

# EYAK LAKE OUTLET STRUCTURE REPLACEMENT DESIGN

## Alternatives Analysis

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Copper River Watershed Project  
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## ACRONYMS

AEP .....	Annual Exceedance Probability
ADF&G .....	Alaska Department of Fish and Game
ANCSA .....	Alaska Native Claims Settlement Act
CRWP .....	Copper River Watershed Project
DOT&PF .....	Alaska Department of Transportation and Public Facilities
DNR .....	Alaska Department of Natural Resources
FEMA .....	Federal Emergency Management Agency
FIS .....	Flood Insurance Study
LOMR .....	Letter of Map Revision
LUP .....	Land Use Permit
NOAA .....	National Oceanic and Atmospheric Administration
NFIP .....	National Flood Insurance Program
OHW .....	Ordinary High Water
SWPPP .....	Storm Water Pollution Prevention Plan
USACE .....	U.S. Army Corps. of Engineers
USFS .....	United States Forest Service
USFWS .....	United States Fish and Wildlife Service
USGS .....	United States Geological Survey

## 1.0 INTRODUCTION

This report presents a list of preliminary alternatives developed to assist stakeholders evaluate the proposed project to rehabilitate or replace the Eyak Lake outlet structure. This list has been developed in consultation with the Copper River Watershed Project using conceptual engineering review of the available data regarding the discharge of water from Eyak Lake. Replacement of the Eyak Lake outlet structure is proposed to preserve fish habitat in the lake and improve upstream fish passage to maintain this important fishery that citizens of Cordova rely on for economic health, a method of transportation, sport and scenery.

### 1.1 Project Goals

The list of alternatives has considered the following factors that will be used to measure the effectiveness of each with respect to the selection of the Preferred Alternative. The following is a summary of evaluation parameters used to evaluate each alternative, listed in no particular order:

- Structure reliability and design life
- Improve the conditions for fish passage
- Improve public safety
- Maintain existing Eyak Lake water surface elevations and discharge from Eyak Lake watershed

- Reduce potential maintenance and operations costs
- Improve the safety of boat passage
- Cost
- Constructability

## 1.2 Need for Proposed Project

The Eyak Lake outlet structure was originally built in 1972 to reestablish the water surface elevation in Eyak Lake after the 1964 'Good Friday' earthquake. As the structure approaches its assumed 50-year design life, the hydraulic analysis of the structure (DOWL 2021) highlights the following:

- Healthy Salmon Habitat

The outlet structure was determined not to be conducive to effective fish passage for the five highlighted species of fish that are of significant economic benefit to Cordova. The original design of the weir does not appear to consider the passage of fish in the design. The presence of the 'boat slot' provides a low flow notch that also provides limited fish passage, but the discharge of the weir and the velocities of the corresponding flow are not considered conducive to fish passage. No documentation exists that demonstrates that the original design of Eyak Lake weir considered fish passage or scour.

- Safety Concerns

A pier located at the center of the weir is a popular location for fishing. The pier is located beside the 'boat slot'; the geometry of the boat slot induces a jet of water that is at a shallower angle and higher velocity than the discharge of the rest of the weir. The hydraulic jump observed at the boat slot can be described as a 'Case III' jump in which the tailwater at the weir submerges the hydraulic jump. The submerged hydraulic jump causes a 'rolling' current between the weir and the subcritical flow that may trap either debris or recreational users of the area. The type of hydraulic jump will change with the depth of tailwater, but still remains a significant safety hazard for those who use the outlet structure recreationally.

- Threat of Failure or Malfunction

The outlet structure is seen to have large structural deformations adjacent to the boat slot, bulging approximately 5 feet from the original alignment. Some joints between the sheet piles appear to be becoming expanded or separated.

The Dam Safety and Construction Unit of the Alaska Department of Natural Resources (DNR) discussed the failure mode of the structure noting that continued erosion of the buttress and embedment material would likely lead to progressive failure of the weir during large flood flows. However, it was commented that the effects of the failure would be 'significantly muted' by the flood flows (DNR 2012).

- Fish Enumeration

Projects for fish enumeration by stakeholders (Eyak Corporation) are currently under investigation. As Eyak Lake outlet structure is as a singular inlet/outlet for Eyak Lake, it is an ideal place to locate efforts to enumerate fish stocks that use Eyak Lake as their primary habitat.

### **1.3 Design Philosophy**

The design is intended to improve the fish habitat by maintaining water surface elevations to protect spawning areas in Eyak Lake and to improve the window of opportunity for the design fish to migrate through the outlet structure. Each of the alternatives presented in this analysis can be designed to pass the design fish during the optimum migration window and resist the 0.2% annual exceedance probability (AEP) storm (500-year).

Recreational boating on Eyak Lake is enjoyed by members of the community as well as visitors. Alternatives were developed to accommodate safe recreational boat passage through the Eyak Lake outlet structure, while meeting goals of providing healthy and sustainable fish habitat.

### **1.4 Project Design Guidance**

Fish passage improvement is one of the key goals for the project. The use of a natural fishway will be examined and incorporated into the alternatives as a roughened channel, step-pool, or hybrid fishway to restore fish migration and water conveyances. The natural fishway will be designed to meet biological design criteria for passage of juvenile coho salmon. Rock will be designed to withstand the entire range of flow conditions. Design criteria from the U.S. Fish and Wildlife Service (USFWS) Fish Passage Engineering Design Criteria February 2017 and the U.S. Department of Agriculture Natural Resources Conservation Service Part 654 National Engineering Handbook Stream Restoration Design will be used for the natural fishway design.

## **2.0 STAKEHOLDER COORDINATION**

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### **2.1 Identified Stakeholders**

- Residents of Cordova
- Copper River Watershed Project (CRWP)
- U.S. Forest Service (USFS)
- Alaska Department of Fish and Game (ADF&G)
- U.S. Fish and Wildlife Service (USFWS)
- Alaska Department of Transportation and Public Facilities (DOT&PF)
- Eyak Corporation
- National Oceanic and Atmospheric Administration (NOAA)

## **2.2 Landowner Coordination**

The land occupied at the site is identified as belonging to the State of Alaska (under ordinary high-water mark) and to the Eyak Corporation (access and riverside banks).

## **2.3 Agency Coordination**

In addition to State and Federal agencies listed as identified stakeholders, the Alaska Department of Natural Resources (DNR) will:

- Be required to identify navigability issues
- Issue land use permits
- Grant easements
- Be responsible for the Alaska Dam Safety Program review

## **2.4 Alaska Native Corporation Coordination**

The Eyak Corporation was formed July 25, 1973 as a for-profit corporation under Alaska law pursuant to the Alaska Native Claims Settlement Act (ANCSA).

The Eyak Corporation owns the land adjacent to the site that encompasses the largest Eyak village site within the Corporations lands. The project aims to minimize the impact to Eyak property and to enable the continued stewardship of the surrounding lands under the Eyak Corporation. To minimize impacts to sensitive areas, a cultural resource study is recommended to be undertaken before the start of any construction.

As part of Eyak Corporation's stewardship of the area and the natural resources, the project will include, where reasonably practicable, methods to enumerate fish populations migrating through the Eyak Lake outlet structure.

## **2.5 Public Scoping Meeting**

CRWP conducted public outreach to understand how the community uses the weir and to capture their vision for the area. Two communication methods were used to collect community feedback: online survey and public workshop.

A short twelve question survey was distributed from July 12, 2021. The data collected to July 26<sup>th</sup>, 2021 from 78 respondents indicate that 84 percent of those surveyed are concerned about the weir and the top three priorities if a new weir was constructed are, in order: improved fish passage, maintain lake level, and reduced maintenance needs. While not all respondents used the weir for recreational fishing or access to Eyak Lake, a significant number of comments were made recognizing and appreciating the need to improve public safety at the weir. Detailed data from the survey can be found in Appendix 1.

The public meeting was held on July 19, 2021, 5:30 P.M. at the Cordova Center (Council Chambers) and consisted of a community workshop. The presentation highlighted the work to date and the potential alternatives that may be suitable for the site. Feedback given at the public

meeting was broadly supportive of the project, including feedback about the use of the boat slot, and voiced appreciation for the proactive approach to replacing the structure.

### **3.0 ALTERNATIVES DEVELOPMENT**

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This section outlines four alternatives feasible to rehabilitate or replace the existing outlet structure at Eyak Lake. The following alternatives are explored:

- Alternative 1: No Action
- Alternative 2: Rehabilitate Existing Structure with Natural Fishway
- Alternative 3: Replace in Kind with Natural Fishway
- Alternative 4: Series of Rock Weirs

#### **3.1 Alternative 1: No Action**

##### **3.1.1 Alternative Goals**

- Minimize cost to project by continuing to use the existing weir to maintain existing lake levels
- Minimize impacts to vegetation and wildlife habitat

##### **3.1.2 Alternative Features**

- No removal or improvement to existing weir
- No fish passage improvements
- No safety improvements

##### **3.1.3 Discussion**

Alternative 1 is a “No Action” option and its purpose is to provide a comparison point for the other alternatives. No action has been the default choice in recent years. The no active alternative would not address the project objectives identified by CRWP and other stakeholders to significantly improve fish passage, public safety, and the longevity of the structure relied on to maintain existing lake levels.

Keeping the existing facility in place has the benefit of using less capital funds to implement this project. However, future maintenance costs to rehabilitate any further structural deterioration may prove more expensive than the proposed actions under consideration. Keeping the existing weir in place will have the least impact on the lake water surface elevations, stream banks, and stream conditions but opportunities to improve on existing fish passage conditions are lost. The design goal with other options presented herein is to identify the best features of the existing outlet structure and continue their use or improve upon them with other alternatives.



## **3.2 Alternative 2: Rehabilitate Existing Structure with Natural Fishway**

### **3.2.1 Alternative Goals**

- Use existing structure
- Improve fish passage
- Improve safety
- Minimize project cost

### **3.2.2 Alternative Features**

- Replace bulged section of sheet pile
- Repair and reinforce boat slot including more buttressing
- Place fishway close to river right
- Repair pier
- Add large rocks or energy dissipating blocks to mitigate the dangerous hydraulic jump
- Reconfigure existing scour control to meet updated standards
- Place bollards at an angle to direct large woody debris away from fishway.
- Natural fishway to be constructed as a roughened channel, step-pool, or hybrid fishway to meet the needs of the design fish

### **3.2.3 Discussion**

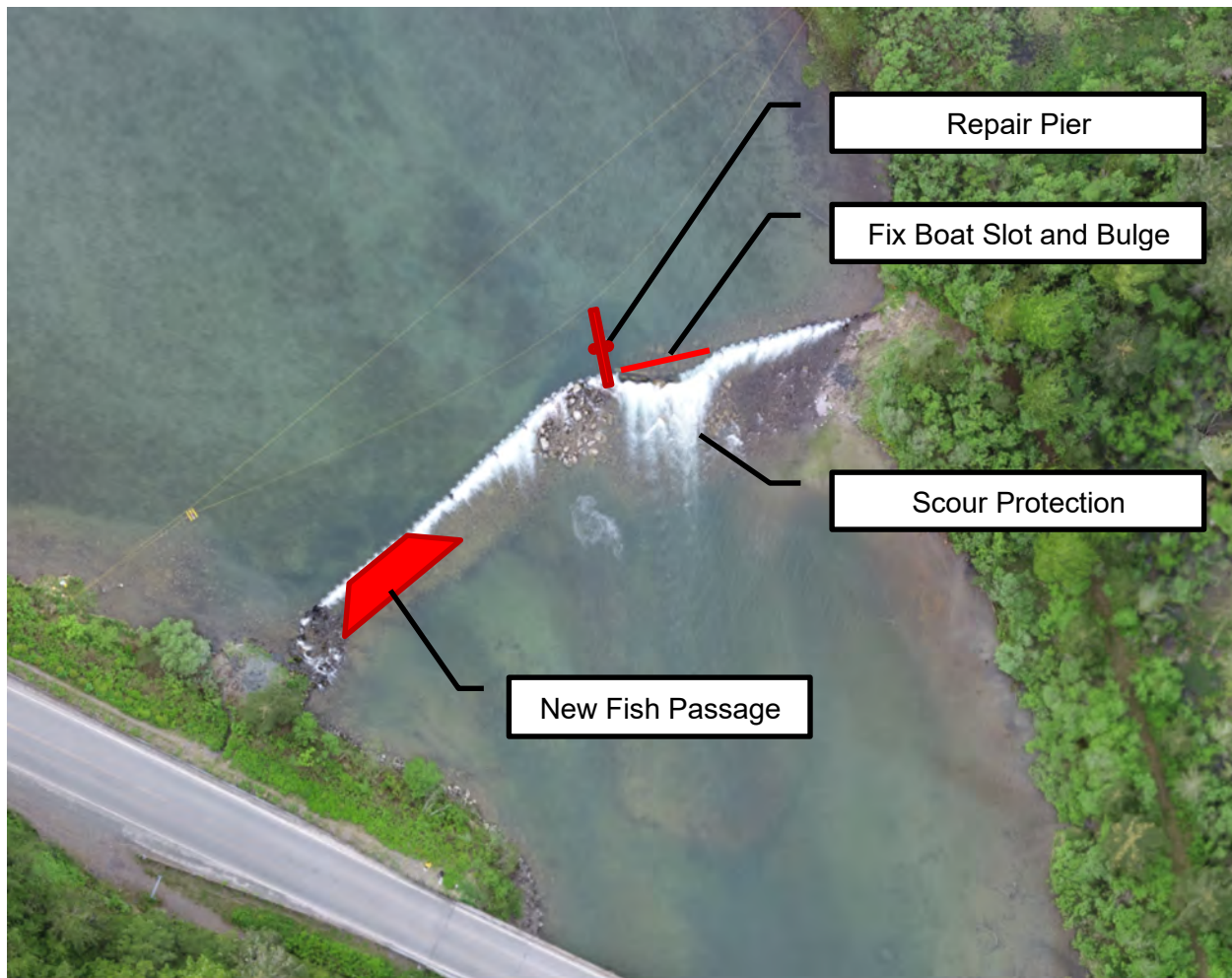
The premise of Alternative 2 is to utilize the existing site as much as possible, incorporating the most functional parts of the outlet structure and in-stream features with new fish passage components.

One aspect of this option is that the elevation of the weir and the hydraulic characteristics of the outlet structure remain relatively similar to existing conditions. This may help the permit review process if the water surface elevation or lake discharge becomes an issue with other alternatives.

The location and dimensions of the boat slot will remain the same, meaning there may not be an appreciable reduction in risk for recreational fishers or boaters using the pier due to the proximity of the hydraulic jump.

The natural fishway will be constructed close to river right, shifting the fish passage from the boat slot location. The natural fishway will tie into the existing channel and be constructed as a roughened channel, step-pool, or hybrid fishway.

The rehabilitation will only extend the service life for a limited period of time compared to a newly designed structure and assumes that the bulged section of the weir can be repaired after approximately 45 years in a modified configuration.



**Figure 1: Alternative 2 Concept**

### **3.2.4 Estimated Cost**

The estimated cost of Alternative 2 is \$1,710,000. This estimate contains a 20% contingency account for the uncertainty of construction materials. A breakdown of estimated cost can be found in Appendix 2.

### **3.2.5 Example: East Fork Salmon River<sup>1</sup>**

*Location:*

Salmon River, Idaho

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<sup>1</sup> U.S. Department of the Interior, Bureau of Reclamation, Rock Weir Design Guidance, March 2016



*Construction Cost:*  
Unknown



**Figure 2: East Fork Salmon River, Before Construction**



**Figure 3: East Fork Salmon River, After Construction**

### **3.3 Alternative 3: Replace in Kind with Natural Fishway**

#### **3.3.1 Alternative Goals**

- Use existing structure
- Improve fish passage
- Improve safety

#### **3.3.2 Alternative Features**

- Construct new sheet pile structure adjacent to (downstream) of existing structure
- Fill the annular void between the existing and proposed weirs to create a uniform structure
- Rehabilitate the boat slot and pier
- Construct natural fishway on river right closer to shore to allow maintenance and monitoring
- Construct natural fishway as a roughened channel, step-pool, or hybrid fishway to meet the needs of the design fish

#### **3.3.3 Discussion**

Alternative 3 allows for a structurally safe weir to be installed immediately downstream of the existing outlet structure without requiring the removal of the existing structure, reducing construction costs. The annular space between the two structures will be filled with a compacted non-frost susceptible fill to create a uniform structure.

The new sheet pile structure would be configured to rehabilitate the boat slot. The boat slot will remain at the same location to prevent any confusion of regular users that traverse the weir. The approach to the new boat slot will be designed to allow passage of shallow draft boats without damage at mid to high water levels at the outlet structure.

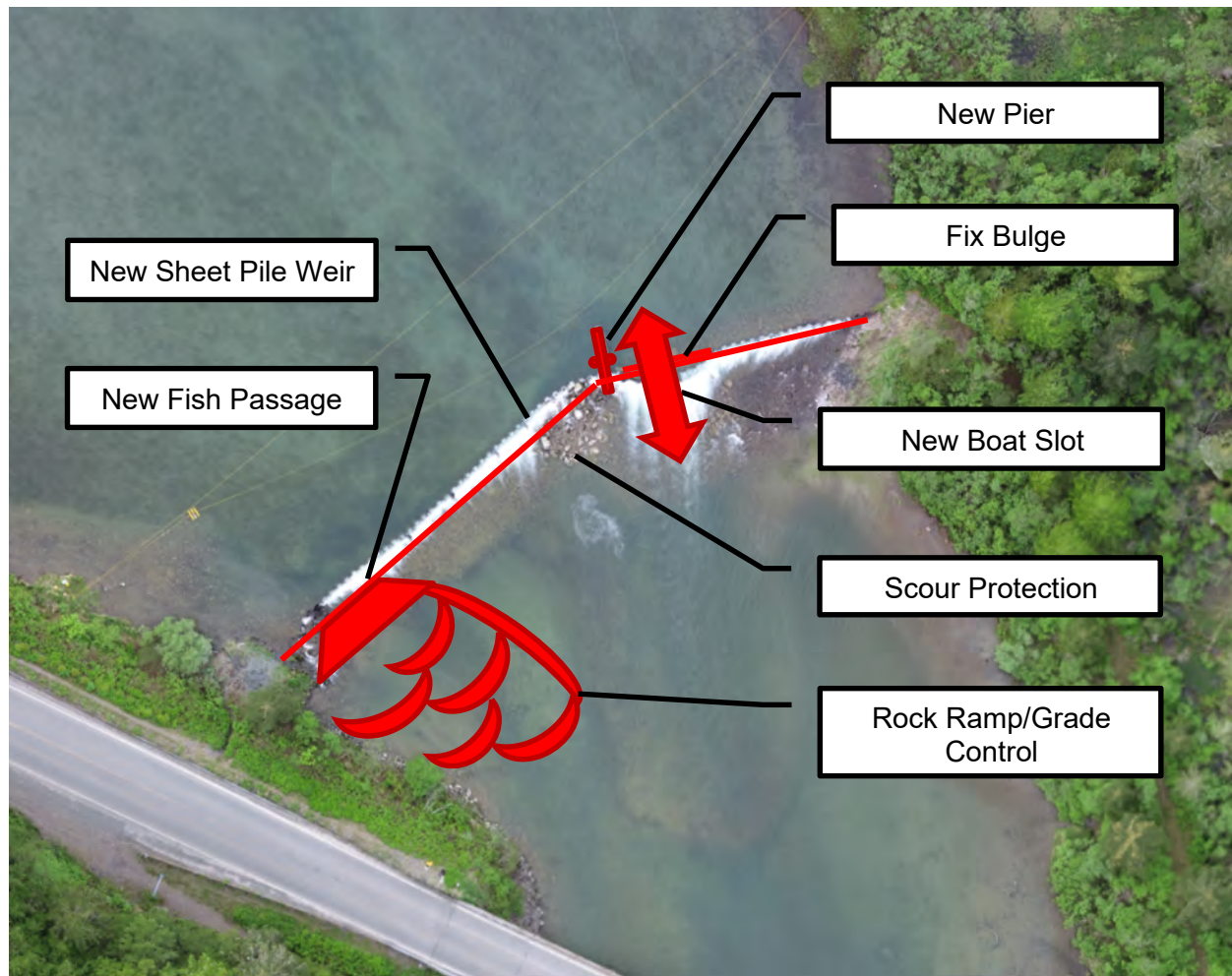
The fish passage will be located at river right, closer to shore, to use a shallower and less dynamic portion of the river channel. The natural fishway will tie into the existing channel and be constructed as a roughened channel, step-pool, or hybrid fishway. A rock ramp will be used as grade control to locally reduce the hydraulic gradient of the Eyak River on the right bank.

The separation of the fish passage and the boat slot will likely create a split flow during low flow conditions. The fish passage will be designed to have a lower crest elevation than the boat slot to allow a minimum depth of water to flow over the fish passage as well as making sure that the toe of the structure has significant depth and interconnectedness to allow fish to probe the toe, looking for a suitable passage.

One risk of disconnecting the boat passage from the fishway, especially at low flows, is splitting the potential attractant flow and likely attracting some of the fish to the boat passage rather than



the fish passage. Keeping the boat slot and the fish passage combined or in immediate proximity mitigates this risk.



**Figure 4: Alternative 3 Concept**

### **3.3.4 Estimated Cost**

The estimated cost of Alternative 3 is \$2,770,000. This estimate contains a 20% contingency account for the uncertainty of construction materials. A breakdown of estimated cost can be found in Appendix 2.

### **3.3.5 Example: Gunnison River Hartland Dam**<sup>23</sup>

*Location:*  
Delta, Colorado

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<sup>2</sup> <https://mclaughlinwhitewater.com/projects/gunnison-river/>

<sup>3</sup> <https://www.fws.gov/fisheries/fish-passage/fish-passage-projects-at-work.html#:~:text=The%20National%20Fish%20Passage%20Program,through%20the%20removal%20of%20barriers.>

*Construction cost:*  
Not found



**Figure 5: Gunnison River Hartland Dam, Before Construction**



**Figure 6: Gunnison River Hartland Dam, After Construction**

### **3.3.6 Example: Lake Tecumseh Weir<sup>45</sup>**

*Location:*

Lake Tecumseh Weir. Virginia Beach, VA.

*Owner:*

U.S. Fish and Wildlife Service

*Construction cost:*

Not found

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<sup>4</sup> <https://www.cmilc.com/case-studies/lake-tecumseh-weir>

<sup>5</sup> [https://www.fws.gov/northeast/virginiafield/partners/Lake\\_Tecumseh/laketecumseh.html](https://www.fws.gov/northeast/virginiafield/partners/Lake_Tecumseh/laketecumseh.html)





**Figure 7: Lake Tecumseh, Before Construction**



**Figure 8: Lake Tecumseh Weir, After Construction**



**Figure 9: Lake Tecumseh Weir, After Construction**

### **3.4 Alternative 4: Series of Rock Weirs**

#### **3.4.1 Alternative Goals**

- Improve fish passage
- Improve aesthetic appeal of outlet structure
- Improve public safety

#### **3.4.2 Alternative Features**

- Construct a natural fishway as a series of full width rock weirs to meet the needs of the design fish
- Buttress/encapsulate existing weir with grouted rock
- Add additional rock weir downstream of the outlet structure to create a shallower hydraulic gradient
- Increase energy dissipation, reducing the velocities downstream
- Remove the safety concerns for rolling hydraulic
- May increase the complexity of navigation for watercraft

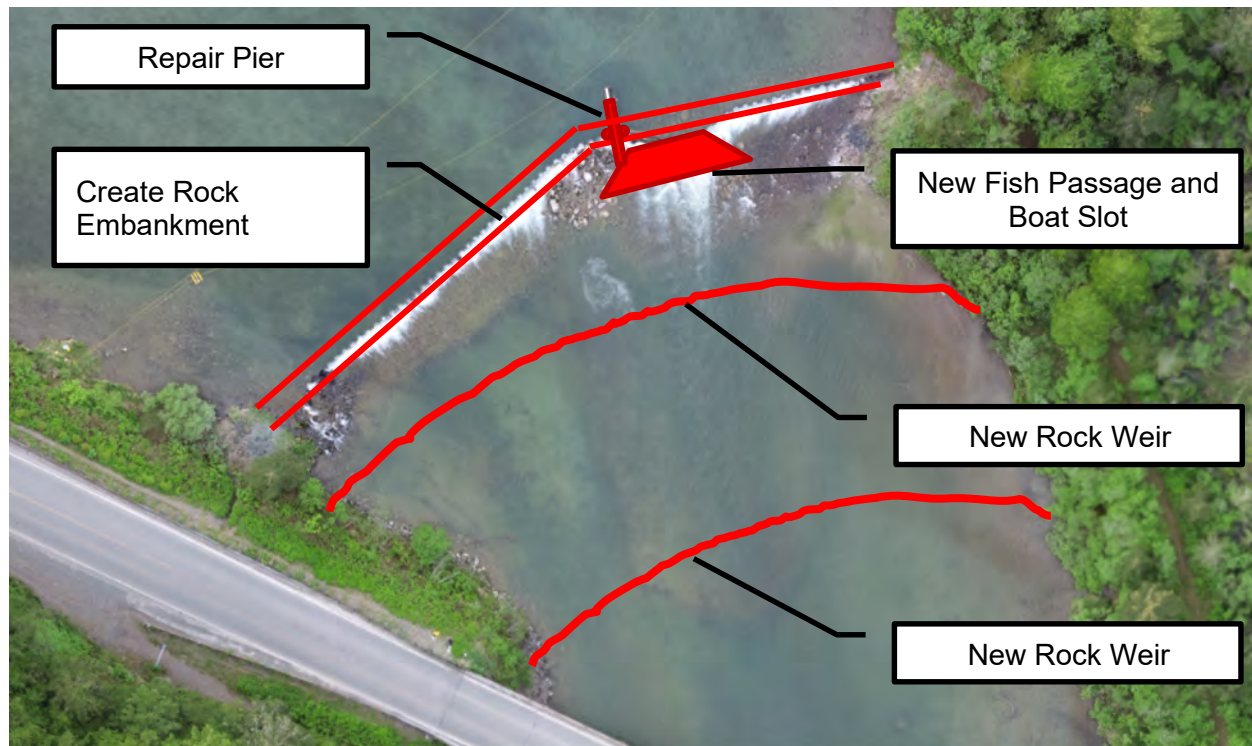
#### **3.4.3 Discussion**

The rock drops would be designed for safe fish passage and boat passage. However, there will likely be challenges to navigation of shallow draft watercraft at low flows. The intent is to create riffles and pools by gradual drops. During larger high-water events, the drops would become submerged and not visible.



Under this option there would be no significant weir structure seen by the public. The uppermost drop will be constructed of carefully placed and interlocked riprap around the existing outlet structure, supported by structural fill. The subsequent rock drops would be constructed of material consisting of quarried rock and existing bed material large enough to resist high flows.

While cost to remove the existing structure would be minimized, the quantity of quarried rock used to regrade the outlet structure would be significant.



**Figure 10: Alternative 4 Concept**

#### **3.4.4 Estimated Cost**

The estimated cost of Alternative 4 is \$5,500,000. This estimate contains a 20% contingency account for the uncertainty of construction materials. A breakdown of estimated cost can be found in Appendix 2

#### **3.4.5 Example: Navajo River Endangered Fish Habitat & Municipal Water Supply Diversion.**<sup>6</sup>

*Location:*  
Dulce, New Mexico

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<sup>6</sup> <http://www.riverrestoration.com/portfolio/irrigation-water-delivery-systems/>

*Construction Cost:*  
Not found



**Figure 11: Navajo River Diversion, Before Construction**







































**Figure 12: Navajo River Diversion, After Construction**

### **3.5 Summary of Design Features of Proposed Alternatives**

Of the alternatives that propose a change to the Eyak Lake outlet structure, Alternatives 2 and 3 separate the boat passage and the fish passage. Alternate 4 keeps the fish passage and boat slot combined but with a stepped fishway/boat channel near the existing notch.

Table 1 depicts a simplified matrix comparing the alternatives.

**Table 1: Comparison Matrix**

	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Fish Passage		 	  	  
Boat Access		 	 	
Aesthetics		 	 	  
Maintenance	  	 		
Cost	\$	\$	\$ \$	\$ \$ \$
Constructability	N/A		 	  

### 3.6 Alternatives Considered but eliminated from Further Analysis

#### 3.6.1 Structural Fish Ladder

A structural fish ladder was considered for the alternatives, but not progressed as the cost of designing and constructing a structural fish ladder outweighed the benefit of fish passage compared to the other alternatives. Aesthetically, it was thought that the structure would feel out of place for Cordova's natural aesthetic.

Example: Watson Lake Fish Bypass<sup>78</sup>

*Location:*

Poudre River, Northern Colorado

*Construction Cost:*

\$850,000

<sup>7</sup> <https://www.northernwater.org/NISP/environmental/watson-lake-fish-bypass>

<sup>8</sup> <https://www.nps.gov/articles/poudrefishladder.htm>





**Figure 13: Watson Lake Fish Bypass, During Construction**



**Figure 14: Watson Lake Fish Bypass, After Construction**

### **3.6.2 Removal of Weir**

The removal of the weir was considered for the alternatives, but not progressed as benefits of removing the structure for fish passage and navigability were outweighed by the impacts to spawning habitat, reduction in water surface elevation, and change in land ownership/boundaries.

## 4.0 SELECTION OF PREFERRED ALTERNATIVE

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The alternative that best reflects the project goals and the needs of the local residents is Alternative 3, Replace in Kind with Natural Fishway. A new structure placed adjacent (downstream) of the existing weir can be designed to updated design standards allowing it to withstand the appropriate seismic, ice, and hydrodynamic forces.

Alternative 3 keeps the existing structure in place to maintain existing water levels during construction as well as minimizing disturbance at site, reducing the risk of impacting spawning habitats in Eyak Lake.

The natural fishway will be designed to significantly improve the ability to pass juvenile salmon. Locating the fishway close to the river right (Copper River Highway) will allow for easy access for maintenance and monitoring. The fish passage will be designed to withstand the critical flow event that would see maximum velocities at the weir. The rock ramp/grade control structure will contain large stones keyed in to resist mobilization, protecting the natural fishway. The offset location of the fishway will reduce the likelihood of damage by ice, debris or high velocity flows.

Recreational boat passage will be continued at the weir by maintaining the location of the boat slot and restoring the existing dimensions of the boat slot by fixing the bulged section of the weir. The rehabilitation of the boat slot will be designed to minimize potential damage to the hulls of the shallow draft watercraft using it. Depending on the hydraulics of the weir flow in conjunction with the natural fishway, the boat slot will be optimized to the type of boat using the access.

The design of the new weir structure will attempt to minimize the maintenance requirements of the structure. To address this, the design will consider how the community interacts with the weir and the environmental parameters that may impact the integrity of the structure. Layers of rock will be used to buttress the weir structure to act as a flexible and repairable surface with tangential structures, like the pier at the boat slot, located and designed to withstand use and potential misuse from the public and impacts from environmental forces.

The conceptual plans for the proposed alternative will likely be:

- Installation of 365 feet of new sheet pile placed in two linear sections making a 'V' shape similar to the existing structure
- The width of the crest will increase to approximately 5 feet wide
- The height of the crest will match the existing structure
- Rock slopes to buttress the weir will be placed at 3H:1V slope
- A scour apron will extend downstream approximately 25 to 40 feet (depending on design)
- A natural fishway protected by a large rock ramp will be installed river right of the weir with the approximate aerial dimensions of 30 to 50 feet downstream and 10 to 20 feet wide

## 5.0 PERMITS AND AUTHORIZATIONS

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Permitting strategies will depend on the final design of Alternative 3. This section will outline the anticipated permitting requirements for the alternative specified above with the Eyak Corporation, ADF&G, DNR, Alaska Department of Environmental Conservation (DEC), the U.S. Army Corps. of Engineers (USACE), and the Federal Emergency Management Agency (FEMA).

### 5.1.1 Eyak Corporation

- Land Use Permit (LUP):

A LUP is required to request entry into Eyak Corporation lands.

- Cultural Resources Study:

As part of further investigations or construction, a cultural resources study will be required to be conducted.

### 5.1.2 ADF&G

- Title 16 Fish Habitat Permit:

Eyak River is an anadromous creek requiring a Title 16 Fish Habitat Permit for any activity that is below ordinary high water (OHW). Additional conditions may be included in the permit as the chosen alternative may change the composition of bed materials, impacting the aquatic environment, and may require long term monitoring.

### 5.1.3 DNR

- Land Use Permit:

Since construction will occur below OHW, an authorization to use or access state land for a temporary basis is required. The duration of the permit ranges from 1 to 5 years. Construction work will likely require a LUP for the duration of the construction.

- Easement:

The land below OHW that the outlet structure occupies belongs to the State of Alaska. As the owner of the outlet structure and with an interest in the land for a long term or indefinite time period, obtaining an easement from DNR to ensure long-term access to the weir for periodic maintenance by the State is recommended.

- Hazard Classification and Alaska Dam Safety Program Jurisdictional Review:

While the existing Eyak Weir was deregulated by the Alaska Dam Safety Program, a hazard potential classification of the new structure will be required to determine the standard for the design, construction, and operation of the structure during the life of the project. Hazard classifications are articulated in Article 3, Dam Safety, of 11 AAC 93.157.

A review of the proposed alternative will be required to determine if the structure is under state jurisdiction, as defined in AS 46.17.900(3).

#### 5.1.4 DEC

- Storm Water Pollution Prevention Plan (SWPPP):

If the site is less than 1-acre of impact, a SWPPP may not be needed. It is possible that SWPPP may be needed for construction equipment staging impacts if over 1-acre.

#### 5.1.5 USACE

- Department of the Army Permit (Individual Permit):

USACE requires permits for any construction within U.S. navigable waters or if discharge of dredged materials is planned within the Water of the U.S. As part of the permit, the USACE will look at the impacts of the erosion protection or gravel extraction that occur below OHW.

#### 5.1.6 FEMA / Local Certified Floodplain Manager

- Floodplain Development Permit:

The site is located in a regulatory floodway, immediately downstream of the weir (FEMA FIRM 0200370070C). For the City of Cordova to comply with National Flood Insurance Program (NFIP):

*“Encroachments, including fill, new construction, substantial improvements, and other development within the adopted regulatory floodway, that would result in any increase in flood levels within the community during the occurrence of the base flood discharge shall be prohibited.”*

The project will be required to provide a “no-rise” certification, certifying that the project will not affect flood heights established by the last FEMA Flood Insurance Study (FIS) or Letter of Map Revision (LOMR).

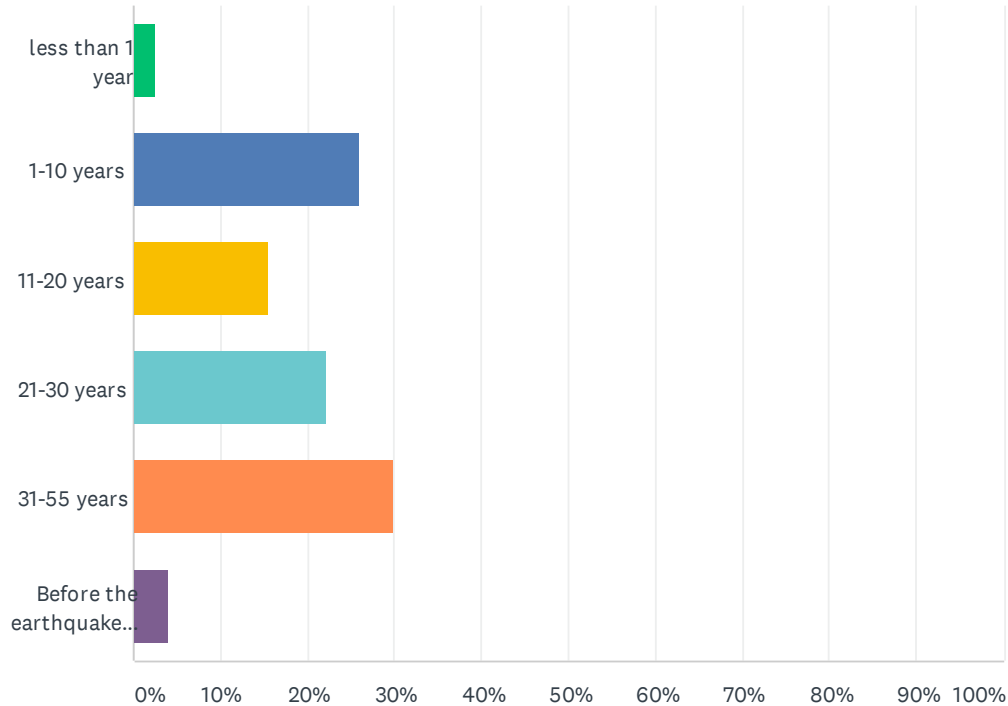
## **APPENDIX 1: SURVEY DATA**

Question 12 has been omitted to protect respondent's identity.



# Q1 Approximately how long have you lived in Cordova, Alaska?

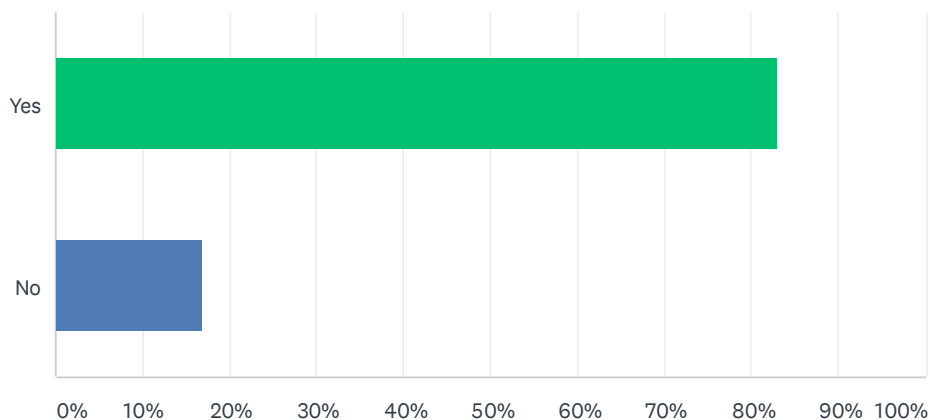
Answered: 77    Skipped: 1



ANSWER CHOICES	RESPONSES	
less than 1 year	2.60%	2
1-10 years	25.97%	20
11-20 years	15.58%	12
21-30 years	22.08%	17
31-55 years	29.87%	23
Before the earthquake (more than 56 years!)	3.90%	3
<b>TOTAL</b>		<b>77</b>

## Q2 Are you concerned at all about the current weir structure on Eyak Lake?

Answered: 77   Skipped: 1



ANSWER CHOICES	RESPONSES	
Yes	83.12%	64
No	16.88%	13
TOTAL		77

#	IF YES, PLEASE PROVIDE A BRIEF SUMMARY HERE (IF NO, SKIP TO NEXT QUESTION):	DATE
1	Not well designed for fish passage. Should have capability for escapement counts.	7/21/2021 9:23 PM
2	Failure would be devastating for sockeye habitat	7/21/2021 4:39 PM
3	I am concerned that the structure will fail and cause damage to the ecology of the lake and salmon spawning. Also, don't want anyone to be hurt as they try to fish on, or navigate the weir.	7/21/2021 1:55 PM
4	The foot bridge seems to be getting bad.	7/21/2021 12:18 PM
5	I would like to see the weir repaired or rebuilt to maintain water height in the lake, and to allow easy passage for salmon. I don't think we should be concerned with providing passage for boats through/over the weir.	7/21/2021 5:58 AM
6	as it exists now, I believe the weir impedes fish passage at some life stages.	7/20/2021 2:36 PM
7	Seems aged/ hazardous.	7/20/2021 9:22 AM
8	I have been fly fishing at the wier since they opened it for fishing and have watched the deterioration. While fishing I wave watch the migration of the fish, the predation by mergansers and the occasional seal. I included these observations in my art that is up in Mt Eccles elementary. I am particularly concerned about the platform because I use it. And the obvious slow failure far side wier and boat passage.	7/20/2021 7:21 AM
9	Its only a matter of time before it goes out. Glad it is being looked into. Hope it leads to something.	7/19/2021 4:04 PM
10	I don't want it to fail.	7/19/2021 1:15 PM
11	Lots of concern with the weir failing and then main concern is with keeping a boat passage with new construction!	7/19/2021 12:30 PM

## Eyak Lake Weir Community Feedback

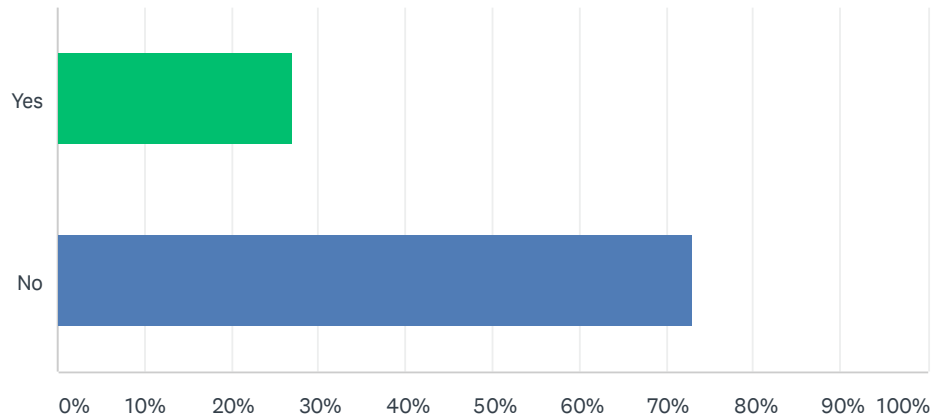
12	The current weir helps sustain our rich salmon habitat. It also directly affects residents living along the river.	7/18/2021 10:11 PM
13	The weir is deteriorating and should be maintained to keep an adequate water level in Lake Eyak to allow salmon spawning primarily. Secondly it should provide recreational opportunity.	7/18/2021 9:59 PM
14	Seams like an important structure for the lake water level.	7/18/2021 9:43 PM
15	It's definitely but getting any younger.	7/18/2021 9:25 PM
16	Hoping this is addressed before it is too late. Worried about lake level dropping.	7/18/2021 12:08 PM
17	The weir started to deteriorate the last 10 or so years,Ive seen boat get damaged trying to cross it. the biggest damage was a few years ago when the lake had and early break up and huge ice chunks came over the weir and tore up the walk way and bent the right side . this weir is very important to keep Eyak lake water levels up and needs to be fixed.	7/18/2021 7:56 AM
18	Water levels need to be maintained in the lake	7/17/2021 9:16 AM
19	I was not aware that the structure needed updating but am glad to read that efforts are being made to be pro-active. We have a house on the Eyak River and commercial fish so would be affected by any major changes or a failure of the structure (either by lower lake levels and its affect on salmon spawning or by rising river levels which could cause flooding to homes along the river). We enjoy occasionally carrying our kayaks or canoes across the grassy area next to the weir to go between the river and the lake.	7/16/2021 10:01 PM
20	Llving in close proximity of the lake	7/16/2021 2:24 AM
21	I used to jump the weir through the boat slot with an outboard by yanking the outboard and sliding through both directions. Eventually I switched to a jet and could pass either direction at any water level without any problem. Several years ago during a high water weather event a piece of the weir was moved, causing a jagged edge to be exposed . I stopped using the slot out of concern for possible damage to my skiff.	7/16/2021 1:44 AM
22	Keeping the proper water level in the lake , is it easy enough for the salmon to get over?	7/15/2021 8:15 PM
23	I'm concerned about water levels in the lake and river.	7/15/2021 3:01 PM
24	Failure of weir could lower lake levels and adversely affect fish habitat (sockeye salmon spawning, shallow water coho salmon rearing areas). New design could improve sportfishing conditions - allowing more than 3 or 4 anglers to fish at one time, provide safer footing, remove platform that tangles and breaks lines (leaving fish with hooks and line in mouths). Boat passage slot could allow boats to access lake from downstream Forest Service boat ramp, reducing need for ramp at city airport area.	7/15/2021 2:32 PM
25	I'm concerned that the structural integrity of the weir will fail causing an outburst event into Eyak River that may affect those who live along the river. Such an event could cause devastating ecological impacts to Eyak Lake harming salmon habitat. Hi Kate!	7/15/2021 1:24 PM
26	It would be nice to have better passage for fish.	7/15/2021 8:16 AM
27	Until I received this email I hadn't thought about it at all but am now concerned and want to learn more.	7/15/2021 7:53 AM
28	i am concerned because i have just read there is a problem	7/15/2021 7:32 AM
29	I would hate to see it fail	7/14/2021 9:01 PM
30	If the weir structure is changed, will we still be able to take boats over it? I live on the lake, I like the level the lake is at now. I would not like it raised higher than it is now (would lose property ).	7/14/2021 7:31 PM
31	After hearing about the weir starting to show its age, I have become concerned. The weir has become an integral part of life in Cordova. From humans to fish and swans, we all have become to depend on it for human needs and wildlife needs.	7/14/2021 5:52 PM
32	Have Eyak river front home. I am concerned about posible flooding.	7/14/2021 3:46 PM
33	Fish access is important	7/14/2021 3:45 PM

## Eyak Lake Weir Community Feedback

34	I'm worried about the weir failing, lowering the water level, and damaging Salmon spawn areas.	7/14/2021 1:41 PM
35	structure should at least be accessed in a timely manner. this is the time.	7/14/2021 10:56 AM
36	The weir has entered a rapid state of degradation and must be repaired to protect salmon stocks.	7/14/2021 10:56 AM
37	It's in deteriorated condition...needs fixed repaired or replaced!	7/14/2021 10:54 AM
38	The current weir does not allow for adequate juvenile and adult fish migration to and from Eyak Lake. The population of Eyak Lake sockeye salmon has been declining over the past decade and I think it is partly due to the fish barrier the existing structure creates. I think that the new weir should be installed with juvenile and adult fish passage as the top priority.	7/13/2021 8:11 PM
39	Structure is unsafe and falling apart dangerous to fish off I fell off into lake when the railing broke off behind me	7/13/2021 5:55 PM
40	weir failure will upset many, many people	7/13/2021 3:04 PM
41	The structure is aging out, prone to failure and accident, and is a heavily used recreation spot during May through July.	7/13/2021 2:09 PM
42	It need routine maintenance	7/13/2021 12:46 PM
43	Maintaining Water level Conducive to rearing coho and red up to smoky stage, juvenile fish passage upstream, adults don't seem to have a problem clearing it, be careful about changing things in a way that would allow less valuable species like pinks to get an edge up on coho and reds. Is siltation in the lake a looming problem? Do we need to take the damn out and let the lake flush out a little bit before reinstalling to prevent long term problems?	7/12/2021 11:06 PM
44	Looks to be deteriorating.	7/12/2021 8:25 PM
45	It appears to be in rough shape and is critical to maintain red and silver salmon spawning habitat.	7/12/2021 7:45 PM
46	The weir is failing, failure would negatively impact all users and inhabitants.	7/12/2021 7:24 PM
47	It is used by many to fish for ir observe salmon and it is completely unsafe.	7/12/2021 5:24 PM
48	Certainly doesn't look like it's in great shape, and I'm very glad this conversation is starting.	7/12/2021 5:08 PM
49	I was unaware there was any issue with the current weir but I own lakefront property that is directly impacted by water levels.	7/12/2021 1:44 PM
50	Only concerned in that it appears to be falling apart. I don't own property on the lake or river, so no personal property concerns.	7/12/2021 10:56 AM
51	The current weir need to be replaced, itis failing and the boat passage no longer is useable.	7/12/2021 9:43 AM
52	Old, not secure...	7/10/2021 10:58 AM
53	Seems like a weird thing to have there.	7/8/2021 7:27 PM
54	I want studies on how much water to hold back if replaced because you may flood house on the lake.	7/8/2021 2:48 PM
55	it's failing yo	7/7/2021 5:17 PM

### Q3 Do you own property along Eyak Lake or River

Answered: 78 Skipped: 0



ANSWER CHOICES	RESPONSES	
Yes	26.92%	21
No	73.08%	57
TOTAL		78

## Q4 If you have property on Eyak Lake or Eyak River, what is your biggest concern regarding the current weir structure?

Answered: 36   Skipped: 42

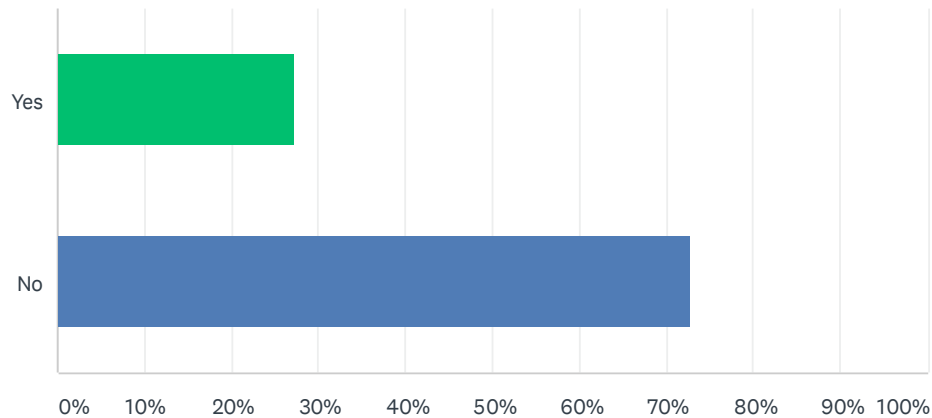
#	RESPONSES	DATE
1	N/A	7/21/2021 4:39 PM
2	water level	7/21/2021 12:18 PM
3	Access over the weir to the lake is dependent on water level. If it fails I worry about sufficient water in the lake and the gradual impact it would have to the river. It would be terrible if travel on the lake or river was restricted by water level as well.	7/19/2021 4:04 PM
4	Failure.	7/19/2021 1:15 PM
5	N/A	7/19/2021 12:30 PM
6	Greed	7/18/2021 11:46 PM
7	N/A	7/18/2021 10:11 PM
8	N/A	7/18/2021 9:59 PM
9	None	7/18/2021 9:43 PM
10	If nothing is done it will soon drop the level of the lake and we will loose valuble salmon spawning streams.	7/18/2021 7:56 AM
11	Maintaining water levels	7/17/2021 9:16 AM
12	see comments above	7/16/2021 10:01 PM
13	Lake water levels	7/16/2021 2:24 AM
14	Being unable to access the river from my house without having to trailer the boat.	7/16/2021 1:44 AM
15	flooding	7/15/2021 7:51 PM
16	The river is already low enough to stop spawning cohos in hot/dry years. If the weir fails this salmon run could be adversely impacted.	7/15/2021 3:01 PM
17	NA	7/15/2021 1:24 PM
18	That if it is raised higher, it will increase the height of the lake and would loose property under water.	7/14/2021 7:31 PM
19	x	7/14/2021 5:38 PM
20	Possible flooding if the weir went all at once.	7/14/2021 3:46 PM
21	Obviously, failure of the weir structure, potentially flooding properties along Eyak River. Boat slot is mandatory if weir is rebuilt	7/14/2021 1:51 PM
22	lake levels dropping, loss of spawning habitat and explosion of elodea when lake levels are low.	7/14/2021 11:51 AM
23	Water level rising could cause flooding, would want to keep the weir height at the same as before the breach on the cutout.	7/14/2021 10:56 AM
24	n/a	7/13/2021 3:04 PM
25	Excess flooding could occur from the lake to the river, but where my property is I don't believe the issue would critical.	7/13/2021 2:09 PM
26	Upkeep so it doesn't fall.	7/13/2021 12:46 PM

## Eyak Lake Weir Community Feedback

27	Na	7/13/2021 9:55 AM
28	Stability	7/13/2021 6:55 AM
29	None.	7/13/2021 2:33 AM
30	.	7/12/2021 9:31 PM
31	Lake level being maintained.	7/12/2021 7:24 PM
32	This is the first I've heard of any concerns.	7/12/2021 7:01 PM
33	Flooding of my home is the first concern. Also, receding water levels/waterline is a bit concerning.	7/12/2021 1:44 PM
34	Not applicable	7/10/2021 10:58 AM
35	If you replace it to high you flood houses	7/8/2021 2:48 PM
36	N/A	7/7/2021 5:17 PM

## Q5 Do you fish at the Eyak weir under the strict fly fishing (no barb, no weight) regulations?

Answered: 77 Skipped: 1



ANSWER CHOICES	RESPONSES
Yes	27.27% 21
No	72.73% 56
TOTAL	77

#	IF YES, HOW OFTEN DO YOU FISH AT THE WEIR EACH SEASON, ON AVERAGE? (IF NO, SKIP TO NEXT QUESTION)	DATE
1	3 to 4 hours each session	7/21/2021 3:01 PM
2	Used to fish here, harder to access with children.	7/20/2021 9:22 AM
3	I fish here several times a week for a couple hours each time.	7/20/2021 7:21 AM
4	seldom	7/19/2021 4:04 PM
5	6+ times a year	7/19/2021 12:30 PM
6	A day or two.	7/18/2021 12:08 PM
7	2-3 times	7/17/2021 9:16 AM
8	But maybe someday.	7/16/2021 10:01 PM
9	Half a dozen	7/16/2021 1:44 AM
10	Four times/year	7/15/2021 2:32 PM
11	NA	7/15/2021 1:24 PM
12	1-2	7/14/2021 7:31 PM
13	Probably half a dozen times a season	7/14/2021 1:51 PM
14	10	7/14/2021 11:51 AM
15	40+	7/13/2021 5:55 PM
16	Few times a season, if I have time.	7/13/2021 2:09 PM
17	A few times during silver season	7/13/2021 6:55 AM



## Eyak Lake Weir Community Feedback

18	3 times	7/13/2021 2:33 AM
19	1	7/12/2021 11:06 PM
20	A dozen or more times	7/12/2021 7:24 PM
21	3 or 4 times per season	7/12/2021 5:24 PM
22	5	7/9/2021 4:48 PM
23	Wait it's barbless? There's a barbless reg in Alaska?! I think the entire state should go barbless.	7/8/2021 7:27 PM

## Q6 Please share any safety concerns regarding fishing at the current Eyak lake weir?

Answered: 40   Skipped: 38

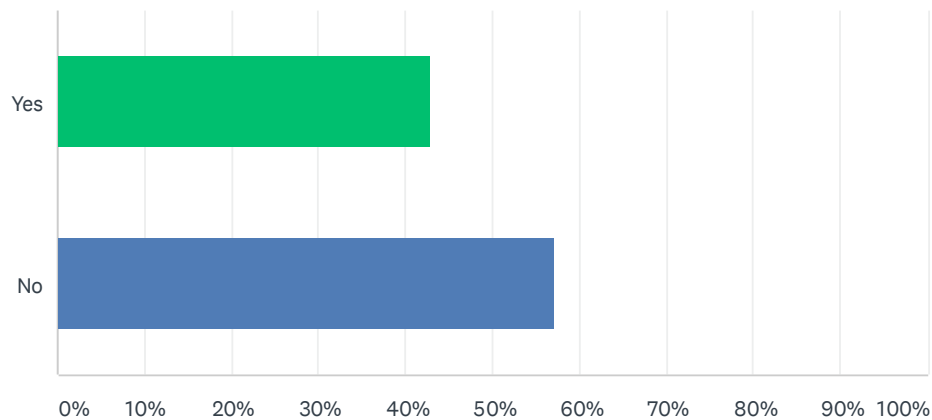
#	RESPONSES	DATE
1	The catwalk is dilapidated	7/21/2021 4:39 PM
2	Afraid someone may hurt themselves on structure or falling into water/rocks.	7/21/2021 1:55 PM
3	The foot bridge	7/21/2021 12:18 PM
4	Accessibility in current makes for unstable wading.	7/20/2021 9:22 AM
5	The platform is failing. few good casting locations. Weir failure on the right side ( away from road) and the poor footing (tripping boulders) in the water on that right side.	7/20/2021 7:21 AM
6	Not safe at all. fishing should be taken into account for any future structure plans.	7/19/2021 4:04 PM
7	The center walkway is badly damaged with sharp metal protruding as well as with boat passage there is a sharp sheet pile corner	7/19/2021 12:30 PM
8	Pedestrian on the bridge	7/18/2021 11:46 PM
9	N/A	7/18/2021 10:11 PM
10	None	7/18/2021 9:43 PM
11	I'm concerned about a blow out and flooding along the river corridor.	7/18/2021 9:25 PM
12	The walkway is falling apart and thats where many of the folks fish from.	7/18/2021 7:56 AM
13	None	7/15/2021 7:51 PM
14	n/a	7/15/2021 3:01 PM
15	Large boulders along weir are slippery, uneven. People trying to access platform can get caught by current at higher flows. People can fall from platform	7/15/2021 2:32 PM
16	Collapse of the weir while people are near it would be very bad.	7/15/2021 1:24 PM
17	Foot traffic on and around the bridge. It's a miracle that more people do not get hurt.	7/15/2021 8:16 AM
18	That jagged piece of metal sticking up where you can take a boat from the lake to the river.	7/14/2021 7:31 PM
19	I have not been aware of any safety issues.	7/14/2021 5:52 PM
20	x	7/14/2021 5:38 PM
21	none for me but due to jagged metal boats and people could be injured easily	7/14/2021 11:51 AM
22	people walking and crossing over the bridge. never been down there so don't know if there is harm to the lake or river bank	7/14/2021 10:56 AM
23	None	7/14/2021 10:56 AM
24	Metal is sharp in the water no railings current standing structure is falling apart	7/13/2021 5:55 PM
25	n/a	7/13/2021 3:04 PM
26	I've responded to several accidents where fishermen have slipped or become injured on the metal flashing holding back water.	7/13/2021 2:09 PM
27	Na	7/13/2021 9:55 AM
28	Tough the maneuver around for this old lady. Just getting down to it and back up the hill	7/13/2021 6:55 AM
29	Crossing the river below the weir. Lack of areas to fish, increasing contact with others.	7/13/2021 2:33 AM

## Eyak Lake Weir Community Feedback

30	.	7/12/2021 9:31 PM
31	Family and friend fish there. Needs to be as safe as can be.	7/12/2021 8:25 PM
32	Fishermen at risk if structure fails while fishing.	7/12/2021 7:24 PM
33	None	7/12/2021 7:01 PM
34	Completely unsafe. I stopped using it in 2019	7/12/2021 5:24 PM
35	It's a popular location and we need to preserve it	7/12/2021 5:08 PM
36	I do not fish at the weir	7/12/2021 1:44 PM
37	No concerns	7/10/2021 1:53 PM
38	N/a	7/10/2021 10:58 AM
39	None	7/8/2021 7:27 PM
40	access is not good	7/7/2021 5:17 PM

## Q7 Have you driven a boat from Eyak Lake to Eyak River (or vice versa) using the boat slot in the weir?

Answered: 77 Skipped: 1



ANSWER CHOICES	RESPONSES
Yes	42.86% 33
No	57.14% 44
TOTAL	77

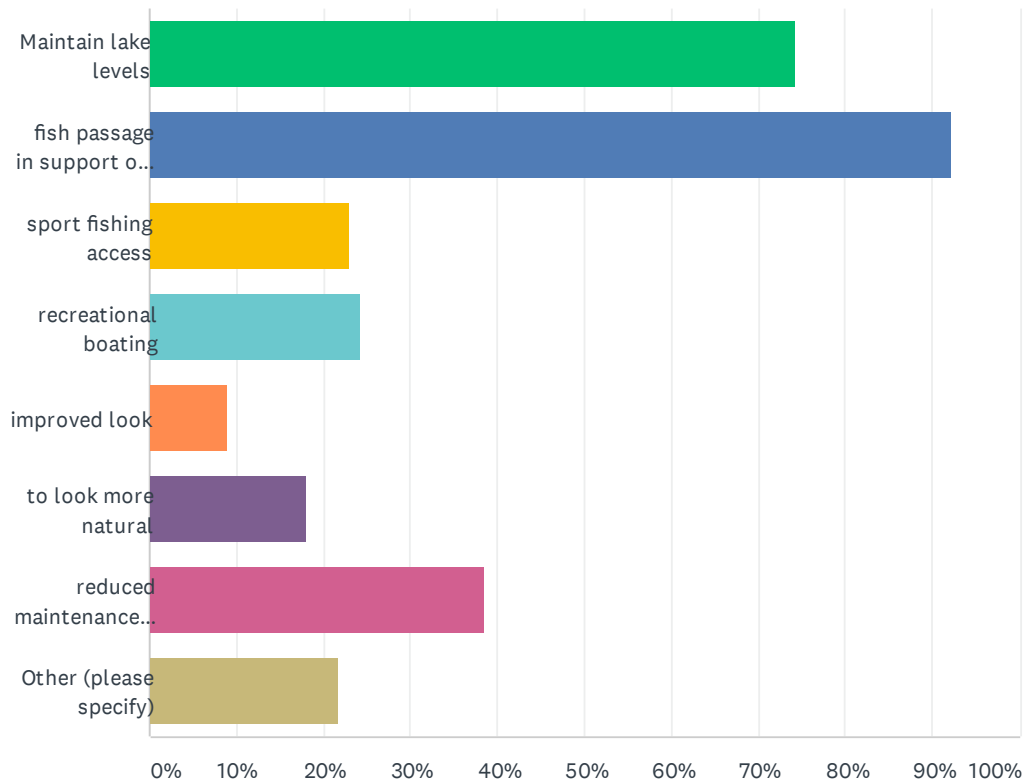
#	IF YES, HOW FREQUENTLY AND WHAT KIND OF BOAT(S)? (IF NO, SKIP TO NEXT QUESTION)	DATE
1	Doesn't seem that necessary to me for the few that actually use it. A launch on both water bodies.	7/21/2021 4:39 PM
2	Less frequently than a decade ago. water level has to be correct or you will damage your hull. safe traversal of river skiffs over the weir should be taken into account for any future structure plans.	7/19/2021 4:04 PM
3	Probably 3 times in my life. Motorized river boat, mostly for fun, not necessity.	7/19/2021 3:48 PM
4	In my teen age years and some in my older years skiff and kicker and airboat	7/19/2021 2:24 PM
5	Canoes and small skiffs. Maybe average once a year.	7/19/2021 1:15 PM
6	Over a dozen times a year! For lots of years using all different kinds of boats! Jet boat, airboat, prop skiff, ski boat, was just there Saturday 7-17-21 in the jet boat	7/19/2021 12:30 PM
7	River skiff, only at high water. Not often, just a few times. I wouldn't rely on it, but it was fun.	7/18/2021 9:59 PM
8	Years ago I used the boat slot all the time , even before we had jet boats. Over the years the slot has become damaged and so I have not used it in a few years. It has never been a very safe way to access the lake or river but it is all we have at this end of the lake. I would like to see if they could build a small boat launch at the end of the 5 mi loop road.	7/18/2021 7:56 AM
9	I have a jet boat now and would like to if it was possible to go both directions.	7/17/2021 9:16 AM
10	Only a few times over the past 30+ years - small river skiff with outboard.	7/16/2021 10:01 PM
11	few times	7/16/2021 2:24 AM
12	The M/V Twisted Sister (high school shop boat) Half a dozen times a year.	7/16/2021 1:44 AM
13	Not often - bowpicker, kayaks	7/15/2021 7:51 PM

## Eyak Lake Weir Community Feedback

14	Small outboard river skiffs	7/15/2021 1:24 PM
15	Once a year	7/14/2021 7:31 PM
16	Air boat. Several times a year.	7/14/2021 5:52 PM
17	Several decades ago. a very small duck boat.	7/14/2021 3:46 PM
18	Flat bottom river boat, few times a year in the fall	7/14/2021 2:47 PM
19	Jet river skiff, canoes, airboat, several times a year	7/14/2021 1:51 PM
20	I haven't, but I have a kayak that I could easily lift over the weir if I ever needed to.	7/14/2021 1:41 PM
21	Not frequently due to the sharp pieces of metal sticking out of the boat slot	7/14/2021 12:23 PM
22	When I was a teenager my brother s and I used it plenty of times.	7/14/2021 11:58 AM
23	airboat and jet skiff, only a few times because its not safe	7/14/2021 11:51 AM
24	I have jumped the weir with river skiffs	7/14/2021 10:56 AM
25	One time...was a tight squeeze!!	7/14/2021 10:54 AM
26	Jetboats and a couple times a year	7/13/2021 5:55 PM
27	once, it was awful.	7/13/2021 2:09 PM
28	Once every two years for fun during high water in fall.	7/12/2021 11:06 PM
29	around 6 times airboat and river skiff	7/12/2021 8:34 PM
30	River skiff, couple times a year	7/12/2021 8:25 PM
31	Jet boats, canoes. Not in a few years.	7/12/2021 7:45 PM
32	Handful of times on a skiff and kayak	7/12/2021 5:08 PM
33	I was unaware of the boat slot. I canoe on the Lake but have been very wary of approaching the weir in my canoe or kayak. I will check it out now.	7/12/2021 1:44 PM
34	1 time, river skiff with jet engine.	7/12/2021 10:56 AM
35	I tried to pass over the weir a couple of years ago and tore a lg hole in my boat. There is ragged metel in the slotthat will damage any boat that comesin contact, i own a jet boat 16 ft river skiff.	7/12/2021 9:43 AM
36	Once. Jetboat.	7/10/2021 1:53 PM
37	River skiffs, air boars, jets skis. Many times a year with each	7/8/2021 2:48 PM

## Q8 Please pick the top three priorities you have for a new Eyak weir structure:

Answered: 78 Skipped: 0



ANSWER CHOICES	RESPONSES	
Maintain lake levels	74.36%	58
fish passage in support of species like salmon	92.31%	72
sport fishing access	23.08%	18
recreational boating	24.36%	19
improved look	8.97%	7
to look more natural	17.95%	14
reduced maintenance needs	38.46%	30
Other (please specify)	21.79%	17
Total Respondents: 78		

#	OTHER (PLEASE SPECIFY)	DATE
1	Should have fish passage monitoring which would create educational opportunities and help understand status of salmon populations there.	7/21/2021 9:23 PM
2	the weir could be re-designed to allow for more natural fish passage conditions, such as a design with step pools, and could also be re-designed to incorporate the use of underwater	7/20/2021 2:36 PM

## Eyak Lake Weir Community Feedback

cameras for monitoring sockeye and coho salmon escapement to Eyak Lake. A re-designed weir would probably also allow for safer sport-fishing access.

3	Is the real concern all the ww2 military waste and chemicals dumped in there?	7/18/2021 11:46 PM
4	Play wave	7/18/2021 9:59 PM
5	Surf/play wave!	7/18/2021 9:43 PM
6	I don't want to see an opportunity to create an extremely enjoyable, and affordable recreation activity lost. The weir could be engineered into an amazing kayaking/surfing playwave. They are popular all over the country. <a href="https://youtu.be/JJB14aOp7WNY">https://youtu.be/JJB14aOp7WNY</a>	7/18/2021 9:25 PM
7	prevent flooding to homes on the river - which is probably the same as 'maintain lake levels'.	7/16/2021 10:01 PM
8	Should have hydro power	7/15/2021 7:51 PM
9	Need to consider how changes in flow amounts, drainage timing, and channel will affect properties along river and lake.	7/15/2021 2:32 PM
10	Until I received this email I hadn't thought about the weir at all. My main priority is that the environment be considered first. I don't want it to "look" more natural, I want it to be natural. But it's probably too late to restore the lake to whatever it was like originally before people started messing with it. I want to learn more.	7/15/2021 7:53 AM
11	Prevent flooding.	7/14/2021 3:46 PM
12	It's impossible to pick only three. All of the above are important	7/14/2021 1:51 PM
13	safety of users and conservation of the area	7/14/2021 10:56 AM
14	increase safety in crossing to the midway platform.	7/13/2021 2:09 PM
15	Salmon observation	7/12/2021 5:24 PM
16	No comment	7/10/2021 10:53 AM
17	Lion at the west Chester lagoon dam, provides spawning habitat and keeps lagoon level	7/8/2021 7:27 PM

## Q9 If it was feasible and we had the funding, what element of a new weir structure could we add to help support one of your top three priorities?

Answered: 67 Skipped: 11

#	RESPONSES	DATE
1	Sonar monitoring with educational kiosk.	7/21/2021 9:23 PM
2	Potential for small scale hydropower that doesn't impede fish passage	7/21/2021 4:39 PM
3	Add a viewing platform for non-fisherman? Fish counting capability?	7/21/2021 1:55 PM
4	access to foot bridge	7/21/2021 12:18 PM
5	fish ladder, if needed, to improve salmon passage	7/21/2021 5:58 AM
6	fisheries management tools such as underwater camera to monitor sockeye and coho salmon escapement, and more natural salmon habitat conditions with step pools. Also need something that will stand up to heavy flow events as climate change continues to affect rainfall patterns.	7/20/2021 2:36 PM
7	Trail access/ raised underwater structure for easier wading.	7/20/2021 9:22 AM
8	Fishing wise I'm concerned about making it too accessible. However I think a couple of supporting boulder(s) stances mid river would give another safe fishing location.	7/20/2021 7:21 AM
9	dedicated & properly designed boat slit. could possibly incorporate a fish ladder.	7/19/2021 4:04 PM
10	My 4th would have been sport fishing. A safer access from the pull-out to a larger fishing platform. The bridge is narrow so having to walk from the pull-out down through the alders, or wading across the current to the metal structure can be tricky and unsafe at times.	7/19/2021 3:48 PM
11	None	7/19/2021 2:24 PM
12	*IF* fish are currently having a hard time getting into Eyak lake we should fix that.	7/19/2021 1:15 PM
13	A design that would allow boat passage at lower water levels without damage to boat	7/19/2021 12:30 PM
14	Let Mother Nature take her course.	7/18/2021 11:46 PM
15	Anything that would help salmon populations and our community's economy through fishing.	7/18/2021 10:11 PM
16	A play wave for surfing	7/18/2021 9:59 PM
17	Surf/play wave!	7/18/2021 9:43 PM
18	A recreational play/surf wave would be my highest priority. <a href="https://youtu.be/JB14aOp7WNY">https://youtu.be/JB14aOp7WNY</a> Second, better fishing access. Like a boardwalk or platforms.	7/18/2021 9:25 PM
19	more natural slope	7/18/2021 12:08 PM
20	I believe the weir has work well for years and just needs to be rebuilt at the same level. If possible there could be a nice walkway added to help fisherman access the the fishing areas.	7/18/2021 7:56 AM
21	Boat access both directions.	7/17/2021 9:16 AM
22	make it to not disturb the wildlife but accessible for fly fishermen.	7/16/2021 2:24 AM
23	Studies	7/15/2021 8:15 PM
24	hydro power	7/15/2021 7:51 PM
25	better fish passage	7/15/2021 3:01 PM
26	Add gravel/small cobble upstream to create gently sloping banks extending into the lake so anglers can safely fish from shore/shallow water. Design would have to incorporate features to prevent gravel from washing away. Currently east side has silt bottom, so this may not be too difficult.	7/15/2021 2:32 PM



## Eyak Lake Weir Community Feedback

27	Incorporating sustainable building products.	7/15/2021 1:24 PM
28	Adding fish passage.	7/15/2021 8:16 AM
29	Need more information	7/15/2021 7:53 AM
30	safer sport fishing access	7/15/2021 7:32 AM
31	Fish passage	7/14/2021 9:01 PM
32	A way to take a boat through it easier. The fish can go up in now. Don't make it higher.	7/14/2021 7:31 PM
33	I have not given this question any thought.	7/14/2021 5:52 PM
34	x	7/14/2021 5:38 PM
35	eliminate the boat slot and make a better way for fish to enter the lake	7/14/2021 3:46 PM
36	A more pronounced boat slip	7/14/2021 2:47 PM
37	An article I read mentioned a sloped side to the weir allowing easier access to the lake for salmon.	7/14/2021 1:41 PM
38	Better boat slot	7/14/2021 12:23 PM
39	Fish passage	7/14/2021 11:58 AM
40	a mechanism that allows the lake to hold more water during the summer or low rain fall times and allow more lake water out when lake floods	7/14/2021 11:51 AM
41	unknown	7/14/2021 10:56 AM
42	Fish passageway, overflow chute with hydro power.	7/14/2021 10:56 AM
43	Long lasting material that gets the job done!!	7/14/2021 10:54 AM
44	Juvenile and adult fish passage. A larger population of salmon in Eyak Lake would increase the Cutthroat trout population and make better subsistence and sport fishing opportunities closer to town.	7/13/2021 8:11 PM
45	Fishing structure walkout ramp	7/13/2021 5:55 PM
46	dunno yet	7/13/2021 3:04 PM
47	some sort of boating gate would be great.	7/13/2021 2:09 PM
48	No weir	7/13/2021 9:55 AM
49	Safe walking area	7/13/2021 6:55 AM
50	Additional fishing areas.	7/13/2021 2:33 AM
51	Design that would allow all life stages of salmon and trout to pass both up and down stream even during low water events.	7/12/2021 11:06 PM
52	taller markings for boat travel on high water events	7/12/2021 8:34 PM
53	Safer for boat passages- better markings	7/12/2021 8:25 PM
54	Make it more substansial than sheet pile. Quite a few people have damaged there boats on it.	7/12/2021 7:45 PM
55	Better design and construction would improve all of them.	7/12/2021 7:24 PM
56	Beauty	7/12/2021 7:01 PM
57	A structure that extends from the shoreline to the center of the weir.	7/12/2021 5:24 PM
58	Sport fishing platforms and access from the Highway; a trail from the pull out to the weir and more than one platform to fish from. Easy boat passage. A fish ladder for viewing? Signage for fish education	7/12/2021 5:08 PM
59	I know nothing of weirs so cannot contribute	7/12/2021 1:44 PM
60	I think it would be nice if there was a walkway with a railing for part of the way across the weir.	7/12/2021 10:56 AM

## Eyak Lake Weir Community Feedback

61	A row of lg boulders to creat a natural rapid, no maintenance, natural look	7/12/2021 9:43 AM
62	Access to lake	7/10/2021 1:53 PM
63	Do not know!	7/10/2021 10:58 AM
64	Fish passage	7/9/2021 4:48 PM
65	Removing it	7/8/2021 7:27 PM
66	Safe passage over spill way with boats. Keep in mind if fisherman are there we need to get through. Keep in mind fisherman on platform not wanting to get hit or splashed when boats travel	7/8/2021 2:48 PM
67	water slide	7/7/2021 5:17 PM

## Q10 Please use this space to share other thoughts, concerns, or ideas that we did not capture in this survey.

Answered: 28   Skipped: 50

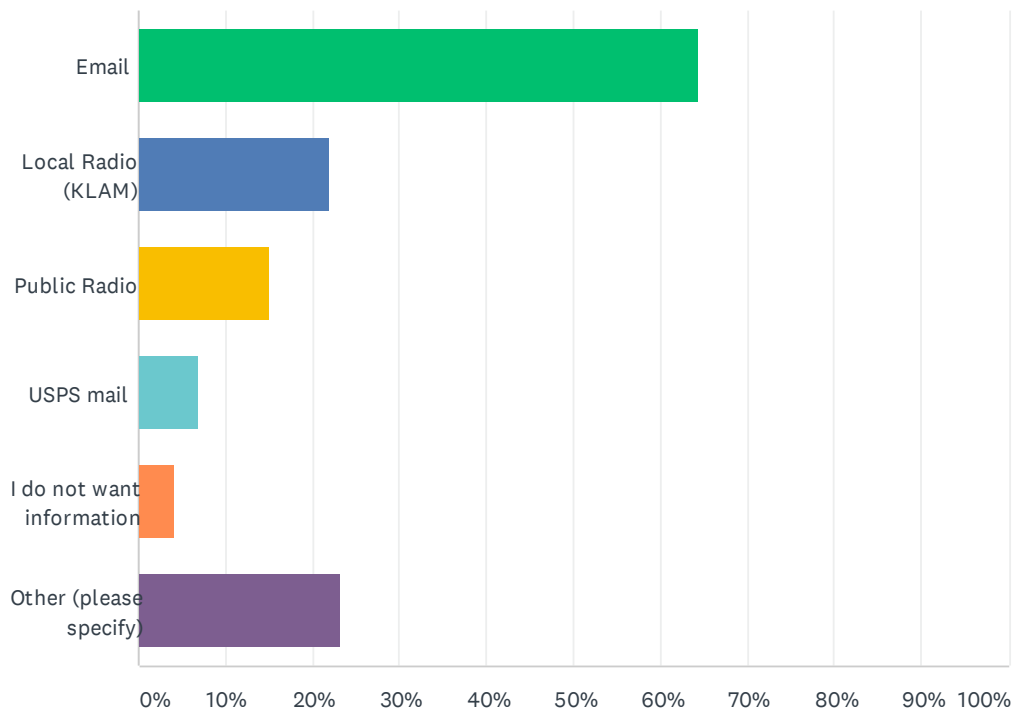
#	RESPONSES	DATE
1	Any changes should place environmental impacts first. Salmon and ecosystem above sport and leisure.	7/20/2021 9:22 AM
2	Fry passage, this seems to be an opportune feeding point for mergansers where the fry jump over the wier at rivers edge.	7/20/2021 7:21 AM
3	Just happy this is being looked into. This town has a lot of room for improvement.	7/19/2021 4:04 PM
4	If fishing improvements are made, the downside could be that it might turn into a high traffic fishing spot like Ibek (which took a beating). I think the tricky access now keeps fishing traffic low. Consider potential impact on the salmon run if access becomes too welcoming and use increases. Combat fishing is no fun and can be detrimental to the salmon stock.	7/19/2021 3:48 PM
5	None	7/19/2021 12:30 PM
6	N/A	7/18/2021 10:11 PM
7	None	7/18/2021 9:43 PM
8	Any earthquake concerns? How is the bridge holding up?	7/16/2021 10:01 PM
9	None	7/15/2021 7:51 PM
10	Just keep in mind what an empty lake or swamp would do to Cordova.	7/15/2021 3:01 PM
11	Eyak Lake is generally quite shallow, and even a drop of a few feet could dewater many acres of juvenile fish rearing habitat and waterfowl habitat.	7/15/2021 2:32 PM
12	Get rid of the sport fish platform.	7/14/2021 9:01 PM
13	None	7/14/2021 7:31 PM
14	Should prevent all boats and watercraft from crossing the weir and it would be nice to keep the fishermen some distance from the fish ladder or crossing zone.	7/14/2021 3:46 PM
15	I did not know this was a concern until I came across the Cordova times article. I'm a newer resident of Cordova and I have a lot to learn about the history. I personally would donate time and money to help reconstruct the weir.	7/14/2021 1:41 PM
16	Could we incorporate a small power generation with it?	7/14/2021 10:56 AM
17	SHEPARD POINT PROJECT = STUPID!!!	7/13/2021 8:11 PM
18	n/a	7/13/2021 3:04 PM
19	Thank you for doing this.	7/13/2021 2:09 PM
20	Na	7/13/2021 9:55 AM
21	The area seems to be pretty important for a lot of birds. Especially trumpeter swans. Maybe make it friendly to wildlife crossing the river.	7/12/2021 11:06 PM
22	None	7/12/2021 7:01 PM
23	Thank you for getting this going! Excited for some improved possibilities	7/12/2021 5:08 PM
24	Thank you for getting community input on this project. Best of luck in this endeavor	7/12/2021 1:44 PM
25	No other ideas	7/10/2021 1:53 PM
26	Thanks for doing this.	7/10/2021 10:58 AM

## Eyak Lake Weir Community Feedback

27	The angle inwhich boats head over wier with weeds growing and fisherman in water. There has been many boats hit the weir and sink. I bet over 50. I have fixed a few. People got thrown out of the boats	7/8/2021 2:48 PM
28	CRWP is the best	7/7/2021 5:17 PM

## Q11 What is the best way to keep you informed about progress and planning for Eyak lake weir? (check all that apply)

Answered: 73 Skipped: 5



ANSWER CHOICES	RESPONSES	
Email	64.38%	47
Local Radio (KLAM)	21.92%	16
Public Radio	15.07%	11
USPS mail	6.85%	5
I do not want information	4.11%	3
Other (please specify)	23.29%	17
Total Respondents: 73		

#	OTHER (PLEASE SPECIFY)	DATE
1	Social media like the FB page, Cordova online bulletin board	7/21/2021 1:55 PM
2	Cordova Times	7/19/2021 4:04 PM
3	The Cordova Times and the Cordova Bulletin on FB	7/19/2021 3:48 PM
4	Cordova Times	7/19/2021 1:15 PM
5	city of cordova web site	7/15/2021 7:32 AM
6	Newspaper	7/14/2021 5:52 PM
7	Cordova Times	7/14/2021 2:47 PM

## Eyak Lake Weir Community Feedback

8	Cordova bulletin board on Facebook	7/14/2021 1:51 PM
9	Updates in Cordova times	7/14/2021 1:41 PM
10	Cordova times	7/14/2021 11:58 AM
11	newspaper	7/14/2021 11:51 AM
12	i read your newsletter and that is good.	7/14/2021 10:56 AM
13	Cordova Times	7/13/2021 8:11 PM
14	Social Media	7/13/2021 12:46 PM
15	Facebook	7/13/2021 9:55 AM
16	Facebook is always good for thag	7/12/2021 5:08 PM
17	tcarte67@gmail.com	7/12/2021 1:44 PM

## **APPENDIX 2: COST ESTIMATE BREAKOUT**

**Eyak Lake Outlet Structure Replacement Design**  
**Conceptual Opinion of Total Project Costs for Alternative 2 --- Rehabilitate Existing Structure with Natural Fishway**

Item No.		Item	Unit	Quantity	Unit Price	Total Price	Source and Comments
<b>1.00</b>		<b>Mobilization</b>				<b>\$ 41,000</b>	
	1.01	Mobilization and Demobilization	LS	1.0	All Required	\$ 41,000	Max. 5% of Total Construction Cost
		<i>Mobilization Subtotal</i>				<i>\$ 41,000</i>	
<b>2.00</b>		<b>Survey</b>				<b>\$ 35,000</b>	
	2.01	Construction Surveying	LS	1.0	All Required	\$ 25,000	Max. 3% of Total Construction Cost
	2.02	As-Built Plans	LS	1.0	All Required	\$ 10,000	Estimated by DOWL
		<i>Survey Subtotal</i>				<i>\$ 35,000</i>	
<b>3.00</b>		<b>Existing Structure Rehabilitation</b>				<b>\$ 737,833</b>	
	3.01	Dewatering and River Control	LS	1.0	All Required	\$ 250,000	Estimated by DOWL
	3.02	Embankment	CY	50.0	\$ 100	\$ 5,000	Estimated by DOWL
	3.03	Sheet Pile	LF	35.0	\$ 300	\$ 10,500	Cost from St. Mary Airport Project 18" Steel Pipe Pile - Drive inclined (35')
	3.04	Boat Slot Repair and Reinforcement	LS	1.0	All Required	\$ 125,000	Estimated by DOWL
	3.05	Spot Repairs to Weir	LS	1.0	All Required	\$ 50,000	Estimated by DOWL
	3.06	Pier Repair	LS	1.0	All Required	\$ 85,000	Estimated by DOWL
	3.07	Riprap, Class I	CY	433.3	\$ 100	\$ 43,333	Cost from Valdez 10 Mile Dikes Maintenance
	3.08	Riprap, Class III	CY	1300.0	\$ 130	\$ 169,000	Estimated by DOWL
		<i>Existing Structure Rehabilitation Subtotal</i>				<i>\$ 737,833</i>	
<b>4.00</b>		<b>Natural Fishway</b>				<b>\$ 22,200</b>	
	4.01	Material for Natural Fishway	CY	70.0	\$ 110	\$ 7,700	Estimated by DOWL
	4.02	Riprap, Class I	CY	25.0	\$ 100	\$ 2,500	Cost from Valdez 10 Mile Dikes Maintenance
	4.03	Riprap, Class II	CY	100.0	\$ 120	\$ 12,000	Cost from Valdez 10 Mile Dikes Maintenance
		<i>Natural Fishway Subtotal</i>				<i>\$ 22,200</i>	
<b>5.00</b>		<b>Ancillary Project Costs</b>				<b>\$ 585,000</b>	
	5.01	Erosion and Sediment Control / SWPPP	LS	1.0	All Required	\$ 41,000	Max. 5% of Total Construction Cost
	5.02	Site Restoration, Planting and Cleanup	LS	1.0	\$ 50,000	\$ 50,000	Cleanup
	5.03	Engineering and Environmental	LS	1.0	All Required	\$ 122,000	Contract Value Max. 15% of Total Construction Cost
	5.04	Construction Administration	LS	1.0	All Required	\$ 122,000	Contract Value Max. 15% of Total Construction Cost
	5.05	Permitting Fees	LS	1.0	\$ 50,000	\$ 50,000	Estimated by DOWL
	5.06	Cultural Resources Study	LS	1.0	\$ 200,000	\$ 200,000	Estimated by DOWL
		<i>Ancillary Project Costs Subtotal</i>				<i>\$ 585,000</i>	
<b>6.00</b>		<b>Contingency</b>				<b>\$ 284,207</b>	
	6.01	Contingency	LS	20%	All Required	\$ 284,207	Estimated by DOWL
		<i>Contingency Subtotal</i>				<i>\$ 284,207</i>	

<b>Total Project Costs for This Option</b>	<b>\$ 1,705,240</b>
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## Eyak Lake Outlet Structure Replacement Design

### Conceptual Opinion of Total Project Costs for Alternative 3 --- Replace in Kind with Natural Fishway

Item No.		Item	Unit	Quantity	Unit Price	Total Price	Source and Comments
<b>1.00</b>		<b>Mobilization</b>				<b>\$ 114,000</b>	
	1.01	Mobilization and Demobilization	LS	1.0	All Required	\$ 114,000	Max. 5% of Total Construction Cost
		<i>Mobilization Subtotal</i>				<i>\$ 114,000</i>	
<b>2.00</b>		<b>Survey</b>				<b>\$ 79,000</b>	
	2.01	Construction Surveying	LS	1.0	All Required	\$ 69,000	Max. 3% of Total Construction Cost
	2.02	As-Built Plans	LS	1.0	All Required	\$ 10,000	Estimated by DOWL
		<i>Survey Subtotal</i>				<i>\$ 79,000</i>	
<b>3.00</b>		<b>Structure Replacement</b>				<b>\$ 983,933</b>	
	3.01	Dewatering and River Control	LS	1.0	All Required	\$ 250,000	Estimated by DOWL
	3.02	Embankment	CY	50.0	\$ 100	\$ 5,000	Estimated by DOWL
	3.03	Sheet Pile	LF	365.0	\$ 300	\$ 109,500	Cost from St. Mary Airport Project 18" Steel Pipe Pile - Drive inclined (35')
	3.04	Annular Void Fill	CY	3285.0	\$ 60	\$ 197,100	Estimated by DOWL
	3.05	Riprap, Class I	CY	433.3	\$ 100	\$ 43,333	Cost from Valdez 10 Mile Dikes Maintenance
	3.06	Riprap, Class III	CY	1300.0	\$ 130	\$ 169,000	Cost from Valdez 10 Mile Dikes Maintenance
	3.07	New Pier	LS	1.0	All Required	\$ 85,000	Estimated by DOWL
	3.07	New Boat Slot	LS	1.0	All Required	\$ 125,000	Estimated by DOWL
		<i>Existing Structure Rehabilitation Subtotal</i>				<i>\$ 983,933</i>	
<b>4.00</b>		<b>Natural Fishway</b>				<b>\$ 34,500</b>	
	4.01	Material for Natural Fishway	CY	150.0	\$ 110	\$ 16,500	Estimated by DOWL
	4.02	Riprap, Class I	CY	25.0	\$ 100	\$ 2,500	Cost from Valdez 10 Mile Dikes Maintenance
	4.02	Riprap, Class II	CY	75.0	\$ 120	\$ 9,000	Cost from Valdez 10 Mile Dikes Maintenance
	4.03	Riprap, Class III	CY	50.0	\$ 130	\$ 6,500	Cost from Valdez 10 Mile Dikes Maintenance
		<i>Natural Fishway Subtotal</i>				<i>\$ 34,500</i>	
<b>5.00</b>		<b>Ancillary Project Costs</b>				<b>\$ 1,096,000</b>	
	5.01	Erosion and Sediment Control / SWPPP	LS	1.0	All Required	\$ 114,000	Max. 5% of Total Construction Cost
	5.02	Site Restoration, Planting and Cleanup	LS	1.0	\$ 50,000	\$ 50,000	Cleanup
	5.03	Engineering and Environmental	LS	1.0	All Required	\$ 341,000	Contract Value Max. 15% of Total Construction Cost
	5.04	Construction Administration	LS	1.0	All Required	\$ 341,000	Contract Value Max. 15% of Total Construction Cost
	5.05	Permitting Fees	LS	1.0	\$ 50,000	\$ 50,000	Estimated by DOWL
	5.06	Cultural Resources Study	LS	1.0	\$ 200,000	\$ 200,000	Estimated by DOWL
		<i>Ancillary Project Costs Subtotal</i>				<i>\$ 1,096,000</i>	
<b>6.00</b>		<b>Contingency</b>				<b>\$ 461,487</b>	
	6.01	Contingency	LS	20%	All Required	\$ 461,487	Estimated by DOWL
		<i>Contingency Subtotal</i>				<i>\$ 461,487</i>	

<b>Total Project Costs for This Option</b>	<b>\$ 2,768,920</b>
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## Eyak Lake Outlet Structure Replacement Design

### Conceptual Opinion of Total Project Costs for Alternative 4 --- Series of Rock Weirs

Item No.		Item	Unit	Quantity	Unit Price	Total Price	Source and Comments
<b>1.00</b>		<b>Mobilization</b>				<b>\$ 152,000</b>	
	1.01	Mobilization and Demobilization	LS	1.0	All Required	\$ 152,000	Max. 5% of Total Construction Cost
		<i>Mobilization Subtotal</i>				<i>\$ 152,000</i>	
<b>2.00</b>		<b>Survey</b>				<b>\$ 101,000</b>	
	2.01	Construction Surveying	LS	1.0	All Required	\$ 91,000	Max. 3% of Total Construction Cost
	2.02	As-Built Plans	LS	1.0	All Required	\$ 10,000	Estimated by DOWL
		<i>Survey Subtotal</i>				<i>\$ 101,000</i>	
<b>3.00</b>		<b>Existing Structure Rehabilitation</b>				<b>\$ 603,667</b>	
	3.01	Dewatering and River Control	LS	1.0	All Required	\$ 250,000	Estimated by DOWL
	3.02	Embankment	CY	50.0	\$ 100	\$ 5,000	Estimated by DOWL
	3.03	Boat Slot Repair and Reinforcement	LS	1.0	All Required	\$ 100,000	Estimated by DOWL
	3.04	Grout	CY	400.0	\$ 50	\$ 20,000	Estimated by DOWL
	3.05	Riprap, Class I	CY	466.7	\$ 100	\$ 46,667	Cost from Valdez 10 Mile Dikes Maintenance
	3.06	Riprap, Class III	CY	1400.0	\$ 130	\$ 182,000	Cost from Valdez 10 Mile Dikes Maintenance
		<i>Existing Structure Rehabilitation Subtotal</i>				<i>\$ 603,667</i>	
<b>4.00</b>		<b>Rock Weirs and Fishway</b>				<b>\$ 2,371,667</b>	
	4.01	Material for Natural Fishway	CY	3000.0	\$ 110	\$ 330,000	Estimated by DOWL
	4.02	Riprap, Class I	CY	4166.7	\$ 100	\$ 416,667	Cost from Valdez 10 Mile Dikes Maintenance
	4.03	Riprap, Class III	CY	12500.0	\$ 130	\$ 1,625,000	Cost from Valdez 10 Mile Dikes Maintenance
		<i>Natural Fishway Subtotal</i>				<i>\$ 2,371,667</i>	
<b>5.00</b>		<b>Ancilliary Project Costs</b>				<b>\$ 1,360,000</b>	
	5.01	Erosion and Sediment Control / SWPPP	LS	1.0	All Required	\$ 152,000	Max. 5% of Total Construction Cost
	5.02	Site Restoration, Planting and Cleanup	LS	1.0	\$ 50,000	\$ 50,000	Tree/Shrub Planting, Cleanup
	5.03	Engineering and Environmental	LS	1.0	All Required	\$ 454,000	Contract Value Max. 15% of Total Construction Cost
	5.04	Construction Administration	LS	1.0	All Required	\$ 454,000	Contract Value Max. 15% of Total Construction Cost
	5.05	Permitting Fees	LS	1.0	\$ 50,000	\$ 50,000	Estimated by DOWL
	5.06	Cultural Resources Study	LS	1.0	\$ 200,000	\$ 200,000	Estimated by DOWL
		<i>Ancilliary Project Costs Subtotal</i>				<i>\$ 1,360,000</i>	
<b>6.00</b>		<b>Contingency</b>				<b>\$ 917,667</b>	
	6.01	Contingency	LS	20%		\$ 917,667	Estimated by DOWL
		<i>Contingency Subtotal</i>				<i>\$ 917,667</i>	

<b>Total Project Costs for This Option</b>	<b>\$ 5,506,000</b>
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