CITY OF UNALASKA
UNALASKA, ALASKA

RESOLUTION 2021-54

A RESOLUTION OF THE UNALASKA CITY COUNCIL AUTHORIZING FINANCIAL SUPPORT OF AERIAL SALMON SURVEYS DURING CALENDAR YEAR 2021 BY ALEUTIAN AERIAL LLC IN THE AMOUNT OF $6,550 WITH FUNDING FROM FY22 COUNCIL CONTINGENCY BUDGET

WHEREAS, in 2018 the Unalaska Native Fishermen Association (UNFA) provided funding to Aleutian Aerial for sockeye salmon surveys of three road system drainages of Morris Cove, Summer Bay and Iliuliuk Lake; and

WHEREAS, in 2019 the City of Unalaska joined with Ounalashka Corporation (OC) and the Unalaska Native Fishermen Association (UNFA) to financially support the same aerial salmon surveys; and

WHEREAS, in 2020 the Qawalangin Tribe of Unalaska (Q-Tribe) joined the City, OC, and UNFA to financially support the aerial salmon surveys and an aerial survey of McLees Lake was also included; and

WHEREAS, Aleutian Aerial LLC has submitted a proposal to provide aerial drone salmon survey for the fourth year in a row and is seeking funding support from these groups once again; and

WHEREAS, Unalaska residents, UNFA, the Unalaska Fish and Game Advisory Committee, and the Alaska Department of Fish and Game (ADFG) continue to be concerned that the lack of escapement estimates for sockeye salmon in local lake drainages could jeopardize future opportunities for subsistence and sport fishing; and

WHEREAS, ADFG, with budget constraints, has indicted that drone surveys show the potential to be a reliable and cost-effective way to survey small river and lake systems; and

WHEREAS, the Unalaska City Council believes the aerial salmon surveys to be a benefit to the citizens of Unalaska to allow for continued subsistence and sport fishing seasons.

NOW THEREFORE BE IT RESOLVED that that the Unalaska City Council approves funding in the amount of $6,550 to support aerial salmon surveys during calendar year 2021 to be performed by Aleutian Aerial LLC, with funding from the Council Contingency line item in the FY22 budget.

PASSED AND ADOPTED by a duly constituted quorum of the Unalaska City Council on July 27, 2021.

Vincent M. Tutiakoff, Sr.
Mayor

ATTEST:

Marjie Veeder, CMC
City Clerk

CITY OF UNALASKA CORPORATE SEAL STATE OF ALASKA

MEMORANDUM TO COUNCIL

To: Mayor and City Council Members
From: Erin Reinders, City Manager
Date: July 27, 2021
Re: Resolution 2021-54: Authorizing financial support of aerial salmon surveys during calendar year 2021 by Aleutian Aerial LLC in the amount of $6,550, with funding from FY22 Council Contingency Budget

SUMMARY: Andy Dietrick of Aleutian Aerial LLC has proposed performing aerial drone salmon surveys and has requested support from City Council. The passage of this resolution will approve City Council's financial support in the amount of $6,550 for surveys of the Morris Cove, Summer Bay, and Iliuliuk Lakes road system drainages as well as McLees Lake. These surveys will then be provided to the Alaska Department of Fish and Game (ADFG) for use in their analysis. This will be the fourth year of aerial drone surveys and would be the third year that the Unalaska City Council provided financial support for the project.

PREVIOUS COUNCIL ACTION: The Unalaska City Council provided $5,200 in FY20. Funding came from Council Sponsorships Contingency. The partnership in 2019 had three participants including the City of Unalaska, Ounalashka Corporation (OC), and Unalaska Native Fishermen Association (UNFA).

Council provided $6,550 in FY21. Funding again came from Council Sponsorships Contingency. The partnership and scope expanded in FY21 to include the Qawalangin Tribe and McLees Lake.

BACKGROUND: Andy Dietrick of Aleutian Arial emailed a proposal and request for financial support for the aerial drone salmon surveys. The surveys will assist ADFG in their analysis. This email is included in your packet. OC and the Qawalangin Tribe have indicated that they are again interested in the effort. The Mayor requested that City Council consider this item and potentially take action this evening. Staff has prepared a resolution should Council wish to provide financial support.

DISCUSSION: Again, the passage of this resolution will approve City Council's financial support in the amount of $6,550 for aerial drone salmon surveys of the road system drainages of Morris Cove, Summer Bay, and Iliuliuk Lake as well as McLees Lake. The plan is for the City's contribution to be combined with the contributions of the Q-Tribe, UNFA and OC. This information will be provided to the Alaska Department of Fish and Game for analysis. This will be the fourth year of aerial drone survey work on the road system lakes and the second year for McLees Lake.

The lack of salmon escapement on the local lake drainages has been a concern of the local residents who participate in subsistence and sport fishing activities. The Unalaska Fish and Game Advisory Committee, UNFA and ADFG have also expressed their concern. ADFG has faced budget constraints that have impacted their ability to perform the needed survey work. Continued participation in the drone salmon surveys will help provide needed information to ADFG on the status of the local drainages.

ALTERNATIVES: Council may choose not to get involved with this issue, or may choose to support a different contribution amount. Council may also choose to defer this item and consider it at a future date.

FINANCIAL IMPLICATIONS: The FY22 Council Contingency line item contains sufficient funding to cover a $6,550 contribution.

PROPOSED MOTION: I move to adopt Resolution 2021-54.

ATTACHMENTS:

1. July 7, 2021 email from Aleutian Aerial
2. July 7, 2021 memo from Aleutian Aerial; 2021 Project Proposal for Unmanned Aerial Salmon Counting
3. March 8, 2021 memo from State of Alaska; 2020 Indexed Escapement of Salmon using Drone Surveys at McLees Lake and Unalaska Road –System Lakes

Erin Reinders

From: Marjorie Veeder
Sent: Thursday, July 8, 2021 4:23 PM
To: Erin Reinders
Subject: FW: 2021 Aerial salmon counting proposal - City of Unalaska
Attachments: 2021_07_07_UNALASKA_SALMON_COUNT_PROPOSAL_AAERIAL_COU.pdf; Memo Unalaska Drone Surveys 2020.pdf

Follow Up Flag: Follow up
Flag Status: Flagged

Erin,

As we discussed, here is the email from Aleutian Aerial.

Marjie Veeder
City Clerk
CITY OF UNALASKA
(907) 581-1251 ext. 2104

From: Andy Dietrick [mailto:andy@aleutianaerial.com]
Sent: Wednesday, July 7, 2021 1:03 PM
To: Marjorie Veeder; Andy Dietrick
Subject: 2021 Aerial salmon counting proposal - City of Unalaska

Hello Mayor & Council,

I am writing with a proposal for funding support to continue the Unalaska aerial sockeye salmon survey project.

This will be the fourth year of data collection on the 3 roadside lakes and the second year of paired weir/drone data collection on McLees Lake.

Please see the attached proposal for 2021 as well as a copy of the 2020 report that was distributed to you all from ADF&G on March 8, 2021.

A few highlights...

- ADF&G continues to be in full support of this project and has again offered to analyze and report on the data.
- ADF&G would like to incorporate tagging in 2022 at McLees Lake to collect data similar to other mark-recapture tagging programs they operate on other streams.

- The paired weir/drone data coming from McLees Lake is a first-of-its-kind dataset. The goal is to be able to have statistically valid surveys done by drone that provide an accurate index of escapement in absence of other data collection methods (e.g. weirs).
- ADF&G has increased the mileage of shoreline requested to be surveyed for 2021. They would like to survey a portion of the inlet streams to each lake in addition to the lake shore. This almost doubles the mileage to be surveyed. We have chosen to leave the funding request the same as 2020 despite this increase in project scope. Some reasons we have left the funding request the same include: 1. We get more efficient at executing these surveys each year we perform them. As a return on investment to committed funding agencies, this efficiency should be passed back as cost savings. 2. We need to ground-truth exactly how much of the inlet streams need to be surveyed and how much actually can be surveyed. We need to get a year of collection of these inlet streams under our belt to more fully understand the spawning locations. 3. Being based in, and residents of Unalaska, we are passionate about our subsistence salmon opportunities here and the need to have a scientific understanding of the runs that provide a food source to residents.
- To get started on time for 2021 surveys we need a notice-to-proceed from each of the 4 funding agencies. You'll notice in the attached proposal that we set the notice-to-proceed deadline from the City to be July 28, 2021, a day after the next scheduled Council meeting.
- We are glad to call in to the July 27, 2021 Council meeting to answer questions should Council desire.

Thank you for consideration of this request and we hope to be able to continue this project in 2021 for the citizens of Unalaska.

Please reach out to me directly if you have any questions or would like to discuss the project further and we look forward to hearing back from you.

All the best,

Andy Dietrick
Aleutian Aerial LLC
cell 907-957-1680

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fb aleutianaerial
ig aleutian_aerial

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Unalaska, Alaska 99685
907.957.1680
andy@aleutianaerial.com

July 7, 2021

To: Potential funding entities to support a continuation of aerial salmon counting on three Unalaska roadside drainages and McLees Lake *(UNFA, OC, Q-Tribe, City of Unalaska)*

Re: 2021 Project Proposal for Unmanned Aerial Salmon Counting

Aleutian Aerial LLC (Aleutian Aerial) is pleased to provide a proposal for data collection services to support aerial lakeshore sockeye salmon counting on three Unalaska roadside drainages (Morris Cove, Summer Bay, Unalaska), and McLees Lake. Aleutian Aerial utilizes small unmanned aerial systems (sUAS) to perform video collection for salmon counting. All data collection is performed by a FAA Part 107 certified remote pilot. Aleutian Aerial will provide all personnel and equipment for data collection for this project.

Background:
This project began in 2018 with funding from the Unalaska Native Fishermen's Association (UNFA). The goal was to perform aerial surveys to determine sockeye salmon escapement estimates on local streams. UNFA funded the data collection and the Alaska Department of Fish and Game (ADF&G) provided biologist support to analyze and report on the data. ADF&G supports using sUAS technology for this type of salmon counting.

In 2019, the project was continued with ongoing support from UNFA and additional support from the Ounalashka Corporation (OC) and the City of Unalaska.

In 2020, the project was supported by a total of 4 funding agencies: UNFA, OC, City of Unalaska, and the Qawalangin Tribe. ADF&G continues to support the project with biologist time for data collection recommendations, data analysis and reporting. A big addition to the 2020 survey was including McLees Lake (which had a weir in operation after two years without any weir data).

For 2021, ADF&G biologists are enthusiastic about continuing the project as a whole in addition to another year of paired weir and drone data for the McLees Lake location. The McLees Lake weir is in its second of four years of guaranteed funding for operation, creating a valuable opportunity to create a first-of-its-kind dataset comparing weir counts with drone counts. ADF&G also planned to incorporate a tagging program at McLees Lake this year, but hiring and staffing challenges precluded this from happening (tagging will be re-visited in 2022 if the project continues). Another change for 2021 is adding significant mileage of inlet streams to the survey. With ADF&G biologists observing sockeye in many of the inlet streams of these lakes, they have requested that Aleutian Aerial add approximately 11 miles of inlet stream surveys to the data collection. This effectively doubles the mileage that needs to be surveyed for this project from about 11 miles to 22 miles per survey.

Site Logistics:
Aleutian Aerial is familiar with the complicated site logistics of working in the Aleutian Islands. Based in Unalaska/Dutch Harbor, Aleutian Aerial is capable of taking advantage of flight weather windows and lighting conditions as they are presented by Mother Nature. This can provide a significant cost savings by reducing transportation, freight, housing, and per diem costs. Specific sites for this project include the nearshore waters and inlet streams of Unalaska Lake, Summer Bay Lake, Morris Cove Lake, and McLees Lake – aerial pictures attached.

Execution of Work and Schedule of Costs:
Aleutian Aerial has the financial and technical resources, capability, and in-house capacity to successfully perform this video data collection. Data collection using sUAS will be performed during a target window of August 1 to September 30. Start timing is based on the last two years of drone surveys as well as 2012-2017 McLees Lake weir data showing 99% escapement being achieved by the last week of July. The primary sUAS used will be a DJI Matrice 300. The camera sensor and lenses have the capability of capturing 45-megapixel still images and 4K (60 frames per second) video. Flight heights are generally 50–80 feet above lake level with variable speed depending on the salmon volume encountered. Polarized lenses will also be used to aid in seeing individual salmon underwater. Flights start at the same point on the lakeshore each lap and travel the perimeter with the camera pointed 50-90 degrees down from horizontal depending on optimal visibility into the water. Generally, you can see the entire nearshore spawning area in one field of view. In areas where shallows extend far out from shore, flight height is increased and a grid pattern is flown using rocks or unique features on the lake bed to keep the biologist oriented and prevent double counting or missing fish.

The following rates are applicable to this project:

- Project execution including all field logistics, drone and support equipment, aerial media acquisition, quality check, and creation of deliverables for analysis by ADF&G biologists. As advised by ADF&G, this will include four (4) sets of data from each roadside lake and inlet stream (~9.6 shoreline miles per lap surveyed, total of ~28.8 shoreline miles surveyed for the project), and three (3) sets of data from McLees Lake and inlet streams (~12 shoreline miles per lap surveyed, total of ~36 shoreline miles surveyed for the project), taken at regular intervals during a target window of August 1 to September 30 (as allowed by Mother Nature). Daily weather monitoring and forecasting during the entire project period and collaboration with ADF&G biologists for data quality assurance.

Project Total $26,200 (Note: This is for nearly double the surveyed mileage gathered in 2020. Price is the same as 2020.)

Seeking multiple funding sources. Based on 4 contributing entities, this request to the City of Unalaska is $6,550.

Exclusions:
Any condition outside the control of Aleutian Aerial and any item of work not specified in this proposal.

Assumptions:

- Flight weather windows are out of the control of Aleutian Aerial.
- Aleutian Aerial will operate sUAS under FAA Part 107 rules in the Class G airspace in and around Unalaska/Dutch Harbor during data collection.
- Any land use permissions required (except for licenses/certifications related to flight operations) are the responsibility of the funding organizations.
- Image acquisition will be done using a camera sensor capable of recording 4K, 60 fps video, on a professional grade sUAS platform.
- Photo/video media deliverables will be in common formats and delivered on an external hard drive to ADF&G in Kodiak.
- Aleutian Aerial agrees to process and deliver media to ADF&G during the course of the project so data quality can be reviewed.

This proposal is offered and limited to the terms specified. A notice-to-proceed must be received by each of the 4 funding entities no later than July 28, 2021.

Please feel free to contact me if you have any questions or comments regarding this proposal.

Thank you for considering Aleutian Aerial for data collection on Unalaska's salmon streams.

Sincerely,

Andy Dietrick
Owner, Aleutian Aerial LLC
andy@aleutianaerial.com
907.957.1680

Attachment #1: Unalaska Lake Overview

Unalaska Lake details:

Approximate length – 1.8 miles

Approximate width – 0.60 miles

Approximate perimeter – 1.8 miles

Approximate inlet stream area of interest – 1.32 miles

Attachment #2: Summer Bay Lake Overview

Summer Bay Lake details:

Approximate length – 0.85 miles

Approximate width – 0.30 miles

Approximate perimeter – 2.3 miles

Approximate inlet stream area of interest – 2.25 miles

Attachment #3: Morris Cove Lake Overview

Morris Cove Lake details:

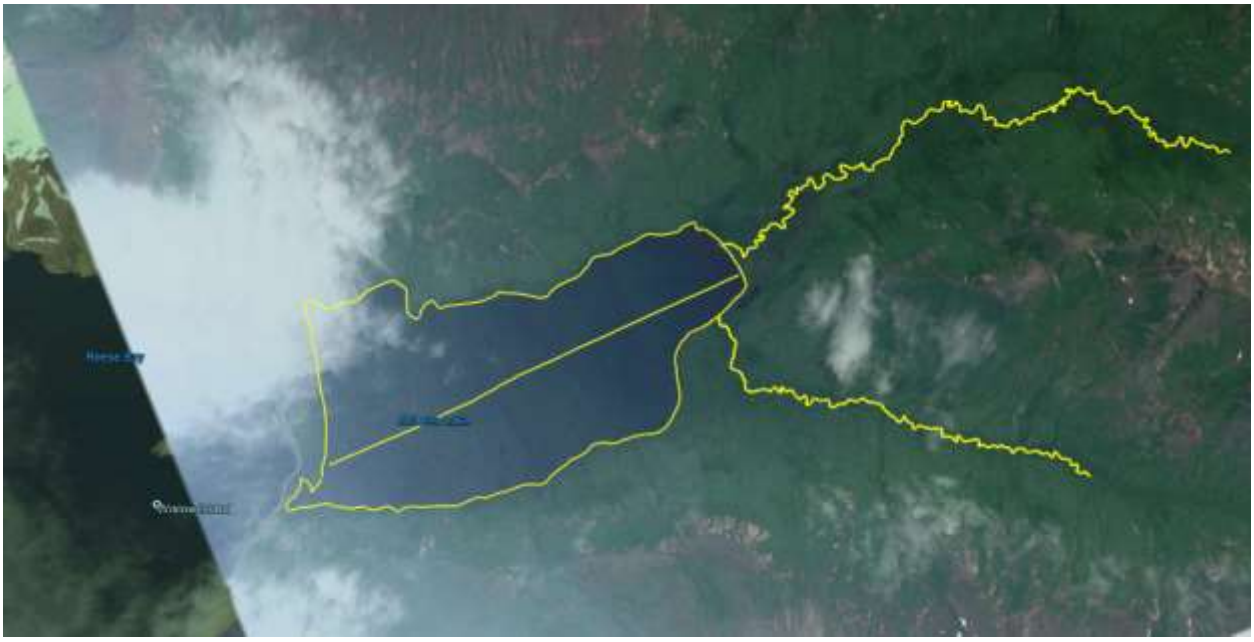
Approximate length – 0.40 miles

Approximate width – 0.20 miles

Approximate perimeter – 1.1 miles

Approximate inlet stream area of interest – 1 mile

Attachment #4: McLees Lake Overview



McLees Lake details:

Approximate length – 2 miles

Approximate width – 0.85 miles

Approximate perimeter – 6.2 miles

Approximate inlet streams area of interest – SE Inlet 4 miles, SW Slough 2.53 miles

THE STATE of ALASKA
GOVERNOR MICHAEL J. DUNLEAVY

Department of Fish and Game

Division of Commercial Fisheries
Kodiak Office

351 Research Ct.
Kodiak, AK 99615
Main: 907.486.1825
Fax: 907.486.1841

MEMORANDUM

TO: Unalaska Native Fishermen's Association, the Ounalashka Corporation, the City of Unalaska, and the Qawalangin Tribe of Unalaska

THROUGH: Lisa Fox, Area Management Biologist South Alaska Peninsula and Aleutian Islands Division of Commercial Fisheries, Region IV

FROM: Tyler Lawson, Assistant Area Management Biologist South Alaska Peninsula and Aleutian Islands Division of Commercial Fisheries, Region IV

DATE: March 8, 2021

PHONE: (907) 486-1882

SUBJECT: 2020 Indexed Escapement of Salmon using Drone Surveys at McLees Lake and Unalaska Road-system Lakes

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Local Unalaska residents and the Alaska Department of Fish and Game (ADF&G) are concerned that a lack of escapement estimates for sockeye salmon *Oncorhynchus nerka* into Summer Bay, Morris Cove, and Iliuliuk (Unalaska) lakes could jeopardize the health of the run as well as future opportunities for subsistence fishing. Since 2018, drone surveys and indices of salmon escapement have been completed for these systems (Figure 1, Tables 1-3). Additionally, 2020 provided an opportunity to compare the reliable and accurate escapement estimate provided by the McLees Lake weir to indices of escapement calculated from drone surveys (Figure 1). In 2020, the Unalaska Native Fishermen's Association (UNFA), the Ounalashka Corporation, the City of Unalaska, and the Qawalangin Tribe of Unalaska provided funding to contract Aleutian Aerial LLC to conduct drone aerial surveys of sockeye salmon for Summer Bay, Morris Cove, Iliuliuk, and McLees Lake drainages in 2020.

Utilizing drone surveys as a method to estimate salmon escapement is an innovative technique that has potential to be a reliable and cost-effective data source, particularly in small river and lake systems that are accessible by road. Aerial surveys flown with a drone are similar to traditional aerial surveys flown with a fixed-wing aircraft and would be considered scientifically defensible in the same manner.

Surveys flown by Aleutian Aerial LLC on McLees Lake and the three Unalaska road-system lakes took place between August 8 and October 3, 2020. Drone surveys were conducted when the weather was ideal (good visibility and low wind) on Unalaska Island, which resulted in video of good quality and clarity. By surveying during optimal conditions, interference such as glare from the sun and wind waves on the water's surface was minimized. The drone video has the added benefit of allowing the reviewer to slow down and rewind the video as needed to provide a

more accurate count. Additionally, salmon species could typically be differentiated from other salmon species without difficulty. Video reviewers were able to observe fish utilizing different parts of the lake during different survey times. Salmon were observed on spawning grounds and in schools near tributary mouths and in deeper parts of the lake. Since the drone survey video was of good quality, reviewers were able to provide adequate sockeye salmon indices of escapement comparable to aerial surveys conducted from manned, fixed-wing aircraft.

Video files were sent to the ADF&G Commercial Fisheries Division to be enumerated by South Alaska Peninsula and Aleutian Islands biologists. Standardized methodology used to calculate indices of escapement from traditional aerial surveys flown with a fixed-wing aircraft (Fox et al. *In prep*) were used to calculate indices of escapement from drone video footage. Total indexed escapement of sockeye salmon was calculated by using drone survey peak counts. The surveys were uploaded into the Kodiak ADF&G database and the escapements will be published in the Department's 2021 Annual Management Report of the Aleutian Islands and Atka-Amlia Islands Management Areas. ADF&G did not receive any funds from the Unalaska Native Fishermen's Association (UNFA), the Ounalashka Corporation, the City of Unalaska, or the Qawalangin Tribe of Unalaska for this service.

In 2020, the total indexed escapement of sockeye salmon was 815 fish in Iliuliuk Lake, 4,507 fish in Summer Bay Lake, and 106 fish in Morris Cove Lake (Tables 1-3). The 2020 drone survey of McLees Lake showed a total indexed escapement of 2,428 sockeye compared to the estimated escapement of 5,037 sockeye at the McLees Lake outlet weir (Table 4).

Pink salmon *O. gorbuscha* and coho salmon *O. kisutch* that were observed during the road-system drone surveys were also tallied, and peak counts for these species are summarized in Tables 1-3. The observed pink salmon escapement is likely an underestimate, as pink salmon were observed heading upstream from the lakes which was outside of the scope of the survey. Additionally, coho salmon have a later run timing in comparison to sockeye salmon. The coho salmon that were observed in each lake (Tables 1–3) were likely the beginning of the run and counts during the peak of the run were not captured. Therefore, the coho salmon escapement observed is an underestimate of the total run.

The discrepancy in drone vs weir estimates is perhaps attributed to several factors such as not surveying the inlet streams of McLees Lake and salmon spending time in deep nearshore drop offs where water clarity quickly declines and makes counting difficult. Past ADF&G fixed-wing surveys from the early 2000's observed large numbers of sockeye spawning in the tributaries of McLees Lake which further suggests a need to include these habitats in future surveys (Shaul and Dinnocenzo, 2002).

ADF&G and Aleutian Aerial LLC's partnership has already allowed for an increase in efficacy and efficiency of surveys. Time necessary to review videos has declined while the quality of surveys and ability to enumerate salmon has increased since the first drone surveys in 2018. Inclusion of the McLees Lake drone surveys may help to calibrate an alternative survey tool if the weir is unable to procure funding in the future. With that in mind, one major goal of ADF&G for future drone work is to ensure full surveys of upstream tributaries in all systems are performed to better index as many salmon as possible. This would add further timing and logistical concerns to an already challenging set of surveys. For example, it is estimated that approximately 6.5 miles of inlet tributaries would need to be surveyed at McLees Lake and a good portion of that would need to be done on foot up rugged terrain. While typically enough surveys are performed on each system to capture the run, some fish are likely moving

upstream to spawn between surveys on the road-system lakes as well. Nevertheless, ADF&G suggests surveys continue in future years to compare variability in run strength and timing to help adequately assess salmon stocks. The remote location and mercurial weather of this region makes it difficult to perform traditional fixed-wing aerial surveys. Thus, the data provided by Aleutian Aerial LLC surveys are invaluable.

REFERENCES CITED

Fox, E. K. C., R. L. Renick, and T. D. Lawson. *In prep*. South Alaska Peninsula salmon annual management report, 2020 and the 2019 subsistence fisheries in the Alaska Peninsula, Aleutian Islands, and Atka-Amlia Islands management areas. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report 4K.20xx.xx, Kodiak.

Shaul, A.R., and J.J. Dinnocenzo. 2002. Aleutian Islands and Atka-Amlia Islands Management Areas Annual Report, 2001. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report 4K02-14, Kodiak.

FIGURES

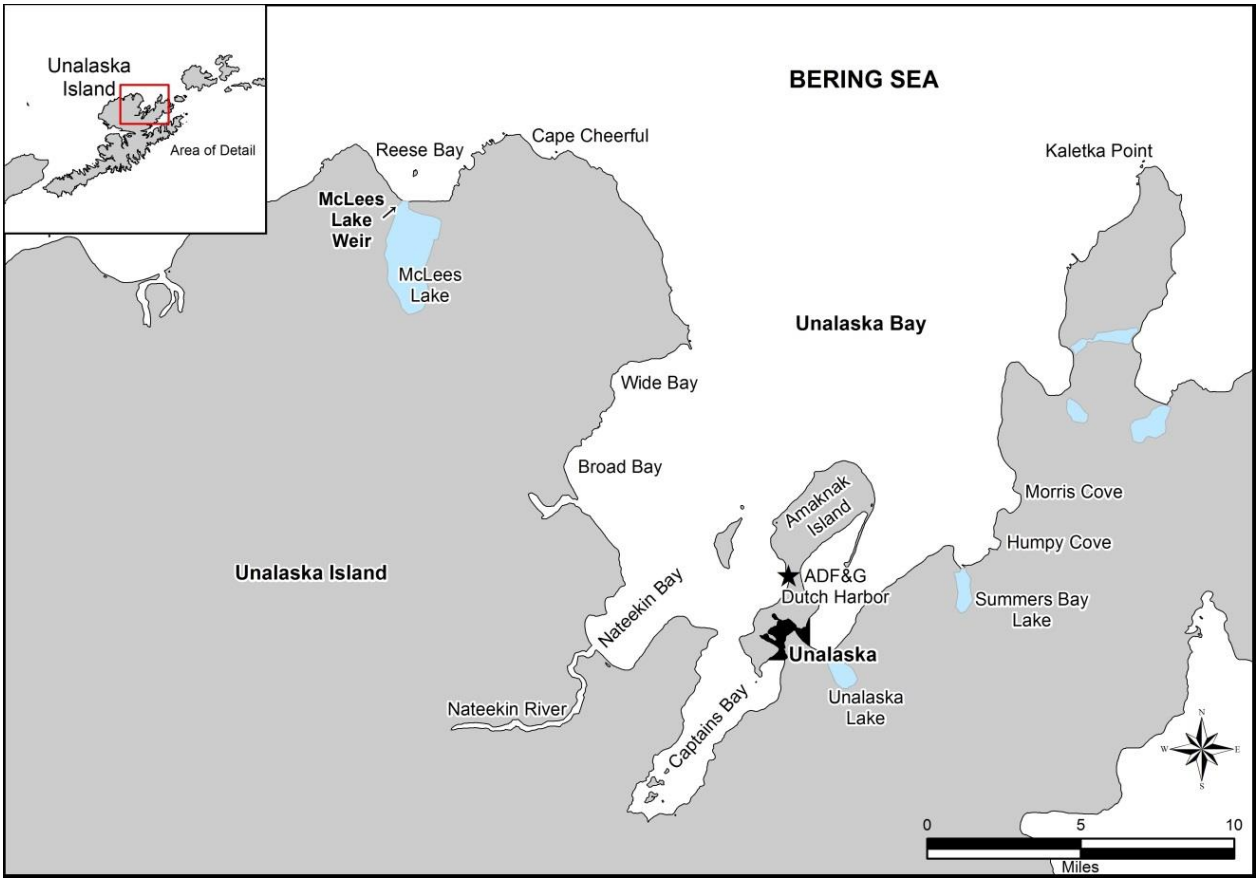

Figure 1.–Map of Unalaska Island showing the location of McLees Lake, Unalaska (Iliuliuk) Lake, Summer Bay Lake, and Morris Cove Lake.

TABLES

Table 1.– Sockeye salmon indexed total escapement. Pink salmon and coho salmon minimum escapement for Iliuliuk Lake.

Year	Sockeye Salmon	Pink Salmon[a]	Coho Salmon[b]
2018	583	605	21
2019	350	25	0
2020	815	740	0

Table 2.– Sockeye salmon indexed total escapement. Pink salmon and coho salmon minimum escapement for Summer Bay Lake.

Year	Sockeye Salmon	Pink Salmon[a]	Coho Salmon[b]
2018	3,622	4,105	201
2019	2,575	4,090	415
2020	4,507	4,901	33

Table 3.– Sockeye salmon indexed total escapement. Pink salmon and coho salmon minimum escapement for Morris Cove Lake.

Year	Sockeye Salmon	Pink Salmon[a]	Coho Salmon[b]
2018	315	7	0
2019	376	0	0
2020	106	230	0

Table 4.– Sockeye salmon indexed total escapement of drone surveys vs weir count for McLees Lake.

Year	Drone Survey[c]	Weir Count
2020	2,428	5,037

[a] Pink salmon estimates are under estimates, as the surveyed area did not include all habitat used by pink salmon.

[b] Coho salmon estimates are under estimates, as surveys concluded prior to when coho salmon runs peak.

[c] Surveys did not include inlet streams where some sockeye are suspected to spawn.