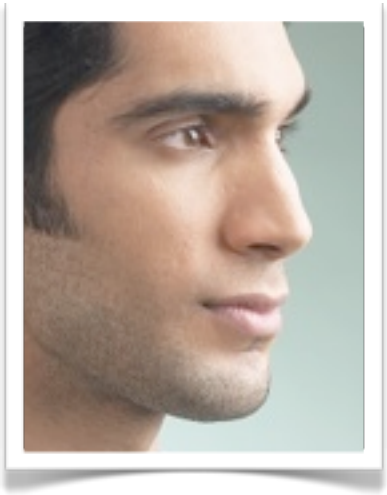
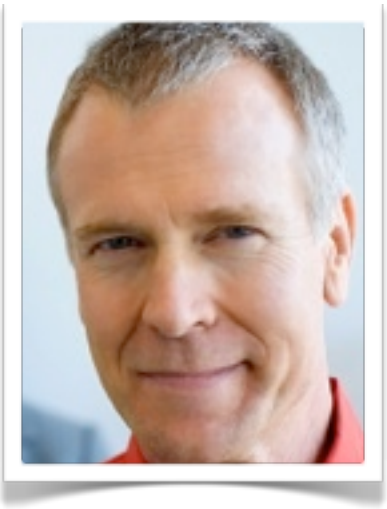
# Role Play Activity

## Seafood from Puget Sound - How Much Can We Safely Eat?





Center for ecogenetics & Environmental Health

## Acknowledgements

We wish to thank our reviewers:

- **Liz Carr**, Fish Program Coordinator, Washington State Department of Health
- **Katie Frevert**, Research Translation Core Program Manager, Superfund Research Program, University of Washington
- **Dr. Elaine Faustman**, Institute for Risk Analysis and Risk Communication, UW Department of Environmental & Occupational Health Sciences

We are also grateful to the students and staff members who participated in early versions of the activity and provided valuable feedback:

- Students and staff members from the University of Washington Department of Environmental and Occupational Health Sciences (DEOHS)
- Student participants in the 2012 UW Genomics Outreach for Minorities (GenOM) Project
- Undergraduate students in the summer 2012 Environmental Health Research Experience Program, UW DEOHS

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Center for ecogenetics & Environmental Health

This activity was developed by the Community Outreach and Ethics Core of the Center for Ecogenetics and Environmental Health at the University of Washington with funding from the National Institute of Environmental Health Sciences, grant # ES007033.

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# Role Play Activity: Seafood from Puget Sound - How Much Can We Safely Eat?

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# Activity Instructions

This Role Play Activity is designed to promote discussion and critical thinking about the issue of seafood safety. While much of the information included in the activity is real and accurate, the people and places are, for the most part, fictional.

The activity is designed for a group of 6 or more participants. It can be used with secondary school students as well as adults. The facilitator should be familiar with the basic principles of public health and environmental health and should have read all the activity materials beforehand.

**Before the Event:**

1. Make the following number of copies of the handouts:
    a. "Setting the Scene" page - one for each participant
    b. "Perspective" pages (3 characters, 2 parts each) - one Perspective for each participant, As each participant will be assigned one of the 3 perspectives, divide the number of participants by 3 and make that many copies of each perspective.
    c. "Take Away Messages about Safe Seafood" - one copy for each facilitator
    d. "Wrapping It Up" pages - cut along the dotted lines, keeping each of the 4 endings for each character together. Place each set of 4 in an envelope labeled with the character's name.

**At the Event:**

1. Divide participants into groups of 2, or no more than 5. You will need at least 3 groups. Ideally, the number of groups should be a multiple of three.
2. Assign one of the three "Perspectives" - Joe James, Larry Lakey, or Janelle Jackson - to each group. The group's assignment is to take on the character they are assigned and try to respond to the prompts the way they think that character would respond.
3. Give each participant a copy of the "Setting the Scene" background document. If the facilitator did not present this material to the whole group, instruct the small groups to read this sheet as a "round robin" in which one person reads the first paragraph, then the next person reads the second, etc. Or ask them to read it quietly to themselves.
4. Invite each group to discuss the information briefly. Instruct them to focus on asking clarifying questions to make sure they all understand the text and figures.
5. Invite each group to share one thing that surprised them or was new information for them.
6. Hand out "Part 1" of the story to each group according to the character they have been assigned. Tell them to choose both a note taker and a spokesperson. Instruct them to read the narrative, either to themselves or as a round robin, then discuss the questions as a group. Encourage each group to come to consensus around their answers to the questions. Remind them to consider the questions from the point of view of their assigned character.
7. Invite each group's spokesperson to share the following with the larger group: Who they are, what questions they were asked to discuss, and how they answered the questions. Encourage others to

ask clarifying questions to make sure that the whole group understands the various perspectives and characters being presented.

8. Hand out “Part 2” of the story to each group according to the character they have been assigned. Instruct them to read the continuation of the narrative, either to themselves or as a round robin, then discuss the questions as a group. Point out that Part 2 is a bit different because it has two sections, each of which is followed by a “decision point” in the form of a question. Make sure they understand that they need to agree on how to answer each of the two questions by the end of the discussion period. Ask them to complete the “Decision Summary” check boxes on the back side of the Part 2 handout when the discussion period has ended.
9. Invite the first group’s spokesperson to share the group’s answers to the two “decision point” questions. Ask them to briefly explain how easy or difficult it was to come to a consensus around the questions. After the group reports, ask them to restate how they voted on the two decision points, YES/YES, YES/NO, NO/YES, or NO/NO. Give a group member the corresponding slip of paper from that character’s envelope of “Wrapping It Up” endings and invite him or her to read their ending to the larger group. Ask each group in turn to report their answers to the two “decision point” questions and to explain how they decided. Then give them the corresponding paper from their character’s envelope of “Wrapping It Up” endings to read to the larger group.
10. The facilitator then summarizes the material on the sheet “Take-Away Messages About Safe Seafood” as appropriate to the group.
11. Close with a discussion of how this activity might be relevant to the participants real lives. Do they struggle with knowing how to make healthy eating choices in the face of pollution and mixed messages they hear from the media and experts? Do they take part in activities that cause water pollution? Are there ways they can help reduce water pollution?


## Setting the Scene: Background Information about Seafood Safety and Puget Sound

- Perch, rockfish, flounder, sole, salmon, and trout live in Puget Sound.
- Local shellfish include crab, clams, cockles, mussels, oysters, and shrimp.
- Industry and manufacturing have operated on Puget Sound for more than 160 years, contaminating the Sound and rivers with industrial waste. These industries include fishing, marine, aerospace, paper, biotechnology, electronics, telecommunication, transportation, and military.
- Agricultural farmers and residential homeowners are responsible for pollution, too. Rain and snow flow over fields, lawns and roads, washing fertilizers, chemicals, oil, and litter into the Sound.
- Some toxic chemicals found in Puget Sound are polychlorinated biphenyls (PCBs,) polycyclic aromatic hydrocarbons (PAHs), oil, phthalates, mercury, cadmium, arsenic and lead.
    - Being exposed to PAHs for a long time can cause cataracts, jaundice, liver and kidney damage.
    - Exposure to PCBs and PAHs can cause cancer.
    - Mercury exposure can cause neurological symptoms including Parkinson's disease. Mercury can harm the growing brain and nervous system of fetuses, infants and children, and can also increase the risk of heart attack.
    - Phthalates are endocrine-disrupting chemicals that affect hormone levels and can cause birth defects.
- When people eat fish and shellfish from Puget Sound, they are exposed to the toxic chemicals that have collected in these animals.
    - Rockfish and Chinook salmon have high amounts of PCBs and mercury.
    - In the Duwamish River, perch, sole, flounder, rockfish and all shellfish are so contaminated with PCBs that the Washington State Department of Health (DOH) has issued a fish advisory that warns everyone -- men, women and children -- not eat any resident fish, crab or shellfish from the Duwamish River.
- On the other hand...eating fish and shellfish is healthy. Seafood is a high-protein food that is low in saturated fat and contains omega-3 fatty acids, B and D vitamins, and essential trace minerals.
    - The American Heart Association recommends eating at least 2 meals of fish per week.

## Role Play Activity: Seafood from Puget Sound - How Much Can We Safely Eat?

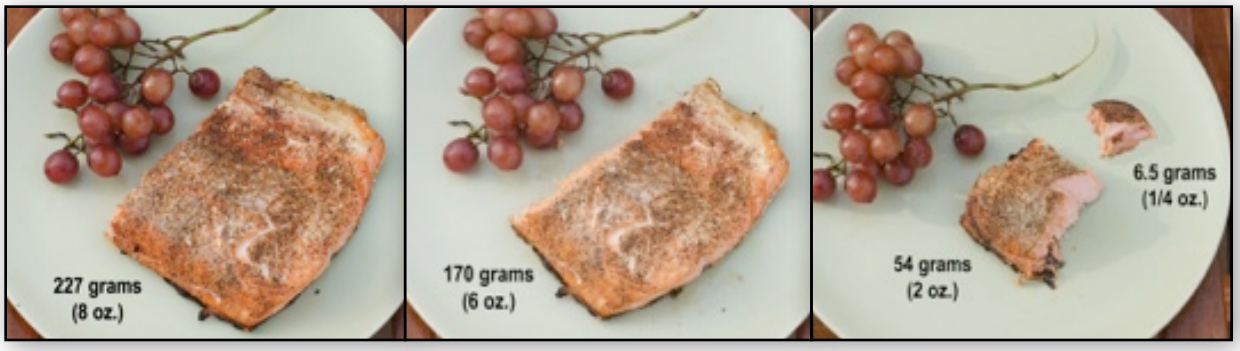
***Figure 1:*** *Washington State Department of Health's Healthy Fish Guide Wallet Card*


**Table 1:** Summary of Survey Results
Source: WA Department of Ecology Fish Consumption Rates Technical Support Document,
Pub # 11-09-050, September 2011.

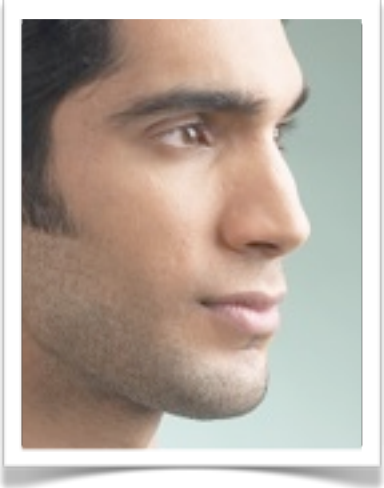
| Population Surveyed | Date Survey Taken | Average Per Day | * 95th Percentile |
|---|---|---|---|
| US Population | 1980s | 6.5 grams | No Info Available |
| Recreational Fishermen in Washington State | 1991 | 54 grams | No Info Available |
| Tulalip Tribal Members | 1996 | 72 grams | 244 grams |
| Asian & Pacific Islanders | 1999 | 117 grams | 306 grams |
| Suquamish Tribal Members | 2000 | 214 grams | 489 grams |

*One in twenty survey respondents eats this much.

**Figure 2:** Serving sizes in grams and ounces



# Perspective #1: Joe James, Part 1



You are Joe James, a member of a Native American tribe in Puget Sound. Federally recognized tribes have the right to harvest fish and shellfish in their historic fishing areas. In 1974, the Boldt Decision reaffirmed the right of tribes in Washington to harvest up to 50% of the harvestable number of salmon in their usual and accustomed fishing areas.

Harvesting and eating seafood is a cornerstone of Puget Sound tribal culture and spiritual practices. But fish consumption by tribal members is suppressed. This means tribal members eat less fish than their ancestors ate, and many eat less than they would like to eat. First the tribes were driven from their land and had no fishing rights. When fishing rights were restored, habitat was destroyed and fish populations declined. Now as attempts are being made to protect and restore fish populations, tribal members can't harvest in some traditional fishing grounds because the fish is not safe to eat. Meanwhile, tribes have high rates of obesity and diabetes that they might not have if they ate their traditional diet.

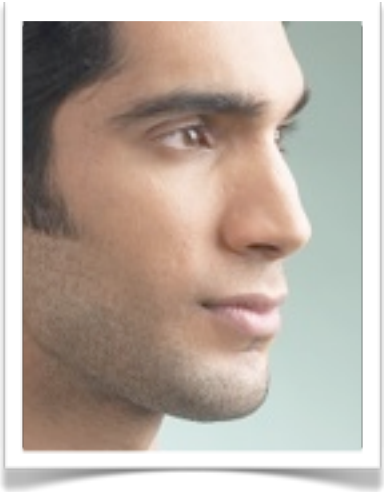
Along with other members of your tribe, you make your living harvesting salmon from your tribal fishing grounds at the mouth of the Salmon River on Puget Sound. Your tribe sells the salmon to a grocery chain under contract. The fish sold in the stores are labeled "Wild Tribal-Caught Salmon". You don't sell everything you catch and bring home enough to provide your family with a diet rich in seafood. You eat one or two meals of fresh seafood every day.

You have seen the DOH Healthy Fish Guide that lists many types of fish and shellfish, including Puget Sound and Washington coastal salmon (Figure 1). DOH recommends that people in Washington include fish in their diet. The Healthy Fish Guide tells how much of different species you can eat and be safe. You are also aware of the DOH fish advisories posted on rivers and beaches where some seafood is not safe to eat. You follow the fish advisories, but you don't use the Healthy Fish Guide because the amount of fish it says you can eat is too restrictive. It makes you angry that fish consumption is suppressed.

**Discussion Questions:**

1. Your diet includes a large amount of seafood and you eat far more than the recommended amount. Are you concerned about being exposed and exposing your family members to unsafe chemicals? If you are, what are some options that are acceptable for you?
2. Is it fair that you and your fellow tribal members do not have access to the quantity and quality of seafood that your ancestors did? Does the US government have an obligation to make seafood safer and more available to tribes? If not, why not? If so, make some specific suggestions for how the US government can meet its obligation.

## Perspective #1: Joe James, Part 2



One approach to seafood safety is to figure out how much is safe to eat, and only eat that much. Another approach is to clean up the waterways to make seafood less toxic and safer to eat. There are a number of ways to clean up the waterways.

One way is to **PREVENT** new toxic chemicals from entering Puget Sound. Stormwater picks up pollution as it flows over hard surfaces. Activities such as home construction, outdoor machinery maintenance, driving, lawn fertilizing, and washing cars add pollutants to stormwater. Using chemicals responsibly, and building stormwater treatment systems help prevent toxic chemicals from entering the Sound. Prevention is important to keep Puget Sound from becoming more polluted.

Your tribe's usual and accustomed fishing area on the Salmon River is part of the town of Seahaven. Seahaven has a beautiful riverfront, but there is a sheen of oil in the water from runoff from the highway. The Town Council has had the water tested and identified the contaminants. They want to clean up the water and have proposed a $25 million bond measure to build a stormwater treatment system to stop runoff from reaching the Sound. Taxes would increase for Seahaven residents by an average of $500 annually. Although there are no property taxes on the reservation, you and your family live in a small house in Seahaven that your wife inherited. You pay annual property taxes and would have to tighten your budget a lot to pay $500 more in taxes.

**Discussion Question 1:**

- Think carefully about how the bond measure could affect you, your family, and your community. Would you vote for or against the bond measure? Why?

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It is also necessary to **REMOVE** industrial pollutants that already contaminate river and lake bottoms. Several cleanup options are explained in the table below:

| Strategy | Removal | | Containment | Natural Recovery | |
|---|---|---|---|---|---|
| **Options** | **Treatment** | **Disposal** | **Engineered Caps** | **Enhanced** | **Monitored** |
| **How it works** | Treated to remove pollution | Removed to landfill or other location | Cover the sediment with a layer of clean sand, gravel, or rock to isolate the pollution | Add a layer of sand to cover the pollution and speed recovery | Watch and keep records as chemicals break down naturally |
| **Cost** | $$$$ | ← | → | | $ |
| **Effectiveness** | More Treatment | ← | → | | Less Treatment |

**Role Play Activity: Seafood from Puget Sound - How Much Can We Safely Eat?**

In an experimental removal strategy using tiny, engineered molecules called nanomaterials, contaminated sediment is dredged and removed from the waterway, then filtered through huge columns filled with fine resin. The resin is a molecular sponge that absorbs a contaminant such as mercury. The contaminant stays bound to the resin in the column while the cleaned sediment passes through the column and is returned to the water. Separating the contaminant from the sediment results in a much smaller volume of toxic waste to dispose of.

The Department of Ecology has concluded a study of the Puget Sound seabed off Seahaven and discovered high concentrations of mercury contamination from the paper mill that operated in Seahaven from 1900-1970. When the mill closed, the town bought the land and took responsibility for cleanup.

While removing all the mercury would be the most thorough cleanup, businesses in Seahaven say it would be too expensive to dredge the sediment and remove the mercury, and that bringing heavy equipment into town for dredging would discourage people from coming to Seahaven, which would put merchants out of business. The Town Council also says the town will have to pay for some of the cleanup, and that may mean reducing important local services like police, garbage, and park maintenance.

Nevertheless, Ecology would like to use Seahaven as a pilot project for the experimental removal strategy using nanomaterials and would pay the $50 million required to fund the project. This technology hasn't been tried on this large a scale, and some environmental groups and public health officials worry that dredging will stir up the mercury and make the contamination worse. In addition, there are concerns that the new technology itself might have unforeseen health risks for the environment and human health. The Seahaven business community and Town Council oppose this plan and claim that since the paper mill is closed and no more mercury is entering the Sound, a less costly strategy would be to monitor a natural recovery.

**Discussion Question 2:**

- Consider your stake in cleaning up the seabed. Would you support Ecology's recommendation? Why or why not?

**Decision Summary:**

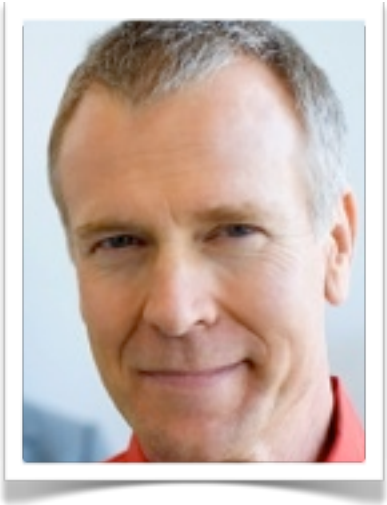
Do you approve the $25 million **bond measure** to build a stormwater treatment system?

☐ **YES** ☐ **NO**

Do you support **Ecology's recommendation** to use Seahaven as a pilot project for the experimental removal strategy using nanomaterials?

☐ **YES** ☐ **NO**

## Perspective #2: Larry Lakey, Part 1



You are Larry Lakey and you work for Ecology. Ecology's mission is to protect, preserve and enhance Washington's environment, and to promote the wise management of Washington's air, land, and water for the benefit of current and future generations of Washington residents.

Ecology is reviewing the requirements for sediment management standards for water bodies in Washington State. When sediment is contaminated with toxic chemicals, fish and shellfish become contaminated. People are then exposed to toxic chemicals in the seafood. Ecology is collecting data on how much seafood people in Washington eat; this information will help the agency recommend a fish consumption rate (FCR). The FCR is used in a complex formula to set the cleanup standard for sediment, and also set emissions standards for industry. When sediment meets the cleanup standard, people should be able to eat seafood in amounts up to the FCR and be safe from negative health effects. The FCR is different from the DOH Healthy Fish Guide.

Ecology believes Washington's current FCRs are outdated and inaccurate. Washington uses two rates, calculated from data over 20 years old: An FCR of 6.5 grams per day is used to set emissions standards to ensure good water quality. An FCR of 54 grams per day is used for cleanup standards for sediment (see Figure 2 from Setting the Scene).

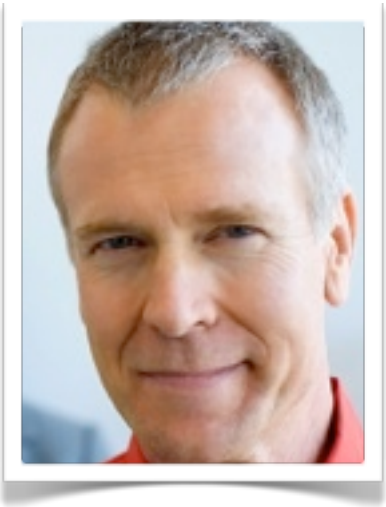
Several Washington tribes have conducted fish consumption surveys. Surveys of Asian and Pacific Islanders, the US population, and recreational fisherman in Washington have also been conducted. (see Table 1 from Setting the Scene).

If the sediment management standard could be strict enough to protect the people who eat the highest amount of seafood, everyone who eats local seafood would be protected. But setting the FCR to the highest seafood consumers would require the water and sediment to be cleaner and emissions standards for business and industry to be more strict. That can be very expensive for businesses, taxpayers and government. Stricter standards can also lead to tradeoffs in the state budget, or to higher taxes. Ecology invites public comments before they make a decision, and many citizens and business leaders responded with a wide range of opinions about what FCR should be adopted. Based on Table 1, the agency wants to recommend one FCR of between 150-275 grams/day. You are asked for your recommendation.

**Discussion Questions:**

1. Study Table 1 and make sure you understand how "average per day" and "95th Percentile" are related to the FCR. What FCR do you recommend, and why?
2. According to the data in Table 1, some WA residents eat more than 275 grams of seafood per day. Does the FCR you recommended in Question 1 adequately protect their health?
3. Does Ecology have an obligation to protect the health of the average person, most people, or everybody? Why do you think so?

## Perspective #2: Larry Lakey, Part 2



Ecology is responsible for identifying water bodies that do not meet water quality standards. It works with local interests to prepare prevention and cleanup plans to reduce pollution. Ecology also negotiates discharge permits and contaminant management plans, and monitors the effectiveness of cleanup projects. After Ecology recommends a new FCR, the agency will add it to the mathematical formula that sets new standards for Sediment Management and Water Quality.

One way to protect water quality is to **PREVENT** new toxic chemicals from entering Puget Sound. Stormwater picks up pollution as it flows across hard surfaces. Activities such as home construction, outdoor machinery maintenance, driving, lawn fertilizing, and washing cars add pollutants to stormwater. Stormwater treatment systems help prevent these toxic chemicals from entering the Sound. Prevention is important to keep Puget Sound from becoming more polluted.

Ecology is studying contamination of the waterways in and around the town of Seahaven, located where the Salmon River enters Puget Sound and adjacent to an Indian reservation. Seahaven has a beautiful riverfront, but there is a sheen of oil in the water from runoff from the highway. The Town Council has had the water tested and identified the contaminants. They want to clean up the water and have proposed a $25 million bond measure to build a stormwater treatment system to stop stormwater from entering the river and the Sound. Taxes would increase by 10% for Seahaven businesses and industries, and by $500 annually for the average resident. You expect to get strong pushback about the cost to build a stormwater treatment system. You also have a personal stake in what happens in Seahaven because your elderly mother lives there. She owns a little house and lives month-to-month on a small pension. If taxes increase, she could lose her home.

**Discussion Question 1:**

- Consider your professional and personal stake in the proposed stormwater treatment system to clean up the river. Do you support Seahaven's $25 million bond measure?

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It is also necessary to **REMOVE** industrial pollutants that already contaminate river and lake bottoms. Several cleanup options are explained in the table below:

| **Strategy** | **Removal** | | **Containment** | **Natural Recovery** | |
|---|---|---|---|---|---|
| **Options** | **Treatment** | **Disposal** | **Engineered Caps** | **Enhanced** | **Monitored** |
| **How it works** | Treated to remove pollution | Removed to landfill or other location | Cover the sediment with a layer of clean sand, gravel, or rock to isolate the pollution | Add a layer of sand to cover the pollution and speed recovery | Watch and keep records as chemicals break down naturally |
| **Cost** | $$$$ | ⟷ | ⟷ | ⟷ | $ |
| **Effectiveness** | More Treatment | ⟷ | ⟷ | ⟷ | Less Treatment |

## Role Play Activity: Seafood from Puget Sound - How Much Can We Safely Eat?

In an experimental removal strategy using tiny, engineered molecules called nanomaterials, contaminated sediment is dredged and removed from the waterway, then filtered through huge columns filled with fine resin. The resin is a molecular sponge that absorbs a contaminant such as mercury. The contaminant stays bound to the resin in the column while the cleaned sediment passes through the column and is returned to the water. Separating the contaminant from the sediment results in a much smaller volume of toxic waste to dispose of.

Ecology has also studied the Puget Sound seabed off the coast of Seahaven and discovered high concentrations of mercury left by the paper mill that operated in Seahaven from 1900-1970. When the mill closed, the town bought the land and took responsibility for cleanup.

While removing all the mercury would be the most thorough cleanup, businesses in Seahaven say it would be too expensive to dredge the sediment and remove the mercury, and that bringing heavy equipment into town for dredging would discourage people from coming to Seahaven, which would put merchants out of business. The Town Council also says the town will have to pay for some of the cleanup, and that would mean reducing important local services like police, garbage, and park maintenance.

Some of your colleagues at Ecology think the cleanup at Seahaven would be a good pilot project for the new removal strategy using nanomaterials and have suggested that Ecology pay the $50 million required to fund the project. This technology hasn't been tried on this large a scale and some environmental groups and public health officials worry that dredging will stir up the mercury and make the contamination worse. In addition, there are concerns that the new technology itself might have unforeseen health risks for the environment and human health. The Seahaven business community and the Town Council are opposed to a pilot and say that since the paper mill is closed and no more mercury is entering the Sound, a less costly strategy would be to monitor a natural recovery.

**Discussion Question 2:**

- What are the pros and cons of the cleanup that uses nanomaterials? Would you recommend this pilot program using nanomaterials for Seahaven?

**Decision Summary:**

Do you support the $25 million **bond measure** to build a stormwater treatment system?

☐ **YES** ☐ **NO**

Do you support **Ecology's recommendation** to use Seahaven as a pilot project for the experimental removal strategy using nanomaterials?

☐ **YES** ☐ **NO**

## Perspective #3: Janelle Jackson, Part 1

You are Janelle Jackson and you and your husband live in the small town of Seahaven, located where the Salmon River enters Puget Sound. Your husband works in the pulp and paper mill located on the Salmon River. You enjoy walking together on the riverfront and beach in Seahaven.

You also like to eat local foods and are a big fan of seafood. You know that fish is very healthy. The American Heart Association recommends eating at least 2 meals of seafood every week.

But you are hearing that some types of fish and shellfish are safer than others, and that toxic chemicals in the water are showing up in these animals in Puget Sound and Washington rivers. You hear that many of the toxic chemicals come from past and present industry and manufacturing in the region. Your husband gets upset when he hears news reports about contaminants in water and seafood that link the problem to industry. He says industry should not be blamed; that's who makes the paper products we use every day. He reminds you that industry provides the paycheck your family depends on. You know he is concerned that stricter regulations could cause the plant to shut down and he could lose his job.

You feel conflicted because it's important to you that the seafood you enjoy is safe to eat. You are trying to get pregnant, and you worry because you've heard that pregnant and nursing women and growing children are more at risk from eating fish that contain toxic chemicals. DOH offers a Healthy Fish Guide that tells how much of which types of seafood you can eat and be safe (Figure 1). You carry it in your wallet and consult it at the grocery store.

The Department of Health is responsible for issuing fish consumption advisories for rivers, lakes, Puget Sound, and other water bodies across the state where the fish and shellfish aren't safe to eat. Although there are no signs posted where you walk along the riverfront, you've noticed that the river doesn't look very clean. You wonder how safe it is to eat fish from the river.

To complicate matters, the grocery store where you shop has a contract with local tribes to buy salmon harvested from their traditional fishing grounds. The fish is labeled, "Wild Tribal-Caught Salmon". In a conversation with the butcher, you learn the wild tribal-caught salmon is from the Salmon River. When you express concern about how dirty the river appears to be, the butcher tells you the grocery chain has no concerns about selling fish from the Salmon River.

Discussion Questions:

1. With the publicity about toxic chemicals in fish, how many times a week do you decide to eat fish and shellfish?
2. You have bought the wild tribal-caught salmon in the past. Now that you know it is from the Salmon River, make a list of the pros and cons of continuing to buy and eat fish from the Salmon River. Be sure to consider your husband's perspective.
3. With the information you have about toxic chemicals in fish, and your dependence on the industry where your husband works, do you feel comfortable that you can make good decisions about eating seafood?

## Perspective #3: Janelle Jackson, Part 2

One approach to seafood safety is to figure out how much is safe to eat, and only eat that much. Another approach is to clean up the waterways to make seafood less toxic and safer to eat. There are a number of ways to clean up the waterways.

One way is to **PREVENT** new toxic chemicals from entering Puget Sound. Stormwater picks up pollution as it flows across hard surfaces. Activities such as home construction, outdoor machinery maintenance, driving, lawn fertilizing, and washing cars add pollutants to stormwater. Using chemicals responsibly, and building stormwater treatment systems help prevent toxic chemicals from entering the Sound. Prevention is important to keep Puget Sound from becoming more polluted.

When you walk along the Seahaven riverfront, you can see a sheen of oil in the water. Town officials say the oil is coming from untreated stormwater that picks up runoff from the highway. The Town Council has had the water tested and identified the contaminants. They want to clean up the water and have proposed a $25 million bond measure to build a stormwater treatment system to stop runoff from reaching the Sound. Taxes would increase for Seahaven residents by an average of $500 annually. Paying higher taxes would be a hardship - you would have to give up something to pay $500 more in taxes.

**Discussion Question 1:**

- Consider your stake in cleaning up the river. Would you vote for the bond measure?

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It is also necessary to **REMOVE** industrial pollutants that already contaminate river and lake bottoms. Several cleanup options are explained in the table below:

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**Discussion Question 2:**

- Consider your stake in cleaning up the seabed. Would you support Ecology's recommendation? Why or why not?

**Decision Summary:**

Do you approve the $25 million **bond measure** to build a stormwater treatment system?

☐ **YES** ☐ **NO**

Do you support **Ecology's recommendation** to use Seahaven as a pilot project for the experimental removal strategy using nanomaterials?

☐ **YES** ☐ **NO**

## Take-Away Messages About Safe Seafood

1. The health benefits of eating seafood outweigh the risks if you choose fish and shellfish that are low in contaminants. As the Healthy Fish Guide says, “Eat Fish, Be Smart, Choose Wisely”. The American Heart Association recommends eating at least two fish meals per week.

2. The WA DOH provides the Healthy Fish Guide at: http://www.doh.wa.gov/CommunityandEnvironment/Food/Fish/HealthyFishGuide.aspx (Search “WA DOH fish”). For information about local fish advisories, see www.doh.wa.gov/fish.

3. The prevention & cleanup strategies on the table in Part 2 are real.

4. More about the Fish Consumption Rate (FCR):

    - FCRs are used to set regulation standards for clean water and for cleaning up contaminated sediment.
    - FCRs are controversial because they affect the rules how much pollution industrial and municipal plants are allowed to discharge into lakes, river, and the Sound.
    - Ecology Director Ted Sturdevant says that “Washington’s fish consumption rates for years have not reflected actual consumption.” (FCRs are 6.5 grams/day for Surface Water Quality Standards and 54 grams/day for Sediment Management Standards).
    - Ecology estimates people need to be able to eat 157-267 grams/day or 11-18 pounds of seafood/month and be safe from contaminants.
    - Business and local government interests reacted with alarm at Ecology’s estimate.

5. Oregon Fish Consumption Rate:
    - 2004 - FCR was set at 17.5g/day for Water Quality Standard
    - 2010 - EPA rejected this rate as too low
    - 2010 - Oregon adopted the FCR 175 grams/day, the highest in the US

6. Idaho Fish Consumption Rate:
    - 2010 - new FCR of 17.5 g/day
    - 2012 - new FCR under review by EPA

7. Ethical Issues:

    - Native Americans were driven from their land and had no fishing rights. When fishing rights were restored, habitat was destroyed and fish populations declined. Now as fish populations are being restored, tribal members can’t harvest in some traditional fishing grounds because the fish is not safe to eat. Injustice is heaped on injustice.

    - Higher fish consumers tend to be from vulnerable populations. Some are non-English speakers or illiterate and can’t read fish advisory signs. Some are subsistence fisherman and can’t afford to buy their food. Some of these vulnerable populations also have high rates of obesity and diabetes.

- The Washington State FCR, 6.5 grams/day, used for Surface Water Quality Standards, is based on a survey of all US residents, including people who don't eat fish.
    - Including non-fish eaters makes the FCR artificially low.
    - "It makes no sense to direct standards to people who aren't eating fish. It's like directing an anti-smoking campaign at nonsmokers." [Catherine O'Neill, law professor & faculty fellow at Center for Indian Law & Policy, Seattle University].

8. Action steps we can take:

- Prevent non-point pollution by:
    - Not dumping anything into storm drains
    - Washing the car at the carwash where water is recycled, or on the grass to filter the soap and dirt before water reaches the storm drain
    - Use less lawn fertilizer
    - Dispose of leftover prescription medications through the 'Take It Back' network or at your pharmacy. Don't flush them down the drain or toilet

- Take hazardous household waste to the Wastemobile where it will be disposed of safely. See http://www.lhwmp.org/home/hhw/disposal-locations.aspx.

- Tell government agencies to keep the water clean by responding to public comment periods (Google 'WA public comment' to learn which agencies are asking for public comments)

## Wrapping It Up - Joe James

### JOE: Bond Measure? NO & Ecology Pilot Project? NO

Because runoff continues and mercury breaks down slowly, the local seafood gets more contaminated as years go by. You continue to eat it often. You get the advantage of good nutrition from eating seafood, and your family stays fit and avoids getting diabetes. When you're 70 years old, you are diagnosed with Parkinson's disease. Soon after, your wife is diagnosed with early-stage breast cancer.

### JOE: Bond Measure? YES & Ecology Pilot Project? YES

Because runoff is prevented and the mercury is cleaned up, local seafood gets safer to eat as years go by. Local seafood becomes more popular, and you sell more fish at higher prices. Your income increases and you build a dream home for your family on the reservation.

### JOE: Bond Measure? NO & Ecology Pilot Project? YES

The mercury in Puget Sound was cleaned up using nanomaterials, but the community voted down the bond measure and no stormwater treatment plant was built. In a few years, the sheen of oil extends beyond Salmon River into Puget Sound. As a result, DOH issues a fish advisory. Your income drops and, in a couple of years, you are forced to sell your home in Seahaven and you and your family move in with your parents on the reservation.

### JOE: Bond Measure? YES & Ecology Pilot Project? NO

Even though the Sound is still contaminated with mercury, the Salmon River gets cleaner. Salmon runs are better. You have less concern about your family's diet and about promoting the salmon you sell. The issues around seafood contamination have raised your awareness of seafood safety and you have stopped harvesting shellfish from Seahaven beaches. You get the benefit of good nutrition from eating fish and don't get sick from contaminants in seafood.

## Wrapping It Up - Larry Lakey

### LARRY: Bond Measure? NO & Ecology Pilot Project? NO

Because runoff continues and mercury breaks down slowly, the local seafood gets more contaminated as years go by. This is disappointing because the river could be cleaner by now. You are motivated to work harder to make a healthy environment. You run for legislative office and are elected.

### LARRY: Bond Measure? YES & Ecology Pilot Project? YES

The stormwater treatment plant is built and runoff is prevented. However, your mother couldn't pay the higher taxes required by the bond measure and the town repossessed her home. Now she lives in your spare bedroom. In addition, there are unexpected problems with the experimental nanomaterials used to remove the mercury contamination. Workers inhale the mercury bound to the resin and develop serious respiratory and neurological problems. The pilot project is stopped. The incident makes you realize how much more there is to learn about the safety of nanomaterials. You quit your job and go back to school at the UW School of Public Health to learn more.

### LARRY: Bond Measure? NO & Ecology Pilot Project? YES

The mercury in Puget Sound was cleaned up using nanomaterials, but the community voted down the bond measure and no stormwater treatment plant was built. In a few years, the sheen of oil extends beyond Salmon River into Puget Sound. As years pass, you see how much better it would have been to prevent the pollution. DOH issues a fish advisory that resident fish from Salmon River and Seahaven are not safe to eat. You develop public service announcements about preventing runoff. In a few years, Seahaven has another bond measure for stormwater treatment, and this time it passes.

### LARRY: Bond Measure? YES & Ecology Pilot Project? NO

Even though the Sound is still contaminated with mercury, the Salmon River gets cleaner. However, your mother couldn't pay the higher taxes required by the bond measure and the town repossessed her home. Now she lives in your spare bedroom. As for cleaning up the mercury, a cleanup using nanomaterials was piloted in California with high success. At your next performance review, your supervisor tells you that you lack vision because you didn't recommend the pilot project at Seahaven. You apply for a promotion you really want, but you don't get it because of your poor performance review.

## Wrapping It Up - Janelle Jackson

### JANELLE: Bond Measure? NO & Ecology Pilot Project? NO

Because runoff continues and mercury breaks down slowly, the local seafood gets more contaminated as years go by. You worry about whether local seafood is safe, and you eat less, switching to more processed and fast food for a few meals a week. You gain weight and are diagnosed with Type 2 Diabetes. You never do get pregnant.

### JANELLE: Bond Measure? YES & Ecology Pilot Project? YES

Because runoff is prevented and the mercury is cleaned up, local seafood gets safer to eat as years go by. In order to pay the higher taxes, you give up cable TV. Now instead of watching television, you take an evening walk. To save money on groceries, you plant a garden and eat more vegetables. You also continue to eat seafood. You enjoy great health. You and your husband have two healthy kids.

### JANELLE: Bond Measure? NO & Ecology Pilot Project? YES

The mercury in Puget Sound was cleaned up using nanomaterials, but the community voted down the bond measure and no stormwater treatment plant was built. In a few years, the sheen of oil extends beyond Salmon River into Puget Sound. You cut back on local seafood and buy imported seafood and Alaskan salmon instead. You spend much more on groceries, as much as it would have cost to pay the taxes to clean up the water in Seahaven. Although the local seafood gets gradually more contaminated, your own health is not affected. You and your husband have two healthy kids.

### JANELLE: Bond Measure? YES & Ecology Pilot Project? NO

Even though the Sound is still contaminated with mercury, the Salmon River gets cleaner. When you retire, you have numbness in your arms and legs and become uncoordinated. Your daughter becomes your caregiver. You wonder if these neurological symptoms were caused by mercury in the shellfish you ate for many years.