



Yukon Fisheries News

THE OFFICIAL PUBLICATION OF THE YUKON RIVER DRAINAGE FISHERIES ASSOCIATION

SPRING 2023

YUKON RIVER SALMON OUTLOOKS FOR 2023

WRITTEN BY: DEENA JALLEN AND CHRISTY GLEASON (ADF&G), HOLLY CARROLL (USFWS)

Salmon forecasts are tools used by fishery scientists and managers to incorporate information from past years into outlooks for the coming season. Parent year run sizes, escapement totals, productivity, juvenile abundance, and stock compositions are some of the information types used for each salmon species. Outlooks help give fishermen and fishery managers a look ahead at how many fish might come back to the river this year. While outlooks are useful for guiding early season management actions and expectations, we rely more on inseason data as the runs start to enter the river.

The drainagewide Chinook salmon outlook is for a run size of 62,000 to 104,000 fish, and the Canadian-origin Chinook salmon run size outlook is for a run of 26,000 to 43,000 fish. At run sizes below 150,00 fish we tend not to meet escapement goals. Because of the poor projected run size, salmon fishing closures will be necessary to protect Chinook salmon as they migrate to their spawning grounds in Alaska and Canada. There likely will be no harvestable surplus of Chinook salmon this year.


The drainagewide summer chum salmon outlook is for a run size of 557,000 fish, with a range of 280,000 to 900,000 fish. There is a lot of uncertainty in this outlook in part due to hot water conditions during the 2019 spawning migration and recent low run sizes. There may be openings with selective gear types for summer chum salmon if the run is projected inseason to exceed the lower end of the escapement goal of 500,000 fish.

The drainagewide fall chum salmon outlook is for a run size of 251,000 fish, with a range of 112,000 to 602,000 fish. The fall chum salmon projection will be revised in mid-July based on the 2023 summer chum salmon run size.

Again, this season we will be providing liberal opportunity to harvest non-salmon during salmon fishing closures. Though we have heard concerns from fishermen that harvest of these stocks may increase, survey data indicates harvests have not increased substantially for these species in the last two years.

HOW DO I BECOME A YRDFA MEMBER?

- Go to yukonsalmon.org
- Go to YRDFA's Facebook page
- Fill out and mail in the form on page 18



Protecting and promoting all healthy wild fisheries and cultures along the Yukon River drainage.

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YRITFC UPDATE

WRITTEN BY: MICHELLE QUILLIN

The Yukon River Intertribal Fish Commission (YRITFC) held their annual meeting and elections on May 2-4 in Fairbanks, AK. More than thirty commissioners from communities along the Yukon River were in attendance, further demonstrating the strength and unity of Indigenous people and the self-governance of communities along the Yukon River. YRITFC is proud to introduce their members of the YRITFC Executive Council: James Landlord, Brad Painter, Percy Lolnitz, Speedy Sam, Charlie Wright, Mike Peter, William Peter, and Karma Ulvi. YRITFC unanimously elected Karma Ulvi as their chairperson and Brad Painter as their Vice-chair. YRITFC would like to invite everyone on the river at one time together, to do a blessing so everyone can stand together united- Exact date and time TBD. YRITFC hopes to see more tribes join the fish commission so our voices can become stronger and more unified in preserving our way of life and rebuilding a healthy fish population for future generations to come.



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Yukon Fisheries News is published by the Yukon River Drainage Fisheries Association
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Funding for this publication provided by the USFWS through the Restoration & Management Fund

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The management team recognizes the severe hardship of another anticipated season of salmon closures. Our forecasts show that incremental improvements in the chum and chinook salmon runs may be occurring, and we are confident that the sacrifices we're making now will help them to recover for the longer term.

Alaska Department of Fish and Game (ADF&G) research and management staff have worked closely with United States Fish and Wildlife Service (USFWS) staff to develop this year's management strategy. Feedback has been sought from stakeholders, agency staff and leadership, and this strategy has been discussed in depth at the Yukon River Drainage Fishermen's Association (YRDFA) public preseason fishermen's meeting, and at the Yukon River Panel April meeting.

Households should receive an Outlook Flier in the mail in May with more detail on management actions and how this year's forecasted runs compare to previous years. We encourage everyone to tune in to the weekly YRDFA teleconferences inseason for assessment updates and discussions about how the summer is going. Fishery announcements and weekly updates will be published through the State of Alaska Advisory Announcement system and shared on our Facebook page (Yukon River Fishing-ADFG). Fishing information for your area of the river can be reached anytime by dialing the toll-free hotline number at 1-866-479-7387.

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EDUCATIONAL EXCHANGE



On an annual basis the Yukon River Drainage Fisheries Association in partnership with the Yukon Salmon Sub-Committee hosts an educational exchange trip that is funded by the Yukon River Panel. The goal of this program is to build relationships among Alaskans and Canadians that share the same salmon resources. The educational exchange first began in 2002 and to date we have built relationships between more than 90 participants between the two countries.

This year Alaska will be hosting our neighbors and we plan to travel to Grayling, Anvik, Holy Cross and Russian Mission. We plan to begin our trip by flying to Grayling on July 12, 2023. We will stay for two nights and continue by boat to the other three communities and then fly out of Russian Mission back to Fairbanks on July 20, 2023. We will stay two nights in each community before traveling to the next. We will be coordinating our trip with the local Tribe and we are excited to be coming to your community.



News From the Director

All I have known is disaster. As I reflect on my first three years as the executive director for YRDFA it sure has been an uphill battle. I was hired during the beginning of the pandemic halting all activity all over the world. New job, homeschooling three children, and then the start of the 2020 fishing disaster hits. Through it all, YRDFA has been a major player in ensuring the communication between all users are at the forefront. Our small staff of three has put such tremendous efforts to maintain our organization stays in full operation. YRDFA was awarded several funds that will assist us in hiring additional staff members to better serve the people of the Yukon River.



BY SERENA FITKA

reducing fishing time in Area M's Shumagin Island, and Umiak Island districts. The support for proposal #140 was strong; however, the Board of Fish did not pass it. Although, an alternative proposal passed with only a small reduction in fishing time with trigger points put in place. The trigger points are the same as a cap. When the harvest of chums reaches the trigger point then fishing will

be shut down. Many people are not confident the triggers will work due to the 'chum chucking' that has always occurred in this particular fishery. The group continues to meet and if you are interested in joining in on the conversation please reach out to our office.

It has been a very busy winter with many meetings. The Arctic Yukon Kuskokwim was in cycle with the Board of Fish this year along with the Alaska Peninsula Aleutian Chain Chignik region as well. For a year a coalition of leaders from Western Alaska met twice a month; sometimes weekly, to prepare for the Alaska Peninsula meeting. It was the largest group of organizations that all banded together to support one issue;

Moving forward with our funded projects we hope to see many of you along the river this summer; whether it be culture camps, field work, or traditional celebrations, it is always wonderful to visit with one another. Some of our team members along with our partners will be traveling throughout the Yukon River watershed.. Please keep an eye out for our team members in any of our Yukon River communities. Piuraa

"...we hope to see many of you along the river this summer; whether it be in culture camps, field work, or traditional celebrations, it is always wonderful to visit with one another"

THE MISGUIDED PIPEDREAM OF SALMON HATCHERIES ON THE YUKON

WRITTEN BY: GALE K. VICK

APRIL 2023

The continuing Chinook and chum salmon crisis in the Yukon River, indeed in the entire AYK¹ and the Nushagak in Bristol Bay, has reached historic proportions. The pain created by salmon losses has been searing. Both stakeholders and managers alike, on both sides of the border, are desperate for solutions, for food security, for culture and for the salmon themselves to survive.

Recent talk about an *anadromous-release*² salmon hatchery on the Yukon River to create an *opportunity for harvest* is, once again, raising a false flag. Because the Yukon River cannot support a production hatchery nor should we transplant hatchery raised fish to wild streams, an *anadromous-release hatchery will not give us any harvest*.³

Hatcheries are not a solution if we are serious about saving, rebuilding and protecting the future of wild salmon stocks. They will only increase the stress on wild stocks and further send Yukon salmon on the road to extinction. This is not hyperbole; there are multiple reasons *anadromous*⁴ hatchery production should be reduced rather than increased and these are being debated around Alaska and the Pacific Northwest.



*The history of Pacific salmon hatcheries has little to show for its 120 years of effort and hundreds of millions of dollars in expenditures. Throughout that time, we have blindly depended upon hatcheries to compensate for overfishing and habitat destruction, even though science and historical trends indicate that hatcheries fail to meet this intended function. Despite widespread hatchery development, over 100 major Pacific salmon runs have gone extinct, and many of the remaining 200-plus runs are at risk of disappearing. Even though studies indicate that hatchery fish may accelerate the extinction of salmon runs, faith in hatcheries continues.*⁵

The Yukon River is over 1980 miles long from tidewater in the Bering Sea to the headwaters in British Columbia, Canada. It is one of the world's mightiest rivers with an intrinsic value of also being the largest wild Chinook and chum salmon

producers in Western Alaska. From 1960 to 2000, Yukon River Chinook salmon *harvests* averaged greater than 150,000 (range of 82K to 220K) and chum salmon harvests averaged greater than 1million. Both species have since declined in size, fecundity, return numbers and related productivity, resulting in no harvestable surplus at all in recent years. In a few short decades, we have seen Yukon River fabled Chinook salmon grown smaller in size (average weight declined from 25 to 11 pounds) and year class (from 8 year to 5 year old dominants); increasingly in danger of discrete stocks becoming extinct. Many smaller stocks of Chinook and chum salmon are likely extirpated from home streams and most larger stocks are now small stocks (Anvik, Chena, Salcha, Chatanika, Goodpaster.) Coho salmon are showing similar signs of stress. Chinook, summer chum, fall chum and coho fisheries on the Yukon River are now closed for the foreseeable future.

We all bear some culpability. Mistakes, lack of knowledge to more egregious errors. What matters is that we accept and learn from them. *It also means sharing both the burden and responsibility of mitigation, from the AYK to the BSAI and Alaska Peninsula and beyond.* It means paying attention to entire ecosystems, not just pieces. It means deciding if we are going to make a real commitment to wild salmon for the future. That's our metric.

Looking at Yukon River salmon runs through an historical lens, we can understand how past and present management practices have contributed to massive run reductions, and, at the same time can inform the future. Some of the more obvious (but not limited to):

- » Unrestricted fishing in the early 1900's and again 1960-2010,
- » Mixed attempts to manage conservatively for passage within both watersheds and oceans *throughout the run cycle of salmon*
- » Having virtually no restrictions on Alaska Peninsula chum intercept and Bering Sea chum bycatch and for years on Chinook salmon bycatch

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1 Arctic-Yukon-Kuskokwim

2 Anadromous-release means putting salmon into a watershed to simulate a wild stock cycle, river to ocean to river

3 The Whitehorse Hatchery is not a production hatchery

4 This does not include non-anadromous sport stocking hatcheries

5 Minnesota Journal of Law, Science & Technology Volume 6 Issue 1 Article 17 2004 The Salmon Hatchery Myth: When Bad Policy Happens to Good Science, Melanie Kleiss

A Disease that May Limit Yukon River Chinook Salmon from Successful Upriver Migration

WRITTEN BY: KEITH HERRON IVY IN COLLABORATION WITH THE ADF&G AND THE USFWS

Positionality Statement: My name is Keith Herron Ivy, I am a Yup'ik biologist and scholar. My family comes from Bethel, Alaska; however, I grew up in the communities of Wrangell, Seward and Kenai, Alaska. I work for the U.S. Fish and Wildlife Service as a Fishery Biologist, Assistant Subsistence Fisheries Manager, and Tribal Liaison for Fisheries on the Yukon River. Part of the information collected by this research will be utilized for my Masters of Fisheries degree at the University of Alaska Fairbanks supported by the Tamamta program (NSF # 2022190). I am honored to live and work on the traditional homelands of the lower Tanana and Dena' peoples in Fairbanks, Alaska.

In 2022, I was one of the fishery biologists out on the river gathering samples to investigate the impacts of the fish parasite *Ichthyophonus* on Yukon River Chinook salmon. I witnessed firsthand the pain and suffering of the people without fish along the Yukon River, and it felt like the entire ecosystem was suffering because of the current fishery collapse. The Yukon River Chinook salmon drainage wide run in 2022 was the worst on record with approximately 45,000 Chinook salmon passing Pilot Station sonar. In the middle Yukon River, the number of Chinook salmon with visual signs of disease caused by *Ichthyophonus* was appalling. While sitting on the bank of the river, the river's unwell state reiterated a deep feeling of empathy for the wellbeing of the people, the land, and the salmon. I felt compelled to write this article to help introduce this important fish health issue, provide a brief history of *Ichthyophonus* within the Yukon River, and explain some of the approaches that are being taken to learn more about overall Yukon River Chinook salmon health. On behalf of the large research and management team that is supporting this work, we look forward to sharing more information and research findings in the coming months.

What has caused such low numbers of spawning Chinook salmon in the Yukon River in recent years? While many factors likely contribute to the salmon declines, we suspect that the resurgence of the parasitic pathogen *Ichthyophonus* may be a significant factor adding stress on Yukon River Chinook salmon and might prevent them from successfully reaching their spawning grounds. Understanding the impacts of *Ichthyophonus* on migrating Chinook salmon and whether it causes mortality before they spawn is essential for effective fisheries management.

Some of the factors contributing to the Chinook salmon decline are outside of our control as stewards and managers. However, we can influence the information that is collected to enable effective management actions designed to protect Yukon River

Chinook salmon. That is why starting in the spring of 2021, the Alaska Department of Fish and Game (ADF&G) and the U.S. Fish and Wildlife Service (USFWS) brought together many experts, Alaska Native Tribes, and communities to work collaboratively to address growing concerns about *Ichthyophonus* and other fish health related issues. Through this fish health research, we aim to develop an annual *Ichthyophonus* monitoring program, build support to increase community-based (or Tribal-led) *Ichthyophonus* monitoring, improve tools to estimate annual disease-associated mortality, and provide a more complete assessment for the fate of Chinook salmon migrating up the Yukon River mainstem. Our anticipated results will allow fishery management agencies to better account for potential disease-associated mortality during future runs while still allowing for sustainable harvest levels assuming, and hoping, the run rebounds.

Ichthyophonus infects Chinook salmon while at sea rather than in freshwater. The infection is not believed to kill many ocean-phase salmon, but infection can cause disease within spawning-phase freshwater salmon that may progress to lethal levels resulting in en route mortality. Current information suggests en route mortality may be associated with high levels of *Ichthyophonus* and may have limited many Yukon River Chinook salmon from successful upriver migration in 2020, 2021, and 2022.

Fishers on the Yukon River have been able to observe *Ichthyophonus* in diseased Chinook salmon and recognize trends over time in the Yukon River. This knowledge led fishers to suggest *Ichthyophonus* could be a significant source of en route mortality. Not all Chinook salmon are infected with *Ichthyophonus*, but those infected may show visual signs of disease such as white spots on the heart (Picture 1) and elsewhere in the body. The filets from infected fish can have an unusual "sweet" or "tangy" smell and do not dry well, which can impact common fish preservation practices. By measuring

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these visual signs of disease, one can determine prevalence of disease based on the proportion of diseased salmon present within their harvest. Also, by counting the number of white spots within the heart muscle, one can determine intensity of disease based on the relative level of infection. Once infected, fish do not recover from the infection and the disease continues to progress within the fish during their freshwater migration. Fishers in the middle Yukon River in Alaska have reported that visible signs of disease in Chinook salmon are at higher levels now than they remember in previous years. And fewer severely diseased fish are observed by fishers further upstream in the river around Fort Yukon and Eagle. This strongly suggests that heavily infected fish in the middle river perish before reaching the upper river.

Ichthyophonus has been detected on the Yukon River off and on for over 30 years. In 1986, Bill Fliris, a fisherman from Tanana, recalled one of his harvested Chinook salmon did not dry properly, and at the time did not recognize the incident to be related to *Ichthyophonus*. The following year in 1987, he reported several more harvested Chinook salmon had visual signs of disease and his report aligns with other confirmed *Ichthyophonus* cases. In 1988, an ADF&G pathologist confirmed the first case of *Ichthyophonus* infection in Alaska from a Yukon River Chinook salmon harvested near Galena. After 1988 and throughout the 1990s, fishers continued to report high levels of *Ichthyophonus* within their harvest, which led to a 5-year study led by Drs. Richard Kocan and Paul Hershberger in the late 1990s and early 2000s, followed by additional studies by Dr. Kocan and colleagues, the ADF&G, and others. Since 2001, Stan Zuray, a fisherman, biologist, and Yukon River Drainage Fisherman Association (YRDFA) board member from Tanana, has monitored his Chinook subsistence harvest for salmon size and visible signs of *Ichthyophonus* disease during most seasons over the last two decades. Mr. Zuray's monitoring in the middle river (at his Rapids Research Center) showed low *Ichthyophonus* prevalence from 2005 to 2019, which corresponded to a reduction in *Ichthyophonus* research around 2010. In 2011, the Yukon River Panel Joint Technical Committee recommended that *Ichthyophonus* monitoring, and research be implemented when more than 25% of the adult Chinook salmon return are diseased. In 2020, Mr. Zuray reported that the disease had reemerged at a historically high level, which prompted immediate action by the ADF&G and the USFWS.

Better understanding the factors that influence *Ichthyophonus*,

and thus salmon en route mortality, is critical to understanding and preserving salmon runs. Previously, Dr. Kocan and collaborators predicted that high levels of *Ichthyophonus* within Yukon River Chinook salmon may result in en route mortality. What is not yet known, is what intensity of disease is associated with mortality, how many fish die annually due to disease, and how different environmental stressors, such as high-water levels and high-water temperatures may affect the disease progression. Therefore, annual *Ichthyophonus* and environmental monitoring is essential to understand the disease and its impact on the Yukon River Chinook salmon population. After Mr. Zuray noted high levels of *Ichthyophonus* in 2020, he advocated for fishery management agencies to take the reemergence of disease seriously. As a result, in 2021 the

USFWS partnered with Mr. Zuray to collect a small number of samples at the Rapids, which again showed high levels of the disease. Also in 2021, the ADF&G evaluated the prevalence and intensity of disease in Chinook salmon near the mouth of the Yukon River and initiated partnerships to establish an annual *Ichthyophonus* monitoring program.

Beginning in 2019, the estimated number of Canadian-origin Chinook salmon that passed the Eagle sonar, located near the U.S.-Canada border, was far smaller than what was anticipated based on counts passing the Pilot Station sonar in the lower river. ADF&G explored possible factors to explain the discrepancy between sonar estimates, and all collaborating agencies agreed the discrepancy could not be explained by sonar uncertainty, genetic uncertainty, or unreported harvest. After experiencing two years (2020 and 2021) of high *Ichthyophonus* levels, as well

as continued differences in fish passage estimates between Pilot Station and Eagle sonar, both the ADF&G and the USFWS decided to implement a study to investigate the impacts of *Ichthyophonus* on Yukon River Chinook salmon at various sites within the U.S. portion of the Yukon River starting in 2022.

The current *Ichthyophonus* research is a collaboration between the ADF&G and the USFWS in coordination with fish disease experts, including Dr. Kocan, affected communities, Indigenous and/or local fishers, including Mr. Zuray (Picture 2). In 2022, sampling occurred at three locations: The lower river at Pilot Station sonar; middle river at the Rapids; and the upper river at Eagle sonar near the U.S.-Canada border. The information collected allows us to make reliable estimates of disease prevalence and intensity at multiple locations within the Yukon River drainage. Our preliminary findings indicate that



Picture 1. *Ichthyophonus*-infected Chinook salmon heart muscle. "White spots" are common visual signs of disease associated with *Ichthyophonus* infection. This heart was sampled from a Chinook salmon harvested at the Rapids in the middle Yukon River in 2022.

the proportion of Chinook salmon infected with *Ichthyophonus* was high in the lower river, but overall, the disease was not very advanced. In the middle river, the proportion of infected Chinook salmon was still high, and the disease had progressed to a highly advanced stage within a substantial number of fish. And finally, in the upper river at Eagle sonar the proportion of Chinook salmon carrying the disease was still high, but only minimally or moderately diseased fish were encountered. The pattern we observed across all three sites was consistent with the upriver progression of disease between Pilot Station sonar and the Rapids and the loss of heavily diseased fish between the Rapids and Eagle sonar, which indicates disease-associated en route mortality may be occurring.

Additionally in 2022, only about half of the expected number of Canadian-origin Chinook salmon were counted at the upper river Eagle sonar. This is now the fourth year in a row that expected numbers of Canadian-origin Chinook salmon failed to pass the U.S.-Canada border.

We also express concern for those that do reach the border with minimal or moderate disease levels, since these fish still have a long journey ahead to reach their spawning grounds and the disease may progress to lethal levels during this final unmonitored segment of the migration. The biological samples taken in 2022 provide support for *Ichthyophonus* to be considered one of the most likely explanations for the in-river loss of Yukon River Chinook salmon in recent years. We believe this research deserves our full attention to develop actionable solutions, which requires more sampling in 2023 and 2024.

Each sampling location provides a critical piece of the puzzle. Pilot Station sonar is a vital baseline for assessing the initial prevalence of infection and intensity of disease within Chinook salmon entering the Yukon River. The Rapids sampling location is essential to monitor disease prevalence and how it progresses in fish as they migrate upriver. Based on the fisher reports about not seeing this disease near Fort Yukon, USFWS planned to sample there in 2022. However, after gaining initial support, USFWS experienced a staffing shortage and could not conduct the sampling. In 2023, USFWS plans to add Fort Yukon as a sampling location after gaining Tribal and community support for the project and have the staffing capacity to conduct the project successfully. Fort Yukon will be a key sampling location because it is far enough upriver and far enough from the Rapids site to more precisely see where Chinook salmon disease mortality may occur, and what level of disease intensity is associated with mortality. It is essential to continue monitoring at a lower, middle, and up-river sampling location as the Chinook salmon run passes into Canada in order to make conclusions about potential disease-associated en route mortality in the Yukon River mainstem.

This research requires lethal sampling of fish, which we know is often controversial, and especially so in these times with subsistence salmon fishery closures and poor escapements. The decision to sample fish this year was made thoughtfully and intentionally by the ADF&G and the USFWS, who consulted and received research support from the Tribal Governments near each sampling location before sampling began. Each fish is precious, and this research seeks to maximize the benefit of each sampled Chinook salmon by collecting multiple tissues for various Chinook salmon health and life history studies. Whole Chinook salmon are donated to elders, Tribes, and individuals for subsistence needs after the required samples are collected. These sampled fish are handled with the highest care and respect, and none of the fish are wasted. In this time of crisis, we believe this research is vital to quantify the impacts of the *Ichthyophonus* disease on homeward migrating Yukon River Chinook salmon, improve tools to consistently monitor this disease over time and, to develop management strategies to support healthy salmon populations.

As a lifelong Alaskan, I acknowledge this information is heartbreaking given the current state of Yukon River fisheries. I hope to assure readers that the research investigators are sensitive and empathetic for the fish and the people without fish living along the Yukon River. The last two years with no directed subsistence salmon fishery has resulted in tremendous hardship, immense strain on cultural practices, and unprecedented sacrifice within Yukon River households and communities. I personally have reflected on the ethics and importance of this research, and strongly believe it is of utmost importance that the ADF&G and the USFWS continue the current *Ichthyophonus* research to proactively understand this issue for the benefit of future Yukon River Chinook salmon and the people who rely on them.



Picture 2. Local Yukon River fishers (left to right, Charlie Campbell, Stan Zuray, Ruth Althoff) and Keith Herron Ivy (front center) at a fishwheel placed in the Rapids in the middle Yukon River in 2022.

Preseason Meeting



On April 19 and 20, 2023 Yukon River Drainage Fisheries Association had the annual Summer Preseason meeting of 2023. Over 70 people attended in-person at the Taiga Center at the Wedgewood in Fairbanks, and this year the event was also hybrid, with 15 participants joining online or by phone. Board members, staff members, state and federal management and community members all joined to learn what to expect and hear about for the Summer 2023 season on the Yukon River.

The Yukon River preseason meeting provided a space for board members and community members to hear from management on the predicted salmon run returns and scientific projects underway at the State and Federal levels concerning the Yukon River. Presentations included numbers of salmon predicted by Yukon River summer and fall season managers:

Chinook runs were predicted to be 62,000-104,000 fish drainage-wide and 26,000-34,000 Canadian-origin Chinook. Both are under escapement goals.

Summer chum runs were predicted to be 280,000-900,000 fish, with a high degree of uncertainty and an escapement goal of 500,000-1,200,000 fish. With a surplus of summer chum there could be fishing but a delay in gillnetting to conserve chinook salmon.

Fall chum runs were predicted to be 251,000 fish, below escapement goals of over 300,000 for subsistence levels to occur. Fall coho runs were also predicted to be below escapement goals.

Non-salmon species were also talked about, including the importance of non-salmon openings to fishing families.

Management encourages checking in frequently to see updates on the summer salmon and fall salmon number, management orders and closures as the season progresses.

There was high interest in looking at regulations and regulatory boards that impact Yukon River fisheries and CDQ groups that are invested in the region. Discussion at the Yukon

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River Preseason meeting included these topics. The preseason meeting ended with two panels and a breakout session that focused on the state Senate Bill 128, getting involved in testimony and sharing our ways of life with others.

Overall, the reception to the preseason meeting of 2023 was positive and provided helpful information to Yukon River board and community members.



- » Having no or limited biological restrictions on previous Yukon River hatchery efforts⁶
- » Impacts from a proliferation of Asian hatchery stock in the Bering Sea and Alaska hatchery stock in the Gulf of Alaska
- » Not meeting minimum escapement goals across the AYK region and not meeting Treaty escapement goals with Canada⁷
- » Unrestricted or limited restrictions on past and current mining operations: Many Yukon salmon spawning streams have been mined because gold is in gravel beds. ⁸
- » Limited or no restrictions on human activities on riparian habitat protecting juvenile salmon and stream crossings around or over spawning grounds on both private and public land
- » Little monitoring of and limited restrictions on forestry practices around spawning grounds and rearing streams
- » Treating salmon as a commodity to be exploited to a maximum threshold
- » Not listening more closely to elder's warnings, not listening closer to Canadian warnings

These, along with fluctuations in environmental conditions - ocean changes, increasing predation, fires and floods, in-river water temperatures and water levels - have created a pattern of ups and downs. However, the downs in the last several years have been historic and dramatic and frankly, terrifying.

Yes, there is so much we do not know and there is even more we cannot control. However, we have often done very poorly at what we can control.

But anadromous hatcheries are not the answer. Despite all the efforts and rhetoric of places facing this same dilemma; wild stocks and hatchery stocks are not compatible. Eventually hatchery stocks can displace wild stocks, which also displaces entire ways of life and respect for the species. We lose sight of how intrinsic salmon are to people, animals, ecosystems.

Yup'ik view on the negative effects of fish hatcheries. "They say fish don't continually change where they go. They like to return to the places where they grew up, where they were born in their own world. Our elders told us never to mess around with fish."⁹

Yes, there is one anadromous-release hatchery on the Yukon River at Whitehorse. It is not a commercial terminal fishery but a *mitigation* hatchery underwritten by Yukon Energy and designed to replenish Chinook stocks that were displaced by the building of the Whitehorse Dam.^{10 11} The only other Yukon River hatchery still in operation is the Ruth Burnett Hatchery in Fairbanks on the Chena River, which is a *sport fish stocking* hatchery and cannot legally release salmon into anadromous systems. A sports hatchery at the Clear Air Force Station, opened in 1980's and closed in 1997.

The only Alaska *production* hatcheries that provide common property commercial harvest are saltwater-based Private Non-Profit (PNP) hatcheries in the Gulf of Alaska. These hatcheries must depend on (a) broodstock from returns, (b) "cost recovery," (which takes a high percentage of returning hatchery stock for very expensive operations) (c) grants and loans. Most of these hatcheries have substantial debt loads and must constantly cycle through the State loan system.¹²

There is no place to prosecute a PNP hatchery on the Yukon River due to (a) lack of site location for power, water, terminal harvest area, (b) building and operational costs, and (c) inability to keep wild and hatchery stock separate in-river.^{13 14} Not to mention the Yukon River Treaty with Canada. Most critically, there is no place to get broodstock with wild stock abundance so low. There is no reason to think a Chinook hatchery will work any better on the Yukon River than for tidewater hatcheries which continue to struggle with cost effectiveness, survival rates and returns.

The discussion of the viability of large scale hatcheries on the Yukon River goes back to efforts in the 1990s, resulting in the first Yukon River Comprehensive Salmon Plan (CSP)¹⁵ report, completed in 1998, and then again in 2015 CSP, when a Regional Plan Team began a four-year review of the earlier plan. With both plans, Yukon River stakeholders have emphasized that they do not want large hatcheries on the river. This was reinforced by a 2018 YRDFA¹⁶ resolution that opposed large scale hatcheries, concluding: "conservative management and restoration in times of low abundance should be the management approach rather than enhancement." The 2019

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6 Clear Hatchery 1984-1997

7 13 times since 1998, 50% of the time commonly due to excess harvest

8 Some are still active [Chatanika, Chena, Goodpaster, etc.] Most historic mining operations used riparian trees for fuel and construction, impounding streams further in using water for mining operations, flushing dirt and silt downstream.

9 Francis Charlie, Scammon Bay, King Salmon of the Lower Yukon, Past and Present, workshop sponsored by Yukon River Drainage Fisheries Association, Anchorage 2017, Text by Ann Riordan and Catherine Moncrieff, Funded by the National Science Foundation

10 Joint Technical Committee (JTC) 2021 report to the Yukon River Panel and JTC data analysis observation. Canadian mitigation hatcheries, by law, are designed to shut down when replenishment levels reached. A review of Whitehorse hatchery license currently being conducted. Canadian hatchery fish are coded-wire tagged but Alaska has not monitored for potential straying en route.

11 How well that hatchery has done since 1984 is another story, but it is returning less than 1 adult per 1,000 smolt, or \$1,000 per adult returner

12 There is at least one long-term hatchery that would not be allowed to be built under current regulations.

13 Sam Rabung, Division Director Commercial Fisheries, Alaska Department of Fish and Game

14 August 1993 FRED report, Lower Yukon River Hatchery Site Investigation, reported on a review of data from 215 sites that no large scale production hatchery was feasible. The reasons have only since been magnified.

15 "Comprehensive Salmon Plans" or CSPs are specific to commercial hatchery development and should not be interpreted in other way

16 Yukon River Drainage Fisheries Association

draft Yukon River CSP Guiding Principles include:

- » #1 Strive to ensure the perpetuation, continual health, and unique characteristics of natural wild stock salmon production in the Yukon River tributary streams.
- » #2 Large scale enhancement projects (i.e. hatcheries) designed to create new runs of fish are opposed
- » #7 Habitat or wild stock restoration and rehabilitation projects shall have priority over enhancement projects

In a 2016 report, the U.S. Fish and Wildlife Service (USFWS), which has joint management responsibility on the Yukon River, noted this: “The Service believes that the reasons for opposing artificial propagation of Chinook Salmon in the Yukon River as expressed in the AFS - Alaska Chapter resolution¹⁷, the Yukon River Agreement, and the 1998 version of the Yukon River Comprehensive Salmon Plan are still valid. This position is based on a robust body of scientific research documenting risks posed by artificial propagation as well as recognition of critical knowledge gaps (e.g., understanding of genetic diversity, survival rates) associated with wild stocks in the Yukon River and the factors affecting productivity.”¹⁸

At a March 2019 Alaska Board of Fisheries Hatchery Committee Meeting, ADF&G Chief Fisheries Scientist for Salmon, Bill Templin, began his talk by telling the board why hatchery-wild interactions matter, saying that the Alaska Constitution and policy require that the Department protect wild salmon populations from “harmful and adverse” interactions with hatchery releases. Harmful and adverse interactions can be genetic, as well as competition for resources. At this point, the department is only researching genetic interactions, which happen when hatchery populations stray into wild streams and reproduce with wild fish. Mr. Templin explained that “while straying is a natural part of salmon behavior, it is also the means by which hatchery salmon potentially affect long-term productivity of wild populations.”¹⁹

The hatchery issue in general is incredibly complex and even more so for the Yukon River. But the essential points we need to consider are relatively simple *regarding an anadromous-release hatchery*:

- » There is no place to put a production hatchery to provide harvest on the Yukon River
- » In-river hatcheries cannot avoid mixing with wild stock
- » Hatchery reared fish transplanted to a wild stock stream threaten wild stock genetics
- » Hatchery fish that “stray” to wild stock streams endanger wild

stock by mixing weakened genetics.²⁰

- » Hatchery fish requiring a terminal harvest area do not replenish ecosystems
- » Hatcheries in general are now considered a significant threat to wild stocks. Hundreds of peer-reviewed science papers support this.
- » Hatchery fish are considered a main contributor to “too many fish in the ocean” which limits prey food for all salmon species. The ocean is finite. And the million-dollar question is, if we are producing more hatchery salmon, why are there not more salmon in the ocean?²¹
- » Hatcheries are immensely expensive to operate and require massive amounts of clean water, power, sophisticated equipment, trained personnel, a food supply, and secure long term funding. Hatcheries require significant oversight to meet regulations.
- » The cost to operate hatcheries far outweighs the cost of protecting wild stocks and diverts needed funding for wild stock.
- » Hatcheries require an initial broodstock and periodic replenishment: where do they get eggs when wild stocks are depleted?
- » Realizing returns from hatchery production for Chinook would take many years, and would not be sufficient for harvest
- » Hatcheries cannot compensate for poor marine survival. Hatchery salmon experience the same ocean conditions as wild stock and are simultaneously competing for food
- » Hatchery fish lose their rearing habitat advantage over time. Hatchery fish generally start out larger but within a few generations experience weakened genetics.²² (This is why hatcheries must periodically replenish their broodstock supply from wild stocks, further threatening wild fish. And why eventually hatchery returns diminish.)
- » Aside from weakening the wild gene pool, the release of captive-bred fish also raises the risk of introducing diseases and increasing competition for limited resources²³

“A more genetically diverse population allows for survival and persistence under changing conditions, as they’ve adapted and evolved over time,” ... “The overall fitness (e.g., growth, reproductive output) of hatchery fish is generally lower than that of wild fish so the greater similarity of the genetics of a population to hatchery fish genetics, the higher the likelihood a population could be negatively affected by change, whether that be natural, or human-caused. Further, more diverse (wild) populations allow for a better chance of recovery after a population is diminished, again by environmental conditions

CONTINUED ON PAGE 13

17 Resolution statement of the Alaska Chapter American Fisheries Society regarding artificial propagation of salmon in the Yukon River, 1998, concluded: “Rebuilding of depressed wild salmon stocks should be accomplished with proper management of the resources and not accomplished through increased hatchery production; In no instance should hatcheries be used as a means to increase harvest levels”

18 Review of the Effects of Artificial Salmon Propagation and Agency Perspective on Artificial Propagation of Yukon River Salmon, Fisheries and Aquatic Conservation and National Wildlife Refuge System – Alaska Region October 2016

19 March 7, 2019, Templin presentation “What is the Future of Hatcheries in Alaska?”

20 The biocomplexity of wild salmon stocks makes them much stronger than hatchery stocks but hatchery inter-breeding with wild stocks weakens them.

21 Fish Hatcheries—What Could Possibly Go Wrong? North Isle News 2022

22 Fitness of hatchery-reared salmonids in the wild Hitoshi Araki, et al, May 2005, National Library of Medicine

23 New Study: Hatchery Fish May Hurt Efforts to Sustain Wild Salmon Runs, Michael Blouin, Oregon State University, 2009

or happenings, like wildfire, or harvest by humans.”²⁴

*The quintessential work on the biocomplexity in fisheries is that done on the sockeye salmon (*Oncorhynchus nerka*) stocks in Bristol Bay, Alaska (Schindler et al. 2010). This fishery is considered sustainable, and recent research has revealed evidence of biocomplexity among (Hilborn et al. 2003) and within (Rogers and Schindler 2008) the major fishing stocks.²⁵*

Existing hatcheries within Alaska, much less new considerations, require a lot more public review and cost-benefit analysis than is currently being provided. The issue needs a very public discussion with salmon scientists. It needs a comprehensive independent Legislative review. And it needs transparency. Actually, our overall salmon management could use the same scrutiny. By understanding what already exists, we can move on to policies and management practices that actually do help rebuild wild stocks and not threaten them further.

What are some alternatives to save wild stock?

- » Greater application of the Sustainable Salmon Policy in all our decisions
- » Look at our fisheries through the broader scope of ecosystems
- » Increase monitoring of spawning escapement by utilizing survey technology, drones, eDNA, helicopters, boats, and local and traditional knowledge (as noted in the CSP)
- » Increase the health of spawning and rearing habitat; discontinue spawning and rearing habitat destruction / degradation, repair those areas which have been compromised
- » Increase local and tribal co-management opportunities for community-based monitoring, listen to elders, educate younger generations
- » Continue and increase stakeholder dialogue, knowledge and participation
- » Provide safe *passage* for returning wild salmon
- » Make decisions on standing down from salmon fishing for enough years to manage expectations and increase spawning opportunity
- » Reduce bycatch in the Bering Sea
- » Reduce intercept in the Alaska Peninsula
- » Reduce hatchery production; flooding the ocean with hatchery fish can increase overall fishing pressure because hatchery and wild salmon migrate together.
- » Conduct in-river predation studies on juvenile salmon with subsequent management plans

- » Increase genetic studies in intercept areas following WASSIP²⁶ sampling areas and including Chinook, using otolith microchemistry. (Increased research of salmon genetics is a key component in both understanding and protecting wild stocks. We know, for instance, that Asian hatchery stocks have certain dynamics and markers that make it easier to delineate them from U.S. wild stocks but that our wild stock markers for the Central Western Alaska (CWAK) are much more difficult to determine discrete stream sources.)

Otoliths (ear stones) in salmon incrementally archive geochemical information from the water a fish lives in as it completes its life cycle. During the juvenile component of a salmon's life, a chemical signature of freshwaters is incorporated faithfully into the inner core of the otoliths where it remains preserved indefinitely. Because there is substantial variation in the chemical composition of western Alaska's rivers, otoliths sampled from fish caught in the ocean can be used to determine the geographic location where a fish was born. Further, because western Alaska rivers have substantial geologic variation within them, otolith microchemistry can even be used to determine the tributaries where a fish was born. In particular, geographic variation in isotope ratios of naturally-occurring strontium (Sr) has proven to be particularly powerful for determining natal origins of adult Chinook salmon in the Yukon, Kuskokwim and Nushagak rivers from data derived from their otoliths. (Integrating geochemical tracers in otoliths with genetics and habitat suitability models to establish stock of origin of western Alaska salmon, Daniel Schindler, University of Washington)

What are the alternatives to providing food security and support cultural practices? That's another discussion but there are options we have not considered.

All of this deserves a lengthy public dialogue. Both Alaska and Canadian Yukon River stakeholders are desperate for relief and solutions. We cannot "grow" more fish in a way that doesn't make the problem worse. The only way we will get through this is to protect our wild salmon. It took decades for this problem to be created, now accelerated by climate change. While salmon are amazingly resilient, they can reach tipping points, a situation in the Pacific Northwest that has not been mitigated by hatcheries. However, by identifying and eliminating obstacles and providing for safe passage, our wild salmon have a good chance of recovery.

24 "The Good, the Bad and the Ugly of Fish Hatcheries", Kubie Brown, Meateater Magazine, September 29, 2022

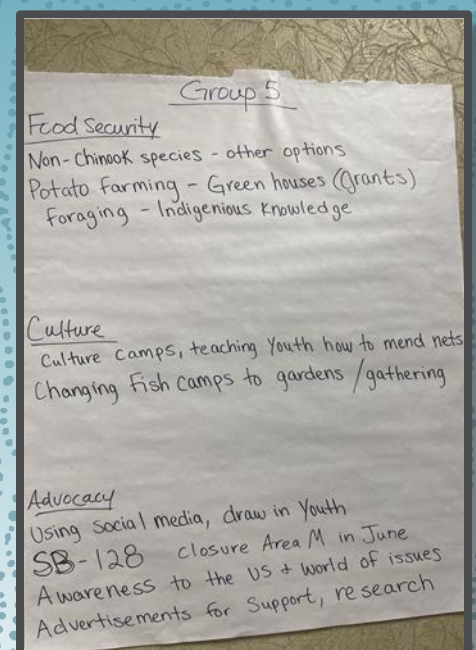
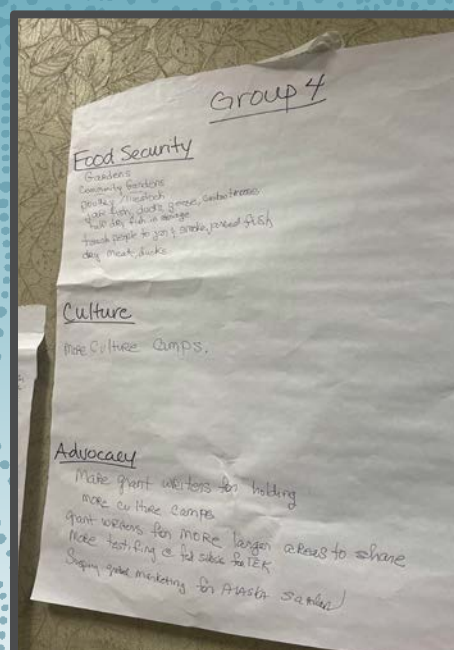
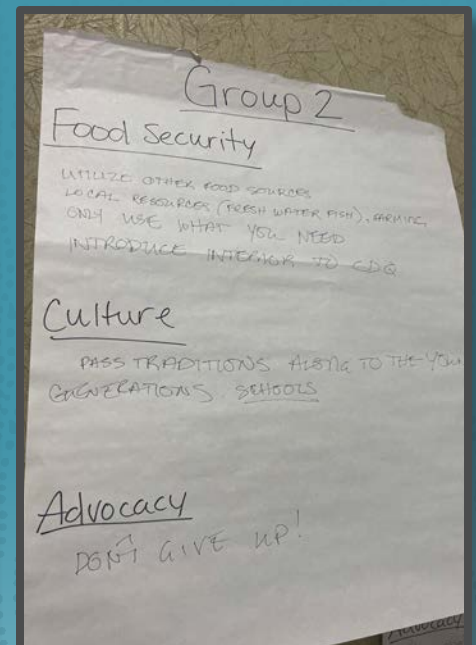
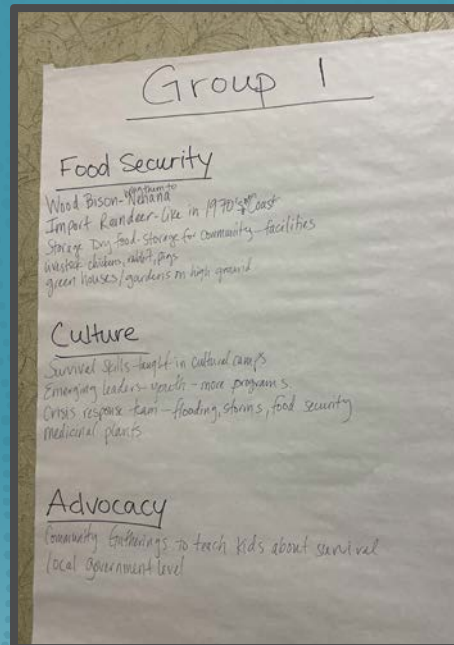
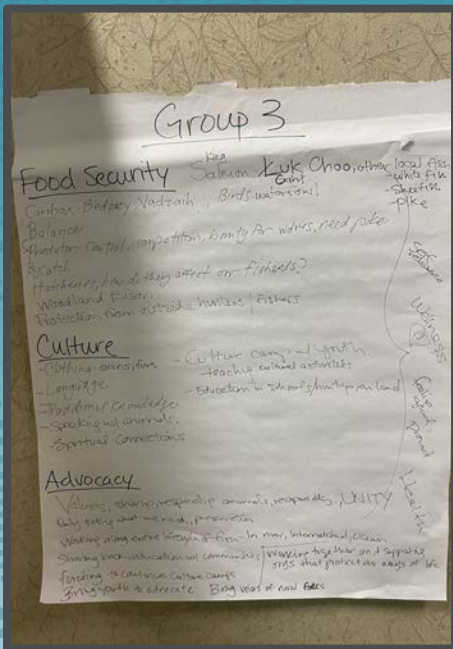
25 Weakening portfolio effect strength in a hatchery-supplemented Chinook salmon population complex, William H. Satterthwaite will. satterthwaite@noaa.gov and Stephanie M. Carlson, Canadian Journal of Fisheries and Aquatic Sciences 20 August 2015

26 Western Alaska Salmon Stock Identification Program, 2007-2009

PRESEASON BREAK-OUT GROUPS

During the 2023 Yukon River Preseason meeting the participants were able to scatter and form 5 break out groups. In these groups there were three areas of discussion: Food Security, Cultural Preservation, and Advocacy. We believe during these times of low abundance of salmon we need to be prepared. We have been living the worst for the past three years. We are unsure when and if we will be able to harvest salmon this summer or next season.

So it is better to be prepared and move forward to thrive in our communities when salmon is not available to us. This will be the first step to preparing our communities for fishing disasters. We will take the information and continue to build upon this foundation to create a template for your communities to use as a guide when salmon fishing is not available.



MARINE RESEARCH HIGHLIGHTS

Climate change keeps Yukon Chinook production low: A new analysis of the Yukon Chinook salmon juvenile marine surveys revealed that productivity was strongly related to the environment that their parents experienced as they left ocean life and entered the Yukon River. Yukon Chinook parents produced fewer juveniles when they left a warmer ocean and entered a warmer river with less water. Poorer marine food quality, heat stress, and reduced reproductive success via premature mortality of adults, egg retention, and egg survival are all implicated. (<https://doi.org/10.1111/gcb.16610>)

AYK Chinook salmon workshop at University of Alaska Fairbanks: In April 2022, researchers from the University of Alaska Fairbanks gathered experts from Arctic-Yukon-Kuskokwim (AYK) communities, Tribal organizations, government agencies, nonprofits, and universities to discuss Chinook salmon. Participants noted climate change as a likely cause of decline. Several pathways forward were also identified including community-based monitoring, Traditional Knowledge, co-production of knowledge, and concern over salmon bycatch in marine commercial fisheries. In the context of low production and run sizes that close in river fishing, marine bycatch was noted as a prioritization of commercial interests over subsistence despite the protections of the Alaska National Interests Lands Conservation Act. (<https://doi.org/10.1002/fsh.10923>)

Ichthyophonus disease study in Chinook salmon by Alaska Department of Fish and Game (ADF&G) at Pilot Station and Eagle and U.S. Fish and Wildlife Service (USFWS) at Rampart Rapids and Fort Yukon. This project responds to the resurgence of Ichthyophonus disease noted by subsistence fisheries, particularly YRDFA board member Stan Zuray. Because this project uses lethal sampling to obtain heart tissue, the fish are shared with community members after the heart is removed for the study and several other samples provided to other researcher to consider other recent drivers of salmon decline including poor body condition, low nutrients, and heat stress. Projects are funded by the Alaska Sustainable Salmon Fund, North Pacific Research Board, and the Arctic-Yukon-Kuskokwim Sustainable Salmon Initiative.

Research projects underway in 2023

Local and traditional knowledge interviews in Emmonak and Alakanuk. Catherine Moncrieff (YRDFA) will be interviewing those who fish and cut fish about the health of adult salmon as they enter the river with funding from the North Pacific Research Board.

Spawning ground surveys in St. Mary's and Huslia. Local hires will work with YRDFA to conduct carcass surveys in August that check for eggs that were not spawned by female salmon and collect biological tissue samples in partnership with ADF&G and USGS. Both communities are located on warm water tributaries of the Yukon and observed fish dying before spawning in 2019. Funding from the North Pacific Research Board.

Radio tagging study by ADF&G to understand why Chinook salmon passage to Canada has been even lower than expected based on the lower river counts. ADF&G will tag Chinook salmon at Emmonak with green or pink spaghetti tags on their back and some of these fish will also have radio tags in their stomachs (antenna will poke out of mouth). Each reported tag will enter you in a drawing for \$50 and you cannot get in trouble for reporting tags. Call 1-877-467-2104 to report tags.

YRDFA Summer Salmon Survey 2023

YRDFA hosted their summer salmon survey training during the annual preseason meeting at the Taiga Center in Fairbanks on April 19, 2023. 6 participants joined us in person and one person joined us online for the training where we went over what to expect for the survey season of 2023 and logistics of surveying. 9 out of 10 surveyors are rejoining us again for another year to survey in their communities on fishing activities and reporting on the weekly teleconferences that YRDFA hosts. We enjoyed meeting in Fairbanks and are excited to report some new and exciting technology updates that YRDFA hopes to roll out over the next year. Survey will look similar to last year, but starting next year we hope to digitize the survey program and expand the questions that surveyors ask participants during the continued salmon closures on the Yukon River. Surveyors and participants alike expressed this concern during fishing closures and we aim to include and direct our programming to fit the needs of community members in the region.

Our Surveyors are in these communities:

Alakanuk: Max Agayar

Mountain Village: Nita Stevens

Marshall: Diane Fitka

Russian Mission: Basil Larsen

Anvik: Alberta Walker

Ruby: Rachael Kangas

Huslia: VACANT

Tanana: Stan Zuray

Fort Yukon: Kara'lissa Tremblay

Eagle: Ruby Becker

If you know of anyone interested in being a summer surveyor in Huslia, please reach out and inquire to us at YRDFA for the summer survey program! Contact the Program contact at gabe@yukonsalmon.org.



Yukon River Clearinghouse Project

KICKS OFF WITH TRAINING EVENT IN ANCHORAGE

The Yukon River Drainage Fisheries Association and the Yukon River Intertribal Watershed Council partnered to establish a five year project to address growing concerns about the health of the Yukon River watershed freshwater ecosystem. The project was awarded through Bering Sea Fishermen's Association in 2022 and is funded by the State of Alaska. The Indigenous Lead project is a holistic approach to establish a clearinghouse that allows tracking of both social and ecological changes in ways that are culturally relevant and responsive to the needs of stakeholders in the Yukon River watershed.

For the project, the team has selected seven regions which includes,

- Region #1 Coastal Communities; three villages
- Region #2 Mouths leading into waterways; five Villages
- Region #3 Lower Yukon; four villages
- Region # 4 GASH Region; five villages
- Region # 5 Yukon Koyukuk River; ten villages
- Region # 6 Yukon to Tanana River; nine villages
- Region #7 Upper Yukon; seven villages

We would also like to access existing Traditional ecological Knowledge (TEK) records to gain a deeper insight about

observed freshwater systems, climate, fish health, and abundance changes in the Yukon River Watershed (YRW). The records will help us to identify TEK gaps and inform us where additional semi structured interviews with elders have to be conducted to generate a historical timeline of observed changes. The goal is to develop and apply TEK indicators to assess freshwater and ecosystems health conditions and to establish a comprehensive YRW database. The Clearinghouse database would incorporate all available historical and current climate, water quality and quantity data to identify vulnerable water bodies and fish habitat areas in order to prioritize these hotspots for increased data collection and to improve the design of the coordinated long-term monitoring efforts in the YRW. The database will also serve to conduct spatial and temporal trend analysis that incorporates TEK indicators to better understand historical trends. Combining TEK and western science data will provide a holistic and long-term understanding of aquatic systems, fish abundance and health changes.

For the seven regions the Indigenous lead project will be hiring seven local field technicians, one per region, throughout the Yukon River Watershed. We are holding our training event in May in Anchorage. The technicians will be trained in Water Quality Monitoring, TEK interviewing, and habitat assessment.



NEW HIRE HIGHLIGHTS



Rachael Marie Kangas Madros is half Athabaskan and resides in Ruby, Alaska with her husband Ryan and their 5 children. Rachael's parents are Ivan Kangas and Kathryn Kangas. Rachael's grandfather Albert Kangas settled in Ruby, Alaska with her grandmother Nora Molly Kangas and lived out a legacy of being a successful gold miner. Rachael's mother Kathryn

Kangas was born in Levittown Pennsylvania but her mother Lillian Albert Snyder was from Kokrines, Alaska which is now a ghost town on the Yukon River.

Kathryn was curious about being Athabaskan and journeyed to Alaska and she has never left since. Rachael's parents raised her to utilize the subsistence bounties that surround them living on the Yukon River. She is an avid fisherwomen and enjoys hunting, camping and being on the River.

Rachael has been in many positions in which has given her knowledge in many important areas such as, 12 years as a Community Health Practitioner, 5 years as a TCC Social worker, President of Dineega Corporation for 3 years and continues to work on the Native Corporations board as the secretary/treasurer. She had also served on their Tribal court as a Children in need of aid judge and served on their local Native Tribal Organization and local City government council as the secretary/treasurer also. She has a determination to assist organizations on writing grants and has been very successful in being awarded several grants to better her community's needs.

She is a small business owner and runs a successful Bed & Breakfast and R&R Catering Company.

Rachael's passion for ensuring the Yukon River one days flows freely with a abundance of Salmon for all of the Native people to enjoy and fill there smokehouses once again gives her the motivation and determination to work cohesively with all of the partners YRDFA has relations with to keep communications transparent for our Native People salmon needs.



Yukon River Watershed Ecosystem ACTION PLAN PROJECT

WRITTEN BY: HEATHER HANSON, FISH PASSAGE ENGINEER, USFWS

YRDFA was formed in 1991 when fishing leaders from the Alaska portion of the Yukon River and its main tributaries gathered together to work on salmon fisheries issues along the Yukon River. Fast forward just over 30 years and the continued and alarming decline of the salmon runs has reached a point where YRDFA believes that we must take all actions possible to help the salmon that people rely on for their physical, spiritual, and cultural sustenance.

YRDFA believes to effectively address the decline of salmon runs across the Yukon Watershed, actions are needed to address the threats to salmon in both their freshwater home and during their time feeding at sea. YRDFA advocates for conservation measures to protect salmon stocks at all stages in their lifecycle. However, we know that there are a wide variety of human activities which have resulted in freshwater habitats being fragmented and degraded in the Yukon River's watershed. Adult salmon need clean, clear, and cold water over the gravels in which they lay their eggs. Juvenile salmon need to be able to move between diverse habitats, including wetlands, lakes, beaver ponds, and small tributary streams to find food and optimum water temperatures for their first 1 to 3 years of life. Human activities over the past 200 years in the Yukon Watershed have resulted in barriers to fish migration, contamination, loss of wetlands, invasive species, increased water temperatures, and streambank erosion. The cumulative effect of these human impacts can reduce the ability of salmon to live long, full lives and return to their home streams to spawn as adults. Fortunately, the degradation of freshwater habitats can be reversed with on-the-ground habitat restoration projects which reconnect diverse habitats, remove invasive species, cleanup contamination, and replant native vegetation along streambanks. While these projects are possible, they take planning and co-stewardship with local communities and Tribes who want to improve the health of the watershed in their region.

YRDFA believes the first step to improving the health of the watershed is to create a watershed-wide action plan. We are happy to announce that we are receiving funding through the Alaska Venture Fund, the U.S. Fish and Wildlife Service (USFWS), and the National Oceanic and Atmospheric Association to complete a plan to address freshwater habitat threats in the Alaska portion of the Yukon River drainage. YRDFA plans a co-stewardship approach to ensure local and Indigenous voices and values are incorporated into this project. The first phase of this project starts in June of 2023 when YRDFA and our project partners, the Yukon River Intertribal Watershed Council and USFWS, will conduct a series of community meetings; phase two will involve interviews of people in the local communities and stream habitat assessments; and phase three will involve drafting an action plan which prioritizes threats to the health of the watershed. The outcome of this project will be a Watershed Ecosystem Action Plan (WEAP) which compiles traditional and local knowledge and scientific information into a publicly accessible, online mapping tool. YRDFA plans this mapping tool will be a living document that we can continue to update on an annual basis as we learn more. The WEAP map will identify and prioritize restoration projects or other actions that are likely to improve the health of the watershed and in turn improve the health of salmon. The identification of specific, high priority restoration projects will allow communities to more effectively pursue funding to improve the health of the watershed in their area.

Please look for us on the Yukon River and its tributaries this summer. We will be visiting the communities of Emmonak, St. Mary's, Holy Cross, Ruby, Tanana, Allakaket, and Ft. Yukon in June and we hope you will join in the conversation to make sure your voice and values are included in the WEAP! The community meeting dates are shown in Table 1. If you live in an outlying area near one of these hub communities, and would like to attend a meeting, please contact Rachael at Rachael@yukonsalmon.org for information about a gasoline stipend.

Understanding the Past to Build a Better Future Together

Humans and salmon have lived alongside each other in the Yukon region (eastern Beringia) for 10,000 years.



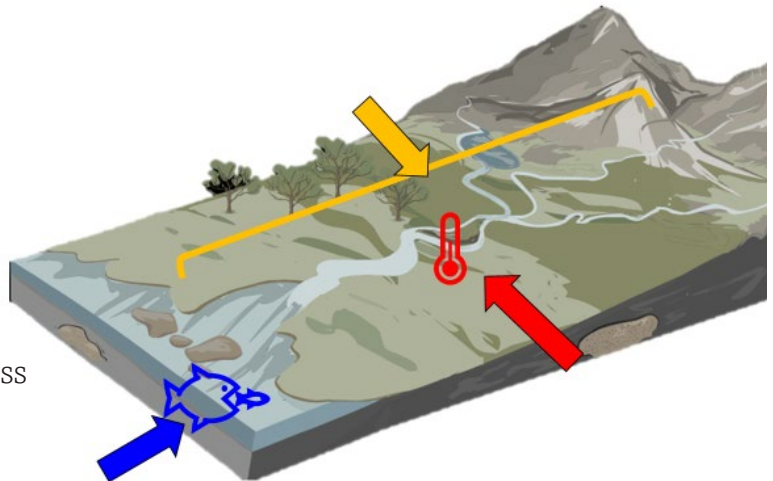
But the temperatures we see now are warmer than people and salmon living here have ever experienced. It's challenging for both. And now salmon populations, and the people who depend on them, are struggling.

There are big challenges for spawning Yukon Chinook:

Blue: They don't eat once they begin their upriver journey as adults. All their food energy comes from the Bering Sea, which is warming.

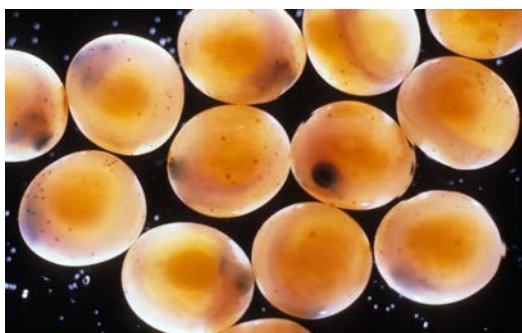
Yellow: Long journeys to spawning areas take more energy for the salmon moms and leave less to give to their eggs.

Red: Warmer river temperatures along the way are stressful and cause salmon moms to use up their stored energy quickly.



Research paper @ <https://doi.org/10.1111/gcb.16610>

So, how do people and salmon adapt and thrive in a changing world together?



Salmon eggs need cool water and enough stored energy to sustain themselves for 1 year.

To help us adapt, we need to learn more about:

- How energy (fat) in returning salmon moms has changed over time
- How disease in Yukon Chinook salmon has changed over time
- What people are seeing on the spawning grounds now that is different from the past
- What makes a successful salmon mom and how we can ensure more salmon moms are successful
- What is happening in the ocean that affects salmon food and survival

Please join us! See Page X for ongoing projects you can become involved in or even send us an email to share your observations and ideas.

Katie Howard, ADF&G
Serena Fitka, YRDFA
Catherine Moncreiff, YRDFA
Vanessa von Biela, USGS

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vvonbiela@usgs.gov



Elders Warnings

Project Video Premier Showing at YRDFA Preseason Meeting 2023

Attendees at the YRDFA 2023 Pre-Season Planning meeting expressed their appreciation of the work done by Millena Jordan, Katie Turner, Natawnee Wiehl, and Catherine Moncrieff. The Elders Warnings project team returned to the Pre-Season meeting this year to present their first videos summarizing what they have learned so far on this 3-year project, funded by the North Pacific Research Board. This project has YRDFA partnering with the Tanana Chiefs Conference Emerging Leaders to learn from both today's fishers and through the archives.

Our team has been traveling around the region, conducting interviews, and attending important gatherings. At the Preseason Meeting, Millena shared a powerpoint presentation summarizing the steps we have taken in training our team, researching archival materials, and conducting interviews with today's fishers. She turned her work into a 9-minute video highlighting her interviews and tapping into archival video footage from Yukon River fishers in the early 2000s. Katie shared her 8-minute video highlighting what she has learned about the Yukon River salmon crash through this project and her own experiences. Both videos were timely representations of the history and current conditions on the Yukon River.

Next steps for this project are to continue giving presentations and creating more videos that can be shared in other venues. Additionally, our team is still conducting a few more interviews and has some other ideas for products that could come out of this project such as podcasts and a children's book. This project ends in March of 2024.



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PROJECT MANAGER: *Rachael Kangas*
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BOARD OF DIRECTORS

DISTRICT	NAME	COMMUNITY
Coastal, Seat 1	Lester Wilde	Hooper Bay
Y-1, Seat 1	Stanley Pete	Nunam Iqua
Y-1, Seat 2	Allen Hansen	Alakanuk
Y-1, Seat 3	Paul Andrews	Emmonak
Y-2, Seat 1	Bill Alstrom	St. Marys
Y-2, Seat 2	Mike Peters	Marshall
Y-2, Seat 3	Stanislaus Sheppard	Mtn. Village
Y-3, Seat 1	Alfred Demientieff Jr.	Holy Cross
Y-4, Seat 1	Fred Huntington, Sr.	Galena
Y-4, Seat 2	Richard Burnham	Kaltag
Y-5, Seat 1	Charlie Wright	Tanana
Y-5, Seat 2	Stan Zuray	Tanana
Y-6, Seat 1	Dorothy Shockley	Manley Hot Springs
Y-6, Seat 2	Victor Lord	Nenana
Koyukuk River	Pollock Simon, Sr.	Allakaket
Flats, Seat 1	Jan Woodruff	Eagle
Canadian, Seat 1	James MacDonald	Whitehorse, YT

YOUNG FISHERS REPS

DISTRICT	NAME	COMMUNITY
Lower River	Kerri Kelly	Pilot Station
Upper River	Katlyn Zuray	Fairbanks (Tanana)

ALTERNATES

DISTR./SEAT #	REPRESENTATIVE	COMMUNITY
Coastal, Alt. 1	Richard Tuluk	Chevak
Coastal, Alt. 2	VACANT	-
Y-1, Alt 1	Marvin Okitkun	Kotlik
Y-1, Alt. 2	John Strongheart	Alakanuk
Y-2, Alt. 1	Rex Nick	Pilot Station
Y-2, Alt. 2	William Riley Jr.	Pitka's Point
Y-3, Alt. 1	Basil Larson	Russian Mission
Y-4, Alt. 1	Dick Evans	Galena
Y-4, Alt. 2	Robert Walker	Anvik
Y5, Alt. 1	James Roberts	Tanana
Y-6, Alt. 1	Phillip Titus	Minto
Y-6, Alt. 2	Kathleen Dimientieff	Nenana
Koyukuk Alt.1	Darrel Vent Sr.	Huslia
Flats, Alt. 1	Rochelle Adams	Fort Yukon/Beaver
Canadian, Alt 1	Carl Sidney	Teslin, YT

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