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A Plan for Assessing the Harvest Potential of Migrant Bristol Bay Sockeye Salmon on the North Alaska Peninsula in the Vicinity of Port Moller During June

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INTRODUCTION

In recent years, the interception of chum salmon in the South Peninsula June sockeye fishery has become a major issue for the State Board of Fisheries. The focus of the concern has been the affect this fishery has on the contributing chum stocks. Limited tagging indicates that Asian and most Western Alaska chum stocks are involved (Eggers et. al, 1987).

Heightening the concern are the poor runs that occurred in 1993 among Western Alaska chum stocks, mainly in the Arctic-Yukon-Kuskokwim area. One of several proposals to minimize chum interception in the June South Peninsula fishery is to transfer part of the sockeye allocation from the South Unimak and Shumagins Islands to the North Peninsula, which extends from Cape Sarichef east to Cape Menshikof. Aside from concerns with allocation, marketing, local-stock protection, and enforcement, the first item to be considered is whether migrating Bristol Bay sockeye salmon are abundant enough during June in the North Peninsula to be efficiently harvested using drift gillnet and purse seine gear.

The Department has little information on non-local sockeye abundance in June for the North Peninsula, north of Port Moller. Limited test fishing indicates that Bristol Bay sockeye salmon are mostly 20 to 60 miles offshore of Port Moller (Straty 1975, Bue et al. 1988).

In June, the North Peninsula from Port Moller to a point about 15 miles north of Cape Seniavin (Three Hills northern boundary) is mainly a drift gillnet fishery. Figure 1 shows this area. During June, the area is managed for the early Bear River and Sandy River runs. In June of 1993, about 153 drift gillnet boats harvested a total of 808,000 sockeye and 3,000 chum salmon from this area.

If the Board of Fisheries chooses to move fishing effort to the North Peninsula during June, the effort might be redirected (1) nearshore, south of Strogonof Point, (2) nearshore, north of Strogonof point, or (3) offshore near Port Moller. Option (1) involves an unacceptably large harvest rate on local stocks. This maybe a problem with option (2) as well. Also, option (2) might involve fishing on poorly mixed Bristol Bay stock groups, and certainly involves large transportation and logistic costs for the Area M fleet and for processors. Option (3) involves jurisdictional problems with the North Pacific Fishery Management Council. Indeed, fishing past 25 miles from the baseline is prohibited by an international agreement. However, if permission to fish up to 25 miles offshore can be obtained, moving effort to the vicinity of Port Moller is the only reasonable alternative of those listed above.

To provide guidance to the Board of Fisheries as to the possible consequences of moving fishing effort to the North Peninsula, the Department proposes a test fishery. This test fishery is designed to provide information on sockeye and chum catch rates, and designed to identify potential problems that might result from fishing on poorly mixed groups of sockeye salmon.

Even so, the results of a single year of test fishing may not describe the general pattern of Bristol Bay sockeye abundance. Ideally several years of information are required.

TEST FISHERY PLAN

Goal

Reduce the harvest rate on chum salmon in the June South Peninsula fishery, by providing an alternative harvest opportunity on migrating Bristol Bay sockeye salmon in North Peninsula waters offshore of Port Moller, without adverse impact to local stocks and traditional allocations.

Objectives

1. Measure the catch rates of sockeye salmon at points offshore in the vicinity of Port Moller.

2. Measure the catch rates of chum salmon and the chum-sockeye ratio at points offshore in the vicinity of Port Moller.

3. Determine the fishability of drift gillnets and purse seines at points offshore in the vicinity of Port Moller.

4. Tag sockeye salmon in the test fish area, to determine the approximate component of major North Peninsula stocks offshore in the vicinity of Port Moller.

5. Examine the scale patterns of sockeye salmon to the east and west of the Port Moller test fishery to determine if these patterns are consistent with the notion that sockeye stocks are well mixed in this area.

6. Collect samples of chum salmon harvested at points offshore in the vicinity of Port Moller to allow genetic stock identification at a later time, if that is eventually considered necessary.

Tasks

1. Daily from 20-30 June, in preselected areas, drift gillnet for Bristol Bay migrant sockeye salmon and quantify the catch by species.

2. Sample a total of 4,800 sockeye salmon for scales from 20-30 June. A goal of 1,200 scales are to be collected from each of the four transects fished with drift gillnet gear.

3. Sample a total of 1,760 chum salmon for scales from 20-30 June. A goal of 440 scales are to be collected from each of the four transects fished with drift gillnet gear. As two scales will be collected from each chum salmon, a total of 3,520 scales will be collected.

4. Identify potential purse seine sites in the test fish area, fish these locations between 20-30 June, and quantify the catch numbers by species.

5. Collect 800 chum samples for genetic stock identification, and archive the samples for later analysis.

6. Digitize all 4,800 sockeye scales collected in the test fish area, and 500 from the Bear River system.

7. Perform a multivariate analysis on digitized scale samples.

8. Tag and release 200 sockeye salmon, per day, per purse seine boat operating in the test fish area, with colored Petersen disk tags.

SUPERVISION

A Department catch observer will be assigned to monitor each boat fishing in the test fish area. A project leader will be based at Port Moller who will be responsible for ensuring that operations are conducted safely and according to the prescribed plan. About 30% to 50% of project leader's time will be spent on the grounds directly participating and evaluating operations. Project leader oversight will include logistic, equipment, crew training, technical support and budget maintenance.

PROCEDURES

Drift Gillnet

Location

Drift gillnet fishing operations will be conducted (1) along four fixed transects and (2) in two broad areas (see Figure 1). The transects will run from (1) Frank's Point (east of Port Moller) from 19 to 25 nautical miles offshore, (2) Entrance Point (at the mouth of Port Moller) from 19 to 25 nautical miles offshore, (3) Cape Seniavin from 12 to 25 nautical miles offshore and, (4) near the northern marker of the Three Hills Section (east of Port Moller) from 12 to 25 miles nautical miles offshore. Transects (1) and (2) will have two stations, at approximately 19 miles offshore and 25 miles offshore. Transects (3) and (4), which are located relatively farther north will have three stations, at approximately 12 miles offshore, 19 miles offshore, and 25 miles offshore.

Four drift gillnet boats will be assigned to fish competitively without assigned stations in one of two areas: (1) from 12 to 25 miles offshore from Entrance Point to Cape Seniavin, and (2) from 12 to 25 miles offshore from Cape Seniavin to the Three Hills reach. Two vessels will operate in each zone. Their goal will be to harvest the maximum number of sockeye salmon possible using gear and methods typical of the Area M drift gillnet fleet. The operators of these vessels will be free to fish anywhere they choose within their assigned zone.

Effort and Schedule

A total of 10 drift gillnet vessels will fish daily: six fishing along fixed transects, and four fishing competitively in large areas. Of the six vessels assigned to fixed transects, each vessel will fish at two stations, making two 2-hour sets per station, for a total of four 2-hour sets per day. Standard North Peninsula drift gillnet gear as described in the regulation booklet will be used (ADF&G 1992). Nets will be fished in a manner typical of North Peninsula fisheries. The operators of boats fishing competitively will be free to determine set length. Fishing will commence on 20 June and end on 30 June and occur daily, weather permitting.

Data Recording

An ADF&G observer will be aboard each vessel and record station and transect, soak times, salmon harvested by species, and other pertinent information such as weather, marine mammal observations, etc. The ADF&G observer will collect scales and organize scale samples.

Marketing

The processor in Port Moller is the intended market. Tender service in Port Moller is typically limited until the latter part of June, when more tenders arrive on the grounds from the South Peninsula June fisheries. A tender will be chartered to deliver catch from the test fish vessels to the processors from 20-30 June. The intent is to minimize lost fishing opportunity for the test fishing vessels by using a tender to service the vessels on the grounds.

Purse Seine

Location

Purse seine operations will occur within the entire study area: east of Franks Point to the northern end of the Three Hills Section, from 12 to 25 nautical miles offshore.

Effort and Schedule

The effort will consist of two purse seine vessels, fishing without adversely affecting the drift gillnet operations, in the same areas as the drift gillnet gear. The preferred size of purse seine vessel is the median vessel length of the entire Area M purse seine fleet. Standard Alaska Peninsula purse seine gear as described in the regulation booklet (ADF&G 1992) will be used. Within the study area, the vessels operators will determine if it is possible to fish using purse seine gear with the objective of maximizing harvest.

Data Recording

An ADF&G observer will be aboard each vessel and record area fished, salmon harvested by species, and other pertinent information such as weather, marine mammal observations, etc.

Tagging

For each day of operations, each vessel will be given a goal of 200 adult sockeye salmon to tag with Petersen disk tags. This should result in approximately 4,400 sockeye salmon tagged in test fishing area.

Marketing

Identical to drift gillnet.

CATCH SAMPLING

Scale sampling of the sockeye and chum salmon harvested in the drift gillnet test fishery will be done by the ADF&G staff on the vessels on a daily basis. A goal of 1,200 sockeye salmon, collectively, are to be sampled from the boats fishing along each transects over the course of the test fishing: 1,200 per boat for those boats fishing on transects with two stations, and 600 per boat for those boats fishing on transects with three stations. Additionally, a total of 440 chum salmon, collectively, are to be sampled from boats along each transect. One scale per fish will be collected from sockeye salmon, and two scales per fish will be collected from chum salmon. Procedures for removing, mounting, and recording information on gumcards will be the same as described in the Alaska Peninsula Salmon Catch and Escapement Sampling Operational Plan (Murphy 1993). Scale samples will be sent to Port Moller as needed.

Fish used for genetic samples must be fresh. These fish ideally should have been dead no longer than 12 hours, and refrigerated the entire time from death to dissection. The tissue used for the genetic samples must be preserved with liquid nitrogen. Because liquid nitrogen is involved, it is infeasible for the on-board observers to preform the dissections and prepare the genetics samples. A technician will be stationed at Port Moller from 19 June until the end of the project on 30 June to prepare, inventory, and transport all genetic samples to the Genetics Laboratory in Anchorage.

ANALYSIS

Sockeye Abundance (CPUE)

Average sockeye catch per unit of effort (CPUE) for the North Peninsula test fishery fleet will be analyzed for trends in time and space, and will be contrasted with average CPUE estimates from the South Peninsula drift gillnet fleet as a point of reference.

Chum Salmon (CPUE)

Since the objective for relocating the South Peninsula fleet to the North Peninsula is to reduce the chum harvest rate, the chum-sockeye catch ratios are expected to be dramatically different between the North and South Alaska Peninsula. This ratio will be reported for the test fish area

and contrasted with the ratio in the South Peninsula fishery.

Chum Salmon Genetic Stock Identification

Because of the large expense involved, the chum salmon genetic stock identification samples will not be analyzed unless (1) we determine that sockeye salmon catch rates are high in the test fish area, and that local-stock sockeye interception is low or nonexistent, and (2) further work is done to define the limits of the ability to resolve chum salmon stocks with genetic analysis. If at a later time, these samples are analyzed, standard genetic tools will be used (Pella and Milner 1987).

Tagging and Scale Pattern Tests for Stock Mixture

If Bristol Bay stocks are well mixed in the area of the test fishery, then differences in scale patterns should not be statistically detectable from the western to eastern border of the test fish area. Based on tagging studies (Straty 1975), we believe the stocks are generally better mixed to the west of Port Moller, and will be increasingly separated as they move east. A multivariate analysis will be undertaken to see if subtle differences in scale patterns can be detected across time or space. If no differences are detected, this will be judged to lessen concern about the potential for differential harvest rates on Bristol Bay stocks, or high harvest rates on local stocks. If subtle differences are detected, this will be considered a reason for concern, although small differences could be due to the sampling procedure. As a check on the ability of this technique to detect high proportions of local stocks, increasingly large proportions of scales of known Bear River origin will be added to the eastern most samples to see at which level of local stock imbalance this technique detects local stocks.

Assuming a directed harvest rate on local stocks of 50% in the July fisheries, assuming a tagging mortality of 50%, and assuming a stock contribution of 10% from key local stocks, then approximately 2.5% of the tags would be detected in North Peninsula weirs. If more than 2.5% of the tags appear in North Peninsula sockeye weirs, then this result will be judged cause for serious concern about local stock interceptions in the test fishing area.

We will report to the Board of Fisheries that we have little concern if three conditions are met. First we can detect no difference in scale patterns from samples collected to the east and west of Port Moller. Second, we find that relatively few Bear River scales (say, less than 60 added to the 600) added to the eastern mixture causes a statistically detectable difference. And third, relatively few (far less than 1% of the original) adult tags from the seine operations are found in North Peninsula weirs.

Similarly, we will report to the Board of Fisheries that we have grave concern if we find large differences in scale patterns moving west to east, and more than 2.5% of the original tags are detected in North Peninsula weirs.

Tags will not be solicited or collected routinely from any catch. This tagging study is not designed to generate quantitative answers to any question except, "Are North Peninsula local stocks abundant in the test fish area?"

REPORTING

A final report will be prepared detailing the test fishery findings including the first five project objectives; Region IV staff will assume lead authorship for the report except the scale analysis and genetic stock identification that will be handled by Headquarters staff.

BUDGET

ITEM	RATE	QUANTITY	DAYS	TOTAL
Boats				
Driftnet				
Fixed Transect	$ 2,400	6	11	$158,400
Competitive	$ 1,200	4	11	$ 52,800
Seine	$ 2,000	2	11	$ 44,000
Tender	$ 3,000	1	11	$ 33,000
On-board Observers				
Staff Support	$ 6,000	1		$ 6,000
Observers	$ 8,000	12		$ 96,000
Genetic Stock Identification				
Archiving	$10,000			$ 10,000
Analysis	$30,000	(not to be done at this time)		
Tech.	$ 5,000			$ 5,000
Scale Analysis				
Digitizing	$ 6,000			$ 6,000
Scale Aging	$ 2,000			$ 2,000
Analysis	(Existing Staff)			---
TOTAL				$413,200

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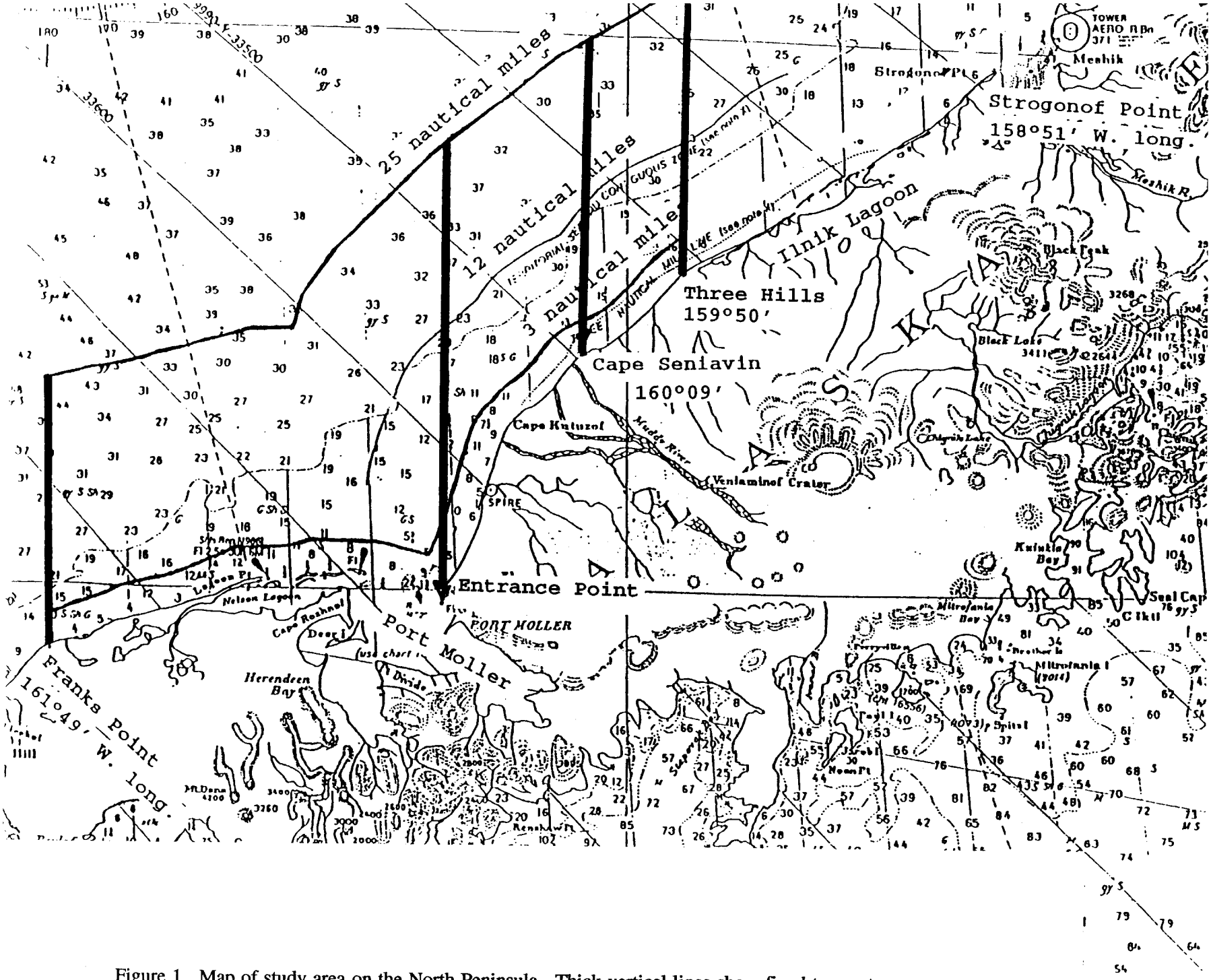

Figure 1. Map of study area on the North Peninsula. Thick vertical lines show fixed transect locations at Frank's Point, Entrance Point, Cape Seniavin, and Three Hills.