



Salmon Fisheries Enhancement Project
Yakutat Regional Aquaculture Association

Situk River Chinook Salmon Rehabilitation

Strategic Plan

September 2026

Prepared by:
DAVID REGGIANI
CHRIS KELLEY



Unakwik
Aquaculture
Group LLP

Table of Contents

Executive Summary.....	1
The Project Area and Regional Setting are shown in Figure 1.....	3
Project Goals and Objectives Identified in Collaboration with YRAA	4
Project Need	4
Effects on Yakutat Fisheries	5
Overall Project Goal	6
Project Objectives	6
Measures of Long-Term Success.....	8
Summary of Site Visit Observations and Candidate Project Locations.....	8
Evaluation of Rehabilitation and Enhancement Alternatives Considered.....	11
Rehabilitation Approach	11
Incubation Alternatives.....	12
Streamside Incubation	12
Instream Incubation.....	12
In-Town Incubation Facility.....	14
Temperature Control and Thermal Otolith Marking	14
Incubation Equipment.....	15
Preliminary Conclusion	17
Discussion of Biological, Operational, Regulatory, and Permitting Considerations	17
Situk River Chinook Salmon Life History	17
Early Freshwater Survival Assumption.....	19
Biological Criteria	19
Biological Timing	20
Operational Considerations	21
Regulatory and Permitting Considerations.....	22
Fish Collection, Propagation, and Release Authorization.....	22
ADF&G Fish Habitat Permit.....	22
Water Use Authorization	23
USFS Special Use Authorization	23
Other Potential Authorizations.....	24
Comparison of Permitting Complexity.....	24
Permit Sequencing and Agency Coordination	25
Summary of Available Supporting Data and Recommended Future Data Collection Efforts.....	25

Available Biological and Fisheries Data	25
Existing Genetic Information	26
Existing Environmental and Facility-Planning Information.....	26
Recommended Water-Temperature Monitoring	26
Recommended Water-Quality and Water-Supply Evaluation.....	27
Recommended Biological and Program Monitoring	28
Preliminary Recommendations Regarding Project Design Concepts and Implementation Approaches ...	28
Facility and Building Requirements	29
Water Source, Collection, and Storage.....	29
Incubation Equipment	30
Recirculation and Water-Treatment System	31
Temperature Control and Thermal Otolith Marking	31
Monitoring, Alarms, and System Redundancy	31
Production Monitoring and Evaluation	32
Recommended Implementation Approach	32
Preliminary Cost Framework	35
Recommended Permitting and Agency Coordination Pathway	36
Strategic Plan as a Pre-Application Document	36
Aquatic Resource Permit Feasibility Study	37
ADF&G Review and Pre-Application Meeting	38
Conversion to a Formal Application	38
Supporting Agency Coordination.....	39
UAG Technical and Permitting Support.....	40
Transition to Implementation.....	40
Prioritized Implementation Roadmap	41
Immediate Project Development	41
Preseason Development and Operational Readiness	42
Initial Production Cycle and Evaluation	42
Long-Term Program Development	43
Recommended Next Steps for Advancing Project Development	43
1. Confirm YRAA’s Preferred Project Direction.....	43
2. Consider Retaining UAG for Continued Project Support	43
3. Initiate Preliminary Agency Coordination.....	44
4. Define the Initial Feasibility Study	44
5. Secure an Appropriate In-Town Site.....	44

6. Prepare a Project Budget, Funding Plan, and Schedule.....	45
7. Advance Permitting and Site-Specific Design	45
8. Establish a Project Management and Decision Process	45
Acknowledgements.....	46
References	46
Personal Communications	47

Situk River Chinook Salmon Rehabilitation Strategic Plan

This Strategic Plan was prepared by Unakwik Aquaculture Group for the Yakutat Regional Aquaculture Association to provide a practical framework for advancing the Situk River Chinook Salmon Rehabilitation Project. The report documents the results of project planning discussions, review of available information, field site evaluations, and technical assessments conducted during the project, and presents UAG's recommendations and next steps for project design, agency coordination, permitting, and implementation.

Executive Summary

This Strategic Plan provides the Yakutat Regional Aquaculture Association (YRAA) with a practical framework for evaluating and advancing a conservation-oriented rehabilitation program for Situk River Chinook salmon. The population historically supported important subsistence, sport, and commercial fisheries in the Yakutat area, but recent escapements have been low and highly variable. Large-Chinook escapement was 888 fish in 2022, 144 in 2023, 517 in 2024, 1,290 in 2025, and a preliminary 219 in 2026 (ADF&G 2026b). Although escapement was within or above the biological escapement goal range of 450 to 1,050 large Chinook salmon in three of these five years, the severe shortfalls in 2023 and 2026 demonstrate that the population is not consistently producing enough returning adults to achieve the minimum escapement objective without substantial fishery restrictions.

Available information indicates that the Situk River continues to provide productive spawning and juvenile-rearing habitat. No single habitat limitation or other cause has been identified that fully explains the population's decline. Consequently, the proposed rehabilitation program should complement, rather than replace, continued habitat protection, conservative fishery management, and biological monitoring. The recommended approach would use only indigenous Situk River broodstock to produce first-generation progeny. Eggs would be incubated under controlled conditions, and the resulting unfed emergent fry would be released into the Situk River system near the natural emergence period. Returning adults would spawn naturally and contribute to recovery of the wild population.

Three general incubation alternatives were evaluated: streamside incubation, instream incubation, and an accessible in-town incubation facility. An in-town recirculating facility is recommended for further development because it provides the best combination of operational access, environmental control, reliability, monitoring capability, and adaptability. The streamside locations evaluated do not provide sufficient gravity-fed water supply and would require pumping, additional infrastructure, and more complex land-use authorization. Instream incubation would offer less control over water flow, temperature, sediment, flooding, equipment security, and egg survival.

The preliminary facility concept consists of an approximately 1,000-square-foot modular building equipped with conventional vertical incubation trays, with moist-air incubation retained as a potential supplemental technology. Situk River water would be collected near Nine Mile Bridge using dedicated 275-gallon intermediate bulk containers and transported to the facility. Final design would address water collection and storage capacity, filtration, ultraviolet treatment, aeration or oxygenation, temperature

control, thermal otolith marking, alarms, backup power, and system redundancy. Water-quality and temperature monitoring should be completed before finalizing the water balance and equipment design.

YRAA has established a preliminary long-term planning goal of producing an additional 2,000 returning adult Chinook salmon. Under the assumptions presented in this plan, that goal would require approximately 82,000 green eggs and broodstock contributions from approximately 19 females and 19 to 38 males. These values are planning estimates, not recommended initial production levels. The size and scope of the first egg-to-fry cycle should be developed with the Alaska Department of Fish and Game (ADF&G) as a limited feasibility study. The greater-than-90-percent egg-to-fry survival criterion should similarly be treated as a planning and evaluation target rather than a guaranteed outcome.

Project development should begin with coordinated preapplication discussions involving ADF&G, the U.S. Forest Service (USFS), and, as appropriate, the Alaska Department of Natural Resources (ADNR), U.S. Army Corps of Engineers (USACE), Alaska Department of Environmental Conservation (ADEC), and local authorities. Final ADF&G authorizations would be provided to the Forest Service before issuance of any required Special Use Authorization. YRAA should confirm its preferred project direction, define the initial feasibility study with ADF&G, secure a suitable in-town site, develop a project budget and funding strategy, and advance site-specific design and permitting. YRAA should also consider retaining Unakwik Aquaculture Group to provide continuity in agency coordination, facility design, commissioning, operating procedures, and staff training.

The first production cycle should be treated as a controlled feasibility study. Results should be evaluated using egg-to-fry survival, fish-health observations, thermal marking, operational performance, juvenile monitoring, and subsequent adult recoveries. Based on those results, YRAA and the responsible agencies could repeat, modify, expand, or discontinue the program. Advancing the recommended concept therefore represents a commitment to continued evaluation and project development, not authorization to construct or operate a full-scale production facility.

The Project Area and Regional Setting are shown in Figure 1.

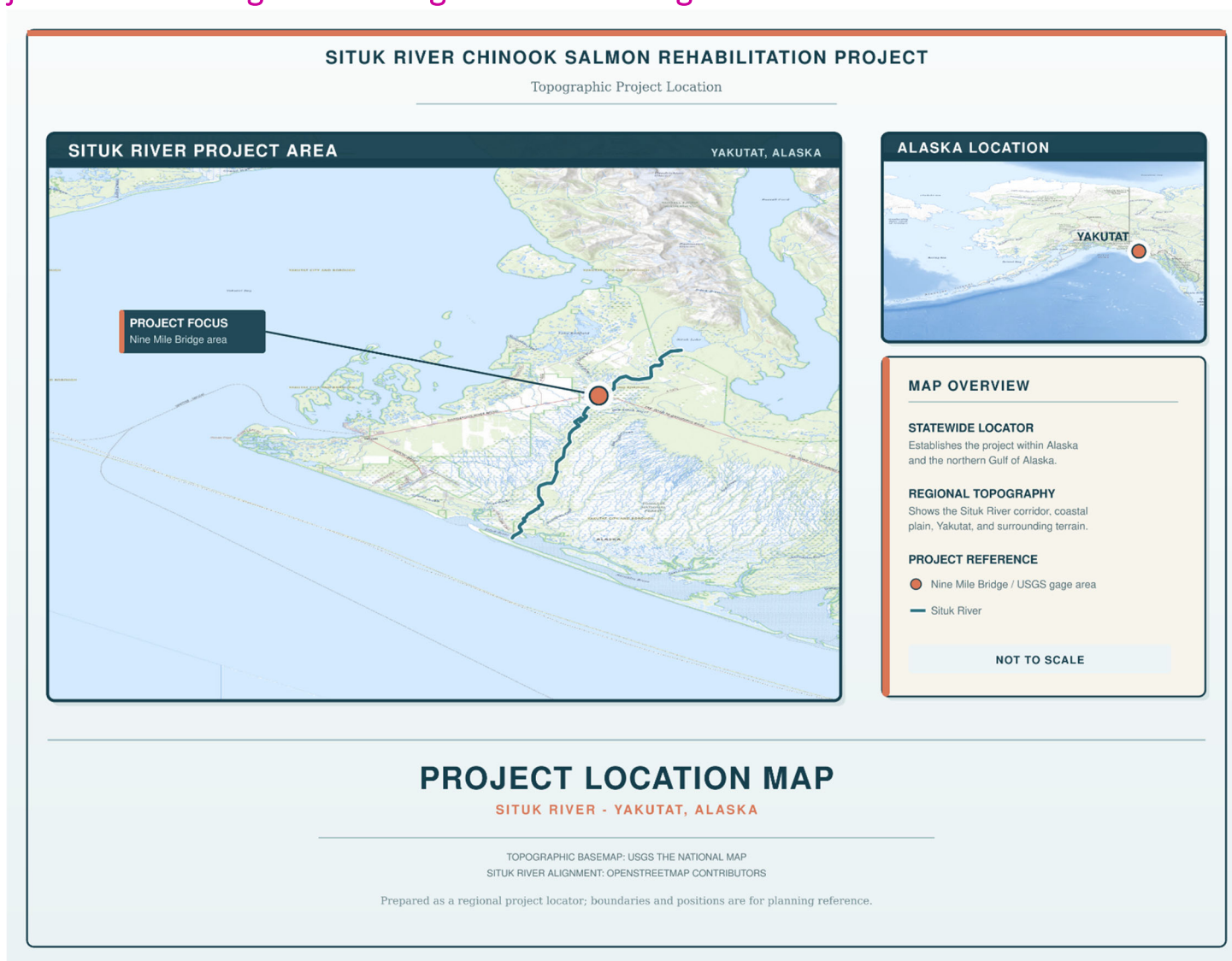


Figure 1. Situk River Chinook Salmon Rehabilitation project location map.

Project Goals and Objectives Identified in Collaboration with YRAA

Project Need

The Situk River historically supported a productive Chinook salmon population that contributed to the subsistence, sport, and commercial fisheries of the Yakutat area. Sustaining this population and the benefits it provides depends first upon maintaining adequate spawning escapement and, over the longer term, producing adult returns in excess of spawning requirements.

The Alaska Department of Fish and Game (ADF&G) currently manages the Situk River Chinook salmon population for a biological escapement goal of 450 to 1,050 large fish, defined as Chinook salmon at least 28 inches in total length. The escapement goal was developed from an analysis of historical spawning abundance and adult production. That analysis identified approximately 730 large spawners as the point estimate associated with maximum sustained yield and concluded that escapements between approximately 450 and 1,050 large spawners would be expected to produce at least 90 percent of maximum sustained yield under the historical stock-recruit relationship (McPherson et al. 2005).

More recent escapement information indicates that the productivity and abundance of the Situk River Chinook salmon population have declined substantially from earlier levels. ADF&G reports that annual spawning escapement averaged approximately 1,250 large Chinook salmon from 1976 through 2007 but has averaged only about 600 large fish since 2008. ADF&G has characterized recent runs as erratic and documented the implementation of management restrictions across all fisheries since 2010. Despite those restrictions, the biological escapement goal was achieved in only six of the ten years from 2012 through 2021 (Hoffman 2022). Between 1976 and 2024, escapement fell below the biological escapement goal in nine years, eight



Photo 1. Fishing prohibited signage at Nine Mile Bridge during the August 13, 2026, site visit.



Photo 2. Adult Chinook salmon staged immediately downstream of the Nine Mile Bridge during the August 13, 2026, site visit.

of which occurred during the past two decades (ADF&G 2026c; Figure 2). The final cumulative weir count increased to 1,290 large Chinook salmon in 2025, but the preliminary 2026 count fell to only 219 large Chinook salmon, well below the lower bound of the biological escapement goal (ADF&G 2026b). These recent results further demonstrate the substantial annual variability of the population and its continued vulnerability to severe escapement shortfalls.

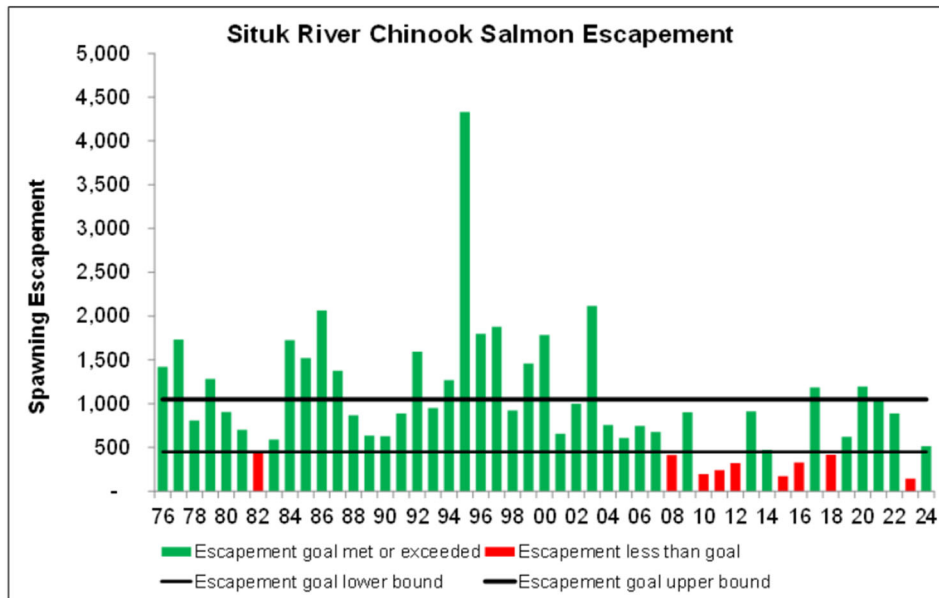


Figure 2. Situk River Chinook Salmon Escapement, 1976-2024

Source: Reproduced from Alaska Department of Fish and Game (ADF&G 2026c).

Although the biological escapement goal was met or exceeded in three of the five years from 2022 through 2026, the severe shortfalls in 2023 and 2026 demonstrate that the population is not consistently producing enough returning adults to achieve even the lower bound of the goal without substantial fishery restrictions.

Effects on Yakutat Fisheries

The effects of low Situk River Chinook salmon abundance extend beyond the loss of direct Chinook harvest opportunities. Chinook salmon migrate through the Situk-Ahrnklin system during a period that overlaps with the return of sockeye salmon. When the Chinook return is forecast to be insufficient to meet escapement requirements, ADF&G implements conservation measures affecting subsistence, sport, and commercial fisheries.

Current management measures distinguish among fishing sectors and between directed and incidental encounters with Situk River Chinook salmon. Under the Situk-Ahrnklin Inlet and Lost River King Salmon Fisheries Management Plan, the Situk River sport fishery for Chinook salmon remains closed until established escapement thresholds are achieved and ADF&G opens the fishery by emergency order. While the closure is in effect, Chinook salmon may not be targeted, retained, or possessed. Any Chinook salmon caught incidentally while fishing for another species may not be removed from the water and must be released immediately (ADF&G 2025; ADF&G 2026d).

Subsistence and commercial fisheries are managed differently because Chinook salmon may be encountered incidentally in fisheries targeting sockeye and other salmon species. When Chinook abundance is insufficient, ADF&G may prohibit Chinook retention, restrict fishing periods, and close specified fishing areas to reduce incidental encounters and associated mortality. In 2026, ADF&G prohibited Chinook salmon retention in the Situk-Ahrnklin Inlet subsistence and commercial set gillnet fisheries and closed specified waters near the mouth of the Situk River and Johnson Slough to fishing with subsistence and commercial set gillnet gear (ADF&G 2026a).

These conservation measures can reduce fishing opportunity during the peak of otherwise productive sockeye salmon returns. Yakutat Regional Aquaculture Association (YRAA) has also identified concerns that protection of Situk River Chinook salmon may affect fishing opportunity outside the immediate Situk-Ahrnklin system when fisheries are managed to minimize potential interception of Situk-bound Chinook salmon. Consequently, low Chinook salmon abundance may limit access to salmon resources that are otherwise sufficiently abundant to support additional harvest (Pavlik 2026).

YRAA has identified improved access to regional salmon fisheries as an important social and economic objective of the rehabilitation initiative. Rebuilding Situk River Chinook salmon abundance may reduce the need for some Chinook-related conservation restrictions when ADF&G determines that projected returns are sufficient to meet escapement requirements. Improved Chinook production could therefore provide benefits through both direct Chinook salmon harvest and increased access to sockeye and other regional salmon fisheries.

Chinook salmon rehabilitation should not be represented as the sole solution to the operational and economic challenges facing the Yakutat fishing fleet. Fishery access will continue to be influenced by run strength, run timing, mixed-stock considerations, allocation decisions, fishing capacity, market conditions, and management requirements. Nevertheless, restoring Situk River Chinook salmon abundance is an important step toward improving the biological foundation upon which broader fishing opportunities depend.

Overall Project Goal

The overall goal of the Situk River Chinook Salmon Rehabilitation Initiative is to improve the abundance, productivity, and long-term resilience of the native Situk River Chinook salmon population so that the biological escapement goal is consistently achieved and, as stock productivity improves, sustainable harvest opportunities can be restored for subsistence, sport, and commercial user groups.

A related long-term goal is to reduce the extent to which low Situk River Chinook salmon abundance constrains access to otherwise harvestable salmon resources in the Yakutat area. Achievement of this goal will depend upon demonstrated improvements in Chinook salmon abundance and continued coordination with ADF&G regarding fishery management and conservation requirements.

Achievement of these goals will require a biologically sound and operationally sustainable approach that complements natural production, protects the genetic and ecological characteristics of the Situk River stock, and can be implemented in coordination with ADF&G and other regulatory and resource management agencies.

Project Objectives

The following objectives were identified through consultation with YRAA and consideration of available biological information, fishery management needs, local priorities, and long-term operational requirements:

1. **Improve spawning escapement reliability.** Increase the number of adult Chinook salmon returning to the Situk River so that the lower bound of the biological escapement goal is consistently achieved and the frequency and magnitude of escapement shortfalls are reduced.

2. **Support recovery of stock productivity.** Improve survival during life stages that can reasonably be influenced through rehabilitation, incubation, enhancement, or habitat-focused actions while maintaining the natural reproductive capacity and long-term resilience of the population.
3. **Restore sustainable harvest benefits.** Develop sufficient adult production above biological escapement requirements to support meaningful and sustainable harvest opportunities for subsistence, sport, and commercial user groups. Consistent with the State of Alaska’s subsistence priority, subsistence opportunity and the cultural importance of Situk River salmon to the Yakutat community should remain central considerations in evaluating project outcomes.
4. **Improve access to regional salmon resources.** Support recovery of Situk River Chinook salmon to abundance levels that may reduce the need for conservation restrictions affecting the harvest of otherwise abundant sockeye and other salmon stocks. Fishery-access objectives should be developed in coordination with ADF&G and should remain subordinate to achievement of Chinook salmon escapement requirements.
5. **Protect Situk River stock integrity.** Use locally derived Situk River broodstock and apply appropriate genetic, pathology, fish culture, and fishery management safeguards to minimize risks to the native population and the broader aquatic ecosystem.
6. **Identify a practical and sustainable rehabilitation approach.** Evaluate candidate rehabilitation, incubation, habitat, and survival-enhancement strategies based on biological effectiveness, operational feasibility, regulatory acceptability, infrastructure requirements, cost, implementation risk, and long-term sustainability.
7. **Develop local operational capacity.** Establish the organizational, technical, and physical capacity necessary for YRAA to implement and sustain a Chinook salmon rehabilitation program. Facility planning should consider operational control, reliable access, manageable water and utility requirements, future expansion potential, and the ability to support additional rehabilitation or enhancement opportunities if justified through future evaluation.
8. **Use a phased and adaptive implementation strategy.** Advance the project through defined planning, data collection, agency coordination, permitting, pilot implementation, monitoring, and evaluation phases. Initial project scale and production objectives should remain responsive to biological performance, infrastructure capacity, regulatory requirements, available funding, and demonstrated operational capability.
9. **Establish measurable performance standards.** Develop monitoring and evaluation measures that address broodstock collection, egg-to-fry survival, juvenile production and release, adult returns, spawning escapement, age and size composition, contribution to fisheries, and potential effects on naturally produced Chinook salmon.
10. **Strengthen agency and community coordination.** Maintain early and continuing coordination among YRAA, ADF&G, the Yakutat Fish and Game Advisory Committee, the Yakutat Tlingit Tribe, Yak-Tat Kwaan, landowners, regulatory agencies, fishery participants, and other community interests. This coordination should support effective conservation measures, transparent

decision-making, efficient permitting, funding partnerships, and broad understanding of the project's purpose and limitations.

Measures of Long-Term Success

Long-term success should not be measured solely by the number of eggs collected, eggs incubated, or juveniles released. The principal measures of biological, fishery, operational, and community performance should include:

- Consistent achievement of the ADF&G biological escapement goal.
- Reduced frequency and severity of escapement shortfalls.
- Increased adult returns attributable to rehabilitation activities.
- Maintenance of the genetic and biological integrity of the Situk River population.
- Demonstrated contribution to sustainable subsistence, sport, and commercial harvest opportunities.
- Improved access to harvestable regional salmon resources when consistent with ADF&G management requirements.
- Reliable operation, monitoring, maintenance, and funding of the selected rehabilitation program.
- Continued community and agency support based on transparent reporting and demonstrated biological performance.

Because Chinook salmon require several years to complete their life cycle, meaningful evaluation will require a long-term commitment extending across multiple brood years. Near-term performance should therefore be assessed primarily through project-development milestones, regulatory approvals, broodstock and fish-culture performance, juvenile survival, monitoring quality, and operational readiness. Adult return, escapement, and fishery-contribution objectives should be evaluated as marked or otherwise identifiable project fish begin returning to the Situk River.

Summary of Site Visit Observations and Candidate Project Locations

David Reggiani and Chris Kelley of Unakwik Aquaculture Group (UAG) arrived in Yakutat on August 12, 2026, and were met by Jonathan Pavlik, YRAA General Manager. The visit began with a productive discussion of YRAA's goals and objectives for the Situk River Chinook Salmon Rehabilitation Strategic Planning Initiative. These discussions continued throughout the field visit and provided context for assessing river conditions, potential broodstock collection areas, and candidate project locations.



Photo 2. Adult Chinook salmon staged immediately downstream of the Nine Mile Bridge during the August 13, 2026, site visit.

Following the initial meeting, the team traveled to the Nine Mile Bridge over the Situk River. Clear skies and sunny conditions provided excellent visibility for observing fish and river habitat. A concentration of adult Chinook salmon was observed immediately upstream and downstream of the bridge, accompanied by a small number of pink and an even smaller number of sockeye salmon. Based on the available 2026 ADF&G weir count information, the Chinook salmon assembled in this area appeared to represent a substantial portion of the season's counted return.

The team walked several hundred yards upstream along the east bank to examine river conditions and look for additional Chinook salmon. No additional Chinook salmon were observed in the reach examined. The upstream assessment was shortened by an encounter with a brown bear.

The team also visited the setnet fishing cabin area near the mouth of the Situk River. Jonathan described the importance of this area to local subsistence and commercial fisheries, providing additional perspective on the river's contribution to the Yakutat community.



Photo 3. Situk River immediately upstream of the Nine Mile Bridge during the August 13, 2026, site visit.

On the morning of August 13, the team returned to the Nine Mile Bridge and walked approximately one-half mile downstream along the east bank. Habitat conditions appeared similarly favorable to those

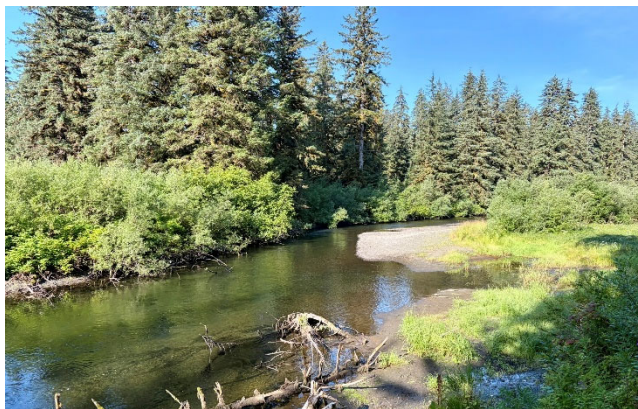


Photo 4. Situk River approximately 300 yards downstream from the Nine Mile Bridge looking upstream during the August 13, 2026, site visit.

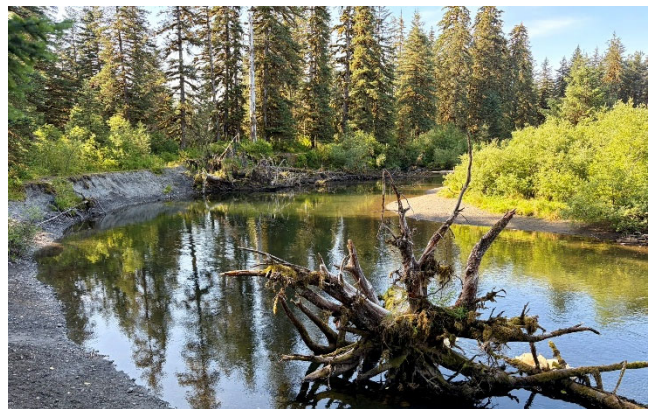


Photo 5. Situk River approximately 300 yards downstream from the Nine Mile Bridge looking downstream during the August 13, 2026, site visit.

observed upstream, with clear water and extensive areas of apparently suitable salmon spawning habitat. No additional adult Chinook salmon were observed in the downstream reach examined, although a few pink salmon were present. Juvenile coho salmon were observed at several locations in slow-current areas along the riverbank.

The portions of the Situk River examined during the visit displayed clear water and abundant spawning habitat consistent with conditions described in the literature. These observations provided useful context for evaluating potential rehabilitation approaches, although the limited geographic extent and duration of the visit did not constitute a comprehensive habitat assessment.

Several beach areas both upstream and downstream of the Nine Mile Bridge appeared suitable for further evaluation as broodstock collection and egg take locations. These areas offered potential opportunities for beach seining, placement of broodstock holding cages, and nearby egg collection activities. Their proximity to the observed concentration of adult Chinook salmon and road access at the bridge made this reach particularly relevant to project planning. Final site selection would require closer evaluation of access, river conditions, safe working areas, and operational requirements.

During the remainder of August 13, Jonathan guided the team to several locations associated with chum salmon fishery enhancement concepts previously explored by YRAA. Although those concepts were outside the primary focus of the visit, the tour provided an opportunity to consider existing infrastructure that might also be relevant to the Chinook salmon rehabilitation project. The Yak-Tat Kwaan Cold Storage and City Icehouse were identified as locations of interest for further assessment of potential water sources and infrastructure. Neither location was selected nor confirmed as suitable for incubation during the visit.

The day concluded with visits to Summit Lake and Tawah Creek, where Jonathan described YRAA's interest in a potential sockeye salmon fishery enhancement project. Summit Lake appeared productive and potentially worthy of further evaluation as a sockeye salmon nursery lake. Its apparent nutrient richness was a preliminary field impression; its suitability for supporting additional juvenile sockeye salmon would require further assessment.

Tawah Creek also appeared nutrient rich, with dense growth of aquatic vegetation preliminarily identified during the visit as *Elodea* sp. The vegetation appeared to constrict portions of the open channel and raised concerns about potential interference with migrating sockeye salmon. The extent of any effect on fish passage was not determined during the visit.

Although sockeye salmon fishery enhancement was not the primary focus of this visit, UAG was encouraged by Jonathan's description of the concept and would welcome the opportunity to assist YRAA in developing project goals and objectives for a separate evaluation.



Photo 6. Dense aquatic vegetation observed in Tawah Creek during the August 13, 2026, site visit. Potential effects on salmon passage warrant further evaluation.

Evaluation of Rehabilitation and Enhancement Alternatives Considered

Rehabilitation Approach

Based on the information reviewed and observations made during the site visit, the Situk River continues to provide extensive, high-quality Chinook salmon spawning and rearing habitat. No obvious habitat limitation was observed that would prevent the watershed from supporting Chinook salmon production at levels substantially greater than those experienced in recent years. Although additional information may be needed to evaluate specific habitat conditions, the reduced number of spawning adults currently appears to be the most immediate limitation on freshwater production.

This conclusion does not identify the underlying cause of the population decline. Factors affecting juvenile and adult survival elsewhere in the Chinook salmon life cycle may continue to influence the population. However, when suitable spawning and rearing habitat remains available, increasing the number of viable eggs, fry, and ultimately returning adults may help the population make fuller use of the watershed's existing productive capacity.

A conservative starting approach would be a limited F1 Chinook salmon rehabilitation program using broodstock collected exclusively from the Situk River population. The term F1 refers to the first generation, or the direct offspring of wild-origin parent fish. Under this approach, a representative group of naturally returning Situk River Chinook salmon would be used as the parental, or F0, generation. Their eggs would be fertilized and incubated under controlled conditions, and the resulting F1 offspring would be released back into the Situk River watershed, preferably as unfed emergent fry timed to coincide with natural emergence.

The purpose of an F1 rehabilitation program would be to improve survival during the egg incubation and emergence stages while limiting the amount of time the fish are exposed to an artificial culture environment. Returning F1 adults would be expected to spawn naturally in the Situk River rather than be used to establish a closed or multigenerational hatchery broodstock. This approach would retain the local genetic and life-history characteristics of the Situk River population while minimizing the potential for domestication or unintended selection associated with multiple generations of hatchery culture. It is also consistent with the conservative principles established in the ADF&G genetics policy, which emphasizes using indigenous stocks and limiting the number of generations that fish intended for wild-stock rehabilitation remain in hatchery culture (Davis et al. 1985).

The desired outcome would be an increase in the number of naturally spawning Chinook salmon returning to the Situk River. Greater escapement would increase natural egg deposition throughout the watershed and could begin a positive rebuilding cycle in which more naturally produced juveniles migrate to sea and subsequently return as adults. Even a relatively small increase in adult abundance could be meaningful when recent escapements are low.

The actual response would depend on survival during the freshwater, estuarine, and marine portions of the Chinook salmon life cycle. A successful program could accelerate recovery and eventually become unnecessary as natural escapement increases. A more moderate outcome could provide additional spawners while helping identify the scale and duration of intervention needed. It is also possible that improved egg-to-fry survival would not produce a measurable increase in adult returns if mortality elsewhere in the life cycle remains the principal constraint. For this reason, any F1 rehabilitation program should include marking or other means of identifying released fish, monitoring of juvenile and adult production, and clearly defined criteria for continuing, modifying, or concluding the program.

Because the Situk River Chinook salmon population is currently depressed, broodstock collection would need to be carefully coordinated with ADF&G to avoid placing additional pressure on natural production. Broodstock should represent the scope of the run to the extent possible, including appropriate temporal, spatial, and sex representation. Spawning practices should maintain family representation and genetic diversity, and the program should incorporate applicable fish-health screening, egg-disinfection, permitting, and monitoring requirements.

Incubation Alternatives

The alternatives considered below represent different methods of implementing a locally based Chinook salmon rehabilitation program. Each alternative could increase survival during early development, but they differ considerably in reliability, operational control, accessibility, scalability, and exposure to environmental risk.

Streamside Incubation

The UAG team has extensive experience with the streamside incubation methods used at the Gulkana Hatchery, where sockeye salmon eggs are incubated using a gravity-fed, spring-water supply. This type of system can be highly effective when a site has a dependable source of clean, oxygenated water located at sufficient elevation above the incubation equipment. The available elevation difference supplies continuous water flow without dependence on pumps, electrical power, or complex mechanical systems.



Photo 7. Gulkana Hatchery near Paxson, Alaska.

Source: Prince William Sound Aquaculture Corporation

During the Situk River site visit, the UAG team did not identify the natural elevation difference and associated water source needed to operate a comparable gravity-fed system at the candidate locations. A pumped streamside facility could be constructed, but it would require a dependable power source, redundant pumps, alarms, backup systems, regular access, and protection from flooding and debris. These requirements would eliminate many of the operational advantages that make the Gulkana model attractive.

For these reasons, the specific gravity-fed streamside incubation approach used at Gulkana Hatchery does not appear well suited to the Situk River project and was not carried forward as a preferred alternative.

Instream Incubation

YRAA has previously discussed instream incubation concepts with ADF&G, Northern Southeast Regional Aquaculture Association (NSRAA), and Douglas Island Pink and Chum, Inc. (DIPAC). Instream incubators are containers or assemblies placed directly within a river or stream to hold fertilized or eyed salmon eggs during development. Designs include Jordan-Scotty incubator plates, Whitlock-Vibert boxes, cylindrical egg tubes, and other containers that allow stream water to circulate around the developing eggs while providing varying degrees of protection.

The Jordan-Scotty system consists of paired plastic plates containing individual egg cells and is designed for eyed eggs. Multiple plates can be connected and anchored within a stream. Escape openings allow developed fry to leave the incubator without the unit being opened. Other instream designs may retain the alevins until the incubator is opened, repositioned, or removed. All designs require appropriate site selection, secure installation, periodic inspection, and eventual retrieval unless specifically intended to remain in place.



Photo 8. Jordan-Scotty instream fish incubator.

Source: Scotty Manufacturing Ltd. n.d. Jordan-Scotty fish egg incubator. <https://scotty.com/jordan-scotty-fish-egg-incubator/>

Accessed August 13, 2026.

The principal advantages of instream incubation include:

- Relatively low initial infrastructure requirements.
- Direct use of natural Situk River water and temperature conditions.
- Incubation and emergence within the watershed where the fish will rear.
- Protection of eggs from some of the predation and physical disturbance associated with natural incubation.
- Limited exposure to an artificial hatchery environment.
- Potential suitability for small pilot projects or research applications.

The principal disadvantages include:

- Exposure to floods, scour, ice, debris, changing water levels, and physical damage.
- Potential accumulation of fine sediment that can restrict water circulation and oxygen delivery.
- Limited ability to control water temperature, dissolved oxygen, or other incubation conditions.
- Difficult winter and spring access for inspection, maintenance, and retrieval.
- Risk of equipment loss, vandalism, wildlife damage, or disturbance.
- Limited ability to remove dead eggs, respond to developing fish-health problems, or correct equipment failures.
- Greater uncertainty in determining egg-to-fry survival and the number of fry successfully released.
- Substantial handling and field labor if a meaningful production volume requires numerous individual incubator units.

Published evaluations demonstrate that instream incubators can support successful salmonid development, but performance varies by incubator design, installation method, sediment conditions, and

location. Much of the available research has focused on relatively small experimental egg lots rather than population-scale rehabilitation programs. Although instream incubation could be useful for a limited pilot study or specialized application, the environmental exposure, access requirements, and reduced operational control make it less suitable as the primary incubation method for the Situk River Chinook salmon rehabilitation program.

In-Town Incubation Facility

An in-town incubation facility appears to offer the greatest potential for providing the control, reliability, and accessibility needed for a successful rehabilitation program. Under this concept, YRAA would identify a suitable existing building in Yakutat or construct a small, purpose-built facility. For preliminary planning purposes, a building with an open floor plan of approximately 1,000 square feet and an interior ceiling height of approximately 8 to 10 feet may be sufficient. Final space requirements would depend on the production goal, incubator selection, water-treatment equipment, water-storage needs, work areas, and required system redundancy.

Situk River water could be collected and transported by tank to the facility for the initial system fill and periodic make-up water. The incubation system would recirculate and treat the water, substantially reducing the volume that would need to be transported compared with a conventional flow-through hatchery. The system would include mechanical filtration, ultraviolet disinfection, aeration or oxygenation, pumps, water-storage capacity, alarms, emergency power, and an integrated heater/chiller system. A preliminary water balance and operational plan would be needed to determine the required frequency and volume of water deliveries.

Locating the facility in town would provide several important advantages. Staff could inspect the incubators daily, remove mortalities, monitor egg development and water quality, and respond quickly to alarms or equipment problems. The building and equipment would be protected from flooding, debris, wildlife, vandalism, and severe weather. The controlled setting would also provide space for fish-health procedures, recordkeeping, equipment sanitation, egg enumeration, and community education.

Temperature Control and Thermal Otolith Marking

The heater/chiller system would use temperature sensors, automated controls, and heat-exchange equipment to add or remove heat from the recirculating water. During normal incubation, the system would maintain water within a predetermined temperature range selected to support egg survival and produce an emergence schedule consistent with the natural timing of juvenile Chinook salmon in the Situk River. Because salmon egg development is temperature-dependent, this capability would also allow managers to adjust the rate of development within biologically appropriate limits when necessary to maintain the desired release timing.

The heater/chiller system would also provide the ability to apply a thermal otolith mark to the developing Chinook salmon. Otoliths are small calcium carbonate structures within a fish's inner ear that grow by depositing layers throughout the fish's life. A thermal otolith mark is created by raising and lowering the incubation-water temperature according to a prescribed schedule. Each controlled temperature reduction temporarily changes the otolith's growth pattern and produces a distinct microscopic ring. Repeated temperature cycles create a permanent pattern of rings that functions as a biological code.

Because all eggs within the incubation system experience the same temperature changes, an entire production group can be marked without handling or physically tagging individual fish. When juveniles or

returning adults are later sampled, their otoliths can be removed and examined under a microscope to identify fish produced by the rehabilitation program. Different patterns may be assigned to individual brood years or release groups, providing an effective means of estimating juvenile survival, adult returns, straying, distribution, and the contribution of the F1 program to future Situk River escapements.

The UAG team has extensive firsthand experience applying thermal otolith marks to salmon during incubation, including experience with large-scale marking programs. This provides the team with a practical understanding of the temperature cycling, system monitoring, data recording, and operational controls needed to successfully apply a prescribed thermal mark.

The heater/chiller and associated controls would need sufficient capacity to achieve the required temperature changes throughout the recirculating system while maintaining uniform temperatures among incubators. The design should include redundant temperature probes, automated data recording, high- and low-temperature alarms, backup power, and safeguards that prevent temperatures from moving outside acceptable incubation limits. The thermal-marking schedule and subsequent mark verification should be coordinated with ADF&G's Mark, Tag and Age Laboratory.

Incubation Equipment

Two commercially available salmon incubation technologies appear appropriate for further evaluation within the recirculating system.

Vertical Heath Tray Incubators

Heath-style incubators consist of a vertical stack of shallow trays. Water enters the upper portion of the stack and flows successively through the trays, providing oxygenated water to the developing eggs. Each tray can hold a separate egg lot, allowing eggs from individual females or family groups to remain segregated until fish-health and genetic management decisions are completed.

The advantages of Heath trays include:

- A long history of successful use with Chinook and other Pacific salmon.
- Relatively simple and well-understood operation.
- Modular capacity that can be expanded by adding stacks.
- Efficient use of floor space.
- Easy access to individual egg lots for inspection, mortality removal, enumeration, and sampling.
- Flexibility to incubate eggs through the eyed stage, hatch, and alevin development.
- Ready integration with recirculating water-treatment and temperature-control equipment.
- Broad availability of equipment, replacement parts, and operational experience.



Photo 9. Heath Tray incubators at Tamgas Creek Hatchery (TCH).

Within a recirculating system, the water discharged from the stacks would be filtered, treated, reoxygenated, brought back to the desired temperature, and returned to the incubators. This would substantially reduce make-up-water requirements while retaining the familiar operational characteristics of conventional vertical incubation. Heath trays would likely provide the simplest and most proven incubation option for an initial Situk River program.



Photo 10. TCH BY19 Chinook salmon green eggs in a Heath tray incubator.

Moist-Air Incubators

Moist-air incubators hold eggs in trays within a chamber maintained at or near 100 percent humidity. Rather than continuously submerging the eggs in flowing water, filtered and treated water is applied as a fine mist, spray, or intermittent flow that keeps the eggs moist while allowing direct access to oxygen in the surrounding air. The small amount of water used by the system is collected, treated, and recirculated.

The advantages of moist-air incubation include:

- Very low water demand compared with conventional flow-through incubation.
- Efficient use of transported Situk River water.
- High oxygen availability to developing eggs.
- Protection from sediment and other source-water debris.
- Precise control of incubation temperature and development rate.
- Efficient application of thermal otolith marks.
- Compact equipment and relatively high egg capacity within a small building.
- The ability to maintain separate egg lots for fish-health and broodstock management.

- Reduced wastewater production and the potential to operate without routine antifungal chemical treatments when paired with effective filtration and ultraviolet disinfection.

Moist-air systems are more specialized and rely on pumps, misting components, sensors, ultraviolet treatment, and environmental controls. They therefore require trained operators, preventive maintenance, spare parts, alarms, and reliable backup power. Some operational protocols use moist-air incubation only through the eyed-egg stage and then transfer the eggs to Heath trays or other water-filled incubators for hatching and alevin development. Other systems are designed to continue through hatch. The appropriate configuration would need to be confirmed with equipment manufacturers and evaluated through a pilot installation before full-scale implementation.

Preliminary Conclusion

Based on the alternatives evaluated, an accessible, in-town incubation facility using a recirculating water system appears to provide the greatest likelihood of success for a Situk River Chinook salmon rehabilitation program. It would offer substantially greater operational control, reliability, and capacity for monitoring and evaluation than in-stream incubation, while avoiding the site constraints and higher costs associated with constructing a gravity-fed streamside facility.

Both Heath tray and moist-air incubation technologies warrant continued evaluation at this stage of design. While Heath trays offer the advantages of simplicity, proven performance, and extensive operational experience, moist-air incubation offers significant water conservation and temperature-control advantages that may be particularly valuable when Situk River water must be transported to the facility. A staged or hybrid system using moist-air incubation through the eyed stage and Heath trays through hatch and emergence may also merit consideration.

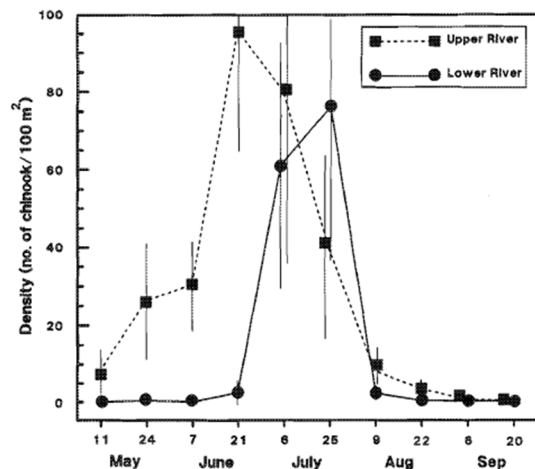
The inclusion of a heater/chiller system would allow YRAA to maintain the desired incubation temperature, coordinate fry emergence with natural Situk River timing, and thermally mark the entire production group. The resulting mark would be essential for evaluating juvenile production, adult returns, and the contribution of the rehabilitation program to future Chinook salmon escapements. The preferred equipment and final facility configuration should be selected during conceptual design after establishing the initial egg-production goal, water-delivery requirements, release strategy, thermal-marking plan, staffing requirements, capital and operating costs, and required levels of system redundancy. Regardless of the equipment selected, the program should begin at a conservative scale and expand only after survival, operational reliability, juvenile release performance, and adult returns can be evaluated.

Discussion of Biological, Operational, Regulatory, and Permitting Considerations

Situk River Chinook Salmon Life History

The life history of Situk River Chinook salmon is unusual among Alaska Chinook salmon stocks and provides an important biological advantage for the proposed rehabilitation program. Most Alaska Chinook salmon exhibit a stream-type life history, in which juveniles rear in freshwater for at least one year before migrating to sea. In contrast, Situk River Chinook salmon predominantly exhibit an ocean-type life history. These fish emerge, rear, and migrate to sea during their first year of life without overwintering in freshwater.

Johnson et al. (1992) documented the distribution, seasonal abundance, habitat use, movement, growth, and seawater tolerance of juvenile Situk River Chinook salmon. Approximately 98% of the juveniles aged during the study were age-0 fish. Recently emerged fry were primarily associated with channel-edge habitats in the upper river during spring. As the juveniles grew, they increasingly occupied pools, willow edges, and other mainstem habitats offering greater depth, current, and cover.



The juveniles moved downstream in two general phases. The first was a spring dispersal of recently emerged fry from the spawning areas into suitable upper and middle river rearing habitats. Juveniles dispersing downstream were captured from April through June, with the greatest catches occurring in May. The second phase was a more pronounced summer migration from the upper river to the lower river. Juvenile density in the upper river peaked in late June, followed by a substantial increase in the lower river during July. Marked juveniles were documented moving approximately 20 kilometers from the upper river to the lower river.

Figure 3. Mean density ($\pm$ SE) of juvenile Chinook salmon by sampling period in repetitive sites in the upper and lower Situk River, Alaska, 1989. For each data point, $n = 10$ (2 sites $\times$ 3 channel edges, 1 willow edge, and 1 debris pool per site). Source: Reproduced from Johnson et al. (1992).

After reaching the lower river, some juveniles remained there for approximately one to four weeks. This tidally influenced reach provided additional feeding opportunities and a period of acclimation before saltwater entry. Mean juvenile fork length in the lower river increased from approximately 40 mm in May to approximately 80 mm by early August. By midsummer, juveniles greater than approximately 60 mm were able to tolerate seawater, and fish approaching 80 mm had the physical appearance of smolts. Most had left the river by late August, and juvenile Chinook salmon were nearly absent from the river by September.

Thedinga et al. (1998) subsequently confirmed that the ocean-type life history predominates in the Situk River. Of the Chinook salmon smolts coded-wire tagged in July 1989, approximately 98% were age-0. Among tagged adults subsequently recovered with readable scales, approximately 87% were identified as ocean-type fish. The authors estimated marine survival of the tagged smolts at 2.9%, excluding returning jacks. At the time of publication, the Situk River stock was the only Alaska Chinook salmon stock validated as migrating to sea primarily at age-0.

This ocean-type life history provides a substantial advantage for the rehabilitation project. The project would not need to rear juveniles through an overwintering freshwater period. Instead, it could incubate the eggs and release unfed fry during the natural emergence and dispersal period. The river would then provide the remaining freshwater rearing habitat needed for the juveniles to grow and become ocean-ready during their first summer.

It is important to distinguish between newly emerged fry and ocean-ready smolts. The juveniles evaluated for marine survival by Thedinga et al. (1998) had already completed most of their freshwater rearing and reached the lower river at approximately smolt size. Newly released project fry would still need to survive the spring and summer rearing period and move downstream before reaching the lower river as seawater-

tolerant smolts. However, they would not be exposed to the overwintering mortality experienced by most other Alaska Chinook salmon stocks.

Early Freshwater Survival Assumption

The available studies do not provide a direct estimate of survival from newly emerged Situk River Chinook salmon fry to outmigrating smolts. For preliminary planning purposes, UAG assumes 90% survival during this early freshwater rearing period.

This assumption reflects the Situk River's unique ocean-type Chinook salmon life history and UAG's experience with salmon incubation, fry releases, and juvenile production. Project-produced fry would be released in coordination with the natural emergence period and would not need to survive an extended freshwater rearing period or overwinter in the river. The Situk River provides productive mainstem rearing habitats, including channel edges, pools, willow edges, and the tidally influenced lower river habitats documented by Johnson et al. (1992). These habitats allow the juveniles to grow rapidly and become seawater tolerant during their first summer.

The 90% fry-to-smolt survival rate is a project planning assumption and is not a survival estimate reported by Johnson et al. (1992) or Thedinga et al. (1998). The assumption should be evaluated through thermal otolith marking, juvenile monitoring, and subsequent adult recoveries as project-specific production information becomes available.

Biological Criteria

YRAA established a preliminary program goal of producing an additional 2,000 returning adult Chinook salmon. The following assumptions provide an initial basis for estimating the number of eggs and broodstock required:

- Target adult production: 2,000 returning adults
- Egg-to-fry survival: 90%
- Fry-to-smolt survival during natural Situk River rearing: 90%
- Smolt-to-adult marine survival: 3%
- Average fecundity: 4,500 eggs per female
- Minimum spawning ratio: one male per female
- Preferred spawning ratio when broodstock are available: up to two males per female
- Remote egg collection using ripe broodstock without an extended holding period
- No immature broodstock retained and no brood-holding mortality assumed

The combined survival from green egg to returning adult under these assumptions is:

90% egg-to-fry survival × 90% fry-to-smolt survival × 3% smolt-to-adult survival = 2.43% green egg-to-adult survival.

Based on these assumptions:

- 2,000 adults divided by 3% smolt-to-adult survival equals approximately 67,000 smolts.
- 67,000 smolts divided by 90% fry-to-smolt survival equals approximately 74,000 released fry.
- 74,000 fry divided by 90% egg-to-fry survival equals approximately 82,000 green eggs.
- 82,000 eggs divided by 4,500 eggs per female equals approximately 19 females.

- A minimum 1:1 spawning ratio would require 19 males and 19 females.
- A 2:1 male-to-female ratio would require up to 38 males and 19 females.

Nineteen females would be expected to produce approximately 85,500 eggs. At the assumed survival rates, those eggs would produce approximately 77,000 fry, 69,000 smolts, and 2,100 returning adults. This provides a modest production margin above the goal of 2,000 returning adults.

Broodstock should consist exclusively of Situk River Chinook salmon and should represent the spatial and temporal distribution of the naturally spawning population to the extent practical. Although a 1:1 spawning ratio is the minimum operational assumption, using additional males when available would increase the number of parental contributions and reduce reliance on a relatively small number of spawning pairs. The number of broodstock removed from natural spawning should be evaluated annually in relation to run strength, escapement, and ADF&G management objectives.

Fish-health considerations will include review of available broodstock pathology records, application of approved egg-disinfection procedures, sanitary separation of egg lots, and compliance with any sampling or testing requirements established by the ADF&G fish pathologist. These considerations apply to all three incubation alternatives.

Biological Timing

Johnson et al. (1992) described Situk River Chinook salmon spawning as occurring from mid-August through mid-September, with peak spawning near the first week of September. This range provides the preliminary basis for planning broodstock collection, with the specific egg collection dates adjusted annually based on river conditions and observed broodstock maturity.

Incubation temperatures should approximate the thermal regime experienced by naturally deposited Situk River Chinook salmon eggs. Johnson et al. (1992) estimated that peak emergence would occur near the first week of April based on peak spawning timing, observed Situk River temperatures, and



Photo 2. Situk River approximately one mile downstream from the Nine Mile Bridge looking downstream during the August 13, 2026, site visit.

approximately 900 accumulated Celsius temperature units (CTUs) to emergence. The study documented the presence of recently emerged juveniles during spring and a downstream dispersal period extending from April through June.

The incubation program should use accumulated temperature units, current Situk River water-temperature data, and the juvenile abundance information presented by Johnson et al. (1992) to target emergence and release during the natural spring dispersal period. Matching the natural thermal development pattern is particularly important for the in-town incubation alternative because water temperature would be controlled by the recirculation system rather than continuously determined by the river.

The heater and chiller incorporated into the in-town recirculation system would allow operators to maintain the desired incubation temperature, reproduce the general natural development schedule, and apply a thermal otolith mark. The resulting mark would provide a permanent means of identifying project-produced fish and evaluating juvenile production, adult returns, survival, and straying.

Operational Considerations

Several beach areas adjacent to the Nine Mile Bridge were identified as potential broodstock collection and egg take locations. Broodstock acquisition methods may include beach seines, dip nets, and rod-and-reel equipment, subject to the methods, locations, timing, and conditions authorized by ADF&G.

A field egg collection crew of approximately six to eight individuals is anticipated. The crew would be responsible for broodstock capture and handling, gamete collection, fertilization, egg rinsing and water hardening, biological sampling, recordkeeping, and movement of the fertilized eggs into the selected incubation system.

Eggs and milt would be collected and mixed in the field. Following fertilization, the eggs would be placed in plastic buckets containing Situk River water and allowed to water harden for approximately one hour. Approximately 200 gallons of river water is expected to be sufficient for fertilization, water hardening, rinsing, and transport associated with the egg collection event. After water hardening and completion of required fish-health procedures, the eggs would be transferred into the incubators.

The three incubation alternatives present different operational requirements.

Instream incubation would avoid the need for pumps, water intakes, treatment equipment, and a constructed incubation building. The incubators would experience the natural Situk River temperature regime. However, installation, loading, inspection, and removal would need to be completed under field conditions. The incubators would be exposed to flooding, sediment deposition, channel movement, debris, predators, vandalism, and physical damage. Once installed and loaded, opportunities to inspect the eggs or correct developing problems would be limited.

Streamside incubation would provide greater access to and control over the eggs than instream incubation. A gravity-fed configuration similar to the Gulkana Hatchery system would be desirable, but the candidate Situk River locations do not appear to provide sufficient natural elevation for that arrangement. A pumped system would therefore likely require continuous electrical power, redundant pumps, backup power, alarms, screened intake structures, flood and debris protection, and dependable operator access throughout incubation. Winter access and the ability to respond promptly to equipment failures would be significant operational considerations.

In-town incubation would require the fertilized, water-hardened eggs to be transported from the egg collection site to an existing or newly constructed facility in Yakutat. The recirculating system would require pumps, filtration, ultraviolet treatment, aeration or oxygenation, temperature control, alarms, and backup power. In exchange for this additional equipment, the facility would provide the best routine access, monitoring capability, environmental control, weather protection, and ability to respond to equipment or fish-health concerns.

Regulatory and Permitting Considerations

YRAA has established August 2027 as its target for the first Chinook salmon egg collection. Meeting this schedule will require a project configuration that minimizes disturbance to the Situk River and adjacent lands and allows the principal agencies to evaluate a complete, clearly defined proposal.

Fish Collection, Propagation, and Release Authorization

For preliminary planning purposes, UAG has assumed that an ADF&G Aquatic Resource Permit could authorize broodstock collection, egg fertilization, incubation, transport, and release. ADF&G describes Aquatic Resource Permits as authorizing the collection and propagation of fish for scientific, educational, and qualifying propagative activities. The permit application identifies the collection methods, numbers, locations, seasons, transport, propagation activities, and final disposition of the fish or their progeny. Once a complete application is received, ADF&G generally acts on an Aquatic Resource Permit application within 45 days. Additional information is available on ADF&G's [Aquatic Resource Permit](#) webpage (ADF&G n.d.-a).

An early determination from ADF&G will be necessary to confirm whether the proposed initial production cycle qualifies as a feasibility study under an Aquatic Resource Permit. ADF&G identifies Aquatic Resource Permits as an available mechanism for salmon research and feasibility studies for potential private nonprofit hatchery production. Fish Transport Permits are generally used for established propagation programs that benefit common property fisheries, and operation of a private nonprofit salmon hatchery requires a separate hatchery permit. The hatchery permit process includes an extensive review of facility design, site suitability, effects on fisheries and wild stocks, and a public hearing. Additional information is available on ADF&G's [Hatchery Permitting Overview](#) webpage (ADF&G n.d.-c).

This regulatory classification is independent of which incubation equipment alternative is selected and is potentially the most important schedule question for the August 2027 objective.

ADF&G Fish Habitat Permit

Most activities occurring within an anadromous fish-bearing waterbody require authorization from the ADF&G Habitat Section under AS 16.05.841 through AS 16.05.871. Activities that typically require a Fish Habitat Permit include water withdrawals, stream crossings, installation of monitoring or other equipment, changes to the bed or banks, and other activities that may affect fish or fish habitat. Additional information is available on ADF&G's [Fish Habitat Permits](#) webpage (ADF&G n.d.-b).

The instream incubation alternative would likely receive the greatest ADF&G Habitat Section scrutiny because it would require equipment to be installed directly within the Situk Riverbed. Excavation, anchoring, backfilling, sediment disturbance, and the potential effects of the incubators on fish habitat and passage would need to be described in detail.

The streamside alternative would likely require a Fish Habitat Permit for its water intake, screened withdrawal system, discharge location, bank access, and any associated construction within or adjacent to the river.

The in-town alternative would have substantially less direct habitat disturbance, although withdrawal of Situk River water for egg take, initial system filling, or make-up water may still require a Fish Habitat Permit.

Water Use Authorization

An instream incubator would use the natural flow of the river and would not require a water withdrawal authorization. However, this does not eliminate the need for ADF&G Habitat approval or authorization from the owner or manager of the riverbed.

The streamside alternative would require a continuous water supply. Alaska Department of Natural Resources (ADNR) defines a significant water use as more than 5,000 gallons of consumptive use from a single source in one day, recurring consumptive use of more than 500 gallons per day for more than 10 days per year, nonconsumptive use of more than 30,000 gallons per day, or any use that could adversely affect existing water rights or the public interest. Depending on the final flow rate and operating period, a streamside facility could require a Temporary Water Use Authorization or a water right. Additional information is available on ADNR's [Alaska DNR Water Rights](#) webpage (ADNR n.d.)



Photo 11. Nine Mile Boat Launch during the August 13, 2026, site visit.

The anticipated one-time withdrawal of approximately 200 gallons for fertilization, water hardening, and egg transport is below the state's significant-use thresholds and would not ordinarily require an ADNR water right or Temporary Water Use Authorization. Initial filling and periodic make-up water for the in-town recirculation system may also remain below those thresholds. Nevertheless, any withdrawal from the fish-bearing Situk River may require an ADF&G Fish Habitat Permit.

USFS Special Use Authorization

A United States Forest Service (USFS) Special Use Authorization is expected to be required for organized egg collection activities, temporary occupancy, equipment staging, or construction on USFS-managed federal lands. A streamside incubation facility located on USFS-managed federal land would require a substantially more detailed authorization for the facility, intake and discharge lines, utilities, access, operations, maintenance, and eventual site restoration.

The USFS special-use process begins with a pre-application meeting to discuss the proposed use, potential land conflicts, probable timeframes, coordination with other agencies, environmental documentation, field review, fees, and bonding. The USFS also requires applicants to consider whether the proposed use can be accommodated on nonfederal land. Additional information is available on USFS's [USFS Special Use Permit Application Process](#) webpage (USFS n.d.).

The need to justify use of USFS-managed land, together with the environmental review associated with a permanent or seasonal streamside facility, makes the streamside alternative more complex from the USFS permitting perspective. An in-town facility on leased or purchased nonfederal property would largely avoid USFS facility permitting, although a Special Use Authorization may still be required for the field egg collection site.

Other Potential Authorizations

Digging into the Situk Riverbed, placing anchoring or fill material, constructing an intake or outfall, or filling adjacent wetlands could require authorization from the U.S. Army Corps of Engineers (USACE) under Section 404 of the Clean Water Act. If an individual Section 404 authorization is required, Alaska Department of Environmental Conservation (ADEC) Section 401 Water Quality Certification may also be necessary. Some nationwide or regional permits may already include state certification. Early consultation with the USACE would determine whether the selected design falls within federal jurisdiction and which permitting mechanism applies. Additional information is available on ADEC's [Alaska DEC Wetlands and Section 401 Certification](#) webpage (ADEC 2026).

An in-town facility would also require confirmation of property control, applicable City and Borough of Yakutat land-use and building requirements, electrical and plumbing requirements, and any conditions associated with process-water disposal. These local requirements are expected to be more conventional than the federal land and instream authorizations associated with the other alternatives.

Comparison of Permitting Complexity

Consideration	Instream Incubation	Streamside Incubation	In-Town Incubation
ADF&G propagation authorization	ARP or other ADF&G authorization required	ARP or other ADF&G authorization required	ARP or other ADF&G authorization required
ADF&G Habitat review	High, due to installation within the riverbed	Moderate to high, due to intake, discharge, access, and bank disturbance	Low to moderate, primarily for limited water withdrawal and egg collection
USFS authorization	Required if river access, staging, or installation occupies National Forest System land	High complexity for facility construction and long-term occupancy of National Forest System land	Limited primarily to the remote egg collection site
ADNR water authorization	No water withdrawal anticipated	May require Temporary Water Use Authorization or water right, depending on flow and duration	Unlikely if initial and make-up withdrawals remain below significant-use thresholds
USACE and ADEC review	Potential Section 404 and Section 401 review for excavation, anchoring, or fill	Potential review for intake, outfall, wetland fill, or access construction	Generally unlikely unless the selected property requires wetland fill or other work in regulated waters
Local development approvals	Minimal	Limited unless local jurisdiction applies	Property, building, electrical, plumbing, and land-use approvals
Principal permitting risk	Direct disturbance of anadromous fish habitat	Facility development and occupancy on USFS-managed land	Confirmation of ADF&G propagation pathway and local facility approvals
Relative permitting complexity	High	High	Lower

The two remote alternatives are complex for different reasons. Instream incubation would likely face the most challenging ADF&G Habitat review because the equipment would be installed directly within the Situk Riverbed. Streamside incubation would avoid placing the eggs and incubators directly in the river but would likely create the greatest USFS land-use review because it requires a facility, water system, utilities, and continuing occupancy adjacent to the river. The in-town alternative would shift most permitting away from federal lands and the river itself, resulting in the lowest anticipated site-development complexity.

Permit Sequencing and Agency Coordination

The USFS has indicated that the necessary ADF&G permits should be obtained before the USFS issues its Special Use Authorization. That sequencing is reasonable because the USFS will need assurance that ADF&G has approved the broodstock collection, incubation, release, and habitat-related activities before authorizing use of National Forest System lands.

However, YRAA should not wait for final ADF&G permit issuance before beginning discussions with the USFS. The USFS process specifically calls for a pre-application meeting, and early coordination will allow the USFS to identify site-selection criteria, required surveys, environmental documentation, design information, bonding, restoration requirements, and other issues that could affect the project schedule.

Accordingly, the most efficient approach is parallel agency consultation followed by coordinated permit issuance. YRAA can begin pre-application discussions with ADF&G, the USFS, and, as appropriate, ADNR and the USACE using the same conceptual project description and site drawings. ADF&G can determine the appropriate propagation permit pathway and define biological and habitat requirements while the USFS identifies the information needed for its land-use and environmental review. Formal applications can then be developed concurrently to the extent allowed by each agency, with final ADF&G authorizations provided to the USFS before issuance of the Special Use Authorization.

This approach does not change the agencies' respective authorities or eliminate sequential permit dependencies, but it should identify critical issues early and reduce the likelihood that a late request for additional information delays the August 2027 egg collection objective.

Summary of Available Supporting Data and Recommended Future Data Collection Efforts

Available Biological and Fisheries Data

A substantial body of biological and fisheries information is available to support the Situk River Chinook Salmon Rehabilitation Initiative. The studies by Johnson et al. (1992) and Thedinga et al. (1998) provide valuable information regarding juvenile life history, seasonal distribution, freshwater rearing, migration timing, smolt production, age composition, and marine survival. Collectively, these studies establish the predominantly ocean-type life history of Situk River Chinook salmon and provide a strong biological foundation for preliminary incubation planning, fry-release timing, production modeling, and future program evaluation.

ADF&G escapement estimates, stock-assessment reports, and fishery management records provide a comparatively long record of adult Chinook salmon abundance in the Situk River. These records document

historical and recent escapements, age and size composition, run timing, and the frequency with which escapement has fallen below the established goal range of 450 to 1,050 large Chinook salmon. Continued operation of the Situk River weir and associated stock-assessment activities will remain essential for evaluating population status, determining the availability of broodstock, and measuring the long-term response to rehabilitation efforts.

Existing Genetic Information

An existing genetic baseline has been developed for Situk River Chinook salmon. ADF&G's coastwide Chinook salmon genetic baseline includes 127 wild adult Situk River Chinook salmon collected in 1988 and from 1990 through 1992. The Situk population has been included in analyses using both microsatellite and single-nucleotide polymorphism markers and is identified as a Northeast Gulf of Alaska population (Gilk-Baumer et al. 2017; Schuster et al. 2021).

Development of a new genetic baseline does not appear necessary. Before broodstock collection begins, however, YRAA should coordinate with the ADF&G Gene Conservation Laboratory to confirm that the existing baseline is appropriate for the proposed rehabilitation program and determine whether contemporary tissue samples should be collected to supplement the historical collections. Genetic samples should also be collected from program broodstock in accordance with ADF&G direction to document broodstock composition and support long-term evaluation of the rehabilitation effort.

Existing Environmental and Facility-Planning Information

YRAA's document archive contains substantial hydrologic, water-quality, site-planning, and conceptual engineering information developed between approximately 2013 and 2019. Most of that work was undertaken to support development of a comparatively large chum salmon hatchery using water sources outside the Situk River watershed. YRAA has since suspended the chum salmon hatchery effort and shifted its focus to rehabilitation of Situk River Chinook salmon.

Consequently, most of the previous site-specific flow measurements, water-quality results, production assumptions, and facility concepts are not directly applicable to the current rehabilitation project. The earlier studies evaluated different water sources, locations, species, production levels, and operational objectives and should not be used as the design basis for the Situk River incubation program.

Certain elements remain useful as background. In particular, YRAA's previous hydrologic investigations identify the available U.S. Geological Survey (USGS) streamflow record for the Situk River and reference several years of historical USGS water-temperature data. These records should be obtained directly from USGS and evaluated for their period of record, completeness, monitoring location, and applicability to the proposed incubation program.

Recommended Water-Temperature Monitoring

Water from the Situk River near Nine Mile Bridge is the preferred source for the proposed incubation system because of its accessibility and proximity to existing infrastructure. The USGS streamgage at Nine Mile Bridge provides an existing record of river discharge and water temperature that can support preliminary evaluation and future facility planning. These data should be obtained and reviewed for completeness, seasonal coverage, and applicability to the anticipated incubation period.

Although the USGS record provides valuable site-specific information, it does not establish whether water temperatures at Nine Mile Bridge are representative of conditions in the principal Chinook salmon spawning reaches or farther downstream. A focused comparative monitoring program should therefore be implemented to confirm the suitability and representativeness of the preferred withdrawal location. Continuous temperature loggers should be installed at or immediately adjacent to the proposed Nine Mile Bridge withdrawal location, within a principal upstream Chinook salmon spawning reach, and at a downstream location representative of the anticipated fry-release area. If practicable, an intragravel logger should also be installed within suitable spawning habitat to characterize the temperatures naturally experienced by incubating eggs.

The loggers should operate concurrently at 60-minute intervals for at least one complete year and preferably for multiple years. Comparisons should include daily minimum, mean, and maximum temperatures; accumulated thermal units during the incubation period; the timing and duration of winter minimum temperatures; and responses to runoff and low-flow conditions. If temperatures at Nine Mile Bridge have a consistent relationship with temperatures in the spawning and release areas, the long-term USGS record could then be used to place the shorter comparative study in a broader historical context.

The objective of this monitoring is not necessarily to demonstrate that all locations have identical temperatures. Rather, it is to determine whether water at Nine Mile Bridge provides a suitable incubation regime and whether any consistent differences from natural spawning-area temperatures would need to be addressed through incubation scheduling, water-temperature control, or operational management.

Recommended Water-Quality and Water-Supply Evaluation

Water-quality evaluation should be centered on the preferred water-collection location near the Nine Mile Bridge. Existing USGS and YRAA records should first be reviewed to determine which parameters and seasons are adequately represented. Site-specific sampling should then characterize temperature, dissolved oxygen, pH, conductivity, alkalinity, hardness, turbidity, suspended solids, iron, manganese, and any additional parameters required by ADF&G for incubation-system planning and permitting.

A limited number of paired water-quality samples should initially be collected from the upstream spawning reach, the Nine Mile Bridge water-collection area, and the downstream release area. Sampling should represent the broodstock-collection and spawning period, fall and winter incubation conditions, spring runoff, and summer low-flow conditions. These comparisons would determine whether water collected near the Nine Mile Bridge differs materially from water in the spawning or release areas. If no biologically or operationally important differences are identified, subsequent monitoring can concentrate on the proposed collection location.

The Nine Mile Bridge location should also be evaluated as a practical and reliable point for periodically collecting the limited volume of Situk River water needed to fill and replenish the in-town recirculating incubation system. This evaluation should address seasonal river discharge, water depth and velocity at the proposed collection point, safe access throughout the anticipated collection period, portable pumping and fish-screening requirements, sediment and debris conditions, freezing and flood exposure, and the equipment and personnel needed to fill, secure, and transport the dedicated 275-gallon IBC totes. Collection methods should avoid unnecessary disturbance to the riverbed and banks and should remain practical under anticipated winter and spring conditions.

A project-specific water balance should be completed to estimate the initial system-fill volume, routine make-up-water requirements, collection frequency, number of IBC totes required, and appropriate reserve-storage capacity. The final determination of source-water adequacy should therefore consider water quality, the reliability and safety of periodic collection and transport, and YRAA's ability to maintain sufficient working and contingency storage at the incubation facility.

Recommended Biological and Program Monitoring

Additional biological monitoring should be developed as the rehabilitation program advances. Initial monitoring should focus on information needed for broodstock collection, incubation management, and evaluation of early program performance. Appropriate monitoring elements may include:

- Annual Chinook salmon spawning distribution and timing.
- Broodstock sex, age, size, maturity, and fecundity.
- Genetic tissue sampling from collected broodstock, as directed by ADF&G.
- Fish-health sampling and screening required by the ADF&G Fish Pathology Section.
- Green-egg-to-eyed-egg and eyed-egg-to-emergent-fry survival.
- Developmental timing and accumulated thermal units.
- Number, size, condition, and timing of fry released.
- Verification of the applied thermal otolith mark.
- Juvenile distribution and relative abundance following release.
- An index of downstream juvenile migration or smolt production.
- Identification of program-origin adults returning to the Situk River.

The monitoring program should be proportional to the scale of the rehabilitation effort and expanded in phases. Initial data collection should focus on confirming the suitability of the selected water source, establishing a natural incubation temperature profile, supporting preliminary design, and meeting ADF&G permitting requirements. Operational and biological monitoring can then be expanded as egg collection, incubation, and fry releases begin.

This phased approach will allow YRAA to build upon the substantial biological and fisheries information already available while limiting new data collection to information that directly supports the Situk River Chinook Salmon Rehabilitation Initiative.

Preliminary Recommendations Regarding Project Design Concepts and Implementation Approaches

Based on the alternatives evaluated, an accessible, in-town incubation facility using a recirculating water system appears to provide the greatest likelihood of success for a Situk River Chinook salmon rehabilitation program. It would offer substantially greater operational control, reliability, and evaluation capability than instream incubation, while avoiding the site limitations and costs associated with constructing and operating a gravity-fed streamside facility.

These recommendations are preliminary and are intended to provide the YRAA Board of Directors with a practical framework for advancing the project. They may also serve as a starting point for coordination and technical review with ADF&G and other applicable agencies. The production scale, equipment configuration, operating procedures, monitoring program, and implementation schedule should be

refined in response to agency input, final site conditions, and the additional information identified in this strategic plan.

The facility should be designed specifically for Chinook salmon egg incubation and the release of emergent unfed fry. The initial system capacity should be based on YRAA's approved egg-collection and fry-release objectives, with sufficient additional capacity to accommodate expected variation in egg survival, loading requirements, and annual production. A modular configuration is recommended so incubation capacity can be expanded or adjusted without requiring substantial modification of the entire system. The building layout and supporting infrastructure could also preserve the ability to accommodate other salmon species in the future, subject to separate biological evaluations and regulatory approvals.

Facility and Building Requirements

For preliminary planning purposes, YRAA should identify an accessible, in-town building with approximately 1,000 square feet of open interior space and a ceiling height of approximately 8 to 10 feet. The final space requirement should be refined after the production objective, incubation technology, source-water storage needs, and equipment configuration have been established.

The selected building should provide dependable electrical service, year-round access, freeze protection, ventilation, adequate lighting, and sufficient space around the incubation and water-treatment equipment for daily inspection and maintenance. The facility should also include appropriate drainage, washable work surfaces, secure chemical and equipment storage, and space for egg enumeration, mortality removal, sampling, recordkeeping, and other routine fish-culture activities.

Building access and floor loading should accommodate filled intermediate bulk container (IBC) totes. A 275-gallon tote would weigh approximately 2,440 pounds when filled with water. The building should therefore have a sufficiently wide access door, a smooth and level route for pallet-jack movement, and a floor capable of supporting the loaded tote and associated handling equipment. Its location should also allow trained personnel to reach the facility quickly in response to system alarms or other operational concerns.

Water Source, Collection, and Storage

Consistent with the project alternatives evaluated, Situk River water should remain the preliminary source water for the incubation program. Water withdrawn near the Nine Mile Bridge may provide an accessible collection point for delivery to an in-town facility. However, the suitability of that location should be confirmed through seasonal water-quality and temperature monitoring and comparison with conditions within the principal Chinook salmon spawning and incubation areas.

Reusable 275-gallon IBC totes are recommended for preliminary planning as the primary means of collecting, transporting, and storing Situk River water. Their integrated pallet bases would allow the totes to be transported in an appropriately rated pickup truck or trailer, unloaded at the facility with a forklift, and positioned inside the building with a pallet jack. A bottom outlet would facilitate controlled transfer of water into the recirculating system.

Only new totes or totes dedicated exclusively to Situk River water should be used. The selected containers and valves should be confirmed as suitable for fish-culture water and should not have previously contained chemicals, petroleum products, or other potentially harmful materials. Written procedures

should address tote identification, inspection, cleaning, disinfection, filling, transport, unloading, storage, and transfer into the incubation system.

The recirculating system should be designed to minimize water use while providing sufficient make-up water to maintain acceptable water quality. In addition to the initial system fill, replacement water will be required to offset evaporation and water removed through cleaning, sampling, equipment maintenance, controlled overflow, and periodic water exchange. A project-specific water balance should be completed to estimate the initial fill volume, normal make-up requirements, collection frequency, number of IBC totes required, and an appropriate contingency supply.

Multiple IBC totes could be maintained at the facility to provide both working and reserve storage. The final number should be based on the completed water balance, anticipated collection schedule, and the volume needed to sustain essential operations during short-term transportation or access interruptions. The facility layout should provide enough space to handle and connect the totes safely without obstructing access to incubation or emergency equipment.

Incubation Equipment

Heath tray incubators are recommended as the primary technology for continued design development. Heath trays are a simple and proven stacked-incubator system used extensively at Alaska salmon hatcheries. They provide direct access for routine inspection, mortality removal, enumeration, sampling, and observation of egg, alevin, and unfed fry development. Depending on Chinook salmon egg size and the approved loading standard, an individual tray may accommodate approximately 10,000 eggs.



Figure 4. UAG Incubation System Preliminary Conceptual Design

The final design should determine the number of trays required from the approved egg-production objective, anticipated egg-to-fry survival, and the need for operational flexibility. For preliminary planning, the system should be designed around a performance objective of greater than 90 percent survival from viable fertilized green eggs to emergent unfed fry. This objective should be treated as a design and operational target rather than a guaranteed outcome.

Moist-air incubation should remain under consideration as a potential supplemental technology for the green-to-eyed egg period. It could reduce water demand and provide precise temperature control during early development, after which eyed eggs could be transferred to Heath trays for hatching, alevin development, and fry emergence. Its potential water-conservation benefits should be weighed against the additional equipment, egg handling, operating procedures, staff training, and system complexity it would introduce. Unless those benefits are demonstrated to be necessary or cost-effective, an all-Heath-tray configuration would offer the more straightforward initial implementation approach.

Recirculation and Water-Treatment System

The incubation system should include appropriately sized tanks or sumps, duty and standby circulation pumps, distribution piping, flow controls, mechanical filtration, and ultraviolet treatment. Mechanical filtration should remove sediment and suspended material before the water enters the incubators and should help maintain water clarity within the recirculating system. Ultraviolet treatment should be incorporated to reduce, although not eliminate, the risk of introducing or circulating fish pathogens associated with untreated surface water.

The need for additional treatment components should be evaluated through the water-quality assessment and final system design. Equipment should be arranged to allow individual components to be isolated, serviced, or replaced without unnecessarily interrupting water delivery to the incubators. The system should also include accessible sampling points and instruments for measuring flow, temperature, dissolved oxygen, and other operational parameters identified during final design.

Temperature Control and Thermal Otolith Marking

A properly sized heater/chiller should be included to maintain the selected incubation-temperature profile and coordinate fry emergence with the natural emergence timing of Situk River Chinook salmon. The operating plan should use available Situk River temperature records and subsequent site-specific monitoring to develop an incubation-temperature schedule that approximates natural thermal conditions and supports the desired release period.

The heater/chiller should also provide the controlled temperature changes necessary to apply a thermal otolith mark to the production group. A thermal otolith mark is created by programmed changes in incubation temperature that form a recognizable banding pattern in the developing fish's otolith, or ear bone. The mark could subsequently be identified through otolith examination and used to distinguish project-origin fish from naturally produced Chinook salmon.

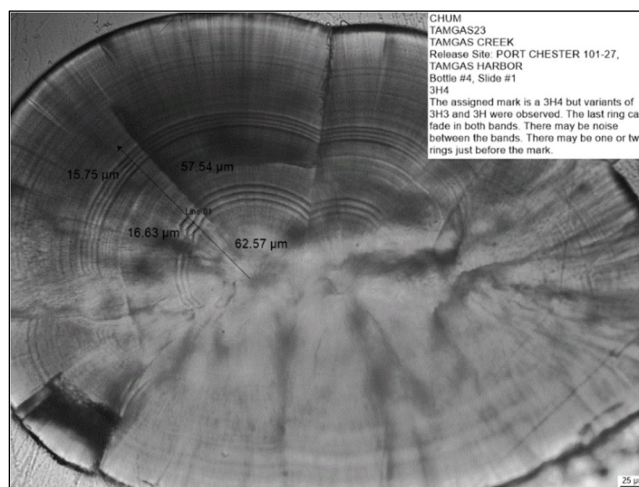


Figure 5. UAG applied thermal otolith mark on Tamgas Creek Hatchery BY23 chum salmon.

The marking schedule should be developed in coordination with ADF&G and integrated with the broader monitoring and evaluation program. Otolith samples should be collected and examined before release to confirm that the intended mark was successfully applied and can be reliably identified. Subsequent sampling of juvenile and adult Chinook salmon could then be used to estimate the contribution of the rehabilitation program to juvenile production and future Situk River escapements.

Monitoring, Alarms, and System Redundancy

Because the recommended facility would depend on continuous water circulation and temperature control, protection from electrical and mechanical failure should be treated as a fundamental design requirement. Critical equipment should incorporate redundancy wherever practical, including duty and

standby circulation pumps, replacement components, and an emergency source of electrical power capable of supporting essential system functions.

The facility should include remote alarms for power loss, pump failure, high or low water level, abnormal water temperature, low flow, and other critical operating conditions. Internet-enabled controls should notify designated personnel by telephone or text message when conditions move outside established limits. Local audible and visual alarms should also be provided so system protection does not depend entirely on internet or cellular service.

Automation should supplement, rather than replace, daily inspection by trained personnel. Operating procedures should establish inspection frequency, alarm-response responsibilities, emergency contacts, equipment-maintenance schedules, and the actions required during power failures, component failures, water-delivery interruptions, or adverse water-quality conditions.

Production Monitoring and Evaluation

The controlled incubation environment should be used to establish complete production records from egg collection through fry release. Recommended records include broodstock numbers and characteristics, egg collections, fertilization estimates, egg inventories, developmental stage, incubation temperature and accumulated thermal units, mortality, disease-screening results, thermal-mark verification, and the number, timing, and location of fry releases.

These records would allow YRAA to calculate survival through each incubation stage and document the number of unfed fry released into the Situk River with substantially greater certainty than would be possible with instream incubation. The production records should be integrated with subsequent juvenile and adult monitoring so program performance can be evaluated over time and production strategies can be adjusted as additional information becomes available.

Recommended Implementation Approach

A phased and adaptive implementation approach is recommended. This would allow YRAA to advance the project efficiently while resolving the remaining design, water-supply, permitting, and operational questions before committing to final equipment purchases and facility modifications.

YRAA should consider retaining UAG to provide project management and technical support throughout implementation. UAG's continued involvement would preserve continuity between the strategic planning recommendations, final system configuration, equipment selection, installation, commissioning, and initial operation of the facility. UAG can also provide the recommended equipment and installation services, coordinate specialized contractors as needed, prepare written operating procedures, and train YRAA personnel. This integrated approach would reduce the number of separate vendors and consultants YRAA must coordinate and provide a clear line of responsibility as the project progresses from planning into operation.

Phase 1: Confirm the Design Basis. YRAA should first establish the proposed annual egg-collection objective, desired fry-release range, target emergence period, and anticipated initial operating duration. This phase should also confirm the availability and suitability of an in-town building; characterize Situk River water near the proposed Nine Mile Bridge withdrawal location; and determine the number of 275-gallon IBC totes required for the initial system fill, routine make-up water, and contingency storage. Vehicle payload, forklift and pallet-jack capacity, building access, floor loading, electrical capacity,

drainage, and emergency-power options should also be verified. UAG can lead this phase on YRAA's behalf and translate the resulting information into a defined basis for final system design.

Phase 2: Complete Agency Coordination and Preliminary Design. The preliminary facility design should be developed concurrently with early coordination with ADF&G and other applicable agencies. The design should address egg collection and transport, incubation capacity, source-water handling, water treatment, temperature control, thermal marking, fish-health procedures, fry release, and monitoring and evaluation. This coordination should confirm that the proposed facility, production level, and operating plan are compatible with the anticipated authorization and permitting pathway before major equipment is purchased. UAG can facilitate this coordination, prepare the necessary technical information, and serve as YRAA's primary point of contact with participating agencies and technical specialists.

Phase 3: Finalize the Facility Design and Procure Equipment. Following confirmation of the design basis and agency requirements, YRAA should complete the equipment layout, hydraulic calculations, water balance, electrical requirements, control strategy, emergency systems, and component specifications. The final layout should identify designated locations for working and reserve IBC totes and provide safe connections for transferring water into the recirculating system.

UAG can prepare the final equipment configuration and provide the specified incubation, recirculation, water-treatment, temperature-control, monitoring, and water-handling equipment. Providing the principal equipment through UAG would help ensure that individual components are properly sized and compatible and that the complete system functions as intended. UAG can also coordinate freight and delivery to Yakutat and identify long-lead components early enough to avoid delaying the intended egg-collection season.

Phase 4: Install, Commission, and Test the System. Facility modifications and equipment installation should be completed sufficiently in advance of the first planned eggtake to allow comprehensive testing. UAG can provide installation and commissioning services for the fish-culture and recirculation equipment and coordinate with local or specialized contractors for building, electrical, and other supporting work.

UAG's commissioning services can include hydraulic and leak testing, calibration of sensors and controls, verification of heater/chiller capacity, ultraviolet-system testing, alarm and notification testing, emergency-power testing, and simulated responses to pump, power, and water-supply failures. Whenever practicable, the complete system should be operated with Situk River water for an extended period before eggs are introduced. UAG can document system performance, correct equipment or operational deficiencies, and confirm that the system and trained personnel are prepared for the first production cycle.

Phase 5: Develop Operating Procedures and Train Personnel. YRAA should adopt written procedures for source-water collection and transport, system startup, egg receipt, incubation, mortality removal, sanitation, biosecurity, temperature management, thermal marking, sampling, recordkeeping, emergency response, fry enumeration, and release. UAG can prepare these procedures specifically for the final facility configuration and anticipated Situk River Chinook salmon production program.

UAG can also provide hands-on training for designated YRAA personnel. Training should include normal system operation, daily fish-culture duties, equipment inspection and maintenance, production recordkeeping, alarm response, emergency procedures, and troubleshooting. Personnel should

demonstrate their ability to operate the system and respond to simulated failures before the first production group is accepted.

Phase 6: Begin Initial Production and Apply Adaptive Management. The first production cycle should be operated at a scale supported by the approved egg-collection objective, demonstrated facility capacity, trained staffing, and available water supply. UAG can provide on-site and remote technical support during egg collection, fertilization, egg transport, system startup, incubation, thermal-mark application, fry enumeration, and release. Continued UAG involvement during the initial production cycle would give YRAA direct access to experienced hatchery personnel during the period when operational questions and system adjustments are most likely to occur.

Following the first release, UAG can assist YRAA with evaluating production results, documenting survival and thermal-mark performance, identifying operational improvements, and updating procedures for subsequent production cycles. This review would provide the technical basis for determining whether changes in production scale, equipment, staffing, or facility capacity are warranted.

Preliminary Cost Framework

The following preliminary cost categories are recommended for project budgeting. Budget allocations should be refined after the site, production objective, incubation technology, water-delivery approach, and equipment configuration have been confirmed. Equipment allocations should include applicable freight and delivery costs to Yakutat.

Project component	Preliminary scope	Budget allocation
Building preparation and interior improvements	Drainage, washable surfaces, lighting, ventilation, freeze protection, equipment supports, access improvements, and work areas	\$_____
Source-water collection, transport, and storage	Dedicated 275-gallon IBC totes, tote fittings, transfer hoses, collection pump, transport restraints, forklift or unloading provisions, pallet jack, and contingency storage capacity	\$_____
Incubation equipment	Heath trays, racks, manifolds, egg-handling equipment, and any selected moist-air components	\$_____
Recirculation equipment	Sumps, tanks, duty and standby pumps, piping, valves, flow controls, and related fittings	\$_____
Mechanical filtration and UV treatment	Source-water and recirculation treatment equipment	\$_____
Heater/chiller and thermal-marking controls	Temperature-control equipment, sensors, programming, and mark-verification support	\$_____
Electrical and control systems	Electrical upgrades, control panels, instrumentation, data logging, and remote alarms	\$_____
Emergency power and equipment redundancy	Generator or equivalent emergency power, standby equipment, and critical spare components	\$_____
Fish-culture, sampling, and biosecurity equipment	Enumeration, sampling, sanitation, protective equipment, and routine operational supplies	\$_____
Egg collection, fertilization, and transport equipment	Broodstock and egg take equipment, egg transport containers, and field support items	\$_____
Freight and project logistics	Transportation and delivery of equipment and materials to Yakutat	\$_____
UAG project management and implementation support	Project coordination, schedule and budget oversight, vendor coordination, technical review, and communication with YRAA and participating agencies	\$_____
Final design and agency coordination	Equipment configuration, technical specifications, hydraulic and water-balance calculations, design coordination, and agency consultation	\$_____

Project component	Preliminary scope	Budget allocation
Equipment installation and commissioning	UAG installation and commissioning services, including system integration, startup, testing, calibration, performance verification, deficiency correction, and coordination with specialized contractors	\$ _____
Operating procedures and personnel training	Facility-specific written procedures, training materials, hands-on operator instruction, and emergency-response exercises	\$ _____
Initial production-cycle support	On-site and remote technical assistance during egg collection, fertilization, incubation, thermal marking, fry enumeration, and release	\$ _____
Initial monitoring and evaluation	Thermal-mark verification, production monitoring, sampling, data management, and reporting	\$ _____
Post-season evaluation and operational refinement	Production review, performance evaluation, recommended system adjustments, and procedure updates	\$ _____
Contingency	Allowance for design development, site conditions, freight variability, and price changes	\$ _____
Total preliminary project cost		

Recommended Permitting and Agency Coordination Pathway

Based on the regulatory considerations and conceptual design presented in the preceding sections, YRAA should pursue a phased and coordinated multi-agency permitting pathway centered on an initial ADF&G Aquatic Resource Permit feasibility study. ADF&G would lead review of the project's biological, propagation, fish-health, genetic, habitat, marking, and release components, while the USFS and other potentially applicable agencies are consulted in parallel regarding their respective authorities. This approach would allow permitting requirements to be identified early, formal applications to be developed concurrently to the extent allowed by each agency, and sequential dependencies to be addressed without delaying overall project development.

The recommended in-town Yakutat incubation facility supports this pathway by minimizing the regulatory complexity associated with project development. The proposed facility would use a limited quantity of Situk River water transported in dedicated 275-gallon IBC totes and treated within a recirculating incubation system. It would not require a permanent river intake, water-supply pipeline, streamside building, or continuous discharge to the Situk River. Fertilized eggs would be transported to the facility, incubated in modular Heath trays, thermally marked, and returned to the Situk River as emergent unfed fry.

Strategic Plan as a Pre-Application Document

Following acceptance by the YRAA Board of Directors, this strategic plan should be used as a common pre-application planning document for opening dialogue with ADF&G, the USFS, and other applicable agencies. The report documents the project's purpose, biological considerations, site evaluations,

alternatives considered, recommended conceptual design, preliminary operating approach, regulatory considerations, and proposed implementation pathway. Collectively, this information should give the participating agencies a sufficiently complete and consistent understanding of the proposed project to provide meaningful preliminary guidance.

Initial transmittal should include a concise cover letter explaining that YRAA is seeking preliminary agency review of a proposed Aquatic Resource Permit feasibility study and the associated supporting activities. The cover letter should clarify that the strategic plan is a conceptual planning document rather than a formal permit application. Agency-specific correspondence may identify the particular questions within each agency's jurisdiction, including propagation authorization, fish habitat, use of National Forest System lands, water withdrawal, wetlands, and local facility requirements.

Using the completed report in this manner should help identify agency concerns before formal applications are prepared, reduce unnecessary duplication, and allow portions of the report to be adapted or incorporated by reference into subsequent permit documents. It will not eliminate the need for agency-specific application forms or supplemental information, but it should allow those materials to be developed from a common project description and focus on the information each agency determines is necessary.

Aquatic Resource Permit Feasibility Study

YRAA should present the initial project phase as a limited feasibility study under an Aquatic Resource Permit. The permit application should request authorization for the complete project cycle, including broodstock or gamete collection, fertilization, egg transport, incubation, temperature manipulation, thermal otolith marking, fry transport, release, sampling, and reporting.

The feasibility study should be conservative in scale and encompass one complete operating cycle. Its purpose would be to determine whether:

- An adequate and representative broodstock sample can be collected without materially affecting natural production;
- Eggs can be fertilized and transported successfully from the Situk River to the Yakutat facility;
- The recirculating incubation system can maintain suitable water quality and temperature;
- Survival can exceed the preliminary objective of 90 percent from viable green egg to emergent fry;
- The heater and chiller can reliably apply an ADF&G-approved thermal otolith mark;
- Emergent fry can be safely transported and released at an approved Situk River location;
- The equipment, alarms, emergency power, and redundant systems perform reliably;
- Locally based personnel can be trained to operate and monitor the facility; and
- The project can generate the records and biological information needed to evaluate future production.

ADF&G's review should proceed concurrently with preliminary discussions with the USFS and other potentially applicable agencies. YRAA would not need to wait for the ADF&G pre-application meeting or final permit decision before initiating those discussions. However, ADF&G guidance regarding the appropriate propagation pathway, acceptable project scale, broodstock collection, and release requirements should remain central to development of the overall feasibility-study proposal.

The initial production objective should be sufficient to provide a meaningful biological and operational evaluation while remaining appropriately conservative relative to the available Situk River Chinook salmon broodstock. The feasibility phase should not be presented as establishing the final production level. Its purpose is to demonstrate the viability of the recommended approach and provide information for future agency and YRAA decisions.

Focusing first on the Aquatic Resource Permit pathway would avoid prematurely entering the more extensive Private Nonprofit Hatchery Permit process. Following completion of the feasibility study, YRAA and ADF&G could use project-specific results to determine whether the program should continue under another limited authorization, be modified, or advance toward a Private Nonprofit Hatchery Permit.

ADF&G Review and Pre-Application Meeting

The strategic plan should initially be provided to the ADF&G personnel responsible for Aquatic Resource Permits, salmon rehabilitation, fisheries management, fish habitat, fish health, genetics, and otolith marking. Appropriate Yakutat-area biologists and fishery managers should be included so local management considerations are incorporated from the outset.

YRAA should request a coordinated pre-application meeting after ADF&G has had an opportunity to review the report. The meeting should focus on confirming:

- Whether an Aquatic Resource Permit is the appropriate authorization for the feasibility study;
- The appropriate applicant or permittee;
- An acceptable initial broodstock and egg-collection level;
- Broodstock-selection and genetic safeguards;
- Fish-health examination and sampling requirements;
- Requirements for the thermal otolith marking plan;
- Acceptable fry-release locations and timing;
- Monitoring, sampling, and reporting expectations;
- Supporting habitat and water-use authorizations;
- Additional information needed for a complete application; and
- A review schedule compatible with the intended egg-collection season.

YRAA should also ask ADF&G to identify which portions of the strategic plan may be incorporated into or referenced by the formal application. This would allow YRAA to build upon the completed planning work rather than recreating the same biological, technical, and operational descriptions in separate documents. The earlier YRAA Fish Resource Permit application and related ADF&G records from 2009 should be included as background if they can be located. Those records may help identify previously considered project conditions and agency concerns, although the proposed feasibility study should be developed under current Aquatic Resource Permit requirements and based on the present conceptual design.

Conversion to a Formal Application

Following the pre-application meeting, the applicable portions of the strategic plan should be converted into a focused Aquatic Resource Permit application and feasibility-study plan. Additional information

should be prepared in response to ADF&G's direction rather than developed speculatively before agency review.

The resulting application package is expected to include:

- Final feasibility-study objectives and performance measures;
- Authorized broodstock and egg-collection levels;
- Collection, spawning, and fertilization procedures;
- Egg and fry transportation procedures;
- Facility and process-flow diagrams;
- Incubation and recirculating-water system descriptions;
- Fish-health, sanitation, and biosecurity procedures;
- Water-quality and temperature-monitoring procedures;
- A thermal otolith marking plan;
- Emergency response and equipment-failure procedures;
- System commissioning and personnel training plans;
- Fry-release and monitoring procedures; and
- Reporting and post-season evaluation requirements.

Maintaining consistency among the strategic plan, permit application, conceptual design, installed equipment, and operating procedures will be important. Changes resulting from agency review should be documented and incorporated across the applicable project materials.

As the Aquatic Resource Permit application and feasibility-study plan are developed, the applicable project descriptions, water volumes, collection methods, site drawings, and operating assumptions should also be provided to the USFS and other reviewing agencies. Supporting applications should be prepared concurrently where practicable. Any agency-specific revisions should be documented and incorporated across the applicable project materials so that all agencies review a consistent proposal.

Supporting Agency Coordination

Supporting agency coordination should proceed in parallel with ADF&G review rather than waiting until the Aquatic Resource Permit pathway is fully resolved. Early consultation would allow each agency to identify its jurisdiction, information requirements, review schedule, and any dependencies affecting final permit issuance.

YRAA should initiate a USFS pre-application discussion regarding broodstock collection, egg collection, equipment staging, temporary occupancy, water withdrawal, and other activities that may occur on National Forest System lands. The discussion should identify the proposed locations and methods, determine whether a Special Use Authorization would be required, and clarify any site review, environmental documentation, restoration, bonding, or scheduling requirements. Although the USFS has indicated that the necessary ADF&G permits should be obtained before it issues its authorization, consultation and preparation of the supporting materials can proceed while ADF&G review is underway.

The ADF&G Habitat Section and ADNR should also be consulted regarding the proposed collection of Situk River water at or near the Nine Mile Bridge. These reviews should use the preliminary water volumes,

collection frequency, portable pumping and screening methods, access procedures, and seasonal operating period developed for the feasibility study. Early consultation should determine whether a Fish Habitat Permit, Temporary Water Use Authorization, or other authorization would be required.

Coordination with the USACE and ADEC should begin when sufficient site and activity information is available to determine whether the project would involve regulated waters, wetlands, dredged or fill material, or a discharge requiring federal or state review. If the selected in-town site and portable water-collection approach avoid these jurisdictional triggers, the agencies may be able to confirm that no further application is necessary.

Facility-related coordination should begin as soon as YRAA identifies one or more candidate buildings or parcels in Yakutat. A previously developed upland site with suitable utilities, access, drainage, structural capacity, and room for future expansion should minimize additional permitting requirements. Applicable property, land-use, building, electrical, plumbing, and wastewater-disposal requirements should be confirmed with the City and Borough of Yakutat during site evaluation.

YRAA should use the same conceptual project description, site information, water-use assumptions, and drawings throughout these agency discussions. Formal applications may then be developed concurrently to the extent permitted by each agency, while recognizing that final issuance may remain sequential. In particular, final ADF&G authorizations may need to be provided to the USFS before the Forest Service issues its Special Use Authorization.

UAG Technical and Permitting Support

UAG is well positioned to provide continuity from strategic planning and conceptual design through permitting and implementation. Under a subsequent professional services agreement, UAG could serve as YRAA's project and permitting lead or provide targeted assistance for selected portions of the process.

UAG's services could include preparing agency cover letters and meeting materials; facilitating coordinated pre-application discussions with ADF&G, the USFS, and other applicable agencies; documenting agency direction; converting the strategic plan into the Aquatic Resource Permit application and feasibility-study plan; coordinating supporting permit applications and agency reviews; responding to agency comments; and maintaining a consolidated permitting schedule and document record.

UAG could also provide equipment procurement and installation, system commissioning, written operating procedures, personnel training, initial-cycle technical support, and preparation of the post-season feasibility report. Using a consistent technical team throughout the process would help maintain alignment among the conceptual design, permit commitments, installed equipment, and actual facility operations.

YRAA would retain responsibility for policy, funding, and permit decisions while using UAG's professional services to facilitate the technical and administrative work necessary to advance the project.

Transition to Implementation

The recommended pathway begins by using this strategic plan to open parallel pre-application discussions with ADF&G, the USFS, and other potentially applicable agencies. ADF&G guidance regarding the Aquatic Resource Permit feasibility study would remain central to defining the biological and operational proposal,

while input from the other agencies would be incorporated concurrently into supporting authorizations, final design, facility development, and implementation planning.

Successful completion of the feasibility study would provide YRAA and ADF&G with project-specific information on broodstock collection, incubation survival, water use, thermal marking, equipment reliability, personnel capability, and fry release. Those results would form the basis for determining the appropriate scale, design modifications, monitoring requirements, and long-term permitting pathway for subsequent project phases.

The following prioritized implementation roadmap translates this permitting strategy into an ordered series of project-development phases and milestones. The final recommended next steps then identify the immediate actions YRAA should take to initiate agency coordination and begin advancing the feasibility study.

Prioritized Implementation Roadmap

The recommended in-town incubation concept should be advanced through a sequence of coordinated actions and decision points that allow YRAA to resolve regulatory, operational, and financial uncertainties before making progressively larger commitments. The highest near-term priority is to establish an agency-supported feasibility-study pathway for an initial Chinook salmon egg-to-fry production cycle. Subsequent development should be guided by the results of that study and coordinated with ADF&G management objectives for the Situk River Chinook salmon stock.

Immediate Project Development

YRAA should begin by using this strategic plan as a discussion document for early coordination with ADF&G. The report can introduce the project purpose, preferred facility concept, proposed source-water approach, preliminary production objectives, and intended rehabilitation role without requiring the agencies to respond to a completed permit application. This early coordination should help identify concerns, clarify information needs, and reduce the potential for avoidable revisions during formal application review.

The primary regulatory objective should be confirmation that an Aquatic Resource Permit is the appropriate pathway for conducting an initial feasibility study. Discussions should define the expected scope of the study, including egg-collection and release locations, initial egg numbers, broodstock handling, fish-health requirements, marking and monitoring methods, and reporting expectations. The agencies should also identify any additional approvals that may be required for water collection, facility development, temporary activities near the river, or other project components.

At the same time, YRAA should identify and secure an appropriate in-town site and refine the anticipated project budget and funding strategy. Site control is an important schedule consideration because final design, permitting, equipment procurement, and facility preparation will depend on the characteristics and availability of the selected location.

Initial development milestone: Agreement on a feasible regulatory pathway, a defined scope for the initial study, and an acceptable in-town site-development strategy.

Preseason Development and Operational Readiness

After receiving preliminary agency guidance, YRAA should incorporate that direction into the feasibility-study plan and Aquatic Resource Permit application. Facility planning can then advance from the conceptual recommendations presented in this report to a site-specific design, equipment package, implementation budget, and construction or installation schedule.

Project scheduling should work backward from the anticipated August egg-collection period. Adequate time should be provided for permit review, funding decisions, equipment procurement, facility preparation, system testing, personnel training, and correction of any deficiencies identified during commissioning. Long-lead equipment and seasonal transportation constraints should be considered when establishing the schedule.

Formal permitting and substantial procurement should remain coordinated so that YRAA does not commit significant resources before the feasibility-study approach is considered acceptable by the appropriate agencies. Similarly, eggs should not be collected until the required permits have been issued and the facility, procedures, staffing, and contingency measures have been demonstrated to be operationally ready.

UAG can assist YRAA during this stage by facilitating agency coordination, preparing technical and permit-support materials, refining the facility design, providing equipment and installation services, managing project implementation, commissioning the system, preparing written procedures, and training personnel.

Preseason milestone: Receipt of required authorizations and documented confirmation that the facility and operating program are ready before egg collection begins.

Initial Production Cycle and Evaluation

The initial egg-to-fry production cycle should be treated as a feasibility study rather than the beginning of an assumed full-scale production program. Its purpose should be to determine whether Situk River Chinook salmon eggs can be collected, transported, incubated, marked, and released using the recommended facility concept while meeting agency requirements and acceptable biological and operational performance standards.

Monitoring should document survival by developmental stage, water quality and temperature control, fish-health observations, equipment reliability, labor requirements, water-transport needs, operational problems, and actual costs. The previously identified egg-to-fry survival objective of greater than 90 percent should be used as a planning and evaluation objective rather than a guaranteed outcome. Release information and thermal-mark validation should also be documented as required by the permit and study plan.

Following fry release, YRAA should prepare a feasibility report that compares actual results with the study objectives and identifies any facility, procedural, staffing, or monitoring changes needed before another production cycle is considered.

Feasibility milestone: Completion and evaluation of the first permitted production cycle, followed by an informed decision on whether the program should be repeated, modified, expanded, or discontinued.

Long-Term Program Development

If the feasibility study demonstrates acceptable biological and operational performance, YRAA can work with ADF&G to establish an appropriate schedule and scale for continued Chinook salmon production. Expansion should occur incrementally and should be based on demonstrated facility performance, sustainable funding, available broodstock, agency management objectives, and the ability to monitor program results.

Long-term evaluation should extend beyond incubation survival and fry release. Thermal-mark recovery, juvenile monitoring, adult-return information, and other available stock-assessment data may eventually help determine whether the program is contributing to Situk River Chinook salmon rehabilitation. Because meaningful adult-return information will require several years, the program should use annual operational results for short-term refinement while maintaining a longer-term framework for evaluating rehabilitation benefits.

The recommended facility may also create future opportunities for sockeye or coho salmon work. Those opportunities should remain secondary to establishing the Chinook salmon feasibility program and should be considered only through separate biological, regulatory, and financial evaluations. Potential sockeye salmon initiatives may require additional nursery-lake and limnological studies before an incubation or stocking program could be justified.

Long-term milestone: Establishment of an agency-supported, financially sustainable Chinook salmon rehabilitation program and evaluation of additional opportunities only after the initial program has demonstrated success.

Recommended Next Steps for Advancing Project Development

To maintain project momentum, YRAA should focus initially on the decisions and coordination needed to establish an agency-supported feasibility study. The following actions are recommended in priority order.

1. Confirm YRAA's Preferred Project Direction

The YRAA Board should review this strategic plan and confirm its general support for advancing the recommended in-town recirculating incubation concept. This decision would not commit YRAA to facility construction or long-term production. It would authorize further agency coordination, site evaluation, feasibility-study development, and preliminary cost and funding analysis.

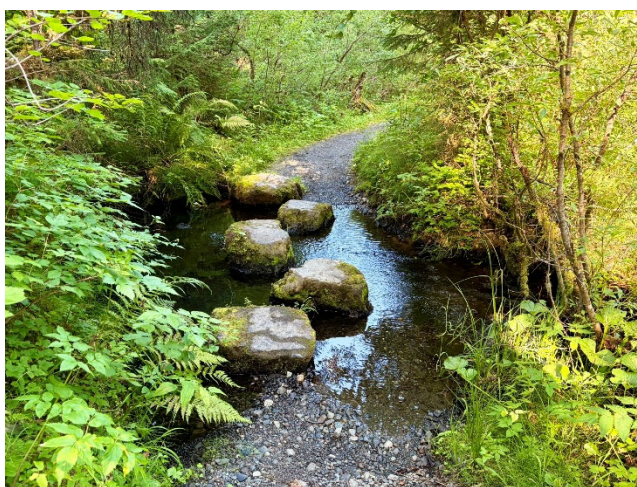


Photo 12. Step pathway across small creek on Middle Situk Trail downstream of the Nine Mile Bridge during the August 13, 2026, site visit.

2. Consider Retaining UAG for Continued Project Support

YRAA should consider retaining UAG under a subsequent professional services agreement to facilitate the permitting and agency coordination process and provide technical support during the next stage of project development. UAG's involvement in the strategic planning initiative and conceptual design provides

continuity and familiarity with the project's biological objectives, proposed facility, operating approach, and implementation needs.

Continued UAG involvement would help maintain consistency among this strategic plan, the feasibility-study design, agency discussions, permit applications, and subsequent facility planning. The scope of services could include organizing and participating in agency meetings, refining the feasibility-study plan, assisting with preparation of permit materials, responding to technical questions, and coordinating the biological, operational, and facility components of the proposed project. Any subsequent agreement should define the authorized scope, schedule, deliverables, and budget before additional services begin.

3. Initiate Preliminary Agency Coordination

Following Board review and authorization to proceed, YRAA should share the strategic plan with appropriate ADF&G representatives as an initial discussion document. A coordination meeting should then be requested to present the project, explain the proposed feasibility-study approach, and obtain agency guidance before preparing formal applications.

The primary objective should be to confirm the suitability of the Aquatic Resource Permit pathway and identify the biological, fish-health, marking, monitoring, and reporting information needed for an application. The discussion should also identify any additional approvals that may apply to source-water collection, facility development, or other project activities.

4. Define the Initial Feasibility Study

Using agency feedback, YRAA should develop a concise feasibility-study plan that defines:

- The initial egg number and broodstock requirements
- Egg-collection, fertilization, and transportation methods
- Incubation and water-management procedures
- Fish-health and biosecurity measures
- Thermal otolith marking and validation
- Fry-release location, timing, and methods
- Performance objectives and monitoring requirements
- Reporting and evaluation criteria

The study should be limited enough to control biological and financial risk while producing meaningful information about the feasibility of the proposed program.

5. Secure an Appropriate In-Town Site

YRAA should identify and obtain control of a suitable site before advancing detailed facility design or making major equipment purchases. The site should be evaluated for utility availability, vehicle and material-handling access, drainage, security, year-round accessibility, emergency response, and the ability to accommodate future modular expansion.

If multiple sites are available, they should be compared using consistent operational, cost, schedule, and ownership criteria. The preferred location should be selected early enough to support site-specific design and permitting.

6. Prepare a Project Budget, Funding Plan, and Schedule

Once the feasibility-study scope and preferred site are better defined, YRAA should prepare a project-development budget addressing facility preparation, equipment, installation, permitting, source-water collection, egg take activities, staffing, operation, monitoring, and contingency needs.

Potential funding sources should be evaluated concurrently. The implementation schedule should work backward from the targeted August egg-collection period and include sufficient time for agency review, funding authorization, procurement, construction or renovation, commissioning, and personnel training. Conducting the first egg collection during the next available spawning season may be achievable, but only if permitting, site control, funding, and operational readiness are completed in time.

7. Advance Permitting and Site-Specific Design

After preliminary agency consultation and site selection, YRAA should authorize preparation of the Aquatic Resource Permit application and supporting study materials. The facility concept should then be refined into a site-specific design and equipment package consistent with the proposed feasibility study and agency requirements.

Permitting, design, and procurement should remain closely coordinated. Significant equipment purchases or construction commitments should be made only after YRAA has reasonable confidence that the study can be permitted and implemented as proposed. Facility development should also allow adequate time for equipment installation, system testing, commissioning, preparation of written operating procedures, and personnel training before eggs are introduced.

8. Establish a Project Management and Decision Process

YRAA should designate a project representative responsible for coordinating Board direction, agency communications, site-development activities, funding, schedules, and technical support. Regular project updates should be provided to the Board, with clearly identified decisions required at each major milestone.

Before authorizing egg collection, YRAA should confirm that:

- Required permits and approvals have been issued
- The facility has been commissioned and tested
- Written operating and emergency procedures are complete
- Qualified personnel have been trained and scheduled
- Source-water collection and transportation arrangements are in place
- Broodstock, egg take, marking, monitoring, and release activities have been coordinated with ADF&G
- Adequate operating and contingency funding is available

Completion of these actions would position YRAA to undertake an initial feasibility study with appropriate biological safeguards, regulatory coordination, and operational preparation. The results of that study would then provide the basis for determining whether continued or expanded Chinook salmon production represents an effective and sustainable component of the broader Situk River rehabilitation effort.

Acknowledgements

UAG extends a special thank you to Jonathan Pavlik for generously sharing his time, local knowledge, and perspective throughout the visit. His assistance with field access and his thoughtful discussion of YRAA's interests contributed greatly to the team's understanding of the Situk River and surrounding systems.

References

Alaska Department of Environmental Conservation (ADEC). 2026. Wetlands and 401 certification of 404 permits. Division of Water, Juneau. Updated April 15, 2026.

<https://dec.alaska.gov/water/wastewater/stormwater/permits-approvals/wetlands/> Accessed August 25, 2026.

Alaska Department of Fish and Game (ADF&G). 2025. Situk River closed to sport fishing for king salmon. Division of Sport Fish, Advisory Announcement, Emergency Order No. 1-KS-H-15-25. Released April 28, 2025.

Alaska Department of Fish and Game (ADF&G). 2026a. 2026 Situk River Chinook salmon forecast and commercial and subsistence fisheries restrictions. Division of Commercial Fisheries, Advisory Announcement, Emergency Order No. 1Y0126. Yakutat. May 28, 2026.

Alaska Department of Fish and Game (ADF&G). 2026b. Fish count data search: Situk River Chinook for 2026. Division of Sport Fish. Accessed August 19, 2026.

Alaska Department of Fish and Game (ADF&G). 2026c. Southeast Alaska and Yakutat research: Situk River Chinook and sockeye salmon research. Division of Commercial Fisheries. Accessed August 19, 2026.

Alaska Department of Fish and Game (ADF&G). 2026d. Sport fishing closed area expanded below Situk River weir. Division of Sport Fish, Advisory Announcement, Emergency Order No. 1-KS-H-20-26. Released July 8, 2026.

Alaska Department of Fish and Game (ADF&G). n.d.-a. Aquatic resource permits.

https://www.adfg.alaska.gov/index.cfm?adfg=otherlicense.aquatic_resource Accessed August 25, 2026.

Alaska Department of Fish and Game (ADF&G). n.d.-b. Fish habitat permits.

https://www.adfg.alaska.gov/index.cfm?adfg=uselicense.fish_habitat_permits Accessed August 25, 2026.

Alaska Department of Fish and Game (ADF&G). n.d.-c. Hatchery permitting and reporting. Division of Commercial Fisheries. <https://www.adfg.alaska.gov/index.cfm?adfg=hatcheries.main> Accessed August 25, 2026.

Alaska Department of Natural Resources (ADNR). n.d. Water rights in Alaska. Division of Mining, Land and Water. <https://dnr.alaska.gov/mlw/water/rights/> Accessed August 25, 2026.

Davis, B., B. Allee, D. Amend, B. Bachen, B. Davidson, T. Gharrett, S. Marshall, and A. Wertheimer. 1985. Genetic policy. Alaska Department of Fish and Game, Division of Fisheries Rehabilitation, Enhancement and Development, Juneau.

Gilk-Baumer, S., D. F. Evenson, and W. D. Templin. 2017. Mixed stock analysis of Chinook salmon harvested in Southeast Alaska commercial troll fisheries, 2010–2014. Alaska Department of Fish and Game, Fishery Data Series No. 17-37, Anchorage.

Hoffman, R. A. 2022. 2022 Yakutat set gillnet fishery management plan. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report No. 1J22-09, Douglas.

Johnson, S. W., J. F. Thedinga, and K. V. Koski. 1992. Life history of juvenile ocean-type Chinook salmon (*Oncorhynchus tshawytscha*) in the Situk River, Alaska. Canadian Journal of Fisheries and Aquatic Sciences 49:2621–2629.

McPherson, S. A., R. E. Johnson, and G. F. Woods. 2005. Optimal production of Chinook salmon from the Situk River. Alaska Department of Fish and Game, Fishery Manuscript No. 05-04, Anchorage.

Schuster, M., M. D. Booz, and A. W. Barclay. 2021. Chinook salmon sport harvest genetic stock and biological compositions in Cook Inlet salt waters, 2014–2018. Alaska Department of Fish and Game, Fishery Manuscript No. 21-04, Anchorage.

Thedinga, J. F., S. W. Johnson, and K. V. Koski. 1998. Age and marine survival of ocean-type Chinook salmon *Oncorhynchus tshawytscha* from the Situk River, Alaska. Alaska Fishery Research Bulletin 5(2):143–148.

U.S. Department of Agriculture, Forest Service (USFS). n.d. How do I apply for a special-use permit? <https://www.fs.usda.gov/working-with-us/contracts-commercial-permits/how-to-apply-for-special-use-permit> Accessed August 25, 2026.

Personal Communications

Pavlik, J. 2026. Personal communication regarding Situk River fisheries and the effects of Chinook salmon conservation measures, Yakutat, Alaska.

