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Study explores subsistence salmon survey data in Norton Sound

By James Magdanz
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(photo by Dave Cannon)

Every fall, as the willows drop their leaves and rivers begin to freeze, an annual ritual plays across western and northern Alaska. Local village researchers and technicians with the Alaska Department of Fish and Game go door-to-door in village after village to ask thousands of people the same, simple question: "How many salmon did you catch for subsistence this year?"

Subsistence salmon surveys have been a fixture of fisheries management in the AYK region for decades. Harvest estimates from survey data are used extensively by the Alaska Board of Fisheries and the Federal Subsistence Board. After the boards adjourn and the annual management reports are written, the actual survey data are archived and rarely revisited.

Recently, a project funded by the AYK Sustainable Salmon Initiative used this rich store of data in a new way: to explore patterns and trends in salmon harvests at the household level. The goal was to better understand how and why subsistence harvests change, which may lead to improved methods for estimating subsistence harvests and, perhaps, to improved models for predicting future subsistence harvests.

Researchers with Kawerak, Inc. and the ADF&G's Division of Subsistence began by retrieving a decade of subsistence salmon survey data for ten communities in the Norton Sound–Port Clarence Area. The database included 7,838 household reports of salmon harvests from 1994 to 2003.

As fishing families remember, the 1990s

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Change is inevitable

By Dave Cannon

Changes, although somewhat subtle, have always occurred in the inherently dynamic Bering Sea ecosystem. However, it's becoming more apparent that some of the changes that northerly latitudes are experiencing are not the normal fluctuations that nature bestowed upon us. According to the Intergovernmental Panel on Climate Change, Arctic regions are warming more rapidly than the rest of the globe. Even prior to the known climate change influences, there have always been a myriad of unknowns in the salt and fresh water environments that fishes inhabit, as well as the all-important land/water interface. Long before the technological advances of high tech equipment that allows scientists to monitor such things as ocean temperatures and fish movements with satellites, one old time ecologist (Frank Egler) noted, "Not only is nature more complex than we think, it is more complex than we can think." Unfortunately, that complexity hasn't changed much. Sometimes the more we learn, the more we realize just how little we really know.

Management of aquatic resources has never been easy. Fishery managers and fishermen will face greater challenges in the coming years. In testimony before Congress on May 10, 2007, Gordon Kruse (President's Professor of Fisheries and Oceanography at the School of Fisheries and Ocean Sciences at UAF and a past Marine Fisheries Scientist for ADF&G) highlighted potential changes to Alaska's

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Check out the online FAIR discussion forums

In the last issue of the FAIR Advocate, we mentioned the launch of a new website associated with the FAIR program (www.fair.bsfaak.org). While some parts of the website are still under construction, the discussion forums are up and running!

In these forums, you'll find discussion threads on salmon bycatch, the upcoming Board of Fisheries meetings for the AYK region and Bristol Bay, and one to talk about the upcoming fishing season.

Please visit the forums and post a reply to one of the existing threads, or start a new discussion topic. **http://fair.bsfaak.org/cfforumsexpress/**

Inside

Household surveys shed light on subsistence harvest patterns

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were poor years for chum salmon in the Norton Sound-Port Clarence Area. Coho, Chinook, and sockeye stocks also were depressed. Thus the study period – 1994 to 2003 – was a difficult time for many subsistence families.

Before conducting the analyses, researchers obtained consent for the study from each of the ten communities. They then revisited the communities to review data with residents, usually the people who conducted the original surveys. They made sure that household identifiers were correct and collected a few additional items of information, such as the ages of heads of households.

The analyses began by exploring what seemed an obvious pattern: the differences in individual households' annual salmon harvests. Some households take thousands of salmon every year, others take hundreds, and some take none. Cutting across this basic pattern was a second pattern: some household's catches are very similar from year to year, while other household's catches vary from zero to thousands of salmon from year to year.

At least in part, these differences arise because salmon fishing in Alaska is an inherently unpredictable enterprise. Salmon runs fluctuate; pink salmon runs routinely fluctuate by an order of magnitude. Weather limits effort and often frustrates attempts to produce salmon dried in the traditional ways. Equipment fails; parts for repair are difficult to obtain. And – most relevant to this study – households have varied abilities to harvest salmon and different needs.

Despite all the variation in harvests, there were consistent patterns, patterns that might be used to refine estimation and prediction. From year to year, through all harvest regimes, cumulative harvest patterns were very similar. Figure 1A shows the cumulative harvests by all households in the study communities for each year from 1994 to 2003. Through many different levels of abundance, through a decade of variable summer weather, with harvests ranging from 67,000 to 140,000 salmon, each year about 21 percent of the households harvested about 70 percent of the salmon, by weight. Some communities had similar consistent patterns of harvests. But the concentration of harvests varied considerably from community to community (Figure 1B).

This pattern was immediately useful. Surveyors try to survey every household, but this is virtually impossible. When surveyors miss a lot of households, it seems they concentrate on high harvesters and miss low harvesters. When this happens, subsistence harvest estimates will be excessively high. Now, researchers can quickly explore a suspect sample to see if it fits the community pattern. If not, the sample probably is not representative.

The good news was that all but 2 of the 100 community samples seemed to be representative. Researchers also found that:

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Figure 1.
Cumulative Subsistence Salmon Harvests

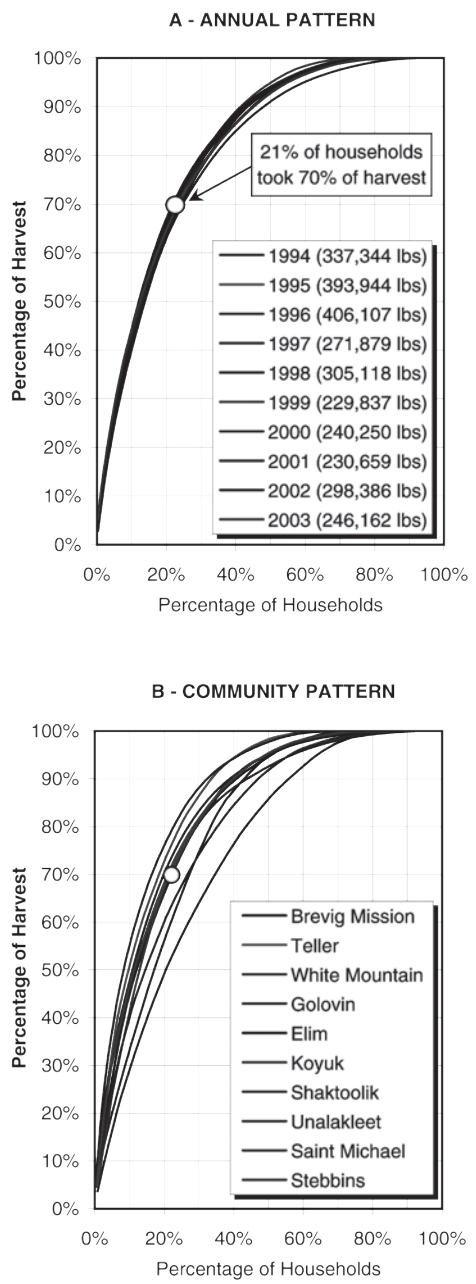
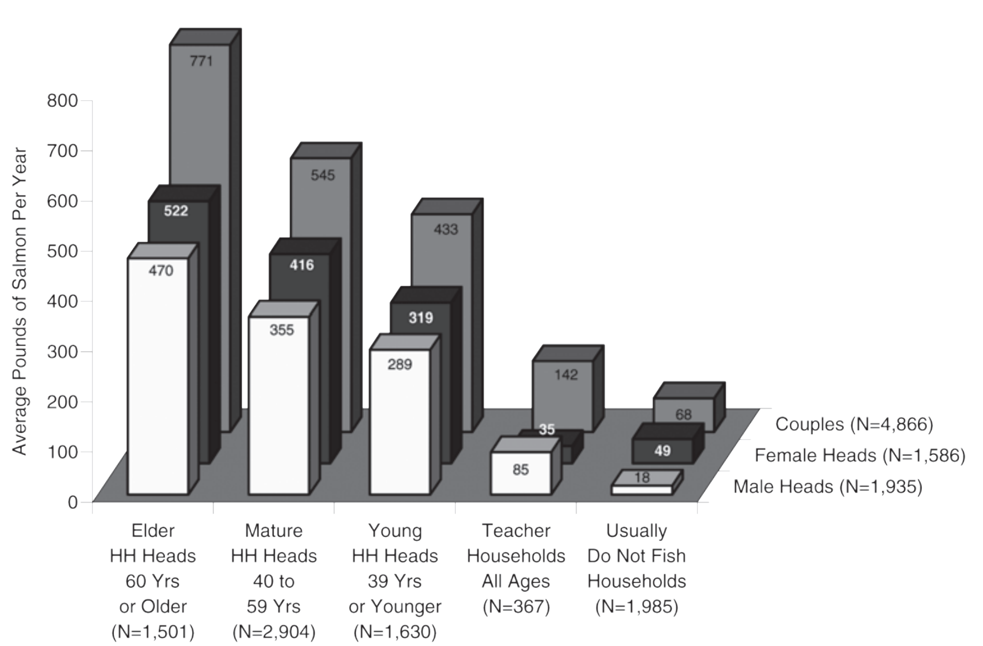


Figure 2. Pounds of salmon harvested by household age and structure



Patterns

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- In most communities, households with older heads harvested significantly more salmon than households with younger heads, and households headed by couples harvested more salmon than households headed by single persons (Figure 2).
- Households that consistently harvested salmon also were among the high harvesting households in their communities.
- Neither commercial fishing retention nor family events seemed to affect harvest levels.

Given these patterns, it was reasonable to assume that a stable core of high-harvest households harvested the majority of salmon year after year. But that was not the case in most communities.

Other than the very highest- and lowest-harvesting households, consistently-ranked households were the exception, not the rule. Even among the very highest harvesting households, there were one or more households that ranked near the top in one or more years and near the bottom in another year. Two Teller and two Brevig Mission households ranked first in one year and last in another year. Low-harvesting households were no different. In most communities, there were several typically low-harvesting households who ranked among the highest harvesting households in one or two years.

To return to the question posed earlier: Were the same households responsible for a majority of the harvests year after year? It seems some households did contribute consistently to the community harvest. But in every community, there were many households whose harvest levels were unpredictable. There were households that usually contributed many fish and then one year contributed few. There were households that usually contributed few fish and then in one year ranked among the highest harvesters in their community. This pattern is not apparent unless one tracks the harvests of individual households over time.

Household surveys are the best way to estimate subsistence harvest, but they are expensive. It will never be possible to survey every household in every community in every year. A better understanding of subsistence harvest patterns helps managers to design better sampling strategies, better harvest estimates, and more reliable models.

The full final report, Patterns and Trends in Subsistence Salmon Harvest in the Norton Sound Port Clarence Area by James Magdanz, Eric Trigg, Austin Ahmasuk, Peter Nanouk, David Koster, and Kurt Kamletz is available at: **http://www.subsistence.adfg.state.ak.us/TechPap/tp294.pdf** ❖

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Kwethluk fry study examines salmon survival rates

Biologists sorting and counting salmon fry. *(photo by C. Zimmerman, USGS)*

"Look at all those eggs," a woman said to me as she cut open a chum salmon.

The glistening skein of orange eggs caused the salmon's belly to bulge. We pulled the skeins of eggs out of the female and set them on the cutting table. This fish probably contained 2,000 to 3,000 eggs. Each egg was a packet of rich oil and represented a contribution from this generation of salmon to the next. Chum salmon that had not been caught would soon be spawning upstream of where we were standing. Females would dig a pit in the gravel, where the fertilized eggs would settle and incubate through the coming winter. In the late spring, fry from this gravel nest would emerge and begin swimming to sea. But, only a portion of all eggs laid in the gravel would survive to this stage. Then, only a portion of those fry would survive to migrate to sea, and so on. Ultimately, in several years a small percentage of the total number of eggs would return as adults to start the cycle over again. Based on studies elsewhere, of all the eggs laid in the gravel, only about 2 to 15% are likely to survive to emerge. And of those, less than 3% are likely to survive to return as adult salmon.

Understanding survival rates of salmon is an important step in knowing what drives production of salmon. Are salmon runs determined by conditions in freshwater, in the estuary as they transition to saltwater, in the ocean, or in rivers as the adults swim upstream to spawn? It probably varies by year and among locations. Bad conditions in any one of the environments where salmon live may lead to low returns or good conditions may lead to high survival and large runs of salmon. Fishery biologists are trying to figure out what survival rates are during the different life stages of salmon. Ultimately, they hope to be able to predict salmon returns based on conditions in freshwater and ocean environments. This is a big task and requires information about salmon abundance at all life stages.

In 2007, the US Geological Survey and US Fish and Wildlife Service began a project to estimate survival of chum salmon in the Kwethluk River, a tributary of the Kuskokwim River. For several years, a weir on the Kwethluk River has been used to count the number of adult salmon swimming upstream to spawn. Using the number of salmon counted by that project and an estimate of the number of eggs carried by each female salmon, biologists will estimate the number of eggs laid in the gravel. The new project is counting the number of fry that emerge from the gravel and travel downstream past the weir site. Using those two numbers, biologists will be able to estimate survival from egg to fry. Then, in a few years, when the adults return and are counted at the weir, biologists will be able to estimate the survival from fry to adult. Carried out over several years, biologists will begin to understand the ranges of survival and compare these rates to environmental variables to build a better understanding of the salmon life cycle in the Kwethluk River.

Counting juvenile chum salmon as they migrate downstream is no easy task. The fish are less than 2 inches long. To catch the small fish, traps that float on the surface of the water are used. Each trap consists of two floats that suspend an inclined-plane or scoop that rests under the surface of the water. The scoop essentially strains the water for small fish that are directed into a box.

It is 4 o'clock in the morning and Jim Finn of the US Geological Survey is getting ready to count all of the salmon in the two traps. It is dark, a drizzle of rain is falling, and the water is cold. In spite of these discomforts, the traps have to be checked. Most of the salmon are migrating at night and the traps have to be checked on a regular basis or they will fill up with too many salmon. Jim turns on the lights over a white counting table and begins scooping the small salmon on to the table. Immediately, the salmon are counted and returned to the river as quickly as possible. During this count, Jim and another biologist count chum, sockeye, coho, and Chinook salmon.

"We also catch pink salmon, rainbow trout, sculpins, and a bunch of other fish," Finn explains as he counts a subset of chum salmon into a bucket.

"This group of fish will be used to estimate the efficiency of the traps."

Unlike the weir used to count upstream swimming salmon that spans the entire river, the floating inclined-plane traps only fish a portion of the river. That means, there are juvenile salmon going past the site that are not captured. To estimate the proportion of salmon being counted, Finn and fellow USGS biologist Sean Burril will give this group of salmon a quick ride

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A salmon fry trap on the Kwethluk River. *(photo by C. Zimmerman, USGS)*

Counting

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back upstream. First, they immerse the fish in a harmless brown dye that will fade after a few days. They know how many fish they dye and will release them back into the stream about a mile above the traps. Then, over the next couple of days, they will count the number of dyed fish they trap to determine the percentage of fish captured by the traps.

"Usually, we catch about 2% of the fish we release upstream. As far as smolt trapping projects go, that is a high number," says Finn.

"Last year, our biggest catch in one day was over 10,000 chum salmon," says Burril as he counts his hundredth salmon in this haul.

The biologists will spend a couple months counting juvenile salmon. In 2008, the project will be counting salmon around the clock from the end of April until the first of July. Then, over the next few months, Burril will spend his days proofing the data, analyzing the efficiency calculations, and finally, estimating the number of chum salmon that left the Kwethluk River.

Chris Zimmerman, team leader for fisheries at the USGS Alaska Science Center explains, "Unfortunately, we don't have a lot of data concerning juvenile salmon productivity in western Alaska rivers. This project builds upon the counts of adult salmon at the weir to gather more information in an incremental fashion. Hopefully, we will be able to continue this project for a few years. Coupled will other studies, we hope to begin understanding what environmental factors control survival of salmon."

This project is a cooperative project between the USGS, Fish and Wildlife Service, and the Organized Village of Kwethluk. Funded by the Arctic-Yukon-Kuskokwim Sustainable Salmon Initiative, the project is scheduled to complete it's second year in 2008. ❖

Genetic analysis of Yukon fall chum may assist in-season management

Beginning in 2004, the United States Fish and Wildlife Service have been examining the genetic profiles of the various fall chum salmon stocks in the Yukon River drainage to assist in the often complex management decisions regarding the fisheries. The Yukon is a mixed-stock fishery. While all the salmon stocks fall under a broad "Yukon" origin, there are many components of the run that originate in different drainages within the Yukon River, in both Alaska and Canada. The individual stocks have their own escapement goals and there are treaty obligations to ensure an adequate number of fish make it across the border into Canada to meet their spawning needs and provide for harvest opportunities. This ongoing study has estimated the size of each component of the Yukon Fall chum run, as well as estimating the time(s) in which each stock is entering the lower Yukon.

Each of the fall chum stocks or stock groups enters the lower Yukon at different times and many overlap one another. With the in-season ability to detect when each stocks is present and at what degree of abundance, fishery managers have a better ability to try and achieve the various objectives for spawning, Alaska-region subsistence and commercial harvests, and border passage requirements.

In 2006, tissue samples were taken from every chum salmon caught in the test fishery at the Pilot Station Sonar during the months of July and August. The samples were then grouped into nine time periods that coincided with pulses of fish entering the river.

In a March 2008 publication ("Application of Mixed-Stock Analysis for Yukon River Fall Chum Salmon, 2006"), the USFWS reports that for the 2006 fall chum run, "Fall chum salmon from the U.S. border region accounted for 43.8% of the total fall run, the largest contribution. The contributions of fall chum salmon from the other sampled regions were as follows: Tanana 20.6%, Canada mainstem 18.9%, Canada Porcupine 3.3%, White 12.7%, and Teslin 0.7%."

The report goes on to state, "Fall chum salmon from the Porcupine and U.S. Border regions continued to have the earliest run timing, followed by fall chum salmon from the mainstem and White regions. Teslin fall chum salmon again were not appreciable contributors, and Tanana fall chum salmon continued to run last, slowly building until they comprised the majority of the final strata. While the above generalization holds, there are overlaps of run timing among the regions, with greater overlap for the more abundant regions."

This research has been quite valuable by verifying what local fishermen and fishery managers had always believed to be true: that the upriver fall chum stocks entered the Yukon River earlier and the Tanana stock entered later.

Much of the work on mixed-stock analysis of Yukon River salmon has focused on fall chum; however work has also been conducted on summer chum. Management switches from summer to fall on the fixed date of July 16, but there is always overlap between the two runs and there can be some differences in timing from year to year. Of potential value to managers will be the in-season information that can indicate the relative strengths of each run around that transition time.

The report can be found at: **http://www.r7.fws.gov/fisheries/fish/Data_Series/d_2008_5.pdf**

More USFWS fishery reports can be found at: **http://www.r7.fws.gov/fisheries/fish/reports.htm** ❖

FAIR program seeks input for new observation network

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Rob Stewart (left) and Allen Mwarey identifying salmon fry.

marine and freshwater ecosystems due to climate change. Of particular note were several likely scenarios that have the potential to drastically affect the Bering Sea's food chain, influencing a wide variety of organisms in one way or another. Dr. Kruse noted that there will likely be dramatic shifts in species distribution and abundance, and predicted that increased water temperatures will negatively affect some species while benefiting others.

For salmon, warmer water temperatures could expand their distribution further northward into the Chukchi and Beaufort Seas, while suboptimal temperatures could cause real hardship for southerly populations in the lower 48 states. Increased water temperatures could lead to increased susceptibility to diseases like Ichthyophonus that has been a concern to the subsistence and commercial fishermen on the Yukon River fisheries for nearly a decade.

Bering Sea researchers believe that since the 1960's increases in bottom water temperatures have contributed to a northerly shift in distributions of adult female red king crab and snow crab. However, those same warmer temperatures favor some predators of young crabs. The distribution of Pacific cod, rock sole and skates has also shifted northward. These are two mechanisms that are believed to have contributed to the crab declines that began in the late 70's. The arrowtooth flounder, which preys on pollock, cod and other valuable groundfish and shellfish, seems to have flourished during that time. It's obvious then that the flounder's numbers aren't floundering. Not only are they at the highest levels ever recorded, they are still increasing.

Besides the affects of temperature change on native species distributions, there is also the concern for invasive species to either expand their current distribution … or new invasive species to be introduced. The European green crab is presently found in British Columbia, near Vancouver, and seems to be moving slowly northward. And with the likelihood of future commercial travel through an ice-free Northwest Passage, the potential for additional invasive species to take hold through ballast water discharge, and other mechanisms, only increases.

In addition to the decline of ice in the Arctic Ocean, the duration that sea ice covers the Bering Sea is also dwindling. According to Dr. Kruse, the more typical coverage of ice for 6 or 7 months now lasts for only 3 to 4 months. Other not so obvious changes directly linked to water temperatures have to do with the trophic interactions (i.e., the food chain) that begin with primary production. Dr. Kruse notes that phytoplankton and zooplankton blooms along the ice-edge account for a large proportion of the total annual primary production in the eastern Bering Sea, and that declines in summer zooplankton have been documented.

If that's not enough to consider, similar sea ice changes in the Chukchi Sea will result in efforts to fish previously unfished waters … by several countries. Areas which, because of their remoteness, have little documented information on presence, absence or abundance of most fish species.

Yet there are other issues to deal with besides the unknowns of climate change. Mineral resource exploration and development are rapidly increasing into relatively pristine areas. Such development could potentially negatively affect habitat and organisms. Yet once again there is little or no scientific or local Traditional Ecological Knowledge (TEK) information available to assess potential negative impacts.

BSFA is proud of our intimate involvement in the ongoing comprehensive research occurring through such programs as the Arctic-Yukon-Kuskokwim Sustainable Salmon Initiative and Bering-Aleutian Salmon International Surveys. Unfortunately, it seems that just when it appears that Bering Sea stakeholders are getting a handle on the many informational gaps pertaining to the ecological intricacies of the North Pacific Ocean – something else pops up. As Dr. Kruse and others point out, the need for additional baseline and species life history information is even more critical.

That's where you come in. Being in touch with, or part of, nature is a way of life for many. Your observations of subtle changes that may be occurring can be valuable. You may notice these changes while berry picking; hunting moose, caribou and waterfowl; fishing for salmon, pike, blackfish, whitefish, halibut or Pacific cod; hunting seals and whales; or commercial fishing offshore for king and snow crab, walleye pollock or other species.

In order to better manage valuable resources of the Bering Sea for commercial, subsistence, aesthetic and ecological reasons, it will take a good working relationship between all interested parties…and a highly effective method of disseminating information. That's the intent of the Fisheries Awareness, Information and Responsibility (FAIR) program, to foster better relationships among stakeholders through the sharing of information across regions.

It's our intent to document and highlight many of the changes that are occurring, as well as contribute to the collection of biological baseline information. Applications having a high degree of utility would include identifying streams in the

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Update on Chinook bycatch and Council process

Salmon bycatch in the Bering Sea/Aleutian Islands fisheries occurs largely in the pollock fishery and has risen to alarming levels in recent years. With the completion of this year's pollock "A" season (which is allocated 40% of the annual catch limit), at this time Chinook bycatch is reduced from the previous record highs. As of April 26, 15,059 Chinook salmon have been taken as bycatch in the pollock fishery, with another 533 Chinook salmon caught in the various CDQ fisheries.

While many people understand that the pollock fishery is where most of the salmon bycatch occurs, most do not understand the differences between the three sectors within the pollock fishery (inshore, mothership, and catcher/processor). Each of these sectors has their own allocation of the pollock catch and each also performs differently in regards to salmon bycatch.

The inshore sector is allocated 50% of the directed pollock harvest. This sector is comprised of "catcher vessels" that deliver their harvest to shore-based processing plants. The mothership sector is allocated 10% of the pollock harvest. It is comprised of catcher vessels that deliver their harvest to large, mobile processing ships. The catcher/processor sector is allocated 40% of the pollock harvest and is comprised of large boats, also called factory trawlers, that catch and process their pollock catch on board the same vessel.

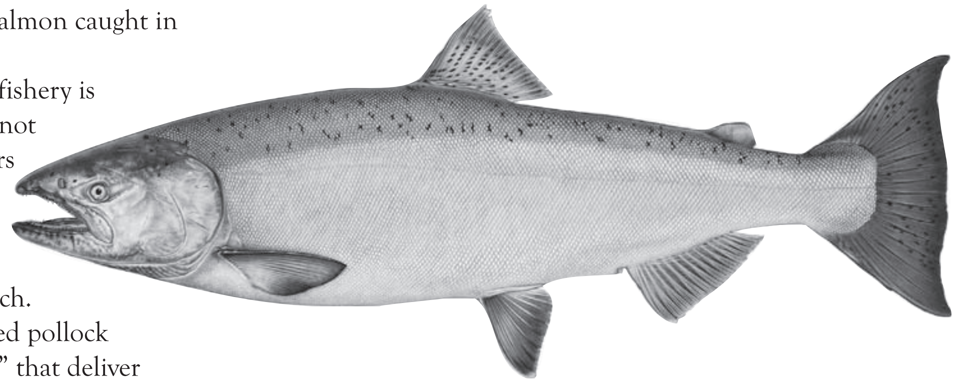
As mentioned above, each of these sectors has different levels of salmon bycatch. For the years 2004 through 2007, the inshore sector caught about 73% of the Chinook salmon bycatch, the mothership sector caught about 5% of the Chinook bycatch and the catcher/processor caught about 22%.

		Percent of Chinook Bycatch	
Sector	Pollock allocation	2004-2007 average	2008 pollock A season
Inshore	50%	73%	66%
Mothership	10%	5%	7%
Catcher/processor	40%	22%	26%

At its April meeting, the North Pacific Fishery Management Council (NPFMC) made further modifications to the suite of alternatives to address Bering Sea salmon bycatch. In the process of developing alternatives for any Council action, the range of options is usually very broad to encompass a variety of ways to deal with the matter.

BSFA hopes that final action by the NPFMC on this matter will result in significant reductions in salmon bycatch through reasonable controls on the fishery. The hard caps being considered will provide the necessary incentive for the fleet to modify their fishing behavior. Among this broad range of options and alternatives BSFA is particularly concerned with two of the possible approaches.

The Council is examining a number of ways that a hard cap for salmon could be allocated to the different sectors. One method is to divide the cap based on each sector's pollock allocation, therefore the inshore sector would receive 50% of the bycatch, the mothership sector would get 10% and the catcher processor sector would get 40%.



Another method for dividing a hard cap would be based on each sector's historical bycatch of salmon. A range of years are still being considered under this option, but many feel that this method of allocating bycatch caps would essentially reward those in the pollock fishery that have had poor salmon bycatch performance. It may also serve to penalize fishery participants who have already been making efforts to reduce their salmon bycatch levels.

> "For most quota managed fisheries, quota allocation starts with the provision of quota to fishers based on some formula that incorporates historic participation with other social goals, such as economic development or discouraging excessive market concentration. This process is never easy because of its long-term financial implications, but here it is even more complicated because there is a concern about rewarding "bad" behavior of past high bycatch." (excerpt from "BSAI Salmon Bycatch, NPFMC Staff Discussion Paper, January 16, 2008)

Another aspect of bycatch management being considered is whether or not to allow salmon bycatch quota to be transferred within the fishery. While BSFA believes that some limited form of transferability may be warranted, we want to see the fleets modify their behavior as it relates to salmon bycatch and not simply "purchase" or trade leftover bycatch quota from other vessels/sectors that have been fishing more cleanly.

The Council is scheduled to continue action on salmon bycatch at the June 2008 meeting in Kodiak with an initial review of the draft Environmental Impact Statement which analyzes the suite of alternatives. The FAIR Advocate will continue to update you on this subject in future issues.

For the full list of alternatives in the Council motion on salmon bycatch go to **http://www.fakr.noaa.gov/npfmc/current_issues/bycatch/salmonbycatch408motion.pdf**

The Council's June meeting agenda is at **http://www.fakr.noaa.gov/npfmc/Agendas/608Agenda.pdf** ❖

Change

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state's Anadromous Waters Catalog that currently aren't identified as such.

We'd also like to see and hear about whatever it is that interests you, whether natural or not, highly unique or just slightly unusual, commonplace or out of the ordinary, mundane or sublime. For instance, when did the ice break-up on your home river? High on everyone's excitement list is when the first chinook salmon is caught in the Yukon or Kuskokwim Rivers … or any river for that matter, for that is the harbinger of one of the best times of year – salmon fishing season. That first fish not only reminds us to get our nets ready, if we haven't already done so, but also accentuates the ever-important cycle of life that is a vital component of the Bering Sea ecosystem… and to our very own existence.

One of the more interesting stories I heard was that somewhere around the late 90's someone caught an adult Chinook salmon through the ice in April in the Aniak River. What it was doing there at that time was anyone's guess, but I'm sure it would have been a lonely and costly (in regards to energetic demands) several months till others arrived. Back then it wasn't possible to prove, almost instantly, that such an interesting anomaly had occurred (digital cameras weren't around yet).

Or maybe you would want to report something akin to this horrific recent sighting - horrific in the sense that it may be an indication of what is to come this summer. It occurred during the second of three meltdowns of the Kuskokwim Region this winter (the first thaw resulted in the Kuskokwim 300 Dogsled Race). And as eerie as it may sound, this sighting occurred near the very same location as that unusual Chinook observation. Although it was not documented with a photograph, this observation was reported and confirmed by several other individuals. There, on the frozen surface of the Aniak River, while ice fishing for rainbow trout and pike in mid-March, he and several others reported seeing a mosquito.

So was this last observation the result of far off human influences or an anomaly, or someone just being in the right time at the right place to witness the astounding spectacle of natural variation? By collecting such observations throughout the region we may all help explain some of the natural complexity that unfolds before our eyes every day.

The observations network on the FAIR website **(www.fair.bsfaak.org)** will be up and running in June 2008. **As we develop the database, we would welcome your suggestions about what kind of observations you think would be useful to catalog. Please contact us.**

With today's technology one can send a message with a photo to the entire world in seconds, and literally become a star overnight. Share your observations with the world and contribute to the sustainability of a very special place. ❖

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