



Background

From 1981 to 1986, I worked as a Field Fisheries Biologist and technician in the Yukon and Northern British Columbia which included contract work for the Department of Fisheries and Oceans Canada. I headed up the salmon programs on Little Tahltan Lake (Stikine River system), Little Trapper Lake (Taku River System) and the Klukshu (Tatshenshini/Asek River System) in 1982, 1984 and 1985 respectively. All 3 of these programs focus predominately on Sockeye salmon as all 3 of these lakes are classed as key indicator spawning populations to the total Sockeye escapement figures for their respective rivers.

In 1985 to 1986 I was the Manager of the Whitehorse Rapids Chinook Fish Hatchery which is a mitigation hatchery built along with the fish ladder to offset the impact of the dam constructed in Whitehorse on the Yukon River by the Northern Canada Power Commission (NCPC). The Mitchie Creek stock of Chinook which pass through the fish ladder are one of the longest if not the longest migrating salmon in the world travelling a total of 2200 miles in freshwater up the Yukon River to Mitchie Creek.

In 1992, I was hired as the Scientific Authority on a joint project between Canada and the USA on Little Trapper Lake, Little Tatsamenie, and Tatsamenie Lake which are all part of the Taku river system to undertake the collection, holding and spawning of Sockeye brood stock collected from the weirs. The Brood were held in fish pens in the river or lake until ripe and then spawned according to Alaska Fish and Game IHN Virus Protocols. Fertilized eggs were then transported by air to a hatchery in Snettisham, Alaska specifically designed and built for Sockeye. This is in part due to the IHN virus which many sockeye salmon stocks are carriers of. The hatchery reared the sockeye up to a gram or two in size and released the fry back into the respective lakes or rivers the following spring.

From 1985 to present I have been involved in the aquaculture industry and more specifically fish farming. I have reared Chinook, Coho, Atlantic and Sockeye salmon as well as Black Cod. Several companies in the early 1990's were looking for alternative salmon species to rear and the company I was managing was one of the first companies in the world to attempt to farm sockeye salmon in saltwater in net cages.



Introduction

In the process of doing Fisheries work on the majestic rivers of the Stikine, Taku, Tatshenshini and the Yukon, I became very familiar with the current (at the time) and historic salmon returns and technical reports related to the salmon returns on these rivers. I also spent time with First Nations collecting information on food fishery catches and was given an even broader historic perspective on the various salmon species returns to the lakes and rivers of the watershed systems.

What did I find out?

- In wilderness areas seemingly devoid of development and industrial activity salmon populations could be negatively impacted by other variables and runs of Sockeye salmon were endangered even in the 1970's and early 1980's.
- Salmon return numbers of all species including Sockeye were inconsistent and in some years the numbers were significantly low enough to warrant the closure of the commercial fisheries and a significant reduction of the First Nations Food fisheries openings (sound familiar). Example – In 1983, I was hired to be the Fisheries Patrolman by DFO for the Stikine River and I ended up working most of the field season on freshwater patrols in the Yukon as the sockeye fishery did not occur due to low numbers of fish. (see Appendix A Figures as these are historical weir counts and escapement estimates that show the highly variable Sockeye population fluctuations of several Canadian and Southeast Alaska sockeye stocks. Even in Southeast Alaska they have sockeye return issues particularly in 2008 and the Yakutat area had the lowest returns in 2008 since Statehood)
- Water flows, water temperatures and water levels can all play a role in the success of the return of salmon. Pre spawning mortalities some years were high on the rivers and lakes due to slightly warmer water temperatures and/or delays due to water levels and flows.
- IHN "Sockeye Disease" is a serious viral disease that can cause major mortalities on spawning grounds. The adult sockeye immune system is at its weakest after the huge expenditure of energy during the migration and pre-spawning activities. If the IHN virus spreads throughout the spawning population then the year class recruitment can be seriously jeopardized.
- Significant salmon species dynamics, gene pool, sex ratio and age class changes were occurring or had occurred due to low return numbers on the key indicator stream, river or lake populations. Examples: Coho population in the Tatshenshini according to several elders of the Southern Tutchone /Klukshu Village was very significant in the early 1900's and perhaps larger



than the Sockeye but it almost nonexistent when I worked on the river. In the Taku river on carcass weirs ratio's of Male to female Chinook were seen to be 5 or 6 to 1 or more not the normal 1 to 1. Selective Gillnet gear in early years targeted the largest and older age classes of Chinook, leaving the

- Jacks and smaller Chinook returning to the spawning grounds. (Have you ever asked yourself why there are not as many large Chinook? It is a long term cumulative damage and alteration of the gene pool that cannot be replaced!!)
- Enhancement projects (not just hatcheries) were already in process or in place in the 1970's and 1980's to try and rebuild salmon populations including sockeye. Not all projects have been consistently successful or successful at all. Part of the contract work that I did for DFO at the time was to produce bathymetric charts of the sockeye lakes and collect water chemistry samples for the purpose of determining the feasibility of fertilizing the lakes. The lakes were fertilized in subsequent years.
- Politics and economics play significant roles in decisions about salmon fisheries in reference to a "common resource fishery".
- The fact that the all of the river systems I worked on were Interboundary acutely emphasized the issues around sharing a resource across borders cooperatively. The river systems I worked on were largely in Canada but that did not necessarily mean Canadians benefited the most from the resource. If you add in the offshore fisheries to the mix then cooperation, sharing of information and proper management of the salmon resource becomes even more difficult.
- Setting up proper monitoring and reporting of sockeye populations requires significant funding and some years there was no funding available for all of the basic population monitoring weirs and/or other counting systems including out migration traps for smolts or hydrological sampling for egg survival and fertilization rate calculations.
- Predators like seals and sea lions can and will follow spawning populations of salmon into freshwater. Example: When doing aerial survey counts of Sockeye on the Stikine River it was not uncommon to see seals 60 to 80km upstream from the mouth of the river. We are all familiar with the growing populations of seals and sea lions on this coast especially with the arrival of the California Sea lions in the late 1980's. This is an ongoing issue for many salmon stocks not just for returning salmon but also for the out migration of smolts.

How is this in any way related to Fraser River Sockeye populations and investigation into the low escapement numbers in 2009?

- I believe that many of the observations and experiences from the Northern Canadian River Sockeye salmon stocks are applicable to the Fraser River sockeye stocks. There are years where many of these other river/lake systems Sockeye stocks should have warranted their own commission and investigation but we never hear about that because it is out of sight and out of mind for most residents of BC and Canada. The Fraser River Sockeye are returning in record numbers this year but what will happen in the next couple of years. I would suggest that given the history of other sockeye salmon stocks we will continue to see good and bad years for returning numbers of salmon. Perhaps we are not really investigating the collapse of salmon stocks including the Fraser River Sockeye but the reasons for the high variability and seeming unpredictability.
- Sockeye salmon populations for the last 40 years in absolute supposedly pristine remote environments where there is virtually no industrial activity and no significant development have had issues with low escapements. If that is correct then given the additional pressures of urbanization and land development, agriculture, industrial activities including mining and forestry, pollution, changing climatic conditions is it any wonder that the Fraser River Sockeye have had problems as well?
- Enhancement of Northern Sockeye and Fraser River Sockeye has been ongoing for the past 30 years including hatcheries, habitat restoration, water flow and levels regulation and lake fertilization work to try to bring the sockeye numbers back to historic levels. Enhancement was required even on river systems where there has been a smaller number of variables or scale of issues than the Fraser River stocks have to contend with.



Who's to Blame???

The Obvious Scapegoat - Salmon Farming and Sea Lice

- We need to stop blaming salmon farms and using them as a scapegoat or the fall back position for every issue that comes up regarding the health and welfare of our “common resource” salmon. It is not helpful; it is counterproductive and counter intuitive given the historic data on sockeye salmon runs and I would argue given the long history of oscillating annual returns of other Pacific Salmon including the Broughton Pink Salmon. (Please note I did not say wild nor did I say natural because I do not believe at this point in time that those words accurately describe the salmon in our ocean, rivers and lakes in present day.)
- Example – 3 years ago we were told by certain individuals, researchers and organizations that the Pink salmon in the Broughton Archipelago were going extinct due to the close proximity of salmon farms with Atlantic salmon. The accusation was that sea lice were being transferred from the farmed salmon to the pink salmon. A tremendous amount of time, money and energy has gone into researching the validity of these claims since by the Federal and Provincial Governments, the fish farm industry as well as other researchers. This research is still ongoing. Bottom line is that there is an overwhelming body of information that shows the pink salmon populations in the Broughton have had historically low runs well before fish farms were present and guess what they have also had record runs since including the last 2 years. (Sound familiar). So, last year the Sockeye do not return to the Fraser River and no surprise here some environmental groups and individuals claim it must be fish farms and the sea lice on the fish farms. Well here we sit today and the Pacific Salmon Foundation is declaring a record run of Sockeye returning to the Fraser River. (Is this not starting to sound like a broken record to you, does anyone remember the Fairy Tale Peter and the wolf or the expression just throw mud against a wall until it finally sticks??)



Who's to Blame???

The Obvious Scapegoat - Salmon Farming and Sea Lice cont'd

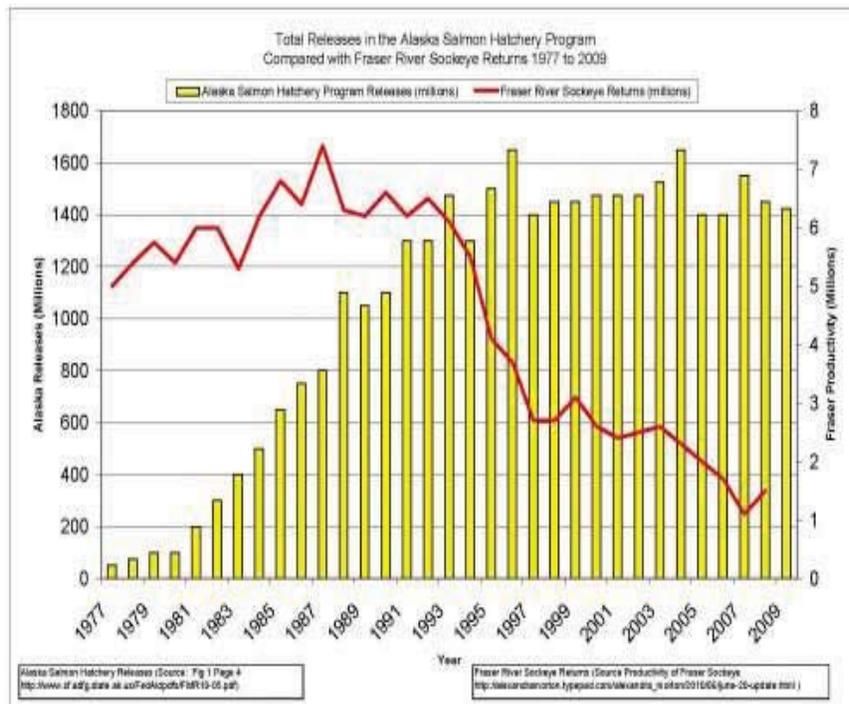
- The Cohen commission should not be expending the time, money and energy on this so called “issue” of farm salmon and sea lice as the taxpayer’s money is already hard at work. Yes albeit on Pink Salmon but I would like to point out that the Fraser River estuary and the Fraser River Sockeye smolts are more than 100km from the nearest Fish Farm so if there is an issue **and this is a big if** with farm salmon and sea lice it would be far more likely to be occurring with the Pink salmon in the Broughton first because of the Pinks proximity to the salmon farms and second due to the life history of the Pink salmon in particular the small size of the Pink smolts in the estuaries and inlets. Pink Salmon in the Broughton leave the rivers quickly whereas most Sockeye spend 1 to 2 years in Freshwater before out migrating therefore they are much larger and less susceptible to sea lice at that size.
- In the early 1990’s salmon farmers were looking into alternative salmon species to rear on the farms. I happened to be one of the few farmers who raised a generation of sockeye salmon. In those days the farms were run by smaller companies that do not exist today so unfortunately I do not have access to the data collected at the time on this commercial scale research. However, reports were filed with the Department of Fisheries and Oceans Canada as part of the terms and conditions of the research project. I had two pens of sockeye salmon growing side by side with 14 other pens all with Atlantic salmon of different sizes and generations including Brood stock for 24 months in saltwater. The sockeye arrived at a size of approximately 15 to 20 grams on average and were harvested at 2 to 3 kg. The interesting point is that despite having several generations of Atlantic salmon on site, we had no issues with Sea lice on the Sockeye salmon. I mean zero. I am sure a lot of people would agree with me that if ever there was a trial by fire so to speak that would or should have been it.



Who's to Blame???

The Obvious Scapegoat - Salmon Farming and Sea Lice cont'd

- Salmon farming is a relatively new addition to the coast and certainly was not in play with the sockeye population fluctuations of the 1970's and 1980's. Salmon farming is certainly not in play with the fluctuations of the sockeye populations in Northern BC and Alaska, however, salmon ranching in Alaska is. Salmon ranching has been in practice for the last 30 years and has grown from <200 million annual releases in the late 1970's to an average of 1400 to 1600 Million annual releases since the mid 1990's. This is a 7 fold or 600% increase in fish competing on the open ocean for the food resources in the last 15 years. Many Sockeye populations including the Fraser River Sockeye stocks have an ocean migration that includes the North Pacific area off the coast of Alaska, and this is a significant feeding ground for the sockeye populations. This figure below examines the Fraser River Sockeye returns versus the Salmon Ranching Production in Alaska. There would appear to be a possible relationship between the two.





- Cooperation between the USA and Canada will be imperative for the success of any plans. This may include a review of the salmon ranching program and the impact it is having on the food resources on the open ocean. Canada and BC have researched and reviewed salmon farming numerous times and instituted several moratoriums and continue to conduct research ; the same cannot be said for our US counterparts. There will be great opposition to this due to the underlying political and philosophical issues including the funding of Environmental groups for anti-fish farming campaigns in BC via US Foundations and via the Alaskan Commercial Fishery. This has been well documented by Vivian Krause.
- Sometimes we have to look beyond our own backyard to discover the issues that are critical to improving the plight of the salmon as well. For example many people do not know why the Atlantic salmon became an endangered species and why the Atlantic salmon fisheries collapsed. To put it quite simply, the fisheries scientists and public on the East Coast of North America were focused on what was happening locally, Iceland and Greenland were focused on their own geographical area, as were the European countries. Unfortunately, no one or too few realized that the Atlantic salmon were migrating from the East Coast of North America to Iceland/Greenland and the Atlantic Salmon from the European countries were also migrating to Iceland/Greenland and the result was that the commercial fisheries in each respective geographic area thought they were managing a single fishery when in fact the fish were being caught in a second fishery off the coast of Iceland and Greenland (The old double dip). Under this scenario the annual returns of the Atlantic salmon to the rivers spiralled downwards rapidly. My point being, we need to consider all impacts here and internationally and we should not overlook a contributing factor because of our own personal biases.



Other Scapegoats

- We can find all kinds of industries including forestry, mining, commercial fishing, agriculture, development, hydroelectric etc to blame however we should consider that compared to 30 or 40 years ago there is a much greater awareness about the salmon populations and of the impacts human activity has on those populations. Regulations, policies and protocols have been improved, perhaps not to everyone's satisfaction but there has to be some acknowledgement that everyone is learning from past mistakes. At the end of the day, we need to move forward and continue to improve in all the things we do that impact salmon as it will all help as oppose to hinder the salmon. To do nothing or to create paralysis by analysis will not create or foster groups working together and that is definitely not in the best interests of the fish.

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Conclusion

Many people ask me how I ended up in fish farming especially after relaying stories to them about working in perhaps some of the most beautiful, isolated and remote wilderness areas in the world. The truth is that after working in those areas and seeing what was happening to the salmon stocks I realized that there was nothing untouched even in those remote areas and that the genetics and ecosystems had already been altered significantly. Whether you want to believe it or not, we are already artificially supporting the salmon stocks including the Fraser River Sockeye and have been for a long time. Does that mean we give up on them, certainly not; we need to examine all techniques used by all countries that have salmon resources and prioritize the plan for managing the present day Fraser River Sockeye stocks based on the most effective methodologies. A better use of the money from this commission would have been to finance and improve the ongoing monitoring and management of the Fraser River Sockeye as well as all other Canadian Sockeye salmon populations. Get Back to Basic Fisheries Science Biology. I am not even sure if this one year collapse is the real issue or if the bigger issue is wanting consistently good predictable returns. It makes it sound like we are trying to control Mother Nature and maybe that is not always possible.

Last but not least, it is a tough task to convince anyone that there are problems and to take you seriously when fishing this year is bountiful, and historic runs are showing up, and when large Chinook over 50 lbs start showing up after 12 years!! That is the difficulty and the challenge, when a bad year is followed by a great year of salmon returns. Do we really need or want a commission every time we do not get what we want or expect? If History keeps repeating itself the taxpayers are in for quite a ride!



Appendix A :

Source : Special Publication No. 18-07 Sockeye Salmon Stock Status and Escapement Goals in Southeast Alaska
Alaska Dept. of Fish and Game
Douglas M. Eggers, John H. Clark, Randall L. Bachman and Steven C. Heintz
December 2008

Examples of Fluctuating Northern Canada Sockeye Salmon Populations

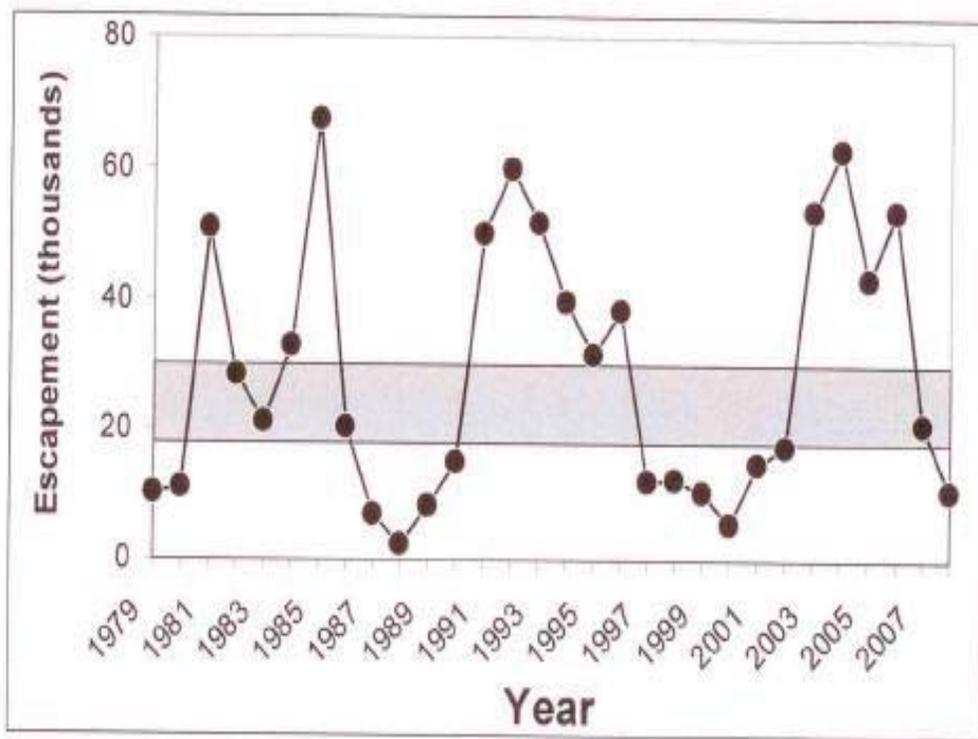


Figure 15.—Escapements (weir counts) for Tahltan Lake sockeye salmon. The gray area is the biological escapement goal range of 18,000 to 30,000 spawners.

Source : Special Publication No. 18-07 Sockeye Salmon Stock Status and Escapement Goals in Southeast Alaska
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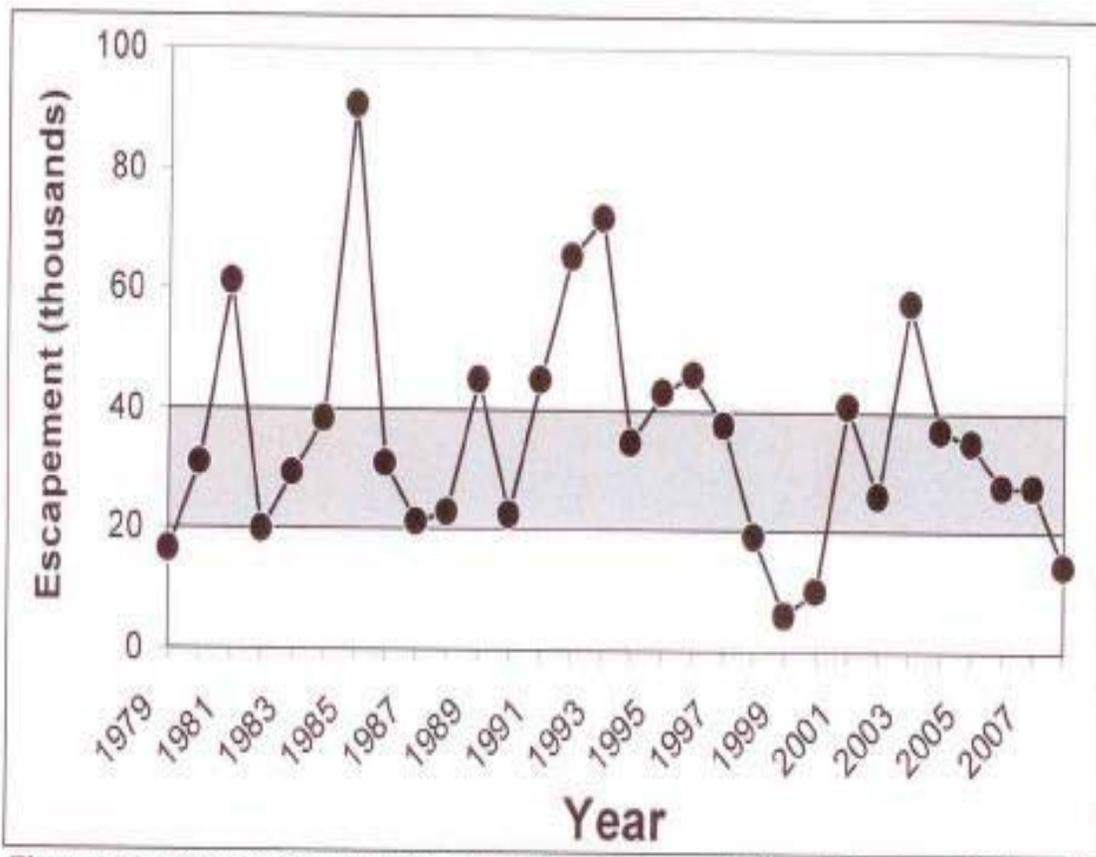


Figure 16.—Escapements (estimated total escapement) for Mainstem Stikine River sockeye salmon in 1979-2007. The gray area is the sustainable escapement goal range of 20,000 to 40,000 spawners.

Source : Special Publication No. 18-07 Sockeye Salmon Stock Status and Escapement Goals in Southeast Alaska



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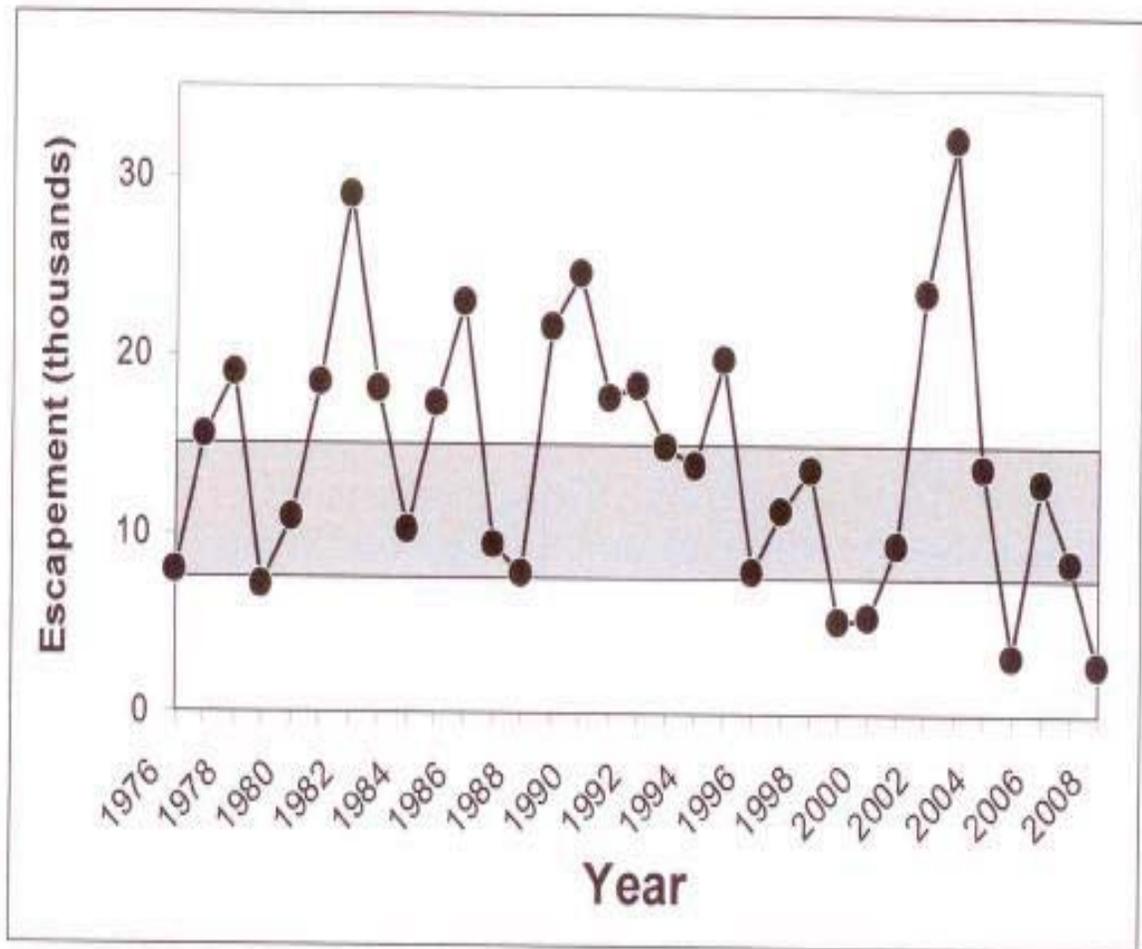


Figure 7.—Escapements (weir counts) for Klukshu River sockeye salmon. The gray area is the biological escapement goal range of 7,500 to 15,000 spawners.

Source : Special Publication No. 18-07 Sockeye Salmon Stock Status and
Escapement Goals in Southeast Alaska
Alaska Dept. of Fish and Game
Douglas M. Eggers, John H. Clark, Randall L. Bachman and Steven C. Heintz
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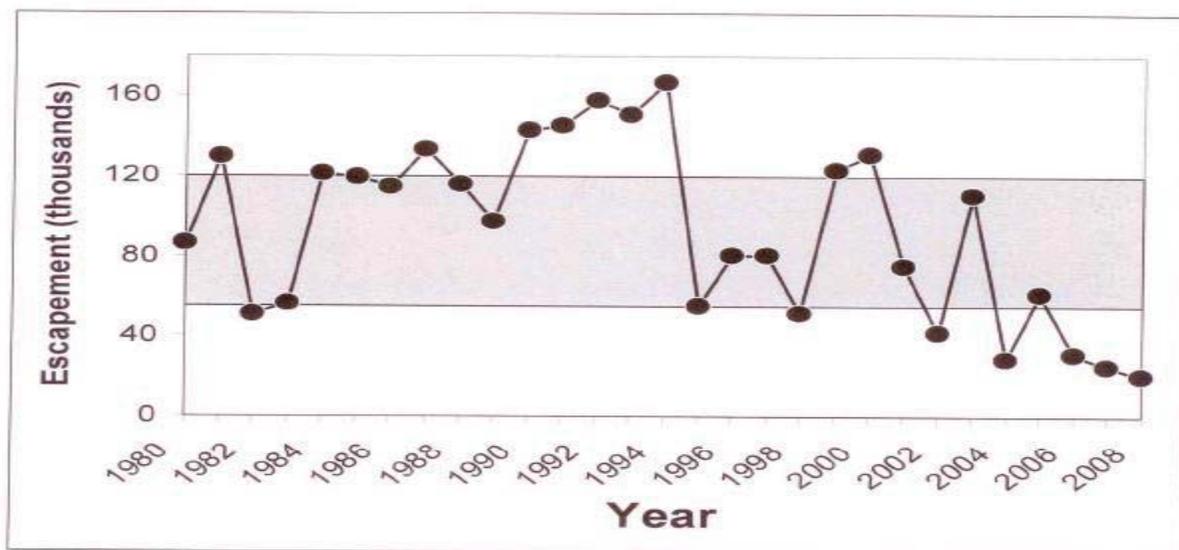


Figure 18.—Escapements (expanded foot counts) for McDonald Lake sockeye salmon, 1982–2008. The gray area is the recommended sustainable escapement goal of 55,000 to 120,000 spawners.

STOCKS OF CONCERN

The McDonald Lake sockeye salmon stock has recently undergone a reduction in recruitment. The escapement goal for McDonald Lake was not met in four of the last five years. In addition fall fry abundance based on hydro-acoustic surveys has been very low since 2005 and indicates low runs will persist for several years. Because of the continuing and anticipated inability to maintain escapement to meet the escapement goal this sockeye salmon stock meets the criteria for a stock of management concern under the Alaska Sustainable Salmon Fishery Policy.

Coded-wire tagging studies in the 1980s showed that this stock was harvested primarily in the District 6 drift gillnet fishery, with the next largest portions of the run harvested in the District 1, 2, and 4 purse seine fisheries. This stock was also harvested in a terminal purse seine fishery at Yes Bay in 1991–1993 and 1996–2001. McDonald Lake sockeye salmon were also harvested in a personal use fishery in Yes Bay.

The ADF&G has implemented a multi-year, genetic stock identification project to help clarify areas of potential catch of McDonald Lake sockeye salmon in 2007 and 2008. Weekly samples were collected from the District 6 drift gillnet fishery and from the District 1 purse seine fishery. These data, once analyzed, will be used to update the coded-wire tagging studies and provide improved information about the time and area distribution of McDonald Lake sockeye salmon in those fisheries.



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The ADF&G has already implemented a series of management actions designed to allow more McDonald Lake sockeye salmon to escape to McDonald Lake. In 2007 and 2008, the District 6 drift gillnet fishery was restricted to two-day openings for three weeks from mid-July to early August; in addition, the western portion of Sumner Strait was closed to fishing during the middle week of that conservation period in 2007. In 2007 and 2008, the District 1 purse seine fishery along the Gravina Island shoreline (north of the latitude of Cone Point) was closed to fishing from mid-July to early August. In addition to these measures for sockeye salmon conservation, overall purse seine fishing time in Southern Southeast was very limited during the 2006 and 2008 seasons due to poor runs of pink salmon. The Yes Bay terminal purse seine fishery has not been conducted since 2001. Finally, the bag limits in the McDonald Lake Personal Use fishery have been stepped down from a daily bag-limit of 50 fish per person, to an annual limit of 20 fish per person.

DISCUSSION

Along with escapements, sockeye yields have generally been maintained in Southeast Alaska over two decades. Although run strength of McDonald Lake sockeye in southern Southeast Alaska has decreased since 2000, sockeye salmon yields have improved in Lynn Canal since the 1990s, and these ups and downs appear to us to be normal stock fluctuations. Overall, yields are probably fairly high for these sockeye stocks, under the current management regime. However, yields are not high in either Southeast Alaska or the Yakutat area, when compared to historical benchmarks.

The overall situation in the sockeye salmon fisheries in Southeast Alaska looks to be similar to the one described by the last Southeast Alaska sockeye salmon stock status review (Geiger et al., 2005). Escapement goals in the monitored systems have been generally within, or even above the escapement goal ranges over the period 2003-2007. The principal exception is McDonald Lake where escapement goals have not been met since 2003. It should be noted that the 2008 run of sockeye salmon was weak everywhere in Southeast Alaska, with escapement goals met only for 2 of 13 systems currently monitored. The 2008 sockeye run to the Yakutat areas was particularly weak, with the 2008 catch being the lowest since Alaska statehood.

Alaska Salmon Hatchery Releases (Source Fig 1 page 4
<http://www.sf.adfg.state.ak.us/FedAidpdfs/FMR10-05.pdf>)

Fraser River Sockeye Returns (Source Productivity of Fraser Sockeye
http://alexandramorton.typepad.com/alexandra_morton/2010/06/june-20-update.html)

