

AN ARGUMENT FOR ADOPTING
A
MIXED-STOCK FISHERIES MANAGEMENT POLICY
FOR
EARLY-RUN KENAI RIVER CHINOOK SALMON

AN ALTERNATIVE APPROACH
PROPOSAL
TO:
THE ALASKA BOARD OF FISHERIES

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ABSTRACT

Alaska Department of Fish and Game (Department) data collected since implementation of the Kenai River Early-Run Chinook Salmon Management plan in 1989 indicate that, while management action was focused on protecting tributary-spawning chinook salmon, the main-stem spawning component of the early-run received no protection. Research indicates that about twenty percent of the chinook salmon entering the Kenai River prior to July 1 and spawning in the main-stem prior to mid-July receive most of the angling effort, possibly precipitating declining returns of these early main-stem spawning chinook salmon.

INTRODUCTION

The Kenai River Chinook salmon (*Oncorhynchus tshawytscha*) historically has been considered to consist of two main components, early-run and late-run fish. As far back as management records show, this has been a primary assumption in the management of the fishery. It wasn't until the early 1980s that any investigation was conducted to determine the spawning destination and timing of these fishes. This data provided the Department with little reason to manage the fishery other than as two distinct and separate runs.

In the late 1980s with mounting concerns about rapidly increasing sport fishing interests and methods, the Department investigated catch-and-release mortality on Kenai River chinook salmon. Coincidentally, these investigations revealed that the initial discrete chinook salmon run assumptions by the fish board and fishery managers were faulted.

Historical Rationalization of Discrete Chinook Salmon Runs

In 1988 the Alaska Board of Fisheries (Board), reacting to the increasing pressure of an expanding sport fishery and concerns about over exploitation, directed the Department to create an escapement goal policy for both the early-run and late-runs of Kenai River chinook salmon.¹

References to discrete early-run and late-run Kenai River chinook salmon can be found in 1985 ADF&G reports. “Chinook salmon return to the Kenai River system in two segments, termed early-run and late-run.”² Graphical data is found to reference these chinook salmon as separate runs as far back as 1974.³ And from a U.S. Fish and Wildlife Service report: we “conclude that early-run fish spawn in Kenai River tributaries (primarily Killey and Funny rivers) and the late-run fish spawn in the main-stem.”⁴

Historically, perhaps even habitually, the date which has consistently been used for differentiation between these two runs has been July 1. Evidence of this date can be found in several places but rationalization can be traced to catch statistics (Hammarstrom 1980) that identify a week’s time in early July where few fish were caught.⁵ This date is found in the Department’s first chinook salmon management plan in 1988 and which uses Burger et al. 1985 as rationale for the early-run and late-run distinction.⁶

Thus it was established and accepted that there was a distinct difference between the early-run and late-run chinook salmon. The early-run ended June 30 and with rare exception chose a tributary to spawn in; “If June 30 is used as an arbitrary tagging cutoff date all salmon radio tagged between 13 May and 30 June 1981, chose a tributary as a final destination except for 1 fish. Upon further examination this salmon was radio tagged on 26 June.”⁷ The late-run began July 1 and according to the data in Burger et al. 1983 there were no salmon that were radio tagged after June 25, 1979, or after July 16, 1980, or July 1, 1981 (the one exception) that chose a tributary in which to spawn.⁸ Consistently no salmon tagged after July 1 chose a tributary in which to spawn.

Doubt About Discrete Chinook Stocks Did Exist

Historically little regard was given to any overlapping entry patterns into the Kenai River, but it is not without reference to this possibility that managers assumed their task: “The two runs are not discrete units, however, as the number of early-run fish entering the Kenai River declines, the number of late-run fish increases. The degree of overlap is not estimated at this time.”⁹ In Burger et al. 1983 it is noted that (in reference to the June 26 radio tagged fish): “observed this salmon at mile 14.9 in mid-July and it was their opinion that the salmon spawned there. If this were true, and if this tagged fish could be shown to representative of some part of the natural population, evidence would exist for comparatively early, main-stem spawning by some chinook salmon.”¹⁰

Regulations Protected Tributary Spawners

In 1988, the Board adopted the Department’s management plan for early-run Kenai River chinook salmon. This plan established minimum (5,300 fish) and optimum (9,000 fish) escapement goals and identified the possible management actions that could be implemented at given escapement levels. The original plan directed that the fishery be prosecuted without bait to reduce angler efficiency. Bait was permitted, by emergency order, when the optimum escapement goal could be projected.¹¹

Subsequent to the Board implemented management plan declining chinook returns in the 1990s (sonar estimates 21,963 fish returned in 1987, the run declined to 10,679 fish in 1990¹²) compelled the Board's concern about meeting early-run escapements and they began directing the department to protect the early-run "tributary" chinook salmon from over-exploitation by anglers.

In 1992 the areas around the mouths of the Funny and Killey Rivers were closed to chinook salmon fishing from January 1 through July 14. In 1996 the board continued tributary protective measures:

- 1) closing the area around Slikok Creek to all fishing from January 1 through July 14;
- 2) closing the Funny River closed area to all fishing during the closure time;
- 3) expanding the Funny River closure to include an area of the Funny River;
- 4) closing that area of the Kenai River 200 yards upstream of the Killey to about 1 mile downstream to all fishing from June 25 to July 14.¹³

Regulatory Impacts On Stocks (Harvest Efficiency).

Assuming that the protective measures effected by the regulatory closures were successful then if there were to be continued effort at all it would probably be upon those fish of main-stem origins. That was the intent of the closures, to make the fishery less effective at harvesting those tributary fish.

It seems reasonable that the effort expended in those closed areas around the Funny and Killey River tributaries would not have moved far, at least by those area residents who keep their boats in the river near their residence. This effort and any resulting harvest would more than likely be a main stream spawner.

Promulgating the fishery in this manner had impacts. "The disproportionately high sport fishing harvest that occurs in the lower 32 river kilometers (Hammarstrom 1989) likely targets on lower-river spawners."¹⁴ By extension this statement can reasonably be applied to all early-run main-stem spawners because:

- 1) they're vulnerable to angler efficiency (In the early-run component of the 1988 fishing season approximately 86% of the total chinook salmon return to the river was caught.¹⁵); and
- 2) tributary area spawning protections afforded by regulation can only be expected to increase harvests of main-stem chinook salmon.

Investigations Raise Question About Previous Assumptions

In the late 1980s the Department became concerned about the implications of catch and release of chinook salmon. The agency initiated "multi-year investigation of mortality associated with this fishing technique."¹⁶ While it was not the intent of this effort to determine the run timing or more specifically the run overlap of the early-run and late-run salmon, the investigations in 1989, 1990, and 1991 produced the evidence suggesting that the assumptions establishing the management plan and driving subsequent regulations were not valid.

A report on these investigations was released in 1992 that provided information suggesting it might be time to consider a mixed stock policy for managing the early-run Kenai River chinook salmon. Summarizing three years of radio telemetry data the report related spawning site selection to run

timing revealing:

- 1) “most (81%) early-run fish spawned in tributaries, while
- 2) most (91%) late-run fish spawned in the main-stem Kenai River, and
- 3) the remaining early-run main-stem spawning chinook salmon identified (19%) in the investigation were found to spawn through out the river.¹⁷”

Early-run Main-stem Spawner Distribution

The Bendock investigations also showed distribution of the early-run main-stem component of chinook salmon was spread throughout the river:

- 1) In the 10 miles of river between tide water (Eagle Rock) and the Sterling Hwy bridge (downstream section) 8 salmon spawned.
- 2) In the 20 miles between the Sterling Hwy bridge and Naptown Rapids (midstream section) 10 salmon spawned.
- 3) In the 10 miles between Naptown Rapids and Skilak Lake (upstream section) 3 salmon spawned.
- 4) Between Skilak and Kenai lake 5 salmon spawned.¹⁸ Note: chinook salmon harvest prohibited above Skilak Lake.

Sample Size Relationship.

At this time there are only two studies that contribute data pertinent to determining spawning location and run timing of chinook salmon returns to the Kenai River:

- 1) salmon investigations in the Kenai River conducted in 1979, 1980, and 1981 by the U. S. Fish and Wildlife Service “to locate spawning areas, 139 chinook salmon were equipped with radio transmitters.”¹⁹, and;
- 2) hook-and-release mortality investigations conducted by the Department “presented findings from 447 tagged and released chinook salmon of which 101 early-run fish were fitted with transmitters (tagged) during 1991, 125 early-run and 120 late –run fish were tagged during 1990, and 100 late-run during 1989.”²⁰

The question of accuracy (as related to sample size) is indeed raised by Burger himself when he observes: “But there were other known chinook producing streams which radio tagged fish never selected.”²¹

Species Diversity.

The importance of species diversity is recognized by federal authority (The Kenai National Wildlife refuge is mandated by congress: “**to conserve fish and wildlife populations and habitats in their natural diversity**”²²) and the State of Alaska Board of Fisheries policy: “Escapement goals should be achieved in a manner to maintain genetic and phenotypic characteristics of the stock, by assuring appropriate geographic and **temporal** distribution of spawners as well as consideration of size range, sex ratio, and other population attributes.”²³

Kenai River main-stem chinook salmon spawning behavior, as indicated by Burger’s data, documents spawning in early August and extending into September.²⁴ Bendock’s data documents spawning behavior in late June and early July.²⁵

Speculations, Conclusions and Recommendations.

The catch and release mortality study identified about 20 percent of those fish that entered the Kenai River and were radio tagged after being sport fishing caught and released entered the river before July 1 and spawned in the main-stem. Other than to document the overlapping entry pattern between what has become habit to identify as early-run and late-run Kenai River chinook salmon there is an obvious lack of information about this issue. There has not been any attempt to verify this data nor has there been any attempt to quantify impacts of management policy on those early-run main-stem spawning populations. This makes it very difficult to make scientifically defensible statements about managing these salmon. *How can a segment of a salmon run be identified as potentially over-exploited if there have been no attempts to quantify them?*

The evidence suggests that the Kenai River main-stem chinook salmon that enter the river and spawn earlier than the recognized late-run main-stem fish are being selected and harvested disproportionately to their abundance. Angling effort, managed specifically to protect tributary spawners, targets main-stem spawning chinook salmon during the entire months of June and July.

The size of the sample used by Burger to establish the evidence used to demonstrate the discrete differences between the early-run and late-run is but a third the size (139:447) of the sample set which Bendock used to reveal the overlapping run timing. The implication of this difference to accuracy of management assumption is significant. Look at the importance of the decision influenced by the data: discrete or mixed stock management.

What part of the historic early-run returns did this main-stem spawning component contribute? It could be argued that when a tributary run fails the main-stem component stabilizes the fishery. It conceivably could be argued that these main-stem fish are also of a larger nature. Data indicate that the late-run fish are larger than the early-run fish on the average. Could those early-run main-stem chinook salmon be consistent with this difference?

What does exist to support the revelations suggested by the Bendock studies is circumstantial evidence. But, the concentration of effort on the main-stem water body while protecting the tributary confluence waters cannot do other than concentrate effort on those fish that live there.

The data provided by Bendock suggest that the early main-stem spawners utilize the whole river below Skilak lake thus would support a total lower river closure to angling, at least until the fish have had a chance to rebuild from depletions resulting from assumed discrete run management policy. The presence of more spawning salmon per mile below the Sterling Hwy bridge certainly doesn't support only closing the river above that land mark.

Alternatives to complete closure of the river that could be considered:

- 1) a long range solution, assuming that early main-stem stocks are strong enough, could allow seasonal sport fishing openings on sections of the river;
- 2) sections of the river could be closed (for example) every other mile (allowing continued access and opportunity while protecting some portion of the early main-stem spawners);
- 3) seasonal openings could include the confluence areas around the tributaries when tributary component run strength indicators might allow such openings.

Continuing with the presently used (assumed) discrete salmon management appears to be detrimental to the diversity of and production of the main-stem component of the Kenai River chinook salmon population. Adopting an early-run mixed stock fishery management plan enables contribution to early-run returns by main-stem spawners, and is consistent with the “Sustainable Salmon Fisheries Policy”.

The least that should be considered by the Board is for a review of both Kenai River chinook salmon management plans by an independent source using all available sources of data. Perhaps the runs of chinook salmon returning to the Kenai River should be managed using a spatial concept as opposed to the present temporal approach.

¹ Development and Implementation of an Escapement Goal Policy for the Return of Chinook Salmon to the Kenai River: McBride, et al. Pg. 1, FM series #8.

² Kenai Peninsula Chinook and Coho Salmon Studies, Hammarstrom, et al. 1985 (AFS-50-1) pg. 64

³ AFS-50-1, pg. 91

⁴ Comparison of Spawning Areas and Timing for Two Runs of Chinook Salmon in the Kenai River, Alaska, Burger et al. 1985, pg. 693

⁵ Salmon Investigations in the Kenai River, Alaska; Burger , et al.. 1983, pg. 4

⁶ Development and Implementation of an Escapement Goal Policy for the Return of Chinook Salmon to the Kenai River: McBride et al. Pg. 2, FM series #8.

⁷ Salmon Investigations in the Kenai River, Alaska; Burger , et al.. 1983, pg. 13.

⁸ Burger et al. 1983, pg. 11,12,14.

⁹ FS-100, Hammarstrom, et al., pg. 100

¹⁰ Burger et al. 1983. Pg. 22

¹¹ Northern Kenai Peninsula Area Management Report presented to the Alaska Board of Fisheries, Feb.2002, pg. 48

¹² Stock Assessment of the Return of Early-Run Chinook Salmon to the Kenai River, 1992, Hammarstrom, FSD 93-17.

¹³ Northern Kenai Peninsula Area Management Report presented to the Alaska Board of Fisheries, Feb.2002, pg. 48.

¹⁴ Mortality and Movement Behavior of Hooked-and-Released Chinook Salmon in the Kenai River Recreational Fishery,1989-1991, Bendock et al., pg. 46.

¹⁵ Mortality and Movement Behavior of Hooked-and-Released Chinook Salmon in the Kenai River Recreational Fisher, 1989-1991. Bendock et al. FM No 92-2. Pg. 41.

¹⁶ Hook and Release Mortality of Chinook Salmon in the Kenai River Recreational Fishery, Bendock et al. FDS No. 90-16, pg. 1.

¹⁷ Mortality and Movement Behavior of Hooked-and-Released Chinook Salmon in the Kenai River Recreational Fishery,1989-1991, Bendock et al., pg. 38.

¹⁸ Mortality and Movement Behavior of Hooked-and-Released Chinook Salmon in the Kenai River Recreational Fishery,1989-1991, Bendock et al., pg. 38.

¹⁹ Salmon Investigations in the Kenai River, Alaska; Burger , et al.. 1983, pg.

²⁰ Mortality and Movement Behavior of Hooked-and-Released Chinook Salmon in the Kenai River Recreational Fishery,1989-1991, Bendock et al., pg. 5.

²¹ Salmon Investigations in the Kenai River, Alaska; Burger , et al.. 1983, pg. 22.

²² Title 3 ANILCA, KENAI NATIONAL WILDLIFE REFUGE,4.B.1

²³ Sustainable Salmon Fisheries Policy, 5AAC 39.22.b.2.D

²⁴ Salmon Investigations in the Kenai River, Alaska; Burger , et al.. 1983, pg. 25.

²⁵ Mortality and Movement Behavior of Hooked-and-Released Chinook Salmon in the Kenai River Recreational Fishery,1989-1991, Bendock et al., pg.

