LESSON 17: HATCHERIES, SAVIORS OR SCOURGE FOR WILD SALMON?

ESSENTIAL QUESTION:

What combination of factors both natural and manmade is necessary for healthy river restoration and how does this enhance the sustainability of natural and human communities?

GUIDING QUESTION:

Hatcheries seem like a good idea, but they are fraught with problems, how are hatcheries both a danger and a blessing to wild fish?

OVERVIEW:

This lesson focuses on the history and roles that hatcheries serve in sustaining commercial fisheries, native fish populations, and saving endangered fish stocks. Hatcheries were historically a popular tool for propagating large numbers of fish for sustaining commercial fisheries, however, a series of problems have resulted in increasing controversies over their use. Some of the problems include the use of non-native stocks, the development of non-competitive behaviors, and over-stocking fish beyond the natural carrying capacity of the environment at the expense of wild native fish. However, as wild fish runs become threatened with extinction, hatcheries are also proving to be a valuable tool for saving these wild native runs.

TIME:

Two class periods

MATERIALS:

- **Lesson 17- Hatcheries, Saviors or Scourge for Wild Salmon.pptx**
- **Lesson 17a- Hatcheries, Saviors or Scourge for Wild Salmon.pdf**
- Reflection Journal pages (printable handout)
- Vocabulary notes (printable handout)
- Hatcheries, Saviors or Scourge for Wild Salmon? Pro and con handout.

PROCEDURE:

1. Review Essential Question; introduce Guiding Question.
2. Students should take a few minutes to respond to the first reflection prompts. Discuss their answers and any questions they've generated.

3. Hand out the Vocabulary Notes. *With this lesson you may want to define the words before presenting the PowerPoint Lesson.*
4. Present the PowerPoint Lesson
5. **Class discussion-** Ask students why they think hatcheries could be good or harmful to salmon
    a. **Discuss the risks of over-stocking beyond the carrying capacity, the introduction of parasites and diseases, and what affects that can have on native stocks**.
6. This might be a good time to show the short video at: **http://www.farmedanddangerous.org/page/learnmorevideo**
    a. Have the students take notes.
7. Pass out the *Hatcheries, Saviors or Scourge for Wild Salmon?* handout. Have students do some research and reading about hatcheries. While they are researching they can fill out the chart on the handout. After the students have filled the columns with reasons for and against hatcheries, have them draft a paragraph at the bottom of each column defending and rejecting hatcheries. The object is for students to examine both sides of a controversial issue. The can take this information further into a formal paper, a debate, or save it with the other lessons they have compiled as a resource for the final project in Lesson 19.
8. Hand out the second Reflection Journal Page. Give students time for a final reflection the lesson.
9. Some web articles on salmon hatcheries:
   http://www.nwfsc.noaa.gov/resources/search_faq.cfm?faqmaincatid=3
   http://www.nwr.noaa.gov/Salmon-Harvest-Hatcheries/Hatcheries/
   http://www.vanaqua.org/salmontales/english/learningcentre/aquaculture.php
   http://news.nationalgeographic.com/news/2008/02/080212-salmon-lice.html
   http://www.montereybayaquarium.org/cr/SeafoodWatch/web/sfw_factsheet.aspx?fid=133

ASSESSMENTS:

WASHINGTON STATE STANDARDS:

SCIENCE:

1. **EALR 4: 6-8 LS3A** The scientific theory of evolution underlies the study of biology and explains both the diversity of life on Earth and similarities of all living organisms at the the chemical, cellular, and molecular level. Evolution is supported by multiple forms of scientific evidence.
    a. Explain and provide evidence of how biological evolution accounts for the diversity of species on Earth today.

2. **EALR 4: 6-8 LS3E** Adaptations are physical or behavioral changes that are inherited and enhance the ability of an organism to survive and reproduce in particular environment.
    a. Give an example of a plant or animal adaptation that would confer a survival and reproductive advantage during a given environmental change.
3. **EALR 4: 6-8 LS2B** Energy flows through an ecosystem from producers (plants) to consumers to decomposers. These relationships can be shown for specific populations in a food web.
    a. Analyze the flow of energy in a local ecosystem, and draw a labeled food web showing the relationships among all of the ecosystem's plant and animal populations.

SOCIAL STUDIES

1. **EALR 5:** The student understands and applies reasoning skills to conduct research, deliberate, form, and evaluate positions through the processes of reading, writing, and communicating.
    a. **Component 5.2:** Uses inquiry-based research.

WRITING

1. **EALR 2:** The student writes in a variety of forms for different audiences and purposes.
    a. **Component 2.1:** Adapts writing for a variety of audiences.
    b. **Component 2.2** Writes for different purposes.

ADDITIONAL RESOURCES AND ENRICHMENT:

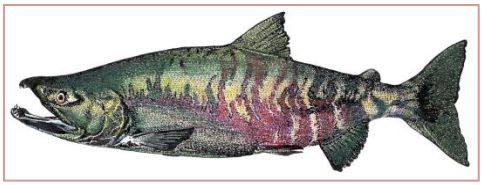
http://www.farmedanddangerous.org/page/learnmorevideo

VOCABULARY TERMS:

- **Hatchery:** A facility used to rear juvenile fish for the purpose of stocking rivers or lakes, producing fish for commercial fishing activities, or restoring endangered fish populations.

- **Carrying Capacity:** The largest number of individuals an ecosystem can support, based on food availability, behaviors, and space limitations.

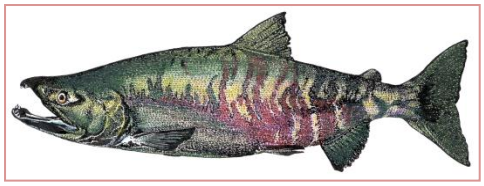
- **Gene pool:** The total number of genes of every individual in an interbreeding population. A large gene pool indicates high genetic diversity, increased chances of biological fitness, and survival. A small gene pool indicates low genetic diversity, reduced chances of acquiring biological fitness, and increased possibility of extinction



Elwha River Restoration
Hatcheries, Saviors or Scourge for Wild Salmon?
Reflection Journal 1

Explain why you think hatcheries are good or bad for wild fish?

What questions do you have about hatcheries?

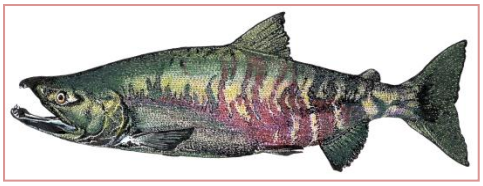


Elwha River Restoration
Hatcheries, Saviors or Scourge for Wild Salmon?
Vocabulary Notes

Hatchery:

Carrying Capacity:

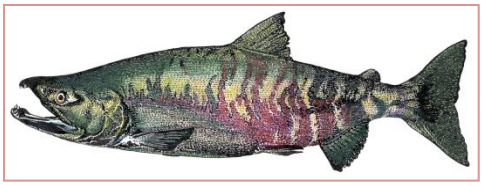
Gene pool:



Hatcheries, Saviors or Scourge for Wild Salmon?

Fill in the columns with arguments for and against hatcheries. When you have gathered enough information, write two paragraphs, one, arguing for hatcheries, and the other, arguing against hatcheries.

Hatcheries are good for salmon because	Hatcheries are bad for salmon because
Write a paragraph arguing for hatcheries	Write a paragraph arguing against hatcheries



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Hatcheries, Saviors or Scourge for Wild Salmon?
Reflection Journal 2

What is your opinion on the hatchery debate now that you've looked into the subject; are hatcheries the savior or scourge of wild salmon?

What questions or comments do you have about hatcheries?