USDA

United States Department of Agriculture

2024 Unuk River Eulachon (Thaleichthys pacificus) Monitoring Report

Forest Service

2024

EXECUTIVE SUMMARY

During the 2024 Unuk River monitoring season the run of Eulachon or Ooligan, *Thaleichthys pacificus*, arrived on the Unuk River on March 12 and remained until March 26, with the peak of the run between March 16 and 20.

Based on the numbers of Ooligan observed by biologists, and reports from local subsistence users the 2024 Ooligan run appeared to be Abundant[1] (Figure 3) on the Unuk River.

The USDA Forest Service (USFS) has monitored the Unuk River, located in District 1, since 2001 using combinations of aerial surveys, foot & boat surveys, satellite cameras, and on-site reports from local subsistence users and cabin owners.

District 1 historically supported subsistence, personal use, and commercial fisheries for Ooligan primarily in the Unuk River system (Figure 1 and Figure 2). In 2005 the District 1 Ooligan population collapsed, with less than 150 fish observed each year between 2005 and 2010 on the Unuk River, resulting in State and Federal closures to fishing beginning in 2005. In 2011 Ooligan began returning to the Unuk River in greater numbers. In 2018 the USFS partnered with the Ketchikan Indian Community (KIC) to increase on-the-ground monitoring efforts on the Unuk River system. Annual monitoring has documented variable return levels between 2011 to present (Figure 3), though stock sizes remain at levels lower than those observed prior to the 2005 population collapse.

Because monitoring efforts have documented Ooligan returning consistently since 2011 the Federal subsistence fishery was reopened on the Unuk River in 2021 to a limited harvest with gear restrictions to federally qualified subsistence users. This limited harvest continues to date. Only nine harvest permits were issued to federally qualified users during the 2024 season, with all nine having reported successful harvest. Harvest was restricted to one five-gallon bucket per household and limited to cast net and dip net only methods. The State of Alaska Ooligan fishery remained closed.

Field personnel flew to the Unuk on March 15 and stayed onsite until March 26. In addition to onsite relative abundance surveys, our partners at the Ketchikan Indian Community continued their partnership with the Ocean & Earth Environmental Services (OEES) to continue their collection of Environmental DNA (eDNA) to better aid our assessment and long-term management of the Unuk River Ooligan population. Data analysis of eDNA collected in 2024 is still ongoing.

LOCATION and HISTORY

The Unuk River lays within District 1, and drains into Burroughs Bay (Figure 1 and Figure 2) on the mainland approximately 54 miles (87 km) northeast of Ketchikan Alaska and is an important system for Eulachon (Ooligan), *Thaleichthys pacificus*. Populations of Ooligan in District 1 have been at critically low levels since 2005. Monitoring efforts by the Forest Service, Alaska Department of Fish and Game, the Ketchikan Indian Community (KIC), and local subsistence users since 2001 have provided base line information that indicated a decline in the populations of District 1 Ooligan.

District 1 historically supported traditional use, subsistence use, personal use, and commercial fisheries for Ooligan, primarily in the Unuk River system. Annual harvest of Ooligan from the 1980's through the

[1] *Relative Abundance Definitions:* **Abundant** *= large high density schools (>10,000 fish) widespread along multiple major channels and present beyond one week;* **Good** *= moderately large high density schools (1000 – 10,000) spread throughout one or more major channels and present for at least a week;* **Moderate** *= Some high density schools, small to moderate in size (500-1000 fish), spread out over multiple channels and present for at least a week;* **Weak** *= small schools of fish (<500 fish), scattered, no large high density schools, and present less than a week;* **Absent/Nearly Absent** *= Little to no fish observed, or small pockets of individuals seen throughout run.*

1990's averaged over 12,000 pounds (Figure 4), with some harvest years exceeding 30,000 pounds (Van Alen, 2011 unpublished). By 2004, only 1500 pounds of Ooligan were harvested on the Unuk River and very low numbers of returning Ooligan were observed by subsistence fisherman and Forest Service personnel. In 2001, the U.S. Forest Service (USFS) and the Alaska Department of Fish and Game (ADF&G) initiated a pilot study to learn more about the level of harvest, distribution, run timing, and life history characteristics of Ooligan in the Unuk River. By 2005, surveys found Ooligan to be nearly absent in the Unuk River system, resulting in State and Federal closures of the Ooligan fishery on the Unuk River. Intensive onsite monitoring surveys between 2005 and 2009 observed less than 100 fish each year, and only 121 fish in 2010 (Figure 3).

This five-year absence of Ooligan alarmed managers because the Ooligan life cycle is typically only five years, suggesting an entire life cycle may have been lost. With the stocks at low levels, there were few options available to managers for conservation other than closure. Due to the sharp declines in the overall number of Ooligan, along with critically low numbers returning to the area, The Unuk River and other portions of District 1 were closed to the harvest of Ooligan in 2005.

Beginning in 2011, Ooligan began returning to the Unuk River. Between 2011 and 2015, Ooligan were observed in both the Unuk River, Burroughs Bay area, and in the Carroll Inlet area. Genetic analysis of Carroll Inlet fish showed these fish to be genetically similar to Unuk River Ooligan. Ooligan continued to return to the Unuk River area between 2016 and present, with variable numbers (Figure 3). Though Ooligan appear to be returning to the Unuk River regularly since 2011, the stock sizes within District 1 remain at levels lower than those observed prior to the 2005 population collapse. However, because Ooligan have been returning to the Unuk River regularly since 2011, managers felt that allowing a limited harvest, limited to one five-gallon bucket per household, would aid in our efforts to obtain biological data and better assess run sizes, as well as provide Federally qualified subsistence users an opportunity to harvest. Data collected will help managers determine if the Ooligan population can support sustained harvest and if future harvest limits should be altered. In 2021 a limited Federal fishery was opened on the Unuk River for the first time since 2004, limited to one five-gallon bucket per household using cast net and dip net only methods. The State fishery remained closed, all other waters in District 1 also remained closed. Due to the success of the 2021 season the limited opening on the Unuk River has continued to date.

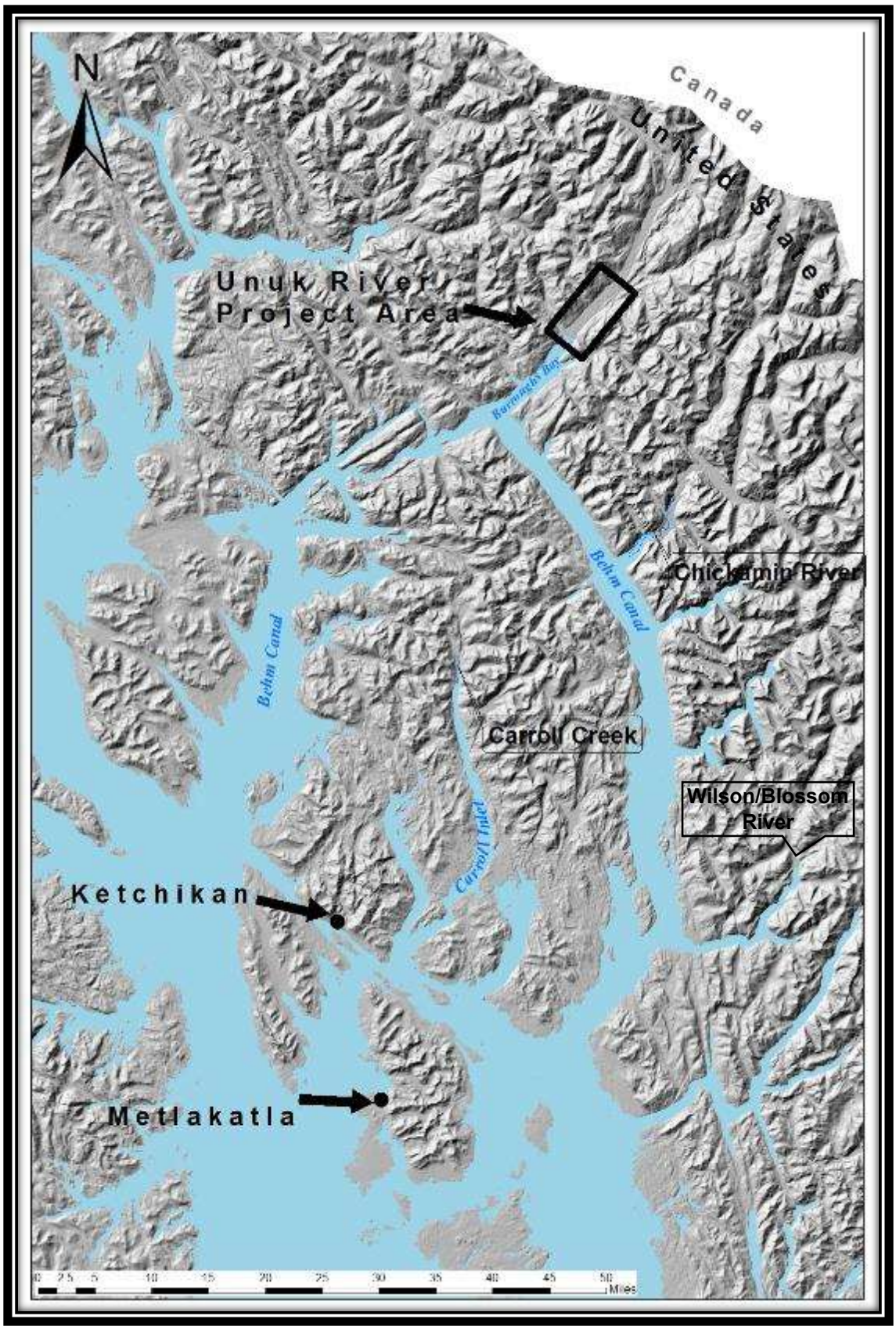

Figure 1. Project Area

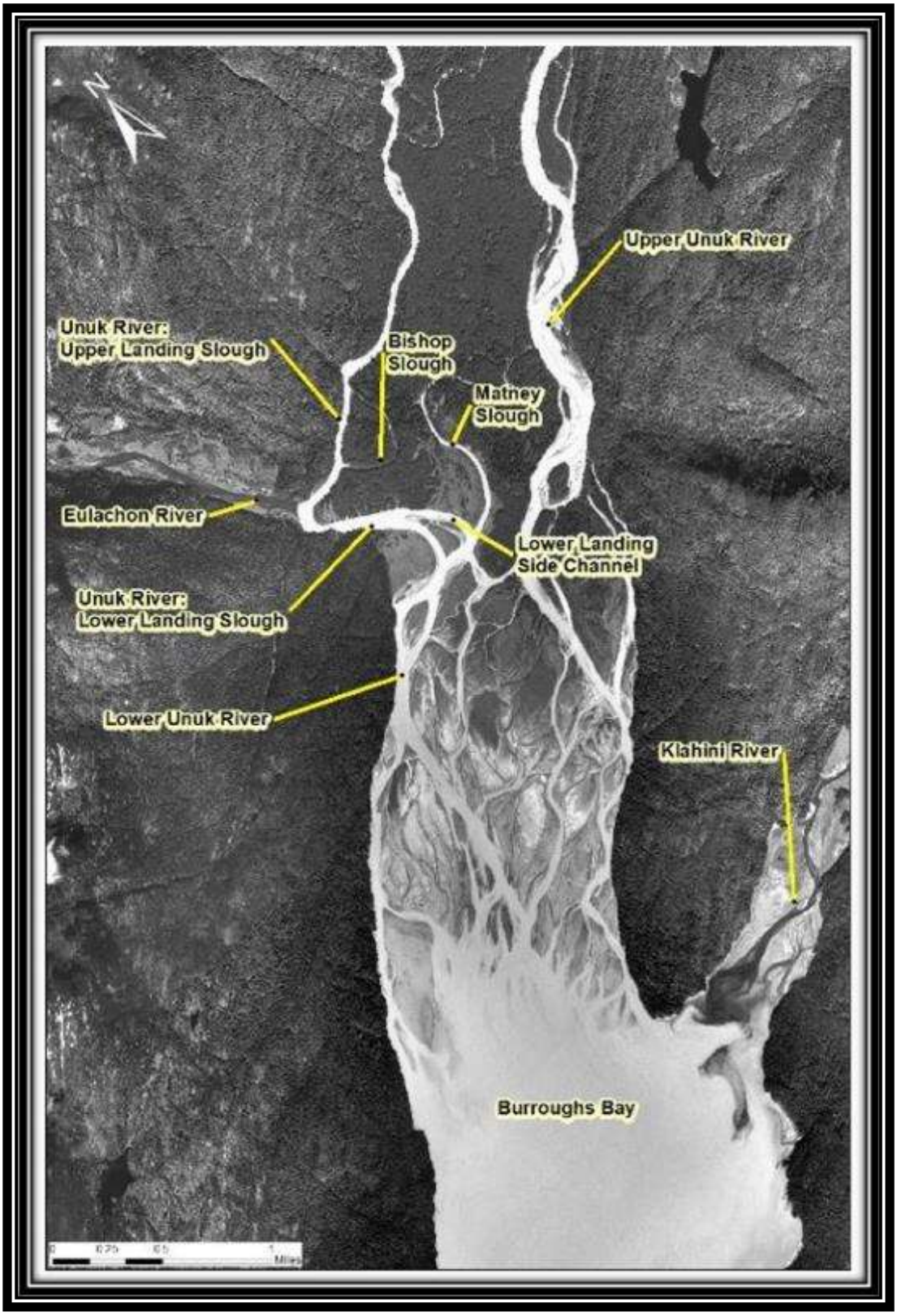

Figure 2. Lower Unuk River system, including major side channels and main tributaries.

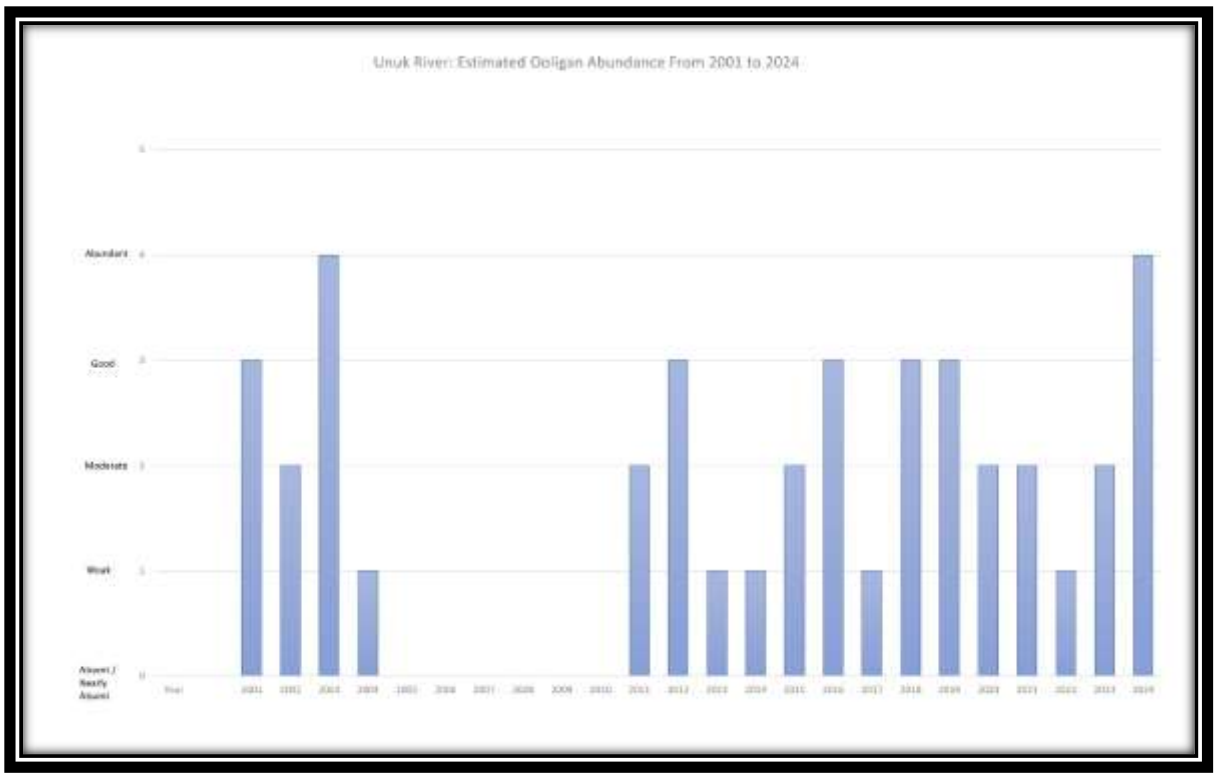

Figure 3. Estimated relative abundance from visual observations of Ooligan in the Unuk River between 2001 to 2024. ***DEFINITION****:* **Abundant** *= large high density schools (>10,000 fish) widespread along multiple major channels and present beyond one week;* **Good** *= moderately large high density schools (1000 – 10,000) spread throughout one or more major channels and present for at least a week;* **Moderate** *= Some high density schools, small to moderate in size (500-1000 fish), spread out over multiple channels and present for at least a week;* **Weak** *= small schools of fish (<500 fish), scattered, no large high density schools, and present less than a week;* **Absent/Nearly Absent** *= Little to no fish observed, or small pockets of individuals seen throughout run.*

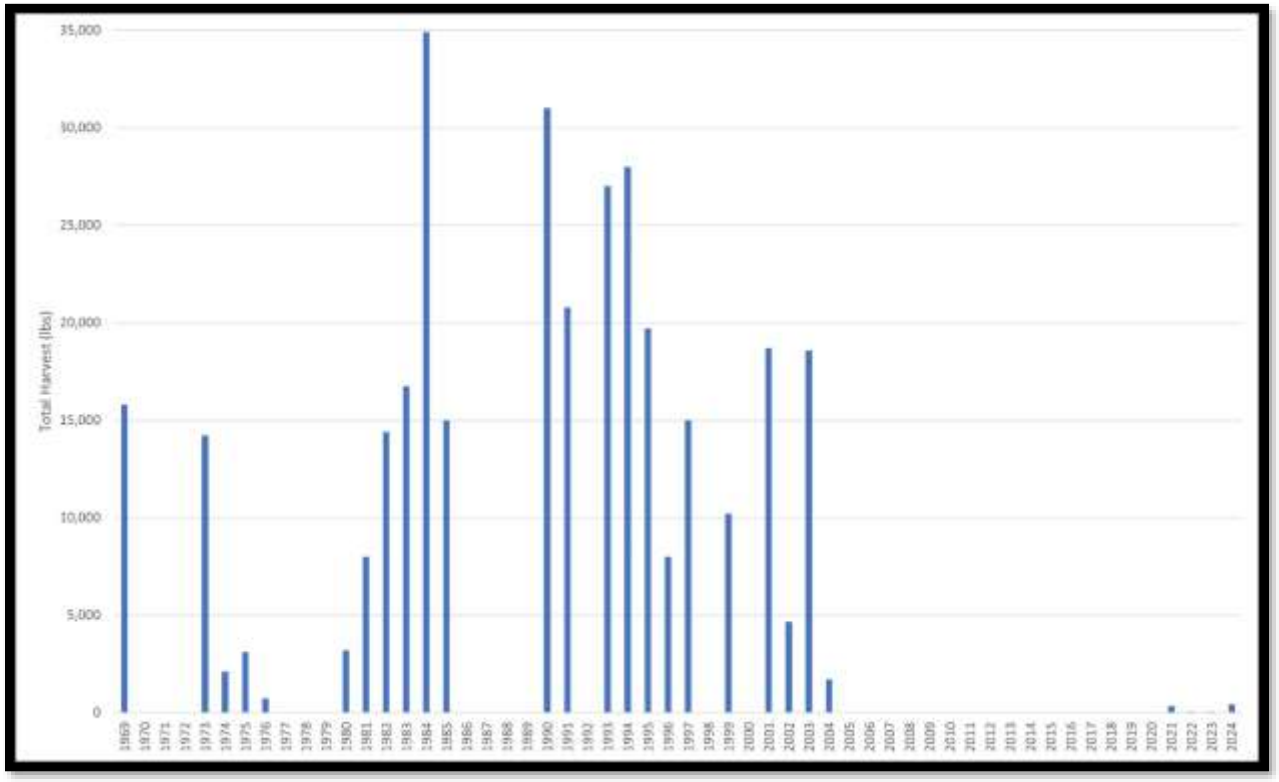

Figure 4. Total harvest (Commercial, State Personal Use / Subsistence, Federal Subsistence) from 1969 to 2024 District 1 (Van Alen 2011 – Unpublished).

2024 FIELD INVESTIGATION METHODS and FINDINGS

Personnel from Ketchikan Indian Community (KIC), and Oceans Earth Environmental Services (OEES) accompanied Forest Service staff during the ground surveys again in 2024 to assess run size. Also assisting in surveys were local fisherman & cabin owners on the Unuk River. Surveys included a mixture of walking and jet-boat surveys on multiple areas within the Unuk drainage (Figure 1 and Figure 2), with jet-boat surveys being the most common. Areas surveyed included the Upper and Lower Unuk River, Unuk River Upper Landing & Lower Landing and Matney (Will's) Sloughs, Klahini River, and the Eulachon River (Figure 2).

Fish counts reported use visual methods to estimate relative abundance which can be highly subjective, and we acknowledge that our accuracy likely diminishes as the density of fish increases. All counts reported below should be taken generally. Methods for estimating numbers include counting a portion of fish in an area and using that area as a guide to estimate numbers of remaining fish in a similar sized area, recounting again as density changes, until the entire school is estimated.

An Alaska Department of Fish and Game (ADF&G) Fisheries Resource Permit for collections was issued to Forest Service personnel in 2024, with intentions to collect samples to assess genetics, length, and weight of Ooligan. We collected 300 deceased Ooligan samples for delivery to the ADF&G laboratory.

In 2024 nine harvest permits were issued to Federally qualified subsistence users for the fourth time since 2005. All nine persons reported harvest in 2024.

Figure 5. Large numbers of Ooligan observed in Eulachon River, this smaller school was observed about 1.5 miles upstream.

Daily Log

Attempts were made on March 08, March 11, and March 13 to access the Unuk River. All attempts were cancelled due to poor weather conditions. Crews successfully accessed the Unuk River on March 15 by float plane.

Figure 6. Iphigenia (Jen) Arvanitis (KIC) points at Ooligan school near shore along Upper Unuk River near confluence with Lower Unuk River.

March 15 – Crews arrived on the Unuk River by float plane. One school of Ooligan observed at mouth of Eulachon River, approximately 500 fish, a few individuals were also observed in Upper Landing Slough,

near Bishop Slough. Water was highly turbid with poor visibility. Biologists observed over 50 seals feeding in Lower Unuk River, near bay.

March 16 – Crews observed approximately several hundred Ooligan at mouth of Eulachon River and several hundred in Lower Landing Slough. Observed approximately over 500+ Ooligan in Upper Unuk slightly past Matney Slough outlet. In same area we observed over 200+ dead Ooligan in dry tidal side channel between Matney Slough and Upper Unuk, along with about 50+ live Ooligan in tidal pools. Only one eagle observed. During our morning survey along the Upper Landing Slough, we observed approximately 1000+ Ooligan from Mouth of Eulachon to Bishop Slough, and another dense school below the Eulachon River in Lower Landing Slough by corner, but water was too turbid to assess size of school. There were at least 500 fish and possibly more. We observed a small school in Upper Unuk River (Eagle Alley) about 3.0 miles upstream of confluence of Lower Unuk and observed a small school of fish and a small number of eggs, very low density, on beach in lower Upper Unuk River, about 0.5 mile upstream, that looked like they were about 24 hours old. We collected three 1000ML bags of dead Ooligan from side channel of Upper Unuk for genetic analysis. Environmental DNA (eDNA) was collected at five sites: Upper Unuk in Eagle Ally (Upper Unuk), Upper Unuk near tidal flats by Matney Slough (Unuk), Confluence of Upper Unuk and Lower Unuk (Confluence), Upper Landing Slough by Bishop Slough (Cabin), and in Eulachon River (Eulachon).

March 17—We boated to Upper Unuk and collected eDNA at all five sites on the way back. We observed approximately 10,000+ Ooligan in Eulachon River, from mouth to about 2 miles upstream.

March 18 – Eulachon River continues to show large numbers of Ooligan, well over 10,000 fish spread out from bank to bank. We observed 40+ eagles at confluence of Upper Unuk and Lower Unuk and 5-6 seals. We spoke to a landowner who informed us that the Ooligan came in on March 12 in small schools along the Upper Unuk near the tidal flats by Matney and were mostly females. On March 13 we observed a little more fish but could not see well due to high turbidity. March 14 he could not see anything at all due to high turbidity. Observed 200+ seals in Bay on the 15th and about 12 sealions.

Figure 7. Iphigenia (Jen) Arvanitis (KIC) displays DNA samples from Upper Unuk River.

March 19 – We boated about five miles up the Upper Unuk to collect eDNA and floated the river downstream where current allowed. We observed about 1000 fish in the Upper Unuk channel concentrated close to shore, though water clarity was low so numbers may are likely higher. We boated up the Eulachon River about 2.1 miles and floated the entire channel down to the mouth. Water clarity was very high, and we observed a considerable number of fish. Counting was difficult due to high

densities of fish, but we estimate greater than 50,000 Ooligan in the Eulachon River. Fish were spread out from bank to bank with highest concentrations in lower one mile, only a few areas with dense schooling behavior, likely caused by our boat passing by. Most fish had a small bubble of space around them. There were a lot more eagle and marine mammal activity today. We observed over 100+ eagles along Lower Landing Slough and lower Upper Unuk as well as 3-5 seals feeding in Upper Unuk channel. Five people showed up in two boats today to fish. We observed them throwing cast nets in Upper and Lower Landing Sloughs. We also observed a small school in Lower Landing Slough and Lower Unuk below confluence of Upper Unuk, but due to high turbidity we could not assess full size of school. We tried to go ashore in Lower Unuk to walk to southern channels in tidal flat, but quickly found quicksand and returned to boat. We will not be walking the flats in this area again for safety reasons.

March 20 – Crew Change occurred today. One large school was observed in Lower Landing Upper Landing Slough confluence, just below the Eulachon River. Several thousand fish schooled up tightly.

March 21 – We boated up the Unuk mainstem approximately 5 miles to collect eDNA, and floated downstream to observe eulachon. We observed approximately 1500 eulachon between Upper Unuk site and Confluence Site. Marine mammal activity was high, but only present downstream of Confluence Site. We boated up the Eulachon River and floated downstream. We observed approximately 2500 eulachon on the float downstream. There was a large school of eulachon observed at Lower Landing, but enumeration was not possible due to visibility and water conditions. We did not observe any subsistence fishing activities.

March 22 - We boated up the Unuk mainstem approximately 5 miles to collect eDNA, and floated downstream to observe eulachon. We observed approximately 1000 eulachon between Upper Unuk site and Confluence Site. Marine mammal activity was high, but only present downstream of Confluence Site. We boated up the Eulachon River and floated downstream. We observed approximately 3500 eulachon on the float downstream. There was a large school of eulachon observed at Lower Landing (appears to be the same school as noted previously), but enumeration was not possible due to visibility and water conditions. We collected eDNA at all 5 sites. We did not observe any subsistence fishing activities.

March 23 – We boated upstream to confluence of Unuk River and Lake Creek. We observed a few small schools of eulachon near the Unuk Site, approximately 300 fish total. No eulachon were observed upstream of Eagle Alley. Marine mammal activity had migrated upstream past the Unuk Site, but we did not observe any feeding behaviors. We collected eDNA at all 5 sites and did not observe any subsistence fishing activity.

March 24 – We boated to Upper Unuk site and collected eDNA at all 5 locations. Fish presence had substantially tapered in Unuk mainstem with only approximately 50 fish observed. Roughly 100 eulachon were observed in Lower Landing Slough. We observed a large school in Upper Landing Slough, ranging from 7500 to 10000 eulachon. We boated to the Klahini River at high tide and traveled upstream approximately 3.5 miles. No fish were observed in the Klahini River. We collected and processed eDNA from all 5 sites. No subsistence fishing activities were observed.

March 25 – We prepared our gear for extraction, and shuttled gear to Burroughs Bay.

March 26 – We departed the Unuk River and concluded our survey efforts.

Figure 8. Jon Hyde collects eDNA samples from Eulachon River.

In addition to onsite surveys a local fisherman and cabin owner contacted us on March 25 to inform us it was a good run of fish this year, he and the four people with him had to look around a while because water was cloudy, but they got their fish, with eight limits taken. The fisherman stated he has fished this river for almost 60 years and had never seen the river so silty and murky before, and wondered what was happening upstream. The fisherman also informed me they observed a lot of sea lion pups in the bay, they have never seen so many pups before. Fisherman said there were a lot of dead Ooligan on the bottom of Lower Landing Slough, and that fish were coming in at night. He also stated that he used to catch about 25,000 to 30,000 pounds on average back in the old days.

A second fisherman also reported seeing two schools of over 10,000 fish in Upper Landing Slough on March 20, a short way above cabin, upstream of large rock in channel. The fisherman stated that in the 50 years he has lived on and fished this river this year's run was about a 7.5-8 out of 10.

Figure 9. Mark Eldridge (USFS) counts Ooligan in Upper Unuk River.

Figure 10. Large numbers of Ooligan observed in Eulachon River at approximately river mile 1.0.

Other Ooligan Monitoring

On March 19 we performed aerial surveys on the Chickamin, Wilson/Blossom, and Carroll Rivers. A small number of fish was observed in the Chickamin River about 4.5 miles up from the bay, but no activity was noted in Wilson/Blossom or Carrol Rivers.

Carrol River was surveyed on foot on April 3 and April 22 with no fish or sign observed.

CONCLUSION & RECOMMENDATIONS

Based on the numbers of live and dead Ooligan observed by Forest Service and KIC biologists between March 15 and March 26, and reports from local subsistence users from March 10 to March 25, the 2024 Ooligan run appears to be Abundant[2] in size and sufficient to continue allowing limited harvest on the Unuk River with gear restrictions. If we continue to observe future run sizes at the scale of 2024, we will consider relaxing restrictions to allow increased harvest.

Future surveys should continue to work with our partners at the Ketchikan Indian Community to collect environmental DNA (eDNA) on the Unuk River to aid our long-term efforts to manage the Unuk River fishery; and continue to utilize partners and local fisherman to aid in real time management of the Unuk River fishery and maximize survey efforts within the Unuk River system.

Figure 11. Iphigenia Arvanitis (KIC) displays DNA sample along beach of Upper Unuk River; in background is Meredith Pochardt and Ethan Herrera (OEES).

The small size of Ooligan, their schooling behavior and their wide and variable distribution within the Unuk River system makes enumeration difficult. Utilization of a limited test fishery with feedback and reporting from local users combined with onsite surveys by biologists appears to be the most successful methods in obtaining real time biological information on the Unuk River system.

With run duration on the Unuk River being shorter than on larger rivers, in combination with the presence of multiple tidally influenced channels, it is highly doubtful that other methods of monitoring, such as mark/recapture estimates, would be successful. To better quantify amounts of Ooligan present, visual observations combined with harvest reports and/or sampling efforts matching what a harvester would gather (e.g., five-gallon bucket) would be highly beneficial, as well as determining weight of those volumes. Both managers and subsistence users would benefit as future permit data could become more accurate and easier to visualize.

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Bias between observers will continue to be an issue as visual surveys can be affected by light and weather conditions, tide levels, ice buildup, river turbidity, observer turnover, and the variation of the observation methods (e.g., boat vs foot surveys). Larger numbers of fish are also harder to quantify than smaller numbers resulting in higher error with estimates of larger schools of fish.

With limited ideal tidal conditions, areas such as the Eulachon River, Matney Slough, and portions of the Mainstem Unuk cannot be surveyed easily or at times not at all because of the aggressive tidal fluctuations during ebbs and floods that limit time in these areas.

The quantity and quality of surveys would increase if separate crews were responsible for each side of the river valley each day to provide for more thorough surveys during the daily tidal cycles.

Although further improvement of monitoring is desired, current survey methods are believed to provide valuable information to managers about the current distribution and relative abundance within the system.

The recently installed water quality and stream gauge station installed by the U. S. Geological Survey provides data on current stream flow and water quality conditions on the Unuk River (USGS 2024) (APPENDIX A.).

LITERATURE CITED

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Van Alen, B. W. 2011 Unpublished. Unuk River Eulachon Stock Assessment, 2001 to 2010. U.S. Fish and Wildlife Service, Office of Subsistence Management, Fisheries Resource Monitoring Program, Final Report Study No. 08-607. Anchorage, Alaska.

Washington Department of Fish & Wildlife and Oregon Department of Fish & Wildlife. 2001. Washington and Oregon Eulachon Management Plan. 39 pp.

APPENDIX A.

USGS Stream Gage Data: USGS 15015595 UNUK R BL BLUE R NR WRANGELL AK (USGS 2024)

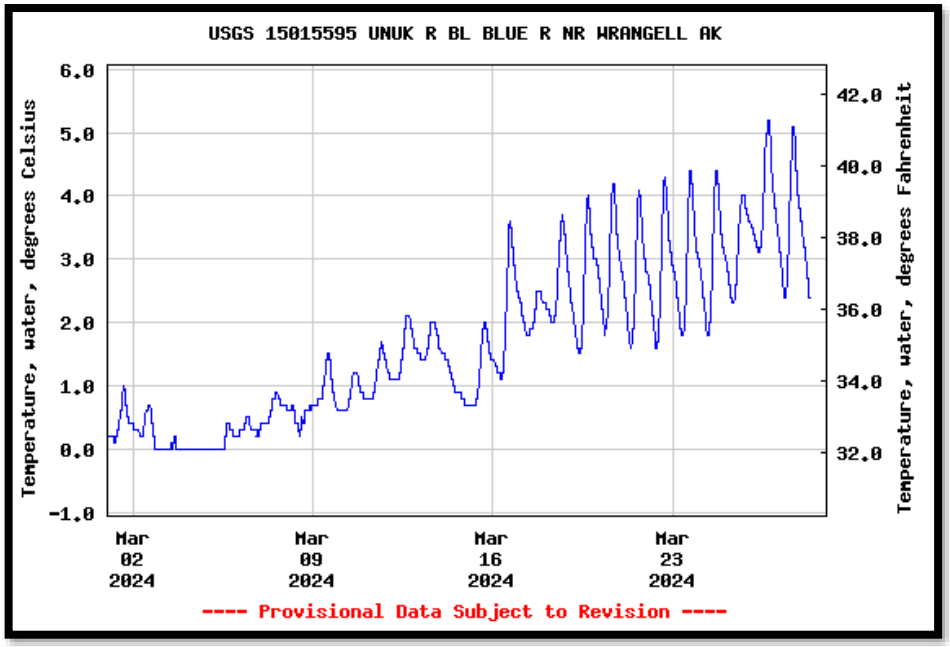

Figure 12. Temperature, water, degrees Celsius (USGS 2024)

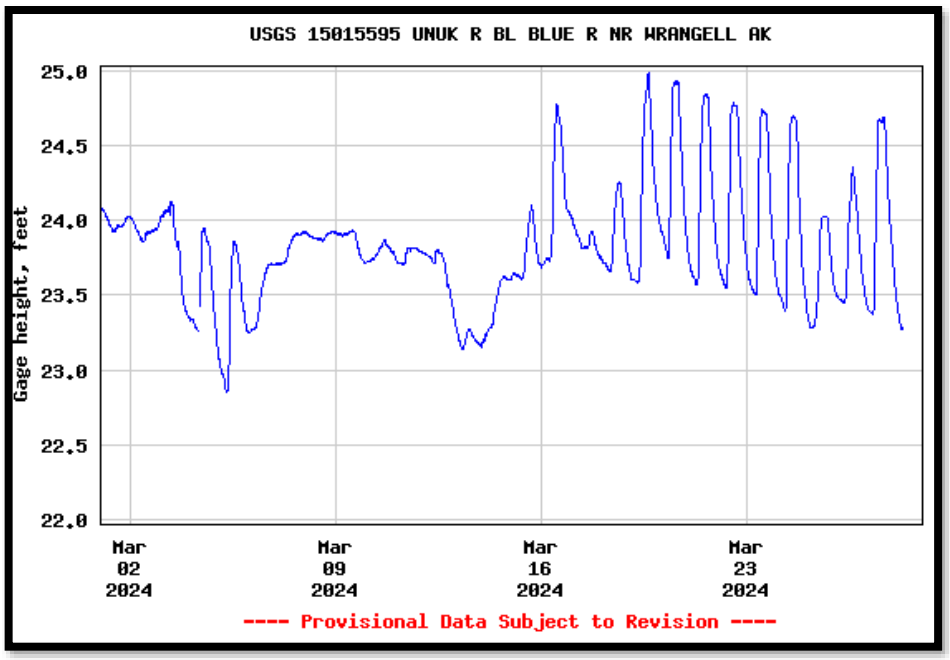

Figure 13. Gage Height in feet. Note Discharge data unavailable for March 2024 (USGS 2024).

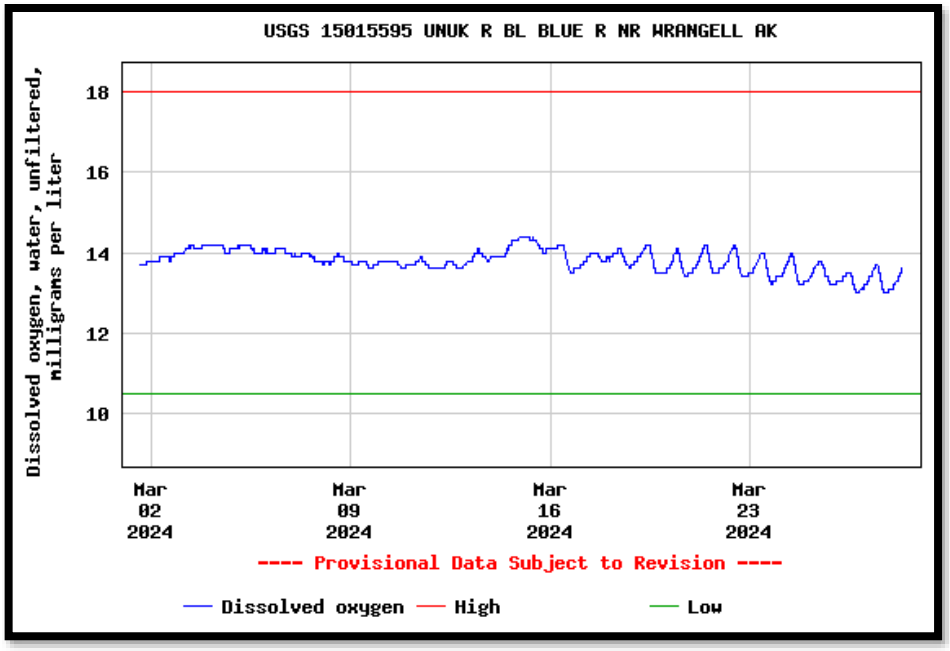

Figure 14. Dissolved oxygen, water, unfiltered, milligrams per liter (USGS 2024).

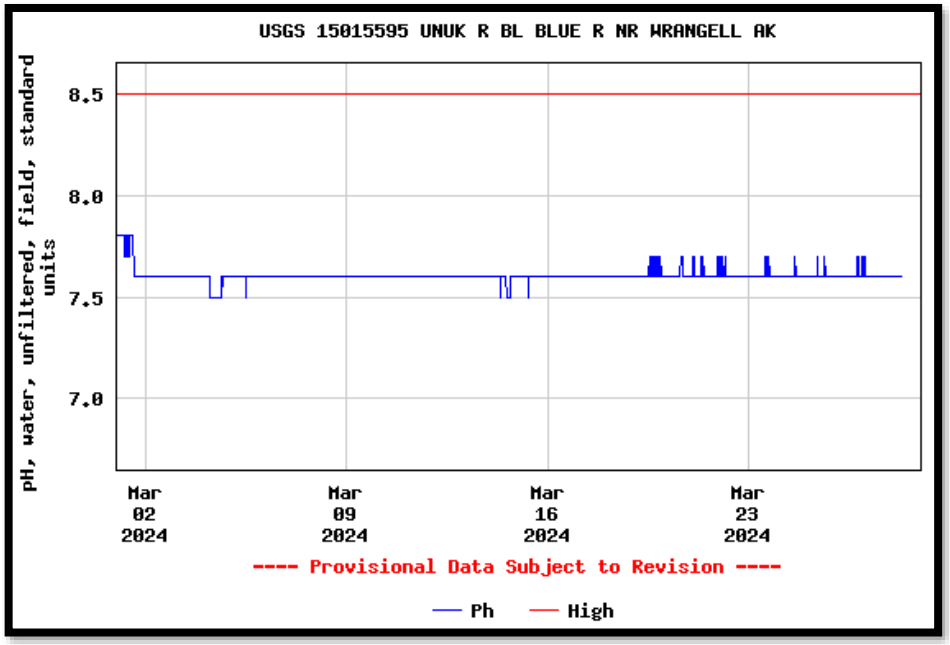

Figure 15. pH, water, unfiltered, field, standard units (USGS 2024).

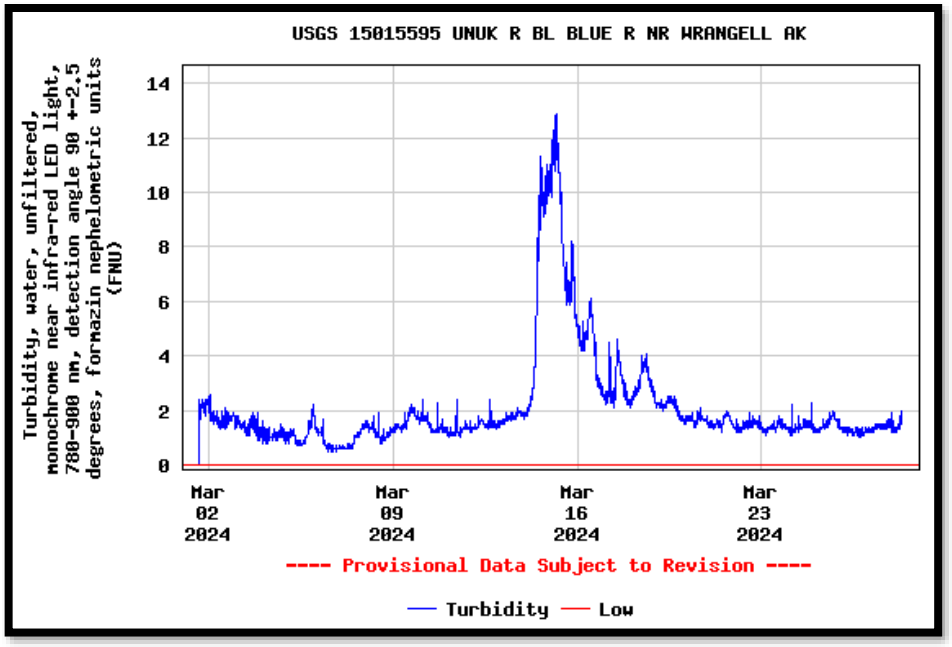

Figure 16. Turbidity, water, unfiltered, monochrome near infra-red LED light detection angle 90 +-2.5 degrees, formazin nephelometric units (FNU) (USGS 2024).