

Lesson 4: History of Water Use in Hawai`i

Overall problem: To determine the impact of restoration of the Lālākea stream on stream flow, water quality, habitat and biota.

Lesson Context: In this lesson, students will acquire a contextual reference for the key event that is the focus of the unit's overall problem – the restoration of Lālākea stream. Prior to learning about water usage in Waipi`o valley and Lālākea in particular (Lesson 5), students gain an understanding of the chronology of water use history in Hawai`i in general. Researching and presenting in teams, students explore how values and philosophies, rights and control, and methods of governance regarding the use of water have changed over time.

Time Frame: 2-3 class periods

Objectives:

Student will be able to:

1. Use primary and secondary sources to conduct historical inquiry into a particular era in Hawaii 's history.
2. Describe the beliefs and events surrounding an issue (water use) that characterize a particular period of history.
3. Identify the continuous and changing factors in water resource management over time.

Materials:

1. "**Water Use in Hawai`i Timeline**" Excel file on Stream Study Website.
2. "**Historical Inquiry: Water Use**" Worksheet (4 versions).
3. Copies of selected readings in Hawai`i water history. Instructions for downloading:
 - a. Go to Stream Study Website and click on "**Teacher Resources**".
 - b. Enter the Log In and Password that was sent to you by e-mail.
 - c. Download and print the four sets of readings:
Historical Readings Team 1, Historical Readings Team 2, Historical Readings Team 3, Historical Readings Team 4

Background:

Review the "**Water Use in Hawai`i Timeline**" chart that has been completed for teacher reference.

Recommended readings for teacher background:

- 1) Native Planters In Old Hawaii: Their Life, Lore, and Environment. E.S. Craighill Handy and Elizabeth Green Handy. Bishop Museum Press, 1972. pps. 57-67, pps. 532-538.

- 2) Sugar Water: Hawaii's Plantation Ditches. Carol Wilcox. University of Hawaii Press, 1996.
- 3) Water and the Law in Hawai'i. Lawrence H. Miike, M.D., J.D. University of Hawaii Press, 2004.
- 4) Environment Hawai'i newsletter. Vol. 6, No. 2, August 1995. and Vol. 7, No. 3, September 1996.

Procedure:

1. Conduct a brief discussion in which the students identify the circumstances that form the basis of the Lālākea Stream Study (stream was diverted, now being restored), recapping what they learned in Lesson 2.
2. Ask students to consider this quote from Mark Twain:

"In the West, whiskey's for drinkin', water's for fightin'."

What makes water such a precious resource? Why is it disputed over?
3. Inform the students that they are now going to act as historians to develop a chronology (sequence) of the history of water use in Hawai'i. Using primary and secondary sources, each team will research a period in history, record their results, and then develop a presentation about that historical period.
4. Divide the class into four teams and assign each team to research one of four major periods of Hawaii's water use history:
 - a. Pre-Settlement (Before A.D. 500)
 - b. Traditional Hawaiian (1780's and Pre-Western Contact)
 - c. Rise of Sugar (1800's)
 - d. Decline of Sugar (Late 1900's to Present)
5. Give each team a copy of the "**Historical Inquiry: Water Use**" Worksheet that pertains to their historical period.
6. Give each team the set of "**Historical Readings**" that pertain to their historical period.
7. Ask the student teams to each conduct historical research about their time period using primary and secondary sources as described on their worksheet. They may assign tasks to individual team members, including reading articles and conducting oral interviews.
8. Refer students to **historical photos of diversions, ditches and tunnels** that can be found in the Student Resources page of the Stream Study Website.
9. Ask teams to discuss their research results in depth, working as a group to complete each question on the worksheet. One team member should record the group's answers on the worksheet.
10. Ask each team to fill in their answers on the chart, "**Water Use in Hawai'i Timeline**", which is available in "Student Resources" on the Stream Study Website.

(NOTE: A completed chart is available for teacher reference in "**Teacher Resources**" on the Website)

11. Combine all information from each on to one chart and submit the completed chart to Bishop Museum staff (**heather.eijzenga@bishopmuseum.org**) for posting on the web site.
12. Ask each team to discuss their period of the timeline chart with the class as a whole. Ask students to identify how attitudes and methods of water management evolved through history. Use the following questions to guide the discussion:
 - a. What aspects of water use are continuous and unchanging?

[water is the source of life; water is an important resource that is necessary and vital; there are multiple and competing uses of water; need to conserve and preserve water sources; water must be kept healthy to be usable]

- b. What aspects of water use have changed through time (history) and place (culture)?

[who uses it and for what; shared equitably or controlled by a few; used or conserved mostly; philosophical and spiritual beliefs about water; systems and laws governing usage]