



KODIAK

Regional Aquaculture Association

2021 ANNUAL REPORT



KRAA was founded in 1983 as Kodiak's regional aquaculture association. The Association is dedicated to salmon fisheries development in the Area K Management Area for the benefit of all common property users — subsistence, sport, and commercial — through research and management efforts, habitat monitoring and protection, stocking, enhancement and rehabilitation projects. KRAA further promotes respect for Kodiak Area salmon resources through science, education, and partnership programs.

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MESSAGE FROM THE EXECUTIVE DIRECTOR

Twenty-twenty-one came and went and blurred into 2020 under the pall of the seemingly endless COVID-19 pandemic, but 2021 came with some bright spots, too. The year taught us more about how to navigate the pandemic and gave us the tools to navigate the latest round of challenges without disrupting our operations or, fortunately for KRAA, suffering any losses. We even had a bit of a return to normalcy in a mostly cool, wet summer with abundant water, cooler water temperatures, and, in several cases, better than forecast returns for KRAA projects.

KRAA had a return to Cost Recovery activities for both sockeye at Telrod Cove and pink salmon at Kitoi Bay Hatchery. At Telrod Cove the 200,000 pound cost recovery goal was met on July 17 and fishermen were able to access the Cove well ahead of the July 31 Cost Recovery deadline. Likewise, nearly 5.5 million fish were caught commercially while KRAA was conducting cost recovery and collecting broodstock at the hatchery (not counting all the fish caught before and after!). Goals for both fisheries were met with relative efficiency in 2021 and KRAA has kept its emphasis on putting as many fish in fishermen's nets as possible.

We had a few other glimpses of "normal" during the year—at least between surges in the pandemic. Fish were a little late and were generally small, but we saw more than

100,000 sockeye reach Telrod Cove for the first time since 2013. In addition, for the last two years total returns on the Spiridon Lake/Telrod Cove Stocking project exceed forecast, and we are optimistic for 2022 as well.

At Kitoi Bay Hatchery, pink, chum and coho all came in at or above forecast, and the Kitoi Bay pink salmon run was one of the largest returns to the facility in its history at nearly 12 million fish. Our Research and Monitoring crews were working concurrently to take more samples for our otolith lab than ever before—not only at the hatchery and terminal areas but at the processors and in local streams as well. These bright spots, and the fact that we once again were able to meet the challenges of the season, come down to a dedicated staff and the volunteer KRAA Board that helps guide the path of the association.

KRAA's Board and staff never lose sight of our mission to provide fishing opportunity for all users. We take pride in the commercial benefit we provide to permit holders, as a return on their investment in KRAA, and the economic benefits we provide the community; however, just as important are the subsistence and sport opportunities we are able to offer our community. Whether it be subsistence opportunities at Telrod Cove for residents of Larsen Bay, stocking of sockeye and coho at Crescent and

Katmai lakes for the villages of Port Lions and Ouzinkie, or partnering with ADF&G to provide sport fishing opportunities on the Kodiak Road System for Chinook, Coho and rainbow trout, KRAA wants fish on your table and sustainable fisheries for our region.

Rolling into 2022, we came off a cold, dry end to 2021 and a cold beginning of the year that has slowed down the pace of development at the hatcheries. However, even if we are slower than usual getting fish into the water this year, we have experienced excellent survival rates across the board and have confidence in the success of the coming rearing season. One thing the cold couldn't slowdown was need for lab work and data processing on all of the samples KRAA crews collected in the past year. Each year our lab has collected and processed more otolith samples and can glean more information about KRAA's contributions to Kodiak's salmon fisheries.

In 2022 we hope you can expect more of the same from us: more fish in your nets and on your table and more of the sustained effort and dedication from your aquaculture association.



Tina Fairbanks
KRAA Executive Director



AQUACULTURE IN KODIAK

Regional aquaculture associations were originally formed in 1976 through legislative action prompted by Alaskan fishermen who lobbied for the exclusion of private enterprise from salmon fisheries development and enhancement (and the creation of the nonprofit hatchery associations—both the regional aquaculture association for each area, as well as other private nonprofit, or PNP, organizations). The ultimate goal was to give Alaskans a voice in salmon fishery enhancement decisions and a hand in actions, such as rehabilitation of



weak salmon stocks or supplemental salmon production, research and educational outreach, and habitat protection and improvement.

Each association is governed by a board of directors comprised of area salmon permit holders representing each gear group as well as processing, marketing, sport fishing and other interests. The Kodiak Regional Aquaculture Association (KRAA) was officially approved by the commissioner of the Alaska Department of Fish and Game in 1983, and it has been enhancing and rehabilitating salmon runs in the Kodiak area for nearly 40 years. During its

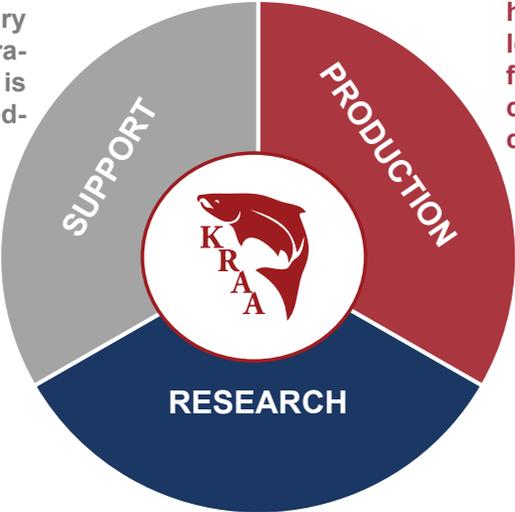
formative first decade, KRAA achieved much through lake enrichment projects, and, by 1994, supplemental sockeye production from stocking



barren lakes had reached significant levels. Since then, KRAA's contribution to the Kodiak Area salmon harvest has continued to expand.

Currently, the Association is primarily funded through two avenues: cost-recovery fishery licensing revenues and a two percent salmon enhancement tax (SET) on first point-of-sale commercial salmon fisheries harvest revenues. The SET is initially paid to the State of Alaska by Area K salmon permit holders. The tax is calculated from gross revenue at the time of delivery and is held in the State of Alaska General Fund until the time of disbursement each year. SET revenues generated in Area K are disbursed annually to KRAA by the state Department of Commerce, Community, and Economic Development.

The KRAA Administration handles all of the necessary day-to-day business operations and ensures KRAA is adhering to all state and federal regulations.



Kitoi Bay and Pillar Creek hatcheries annually collect salmon eggs and rear fry and smolt of all five pacific salmon species, including rainbow trout.

Research and Monitoring biologists monitor and evaluate KRAA hatchery programs as well as wild salmon habitats.

KRAA-produced salmon harvested in the commercial common property harvest were valued at an estimated \$9.989 million.



KRAA-produced salmon made up 21% of the 2021 Kodiak commercial common property fishery.

Data at over 25 salmon-producing habitats was collected by KRAA researchers.

KRAA HATCHERIES

KRAA operates two state-owned salmon hatcheries: Kitoi Bay Hatchery and Pillar Creek Hatchery. Combined, these facilities produce pink, chum, sockeye, coho, and king salmon for all Kodiak users. Additionally Pillar Creek Hatchery in partnership with ADF&G releases rainbow trout for sport fishing opportunity in and around the City of Kodiak.

Kitoi Bay Hatchery (KBH) is located on Afognak Island on the west side of Izhut Bay approximately 48 km (30 miles) north of the City of Kodiak. The hatchery infrastructure was constructed in 1954 by the U. S. Department of the Interior, Fish and Wildlife Service, but was destroyed in the 1964 earthquake and rebuilt by the Alaska Department of Fish and Game in 1965.



The hatchery was initially designed as a sockeye salmon research facility. By 1976, hatchery production priorities had switched to pink salmon fisheries enhancement. The present goal of the facility is to provide enhanced common property salmon fishing opportunities for Kodiak Management Area (KMA) fishermen by increasing returns of pink, chum, coho,

and sockeye salmon through broodstock development, egg takes, incubation, hatching, rearing, and releasing juvenile salmon, primarily to the Kitoi Bay area. KBH's primary contribution is to KMA commercial fisheries. Secondary user groups (in terms of the number of salmon harvested) of hatchery production include subsistence and recreational fishermen.

Pillar Creek Hatchery (PCH) was constructed in 1990 as a cooperative project between ADF&G and KRAA. PCH is owned by the State of Alaska and is located on Kodiak Island Borough land that is leased to the State. KRAA operates the facility under an agreement with the State through ADF&G.

PCH was designed as a central incubation facility where salmon eggs needed for production are collected from brood sources located at sites remote from PCH and transported to the facility for incubation, hatching, and rearing of resulting juvenile fish. Most juvenile fish are then transported to and released at stocking sites remote from PCH.



PERMITTED CAPACITY

Kitoi Bay Hatchery

Permitted Capacity

Pink Salmon:

215 million eggs

Chum Salmon:

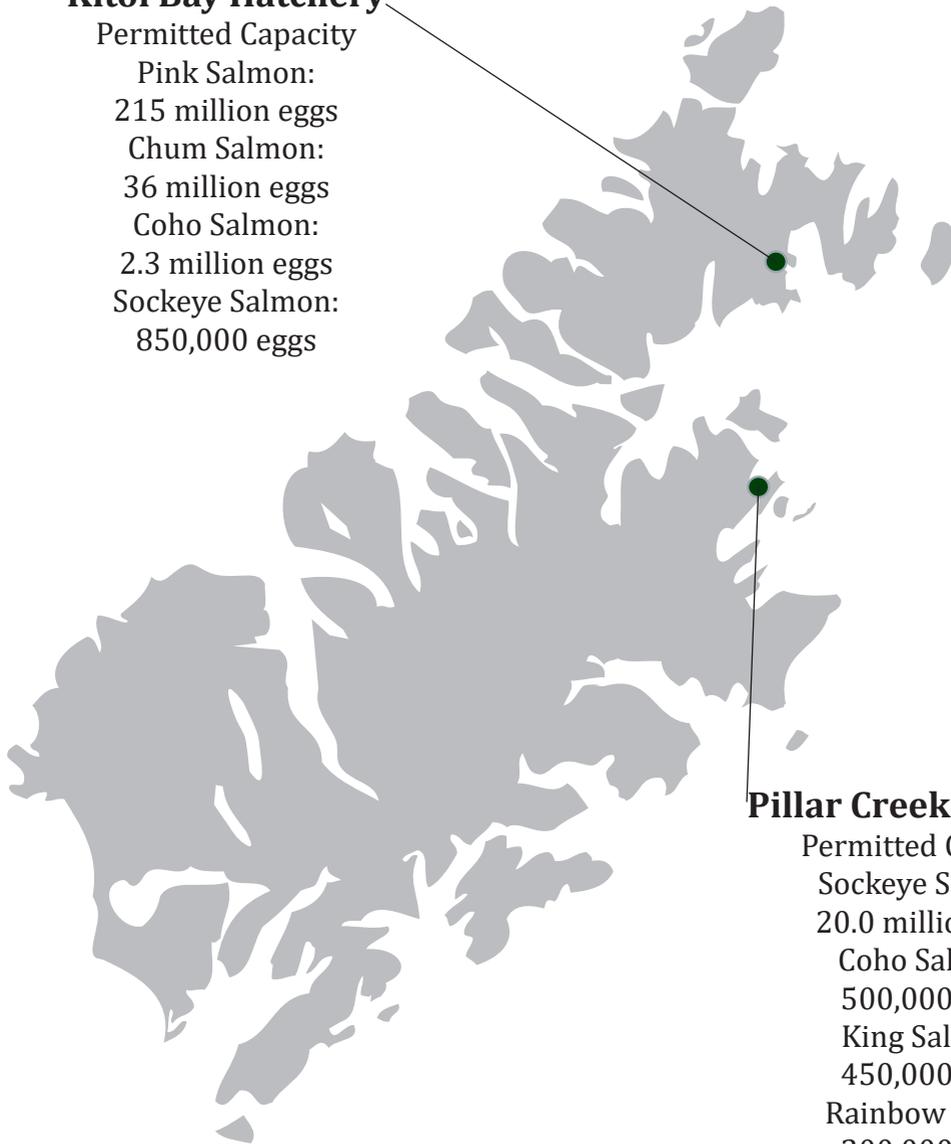
36 million eggs

Coho Salmon:

2.3 million eggs

Sockeye Salmon:

850,000 eggs



Pillar Creek Hatchery

Permitted Capacity

Sockeye Salmon:

20.0 million eggs

Coho Salmon:

500,000 eggs

King Salmon:

450,000 eggs

Rainbow Trout:

200,000 eggs

EGG COLLECTIONS

The two hatchery facilities operated by KRAA were designed for very different applications. Kitoi Bay Hatchery releases the bulk of its production directly into Kitoi Bay while Pillar Creek Hatchery was designed primarily as a central incubation facility with the intention that production would originate from places like Afognak and Saltery lakes and be stocked into barren lakes remote from the hatchery facility. The differing concepts behind the facilities create widely different strategies and practices in egg collection.



With returns coming directly to the hatchery and releases in close proximity, production from Kitoi Bay Hatchery can be relatively consistent on an annual basis—provided broodstock is available. However, diminished returns of sockeye salmon to Little Kitoi Lake have led to more Kitoi Bay Hatchery egg takes at Saltery Lake.

LOCATION	SPECIES	GREEN
Kitoi Bay	Chum	36,300,000
Kitoi Bay	Pink	216,100,000
Saltery Lake	Sockeye	745,400
Kitoi Bay	Coho	600,000

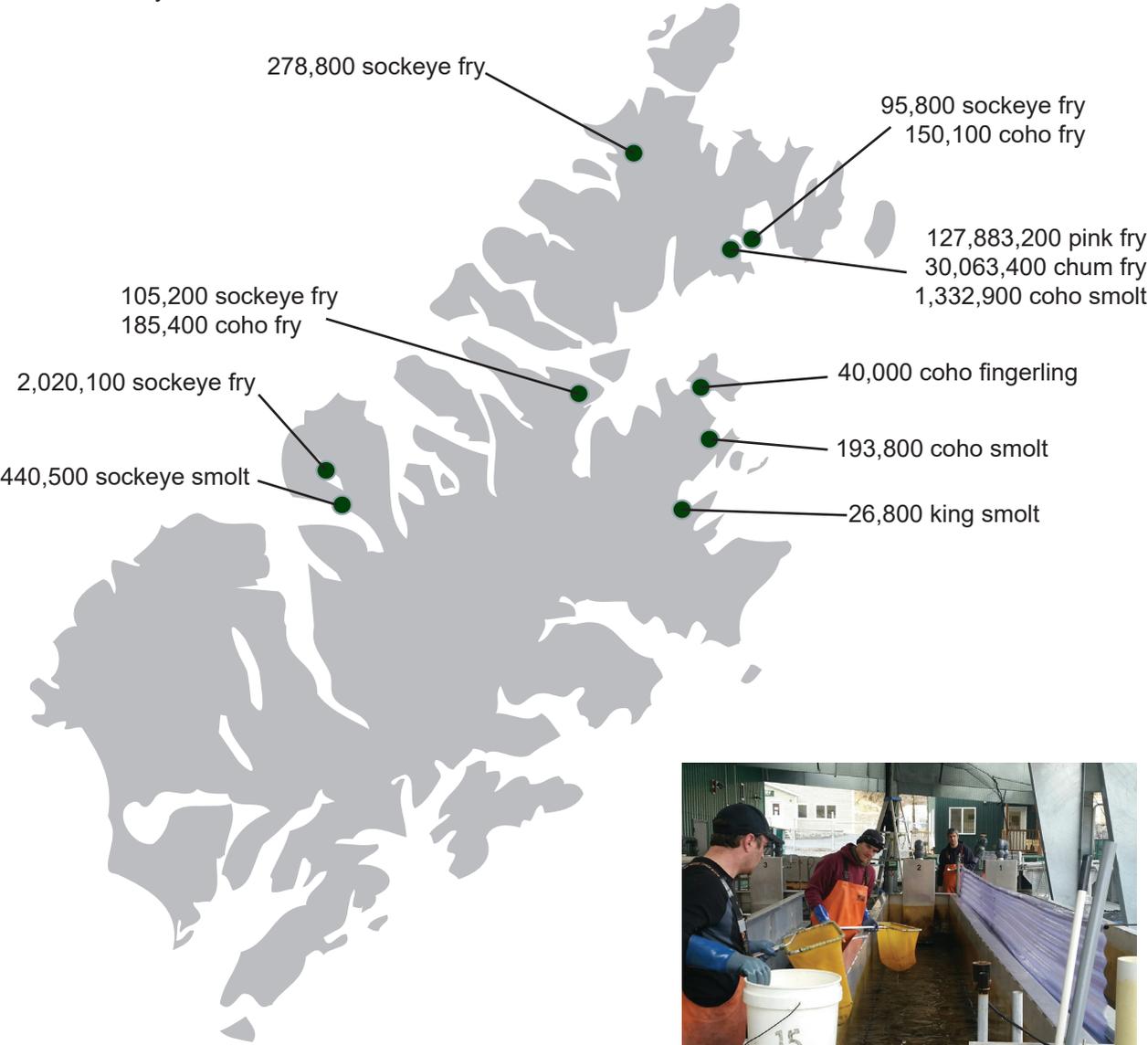
Egg collections at Pillar Creek Hatchery tend to have more variability. The 2021 sockeye salmon egg-take goals were based on the recommended 2022 juvenile release figures for each lake stocking project. Some of the recommended stocking figures are based on an in-season assessment of each lake's zooplankton population. As zooplankton levels vary, so do stocking recommendations.



LOCATION	SPECIES	GREEN
Afognak Lake	Sockeye	753,000
Monashka	King	62,300
Saltery Lake	Sockeye	3,086,000
Pillar Creek	Coho	227,500

RELEASE DISTRIBUTION

Most fish reared at Kitoi Bay Hatchery are released right at the facility, with only a few outstocking projects. Conversely, at Pillar Creek Hatchery most fish are released remotely, with only some coho smolt released directly into Pillar Creek from the hatchery.



FISHERIES MONITORING

To evaluate the success and effectiveness of the Association's programs, KRAA and ADF&G biologists implement projects centered on monitoring and evaluating juvenile salmon survival and adult salmon returns as well as habitat and environmental conditions.

SPIRIDON LAKE/TELROD COVE

Annual sockeye salmon smolt emigrations from Spiridon Lake are enumerated and sampled for age and size to assess growth, juvenile survival and smolt-to-adult survival. Additionally, sockeye salmon harvested in the Spiridon Bay



Special Harvest Area (SBSHA), located at Telrod Cove, are monitored by KRAA staff from mid-June to early August. Monitoring duties include estimating the build-up of returning sockeye salmon, estimating and sampling the sockeye salmon harvest, and estimating the incidental harvest. KRAA also collects otoliths from sockeye harvested inside Telrod Cove and sockeye harvested in adjacent statistical areas. These collections will continue over the next

several years and will allow KRAA to evaluate the success of the sockeye smolt net pen project as well the overall contribution of the Spiridon Lake fry release.

HIDDEN LAKE/FOUL BAY

Sockeye salmon returning to Foul Bay are harvested in the Foul Bay Special Harvest Area (FBSHA). Through KRAA funding, ADF&G annually monitors the commercial harvest and collects scale samples. Lake limnology data is collected to evaluate the response of the lake's zooplankton community to predation by stocked juvenile salmon and to determine stocking levels. Additionally, freshwater growth and fry-to-adult survival data are collected and evaluated.

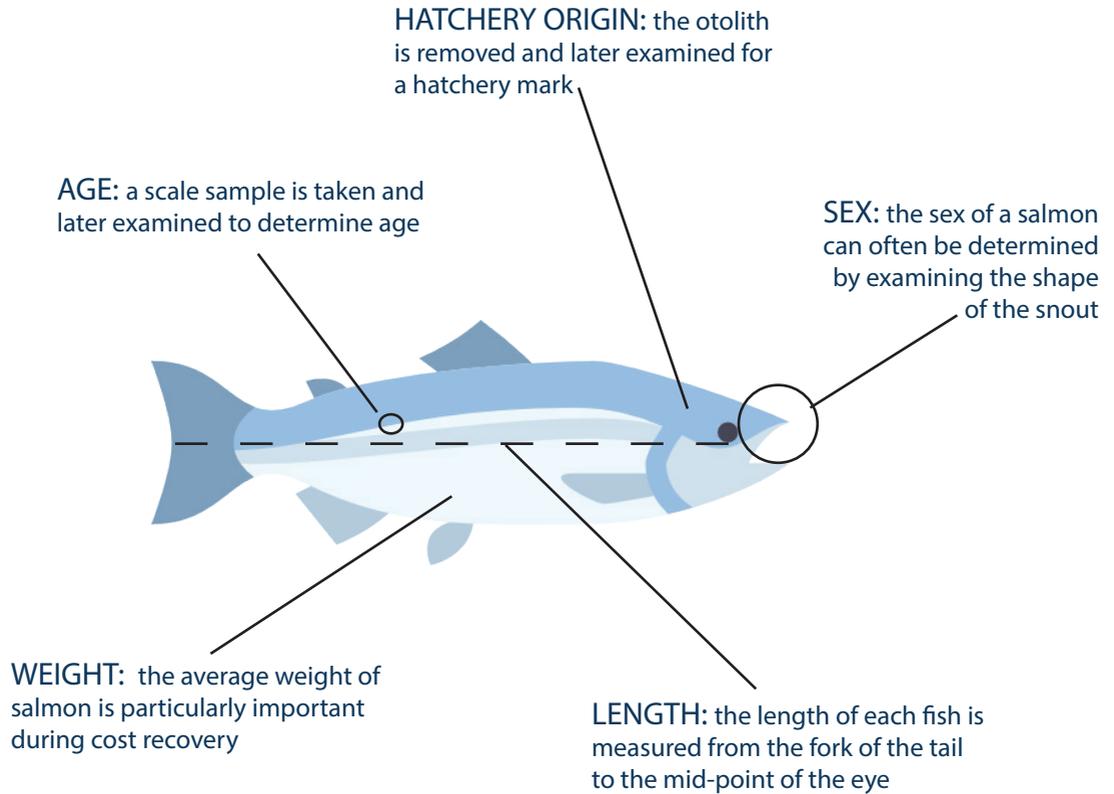
SALTERY RIVER

KRAA provides funding to ADF&G to install and operate the weir at Saltery Lake on an annual basis. Once escapement goals are met, KRAA can utilize adult sockeye salmon for Pillar Creek Hatchery broodstock. Saltery sockeye are targeted by subsistence, sport and commercial fishermen.



FISHERIES DATA COLLECTION:

KRAA Field Technicians collect important information from individual salmon that allow biologists to calculate survival rates, create run reconstructions, and estimate future returns.



LIMNOLOGY PROGRAM

Limnology data collection from Kodiak lakes began in the early 1980's. KRAA, in a cooperative agreement with ADF&G, has provided the funding for the majority of limnology data collection and processing since 1991. In 2021, KRAA collected samples from over 20 lakes and contracted with ADF&G for water chemistry and zooplankton analysis. Limnological data collected at Buskin Lake is done cooperatively with the Sun'aq Tribe of Kodiak (STK).

Most lakes in the Kodiak area are accessible only by float plane. Samples collected while working off the floats include zooplankton net hauls, water samples, temperature and dissolved oxygen profiles, and light incidence measurements. In the laboratory, zooplankton is measured and enumerated under the microscope and water



samples can be analyzed for pH, alkalinity, chlorophyll a, and nutrient content.

ADF&G uses limnology data to assess lake productivity and changes in the freshwater rearing environment of sockeye salmon. From these analyses, ADF&G provides stocking recommendations to KRAA for sockeye salmon projects.

Limnology data collected on sockeye salmon nursery lakes that are not regularly stocked with salmon are archived to provide baseline information. The data is important in instances where sockeye returns begin to dwindle. The baseline limnology and zooplankton data can be used to attribute, or rule out, run failures caused by unfavorable juvenile rearing conditions.

KRAA LIMNOLOGY LAKES

- Big Waterfall
- Buskin
- Crescent
- Dry Spruce
- Frazer
- Hidden
- Karluk
- Laura
- Little Kitoi
- Little Waterfall
- Lower Jennifer
- Lower Olga
- O'malley
- Red
- Ruth
- Saltery
- Spiridon
- Thumb
- Upper Jennifer
- Upper Malina
- Upper Olga
- Thorshiem

OTOLITH LABORATORY

In 2021, KRAA continued to collect sockeye salmon otoliths from Telrod Cove and various statistical areas on the West side. The analysis of these otoliths will indicate the varying survival between fish released in Spiridon Lake and those released directly from saltwater net pens in Telrod Cove. The ultimate goal is to evaluate the success of the net pen project.

In addition to the sockeye otoliths, chum salmon otoliths were collected at Kitoi Bay Hatchery. Chum salmon otoliths were also collected from various commercial fishing statistical areas and several streams in proximity to the hatchery. This analysis will help evaluate the success of the late-large program as well as identify KRAA-released fish within the commercial harvest.

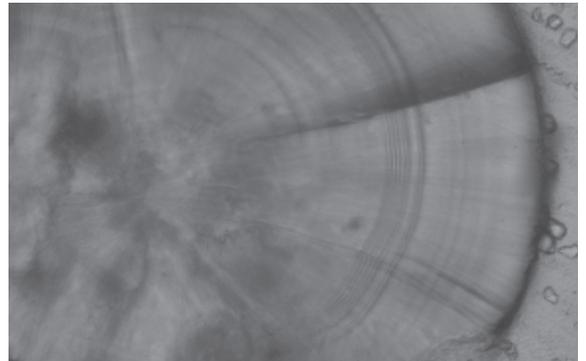


2021 marked the first year that 100% of KRAA-released pink salmon returned with an otolith mark and the second year of the Kodiak Pink Otolith Recovery (KPOR) project. As in 2020, pink salmon otoliths were collected from hatchery broodstock, the commercial common property



harvest, and streams near the City of Kodiak and several in near proximity to Kitoi.

Otoliths collected from pink salmon hatchery broodstock are used to confirm saltwater otolith mark retention. The commercially harvested pink salmon are sampled to acknowledge KRAA's pink salmon contribution to the statistical areas outside of Kitoi Bay. Otoliths from the pink salmon sampled in the streams can indicate if hatchery-



released fish have strayed from returning to Kitoi Bay. All otoliths are analyzed by KRAA personnel at the KRAA lab on Near Island.

COST RECOVERY

Cost recovery harvests are authorized by the State of Alaska to “recover” all or part of the costs of operating the hatchery as well as improvements to the hatchery, other salmon enhancement or rehabilitation projects in the region, fisheries research, and reasonable operating or administrative costs.

COST RECOVERY PROCESS

Prior to the fishing season, the KRAA Board of Directors establishes cost recovery goals designed, in part, to reach funding objectives while minimizing impact on the common property fishery.

KRAA is authorized by the state to license the harvest of salmon for cost recovery in strategically designated locations called Special Harvest Areas (SHA). These areas, often located in terminal or hatchery locations, allow harvest of salmon with minimal impact on common property openings. Once the hatchery’s broodstock and/or cost recovery goals are realized or within reach, salmon fishing in the SHA and associated districts may be opened again to the common property fishery by order of ADF&G area managers and Management Plans. In 2021, the Association concentrated cost recovery efforts at the Spiridon Bay and Kitoi Bay Special Harvest Areas.

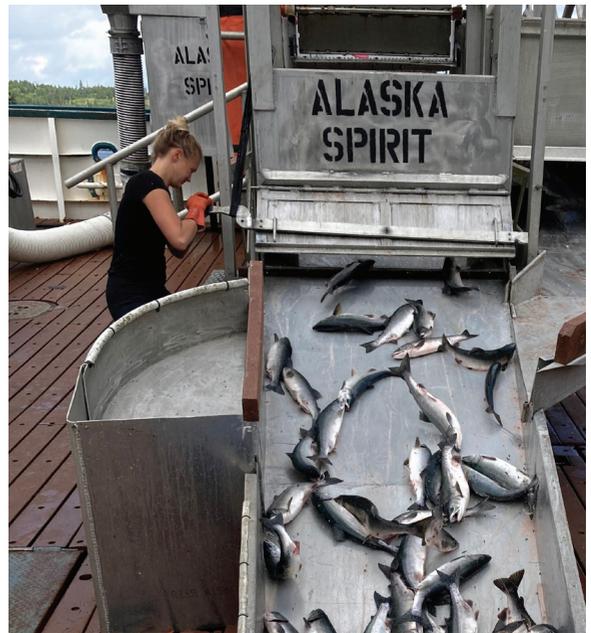
SPIRIDON BAY SHA

The 2021 Telrod Cove cost recovery goal was set at 200,000 pounds of sockeye salmon resulting from Spiridon Lake and Telrod Cove

stocking projects. The Telrod Cove cost recovery harvest began on July 4, 2021 and concluded on July 17, 2021. A total of 207,715 lbs. of sockeye salmon, averaging approximately 3.92 lbs. were harvested during the cost recovery fishery.

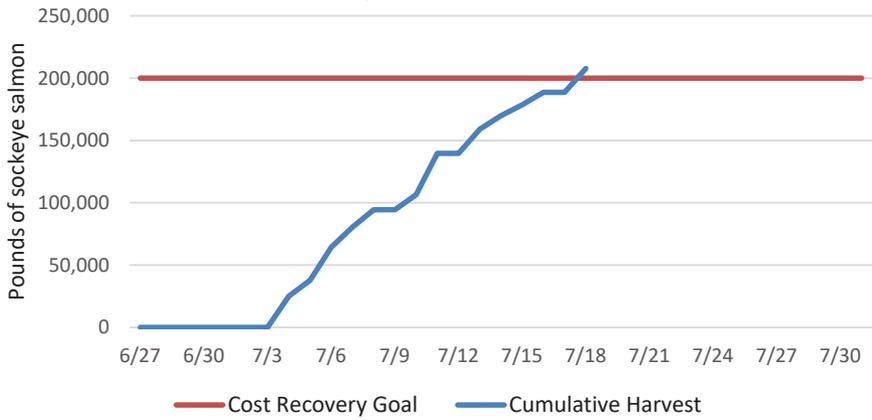
KITOI BAY SHA

The Kitoi Bay cost recovery goal for 2021 was set at 7.0 million pounds of Kitoi Bay Hatchery pink salmon. Due to a late return, cost recovery efforts began on August 8, 2021 and concluded

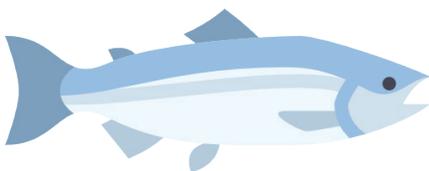
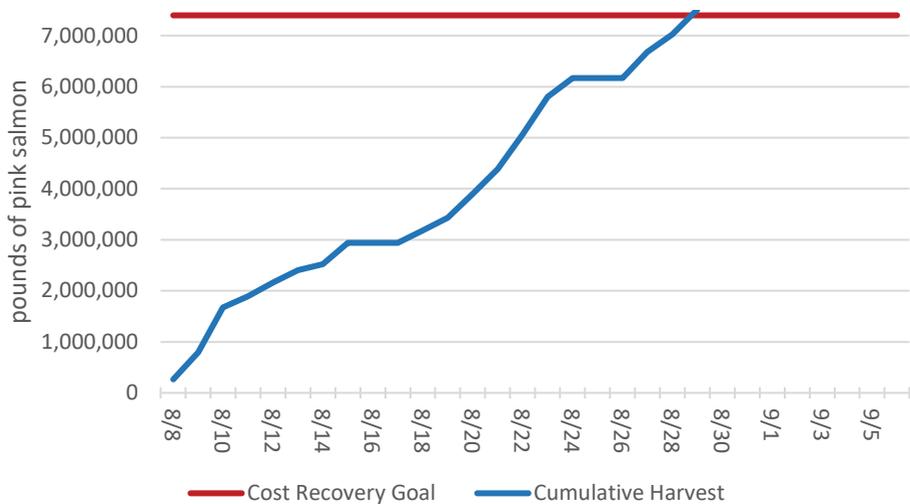


on August 29, 2021 when a total of approximately 7,444,000 lbs. of pink salmon averaging 2.62 lbs. had been harvested.

TELROD COVE



KITOI BAY



Since cost recovery efforts began at Telrod Cove in 2010, approximately 590,000 sockeye salmon have been harvested for cost recovery. In that same time, the Spiridon Lake project has contributed just over 2 million sockeye salmon to the commercial common property harvest.

EDUCATION & OUTREACH

Along with producing salmon, KRAA provides dynamic educational opportunities, events, and resources that advance scientific knowledge and promote stewardship of Kodiak's salmon resource. KRAA's education and outreach efforts strive to foster two-way communication and actively involve the community in salmon enhancement decisions. The following are activities provided by KRAA in typical years. While many outreach programs remained suspended in 2021, KRAA has reinstated its outreach programs for 2022.

KODIAK COMFISH

Under normal circumstances KRAA and Pillar Creek Hatchery provided a fish tank display and information booth during the Kodiak ComFish Trade Show. Guests at the trade show have the opportunity to engage with different KRAA staff



to discuss KRAA projects and learn more about the Association's mission and goals.

HATCHERY TOURS

The staff at Pillar Creek Hatchery typically provide hatchery tours to members of the public, visitors to Kodiak, and classes from our public and private schools. Tours include a brief presentation on annual hatchery operations. Guests are also provided with an opportunity

to see the different functions of the facility from incubation to rearing.

SALMON CAMP

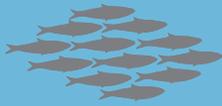
KRAA staff leads salmon campers in salmon dissections in most summers. Students are given an anatomy lesson that includes a first-hand look at the external features of salmon as well as a look at the internal organs.

SALMON IN THE CLASSROOM

During the coho egg-take activities at Pillar Creek Hatchery, KRAA staff provides an educational opportunity for local students. Following a presentation that includes salmon identification, life cycle, and anatomy, KRAA staff demonstrate to students how hatchery personnel collect eggs and milt from coho salmon. Each participating class is given up to 500 coho salmon eggs to incubate in their classroom over the winter. The students track the development from egg to fry. In the spring, the resultant fry are released at Island Lake.

KRAA staff also leads fourth grade students in salmon dissections later in the year. It is a great opportunity for the students to get a hands-on physiology and anatomy lesson and to get a little messy as well! In 2021, KRAA was able to work with Peterson Elementary School to conduct the dissections safely outside.

2021 By the numbers



163.5 million
juvenile salmon
were released by
KRAA hatcheries



11,657,000
KRAA-released salmon
returned to Kodiak



70%

were harvested in the commercial
common property fishery



22

lakes sampled in
the limnology
program

140

zooplankton
samples collected

258,188,200

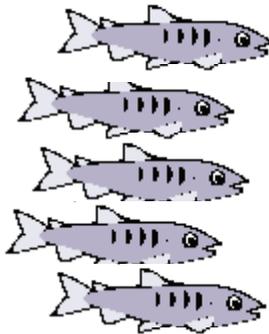


salmon eggs
were collected by
KRAA hatcheries



6,206

otolith pairs
collected for Kodiak
Otolith Recovery
Project



428,416

Sockeye salmon smolt emigrated
from Spiridon Lake

72.8%

were age-1;
resultant from 2020 fry release

KRAA

PERSONNEL

ADMINISTRATION

Tina Fairbanks
Executive Director

Tammy Hulsey
Administrative Office Manager

Megan Holland
Administrative Assistant

Trenten Dodson
Production and Operations

PILLAR CREEK HATCHERY

Al Seale
Manager

James “Hawk” Turman
Assistant Manager

Nick Allen
Fish Culturist

RESEARCH & MONITORING

Nathan Weber
Manager

Marina Thomas
Biologist

Shannon Polhemus*
Biologist

Vacant
Lab Technician

*Shannon Polhemus joined the R&M team full time and was promoted in 2021 shortly after the departure of Kenny Matson and Takoda Edlund.

KITOI BAY HATCHERY

Mike Wachter
Manager

Lauren Deal
Assistant Manager

John Vinci
Fish Culturist

Adam Ruyle
Fish Culturist

Niq Medina
Fish Culturist

Kayla Hansch
Fish Culturist

Mike Fairbanks
Maintenance Manager

Nate Vreeland
Assistant Maintenance Manager



KRAA BOARD OF DIRECTORS



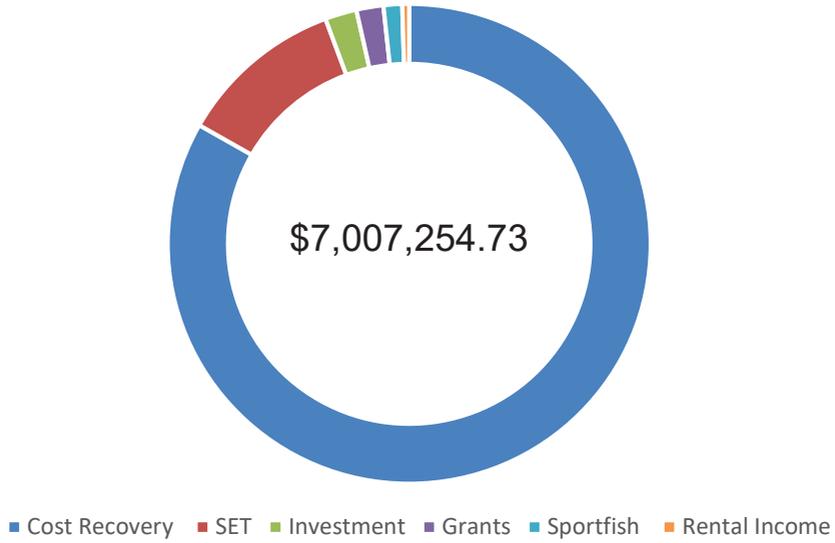
Top Row: Oliver Holm, Wallace Fields, Nate Rose, Melissa Berns-Svoboda, Bryan Horn

Second Row: Marko Patitucci, Matt Moir, Rick Berns, Dave Hilty, Jeff Stephan

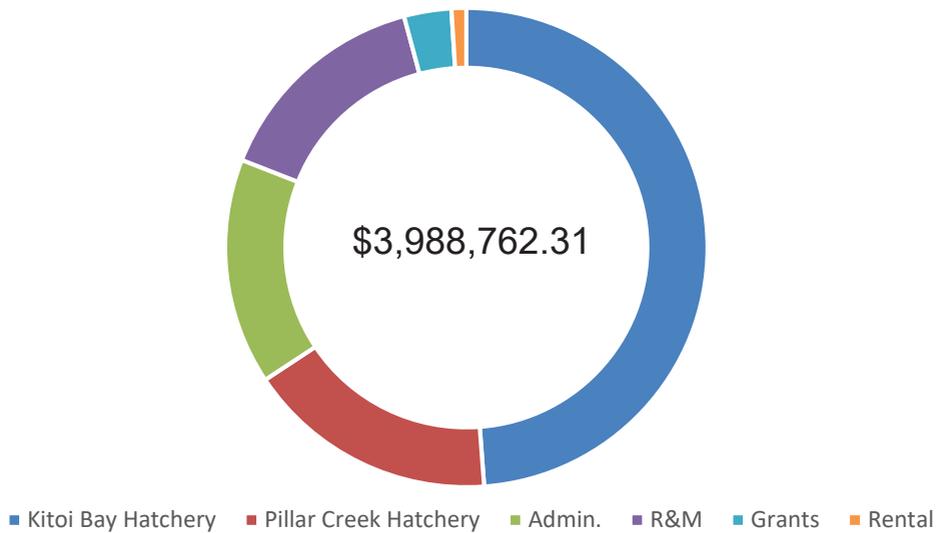
Third Row: Steven Horn, Adam Wischer, Harvey Goodell, Theresa Peterson, Nicholas Hoffman

KRAA FINANCIALS

INCOME

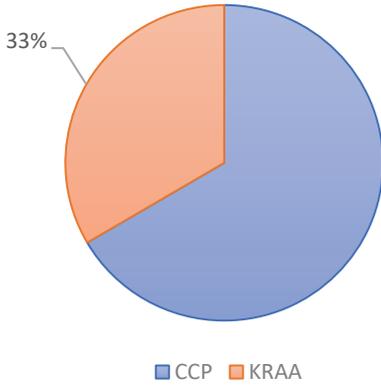


EXPENSES

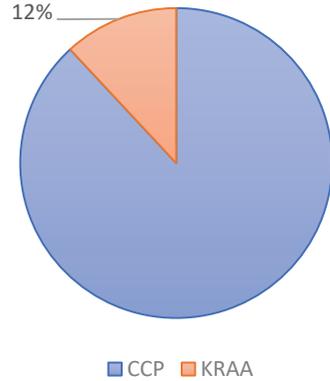


KRAA Values

Pink Salmon

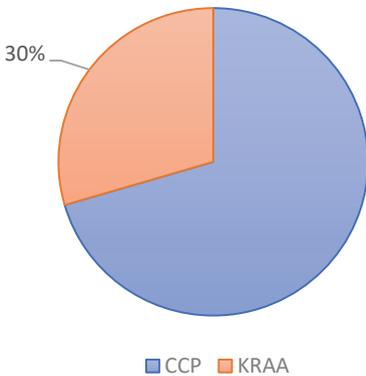


Chum Salmon

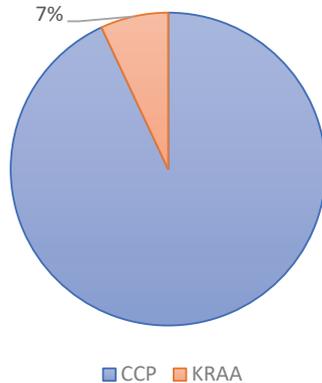


About 8.2 million hatchery-produced salmon were harvested in the Kodiak commercial common property (CCP) fishery in 2021, worth an estimated value of \$9.99 million (21% of total Kodiak value). KRAA-produced pink salmon were valued at \$8.06 million, sockeye were valued at \$1.49 million, coho were valued at \$287,000, and chum were valued at \$157,000. Value proportions are shown in the graphs.

Coho Salmon



Sockeye Salmon





Kodiak Regional Aquaculture Association
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