

A Case Study in the Salmon Dilemma: Who Pays the Price?

Key Concepts

1. Many salmon populations have declined in recent years as a result of human and naturally caused events.
2. Issues affecting salmon have local, regional, national, and international components.
3. Salmon populations present special management challenges because of the distance the fish travel and the wide variety of conditions or changes in habitats through which they travel.
4. Attempts have been made to improve salmon runs including limiting harvest, stocking programs, modifying dams, transporting smolt, and varying water releases from dams. These attempts have met with varying degrees of success.



Background

Helping the Sockeye: Past Strategies

In 1980, Congress passed the Northwest Power Act which mandated a program to protect, mitigate and enhance fish and wildlife resources affected by the Columbia River Basin dams. The Northwest Power and Planning Council oversees the program. Many strategies have been developed in an attempt to improve salmon runs. Since 1980, about 100 million dollars have been spent annually on fish hatcheries, turbine bypass facilities, and in foregone hydropower. None of these efforts were specifically directed toward Snake River sockeye salmon populations. These populations have not substantially increased to date. Among the many strategies used are:

Modifying Dams: Many of the eight dams have installed turbine screens to help deflect migrating salmon away from the power generating equipment. The screens reduce but do not eliminate smolt losses to dam turbines. Fish ladders have also been added so that all eight dams are so equipped.

Transporting Smolts: Ocean bound salmon are often collected upstream

from the dams and barged around the dams. In fact, 50 to 80% of Snake River smolts are barged. Handling, transporting and crowding cause the smolts stress, but so does running the river. Few smolts die during the trip or shortly after being released and there is strong evidence that transport benefits the fish.

Water Release: In efforts to enhance ocean-bound migration of hatchery fish, extra water has been released from Idaho's Brownlee and Dworshak dams to help fish reach Lower Granite Dam. Although much heralded as a vehicle for increased migration survival, this technique has not been used for wild fish. To date, the water release has only lasted for six to 14 days. The Redfish Lake sockeye salmon emigrate from the lake to begin their downstream migration for a period of 60 days during April and May, while the wild smolts of other populations of salmon begin in March and extend through late July. Emigration in all populations peaks in late April.

Harvest Limits: More than 12 government agencies regulate the harvest of the Columbia River Basin salmon. Most restrictions have focused on how many salmon are harvested, rather than on how many salmon escape harvest. To help protect salmon runs, government and tribal fishery managers have decreased the harvest of various salmon populations (including the Snake River sockeye population) by Columbia River and ocean anglers. The limits so far apparently have had little effect on the population size of Snake River sockeye salmon.

Hatcheries: Sockeye salmon have been successfully raised in hatcheries in some areas. From 1980 to 1983, the Idaho Department of Fish and Game tried to raise sockeye salmon by taking eggs from Babine Lake in Canada, hatching and rearing them in hatcheries, and stocking the young fish into Idaho's Stanley Basin lakes. No adults returned so the program was stopped. (Since that time, such efforts have come to be viewed critically since they introduce non-native genotypes to the local gene pool.) In 1986, sockeye salmon returning to Redfish Lake were trapped and spawned. The young fish were released into Redfish Lake. Again no adults returned and the program was discontinued.

The hatchery efforts represented an apparent change in philosophy since in September of 1961 the Idaho Department of Fish and Game had poisoned the Stanley Basin lakes and installed migration barriers to keep out adult sockeye salmon. In 1963, some of the lakes were stocked with cutthroat trout. Curiously, Yellow Belly Lake was poisoned as late as 1988.

Bounties on Predators: Sport fisherman can now collect \$3.00 bounty for

each squawfish caught more than 11 inches long. In 1992, more than 220,000 were caught out of an estimated one million and the total cost of the bounty and research program was about \$8 million. Research indicates that the squawfish program has increased salmon numbers by the thousands.

Possible Solutions

Although these measures have been helpful in restoring the numbers of some Columbia River salmon runs, the approaches tried in the past have not substantially increased Snake River sockeye salmon runs. The debate over whether to try and save the Snake River sockeye and, if so, how to save them is on-going and contentious with many proposed solutions offered. Here is a list of possible solutions presented for saving the sockeye.

Habitat Improvements: The spawning and rearing habitat at Redfish needs to be maintained and improved whenever possible. Access into other spawning and rearing lakes in the Stanley River Basin needs to be restored as part of the effort to reestablish the sockeye population. Many researchers believe the best, long-term strategy for increasing sockeye salmon runs lies in improving spawning and rearing habitats.

The loss of juvenile salmon through diversion into irrigation canals could be reduced by the placement of new and the maintenance of established screens on ditches into the canals.

Shoshone and Bannock tribal biologists are currently conducting lake studies in the Stanley Basin to see whether additional nutrients can improve production. If the research demonstrates low levels of nutrients, the question of the merits of fertilizing the lakes will no doubt be debated.

Finally, habitat improvement through predator control occurs as the federal government continues their squawfish bounty program in an effort to keep these voracious predators from eating too many salmon.

Harvest Restrictions: The present survival rate of sockeye smolts through migration is about 2% (2 out of every 100). As such, additional limits on harvest are needed to increase adult sockeye populations. The limits established each year need to be based on how many sockeye escape harvest rather than how many are harvested. Some individuals studying the situation recommend that commercial and sport harvest be shifted from the mainstream Columbia River to its tributaries to eliminate the incidental harvest of Snake River sockeye by fishers seeking other salmon populations.

Spillway Fish Passage: Another way to possibly improve survival rates of salmon smolts is to provide a fish "spill", a passage route away from the

dam turbines. The “spill” method is designed to provide an alternative, less dangerous method of passing the dams. Although some salmon still die from spilling over the dams, when done properly this method produces significantly lower mortality rates than when salmon pass through penstocks and turbines.

Dam Drawdowns: "Drawdowns" increase the volume of water released from dams, speeding up water flows through the dam system with the objective of decreasing migration stresses of salmon smolts. Whether stresses are actually reduced is a matter of current debate. As presently managed, the Army Corps of Engineers controls the eight major dams along the Columbia River System. The operators develop an "annual water budget" and closely regulate the timing of water discharge. The typical water budget from April 15 to June 15 is 4.65 million acre-feet. This volume of water has not been large enough to sustain minimum desirable flow for fish passage during the entire out-migration period. Once the water budget is used, no more storage is available for fish passage during spring migration.

Recently, modifications in the Corps flood control operations have resulted in increased water storage for the water budget releases. Some believe flows could be accelerated by :

- decreased winter water releases for flood control at Brownlee and Dworshak dams.
- use of water in the Snake River Reservoirs not committed to other uses.
- more efficient irrigation systems which would save water for this use.
- decreased power demand during the winter from encouraging consumers to use alternative heat sources and/or conserve on the use of electricity. By doing so, less water would be released during the winter and could be used in the drawdown.
- exchanging electricity with power producers in California and the Southwest where the summer demand is high. If energy was sent south in the summer and north in the winter, dam operators could cut winter power generation.

A combination of the above proposals probably offers the best hope of recovering the sockeye and other salmon runs; however, their implementation will not come without cost the public.

How Would Dam Drawdowns Affect You?

Of the various proposals, dam drawdowns is currently receiving a great deal of attention. Advocates of the proposal and opponents of the proposal are both numerous and vociferous. Some advocates believe drawdowns will solve all of the Snake River sockeye salmon's problems, while some opponents claim water flow is not the issue at all. The answer probably lies somewhere between these two views. The debate is instructive because the outcome has the potential for impacting a great number of people and groups. Here is how different groups may be affected if the plan to increase drawdowns is implemented:

Electric Consumers: The greatest cost to implement this plan will be to modify the four dams on the Snake River to allow the drawdowns. By law, these construction costs would have to be paid by Pacific Northwest electricity users. These users now enjoy the lowest electricity rates in the nation due to taxpayer subsidies used to build the Army Corps of Engineers dams. Rates for consumers served by Bonneville Power Administration could increase 5% or more. The increases could be less if costly subsidies were reduced or eliminated and energy conservation and regional energy exchanges were optimized.

Irrigators: If the water for the drawdowns comes from the lower Snake River, the drawdowns will have little affect on Idaho irrigation supply but would affect irrigators on the lower Snake River in Washington who pump water from the mainstream pools. If the water comes from the upper Snake River, Idaho farmers would also be affected. These irrigators would face the expense of modifying their pump intakes to operate at lower reservoir levels. If the expenses were not subsidized by the government, consumers could expect to see higher prices for irrigated crops. Since the cost of electricity has gone up too, consumers should expect to see higher prices anyway. Also any subsidy to the irrigators would be paid for by taxpayer dollars, another indication of the far-reaching consequences of a proposal designed to help a fish population in an obscure corner of Idaho.

River Traffic: During drawdowns, barge and other river traffic on the lower Snake River would be interrupted. Those who use the river for transportation would have to reschedule their shipments, find alternative shipping methods, or store their products. These alternatives all involve costs to the producer, shipper, and consumer. The State of Idaho has stated that it recognizes that irrigators, marina operators, ports, and shippers did not create this problem and should not have to pay for fixing it. Their cost should be mitigated as part of the overall solution. But mitigation is not free, either. Someone(s) will have to pay to keep the irrigators, marina operators, ports, and shippers people from having to pay. Again, the payer is likely to be consumers and/or taxpayers.

Recreational Users: For several months the drawdowns would change boating and fishing opportunities. Recreational boaters might choose to recreate elsewhere causing those who rely on tourism to realize a decrease in income. Resident fish managers may have to improve angling opportunities at nearby fishing spots to make up for decreases in those reservoir fisheries.

Salmon Anglers: Solutions enhancing sockeye survival will also benefit chinook salmon and steelhead. Restoring the sockeye and chinook runs could improve salmon harvesting in Washington and Oregon and allow Idaho anglers to once again fish for these salmon. Anglers would be encouraged to use a catch and release fishing technique. Better angling opportunities would also benefit tourism and fish-related businesses such as sporting goods stores.

Commercial Fishers: Dam drawdowns are coupled with plans which call for a decrease in harvest of several Columbia River salmon runs and more restrictions on the ocean harvest of Columbia River fish that swim into Canadian waters. The Northwest Power and Planning Council calls for an end to driftnet fishing in the open ocean. The number of fish available to catch would decline with a likely increase in prices. Many commercial fishers would go out of business, impacting their families and communities. The government would offer to buy back some commercial fishing boats. Higher fish prices and increased taxes to support the buy-back program would affect consumers and taxpayers.

Materials

For each student:

- “Who Pays the Price” activity sheet
- “Who Pays the Price: Put Yourself In Their Place” sheets

Teaching Hints

“Who Pays the Price?” is the third activity in the Salmon Dilemma. The objective of this activity is for students to understand that saving the salmon is possible; however, there are costs associated with doing so and the costs are likely to be shared by everyone. The view points of various interest groups are presented as students work to develop a “fair” and “reasonable” plan to manage and allocate sockeye salmon. Students have the opportunity to evaluate the costs associated with saving the sockeye salmon runs and then decide who should pay those costs.

Procedure:

Part I: Background

1. Divide the class into groups of 3-4. Pass out a "Who Pays the Price?" activity sheet to each group.
2. Provide time for each group to collectively read the background text and answer the accompanying questions.
3. Ask students for their view of the best way to increase sockeye salmon numbers. Introduce Part II by saying something such as, "Many people think dam drawdowns are the best approach to solving the salmon dilemma. Let's look at what such a solution might mean to us and to other people."

Part II: Put Yourself in Their Place

1. Pass out a "Put Yourself In Their Place" sheet to each group. Most of the information was taken from an article written by Al Gibbs (1992) for the *Seattle Times*. Allow time for each group to read their own narrative **and** the narratives for all the other groups.
2. Give each group blank, poster-size paper, and marking pens.
3. a. Challenge students to develop a "fair" and "reasonable" plan for sharing the costs of saving the salmon among the people who use the water directly or indirectly. Students may consider subsidizing certain groups. However, they need to keep in mind that any time there is a subsidy, taxes will increase.
b. Have students also decide which groups of fishers (commercial, sport or tribal) should have fishing rights to any surplus fish.
4. After the groups have discussed the situation thoroughly, have each group use the marking pens to outline their plan on the blank paper. The group should also select a spokesperson to present the plan to the class.
5. Have the spokesperson:
 - a. read aloud the narrative expressing the group's point of view, then,
 - b. present the group's plan to the class.

6. After all groups have presented their plans, discuss the following questions with the class:

- Who is most responsible for the decline of the sockeye salmon and therefore should pay the most?
- Was it easy or difficult to decide who should pay the costs? Why?
- How did talking among your group help or not help you decide?
- Who “owns” the river?
- Will everyone be equally affected by the efforts to save the sockeye?
- Who will be the most affected? Least?
- Who should be responsible for deciding if we should try to save endangered runs of salmon?
- If we should save these runs, who should be responsible for deciding who pays the cost and who gets to reap the benefits (harvest the salmon) once the populations start to increase again?

Key Words

fry - young salmon from the time they emerge from the eggs to about one year of age

parr - young salmon from about one year of age to the time they are ready to migrate downstream to the ocean

smolts - young salmon from the time they are ready to migrate downstream to the ocean until they reach adulthood

redds - salmon “nests”, dug in the gravel, where salmon eggs are laid

Extensions

1. Ask students to write an essay describing their personal decisions on who pays the cost of the drawdown and who has the right to fish for the harvestable fish.
2. Have students look for and report on newspaper articles dealing with the salmon issue.

Answer Key

1. Most students will probably not think the programs have been very successful. This question is unfair in some ways since we have an

experiment without a control - would the salmon now be extinct except for the program? Use the question as a springboard for discussion.

2. Answers will vary. Many students choose dam modification as a more effective approach because of the lasting nature of a dam modification as opposed to a program such as transporting which may be ended in hard budget times. Reward logical thought.

3. For best survival, water release should last 60 days.

4. It is important that regulations focus on escape from harvest because the fish that escape are those that can reproduce.

5. The government paid fishers in 1992:

$$\frac{\$3.00}{\text{squawfish}} \times \frac{220,000 \text{ squawfish}}{\text{year}} = \$660,000 \text{ per year}$$

6. Shifting fishing from the mainstream Columbia to its tributaries would reduce harvest impacts on Snake River sockeye due to the indiscriminate nature of net fishing. In the Columbia, nets catch fish from all tributaries. In a tributary, only fish headed up that water course to spawn are caught. Fish heading for the Snake River would not likely be found in other tributaries.

7. Answers may vary. Transporting salmon smolts around dams is a topic of some debate. While some studies seem to indicate that transporting smolts actually benefits their survival, some groups adamantly oppose the practice. This question calls upon information presented earlier in this activity (see 2, above).

8. The theory is that “drawdowns” increase water flow to a point where the salmon smolts are able to move rapidly downstream under conditions more like those they have experienced for thousands of years. This quick trip will hopefully reduce mortality.

**Who Should Pay the Price?
Part II: Put Yourself In Their Place**

A Farmer/Irrigator's Point of View

The drawdowns to help flush salmon smolts downstream will have little affect on Idaho's irrigation water supply. They would, however, affect irrigators on the lower Snake River who pump water from the mainstream pools.

Bud Mercer is a farmer in Eastern Washington. He is concerned about the drawdown of the lower Snake River. The drawdown could leave Mercer's 3,500 irrigated acres without water at the very time the carrots, wheat, and other crops need it the most. He says there are certain things he can do; but if he loses 50% of his water, he'll lose 50% of his production. Mercer borrowed money from the bank based on 100% production and 50% production would bankrupt him.

Porkey Thomsen is also a farmer that uses irrigation. He, too, is concerned about loss of irrigation water. Without irrigation, the land could not produce crops. Land with water is worth thousands of dollars and land without water is nearly worthless.

Porkey grows potatoes that are used to make frozen french fries and hash browns. Six major processing plants have sprung up in the Tri-cities in Washington state in the past few years. They process such products as potatoes. Agriculture supports as much as one-third of the area's economy. Anything that negatively affects agriculture could have a devastating affect on the local economy.

**Who Should Pay the Price?
Part II: Put Yourself In Their Place**

A Barge Owner's Point of View

Drawdowns would interrupt barge and other river traffic on the lower Snake River. This would be a problem for those who use the river for transportation. They would have to reschedule their shipments, find alternative shipping methods, or store their products.

Skip Hart is a barge owner on the Columbia River near Lewiston, Idaho. He says that the Snake River drawdowns could cripple his barge operations. Fully loaded barges draw about 14 feet. This means that the bottom 14 feet of the barge's hull is underwater. The locks on the dams need at least 15 feet of water to operate. Loading barges at less than full capacity would increase the costs to farmers who ship their grain to Portland export terminals. Grain is a "commodity product." This means that the prices are set by the buyer not the seller. Therefore the farmer would have to absorb the extra costs.

Ron McMurray is manager of the Port of Lewiston, Idaho. He says that when the "slack water" came to Lewiston, the price of transportation dropped. About 50 tugs and 200 barges operate in the area. Millions of tons of grain began flowing through the ports in the area. He says wood products could also be transported by barge. A barge load of material can be shipped to Japan cheaper than you can send it to Chicago.

McMurray also says that they can live with low water for about three weeks, but that four weeks would be extremely difficult. The ports would lose markets they spent years building. He would rather lose the fishing than stop wheat from coming down river.

**Who Should Pay the Price?
Part II: Put Yourself In Their Place**

A Business Manager's Point of View

Jim Forsythe is the Northwest power manager for Kaiser Aluminum Corporation. The aluminum company accounts for 8 billion dollars worth of payroll, taxes, purchases, and other spending. Aluminum is a commodity like grain. The market has been poor lately. Changing the operation of the dams to help the salmon could increase the price of electricity. Forsythe says that the prices for aluminum are very low. Any kind of cost increase would hurt the company. Releasing large amounts of water to flush young salmon to the sea would use the water that dam generators could use to produce power. Forsythe says that he anticipates anywhere from a two to four percent increase in power rates due to the drawdown. However, he adds the increase could be as high as ten percent. Kaiser already pays \$130 million per year for electricity consumed in area plants. An increase of this size would leave the industrial giant unable to compete with new plants that are being operated more cheaply in developing countries around the Pacific Rim.

**Who Should Pay the Price?
Part II: Put Yourself In Their Place**

Commercial Fisher's Point of View

Donna Johnson is a commercial fisherman in Youngs Bay near Astoria, Oregon. Johnson has been fishing commercially for a long time. Like most Columbia River gillnetters, river fishing is not a full time job. She has seen catches decline steadily over the years, as more and more fisherman caught more and more fish.

When the salmon stocks began to decline on the Youngs River, the Clatsop Economic Development Council decided to do something. They began developing hatcheries and releasing young salmon in 1977. Three years later, the fall Chinook salmon catch tripled. In 10 years, the runs were five times larger yet. The Youngs River fishery could be closed down because of the fear that some Snake River salmon might wander into its estuary and be caught in nets. Fishing nets don't discriminate among what they catch.

Johnson is bitter at the prospect of being banned from fishing the waters she loves. Johnson said that everyone had faith in what the enhancement program was doing, but now what? She says we have raised our stock, and now they won't let us fish for them.

**Who Should Pay the Price?
Part II: Put Yourself In Their Place**

A Native American Fisher's Point of View

David Sohappy Jr. struggles to control his bitterness. The salmon run declines have disrupted Indian families' way of life. Once the tribes fished Celilo Falls, a natural chute on the river where salmon runs were pushed into a narrow channel. Millions of fish were caught. Even so, runs remained strong until the "Dalles" dam was built in the late 1950's. The dam flooded Celilo Falls. Today, Sohappy sees no future for his three children on the river that has been his family's livelihood for generations. He wants his children to find other jobs and only fish once in awhile. However, he feels sad that they will have to find other ways to raise their families.

**Who Should Pay the Price?
Part II: Put Yourself In Their Place**

A Fisheries Biologist's Point of View

Biologist Francis Robert works for the National Marine Fisheries Service. NMFS helps manage endangered salmon populations. Robert leads a team working on the management plan for Snake River sockeye salmon. He worries that the plan may come too late. The number of Snake River sockeye salmon is very low.

He knows these fish are found further south and at higher elevations than most sockeye. He also knows they could go extinct naturally. He doesn't want humans to help cause their extinction. Robert says that these fish have special genes to help them survive. These genes could be very important for the species in the future. He thinks they may be the genes necessary for surviving changes in climate. He wonders what will happen if the population disappears.

Robert worries that because we can't put a "dollar value" on these genes, the issue will be ignored. He thinks often about these words of Chief Seattle: "Man did not weave the web of life, he is merely a strand of it. Whatever he does to the web, he does to himself".

**Who Should Pay the Price?
Part II: Put Yourself In Their Place**

Impact on Electricity Consumers

People in the northwest now enjoy the lowest electric rates in the country. They may see a 5% increase due to the drawdowns. Almost half of the region's homes are heated by electricity. Hydroelectric power generated by dams on the Snake and the Columbia Rivers, supplies 60% of the northwest's electric needs.

Toni Mitchell is a volunteer for the St. Vincent DePaul Society. Her group runs a thrift store and helps with a "soup kitchen" in Portland. The Society also helps low income people pay their electricity bills. Many people heat their homes with electricity in Portland. Mitchell knows that many of the people she works with have to make hard choices about how to spend their money. She worries that some people may have to choose between food and electricity. She knows the Society already can't help all the people who need aid. She's afraid that some of the people she knows may suffer illness or even death if they can't heat where they live. Because Mitchell is a sports fisherman, too, she is torn. On one hand, she likes to eat and fish for salmon. On the other, she knows that the price of those salmon could be higher electricity bills.

Who Should Pay the Price?
Part II: Put Yourself In Their Place

Impact on Recreationalists

For several months the drawdowns would change boating and fishing opportunities. Recreational boaters might choose to recreate elsewhere causing those who rely on tourism to realize a decrease in income. Resident fish managers may have to improve angling opportunities at nearby fishing spots to make up for decreases in those reservoir fisheries.

Penny Rich is frustrated. She loves living and working near the water. For years she was an oyster grower on Washington's Puget Sound. Pollution forced her out of business there. She took her small boats and moved to Clarkston, Washington on the Snake River. She used the last of her savings to start a marina. The first few years were pretty tough. Clarkston is a pretty place for riverside camping. Many of the best campsites are only dry in the summer. The increased water levels may put these sites underwater. Rich worries that the rapidly changing water levels will keep small boaters from coming to her marina. She doesn't want to be forced out of business again.

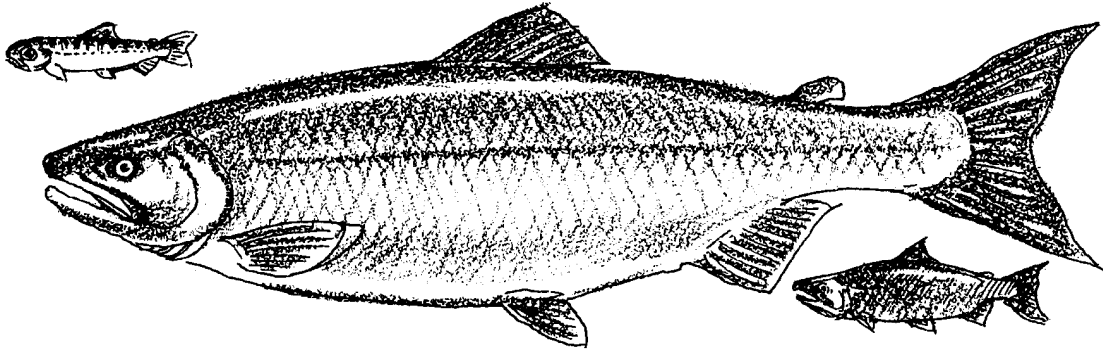
Who Should Pay the Price?
Part II: Put Yourself In Their Place

Impact on Salmon Anglers

Helping sockeye to survive will also benefit Chinook salmon and steelhead. Restoring the sockeye and Chinook runs could allow Idaho anglers to once again fish for salmon. Better angling opportunities would also benefit fish-related businesses.

Arden Fisher runs a guide service from her home in Bear, Idaho. People come from all over the world to travel down the Snake River's Hell's Canyon with her. Fisher's been guiding tours for almost two decades. She has seen the fishing decline. She really loves the area and wants to see the fish runs increase. Fisher knows better runs would mean better business for her. She also knows that each person that she guides spends hundreds or thousands of dollars on transportation, food, and gear. Fisher thinks that improving the salmon runs will pay for itself.

A Case Study in the Salmon Dilemma: Who Pays the Price?



Part I: Background

Clearly, Idaho sockeye salmon are in danger. What can people do to help? Let's begin by looking at what we've done in the past.

In 1980, the U. S. Congress passed laws to help fish affected by eight Columbia River dams. About 100 million dollars is spent each year to improve conditions for fish. The money has been spent in:

Modifying Dams: Many of the eight dams have installed screens to keep migrating salmon out of power generating equipment. The screens reduce smolt losses. Money has been spent to add fish ladders. All eight dams now have fish ladders.

1. In 1992, one sockeye salmon returned to Redfish Lake to spawn. How successful do you think the programs enacted in 1980 have been for Snake River sockeye so far?

Transporting Smolts: Fifty to eighty percent of the ocean bound Snake River salmon are collected at the two up-river dams. The smolts are then barged around the dams. Handling, transporting and crowding cause the smolts stress, but so does running the river. Few smolts die during the trip or shortly after being released. In fact, there is evidence that transport may actually benefit the fish. Even so, it is unclear if barging smolts can rebuild the Snake River sockeye salmon population.

2. You have limited money to spend on salmon protection. Would you choose to spend it on modifying dams or transporting smolts? Why?

Water Release: Extra water has been released from some dams to help smolts migrate to the ocean. During April and May, sockeye smolts migrate from Redfish Lake. This out-migration varies from year to year, often lasting for up to 60 days. The water release has only lasted for six to 14 days.

3. For best survival, how long should water release last?

Harvest Limits: Fishery managers have decreased the permitted harvest of salmon. They hope this will help protect Snake River sockeye salmon runs. Some areas have been entirely closed to fishing. Unfortunately, most restrictions have focused on how many salmon are harvested. What is really important is how many salmon escape harvest. The limits have done little to increase the population size of Snake River sockeye salmon.

4. Why is it important to focus on how many fish escape harvest?

Hatcheries: In some areas, sockeye salmon are successfully raised in hatcheries. Knowing this, the Idaho Department of Fish and Game raised sockeye salmon in hatcheries. They then placed the young fish into the lakes. No adults returned so the program was stopped. Wild sockeye salmon returning to Redfish Lake were also trapped and spawned. The hatchlings were released into Redfish Lake. Again, no adults returned. The program was discontinued.

Bounties on Predators: Governments have paid people to catch salmon

predators. Sport fisherman can now collect a bounty for catching squawfish. More than 220,000 squawfish were caught in 1992. The total cost of the bounty and research program was about \$8 million.

5. The government now pays fishers \$3.00 for each squawfish. How much did they pay fishers in 1992?

Some populations of salmon have clearly benefited from these efforts. Unfortunately, none of them has done much to increase Snake River sockeye salmon populations. The Endangered Species Act requires the creation of a recovery plan for the Snake River sockeye salmon. Until that plan is enacted, recovery of the population seems unlikely.

Possible Solutions

Should we keep trying to save the Snake River sockeye salmon? If so, what should we try now? Here is a list of possible actions to save the sockeye.

Habitat Improvements: Spawning and rearing habitat at Redfish Lake needs to be improved. Other spawning and rearing lakes in the Stanley River Basin need to be restored. Screens which prevent young salmon from being diverted into irrigation canals need to be improved. In addition, predator control programs may be needed to protect the sockeye salmon.

Harvest Restrictions: About two out of every 100 sockeye smolts survive through migration. Most die before they are big enough to interest fishers. Even so, additional limits on harvest could help increase adult sockeye populations. The limits need to be based on how many sockeye escape harvest. Fishing could be shifted from the mainstream Columbia River to its tributaries. This shift would help eliminate harvest impacts on Snake River sockeye salmon.

6. How would shifting fishing from the mainstream Columbia to its tributaries reduce harvest impacts on Idaho sockeye?

Spillway Fish Passage: Survival rates of salmon smolts could be increased if

fish could avoid dam machinery. Salmon can be “spilled” over the dam. “Spilling” provides salmon a way around the machinery. When done properly, fewer salmon die when spilling over the dams than when salmon pass through penstocks and turbines.

7. Flying over the dam or going through turbine blades doesn’t sound like much fun. “The Committee to Keep ’em in The Water” wants to carry the smolts around the dam. What would you tell them about their proposal?

Dam Drawdowns: Drawdowns speed up water flows through the dam system. Some people argue that faster water decreases migration stresses of salmon smolts. Increased flows would change the slack water pools into faster moving water. The rivers could once again rapidly sweep the salmon to the ocean. Present water releases have not lasted the entire 60 day out-migration period of Redfish Lake sockeye salmon. People debate whether there is enough water to increase flows for 60 days. Even if water were available, there would be costs in preparing the system for this change.

8. How might a “drawdown” help increase salmon survival?

But, Who Will Pay the Price?

These proposals offer the best hope for the sockeye. Putting them into effect, however, will cost the public. Many groups of people will be affected: electric consumers, irrigators, river traffic, recreationalists, sport fishers, native fishers, and commercial fishers.

Saving the sockeye salmon runs will cost money. But who should pay for the cost of saving salmon runs? The objective of this activity is for you to decide how to answer this question.

As you learn about the points of view of the people affected, think about

these questions:

- Who is most responsible for the decline of the sockeye salmon and therefore should pay the most?
- Was it easy or difficult to decide who should pay the costs? Why?
- How did talking among your group help or not help you decide?
- Who “owns” the river?
- Will everyone be equally affected by the efforts to save the sockeye?
- Who will be the most affected? Least?
- Who should be responsible for deciding if we should try to save endangered runs of salmon?
- If we should save these runs, who should be responsible for deciding who pays the cost? Once the populations start to increase again, who decides who gets to reap the benefits (harvest the salmon)?