Salmon Run - 10k

Possible Plan

1. Interactive app - teaching you about salmon
2. Poster for advertising it
   a. teams
3. Actual running map
   a. Obstacles
      i. Dam and fish ladder

Goodlink for the app to get information:
https://americanindian.si.edu/nk360/pnw-history-culture/pnw1-salmon/index.html

Problem Statement
How can we mobilize and educate the public about environmental impacts on salmon?

Research
- More than 135 other fish and wildlife benefit from the presence of salmon and wildlife [1]
- Why are salmon good for the environment? They contribute to the environment. When they die they decay. Their body feeds tiny organisms in the stream which are then eaten by the next generation of salmon.[1]
Juvenile salmon are hatched in rivers, go out to the ocean to get big and full of nutrients, then come back to Washington rivers and bring all those nutrients with them [1].

Less than 5% of historic populations of wild steelhead and salmon return to Washington streams [1].

Farmed salmon cause issues with pacific ecosystems, release of parasites, disease, waste to open waters [2].

Lack of chinook salmon is cited as main cause for whale decline [1].

Most important thing to save them is restore a healthy habitat [1].

“Save our WIld Salmon” is a coalition of groups looking to remove Lower Snake River Dams [1].

Dam renewal is most important opportunity to save salmon [1].

“Long Live the King” is environmental group dedicated to protecting and restoring wild salmon [1].

Some Pacific Northwest products are labeled “Salmon Safe”, which recognize farmers who practice conservation and protect native salmon habitat [1].

Climate change, shoreline development, diking and dredging [1].

Overfishing has lead to decline, land development and land building has damaged habitat and impacted salmon runs [5].

Pollution from mining, logging, waste can damage waterways [5] → household chemicals.

South of the border, three dams operated by the public utility Seattle City Light harness the river—Ross Dam, Diablo Dam and Gorge High Dam [7].

The Skagit and its tributaries are home to five species of wild Pacific salmon—chinook (Oncorhynchus tshawytscha), chum (O. keta), pink (O. gorbuscha), sockeye (O. nerka) and coho (O. kisutch), as well as O. mykiss, called steelhead. [7]

In the Pacific Northwest, 19 populations of wild salmon and steelhead are listed as threatened under the Endangered Species Act. On the Skagit these include chinook and steelhead. These are, of course, extant runs. Salmon have already gone extinct in 40 percent of their historical range. [7]

Warming and acidification are bad news [7].

Loggers built splash dams, blocking a stream to build up a force of water, releasing it each day or week to shoot logs (and the streambed) downstream. Logging roads eroded hills and caused landslides; silt buried redds. Canneries wasted fish, driving salmon runs to extinction. Sawmills clogged streams with sawdust. Farmers and householders cleared land down to the water’s edge, and streams silted up and warmed up. Industry fouled the waters. Dams provided inadequate fish ladders or no fish ladders (underwater steps that enable fish to traverse the dam). The first hatchery was built in 1895; early hatchery managers ignored fish biology even after it was understood. [7]
• Farmed salmon escaped farms (Cooke Aquaculture), only 200,000 of 305,000 were recaptured [2]
• “Salmon farming is correlated with a reduction in populations of wild native salmon. “Wild salmon close to fish farms are 73 times more likely to suffer lethal sea lice than juveniles not adjacent to fish farms,”” [2]
• While the industry says it’s improving, common practices require more than a pound of fish meal to produce a pound of salmon [2]
• Anadromous: They are born in fresh water and then spend their adult lives in the ocean and die in the river[3]
• Predators of the fry = bears, eagles, snakes. In the ocean, they are eaten by whales, dolphins, seals[3]
• **Decline:** Overfishing and dams[3]
• Salmon, whether coming or going, require protected pools and quiet side channels to rest in. [4]
• Twin monarchs of the Pacific Northwest, chinook salmon and southern resident orcas, are struggling for survival after a century of habitat losses. From the Pacific to the inland waters of Puget Sound and its freshwater rivers, the changes have outpaced adaptation.
• Across the Pacific Northwest, 40 percent of chinook runs already are locally extinct, and a large proportion of the rest that remain are threatened or endangered.
• But in just the past 150 years all that has changed. Humans have altered everything from the climate and the ocean food web to the estuaries and freshwater rivers where salmon begin their perilous years-long journey to sea and back.
• Despite being listed as a threatened species 20 years ago, the prospects of Puget Sound chinook remain unimproved.
• How much chinook do southern residents need?
• Scientists in the Cetacean Research Program at Fisheries and Oceans Canada estimate it takes the equivalent of at least 723 chinook to feed the entire population of southern residents every single day — but it could be as many as 868, depending on the age, body size and condition of the whales and the fish. A recovered population of killer whales would need even more fish, perhaps as much as 75 percent more, said Rob Williams, of Oceans Initiative, a Seattle-based science nonprofit.
• Without more food, the whales will be extinct within 100 years, Williams and other colleagues found in a 2017 paper.
• Preliminary findings by a total of 60 nonprofits, universities, tribes, state and federal agencies on both sides of the border in a marine survival study
launched by Long Live the Kings and the Pacific Salmon Foundation are revealing devastating trends in the Salish Sea.

- While coastal stocks of chinook have cycled up and down with ocean conditions, chinook, coho and steelhead in the Strait of Georgia and Puget Sound have declined up to tenfold since the 1980s and have remained depressed, the research project is finding. Many salmon die in Puget Sound, victims of everything from pollution to predators to habitat destruction and changes in the food web, long before they ever make it to the open sea.

- Farther south, the Columbia River was once the mightiest salmon river in the world, with some 4.5 million chinook a year returning. Now even in a good year, typically less than a million chinook come back. California’s Sacramento River salmon runs — once an abundant source of vital winter food — have collapsed.

- There have been fishing reforms, but fishing still takes a toll on the orcas’ food supply.

- Starving whales also burn fat to survive, releasing toxics into their blood where they can do damage to the whales’ immune system and reproductive capacity. So hunger hurts. Even kills.
Salmon declining in abundance and size

Chinook populations up and down the West Coast have slowly been decreasing since the 1980s. Not only are there fewer fish in regional waters, but individuals are shrinking in average size and weight, with the older, fatter salmon making up less and less of the population.

**CHINOOK ABUNDANCE FROM ALASKA THROUGH CALIFORNIA**

<table>
<thead>
<tr>
<th>Year</th>
<th>Chinook Population</th>
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<tbody>
<tr>
<td>1976</td>
<td>4,536,221</td>
</tr>
<tr>
<td>2009</td>
<td>2,750,699</td>
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</tbody>
</table>

39.4% fewer salmon than 1976

In 34 years, chinook on average have shrunk by 20% in weight and 7% in length.*

1975 West Coast chinook (average 4-year-old)  
Weight: 25 pounds  
Length: 37.9 inches

2009 West Coast chinook (average 4-year-old)  
Weight: 20 pounds  
Length: 35.1 inches

*Weight and length measured for 4-year-old ocean chinook from multiple salmon runs from Alaska to California.


Emily M. Eng / The Seattle Times
How many fish do orca need?

Chinook are the foundation of resident killer-whale diets. Based on orcas’ individual caloric needs, researchers have calculated the minimum number of chinook needed to sustain the current populations of resident killer whales.

The **75 southern residents** would need at least **317,000** chinook per year to survive with a diet of only chinook. A recovered population would need at least **554,000***.

<table>
<thead>
<tr>
<th>CURRENT POPULATION</th>
<th>317,000</th>
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<tbody>
<tr>
<td>RECOVERED POPULATION</td>
<td>554,000</td>
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The **307 northern residents** would need at least **1,150,000** chinook per year to survive with a diet of only chinook.

<table>
<thead>
<tr>
<th>2017 POPULATION</th>
<th>1,150,000</th>
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Based on preliminary data in 2018, **871,292 chinook** were caught in all commercial, tribal, sport fisheries from Alaska to Oregon.

<table>
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<tr>
<th>2018 CATCH</th>
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<tbody>
<tr>
<td>from Alaska</td>
<td>258,072</td>
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<td></td>
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<tr>
<td>from Canada</td>
<td>360,354</td>
<td></td>
<td></td>
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<tr>
<td>from WA/OR</td>
<td>252,866</td>
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<td></td>
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<tr>
<td><strong>871,292 total</strong></td>
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</table>

*Based on Williams, Rob, et. al, projection of a 75% increase in diet need.


EMILY M. ENG / THE SEATTLE TIMES
https://www.vanaqua.org/education/aquafacts/salmon[3]
Poster Blurbs

- **SALMON FUN RUN**
- **5k / 10k**
  - Why do salmon need our help?
    - Salmon populations are declining
    - They are vital to all animals
  - Learn about challenges our salmon face!
  - Learn how to support our marine ecosystem!
  - See the beautiful salmon!
- $x% entry fee
- Proceeds go to %s

App Blurbs

https://devpost.com/software/salmon-run

3 minute pitch

Kay: We are team boundless bois, and we chose to use the potential of individuals, technology, and collaboration to help Puget Sound Salmon recovery. Our problem statement is: How might we mobilize and educate the Puget Sound community on the current environmental challenges facing salmon? We chose to mobilize the community in a fun run because the Seattle community has high participatory rate in runs.

Lia: It is called the salmon run, a play on words on actual salmon runs, and is a 5k or 10k fun run that involves challenges that mimic a salmon’s life. For example, to mimic swimming upstream, a portion of the course will be up a hill. There will be frequent checkpoints along the race with scannable QR codes. The participant can scan the QR code with their phone, which takes them to information about that checkpoint, delivered by audio or read only depending on the users preferences. This allows for fluid usability that connects the participant with the course and app.

Nivvy: This race is meant for individuals of all ages, disabilities, and families. The playful visual system encourages all participants, and indicates an easy going experience intended to foster dialogue about the declining salmon population in the Puget Sound. We believe that our fun run and app will educate the general public about the issues Puget Sound salmon face, with the hope that fun run participants will make small changes in their life like buying “salmon safe” foods, limiting pesticide use, and mobilizing the community. All these small changes will have a large impact on the health of both salmon and their habitat.

Timo: For our deliverables, we produced a fun run logo, a poster for attracting the local community, and linked prototypes that demonstrate the basic functionalities of the
accompanying app. The next steps for the Salmon Fun Run would be coding our wireframes into android and iOS apps and publishing them, getting city permits, finding the perfect venue, and then promoting and implementing the fun run.