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FISH USE OF SEVERAL TRIBUTARIES TO THE KENAI RIVER, ALASKA

FINAL REPORT

by

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## SUMMARY AND CONCLUSIONS

The three Kenai River tributaries studied during 1982 and 1983 were all used by salmon and trout for spawning and/or rearing. Coho salmon spawning was observed in each stream and juvenile coho were the most abundant and widely distributed salmonid species found in each stream. Most of the observed chinook salmon spawning occurred in Slikok Creek although some was observed in Beaver Creek. Juvenile chinook and sockeye salmon were found rearing in the lower reaches of each stream. Rainbow trout spawning was indicated in Beaver and Soldotna Creeks by the presence of recently emerged fry during July and August. Dolly Varden were found rearing in each stream. A variety of other, non-salmonid fishes was also found in each stream.

The physical characteristics of each study stream reflected the type and intensity of fish use observed. Gravel suitable for salmonid spawning was found in each stream although it represented a higher proportion of the substrate composition in Slikok Creek. Gravel availability was intermediate in Soldotna Creek and lowest in Beaver Creek. Salmon spawning intensity was highest in stream reaches with the highest availability of gravel and was highest in Slikok Creek on a drainage-wide basis. All three study streams were found to have extensive distributions of several habitat characteristics associated with high use by rearing coho salmon, including overhanging riparian vegetation, undercut banks, low gradient, and deep-slow water. The observed distribution and abundance of juvenile coho in each study stream reflected the availability of high quality rearing habitat.

In addition to the observed distribution of habitat features associated with high quality coho rearing capacity, numerous wetland drainages were observed contributing surface flow to the study streams. The direct input of drifting invertebrates from several wetland drainages into Beaver and

Slikok Creeks was documented. This input as well as fine particulate organics and nutrients described by other investigators from similar wetland systems, can be important factors enhancing stream productivity. The potential value of wetland contribution is most pronounced in Beaver Creek, the study stream with the most extensive wetland input.

Comparison of the Slikok Creek and Beaver Creek weir data on juvenile coho salmon points to an important conclusion. The importance and role of Kenai River tributaries should be assessed on an individual basis. Slikok Creek coho production appears to be dependent on spawning within the stream. Indeed, the downstream movement of coho juveniles observed at the Slikok weir indicated that production exceeded the rearing capacity of the stream. On the other hand, coho production in Beaver Creek appears to be a combination of stocks that originated in the drainage as well as those that immigrated from the Kenai River. The rearing habitat available for coho salmon in Beaver Creek apparently exceeds the stream's potential for production of coho spawned within the drainage and serves to supplement the rearing capacity of the Kenai River. Therefore, the role and importance of Kenai river tributaries in coho salmon production cannot be easily defined or separated from the mainstem Kenai River. Rather, the Kenai River drainage appears to be a complex system of interdependent components.

Any disruption within the Beaver Creek drainage that might reduce the rearing potential of that stream could directly affect the production of Kenai River coho stock. Indeed, some disruption may already have occurred. The culvert in Beaver Creek at the Kenai Spur Road appears to be a barrier to the upstream dispersal of juvenile coho smaller than 70 mm FL based on recapture of marked fish upstream from the road (Figure 14). During 1983, this represented 36 percent of the coho captured moving upstream from 14

June to 26 July and 79 percent of the coho captured moving upstream from 2 August to 4 October.

The culvert in Soldotna Creek at the Sterling Highway also appears to be a barrier to the upstream dispersal of juvenile fish. During September 1982, the catch of juvenile coho salmon and rainbow trout declined sharply in the stream reach above the highway while the catch below the highway continued to increase, suggesting accumulation below a barrier and upstream dispersal above the highway (Elliott and Finn 1983).

Six other Kenai River tributaries were inventoried for fish use during 1983. All were used by juvenile salmon for rearing. Coho were the most frequently captured salmon species in each stream. Juvenile chinook and/or sockeye salmon were captured in low numbers in five of the streams. Juvenile coho abundance increased through the summer season in each stream, indicated primarily by the appearance of age 0 fish in the catch. The recruitment of age 0 fish appears to be a result of emigration from the Kenai River. Juvenile Dolly Varden were the most frequently captured salmonid in one stream, referred to as Kalifonsky Creek. Dolly Varden spawning was indicated in this stream by the presence of young-of-the-year fish and suitable spawning gravel.