



Restoration of the San Joaquin River Educator Guide



A resource for using QUEST video in the classroom

Watch it online <http://www.kqed.org/quest/television/restoration-of-the-san-joaquin-river> | 12:28 minutes

QUEST SUBJECTS

Life Science **Biology**
Health
Environment

Earth Science **Geology**
Climate
Weather
Astronomy

Physical Science **Physics**
Chemistry
Engineering

CA SCIENCE STANDARDS

Grade 6

Ecology (Life Sciences)

5. (e) 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.

Grades 9-12

Ecology (Biology/Life Sciences)

6. (a, b) Biodiversity is the sum total of different kinds of organisms and is affected by alterations of habitats; Changes in an ecosystem result from changes in climate, human activity, introduction of nonnative species, or changes in population size.

California Geology (Earth Sciences)

9. (a, c) Resources of major economic importance in California and their relation to California's geology; The importance of water to society, the origins of California's fresh water and the relationship between supply and need.

PROGRAM NOTES

Historically, the San Joaquin River was noted for its enormous salmon populations. However, recent decades have seen most of the river water diverted for hydropower and agricultural uses in California's Central Valley. Now, after years of lawsuits, scientists, farmers, and the government have begun working together to help restore this important waterway.



In this segment you'll find...

- ⦿ a short history of the San Joaquin River and the building of the Friant Dam.
- ⦿ details about the challenges and goals of the San Joaquin River restoration project.
- ⦿ a look at how the restoration project is affecting farmers in California's Central Valley.

TOPIC BACKGROUND

At approximately 330 miles in length, the San Joaquin River is the second-longest river in California and one of the state's most important waterways. As such, it is one of the largest sources of water for the San Francisco Bay-Delta, which provides drinking water to about two-thirds of California's residents.

The original course of the San Joaquin begins at three lakes in the Sierra Nevada Mountains just southeast of Yosemite National Park. From there, the river's waters flowed west past cities like Fresno and Mendota before turning north near Stockton to meet the Stockton River and form the San Francisco Bay-Delta. However, with the completion of Friant Dam near Fresno in 1942, the majority of the San Joaquin's flow was diverted for agricultural purposes. For more than 50 years, the natural flow of the river was greatly interrupted, leaving about 60 miles of the river channel dry except in times of extremely heavy rainfall. This diversion decimated the once-thriving salmon populations and created heavier concentrations of run-off pollution from farms in the Central Valley.

In 1988, a large coalition that included such groups as the National Resources Defense Council and NORCAL Fishing Guides & Sportsman Association filed a federal lawsuit to restore sufficient fish habitat to the San Joaquin River below Friant Dam. For 18 years, these groups fought both state and federal agencies in their effort to return water to the river. In August 2004, a federal judge ruled that the then-operation of Friant Dam directly violated one of California's fishery protection statutes. Two years later, a landmark settlement was reached between the farmers and water users who depend on the Friant and the coalition looking to restore the river to its former glory. Then, at the beginning of 2007, federal legislation was reintroduced authorizing federal agencies to begin implementing the goals of the settlement agreement. With that, one of the country's largest river restoration efforts to date began in earnest. Although the project is nowhere near complete, interim flows began in late 2009 and a Chinook salmon reintroduction is to take place no later than 2012.

VOCABULARY

Agriculture

the science and practice of cultivating the soil, producing crops, and raising livestock

Delta

a generally triangular area at the mouth of a river where sediment is heavily deposited

Divert

to turn aside from a course or direction

Habitat

the type of environment in which an organism or group normally lives or occurs

Irrigation

to artificially supply dry land with water as a way to help crops grow

Restoration

the act of bringing an area back to a former, more natural condition

Riverbed

the channel between two banks of a river where water flows or has flowed in the past

Species

a group of organisms capable of interbreeding

Spawning

the mass production or deposit of eggs by fish, amphibians, or mollusks

PRE-VIEWING

- How do humans use rivers? How do we affect a river ecosystem?
- What is habitat restoration? Where do you think habitat restoration is needed?

VIEWING FOCUS

NOTE: You may choose to watch the television segment twice with your students: once to elicit emotional responses and get an overview of the topic and again to focus on facts and draw out opinions.

- How has the San Joaquin River changed over time? What human activities helped create these changes?
- Who is impacted by the San Joaquin restoration settlement? How are they affected?
- What makes restoration of the San Joaquin River such a unique river restoration project? What are some challenges facing the restoration effort?
- What do you think the river will be like when restoration is complete? Do you think species like the Chinook salmon will return to their former habitats?

For all media see:

- Segment Summary Student Sheet
http://www.kqed.org/quest/downloads/QUEST_SegSum_StudentSheet.pdf
- Personal Response Student Sheet
http://www.kqed.org/quest/downloads/QUEST_PersResp_StudentSheet.pdf

LESSON PLANS and RESOURCES from QUEST, PBS, and NPR

Water Deal is Reached on San Joaquin Riverbed NPR

<http://www.npr.org/templates/story/story.php?storyId=6076780>

In this September 14, 2006 broadcast from NPR's **All Things Considered**, farmers and environmentalists discuss the landmark restoration agreement for the San Joaquin Riverbed.

Survival Battle PBS

http://www.pbs.org/newshour/bb/environment/july-dec03/salmon_12-17.html

Online NewsHour reports on what is being done for fish restoration in the United States and the controversy over who is responsible for rising salmon populations in the Pacific Northwest. (12/17/2003)

The Dam Challenge PBS

<http://www.pbs.org/wgbh/buildingbig/dam/challenge/buttruss/>

In this interactive exercise from the series *Building Big*, students explore different options for dealing with a large hydroelectric dam that is affecting fish populations in a river.

The Grand Canyon: Conservation and Development Teachers' Domain

<http://www.teachersdomain.org/resource/ess05.sci.ess.earthsys.glendam/>

This video segment adapted from *NOVA* details the purposes of dams as well as the impacts they have on a river ecosystem.

Water Conservation: Denver, CO Teachers' Domain

<http://www.teachersdomain.org/resource/ess05.sci.ess.earthsys.dam/>

This video segment adapted from *Last Oasis* details the pros and cons of dams and the need for water conservation in places like Denver, Colorado.

Discuss the Restoration of the San Joaquin River story on the QUEST Blog QUEST

<http://www.kqed.org/quest/blog/2010/07/20/producers-notes-restoration-of-the-san-joaquin-river/>

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www.exploratorium.edu

Girl Scouts of Northern California
www.girlscoutsnorcal.org

Golden Gate National Parks Conservancy
www.parksconservancy.org

The J. David Gladstone Institutes
www.gladstone.ucsf.edu

Lawrence Berkeley National Laboratory
www.lbl.gov

Lawrence Hall of Science
www.lawrencehallofscience.org

Monterey Bay Aquarium
www.mbayaq.org

Monterey Bay Aquarium Research Institute
www.mbari.org

Oakland Zoo
www.oaklandzoo.org

The Tech Museum of Innovation
www.thetech.org

UC Berkeley Natural History Museums
<http://bnhm.berkeley.edu/>

U.S. Geological Survey
www.usgs.gov

MORE EDUCATIONAL RESOURCES FOR USING QUEST MULTIMEDIA TO ENHANCE 21st CENTURY SKILLS IN TEACHING AND LEARNING

Why Use Multimedia in Science Education?

<http://www.kqed.org/quest/downloads/QUESTWhyMedia.pdf>

- Read about the importance of using multimedia in the 21st century science classroom.

How to Use Science Media for Teaching and Learning

<http://www.kqed.org/quest/downloads/QUESTMediaTips.pdf>

- A collection of tips, activities and handouts to actively engage students with multimedia.

Science Multimedia Analysis

<http://www.kqed.org/quest/downloads/QUESTMediaAnalysis.pdf>

- Give your students the tools to recognize the purposes and messages of science multimedia.

Create Online Science Hikes with Google Maps

http://www.kqed.org/quest/files/download/52/QUEST_ExplorationCreation.pdf

- Do you like the science hike Explorations on the QUEST site? Use this place-based educational guide to create similar science-based maps with youth.

OTHER WAYS TO PARTICIPATE IN QUEST



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