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AN EVALUATION OF CHUM SALMON SPAWNING HABITAT
IN THE MIDDLE SUSITNA RIVER

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Slough and side channel spawning habitats, of chum salmon (Oncorhynchus keta) in the middle reach of the Susitna River were studied to evaluate their responses to change in Susitna discharge and local flow conditions. Habitat suitability curves and hydraulic models were developed from field data. These were used to calculate indices of habitat usability (Weighted Usable Area), as a function of mainstem discharge. These data provide an overview of the expected response of currently utilized chum spawning habitat areas to incremental regulation of mainstem discharge by the proposed Susitna Hydroelectric development.

**CHUM AND SOCKEYE SALMON
SPAWNING HABITAT
in the
SUSITNA RIVER**

DRAFT

presented by:

ANDREW HOFFMANN

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ALASKA DEPARTMENT OF FISH AND GAME
SUSITNA HYDRO AQUATIC STUDIES

REPORT NO. 3

AQUATIC HABITAT AND INSTREAM FLOW
INVESTIGATIONS (MAY-OCTOBER 1983)

Chapter 7: An Evaluation of Chum and Sockeye
Salmon Spawning Habitat in Sloughs and
Side Channels of the Middle Susitna River

Edited by:

Christopher C. Estes
and
Douglas S. Vincent-Lang

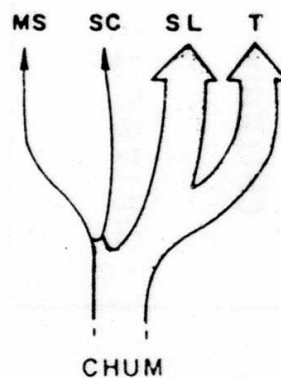
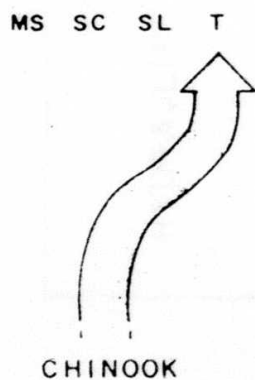
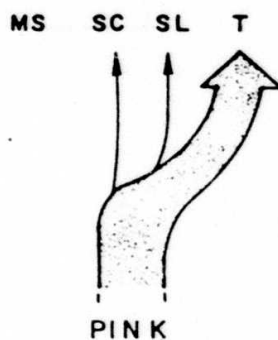
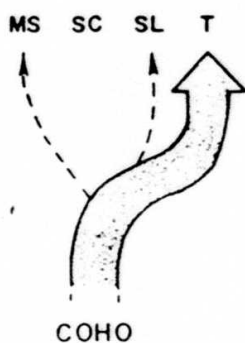
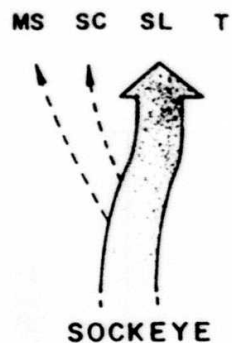
Prepared for:

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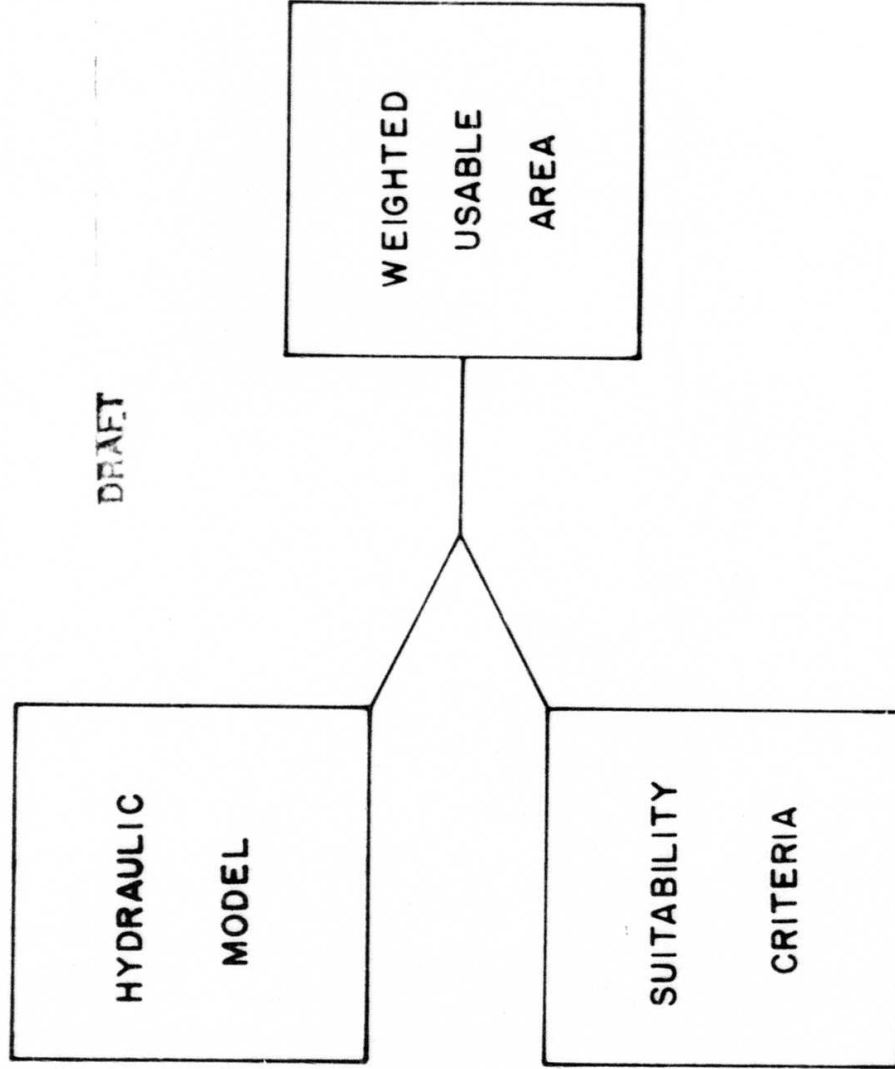
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SPAWNING HABITAT PREFERENCE

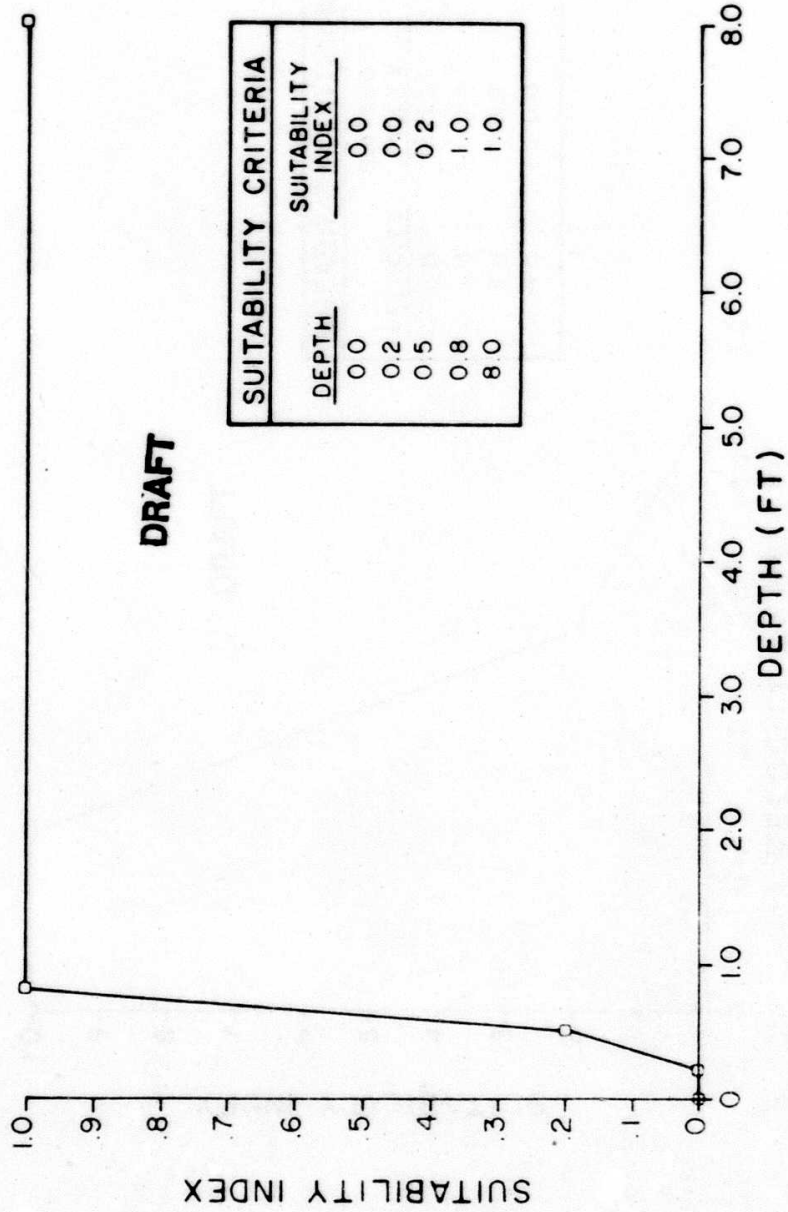
MS - MAINSTEM
SC - SIDE CHANNEL
SL - UPLAND and SIDE SLOUGHS
T - TRIBUTARIES
↑↑ - PRIMARY SPAWNING HABITAT
↑ - SECONDARY SPAWNING HABITAT
- - - INCIDENTAL SPAWNING HABITAT



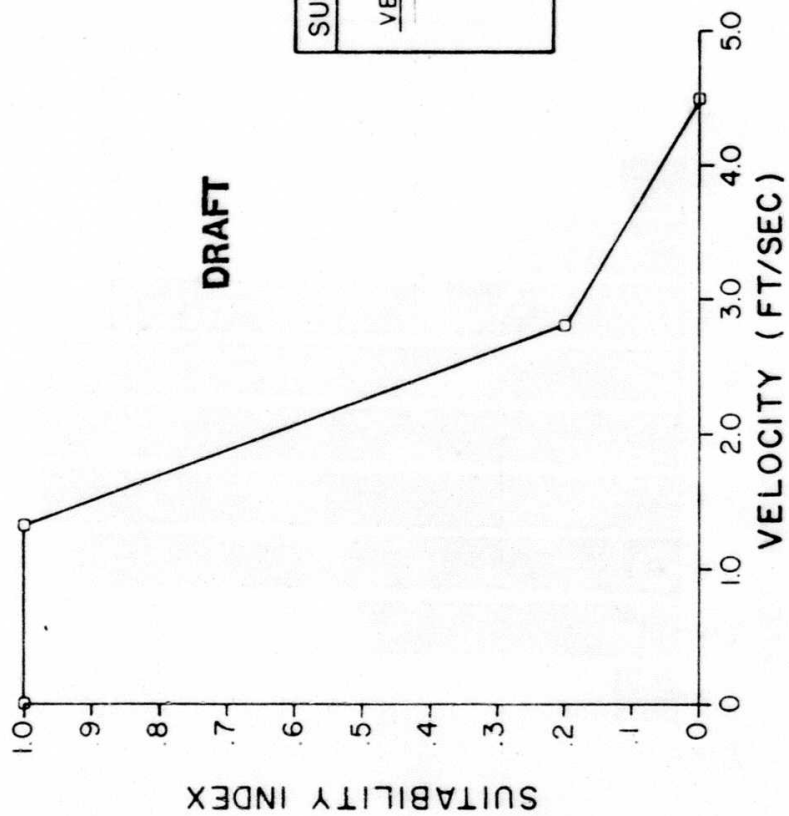
Physical HABitat SIMulation
PHABSIM



CHUM SALMON SUITABILITY CRITERIA CURVE DEPTH



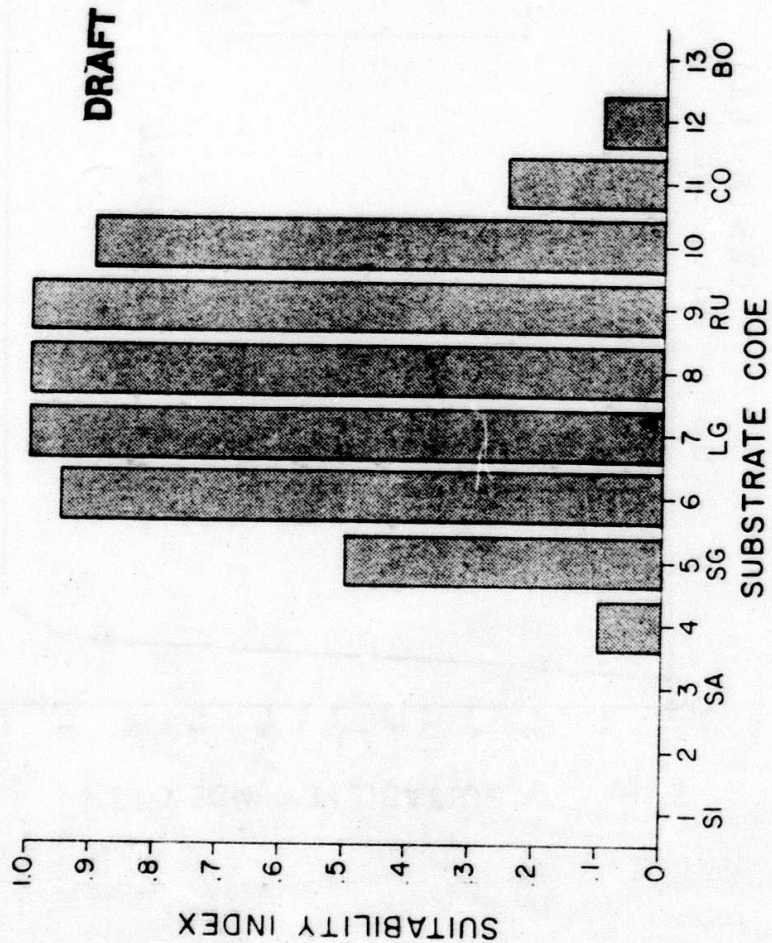
CHUM SALMON SUITABILITY CRITERIA CURVE VELOCITY



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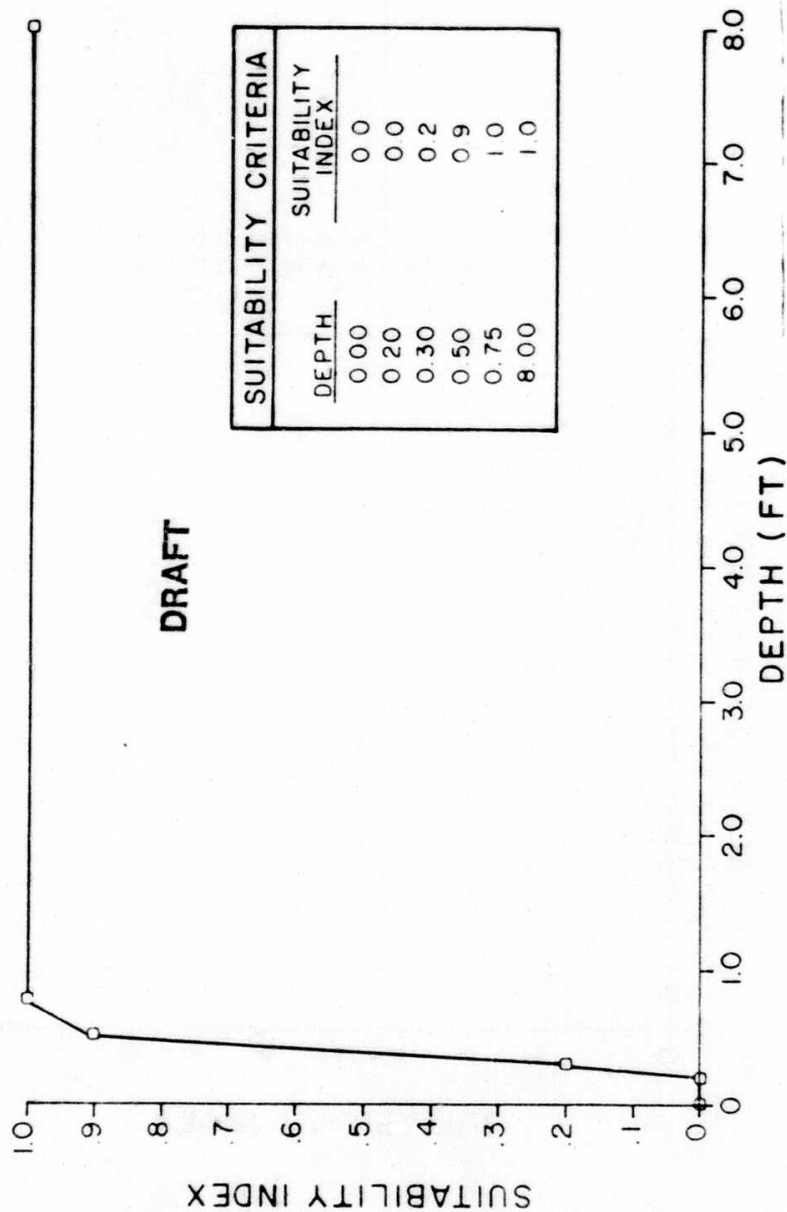
SUITABILITY CRITERIA	
VELOCITY	SUITABILITY INDEX
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1.3	1.0
2.8	0.2
4.5	0.0

SOCKEYE SALMON SUITABILITY CRITERIA CURVE SUBSTRATE

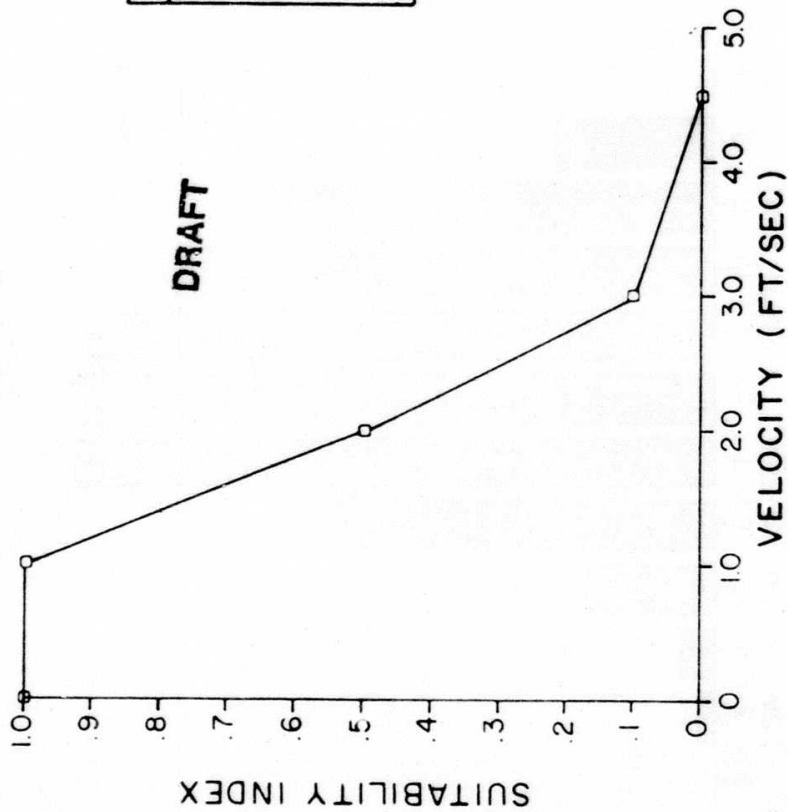


SUITABILITY CRITERIA		
SUBSTRATE CODE	PARTICLE SIZE	SUITABILITY INDEX
1 SI	SILT	0.00
2 SA	SAND	0.00
3 SG	1/8 - 1"	0.10
4 LG	1 - 3"	0.50
5 RU	3 - 9"	0.95
6 CO	5 - 10"	1.00
7 BO	> 10"	1.00
8 SI		0.90
9 SA		0.25
10 SG		0.10
11 LG		0.10
12 RU		0.00
13 BO		0.00

SOCKEYE SALMON SUITABILITY CRITERIA CURVE DEPTH

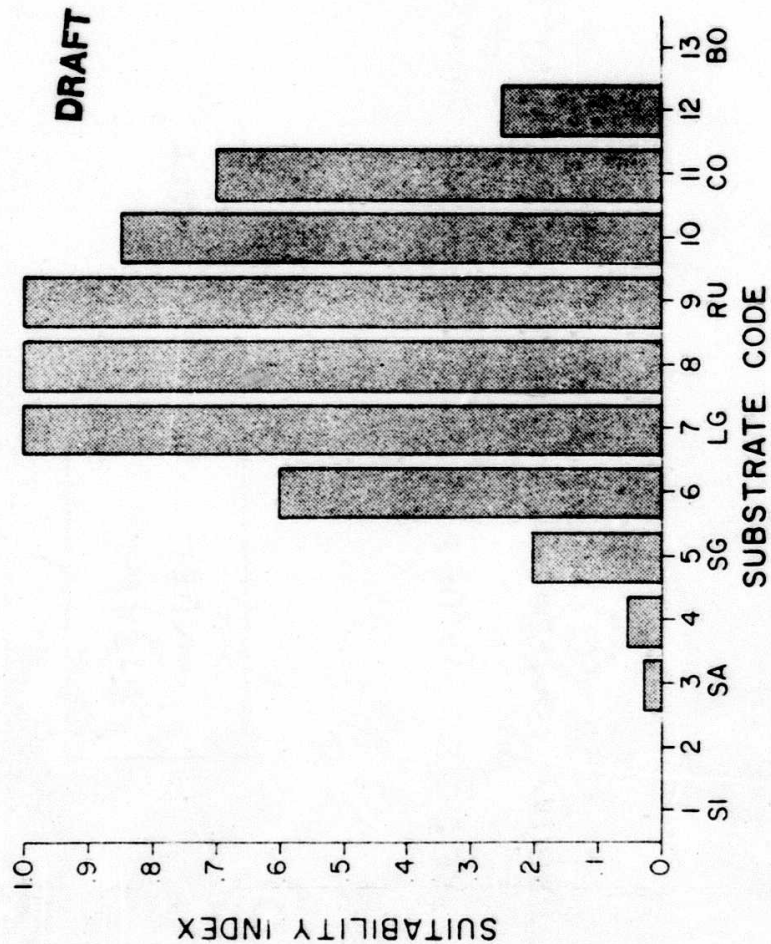


SOCKEYE SALMON
 SUITABILITY CRITERIA CURVE
 VELOCITY

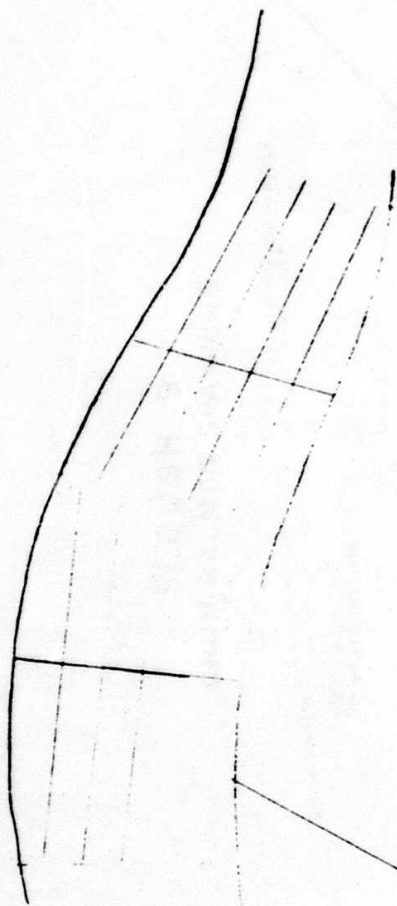


SUITABILITY CRITERIA	
VELOCITY	SUITABILITY INDEX
0.0	1.0
1.0	1.0
2.0	0.5
3.0	0.1
4.5	0.0

CHUM SALMON SUITABILITY CRITERIA CURVE SUBSTRATE



SUITABILITY CRITERIA			
SUBSTRATE CODE	PARTICLE SIZE	SUITABILITY INDEX	
1	SI	SILT	0.00
2			0.00
3	SA	SAND	0.025
4			0.05
5	SG	1/8 - 1"	0.20
6			0.60
7	LG	1 - 3"	1.00
8			1.00
9	RU	3 - 9"	1.00
10			0.85
11	CO	5 - 10"	0.70
12			0.25
13	BO	>10"	0.00



HYDRAULIC
MODEL

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PREDICTED VALUES
for
HABITAT COMPONENTS
in each cell

SUITABILITY
CRITERIA

SUITABILITY FACTOR
for each
Predicted value
in cells

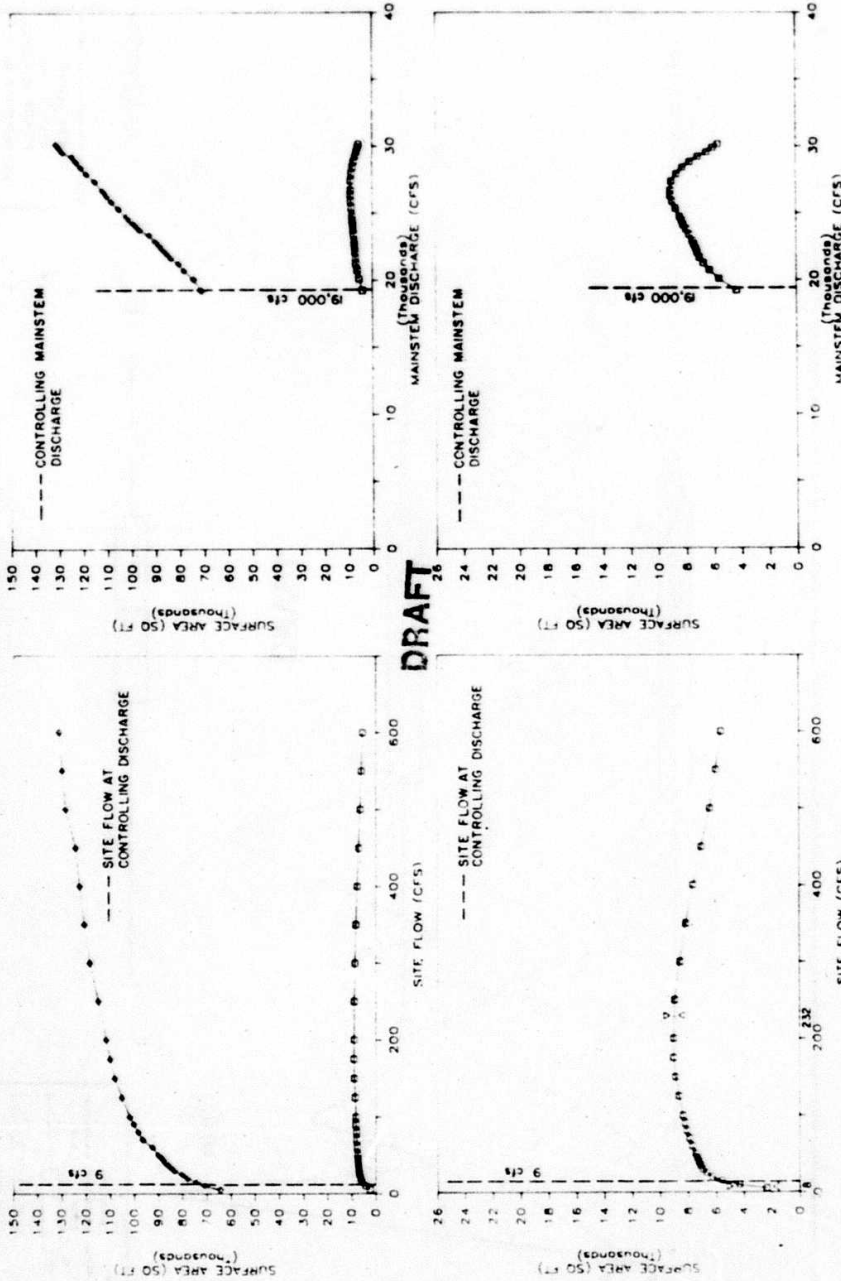
Joint
Factor

Σ

→ WUA

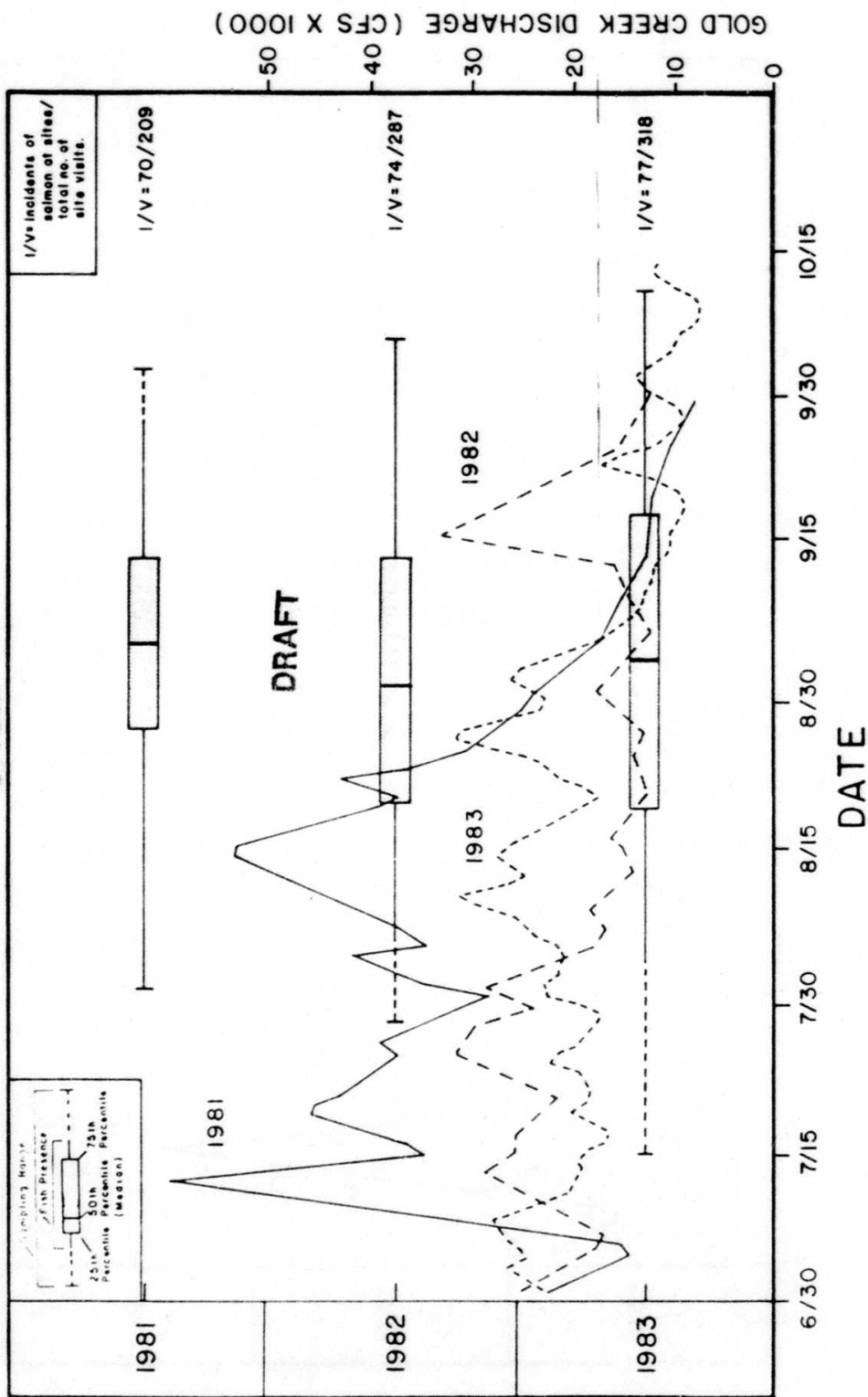
$$WUA = \Sigma \text{ Area } (D \times V \times S \times U)$$

SLOUGH 9 CHUM SALMON SPAWNING

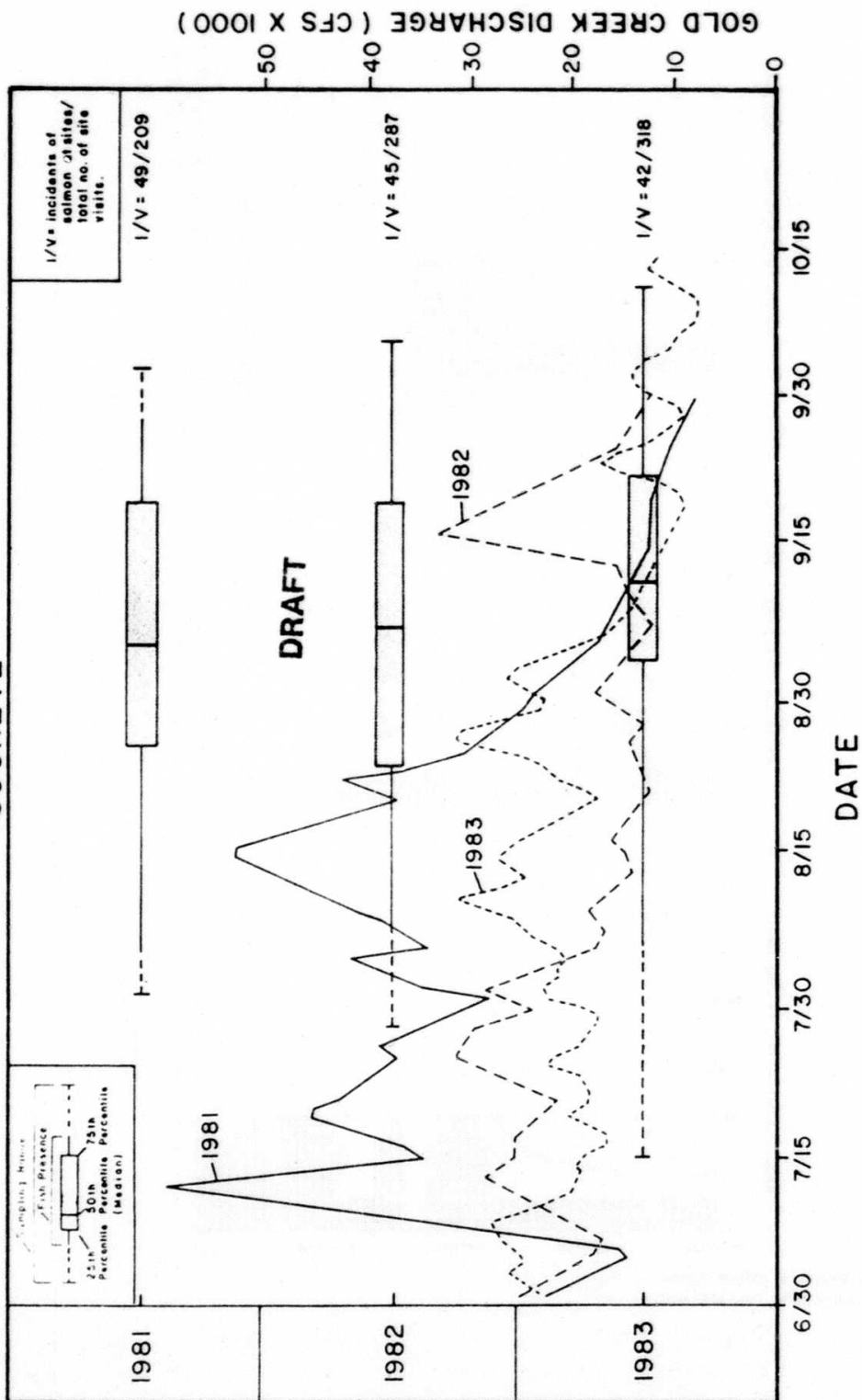


○ GROSS SURFACE AREA ○ WUA (STD COMBINED) ▽ CALIBRATION FLOWS (MIN. & MAX.)

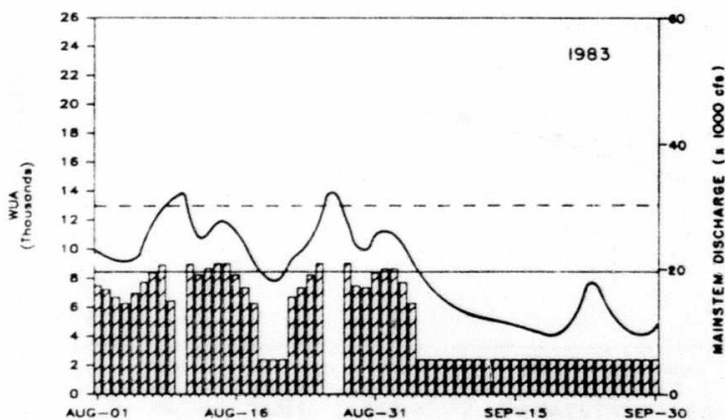
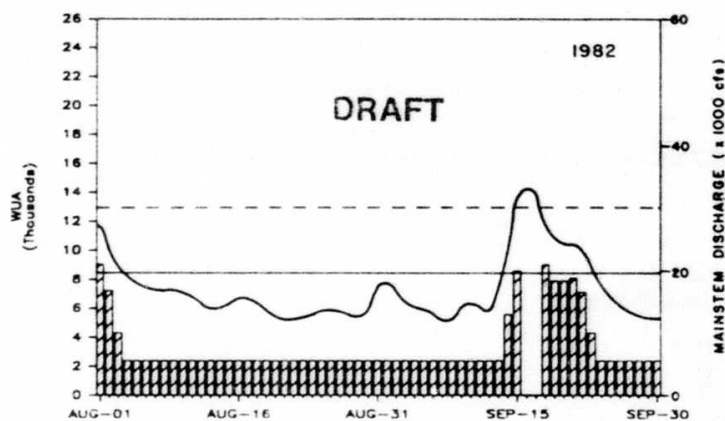
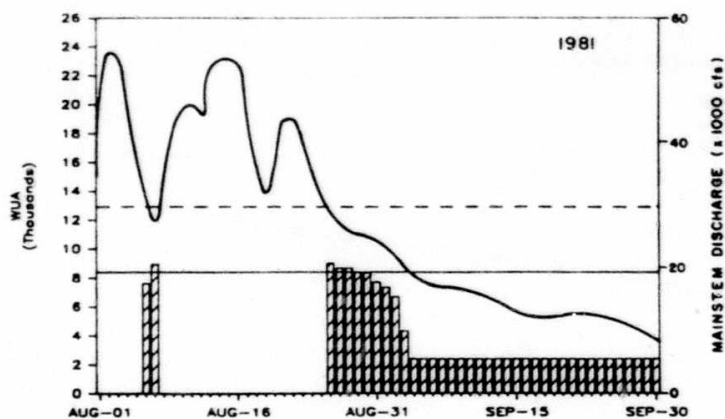
CHUM



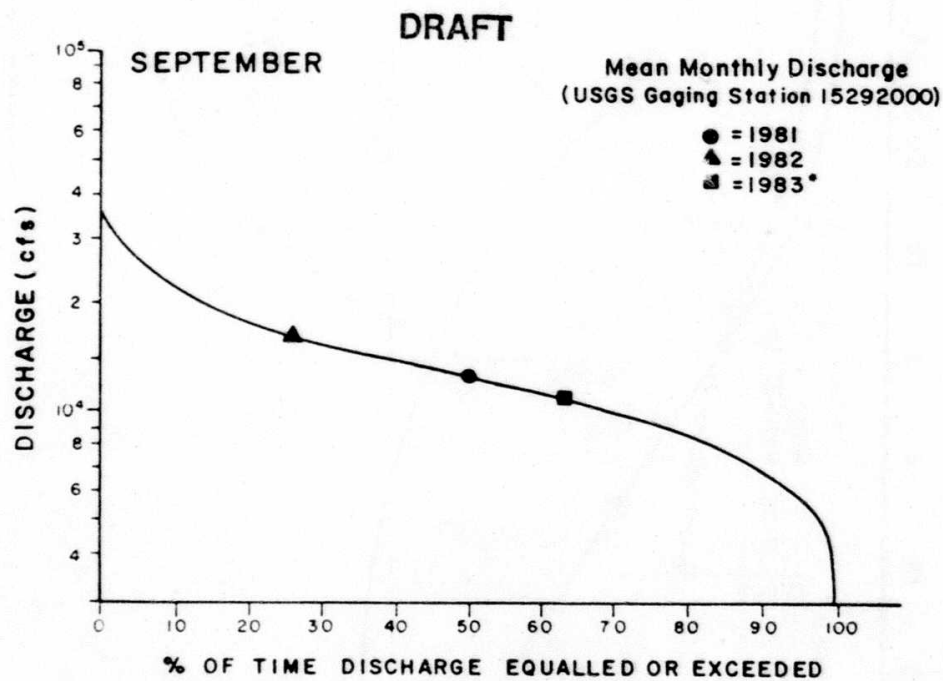
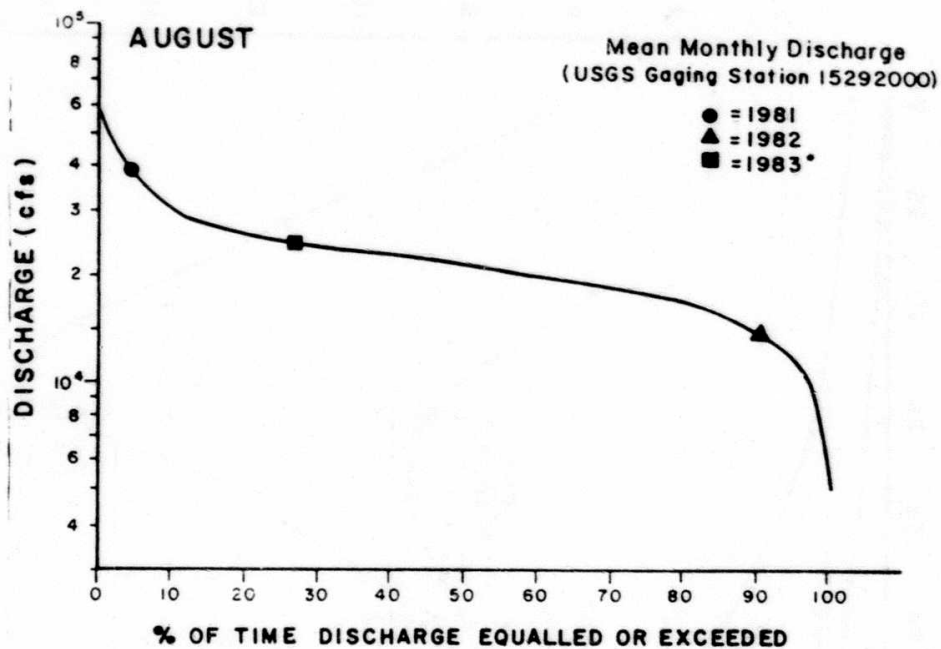
SOCKEYE



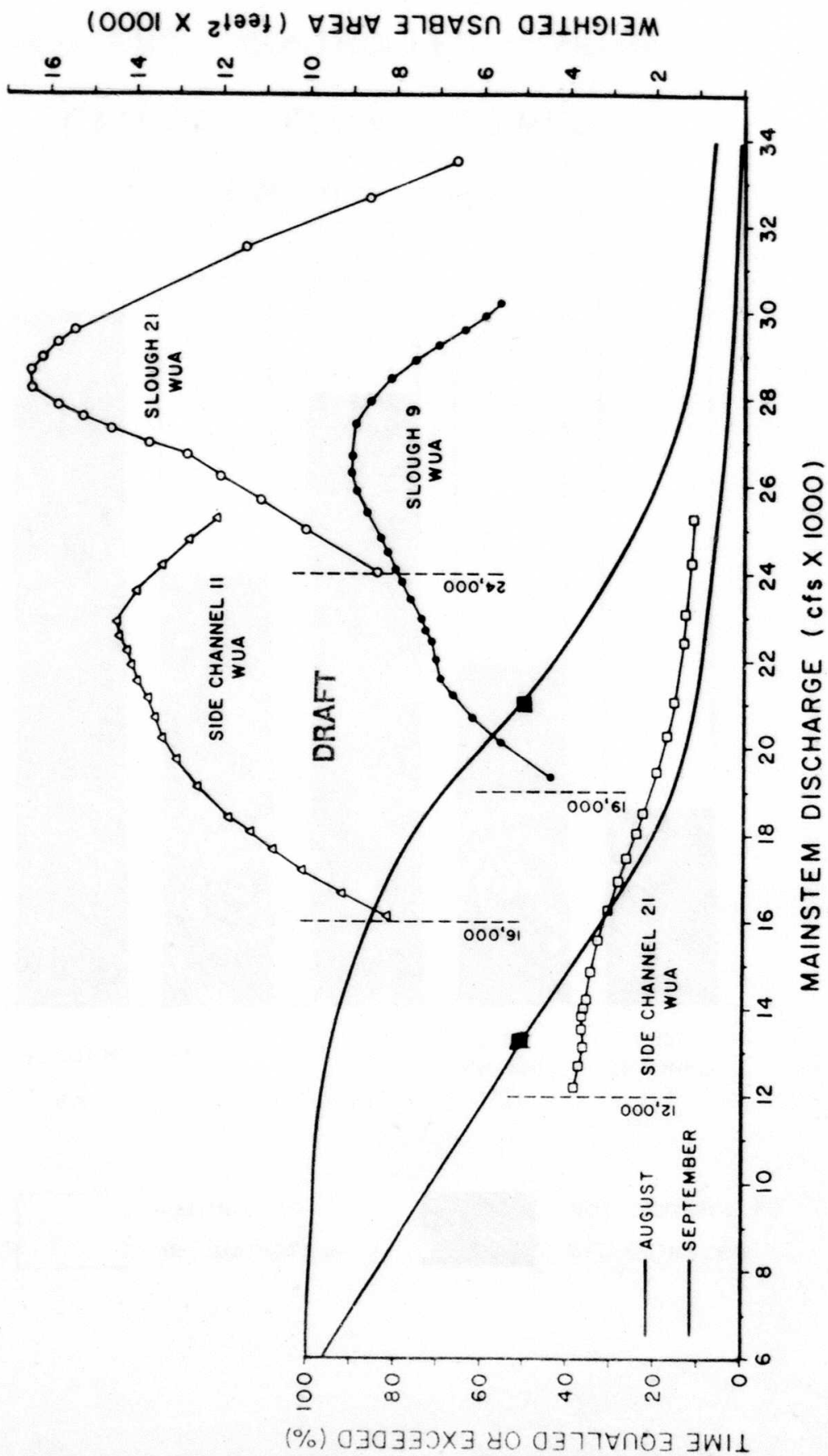
SLOUGH 9 CHUM



--- UPPER MODEL EXTRAPOLATION LIMIT
— CONTROLLING BREACHING DISCHARGE



*Provisional Data

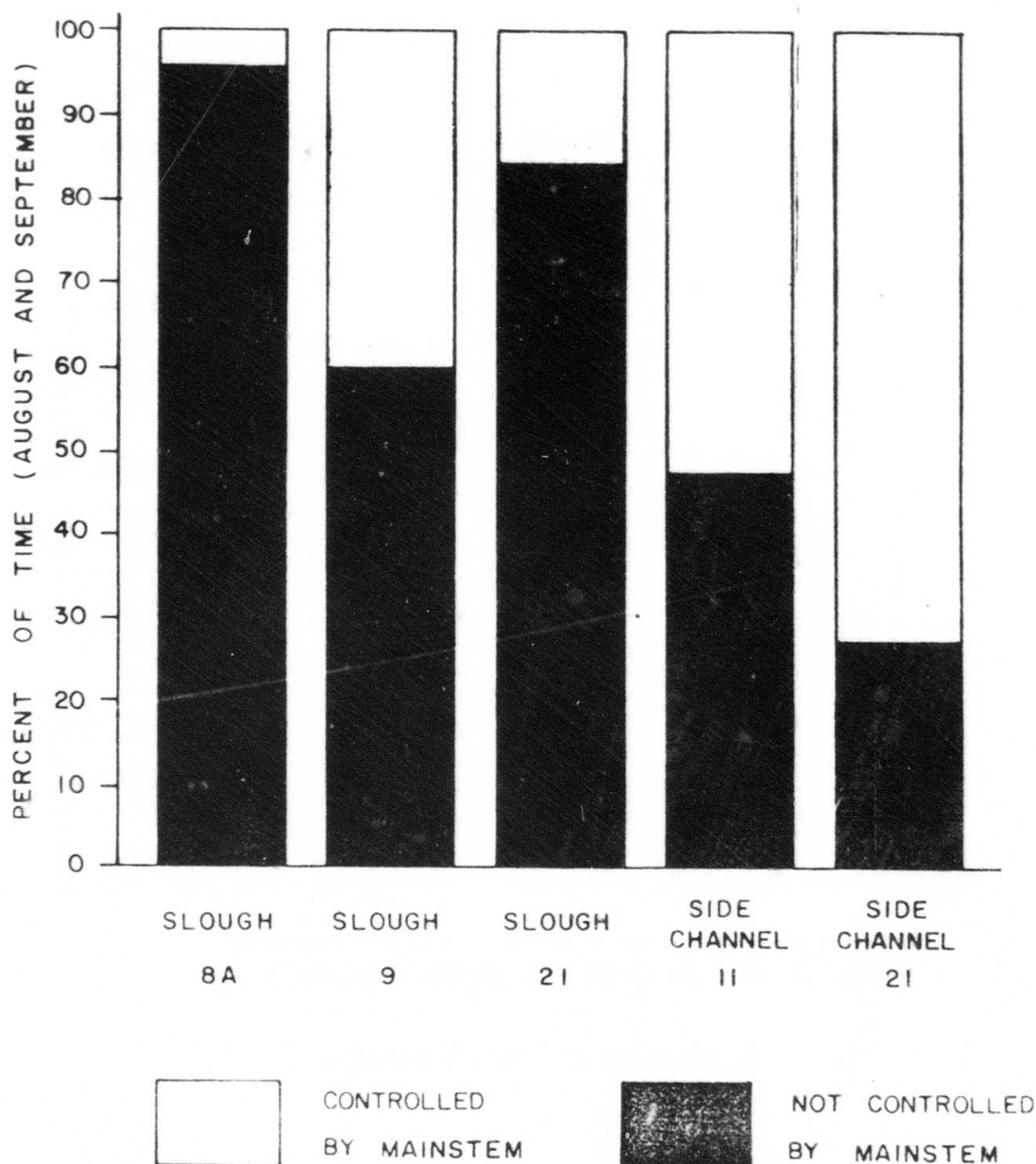


PERCENT CONTROLLED UNDER

NATURAL FLOW REGIMES

(30 Year record)

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INFLUENCE OF MAINSTEM DISCHARGE ON ACCESS TO HABITAT AREAS IN SLOUGHS

