

FISH RAP

Highlighting releases, returns, policy and legislation affecting the Southeast Alaska salmon fisheries

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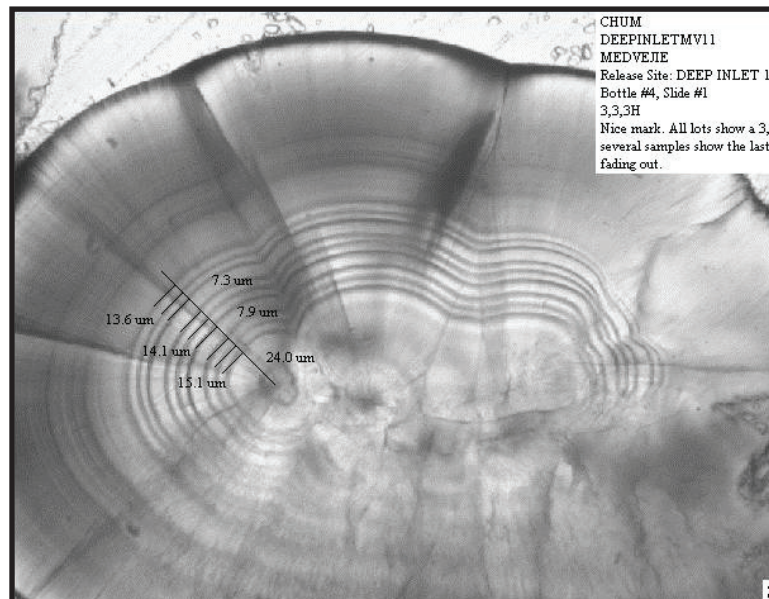
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*An otolith from a BY 2011
Deep Inlet chum fry.
All hatchery chum are
marked in Southeast Alaska.*



NSRAA's Otolith Data Provides Insight On Programs

NSRAA otolith marks all its chum eggs for identification of adults upon their return, but – until now – the organization was rarely able to study the information in season. This year, thanks to extra manpower and the need to analyze the cost benefits of the 4.0 group, NSRAA was able to study the data as the season ended, providing timely information as the new year begins.

By examining the otolith markings on harvested fish, NSRAA can gain an understanding of a number of things, including where fish are caught, where they stray and how different rearing techniques might affect marine survival.

Perhaps the most important of these is the ability to compare the survival rates of NSRAA's 4.0 chum (also known as late-large) with chum raised in its regular program. Typically, fry are released between mid-April and mid-May, at a weight of about 2 grams or a bit under. With the 4.0 program, fish are not released until they double their weight to approximately 4 grams.

"Essentially, to get them to twice the size, you have to feed them twice as much," explains Chip Blair, NSRAA Data Analyst. Twice the food nearly doubles the cost to raise the fish, of course. NSRAA wants to know whether the program is worth the extra cost. "If we can get one third of 1 percent or more increase in marine survival of the late large over the regulars, it's worth it."

NSRAA tried raising chum to 4 grams in the past, but, at best, the survival of these fish equaled that of the regular group. In some cases, it was worse.

"For many of the years we tried it, we experienced unusually cold springs – not the best rearing conditions for any fish," he says.

Douglas Island Pink and Chum (DIPAC) has experienced ongoing success with its 4.0 program, prompting NSRAA to reconsider and try again.

The idea behind the 4.0 program is that while fry raised and released under the regular program remain in shallow waters near shore before moving out into the ocean, the 4.0 chum readily transition to deeper, off-shore waters immediately upon release. Historically, smaller fry tended to survive better near shore where there was cover from predators, so the fish evolved with these physiological and genetically-driven behaviors. Whale predation, however, seems to be a phenomenon of the last decade.

Humpback whales and other predators have taken to hunting the small fry as they hang out near shore after their release. NSRAA has tried various strategies to counter the problem, including towing the fry away

from rearing sites, but there are still many miles of shoreline where predators can hunt the fry as they make their way toward open ocean.

The 4.0 program may be a critical component of NSRAA's success in the future, especially at Hidden Falls. The otolith data collected this year only begins to paint a picture, but as Chip says, "it's encouraging."

Most of the fish from the 4.0 program returned this year as three-year-olds, with a survival ratio as high as 9:1 over those released under the regular program.

"What we found this year, at all the sites we're doing 4.0s, they've been successful by a good margin," says Chip. "The late-large are surviving better, but there are also more of them coming back at a younger age, which might indicate a smaller ratio of 4.0s to regulars next year, when the four-year-olds return. In any case, the ratios show that the increase in survival more than pays for the extra expense – by a large margin."

What will NSRAA do if the 4.0 program continues to show significantly better survival rates?

In smaller releases during the startup years at Southeast Cove and Crawfish, NSRAA raised 100 percent of its chum as 4.0s. As release numbers increase for these projects, space constraints will prevent NSRAA from raising 100 percent of chum as 4.0s, but the percentage would be as high as possible.

The information may be particularly helpful at Hidden Falls. Though the 4.0 program is limited by space – in addition to double the food, the fry need double the space for those few weeks as they grow from 2 to 4 grams – there is a potential that NSRAA could increase the number of 4.0 raised at that hatchery.

"If we continue to see they're doing much better than the regulars, that would show that the predation theory at Hidden Falls is probably true," Chip says. "So we might raise a higher percentage as 4.0s. Say, instead of doing 33 percent 4.0s, as we do currently, we might do 40-50 percent. It's a balancing act between rearing space and cost. Another option might be to raise fewer fish with more 4.0s. We'll probably need a couple more years of analysis before we make the decision to invest that kind of money."

Chip wasn't sure what to expect when he analyzed his first round of otolith data this fall.

"These early results are a lot more encouraging than I expected," he says. "We never would have known that without this information. We're pretty excited and hoping they'll continue with the same trend."

Hatchery Reports



A new weir was installed at Medvejie this summer. It is a major improvement from the old structure.

General Manager's Notes

NSRAA has embarked on a major growth initiative over the past couple of years, including Southeast Cove and Crawfish Inlet, while at the same time evaluating how to turn around the poor marine survival at Hidden Falls. This makes for exciting and challenging times. Adding to these trials is pursuit of a new "old-hatchery" program at Gunnuk Creek near Kake, which has evolved into a two year long labyrinth of negotiations, bureaucracy, setbacks, and just enough forward motion to obtain a vague view of the end zone.

Fortunately, the programs we have control over are advancing nicely: 50 million eggs/fry, the maximum permitted, are destined for S.E. Cove, where the first three-year-olds returned this season at four times the number expected; Crawfish Inlet, new in 2015, has 30 million eggs/fry, also the maximum permitted, ready for next spring. These programs will begin paying dividends over the next three years with full value accruing to an estimated \$6 - 8 million annually by 2019.



The best news of the year is the 4.0 program, which is showing promising results from S.E. Cove to Deep Inlet. This Fish Rap issue provides exciting details on what we learned from the chum otolith data in 2015. Hidden Falls was a disaster again this year, but even there the 4.0 three-year-olds are showing promise. It is only because of the 4.0 performance that we have any confidence in the 1.4 million adult chum forecast for Takatz/Hidden Falls. Still, I suggest a strong dose of caution with the optimism.

Two additional potential release sites at Thomas Bay and Malmesbury are part of the strategic plan to diversify and increase chum salmon production for common property fisheries. We plan to implement multiple strategies to solve the predation issue: 4.0 gram fry, towing fry/smolt away from known predator sinks, and utilizing new release sites with low predator densities.

Finally, I believe by this spring we will add Gunnuk Creek Hatchery to our quiver to complete our expansion and diversification strategy. The opportunities are more difficult to find and develop, but NSRAA has been fortunate enough to mine a few nuggets. The future will tell how pure.

Have a warm and Merry Christmas, Happy Holidays, and New Year.

Medvejie Staff Works To Improve Chinook Program

After two consecutive seasons with unacceptably high mortality in its Green Lake Chinook program, the staff at Medvejie implemented major changes to mitigate those losses.

NSRAA more than doubled the number of Chinook reared at Green Lake to 2.8 million in 2011 after the Green Lake group showed consistently better survival rates than Chinook in the other programs. While there were no problems with the increased numbers the first couple years, the mortality rate jumped to the double digits in 2013 and 2014 – with losses as high as 25 percent.

The staff attributed the mortality to a parasite known as Trycophora, which attaches to the gills of the fish and eventually causes suffocation. Trycophora is known to be problematic in reservoirs, such as Green Lake, that do not frequently spill.

The Green Lake program's losses were compounded by mortality rates as high as 59 percent when the fish were transferred to saltwater, where their health was further compromised by Vibrio and BKD (bacterial kidney disease).

"Even just the 25 percent mortality would be considered a failure," explains Adam Olson, Medvejie Hatchery Manager. "Historically, that program would see a mortality of a percentage or less, so two years of 10 - 25 percent, I would consider a failure."

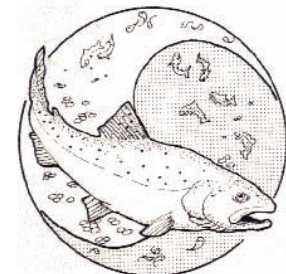
The staff at Medvejie revamped its Green Lake program this year in an effort to avoid compromising the health of yet another generation of

Medvejie Report Continued on page 3

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Medvejie Report (continued)

Chinook. Instead of rearing 2.8 million Chinook at the lake, it transferred only 1.4 million to Green Lake, with the hope that a lower density would mitigate any disease and mortality.

The remaining 1.4 million were reared at Medvejie, but that created problems due to limited space. NSRAA was forced to release 600,000 fish, as zero-check Chinooks, the first spring because there wasn't enough room to keep all 1.4 million at the facility until the fish were moved to saltwater in the fall.

The advantages of the zero-check program are the lower cost and lesser space requirements. NSRAA ended its zero-check program several years ago, though, because the cost-to-benefit didn't pay off. It may cost less to rear them, but the fish suffered lower marine survival rates, indicating they were at a disadvantage going to the ocean within their first year.

The alternative in this case, however, would have been to destroy the 600,000 fish, says Adam. "We'll do (the zero-check program) again next year, but if things work well in Green Lake, I would imagine the company would decide to move the zero-check group back to Green Lake."

The changes to the Green Lake program appear to be a success, with a mere 0.15 percent mortality at the lake this season. Adam credits that success to the redistribution of the fish, as well as the staff improving its rearing practices and trying a number of treatment options to mitigate losses from *Trycophora*.

"The dedicated and experienced staff at Medvejie continues to step up to the challenges of the facility's evolving programs," he says. "Much like the fishermen, we are already looking forward to seeing how next year's returns come in."



Clockwise from above: Medvejie dock, Hidden Falls cubs, loading the Lucy-O for a chum fry transport.



Trollers target coho in Kasnyku Bay.

Hidden Falls: Prevention is Key To Fry Survival

NSRAA and commercial fleets alike were disappointed with this season's chum return to Hidden Falls, which came in at less than 30 percent of forecasts. It's a bitter reminder that once salmon are released into the ocean, it's up to Mother Nature whether they return.

Still, Jon Pearce, Hidden Falls Hatchery Manager, remains optimistic. He and his staff are focused on taking the necessary steps to improve programs at the hatchery, including prevention of diseases, lowering mortality, and getting the fish to the optimal weight before releasing them into the ocean.

BKD (bacterial kidney disease) and cold water disease are two bacterial diseases that are naturally-occurring but can be especially rampant in a hatchery environment where the fish are raised in higher densities and closer proximity than in the wild. Both diseases can make the mortality rate surge within a hatchery.

The staff at Hidden Falls works to prevent the mortality resulting from these diseases through a variety of means, including injecting the female coho to prevent the spread of BKD from the female to its eggs. In addition, eggs are tested for BKD and if they come back positive, all the eggs from that female are discarded.

"In theory, over time, if you have these best eggtake practices, you can reduce the rate of BKD in the population you're releasing," Jon explains. It seems to be working. This year, Hidden Falls only had 6 percent BKD positive female Chinook. In past years, that number has been as high as 19 percent.

Though it's general practice to sterilize a net between ponds – in an effort to prevent the spread of disease between ponds – that doesn't mean it always happens.

"We want to make sure we're really keeping to those practices and not compounding the problem," he says.

Staff has also been examining how fish growth and mortality correlates to the type of food it's given. For example, the staff began feeding some groups a special diet as they prepare to transfer between fresh and salt water – a transition that can be fatally shocking – in hopes it might decrease the mortality related with that transition.

Jon believes taking steps like these is one of the reasons the current brood year (BY14) has one of the lowest mortality rates in the history of the program and the coho and Chinook are the second largest in the history of the program for this time of year.

"They're really healthy, big fish, which will help their survival in overwinter conditions," he says.

The hope, of course, is that bigger, healthier fish released from Hidden Falls will result in bigger, healthier fish returning.

"It benefits everyone; it makes our jobs easier here, it produces more fish for the fleets," he says. "Once we release them, it's up to the will of the ocean. There's not much we can do but prepare them."

Market Report: Approval of Genetically Modified Salmon Creates Uncertainty

Alaska fishermen weren't the only ones dismayed when the U.S. Food and Drug Administration recently announced its approval of genetically-engineered salmon for human consumption, but they might have the most to lose.

The FDA announced in November its approval of AquaBounty Technologies' AquAdvantage, an Atlantic salmon genetically-engineered (GE) to grow twice as fast as normal. For AquaBounty, which has been working toward approval for some 20 years, the FDA's decision was a victory. But not everyone has welcomed the news.

Environmentalists, concerned with the implications of escaped GE salmon on wild salmon populations, as well as the increased likelihood that additional genetically-modified (GM) animals will be approved for consumption, have opposed the FDA's decision. Though it's too early to know whether there might be long-term effects on our health from the consumption of GE salmon, many consumers are uncomfortable with the concept.

According to survey results, most consumers do not want GE salmon and a large majority want it labeled, which may be the most upsetting aspect of the FDA's decision. Though there remains about two years before the GE salmon hit the stores, at present, the FDA is not requiring the fish be labeled when it goes to the market.

"I'm not a fisheries scientist and I'm not a geneticist and I'm not a doctorate of food science and nutrition, so I can't say whether or not any of the environmental, nutritional or health concerns are founded," says Tyson Fick of Alaska Seafood Marketing Institute. "But what I can say is that anything that makes farmed salmon substantially cheaper – and this would; it would cut growing time in half, so that would mean half the food, half the rent, it would definitely lower the cost – would make it difficult for wild salmon to maintain value. Even though there is a separation in the marketplace, we still are affected by commodity pricing."

ASMI has worked hard over the years to distinguish wild Alaska salmon as a premium product. The health and environmental benefits of wild salmon have helped create a niche in the market – but is it enough to sustain demand if the cost of farmed salmon drops dramatically with the introduction of GE salmon?

"Any time there's a potential for really cheap farmed salmon coming on the market, it's going to have a negative market affect for everybody," Tyson says. "What's not captured in that purely economic study of 'What if the cost of farmed salmon is reduced by half?' is what it does for consumer confidence."

According to Tyson, the lack of labeling – and thus, the consumer's inability to know or identify whether or not the salmon for purchase is genetically-modified – could create confusion among consumers and fur-

ther damage the salmon market.

"To have it out there and have it not be labeled could create the assumption that you just don't know what you're getting. You wouldn't know if it's GMO; you wouldn't know if it's Alaska; you just wouldn't know. That could drive people away from seafood altogether."

But it's possible there may be an upside to all of this, too.

Consider, first, that many grocers – Costco, Kroger, Safeway, Whole Foods and Trader Joes included – have responded to the unpopularity of GM salmon among consumers by announcing their commitment not to sell it in their stores.

And though perhaps the FDA's decision to not require labeling may be the result of the fear that doing so would imply there was something wrong with GE salmon, there is the potential that decision could backfire.

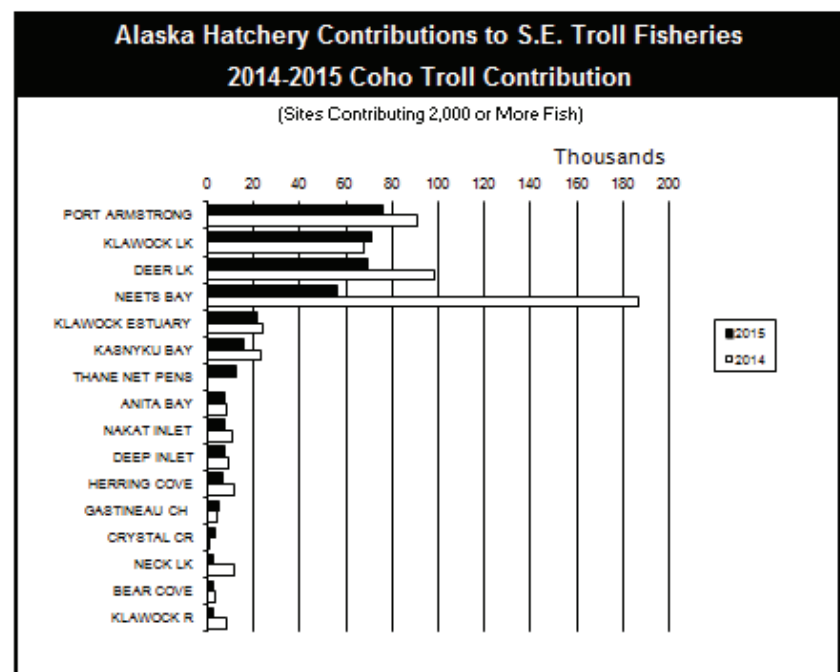
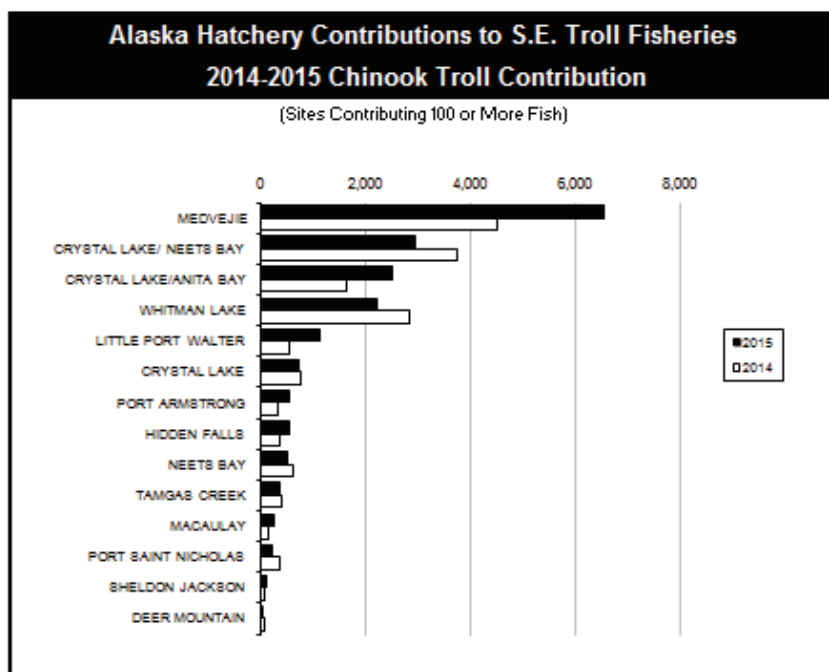
"That means the only way consumers would know they are not getting genetically-modified salmon is to choose wild Alaska salmon or purchase from a trusted purveyor," Tyson explains. "So, weirdly, I think it's even more of a threat to conventional farmed salmon."

A lack of labeling might even drive more customers toward Alaska salmon, if they decide the additional cost is worth the assurance that the fish they're eating is not genetically-altered. Or, perhaps, the introduction of the lower-cost AquAdvantage might bring a new group of customers to salmon.

"It's really early to know, with any kind of certainty, what the actual effects are going to be," he says.



Crawfish Inlet 4.0 chum fry from this spring's initial release at the site. Rearing went very well. Adults (4-yr-olds) will return in 2018.



NSRAA's 2015 Returns Range Drastically

In some sense, this was a record season at NSRAA – a record of bests and worsts. Deep Inlet saw its best return in 15 years with a record gillnet catch, and Hidden Falls experienced the worst return in the history of the project.

More than 2.4 million chum returned to Deep Inlet this season. While this was not a record return, it contributed to the highest catch (more than 2.3 million) since 2000, of which gillnetters caught 690,000 – a record catch for the fleet there.

Steve Reifenhohl, NSRAA General Manager, credits the success at Deep Inlet to the contribution from Douglas Island Pink and Chum (DIPAC).

This is the third season DIPAC has made a sizeable financial contribution to NSRAA, in an effort to increase the number of fish for the fleets. Since DIPAC paid off its debt a few years ago, it has money it may redirect toward the fleets in the form of fish. Its solution: to make an annual financial contribution toward NSRAA's cost recovery operations, reducing or eliminating NSRAA's need to close the fisheries for cost recovery.

DIPAC made a \$2 million contribution to NSRAA this year, an amount that was shared between Deep Inlet (\$1.3 million) and Hidden Falls (\$700,000). The contribution allowed NSRAA to keep the fisheries open when, typically, they must be closed for up to two weeks for cost recovery harvests.

Avoiding cost recovery harvest does not ensure the fisheries won't close, Steve points out. Depending on the size and strength of the run, NSRAA may have to close the fisheries for its broodstock collection. This year, however, no closures were necessary at Deep Inlet, contributing to the successful catch there.

Hidden Falls stood at the other end of the spectrum, with its worst chum return ever: a catch of less than 50,000.

"With the dismal return at Hidden Falls, it was good to have another project perform exceptionally well," says Scott Wagner, NSRAA Operations Manager.

This is the third time in five years that the hatchery's return has fallen below 500,000. NSRAA has struggled with poor ocean survival rates at Hidden Falls for several years and the staff believes those poor returns are the result of heavy predation – likely humpbacks, maybe pollock and other fish – at the time the fry are released.

The fish released from Hidden Falls are the same stock as and raised together with those released remotely from Southeast Cove and Deep Inlet, yet only the marine survival at Hidden Falls has been suffering, lending credence to the predation theory.

The staff at NSRAA continues to try new strategies – from towing the fish away from the harbor before release, to releasing the fish at a larger size – to minimize predation upon release, but only time will tell whether those efforts are successful.

NSRAA Stocks Lakes With Surplus Coho Fry

Many people are familiar with NSRAA's hatchery programs: Medvejie, Hidden Falls and Salmon Creek. Even the remote projects locations – Deer Lake, Southeast Cove and Crawfish Inlet – should be familiar to most. NSRAA's efforts to stock nearby lakes with surplus coho are lesser known.

The organization has permits to drop fish in three barrier lakes: Cliff Lake, Banner Lake and Parry Lake. All three are located near Deer Lake, about 40 miles south of Hidden Falls, off South Chatham Strait.

The coho eggs are collected for the Hidden Falls and Deer Lake programs, but when the number of surviving fry exceeds the number permitted for release from these programs, the fish aren't discarded. Instead, NSRAA drops the surplus fish into nearby lakes, increasing production for the fleets.

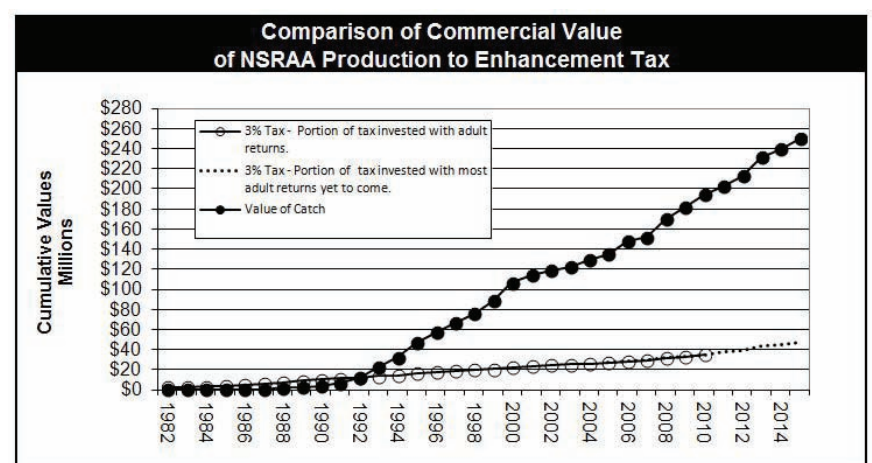
Normally, it would take years of site investigations, permit approvals and work to ensure that any new enhancement projects wouldn't affect wild salmon populations. But these three lakes are separated from the ocean by barrier waterfalls and are not home to wild coho. The waterfalls prevent wild and enhanced salmon from swimming upstream to the lakes to start a population there.

The surplus salmon are released on a rotating basis, explains Woody Cyr, Deer Lake Project Manager. Because the fish are not fed, they are dependent on natural food sources. The rotation allows time for the zooplankton to replenish between stock populations.

"They're completely on their own of course," says Woody. "Whatever happens, happens. The fish leave over the waterfalls, which kills a certain percentage of them, but the majority make it out alive and will come back."

These lakes and others were studied extensively in the 1980s and the studies included the evaluation of waterfall-induced mortality of coho smolt. Cliff and Parry Lakes' barrier falls induce virtually no mortality, whereas the higher Banner Lake falls contributed less than 5 percent mortality.

Typically, NSRAA stocks about 60,000 surplus coho in one of the three barrier lakes. These fish are coded-wire-tagged so the organization can measure the marine survival of the fish when they return after a year in the ocean. This past year, the marine survival of coho from Cliff Lake outperformed that of those released from Hidden Falls' Kasnyku Bay.



NSRAA Contribution to Southeast Alaska Commercial Fisheries								
Number of Fish : 2014 - 2015								
	Gillnet		Seine		Troll		All Gear	
	2015	2014	2015	2014	2015	2014	2015	2014
Chinook	3,315	3,528	4,201	1,874	10,430	6,048	17,946	11,450
Chum	707,553	290,538	1,447,435	880,564	231,116	16,726	2,386,104	1,187,828
Coho	811	881	5,218	2,303	94,258	135,092	100,287	138,276
All	712,000	295,000	1,457,000	885,000	336,000	158,000	2,504,000	1,338,000

Mike Forbush: Summer Adventures Lead To Lifelong Career

Not many people would jump at the opportunity to be a dishwasher, but for 15-year-old Mike Forbush, the job held the promise of adventure in Alaska. It also began a lifelong career in fish processing.

Mike grew up in Astoria, Oregon, where his father worked as an accountant for Bumble Bee Seafoods. Mike was the middle of ten kids. He and his siblings hiked, fished, hunted and found plenty of adventure nearby and along Oregon's Columbia River, but as they became teenagers, each of his older siblings headed north to Alaska to work each summer.

"They came back with all these fascinating stories about working up there, so I couldn't wait to get up there myself," Mike says.

Washing dishes is far from glamorous, especially seven days a week, but 15-year-old Mike was thrilled with his job at Columbia Ward Fisheries. He was on his own in Alaska, learning and working hard.

"My biggest fear was being late," Mike remembers. "I woke up one day at 11 and thought I was late for my shift that started at 10:30 p.m., so I ran to work only to be told it was actually 11 a.m. and I had just left two hours before. It never gets dark in Kenai in the summer, so it's hard to know if it's night or day."

As a young kid in the 80s, earning \$4,000-5,000 a summer felt like a fortune. Mike returned to wash dishes in Kenai again and again. After a couple years, he was promoted to the butcher line, then he became a machinist and eventually worked his way to plant management. He was 25 when he was offered the opportunity to run a plant in Seward. Mike has always enjoyed the hard work and challenges of working in processing.

"There's a real sense of accomplishment at the end of the season," he explains. Sure, the season is crazy, with long work days (16-18 hours) and few, if any, days off, but "there's a start and an end to it, and the sense of accomplishment is really fulfilling."

Today, as Senior Alaska Operations Manager for Ocean Beauty Seafoods, Mike coordinates operations in Southeast Alaska, including its Haines buying station, Excursion Inlet and Petersburg plants and Ketchikan office, and manages fisheries in Puget Sound. He lives in Edmunds, WA with his wife, Young, and their two boys.

He is one of two boys in his family to follow in his father's footsteps with a career in processing. Mike and his father even worked at the same company for about 11 years. Mike's brother, David, is Vice-President of Value-added Operations at Ocean Beauty.



Mike Forbush and wife, Young, and their two sons. Mike holds the Processor seat on NSRAA's board.

"I think the common denominator for the three of us was that we enjoyed the people we worked with," Mike says. "Everyone at these plants works very hard together to achieve a common goal. That hard work, along with a bit of isolation, builds camaraderie that is hard to find elsewhere."

Mike was appointed to NSRAA's board of directors in 2008 as the Processor Representative.

"NSRAA produces a lot of the fish my fishermen depend on," he says. "I wanted to do my part to support it. Being part of NSRAA has taught me a lot more about the biology of the fisheries. It gives me a little better idea of how to budget volumes for our plants in the coming year. I think NSRAA is a very strong organization and Southeast Alaska has benefitted greatly from its creation and existence. I know my job is very dependent on its success."

NSRAA Employee Changes

NSRAA has seen employee changes at Hidden Falls, Medvejie and the Admin office this year.

At Hidden Falls, Assistant Hatchery Manager, Jon Pearce has taken over as Hatchery Manager and Fish Culturist Cain Depriest has moved into the open Assistant Manager Position. Samantha Kanak has filled in the open Fish Culturist position. On the maintenance side of the facility, Rick Morehouse is the new Maintenance Supervisor. The Maintenance Assistant position is currently vacant.

At Medvejie, Adam Olson has been promoted to Hatchery Manager after Angie Bowers left NSRAA to oversee Sitka Sound Science Center's hatchery program. Fish Culturist/Maintenance Assistant, Baxter Poe, has filled into the Assistant Manager position. Brett Jenkins was hired to replace the vacancy left by the promotion of Baxter Poe.

Ben Adams was hired to assist Chip Blair in the Evaluation and Otolith department. He will also oversee and implement the Coded-Wire-Tag program for NSRAA. In Admin, Ilona Mayo has taken over the Office Manager position and Kris Wilcox was hired as Secretary.



Sawmill Creek Hatchery raceways as seen through the eyes of a new remote monitoring system.

Chum Double, Coho Down At Sawmill Creek

While NSRAA struggles to meet its annual coho production goal at its Sawmill Creek Hatchery, it is on target to double that facility's chum population this year.

Sawmill Creek's coho release last May was the hatchery's biggest release to date, with a total of 950,000 fish released. The goal was to double that number to 2 million for release next season, but the current group of coho being raised at Sawmill Creek is even smaller than last year's.

Approximately 781,000 fish are being reared at the hatchery this winter, but only 674,000 of those will be released at Deep Inlet this spring, says Hatchery Manager, Rebecca Olson. The remaining 107,000 fish have been designated as Medvejie broodstock and will be released from there instead.

Sawmill Creek has been unable to reach its production goals for coho this year, due to insufficient broodstock, she explains. Designating the aforementioned group as broodstock should help the facility reach full production, though it won't happen for a couple years.

Approximately 1.2 million brood year 2015 (BY15) eggs are currently incubating at Sawmill Creek. One-quarter of those were a gift of sorts – the eggs were taken from fish discovered in the Blue Lake Powerhouse tailrace containment area.

The staff noticed there were coho jumping inside this containment area, which spills into Sawmill Creek, Rebecca says. Unsure of the origin of these fish, NSRAA seined the area to collect all clipped hatchery fish and a portion of the unclipped fish. The otoliths show that even the unclipped fish gathered were hatchery fish. NSRAA collected the eggs from those coho to help boost its eggtake numbers.

Meanwhile, Sawmill Creek's chum numbers are on track to double those of last year. More than 28 million alevin are being incubated for release from Crawfish Inlet in 2016. To date, the chum being raised for NSRAA's new Crawfish Inlet project have had some of the lowest mortality and highest growth of any current NSRAA chum projects.

Crawfish Inlet rearing has been a huge success, says Rebecca. "It was one of the best projects of the year."



Coho were attracted to the new Blue Lake hydro plant tailrace. NSRAA staff seines up a group of them to supplement broodstock needs.



Top: University of Alaska Southeast fishery students help fill incubators at Sawmill Creek. Below: Chum incubators were added for the increased Crawfish production.

Haines Projects on Hold

This fall was the first in almost 30 years that NSRAA did not collect eggs for its Haines programs, after the board of directors voted last spring to table projects in that area.

NSRAA has been working to enhance salmon populations in the Haines area for several decades. The organization has used a variety of enhancement techniques, including sockeye lake stocking and chum and sockeye streamside incubation, with varying degrees of success.

The most successful of its efforts was improving spawning habitat through the construction or extension of spawning channels. Yet this success was never quantifiable. The board of directors, considering the large financial undertaking of recent chum expansion projects in Crawfish Inlet and Southeast Cove, and the potential to takeover the failed Gunnuk Creek Hatchery, decided that, financially, it made the most sense to redirect the Haines funds and staff time to the new, more economically-viable programs.

Where does that leave Haines? NSRAA's board has not made any decisions to remove the equipment there or sell its office warehouse. For now, the project is simply on hold, says NSRAA Operations Manager, Scott Wagner.

This summer, NSRAA completed work under a legislative grant awarded to the organization in 2012 for salmon enhancement in the Lynn Canal area. After a period of studying the suitability of several potential new sites for spawning channels, NSRAA decided to focus its efforts in Herman Creek where it had already experienced success. The organization extended the length of the existing spawning channels by approximately 30 percent.

"This creates more available spawning habitat," explains Scott. Both the Chilkat and Klehini Rivers are part of a glacial water drainage system that can vary drastically from one season to the next, creating very unstable habitat for spawning. The extended spawning channels will provide salmon stability within that system, in an area with clean water, no siltation and protection from erosion.

"It increases the availability of spawning habitat which, in theory, means more fish spawning and emigrating," he says.

State Rejects NSRAA Offer To Purchase Gunnuk Creek Hatchery

NSRAA's board and staff were shocked when the state refused its offer in November to purchase the failed Gunnuk Creek Hatchery. It's been almost two years since KAKE Nonprofit filed bankruptcy at the hatchery and NSRAA, as the area's regional aquaculture association, was given first right of refusal.

Neither the staff nor the board at NSRAA were certain they wanted to take over the Gunnuk Creek Hatchery when the opportunity first presented itself. Most of the buildings and the weir are in disrepair, requiring costly renovations. But the biggest issue – and likely the main culprit leading to the failure of the hatchery – is the water; the temperatures of which vary drastically from the summer to the winter and are subject to high organic loads and frequent low water flows.

It would cost an estimated \$2.5 million in capital improvements to update the facility to incubate 30 to 68 million chum salmon eggs annually, plus an estimated \$600,000-900,000 in operational costs annually.

It's a huge financial commitment and a project NSRAA General Manager, Steve Reifenhuth, refers to as the biggest challenge the organization has ever faced. Still, the board agreed to pursue the opportunity, voting to move forward with an offer to purchase Gunnuk Creek from the state.

After shaking hands over a verbal agreement with the Deputy Commissioner on the offer price and getting the board's approval on the purchase, Steve was stunned to learn that a committee under Alaska's Division of Economic Development declined NSRAA's offer.

"We thought we had a hatchery," he says. "There was great disappointment. I was floored. I thought everything was taken care of."

The state did not provide NSRAA with a reason for rejecting the bid and the Deputy Commissioner has not offered an explanation. Steve was merely told the site would go up for public auction. He speculates that the state may want to recapture more of the \$22 million it loaned to KAKE Nonprofit over the years.

"The Division wanted us to pay \$3.5 million, initially," Steve says. "We're willing to invest a good chunk, but that's too much when we have to invest \$2.5 million to get the facility running."

Or, it could be that by putting the property to auction, the Division saves itself from any potential criticism.

"They might get even less than we offered, but then they're covered," he explains. "They didn't give anything away; that's just what the market would bear."

As far as Steve knows, NSRAA is the only party interested in the three-acre site, which is severely limited in its development opportunities due to a SealTrust Conservation Covenant.

"There's a long list of things you can't do there," he explains. "If anybody wanted to come in and put a lodge, reservoir for hydroelectric plant, logging, etc. – it couldn't be done. One of the only things you can do is have a hatchery with a pipeline corridor. That's about it."

Even so, the stipulations under the conservation covenant are so strict that Steve has been working with SealTrust to get prior approval for the necessary updates to refurbish the hatchery.

"If you want to change a roofline on a building, they have to approve it," he says. "So they basically have control of what you do there. We can't spend the money to purchase the land if we don't have assurances we can reconstruct and refurbish the hatchery."

Disappointed, perplexed and feeling understandably "paranoid" by the unexpected turn of events, Steve is still hopeful NSRAA will be able to purchase the property – sooner than later.

Assuming it can purchase Gunnuk Creek, getting the hatchery up and running will be NSRAA's biggest challenge to date, but after Hidden Falls' dismal return this season, Steve and the board feel strongly it is the right move for the organization.

"We need another facility if we're going to grow and produce more fish, even if it's not the best location," he says. Finding a new site for a hatchery would be even more costly and would likely take at least ten years to get fish into the water for the fleets.

NSRAA is working to increase production as soon as possible, with a goal to raise and release 10 million chum fry from Gunnuk Creek its initial season.

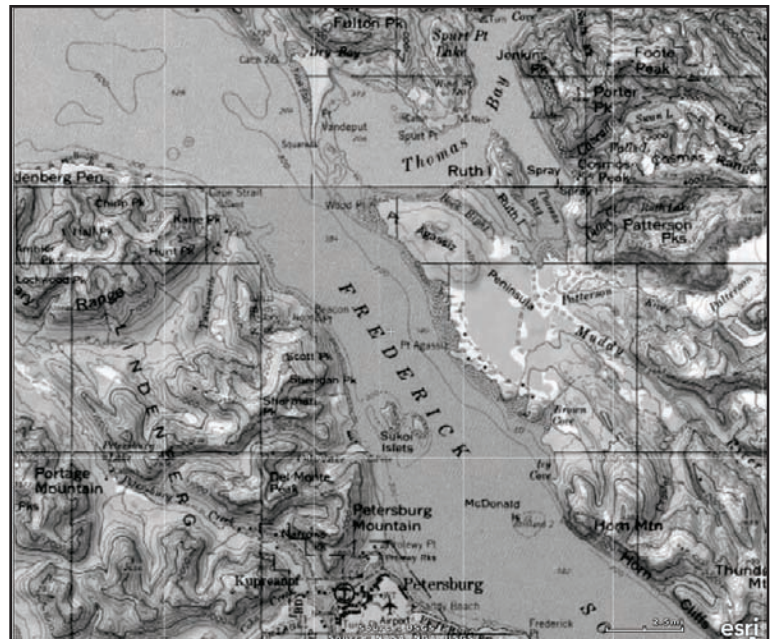
"We've got tentative plans to get this moving as quickly as possible," Steve says. "We're positioned to do that."

If and once NSRAA can purchase the property, that is.



Left: Raceways inside Gunnuk Creek Hatchery.

Below: NSRAA purchased incubators and equipment from the State when Gunnuk Creek was closed. The American Patriot delivers some of the equipment to Hidden Falls.



At its November meeting, NSRAA's Board of Directors discussed using Thomas Bay, near Petersburg, as a release site. The Regional Planning Team tabled a decision on using the site for rearing, pending further studies this summer.