notes as to why they agree or disagree with the speaking group's points.
- 5.** If time, after each group has spoken, ask if there are any groups that would like to change their minds on which watershed management methods they support as the best for handling all the environmental threats. Give the class one minute to discuss within their groups, and allow any groups that have changed their minds to allow a speaker to stand up and explain why they have changed and to what watershed management methods they changed to. This could go on for quite a while, yet can end here. Eventually, have each group write on a sticky note their final choices for the top 3 best watershed management methods and post this in a central spot in the classroom for others to view. Congratulations, you have successfully completed a Socratic Seminar!

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NAME: \_\_\_\_\_ DATE: \_\_\_\_\_ PERIOD: \_\_\_\_\_

## "Go A Little Deeper - Watershed Management" LAB ACTIVITY

### MATERIALS:

Map of a Local Watershed; Top 3 Watershed Management Methods from Environmental Disaster Cards/ Socratic Seminar above

### PROCEDURE:

1. Choose a local water source/watershed together as a class to focus on the history of its environmental management. Use the following link: <https://cfpub.epa.gov/surf/locate/index.cfm>
2. In groups, have students work together to research the following about this water source/watershed:
  - a. Name of the water source/watershed and location
  - b. Size of the water source/watershed and geological formation
  - c. Past and current uses of this water source/watershed (human recreation, industrial use, agricultural needs, habitat for wildlife.
  - d. Past or current environmental concerns/threats/issues facing this water source/watershed

### Data Table 1: SOCRATIC SEMINAR – ENVIRONMENTAL DISASTER CARDS:

#### Top 3 Watershed Management Methods

METHOD #1 –

METHOD #2 –

METHOD #3 –

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## INTERPRETING DATA:

### ANALYSIS:

1. As a class, what local water source/watershed did you choose to focus on and to research? What importance does this water source play in your local community?
2. What do you think would happen if most people in your community chose to ignore the management of this local watershed/water source?

### VOCABULARY REVIEW:

3. What do the words "watershed management" mean to you? What do these words have to do with today's Lab activity in terms of maintaining a healthy and clean water source/watershed?
4. Review your top 3 Watershed Management Methods from the Socratic Seminar that you wrote down in Table 1 above. What environmental issues threaten your local water source/watershed? After performing this lab, is there one method in particular that people in your community can support easily?

### \*BONUS QUESTIONS:

5. What other new or unique management methods or strategies could people in your community come up with that would help ensure the healthy management of your local water source/watershed?

### SUMMARY CONCLUSION:

Please write a 3-5 sentence paragraph using at least 5 of the words from the word bank below. Try to describe what happened during this lab according to your data and what you learned from your data.

## WORD BANK:

VOCABULARY: Salton Sea, Watershed, Watershed Management, Agricultural Runoff, Pesticides, Fertilizer, Oxygen Depletion, Rate of Evaporation, Algae, Environmental Collaboration, Pollutant, Nonpoint Source of Pollution, Erosion, Sediment, Nutrient, Grazing, Irrigation, Riparian Ecosystem, Conservation, Buffer

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