Bullfrog Films presents

DISCUSSION GUIDE

A 52-minute film

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"Net Loss probes one of the most important and cautionary tales for the future relationship between humanity and the sea. We need to think long and hard about this film."
–Carl Safina, President, Blue Ocean Institute

NET LOSS: The Storm Over Salmon Farming
52-minute video available from Bullfrog Films

DISCUSSION GUIDE
Junior high – High School – University – Adult

Summary:

All over the world, fish are at the heart of people's diet and culture. But decades of habitat loss and poor fisheries management have threatened many wild salmon runs. One new alternative is the commercial farming of salmon in giant underwater net-pens, which promises more fish for people to eat and less pressure on the wild salmon. This film examines the impacts of salmon aquaculture on a favorite food, our marine environment, and coastal communities.

Filmed in British Columbia, Chile and the U.S., the film provides both global and local perspectives on the industrial production of salmon. Government and industry spokesmen make the case for salmon farming, while fishermen, Native people, scientists and chefs explain the dangers it may pose for the environment, human health, and coastal cultures.

How to use this guide:

This guide is intended to provide material for thought-provoking discussion for a variety of audiences. Depending on the viewers, you may wish to choose particular discussion questions or adapt the activities. Also provided are resources for further research.

Contents:

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Topics Addressed in the Film Include:

1. Historical significance of the salmon in Northwest Coast Native culture. For the Native peoples of the Northwest Coast of North America, who have relied for thousands of years on the salmon as an important food source, the fish plays a vital part in their cultural history, mythology, and traditional way of life. As wild salmon runs are depleted by contaminants introduced to the coastal ecosystem by the salmon farms, and other activities such as industry and logging, these traditions and ways of life have become threatened.

2. Advantages of salmon farming. Many in the industry view salmon farming as a sustainable means to protect the wild salmon runs from further depletion while providing an important and nutritious product at a reasonable rate. The availability of salmon throughout the year is also seen as a benefit of the industrial method, as is the ability to alter the genetic makeup of the fish itself in order to produce a larger, faster-growing product.

4. Differences in the health benefits of wild versus farmed salmon. Salmon are a natural source of Omega 3 fatty acids, which have been shown to have tremendous health benefits for humans. In recent studies, high levels of PCB's, a chemical flame retardant, and other contaminants have also been found in salmon, with higher quantities discovered in the farmed fish.

5. Working conditions for employees at fish processing plants. Workers in fish processing plants are often exposed to disadvantageous and sometimes harmful conditions, as they are on their feet for long hours in a freezer-like environment. Wages are usually low, time off rare, and the work intensely physical. In some of the processing operations, the bottom line has become a higher priority than the welfare of the workers.

6. Local impact of salmon farms on other marine mammals, the environment, and coastal communities. Additives and antibiotics used in the process of farming salmon have been shown to create resistant strains of bacteria in wild fish, and potentially harmful results in people as well, as they seep into the surrounding marine environment. Recent studies have shown that organic waste produced by industrial salmon farms can be detrimental to the surrounding ecosystem. Some salmon-farmers use underwater sound waves to deter sea lions and other predators, which have been linked to hearing loss and death in these animals. With the salmon farms comes difficulty for local fishermen, who are hard pressed to compete with the lower-priced farmed fish at market.

7. Biotechnology and our food sources. As aquaculture becomes more refined, salmon-farmers are perfecting ways in which to make their business more lucrative by altering the genetic components of the farmed fish. Through the use of genetic engineering, they are able to introduce information into the genes of the salmon allowing the fish to grow faster, bigger, or even with different colored flesh. As this technology itself is relatively new, the long-term impacts on humans who eat the fish and on wild salmon is uncertain.

8. An ongoing experiment. Aquaculture professionals argue that their industry is really still in its infancy, and that with continued research and improvement, they will be able to minimize the negative impacts. Some new projects involve placing fish-pens on land or further away from the coastal shoreline, thus avoiding the direct impact of salmon waste in the surrounding waters.

Questions Before Viewing the Film

These questions are meant to promote a preliminary discussion about some of the topics addressed in the film. You may wish to alter them or to select particular questions depending on the age and experience of the viewers.

1. In what parts of the world do salmon live as a naturally occurring part of the ecosystem?

2. In the Native cultures of the Pacific Northwest, the salmon is an important cultural icon. What do you know about the role of salmon in Native culture? Have you seen salmon represented in Northwest Coast art, on totem poles, or in books about Native Americans? What is its significance? Can you think of any other animals that play an important role in the cultural history and traditions of a group of people?

3. Are you concerned about wild fish disappearing from our oceans and rivers?

4. Do you eat salmon in your home? In what ways is eating salmon good for your health? Do you think there is a difference in the health benefits of wild salmon versus farmed salmon?

5. Have you ever noticed the words "farmed" or "wild" on fresh fish packaging in your grocery store? What's the difference between farmed salmon and wild salmon?

6. Have you tasted farmed salmon? Wild salmon? Do you think they taste different from one another?

7. Do you think that farmed salmon and wild salmon have differing effects on the environment in which they live?

8. Have you ever seen or visited a salmon or fish farm? What did you see there?

9. Have you ever seen or experienced salmon in the wild? What did you think, notice, or feel?

10. Why might fish farmers want to genetically alter the fish that they raise? Which qualities in the fish might they wish to "weed out" and which might they want to increase or strengthen? Can you think of ways in which altering the genetics of fish raised in farms might have an effect on the environment? On people who eat the fish? On wild salmon?

Questions After Viewing the Film

The following questions should be used as a starting point for a conversation about what was observed in the film and what the viewers think, feel, and have learned about the issues related to salmon farming.

1. What did you learn about salmon, either wild or farmed, that you did not know before viewing the film? Has the film changed the way that you think about buying or eating salmon? Why or why not?

2. What do you think about the practice of raising salmon in contained pens? What do you see as the benefits of this method of raising salmon? What are the risks?

3. Salmon farming has become an established industry, even though there is opposition to its effects. How might the industry of salmon farming be made safer and less harmful to the environment and to people?

4. In what ways do the choices that we make as consumers affect the environment, our own health, and people's ways of life?

5. What role does the government play in lessening or worsening the impacts of industrial salmon farms and how can we influence our government to make legislation that will protect wild salmon and the environment while also allowing for the existence of salmon farms?

Educational Activities

Suggested Essay Topics- Choose between the following

1. In what ways do salmon and the practice of industrial salmon farming have an impact on *your* life? Do you know someone who is a commercial or Native fisherman, a salmon farmer, or who lives near a salmon farm? What different roles do wild salmon and farmed salmon play in the larger ecosystem and how do they, negatively or positively, impact the water *you* drink, the air *you* breathe, or the community in which *you* live?

2. In what ways do the choices that we make as consumers have an impact on our health, the environment, and people's ways of life? Use examples that you have seen in the film regarding the impacts of salmon farming, but think also about other ways in which the things that we buy and consume affect the world around us. How can we become better informed about the food we are eating and thus make choices that will lessen the detrimental effects on the environment and on other people?

Interview Assignments- Choose between the following

1. Interview with your grocer-Go to your nearest grocery store and visit the meat/seafood department. Find the salmon and note whether or not the labeling on the fish indicates if it is "farmed" or "wild." Then ask a staff-person in the department about their store's policy regarding salmon. Use these questions as a framework for a short discussion:

A. Do you sell farmed salmon? Do you sell wild salmon? Both?
B. How/why did you decide which salmon to sell?
C. Do very many consumers ask about the source of salmon in your store?
D. Do you personally have thoughts about differences in the look, consistency, or taste of wild versus farmed salmon?

2. Interview with family members or friends- As you have probably noted from your classroom discussion after viewing the film, many people are unaware of the differences between farmed and wild salmon, as related to their health and that of the environment. Choose two-three people whom you know and have a short discussion with each of them about salmon. Use the following questions as a framework for your conversation and then write a report of your findings.

A. Do you enjoy eating salmon?
B. Do you know the difference between "wild" and "farmed" salmon?
C. Are you aware of the different ways in which salmon farming and wild salmon runs have different effects on the environment? On coastal communities?
D. Summarize for your interview subjects what you have learned in the film *Net Loss: The Storm Over Salmon Farming*. Has the information you have provided changed the way that you, your friends, or your family members think about salmon and salmon farming? Why or why not? Will it change their buying or eating habits? Why or why not?

Definition of Terms

Additive: A foreign substance, often a chemical, added to a food in order to enhance the food's flavor, color, or other qualities.
Antibiotic: A substance produced by, or a semi-synthetic substance derived from, a microorganism and able to inhibit or kill another microorganism.
Aquaculture: The industrial cultivation of the natural produce of water (such as fish or shellfish).
Biodiversity: The vast array of Earth's organisms and their genes. Embedded in the concept is the interrelatedness and interdependence of genes, organisms, communities, and ecosystems.
Contaminate: To make unfit for use by the introduction of unwholesome or undesirable elements, as in the contamination of coastal waters by industrial waste.
Dioxin: Any of several heterocyclic hydrocarbons that occur especially as persistent toxic impurities in chemical herbicides.
Ecosystem: The complex of a community of organisms and its environment functioning as an interdependent unit.
Epidemic: A physical malady in a disproportionately large number of individuals within a population, community, or region at the same time.
Feedlot: A plot of land on which livestock are fattened for market. In the case of industrial salmon farming, feedlot refers to the underwater net-pens in which farmed fish are raised.
Fish meal: Ground dried fish and fish waste used as fertilizer and animal food.
Genetic engineering: Modifying the genetic makeup of living organisms using modern molecular biology techniques that can combine genes from dissimilar organisms.
Habitat: The place or environment where a plant or animal naturally or normally lives and grows.
Migration: The process of passing periodically from one region or climate to another for the purposes of feeding or breeding.
Omega 3 fatty acids: A form of polyunsaturated fats, one of four basic types of fat that the body derives from food. Omega 3's have been proven to benefit the hearts of healthy people, people at high risk of cardiovascular disease and patients with cardiovascular disease. High levels of these fats are found in salmon.
Parasite: An organism living in, with, or on another organism and dependent upon the secondary organism.
PCB's: A class of man-made chemicals known as polychlorinated biphenyls that have been shown to cause skin ailments, reproductive disorders, liver disease and other health problems.
Pollutant: A substance that contaminates a natural environment, especially with man-made waste.
Resistance: Phenomenon in which insects, fungi, or bacteria treated with a particular substance evolve the ability to survive that substance. (I.e.- antibiotic resistant bacteria resulting from the use of antibiotics).
Salmon fry: Baby salmon.
Sea lice: External parasites that feed on the skin and mucous of live salmon.
Smolt: A young salmon or sea trout about two years old that is at the stage of development when it is ready to migrate from fresh water to the sea.
Spawn: To produce or deposit eggs -- used to refer to aquatic animals.
Sustainability: Of, relating to, or being a method of harvesting or using a resource so that the resource is not depleted or permanently damaged.
Toxin: A poisonous substance that is a specific product of the metabolic activities of a living organism and is usually very unstable.

An Article About Salmon Farming

Salmon aquaculture in the Pacific Northwest: a global industry with local impacts

Environment, Oct, 2003 by Rosamond L. Naylor, Josh Eagle, Whitney L. Smith

Many locals in British Columbia's Broughton Archipelago welcomed the salmon-farming industry in the early 1980s. It promised jobs, more schools, and higher incomes. It was not until some regular pods of killer whales stopped returning--and later, when some wild salmon populations became diseased--that the locals became concerned. In Alaska, coastal ecosystems were protected from these impacts by a statewide ban on finfish farming in 1989. However, when the price of their commercial salmon catch plummeted in the mid-1990s, Alaskans became worried. Throughout the Pacific Northwest and Alaska, people now see the close connection between salmon farming, the environment, and international markets. As the global aquaculture industry continues to expand, what impacts will it have on local ecosystems and fishing economies?

Salmon aquaculture, which consists of rearing salmon from eggs in hatcheries and then growing them to market size in marine netpens, is indeed a booming industry. Since the late 1980s, there has been a fivefold increase in farm salmon production worldwide. (1) The majority of farm salmon is produced in countries with long, protected coastlines and cold ocean water--most notably Chile, Norway, the United Kingdom, and Canada--and is sold to markets in Japan, North America, and Europe. Global salmon output, including wild catch, has grown from less than 800,000 metric tons (mt) to more than 1.8 million mt during the past 15 years, and virtually all of the growth has come from farms. (2) Consumers now benefit from an abundance of fresh fish in the market throughout the year. Industry representatives have suggested other potential benefits as well, such as reduced pressure on overfished salmon populations and provision of habitat for marine organisms. (3) Given the broad scientific consensus that global fish capture has reached a plateau and that many fish stocks are depleted or close to depletion, (4) aquaculture is often viewed as an important means for replacing, or at least supplementing, capture fisheries and providing a healthy food product to consumers.

The validity of these claims remains a debated topic. (5) Many scientists, environmentalists, and fishers worry that the ecological risks of farm fish--such as the spread of disease and parasites, competition among escaped farm fish and endemic species, and pollution from farm effluent--outweigh the potential benefits. The health advantages of farm fish are also disputed. (6) Taking a close look at a specific region--Washington, British Columbia, and Alaska--where both salmon fishing and salmon farming are important politically, economically, and ecologically, provides insight into this debate. Since the late 1800s, wild salmon capture has played a critical role in the region's economy by providing employment and income to a large number of Native American and nonnative communities along the coast. The region is home to indigenous stocks of sockeye, chum, pink, coho, and chinook salmon, and a large share of the fish captured is sold in international markets. Wild salmon runs have been at record levels in many areas of Alaska since the late 1980s due to favorable climatic conditions and hatchery-enhanced production. (7) Despite these conditions, Alaska's contribution to the global salmon market declined from 40-50 percent in the early 1980s to less than 20 percent by 2000, mainly because of competition with farm salmon. (8) In Washington and British Columbia, several Pacific salmon populations have become threatened or endangered. Seven of every ten salmon produced in Washington and British Columbia now come from farms.

In Washington and British Columbia, there is tension within governing agencies--the U.S. National Oceanic and Atmospheric Administration (NOAA) Fisheries and the Department of Fisheries and Oceans (DFO) Canada, respectively--that have joint mandates to promote aquaculture and to protect ocean resources. There is also mounting regional tension between salmon fishing and salmon-farming activities. British Columbia's government lifted its six-year moratorium on salmon farming in September 2002, while the U.S. government is proposing the development of aquaculture facilities in the offshore federal zone, which lies between 3 and 200 miles off the U.S. coastline. (9) These developments will likely place salmon farms much closer to the Alaskan border, weakening the safety net on coastal ecosystems provided by the state's ban on finfish aquaculture.

Salmon farming is not the only form of aquaculture with impacts on local fisheries, ecosystems, and fishing communities. Although it is not yet on the same scale as salmon aquaculture, the farming of other carnivorous, highly valued species such as bluefin tuna, cod, and halibut is on the rise in different regions around the world (including, for some of these species, the Pacific Northwest). The debate over salmon farming thus serves as a model for exploring the broader set of issues surrounding marine aquaculture.

Resources

Salmon and Salmon Farming on the Internet

The Coastal Alliance for Aquaculture Reform.
www.FarmedAndDangerous.org

The goal of Ecotrust is to create Salmon Nation, where people and wild salmon thrive.
www.SalmonNation.com

The British Columbia Salmon Farmers Association.
www.SalmonFarmers.org

Intrafish is the leading Norwegian media house for international fisheries and aquaculture industries.
www.Intrafish.com

SeaWeb raises awareness and inspires action to protect the ocean and the life within it.
www.seaweb.org/resources/sac

The David Suzuki Foundation works through science and education to protect the balance of nature and our quality of life.
www.DavidSuzuki.org

Pacific Fisheries Resource Conservation Council.
www.fish.bc.ca

Ensuring the health of oceans and coastal communities.
www.LivingOceans.org

Norwegian Salmon Association.
www.Norweigan-Salmon.com

Independent harvesters of line-caught wild Pacific salmon.
www.OrganicOcean.com

Protecting marine and rainforest habitat on British Columbia's central and north coast.
www.raincoast.org

News from the Salmon Farm Protest Group.
www.SalmonFarmMonitor.org

Daily source of news articles regarding salmon and other conservation issues.
www.tidepool.org/salmon

Seafood Choices Alliance provides a list of "farm-free" restaurants and retailers.
www.SeafoodChoices.org

Institute for Agriculture and Trade Policy has educational campaigns about farmed salmon and farmed shrimp, including the new initiative to locate fish pens farther offshore. **www.iatp.org/fish**

Chilean Salmon Farmers Association.
www.SalmonChile.cl

Ecoceanos, a Chilean organization concerned about salmon farming and its impacts on the coastal environment and people**. www.ecoceanos.cl**

Books About Salmon and Salmon Farming

Salmon Nation: People and Fish at the Edge
Edited by Edward Wolf and Seth Zuckerman, Ecotrust, 1999

King of Fish: The Thousand Year Run of Salmon
By David Montgomery, West View Press, 2003

Reaching Home: Pacific Salmon, Pacific People
By Tom Jay, Brad Matsen, Natalie Fobes, Graphic Arts Center Publishing Co, 1995

A Stain Upon the Sea: West Coast Salmon Farming
By Stephen Hume, Alexandra Morton, Betty C. Keller, Rosella M. Leslie, Otto Langer, Don Staniford, Harbour Publishing, British Columbia, 2004.

Recent Study Results

Global Assessment of Organic Contaminants in Farmed Salmon
www.pewtrusts.com/pdf/salmon_study.pdf

The Global Salmon Industry and its Impacts in Alaska
www.labor.state.ak.us/research/trends/oct03ind.pdf

Salmon Farms, Sea Lice and Wild Salmon
www.livingoceans.org/fishfarms/Fishfarmreports/SeaLice_FullReport%20April%202004.pdf

A Competitiveness Survey of the British Columbia Salmon Farming Industry
www.agf.gov.bc.ca/fisheries/pdf/Competitiveness_Survey.pdf

On The Risk of Colonization by Atlantic Salmon in British Columbia Waters
www.salmonfarmers.org/pdfs/colonization.pdf

Summary Report of Contaminant Results in Fish Feed, Fish Meal and Fish Oil
www.inspection.gc.ca/english/anima/feebet/dioxe.shtml

Related Films from Bullfrog

***Fisheries - Beyond The Crisis*, 1998**
Two communities -- one in Canada and one in India -- point the way to sustainable fisheries. 46 minutes. Directed by Eileen Thalenberg.

***The Salmon Forest*, 2001**
Reveals the fragile connection between salmon, bears, trees, and people in the NW rainforest. 52 minutes. Written, produced, and directed by Caroline Underwood for CBC's "The Nature of Things."

***Empty Oceans, Empty Nets*, 2003**
Examines the global marine fisheries crisis and the efforts to implement sustainable fishing practices. 55 minutes. Directed by Steve Cowan.

Farming the Seas, 2004
Many experts now believe that some forms of "fish farming" are actually creating more problems than they are solving. 56 minutes. Directed by Steve Cowan.

What They Are Saying About *Net Loss*….

"An old Chinese proverb, 'the fish sees the bait, not the hook; a person sees the gain, not the danger', warns of the unexpected consequences of new technologies. *'Net Loss: The Storm Over Salmon Farming'* introduces many of the consequences of salmon net-pens, at the same time as it humanizes their effects for individuals and cultures in regions from Chile to the Pacific Northwest."
Dr. James Karr, Aquatic Sciences and Biology, University of Washington

"An extraordinary and timely film."
Dr. Michael Skladany, Institute for Agriculture and Trade Policy

"Fairly portrays the positions of salmon farmers, conservationists, First Nations, traditional fishermen and government officials…. A thorough examination of the growth of the industry in British Columbia and Chile, and the effects of the industry on the environment and other economic sectors."
Jim Fulton, Executive Director, The David Suzuki Foundation

"A fantastic job of telling the entire industrial salmon farming story - from one end of the planet to the other, and from the producer all the way to the consumer. This is the film to show your friends and colleagues who still think that buying farmed fish is the best way to protect wild salmon or to feed the world. NET LOSS is a myth buster par excellence!"
Mark Ritchie, Institute for Agriculture & Trade Policy

Awards:

Bronze Plaque, Columbus International Film & Video Festival
Honorable Mention for Environmental Issue Awareness, International Wildlife Film Festival
Hazel Wolf Environmental Film Festival
Planet in Focus, Toronto International Environmental Film Festival
Bioneers Film Festival
Wild and Scenic Environmental Film Festival, Nevada City, CA
The Conscientious Projector, Bainbridge Island, WA
Santa Cruz Film Festival
Green Reel Film Festival

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