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EFFECTS OF STREAM CHANNELIZATION ON THE SALMONID HABITAT AND
POPULATIONS OF LOWER BIG BEEF CREEK, KITSAP COUNTY,
WASHINGTON 1969-73

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CONTENTS

	Page
INTRODUCTION	1
STUDY AREA	2
METHODS	4
RESULTS	10
Erosion and Scour	10
Rearing Habitat	10
Salmonid Populations	17
Spawning Habitat	20
DISCUSSION	20
Streambed Erosion and Scour after Channelization	20
Fish Habitat Changes	23
Salmonid Population Changes	24
Chum Salmon Redd Scour, Fill, and Displacement	24
RECOMMENDATIONS	27
CONCLUSIONS	27
LITERATURE CITED	29

LIST OF TABLES

Table		Page
1	Major sources of sediment deposited in the channelized area of Big Beef Creek, 1969-73	12
2	Changes in fish rearing habitat characteristics of the channelized area of Big Beef Creek, 1969-73	15
3	Estimated annual late summer densities of juvenile coho salmon and steelhead trout in three pools sampled within the control and channelized areas of Big Beef Creek, 1969-73	18
4	The amount of scour or fill of redds and predicted survival to emergence of early-run chum salmon in the channelized area of Big Beef Creek, 1970-1971	21
5	The amount of scour or fill of redds and predicted survival to emergence of late-run chum salmon in the channelized area of Big Beef Creek, 1970-1971	22
6	Big Beef Creek coho salmon adult escapements and steelhead adult punch card records, 1966-73	25

LIST OF FIGURES

Figure		Page
1	Big Beef Creek study area	3
2a	Channelized streambed condition	5
2b	Excavations of pool habitat during streambed channelization	5
3	Cross-section and topographic survey stations in the channelized area	6
4a	Streambank erosion in the channelized area (Station 11)	11
4b	Streambank erosion in the channelized area (Station 14)	11
5	Streambed scour and streambank erosion at Station 14 and streambed deposition at Station 5	13
6	The streambed profile of the channelized area of Big Beef Creek, 1969-1973	14
7	Annual changes in some important types of fish habitat following channelization of lower Big Beef Creek, 1969-1973	16
8	Mean densities of salmonids in the control and channelized areas, 1969-1973	19

ABSTRACT

The physical and biological effects of stream channelization on Big Beef Creek, Kitsap County, Washington, were investigated from 1969 through 1973. The lower 0.6 km of Big Beef Creek was channelized by bulldozers to reduce the problems of flooding, redd displacement, and loss of fish-rearing habitat. This situation offered an excellent opportunity to document the streambed, fisheries habitat, and population changes caused by alteration and the time required for recovery.

This study included measurements of streambed scour and fill, streambank erosion, pool-riffle composition, streambed and streambank cover, streambed slope, summer low-flow density for coho salmon and steelhead trout, and spawning success of chum salmon.

Channelization was found to be incompatible with good anadromous fish production. The extensive streambed scour and streambank erosion rates in the channelized area caused by man's alterations resulted in a highly unstable stream environment. The total sediment contribution from within the channelized area ($6570 \text{ m}^3/\text{km}$) due to erosion processes was 7.6 times greater than the rate in the unchannelized upstream areas ($870 \text{ m}^3/\text{km}$) over the four-year period of measurement. Much of the important fish habitat characteristics of streambank cover, log jam occurrence, and stream pools and riffles was completely lost during the initial alteration and has shown varying rates of recovery.

The density of juvenile salmonids was greatly reduced for at least the first two summers following alteration. During the second summer following channelization the coho salmon densities ($0.718 \text{ fish}/\text{m}^2$) were 75% lower than the control ($2.925 \text{ fish}/\text{m}^2$); the steelhead age 0 densities ($0.526 \text{ fish}/\text{m}^2$) were 77% lower ($2.290 \text{ fish}/\text{m}^2$) and the age 1+ densities ($0.020 \text{ fish}/\text{m}^2$) were 96% lower ($0.470 \text{ fish}/\text{m}^2$).

The coho salmon populations showed remarkable signs of recovery after three summers, while the steelhead trout have been slow to recover even after five summers.

The resulting instability in the spawning gravel environment caused the loss of 55% of the chum salmon redds spawned within the channelized area during the winter of 1970-1971.

Alteration of lower Big Beef Creek through channelization resulted in a highly unstable stream environment that has not fully recovered after five years. Research should be undertaken to develop wise techniques for fisheries habitat improvement for northwest streams.

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