Education package

SWIMMING UPSTREAM

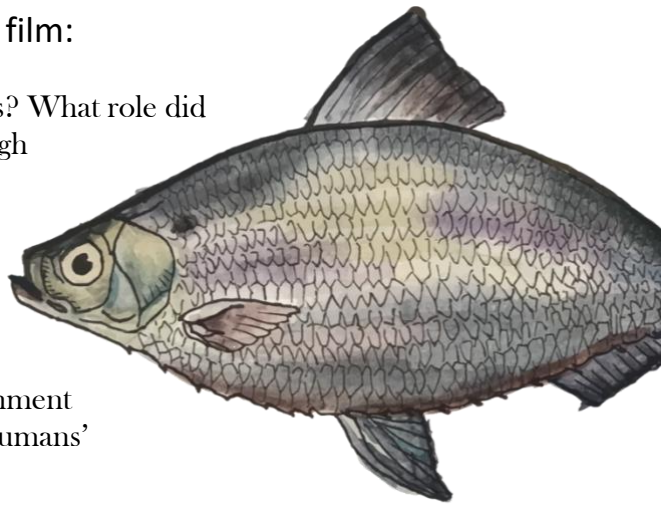
INDIGENOUS ENVIRONMENTAL JUSTICE FOR OUR WATERWAYS

Table of Contents

This education package accompanies the short film “Swimming Upstream: Indigenous Environmental Justice for Our Waterways.” The film, which takes an in-depth look at the history of the Great Bay and its many tributaries, can be viewed at the INHCC YouTube page. The education package includes:

Conversation guide

Suggested prompts for discussion after viewing the film:



How did the construction of dams impact Indigenous peoples? What role did dams play in the colonization of New England? (For a thorough investigation of this question, see this dissertation.) How do these historical relationships between Indigenous sovereignty, colonial power, and water rights connect to other contemporary issues? (Think, for example, of Line 3...)

What is the difference between a dam and a fishing weir? How do their purposes differ? How do they affect the environment differently? How do they reflect different understandings of humans' relationship to their environment?

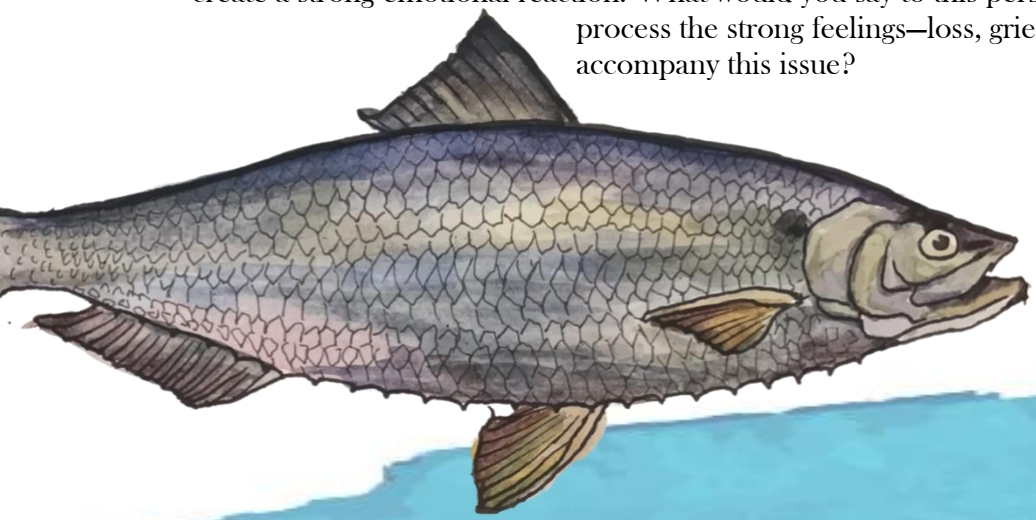
What does "heritage" mean to you? How is that concept related to, or different from, the concept of a community's "legacy"?

There are many factors that might influence policy decisions around dam removal:

- Ecology: dams affect migratory fish, of course, but also sediment flow, habitat availability, water temperature and chemistry, vegetation, algae, macroinvertebrates, and more
- History/heritage: dams remind us of the past—as symbols of industry, or symbols of colonization
- Economics: old dams are expensive to maintain or rebuild, and property values, recreational activity, and ecosystem services are all economic factors, as well

What do you believe are the most important factors to consider in making decisions about what to do with our dams? Do you believe there is a strong moral argument in any direction?

Let's say your friend grew up near Mill Pond—skating on it in the winter, playing around it in the summer. It might be an important place to them, and the thought of removing the dam might create a strong emotional reaction. What would you say to this person? How can we process the strong feelings—loss, grief, guilt—that may accompany this issue?



For kids

The following activities and teaching questions are designed to prompt engagement with young people, either following a viewing of *Swimming Upstream* or independently. Each can take place in the classroom or at home!

Mapping our connected waterways

Materials

- A printed map of local waterways. Possible sources include: USA Rivers and Streams data from ArcGIS (for greatest detail) or GISGeography Lakes and Rivers maps. Note: you can also explore waterways online using the interactive USGS "Streamer" website.
- Markers, pencils, post-its, or other tools for annotating the map.

Activity

Lay the waterways map (the larger, the better) flat on the floor. Start by asking: where are you? Ask students to try to figure out where they live on the map. Draw a dot to represent that location—and, as desired, add dots to represent other sites of importance (your school, the homes of your friends or family members, your favorite parks, etc.).

Introduce the idea that all water is connected. Ask: who are we connected to by these waterways? Find the stream or river that is nearest on the map to the dot that represents home. Follow the water! Trace a line in either direction and see how far you can go by traveling only on water. Can you get to the ocean? How close can you get to your school? Can you get to another town? Or another state? Ask: how might something that happens at one place along the line you traced affect someone at a different point?

Try to trace the path that the river herring swim each spring when they spawn. Can you remember where they start?

Compare your map to the New England Dams Database or the National Inventory of Dams. Where is the nearest dam to you? See what you can learn about its history, and try to place it on your printed waterways map. Look back at the lines you traced earlier—how do they change if they have to stop when they reach a dam? What is the longest line you can trace without reaching a dam?

Possible Extensions

Ask yourself: how do you interact with water in your life? Try to make a list of all the ways. How does that water get to you? Where does it go? Try to draw this on your map. Possible topics to research include where your drinking water comes from, where your sewage drains, and where the rain that falls on your house goes.

Introduce the concept of a watershed. Ask: how can you be a good watershed steward?

Dams vs. Weirs: a hands-on Experiment

Materials

- Pictures or photos of examples of different dams and weirs
- Paper and pencil to diagram their designs
- Rectangular plastic waterproof bin
- Building materials: pipe cleaners, popsicle sticks, twine, wire, stones, twigs, toothpicks, modeling clay, etc.
- Small floating object to represent fish (a fish lure works well)
- Optional: sand/dirt/silt for the "river" floor
- Water

Activity

Introduce the difference between a dam and a weir, using photos and diagrams as illustrations. Describe differences between Indigenous approaches to building weirs and colonial approaches to building dams. Discuss the goals and consequences of constructing a dam or weir. Which consequences are intended? Which might not be?

Then experiment with building models of different kinds of dams or weirs! First, draft a design for a dam. Try to predict what will happen when you build a model of your design, place it across the width of the bin, and add water to one side. Will water flow across? Will a "fish" (lure) be able to "swim" across? What will happen to sand on one side of the dam? What would it be like to be standing or living on either side of the dam? Try it, and observe the results.

Next, try designing a weir, then build it! Repeat the same experiment, and see what differences you observe.

For lesson planning inspiration, see "The Fish Weir: A Culturally Relevant STEM Activity," by Anne Kern, Melinda A. Howard, Aimee Navickis Brasch, Fritz Fiedler, and Jillian Cadwell; the Indigenous NH Harvest Calendar Summer Season, and the TeachEngineering Dams unit, especially the Dam Forces Activity.

Start by learning together whose land you're on (here's a map to help you). What do the people Indigenous to the land you live on call that land? Based on the *Swimming Upstream* film, compare and contrast the Indigenous view of people's place in the environment with settler/American views.

Listen to Penobscot elder James Neptune tell the story of Gluskabe and Aglebemu, the frog monster. Written accounts of this story can be found at page 3 here or at page 114 of this digitized book, which is reproduced here and here. (See the INHCC guide for educators for guidance on incorporating Indigenous storytelling into your curriculum.)

Ask: Why did the people have to destroy the bullfrog monster? Once the bullfrog monster is destroyed and the water is shared by everyone, what happens? What lessons does this story teach us? How can we connect this traditional story to the world around us today?

Talk about the role of storytelling in passing knowledge across generations. How do we share knowledge, besides books? What are some different ways that knowledge can be passed down? Push students to think outside the box! Some examples: a recipe, a house, a quilt, a painting, a song...

Possible Extension

Take some time to think about the place names where you live. Look at the names on the map for rivers, towns, mountains, lakes, and forests. Where do these names come from? Who created them, and what do they mean or refer to? Are any of them derived from Indigenous words?

If there are Indigenous place names that are still widely used, is their meaning known? Remember that there are countless other Indigenous place names that have been erased from the maps you use today. Ask: What differences are there between the meanings or sources of the Indigenous place names and the colonial place names where you live? What can place names tell us about a place? What can they tell us about how the people who created the name thought about that place?

If you were creating your own map of where you live, what would you name the places where you live, learn, and play? What feels important to you about each place?

Migratory Fish Game

This activity is adapted from the Summer Season of the Indigenous NH Harvest Calendar.

Materials

- Fish identification cards for local diadromous fish (see NH Harvest Calendar)
- Fish migration table handout (see NH Harvest Calendar)

Activity

Begin by asking students what they think of when they hear the term "life cycle." Can they draw the life cycle of a frog? A butterfly? A human? Introduce the stages of the river herring life cycle.

Define "anadromous" and "catadromous."

Anadromous: when fish are born in freshwater, migrate towards the ocean and finally migrate back to freshwater once they have reached adulthood.

Catadromous: when fish are born in saltwater, migrate into freshwater, and travel back to saltwater after reaching adulthood.

Introduce the game! All students will get a set of fish identification cards for local diadromous fish and a fish migration table handout. Students should listen carefully as the teacher reads descriptions of each fish's life cycle. Based on the description, students will place the corresponding card in the appropriate column of the migration table. An alternative possibility: instead of using fish migration cards and a table, designate one side of the room as the "anadromous" side and one side as the "catadromous" side...have students run back and forth based on their guesses for each fish, while pretending to swim like that fish!

After the game, discuss... If a lot of your food came from fishing, how would this knowledge of fish migration patterns be helpful to you? If a dam prevents fish from reaching the area where they spawn, what happens to the fish population? Will it increase, decrease, or stay the same?

Possible Extensions

Be a scientist! Read about the "Run, Herring, Run!" community science project here. With your students, help the scientists count the fish! (Note that, as of February 2022, all data is currently processed, but there could be future additions!)

Ask students to graph the annual spawning run totals in New Hampshire. Talk about what you notice, and create a hypothesis for the trend you observe.

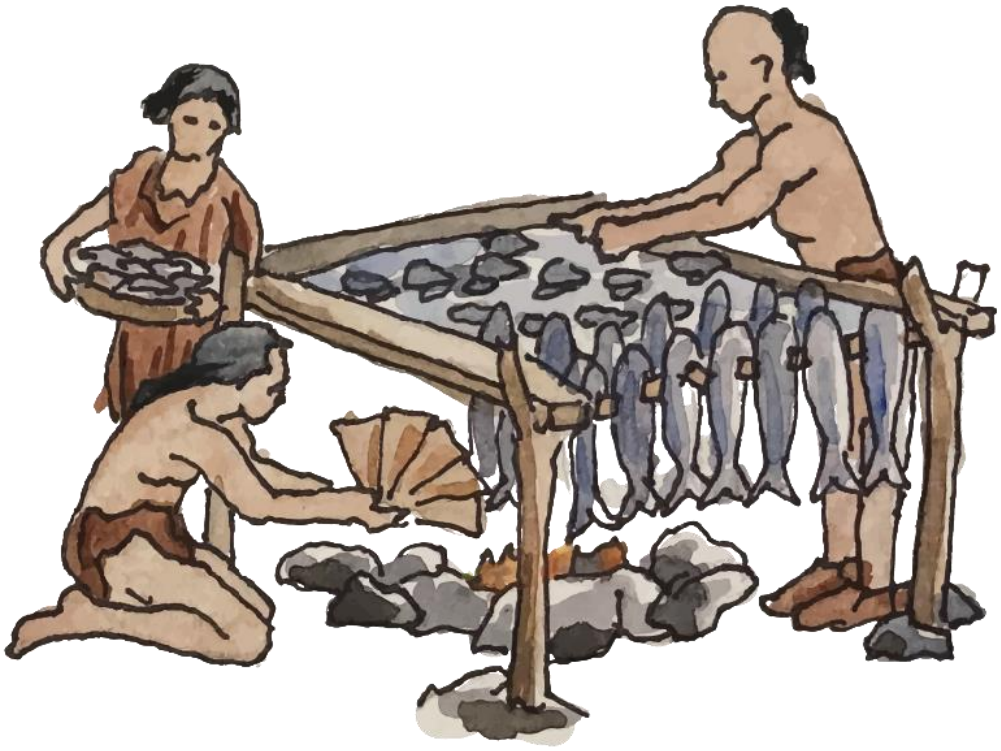
Invite students to explore this virtual storyboard from Native Knowledge 360°, a project of the National Museum of the American Indian. Consider giving students a "scavenger hunt" list of terms to search for and define. Afterwards, talk about the discussion questions included at the end of the case study:

- Why did the United States government want control of the Columbia River system?
- Why was Celilo Falls important to Native Nations?
- What are the benefits of building dams along the Columbia River? What are the costs?
- Why do you think so many Native people dressed in regalia to witness the inundation of Celilo Falls?
- Would you have stayed to watch the inundation of Celilo Falls? Why?

Explain that Indigenous people have led movements to remove dams across North America. Visit the INHCC website for examples of their successful activism. Find each location on a map of the United States. When you get to the Elwha River, read "I Am the Elwha." (Note that the book comes with some excellent activity/discussion ideas!)

Another possible connection to draw for students: ask if any of them have seen the movie Frozen 2. Do they remember the dam? Do they remember what happened to it, and why?

:



Resources

Dam Removal

Indigenous New Hampshire Collaborative Collective Dam Removal Resource Page
Includes news stories and videos specific to Mill Pond Dam, examples of local and regional dam removal successes, state and regional resources, national resources, connections to other Indigenous-led dam removal movements throughout the continent, and links to relevant academic literature.

New England Dams Database
Created by the New England Sustainability Consortium, led by universities from Maine, New Hampshire, and Rhode Island. Includes static and interactive maps and a database of all available dam locations in New England and their associated attributes.

Unleashing Rivers
A 2017 feature in Nature Conservancy magazine on dam removal efforts in New England.

Map of U.S. Dams Removed Since 1912
From American Rivers. Links to other American Rivers resources, including their February 2022 report, "Free Rivers: The State of Dam Removal in the United States."

River Herring

Cultural Importance of River Herring to the Passamaquoddy People
Prepared by the Sipayik Environmental Department of the Pleasant Point Reservation of the Passamaquoddy Tribe.

New Hampshire River Herring Run Data
From New Hampshire Fish and Game, for the years 1972 to the present.

Alewife (*Alosa pseudoharengus*) and Blueback Herring (*Alosa aestivalis*)

Mill Pond Dam

Free the Oyster River
Site by the Oyster River Conservation Alliance, including answers to frequently asked questions about the proposal to remove Mill Pond Dam.

Oyster River Dam at Mill Pond: Feasibility Study
Official November 2020 report evaluating paths forward for the Mill Pond Dam, including assessments of hydrology, sediment quality, infrastructure, water quality, cultural resources, recreation, fisheries, and wildlife.

Presentation from Public Information Meeting on Feasibility Study

Mill Pond Bathymetric Survey and Sediment Sampling Study
2009 technical report surveying existing pond sediment and vegetation conditions and outlining estimated future conditions following possible dam removal.

Town of Durham Supporting Documents
Mill Pond Park – including dam history, aerial maps, town council communications
Oyster River Dam Current Information and Feasibility Study

UPDATE On Tuesday, March 8th, 2022, 74% of voters in Durham, NH voted to remove the dam, upholding a previous decision by the Town Council that had been challenged. The vote was 1,706 to 596. Town officials reported 2,365 people voted in the election, more than double the average turnout of a little less than 1,100 for town elections.

"Swimming Upstream: Indigenous Environmental Justice for Our Waterways" was created in 2022 by Catherine Stewart in collaboration with the Cowasuck Band of the Pennacook Abenaki People and with support from the Episcopal Church of New Hampshire. The accompanying education package was created by Jordan Schmolka, Catherine Stewart, and members of the Indigenous New Hampshire Collaborative Collective.

With thanks to the aki (land), nebi (water), olakwikak (flora), awaasak (fauna), and aln8bak (people) of N'dakinna.