

REGULATORY IMPACT REVIEW OF THE  
PROPOSED PLAN FOR MANAGING THE 1981 SALMON FISHERIES  
OFF THE COAST OF CALIFORNIA, OREGON AND WASHINGTON

PACIFIC FISHERY MANAGEMENT COUNCIL

526 S.W. Mill Street  
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SUPPLEMENT TO THE 1981 SALMON REGULATORY IMPACT REVIEW TO FULFILL  
AGENCY RESPONSIBILITIES UNDER THE REGULATORY FLEXIBILITY ACT OF 1980

The Regulatory Flexibility Act (P.L. 96-354) is designed to ensure that the impacts of proposed regulations on small businesses and other "small entities" are taken into account during the rule-making process. In order to fulfill agency responsibilities under this Act, the 1981 Salmon Regulatory Impact Review focuses on social and economic impacts on the numerous small entities involved in the Pacific salmon fisheries. In addition, this supplement is provided to further describe the small entities involved, and assess the impacts of the 1981 Salmon Fishery Management Plan Amendment on those entities.

The small entities that would be most directly impacted by the 1981 Amendment fall into two categories: ocean trollers and ocean charterboat businesses. These small entities are involved in the salmon fisheries coastwide, i.e., in California, Oregon and Washington. The table below estimates the number of potentially impacted small entities in each category in 1981.

Approximate Number of Troll Vessels and Salmon Charterboats Potentially Directly Impacted by the 1981 Salmon Plan Amendment, by State.<sup>a/</sup>

State	Troll Vessels <sup>b/</sup>	Charterboats
California	6,500 - 7,000	50 - 70
Oregon	3,700 - 3,900	180 - 200
Washington	2,700 - 2,900	500 - 520

a/ In some cases, one person or company may own more than one vessel so these figures may represent a slight overestimate of potentially impacted small entities.

b/ State estimates for troll vessels are based on vessel licenses or salmon landings. Some troll vessels land or are licensed in several states. For this reason, also, troll figures in this table must be considered overestimates.

Sources: CDF&G, ODFW and WDF, preliminary unpublished data.  
Golden Gate Sportfishers, preliminary unpublished data.

The social and economic impacts of the management options proposed in the 1981 Amendment on troll and charterboat businesses are discussed in the draft Regulatory Impact Review. In addition, the following small entities may be indirectly impacted by the 1981 Amendment:

- Treaty Indian fishermen, their families and other tribal members. (In the 19 treaty tribes of western Washington, this includes 18-19,000 tribe members, 2,000-2,200 of which are tribal fishermen).<sup>1/</sup>

<sup>1/</sup> Source: Northwest Indian Fisheries Commission, 1980.

- Salmon gillnetters, purse seiners and reefnetters in Washington and Oregon;
- Salmon fishermen in Alaska;
- Harvesters of fish species other than salmon (coastwide);
- Fish processing companies, wholesalers, retailers, brokers and distributors;
- Marine trade industries (e.g., boatbuilders, electronics businesses, machine shops, marine supply stores, bait suppliers);
- Support industries (e.g., restaurants, bars, grocery stores, hotels, motels, campgrounds, gift shops, gas stations, banks).

Estimates of the number of small entities in each of the above categories are not currently available. Some discussion of the potential impacts of the 1981 Amendment on these entities is contained in the 1981 Amendment (see Appendix B) and this draft Regulatory Impact Review.

No direct increased compliance costs for small entities (e.g., required gear purchases) are anticipated as a result of the Amendment.

Reporting and record-keeping burdens for small entities and enforcement costs are not expected to increase significantly over 1980 as a result of this Amendment.

## EXECUTIVE SUMMARY

This Regulatory Impact Review (RIR) analyzes the social and economic impacts of alternative management measures considered by the Pacific Fishery Management Council in the development of the 1981 Amendment to the 1978 Salmon Fishery Management Plan. The decision matrix below briefly summarizes these impacts.

## DECISION MATRIX FOR 1981 SALMON REGULATORY IMPACTS

		Adopted Regulations	Option I	Option II	Option III	Option <sup>a/</sup> IV	Option <sup>a/</sup> V	Option VI
ESCAPEMENT, i.e., achievement of 1981 goals	Puget Sound coho	>	<	<	=	<	<	>
	Washington coastal coho (run-by-run)	=	<	<	<	<	<	>
	OPI coho	=	<	<	<	<	<	>
	Upper Columbia River chinook <sup>b/</sup>	=	<	=	>	<	<	>
	Oregon coastal chinook	=	=	=	=	=	=	=
	Klamath River chinook <sup>c/</sup>	=	<	<	=	<	<	>
	Sacramento River chinook	=	<	=	=	=	<	>
INDIAN TREATY ALLOCATION, i.e., achievement of alternative 1981 goals	Multi-species aggregation	>	>	>	>	<	<	>
	Single-species aggregation	>	<	<	<	<	<	>
	Run-by-run allocation	<	<	<	<	<	<	<
	Run-by-run allocation except on Hoh, Quillayute & Queets Rivers (spawning escape- ment met) and Skagit River (spawning escape- ment not met).	=	<	<	<	<	<	>
	Columbia River <sup>b/</sup> allocation	=	<	=	>	<	<	>
OCEAN COHO HARVEST RATIOS <sup>d/</sup> Compared to 1981 goals:								
WPP: 60 troll/40 recreation (1980 actual: 50/50)	WPP	60/40	62/38	60/40	61/39	67/33	69/31	56/54
OPI: 71 troll/29 recreation (1980 actual: 51/49)	OPI	71/29 <sup>e/</sup>	72/28	70/30	70/30	77/23	77/23	37/33
"INSIDE" NON-TREATY <sup>f/</sup> FISHING OPPORTUNITIES Compared to 1980	Puget Sound <sup>g/</sup>	<	<	<	<	<	<	<
	WA coast (Willapa Bay & Grays Harbor)	>	<	o	o	<	<	>
	Columbia River <sup>b/</sup>	<	<	<	<	<	<	>
	Klamath River <sup>h/</sup>	o	<	<	o	<	<	>
GOVERNMENT DATA/ ENFORCEMENT COSTS Changes from 1980 due to 1981 regulations	Due to changes in OR experimental chinook-only troll fishery	<	o	o	o	<	>	<
	Due to need for more timely data for CA chinook quotas	>	o	o	o	o	o	o
1981 CHARTERBOAT GROSS REVENUES AND OCEAN ANGLER BENEFITS Compared to 1980								
CALIFORNIA Changes due to:	Rec. season changes	+	+	o	o	+	+	o
	Chinook quotas	o	o	o	o	o	o	o
OREGON Changes due to:	Bag limit changes	-	-	-	o	-	-	-
	Recreational season changes	+	+	o	o	+	+	-
	Boundary change for late chinook- only fishery	o	o	o	o	o	o	o
	Coho quotas	-	o	o	o	o	o	o
WASHINGTON Changes due to:	Bag limit changes	-	-	-	o	-	+	-
	Recreational season changes	+	+	o	o	+	+	-
	Recreational coho size limit change	+	o	o	o	o	o	o
	Coho quotas	-	o	o	o	o	o	o

		Adopted Regulations	Option I	Option II	Option III	Option <sup>a/</sup> IV	Option <sup>a/</sup> V	Option VI
1981 TROLL GROSS REVENUES Compared to 1980								
CALIFORNIA								
Changes due to:	Reduced May troll season	○	○	○	-	○	○	-
	Early June all-species troll season	○	+	○	○	+	+	○
	June 1 opening of north coast all-species troll season	+	○	○	○	+	+	○
	Chinook quotas	-	○	○	○	○	○	○
OREGON								
Changes due to:	Reduced May troll season	○	○	○	-	○	○	-
	Time shift or elimination of June "experimental" chinook fishery	-	○	○	○	-	+	-
	Early opening of all-species season (no quota)	○	+	○	○	+	+	○
	Coho quotas	+	○	○	○	○	○	○
	Boundary change for troll chinook-only fisheries	+	○	○	○	+	+	○
WASHINGTON								
Changes due to:	Reduced May troll season	○	○	○	-	○	○	-
	Early opening of all-species season (no quota)	○	+	○	○	+	+	-
	Coho quotas	-	○	○	○	○	○	○
	July 15 opening of all-species season with early closure	-	○	○	○	○	○	-
	Makah troll size limit change	+	○	○	○	○	○	○
1981 TROLL COHO SUPPLY FROM WA/OR/CA -Compared to 1980		-9%	+12%	+5%	+3%	+21%	+23%	-12%
1981 TROLL CHINOOK SUPPLY FROM WA/OR/CA -Compared to 1980		+3%	+10%	+11%	-2%	+13%	+18%	-21%
1981 PRICE CHANGES DUE TO COUNCIL MANAGEMENT		○	○	○	○	○	○	○

#### Footnotes

- Options I-VI were analyzed by the Salmon Team on the assumption that coho quotas would not be in place. Imposition of quotas would alter many of the impacts summarized in this matrix.
- Columbia River escapement, Indian allocations, and "inside" non-Indian fishing opportunities may vary according to Columbia River compact fishery management actions.
- Assumes 1980 Indian harvest level.
- For Options I-VI, assumes fisheries were allowed to continue to scheduled end of season. If in-season closures occurred, ocean harvest ratios would be changed depending on the relative fishing speed of the two fisheries.
- Ocean harvest ratio for the area from Cape Falcon to the California/Mexico border only. All other harvest ratios are for the entire OPI area, from Leadbetter Point to the California/Mexico border.
- Excludes "inside" sport fishing opportunities.
- Reduced fishing opportunities in Puget Sound are due to reduced stock abundance rather than more liberal ocean regulations.
- The Pacific Council, the Department of Commerce, and the State of California have no management authority over on-reservation Indian fishing on the Klamath River.

#### Sources

1981 Salmon Regulatory Impact Review  
1981 Salmon Plan Amendment, Appendices D and F  
WDF, preliminary unpublished data

#### Legend

- \ : Exceeds  
 / : Does not reach  
 \ : Almost reaches  
 ○ : Approx. equal to  
 ○ : Approx. the same as 1980  
 + : Positive impact  
 - : Negative impact

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## I. INTRODUCTION

This Regulatory Impact Review (RIR) has been prepared in the process of developing the Proposed Plan for Managing the 1981 Salmon Fisheries Off the Coast of California, Oregon and Washington. (The 1981 "Proposed Plan" is an amendment to the "Fishery Management Plan (FMP) for Commercial and Recreational Salmon Fisheries Off the Coast of Washington, Oregon and California Commencing in 1978" and will hereby be referred to as "The Amendment.") The RIR was prepared by the Pacific Fishery Management Council (Council) in compliance with Executive Order 12291 and the Regulatory Flexibility Act of 1980 (P.L. 96-354). This RIR focuses on the issues and problems in the Pacific Coast salmon fisheries that give rise to the need for Federal management, and provides discussion and analysis of the social and economic impacts of alternative management measures considered in the development of the FMP.

## II. MANAGEMENT UNIT: AREAS, SPECIES AND FISHERY PARTICIPANTS

Figure 1 presents the area being managed by the Pacific Council's 1978 Salmon FMP and the 1981 salmon plan amendment. The area includes the waters off Washington, Oregon and California from 3 to 200 miles (Fishery Conservation Zone, or FCZ). Figure 1 also shows the boundary lines for salmon management sub-units proposed in this Amendment.

The species managed under the proposed amendment are coho (Oncorhynchus kisutch), chinook (O. tshawytscha) and pink (O. gorbuscha) salmon. Pink salmon only appear in the fisheries in odd-numbered years; they will be available in 1981. "Inside" net fisheries also catch chum (O. keta) and sockeye (O. nerka) salmon, but these species are not caught in significant numbers by the ocean fisheries under the Pacific Council's direct management jurisdiction.

The primary salmon stocks to be managed in the ocean under the proposed Amendment are:

1. Klamath River chinook
2. Sacramento River chinook
3. Oregon coastal chinook
4. Columbia River chinook
5. Washington coastal chinook
6. Oregon coastal coho
7. Columbia River coho
8. Washington coastal coho
9. Puget Sound coho.

Table 1 puts Washington/Oregon/California salmon production in perspective relative to total U.S. and worldwide production of Pacific salmon. During the period 1975-77, the three west coast states harvested 38%-44% of the U.S. catch of chinook, 27%-53% of the U.S. catch of coho, and 2.0%-3.6% of the world catch of all six species of Pacific salmon. Since chinook and coho prices are related to world supply and demand for all salmon species as well



Table 1: Pacific salmon catch by region, harvesting nation and species, 1975-77 in contrast with Washington/Oregon/California troll salmon catch, 1975-77<sup>a/</sup> (metric tons).

Region	Harvesting Group	Species	1975	1976	1977
WA/OR/CA	U.S. - Troll Vessels	Chinook	5,466	5,229	5,884
		Coho	4,946	9,267	3,407
WA/OR/CA	U.S. - All Gear Types	Chinook	10,765	9,695	8,936
		Coho	9,821	12,386	6,226
		All Salmon	29,702	29,843	26,460
Gulf of Alaska	U.S. - All Gear Types	Chinook	2,129	1,999	1,921
		Coho	2,787	4,473	4,222
		All Salmon	41,255	81,572	89,595
Eastern Bering Sea	U.S. - All Gear Types	Chinook	1,020	2,045	2,547
		Coho	447	590	2,185
		All Salmon	21,164	29,950	27,931
Subtotal: Total U.S.A.	U. S. - All Gear Types	Chinook	13,914	13,739	13,404
		Coho	13,055	17,449	12,633
		All Salmon	92,121	141,365	143,986
British Columbia <sup>b/</sup>	Canada - All Gear Types	Chinook	7,289	7,774	7,582
		Coho	7,736	9,325	9,857
		All Salmon	36,334	57,417	65,582
NW Pacific <sup>b/</sup>	Japan - All Gear Types	Chinook	1,115	1,609	908
		Coho	3,757	7,692	8,161
		All Salmon	159,406	129,488	116,546
	USSR All Gear Types	Chinook	3,344	3,560	3,000
		Coho	3,310	3,556	3,898
		All Salmon	104,159	72,049	139,224
Total North Pacific	All Nations	Chinook	25,662	26,682	24,894
		Coho	27,858	38,022	34,549
		All Salmon	393,020	400,319	465,338
WA/OR/CA	Troll catch as % of Total USA catch	Chinook	39%	38%	44%
		Coho	38%	53%	27%
WA/OR/CA	Combined chinook and coho troll catch as % of total North Pacific all salmon species catch		2.6%	3.6%	2.0%

<sup>a/</sup> Data for 1978-80 is available only for U.S. troll vessels fishing off Washington, Oregon and California, as follows:

Species	1978	1979	1980
Chinook	4,456	5,337	4,477
Coho	3,491	4,776	2,286

<sup>b/</sup> Salmon harvests made by Canadian vessels in U.S. waters are attributed to British Columbia.

<sup>c/</sup> Japanese and Soviet harvests of salmon in the FCZ of the USA and Canada are attributed to the NW Pacific.

Sources: Miles, Sherman, Gibbs, Fluharty, et al., Atlas of Marine Use in the North Pacific Region, forthcoming.  
1981 Salmon Plan amendment, Pages 2-II, 10-II. and 26-II.

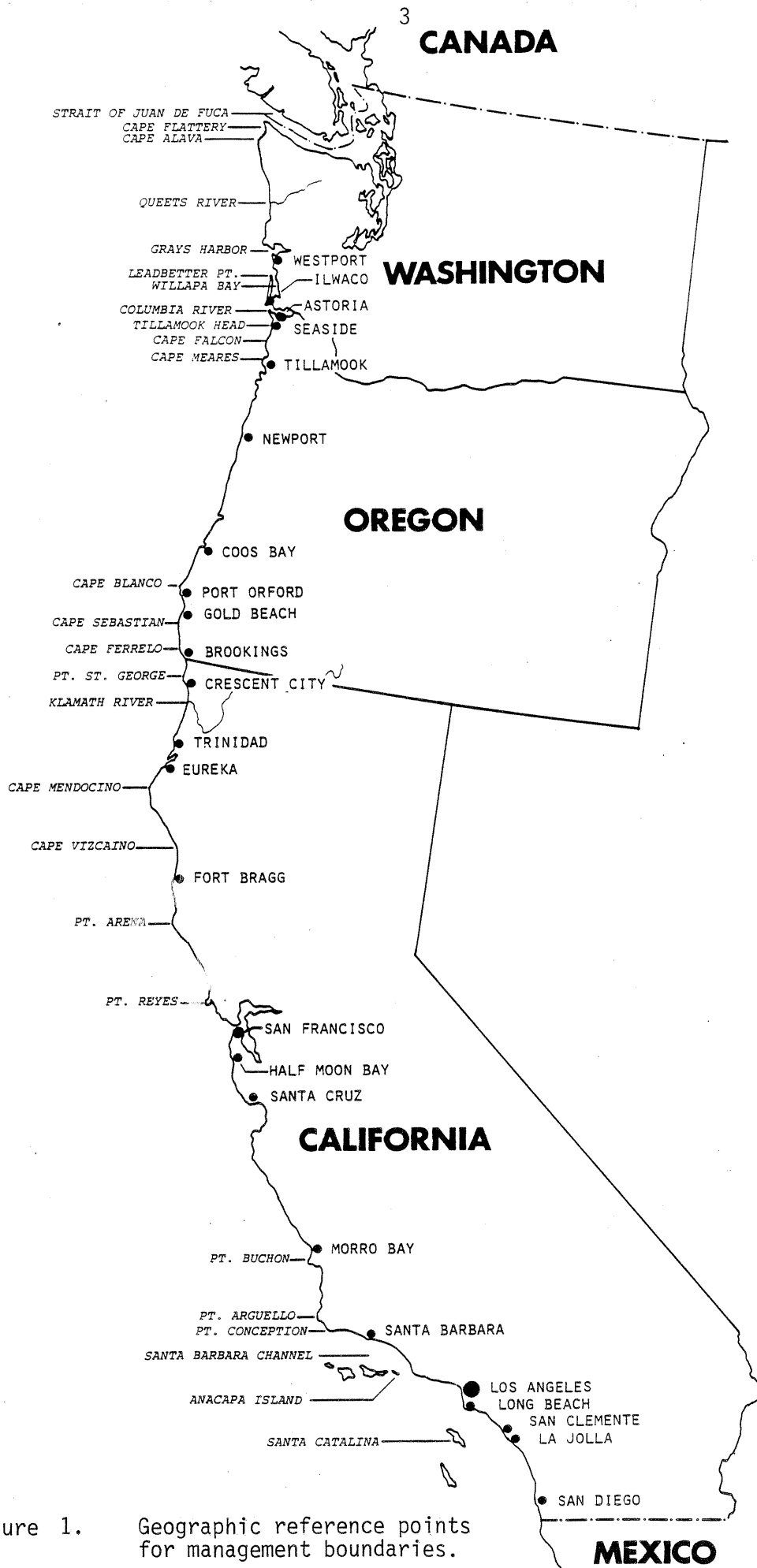


Figure 1. Geographic reference points for management boundaries.

as other factors, and west coast chinook and coho supply is such a minor part of world salmon production, incremental supply changes resulting from Pacific Council management measures are not expected to impact salmon prices significantly.

Numerous communities of fishery participants would be impacted by implementation of the management regime proposed in this Amendment. These communities of participants are joined in different ways by geographical, social, cultural, economic and political factors. For the purposes of this analysis, salmon fishery participants can be grouped into the following categories:

1. Commercial Participants

Trollers

Washington-based  
Oregon-based  
California-based

Net fishermen

Oregon Columbia River gillnetters  
Washington Columbia River gillnetters  
Willapa Bay and Grays Harbor gillnetters  
Puget Sound gillnetters  
Puget Sound reefnetters  
Puget Sound purse seiners

Private aquaculturists

Processors, marketing agents and consumers: the marketing sector

2. Recreational participants

Ocean charterboat operators and anglers  
Washington, Oregon and California fleets

Private ocean sport fishermen

Washington, Oregon and California-based

Inland sports fishermen

Washington, Oregon, California and Idaho-based

3. Indian participants

Commercial fishermen

Net fishermen: Columbia River, Washington coastal rivers,  
Grays Harbor and Puget Sound

Trollers: Washington-based

Ceremonial and subsistence fishermen: Washington, Columbia River  
and Klamath River

4. Coastal communities

In Washington, Oregon and California

In addition, non-fishery related groups (e.g., taxpayers) could be impacted by implementation of the management regime proposed in the Amendment. However, the Council has specific regulatory authority only over participants operating within the FCZ off California, Oregon and Washington, i.e., the ocean trollers, ocean charterboats and private ocean sport fishermen. Impact analysis in this RIR focuses primarily on those three groups.

### III. GENERAL DESCRIPTION OF 1981 SALMON MANAGEMENT PROBLEMS

The problems facing the Pacific salmon fisheries in 1981 are similar in many ways to problems that have been present in the fisheries for the past two or three years.

This Amendment addresses two fundamental and interrelated problems: conservation of the salmon resource and allocation of the resource among fishery participants. Habitat degradation and other problems have greatly reduced salmon stocks over the past 50 years so that they now require strict conservation. Resolution of the conservation problem determines the size of the resource available for use by all participants. Allocation decisions divide up the resource (or the opportunity to harvest the resource) among groups of fishery participants. However, since resolution of conservation and allocation problems takes place simultaneously, the two problem areas affect each other. Management strategies designed to protect salmon stocks and promote conservation of the resource have allocation implications. Allocation strategies may be constrained by or affect conservation decisions.

Within these two broad problem areas, the Council has developed the following management goals:

- Provision for adequate spawning escapement
- Allocation to treaty Indian fisheries
- Allocation among ocean and "inside" sport and commercial fisheries
- Consideration of the interests of non-fishing participants (e.g., processors, marine trades industry)
- Consideration of the interests of non-fishery related groups (e.g., consumers, taxpayers)

The first two goals are of prime importance. The remaining responsibilities are considered simultaneously and balances are made among them.

Numerous specific problems arise within the broad problem areas of resource conservation and allocation. These can be divided into four categories: biological; legal; economic and social; and institutional. In addition, habitat and environmental problems still plague the salmon resource. These are discussed in greater detail in the Amendment.

#### Biological

The spatial distribution of many salmon stocks overlap. The term "stock" in this case may be based on differences in the following parameters:

- (1) Species (coho, chinook or pink)
- (2) Spawning habitat (natural or hatchery-produced)

- (3) Origin (smaller coastal rivers, Puget Sound rivers, Columbia River system, Klamath River system or Sacramento River system)
- (4) Timing of entry into the river system (spring, summer or fall runs)
- (5) Distance upriver of spawning site (e.g., upper and lower Columbia River fall chinook)

The ocean distribution and abundance of these stocks may vary from year to year. Hatchery runs generally can support higher harvest rates than natural runs. Weaker and stronger runs occur simultaneously in offshore areas.

In 1980, California chinook escapements remained well below long term escapement goals, with the Klamath River being particularly poor. The Sacramento River escapements must be increased substantially over a period of time to realize full production potential. In 1980, while upper Sacramento River chinook returns fell short of natural escapement goals, one hatchery on the lower Sacramento River received returns higher than necessary for maintenance of that hatchery run. The only commercial fishery for Sacramento River chinook is the ocean troll fishery.

Depressed Klamath River chinook stocks are present in southern Oregon coastal waters at the same time as depressed Oregon coastal coho stocks. Oregon coastal chinook stocks also present at this time are in relatively good condition. Management strategies must therefore attempt to provide additional protection to these depressed stocks while allowing harvest of healthier stocks.

Upper Columbia River spring and summer chinook stocks still are in a depressed state. They contribute a relatively small proportion of the current chinook catches off Washington and Oregon. Thus, little additional protection can reasonably be given to these stocks by additional curtailment of ocean harvest in those areas.

The upper Columbia fall chinook run entering the river continues a downward trend in abundance, reaching an all-time low in 1980. This decline has occurred in spite of increased restrictions on the ocean fisheries in recent years off northern Oregon and Washington. The chinook catch off Washington dropped from 209,000 fish in 1979 to only 173,000 fish in 1980--well below the annual average Washington ocean catch of 490,000 from 1971-75.

Another mixed stock harvest problem occurs off the Washington coast. Puget Sound coho stocks are generally more abundant and productive than Washington coastal coho stocks, although both occur simultaneously off the Washington coast. In 1980, management restrictions on Washington ocean fishing effort were instituted to protect coastal and certain weaker Puget Sound coho stocks. As a result, large numbers of Puget Sound coho that would otherwise have been harvested in the ocean, reached Puget Sound where increased "inside" fisheries occurred. This management measure resulted in an escapement to Puget Sound greater than needed to meet the projected Indian treaty allocation or escapement goals. It also resulted in increased catch in 1980 for both the Indian and non-Indian net fisheries. However, Washington coastal coho stocks still had very disappointing escapements. The problem of the mixture of weak and strong coho stocks in the Washington ocean fishery will continue in 1981.

Table 2, taken from the 1981 Amendment, summarizes the resource status and management goals of the major salmon stocks under Pacific Council management.

### Legal

Indian treaty fishing rights affording the opportunity to take up to 50% of the harvestable salmon resource apply to all stocks of salmon under U.S. control or jurisdiction (including jurisdiction exercised by the States) that, absent prior interception by Washington fishermen, would pass through or be available at any of the treaty tribes' usual and accustomed fishing grounds wherever located. Currently, the rights have been expressly held to apply to Washington salmon stocks originating from Grays Harbor northward, plus other salmon stocks passing through the usual and accustomed fishing areas. For some tribes, the usual and accustomed fishing places include the ocean, though for most tribes they are "inside."

Columbia River treaty fishing rights are defined for allocation purposes in the Columbia River Management Plan.<sup>1/</sup> The question of the scope of the treaty right to salmon of Columbia River origin is currently being adjudicated in U.S. District Court.

California state courts have upheld Indian rights to fish on the Klamath River for subsistence and ceremonial purposes. The issue of commercial Indian fisheries on the Klamath is currently being adjudicated.

The Council recognizes its legal responsibility to provide for treaty Indian fisheries. This presents a complex management problem, especially given the multitude of "usual and accustomed fishing areas" involved, the mixed distribution of stocks in the ocean and the fact that Indian river fishermen are usually among the last in the progression of harvesters to have access to the fish.

In March 1981, a U.S. District Court enjoined the State of Washington from imposing a 28-inch minimum size troll chinook catch limit upon members of the Makah Tribe fishing in coastal waters on the basis that the size limit was not necessary for conservation, was discriminatory, and deprived the tribe of the power to determine what is the wisest use of its share of the salmon resource.

In addition to the legal responsibilities of the Indian treaties, the Council is legally required under the Fishery Conservation and Management Act of 1976 (FCMA) to manage the salmon resource according to optimum yield. A discussion of the biological, ecological, social, economic and institutional problems associated with this legal mandate is contained in this section and Appendices A and B of the Amendment.

During the 1980 salmon season, the Fort Bragg Salmon Trollers Marketing Association brought suit against the State of California in State Court. The suit succeeded in voiding a State statute which authorized the Director of the

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<sup>1/</sup> "A Plan for Managing Fisheries on Stocks Originating from the Columbia River and Its Tributaries above Bonneville Dam," February 1977.

Table 2. Summary of 1981 resource status and management goals. a/

<u>System</u>	<u>Stock Prediction 1981</u>	<u>1981 Goal</u>	<u>Long-Term Goal</u>
1. Klamath Fall Chinook	Same or slightly higher than 1978. Considerably better than 1980.	Escapement 86,000	Escapement 115,000 Goal to be reached over 2 complete cycles (8 yrs) given average environmental conditions.
2. Sacramento R. Fall Chinook	Slight improvement over 1980, upriver stocks depressed.	Escapement 145,000 adults - 74,000 upriver chinook (75% of long-term goal) and 71,000 downriver chinook (100% of long-term goal)	Escapement 170,000 adults. Goal to be reached over 2 complete cycles (8 yrs) given average environmental conditions.
3. Oregon Coastal Chinook	Near or above average	Escapement 150-200,000	Escapement 150-200,000.
4. Columbia R. Upper River Fall Chinook	Similar to or less than 1980, stocks depressed.	Exceed 1980 in-river run size (160,000 adults), escapement of 40,000 adults above McNary Dam.	300,000 in-river run size, escapement of 40,000 above McNary Dam.
Upper River Spring Chinook	Near record low (depressed), minor part of Washington coastal ocean catch.	Escapement 100-120,000 (not attainable)	Escapement 100-120,000.
Upper River Summer Chinook	Near record low (depressed), minor part of Washington coastal ocean catch.	Escapement 80,000 (not attainable)	Escapement 80-90,000
Lower River Fall Chinook	Mainly managed for hatchery production.		
Lower River Spring Chinook (Willamette)	Slightly above average, minor part of Washington coastal ocean catch.	Escapement 30-35,000	Escapement 30-35,000.
5. Washington Coastal Fall Chinook	Hatchery production equal to or better than 1980, wild production depressed. Ocean distribution primarily north of Washington.	Natural escapement 28,000 plus meet treaty and non-treaty allocation.	Natural escapement 28,000 plus meet treaty and non-treaty allocation.
6. Washington North Coastal Spring/Summer Chinook	Natural runs depressed. Ocean distribution primarily north of Washington.	4,100 natural escapement plus meet treaty and non-treaty allocation.	4,100 natural escapement plus meet treaty and non-treaty allocation.
7. Puget Sound Chinook	Minor part of Washington coastal ocean catch.		
8. Columbia R. & Oregon Coastal Coho (OPI)	Near record low, similar to 1980	300,000 OPI ocean escapement, plus 125,000 adult natural coastal spawning escapement (15-20 adults per mile)	575,000 OPI ocean escapement, plus 200,000 adult natural coastal spawning escapement (29 adults per mile) To be reached by 1987.
9. Washington Coastal Coho	Hatchery-similar to or less than 1980, natural-depressed.	71,000 natural escapement plus meet treaty allocation.	71,000 natural escapement plus meet treaty and non-treaty allocation.
10. Puget Sound Coho	Above average for hatchery but less than 1980 for natural.	152,000 natural escapement plus meet treaty and non-treaty allocation.	152,000 natural escapement plus meet treaty and non-treaty allocation.
11. Fraser River Pink	Above average.	4,000,000 escapement.	--

a/ In general, these goals were developed by the state fishery management agencies.

California Department of Fish and Game to suspend any State statute or regulation in order to conform California law to the Secretarially approved Salmon FMP. As a result, California territorial waters were opened for salmon fishing from July 4-12 while the FCZ off California was closed. It is estimated that approximately 4,600 chinook were taken in State ocean waters during the July 4-12 period, of which 1,900 were estimated to be of Klamath River origin.

The case is presently being appealed. In the meantime, the State statute authorizing conformance remains inoperative. At present, the Director of the California Department of Fish and Game does, however, have the authority to take such regulatory action in California ocean waters as is necessary to conserve the salmon resource.

### Economic and Social

The unique economic and community characteristics associated with the Pacific salmon fisheries create another set of management problems. The market price, consumer preference and the array of interested fishery participants vary by stock, location and time period.

The market system for salmon is complex. It includes daily price fluctuations and competition among products of different types, species and origins.

For example, troll-caught salmon are preferred by some processors over net-caught salmon. However, some small early-season, troll-caught coho command lower prices, while certain net-caught fish (e.g., upriver early spring chinook) bring premium prices due to their high quality.

Numerous fishery participants have substantial investments in salmon fishing and processing. Many of them are highly dependent on the fishery and are greatly impacted by regulatory decisions. The mobility of many of the commercial salmon vessels and the multispecies nature of many of the processing facilities make it difficult to estimate these impacts. For instance, while some troll vessels are completely dependent on salmon, other troll vessels may operate from California to Alaska and may fish albacore, crab, sablefish, halibut, and other species in addition to salmon. This mobility introduces an element of flexibility into the salmon fisheries which may lessen the economic impact of management decisions but also makes fisherman behavior and economic impacts more difficult to predict. Fishery managers can attempt to coordinate salmon regulatory measures with fishing opportunities in other fisheries. At the same time, economic problems in the salmon fisheries may be compounded by poor economic returns from other fisheries.

For instance, many Pacific salmon fishermen experienced low salmon prices, restricted seasons, and poor salmon fishing, as well as poor albacore fishing and a general recession in 1980. Low-interest Small Business Administration loans to some fishermen may alleviate these economic impacts temporarily, but in 1981 the salmon fisheries will again be under severe economic pressures. Coastal communities may suffer similar economic problems as a result of regulatory decisions taken with regard to the commercial and recreational fisheries.



Many salmon fishermen also feel strong social ties to the fisheries. A strong sense of community identity associated with the salmon fisheries frequently influences the behavior of salmon fishermen and contributes a significant, though unquantified component to the value of the fisheries.

Another social and economic management consideration is the difference between commercial and recreational salmon fisheries with regard to length of season and catch. Time on the water and number of fish caught are important elements for both commercial and sport fisheries, but the degree of importance of each element varies. The primary goal of commercial fishing is to catch fish. To the commercial fisherman, fishing time is also important, primarily in order to ensure that he can catch an adequate number of fish. This is particularly true of trolling, in which catch per unit of time is low relative to other commercial gear types. Figure 2 shows the extensive reductions in fishing time that have been imposed on the troll fisheries in Washington and Oregon north of Cape Falcon since 1975.

In the recreational salmon fisheries, where much of the value of the fisheries involves the fishing "experience," time is the primary factor. Although number of fish caught is important, the significance of its contribution to the value of the recreational salmon fisheries is difficult to quantify.

Management strategies must take account of these economic and social considerations.

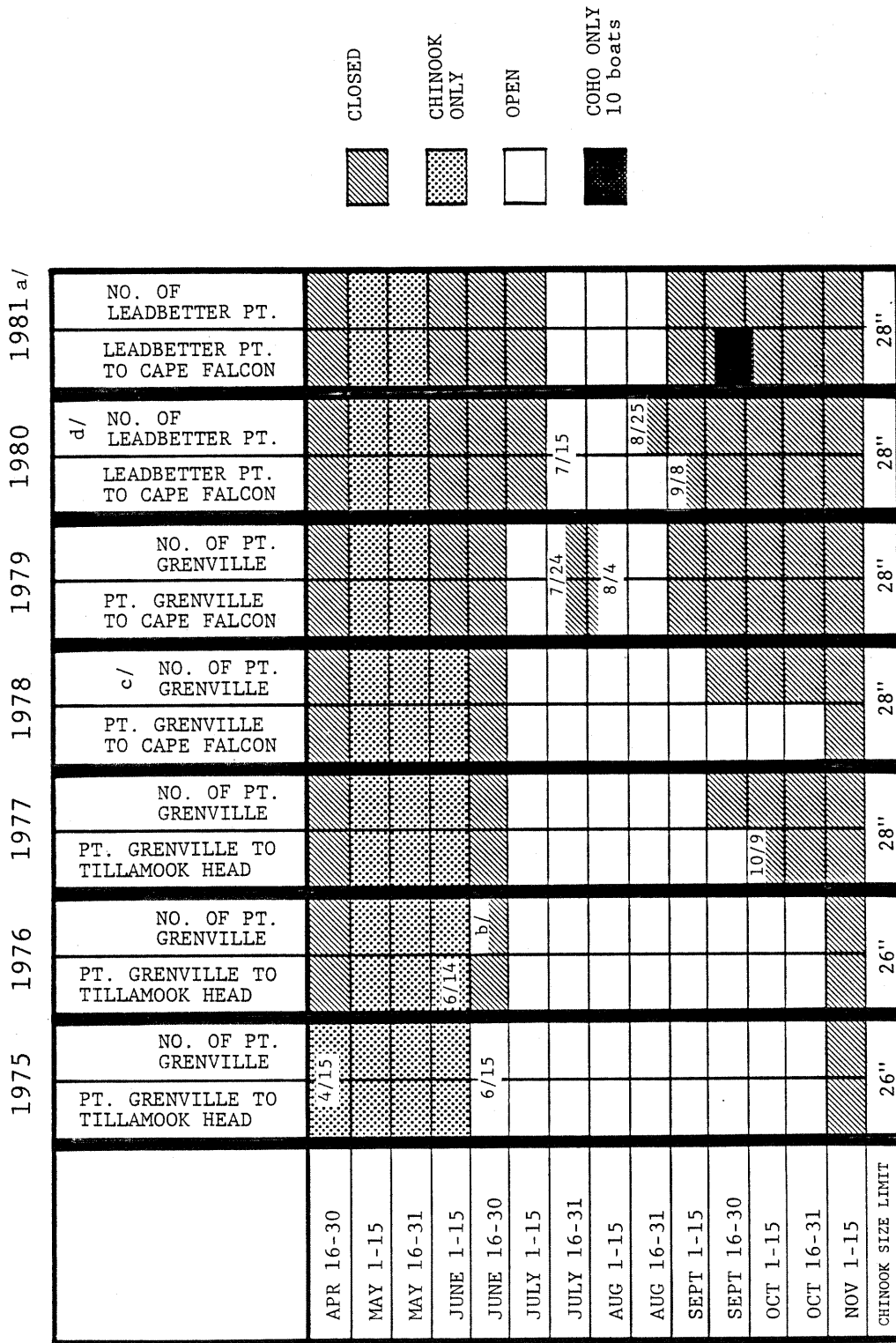
### Institutional

A multitude of agencies are involved in the management of Pacific salmon. The goals and viewpoints of these agencies may conflict while their jurisdictions overlap. The Pacific Fishery Management Council, in conjunction with the Secretary of Commerce, has management responsibility over the offshore salmon fisheries. The states of California, Oregon, Washington, Idaho and several Indian tribes manage salmon within their waters. The Council depends on the states for the majority of their salmon data. Each state has its own system of data collection and decision-making, involving management agencies, the state legislatures, and other bodies. Coordination of policies within states, and between the states and the Council is necessary.

Other federal agencies, i.e., National Marine Fisheries Service, Coast Guard, U.S. Fish & Wildlife Service, Bureau of Indian Affairs, and the International Pacific Salmon Fishery Commission, are also involved. For the Klamath River region, for example, the U. S. Fish and Wildlife Service (Department of the Interior) monitors Indian salmon catches. The Bureau of Indian Affairs (Department of the Interior) is involved in salmon management in Washington.

The movement of salmon and fishermen along the coast adds to the institutional problem. Pacific salmon also migrate out of the jurisdiction of the three states and the Pacific Council into Canadian and Alaskan waters. Similarly, some Washington and Oregon salmon fishermen fish off Alaska. Alaskan and Canadian interceptions of west coast salmon require management coordination between the Pacific Council and both the North Pacific Fishery Management Council (NPFMC) and Canadian fishery agencies. In 1981, possible reductions of 10%-15% in southeast Alaskan chinook harvests, instituted by the NPFMC, may increase upper Columbia River chinook escapement by a few percent over 1980.

FIGURE 2. TROLL FISHING SEASONS NORTH OF CAPE FALCON, 1975-1981



- a/ Adopted  
 b/ Open along entire Washington coast until 6/22  
 c/ Change from Tillamook Head to Cape Falcon  
 d/ Change from Point Grenville to Leadbetter Point

Coordination among all these management bodies is often difficult to achieve, requiring long-term planning and negotiation. In the meantime, the salmon fisheries must continue to be managed.

The biological, legal, economic, social and institutional problems described above fundamentally stem from a problem of magnitudes: more and more participants with greater economic and social needs are putting more pressure on smaller salmon populations. Many of the complexities, however, derive from peculiarities of timing. Examples of the importance of the time element include:

- The value of "time on the water" to recreational fishermen.
- The need of trollers to be present on the fishing grounds when the fish are "biting."
- The influence of the timing of weather patterns on the fisheries.
- Time overlaps of salmon stocks passing through a given ocean area.
- The timing of the growth period for harvestable coho (i.e., rapid growth occurs during the spring and early summer, which has implications for potential poundage yield of coho at different points in the season).
- The time sequence of harvest by different fishery participants (e.g., for a given run, harvest by the ocean fisheries occurs before harvest by the treaty and non-treaty "inside" fisheries).
- The timing of fishing opportunities for other species.
- The timing of data availability for in-season assessments to achieve conservation and allocation goals.
- The timing of the administrative review and public comment processes.
- The timing and intensity of Canadian and Alaskan offshore salmon fisheries.
- The timing of the North Pacific Fishery Management Council's salmon plan which occurs prior to the development of the Pacific Council's salmon plan (or amendments).

The management regime presented in the 1978 salmon FMP and the 1981 amendment attempts to address all the biological, legal, economic and social problems described above, while recognizing the constraints imposed by data gaps and the institutional structure of salmon management.

## IV. PROPOSED SALMON MANAGEMENT OPTIONS

During the 4 years of Pacific Council management of the salmon fisheries, many alternative management tools have been considered in attempts to solve the problems described in Section III. Table 3 lists the major categories of these management tools. Many of the management tools were necessarily rejected for reasons beyond the scope of consideration of this RIR. The 1981 Salmon Plan Amendment focuses on time/area closures (seasons), recreational fishery bag limits, in-season adjustment and ocean harvest quotas, as management tools to restrict harvest of depressed stocks and immature fish, and focus harvest on healthier stocks and more mature fish. Six option packages and the Council's adopted regulation package, each employing these management tools in a different way, have been developed in the draft Amendment. The option packages are presented in Figures 3 - 8. Figures 3 and 6 represent the management regime adopted by the Council for 1981. This RIR analyzes the critical socio-economic issues arising from the proposed and adopted management options, as well as estimating the impacts of each of the options on fishery participants.

Table 3. Alternative management tools considered to achieve optimum yield in the Pacific salmon fisheries.






- 
- ° Troll chinook minimum size limit
  - ° Troll coho minimum size limit
  - ° Selective troll fishing gear
  - ° Troll chinook fishing time/area closures
  - ° Troll coho fishing time/area closures
  - ° Incidental catch allowance for coho
  - ° Troll fishery limited entry
  - ° Ocean sport time/area closures
  - ° Ocean sport fishery minimum size limits
  - ° Ocean sport fishery bag limit
  - ° Ocean sport fishery limited entry
  - ° Ocean sport fishery gear
  - ° River mouth closures
  - ° Barbless hooks
  - ° Ocean fishery catch quotas
- 

Source: PFMC, 1978 Salmon FMP

# TROLL

14

DATES	1980 (Actual)						1981 a/					
	C		O		W		C		O b/		W b/	
	SO. OF CAPE VIZCAINO	NO. OF CAPE VIZCAINO	OR/CA BORDER TO CAPE BLANCO	CAPE BLANCO TO CAPE FALCON	NO. OF CAPE FALCON	SO. OF LEADBETTER PT.	NO. OF LEADBETTER PT.	b/ ALL CALIFORNIA	OR/CA BORDER TO CAPE SEBASTIAN	CAPE SEBASTIAN TO CAPE FALCON	NO. OF CAPE FALCON	SO. OF LEADBETTER PT.
APRIL 1-30												
MAY 1-15												
MAY 16-30												
JUNE 1-15												
JUNE 16-30												
JULY 1-15												
JULY 16-31												
AUG 1-15									c/			
AUG 16-31												
SEPT 1-15												
SEPT 16-30												
OCT 1-15												
OCT 16-31												
NOV 1-15												

	ALL SALMON		ALL SALMON EXCEPT COHO
	CLOSED		COHO ONLY (out to 12 miles only, maximum ten boats, coho gear only).
	EXPERIMENTAL FISHERY		

a/ Adopted by Council, March 26, 1981.

b/ Troll harvest guidelines:

California south of Point Arena: 265,000 chinook

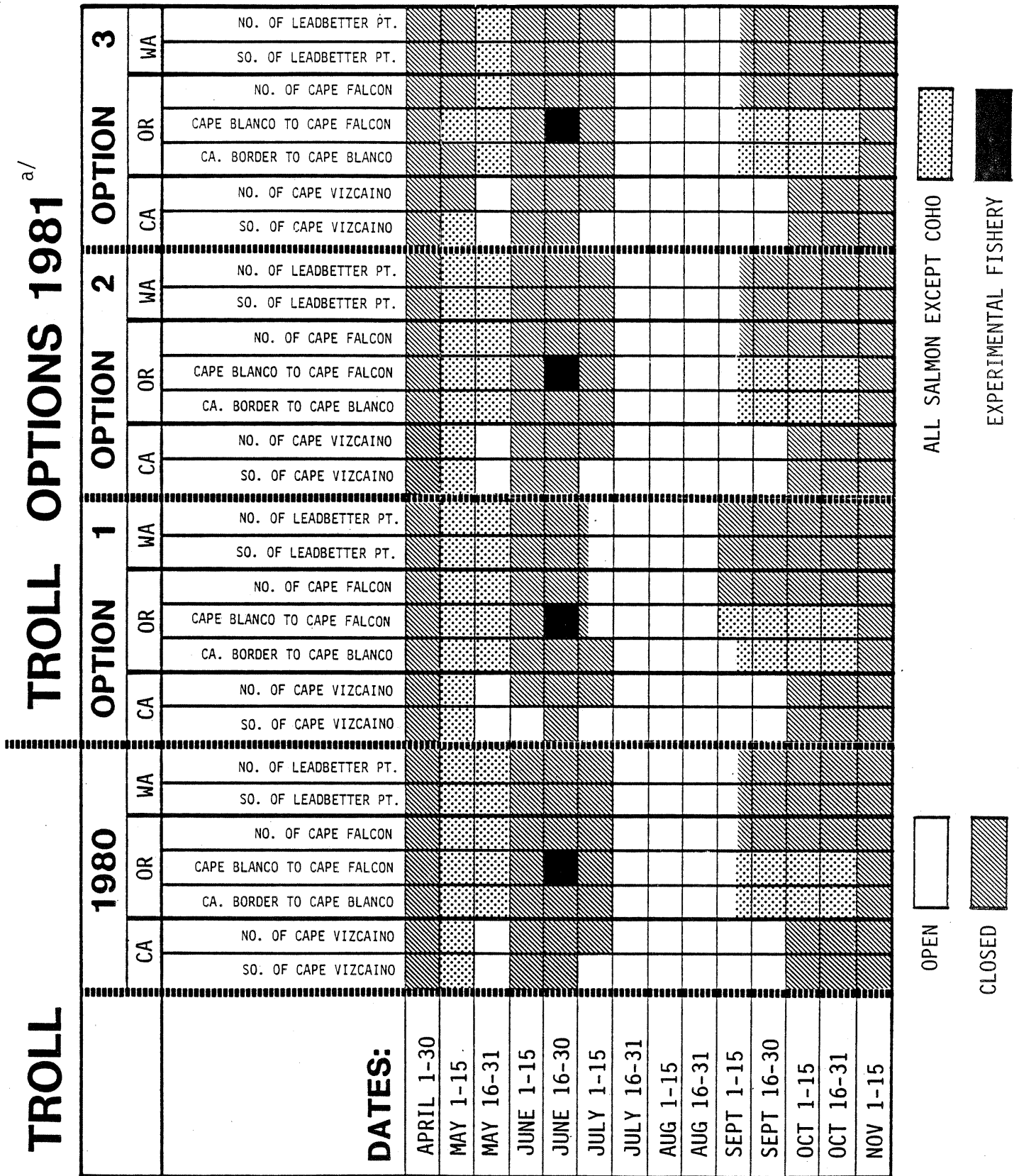
California north of Point Arena: 300,000 chinook

Oregon and California south of Cape Falcon: 548,000 coho

Oregon and Washington north of Cape Falcon: 372,000 coho

c/ ALL SALMON EXCEPT COHO, whole bait or 5-inch plugs, after coho catch reaches harvest guideline.

Figure 3.



<sup>a/</sup> The presentation of the options on this page does not preclude Council consideration of more or less restrictive options based on information and proposals received during the public comment period as long as the options are based on up-to-date technical information regarding the status of the fishery and are reasonably calculated to achieve the goals of this plan amendment. (See page 13-IV.)

# TROLL

OPEN	ALL SALMON EXCEPT COHO
	
CLOSED	EXPERIMENTAL FISHERY
	

Figure 5.

# RECREATION

17

DATES		1980 (Actual)			1981 <sup>a/</sup>				
		C	O	W	C	O <sup>b/</sup>	W <sup>b/</sup>		
		ALL CALIFORNIA	SO. OF CAPE FALCON	NO. OF CAPE FALCON	NO. OF LEADBETTER PT. SO. OF LEADBETTER PT.	ALL CALIFORNIA	OR/CA TO CAPE BLANCO	C. BLANCO TO C. FALCON	NO. OF CAPE FALCON
FEB 14-MAY 15									
MAY 16-31									
JUNE 1-15									
JUNE 16-30									
JULY 1-15									
JULY 16-31									
AUG 1-15									
AUG 16-31									
SEPT 1-15									
SEPT 16-30									
OCT 1-15									
OCT 16-31									
NOV 1-15									
BAG LIMIT		2	c/	c/	2	2	2	2	2+1
SIZE LIMIT	COHO	d/	16"	16"	d/	16"			20"
	CHINOOK	d/	22"	24"	d/	22"			24"

 OPEN  CLOSED

 ALL SALMON EXCEPT COHO

<sup>a/</sup> Adopted by Council, March 26, 1981.

<sup>b/</sup> Recreational harvest guidelines:

California south of Point Arena: 115,000 chinook

California north of Point Arena: 15,000 chinook

Oregon and California south of Cape Falcon: 224,000 coho

Oregon and Washington north of Cape Falcon: 248,000 coho

<sup>c/</sup> 1980 season began with 3-fish bag limit; this was reduced to 2 fish.

<sup>d/</sup> There is a 22-inch minimum size limit on chinook and coho in California, except that one chinook or coho may be less than 22 inches but not less than 20 inches.

Figure 6.




## RECREATION

RECREATION  
OPTIONS 1981

c/ The presentation of the options on this page does not preclude Council consideration of more or less restrictive options based on information and proposals received during the public comment period as long as the options are based on up-to-date technical information regarding the status of the fishery and are reasonably calculated to achieve the goals of this plan amendment. (See page 13-IV.)

	1980			1			2			3		
	CA	OR	WA	CA	OR	WA	CA	OR	WA	CA	OR	WA
DATES:	ALL CALIFORNIA	SO. OF CAPE FALCON	NO. OF CAPE FALCON	SO. OF LEADBETTER PT.	NO. OF LEADBETTER PT.	ALL CALIFORNIA	SO. OF CAPE FALCON	NO. OF CAPE FALCON	ALL CALIFORNIA	SO. OF CAPE FALCON	NO. OF CAPE FALCON	ALL WASHINGTON
FEB 14 - MAY 15												
MAY 16-31												
JUNE 1-15												
JUNE 16-30												
JULY 1-15												
JULY 16-31												
AUG 1-15												
AUG 16-31												
SEPT 1-15												
SEPT 16-30												
OCT 1-15												
OCT 16-31												
NOV 1-15												
BAG LIMIT	2		a/	2	b/	2	b/	2	b/	2	b/	

CLOSED ALL SALMON EXCEPT COHO  
(OPTIONAL FOR 1981)OPEN 

a/ 1980 SEASON BEGAN WITH 3-FISH BAG LIMIT;  
THIS WAS REDUCED TO 2 FISH.

## b/ BAG LIMITS

OPTION	AREA	SPECIES	BAG LIMIT	DATES (inclusive)
1	OREGON, SOUTH OF CAPE FALCON	ALL SALMON	2 FISH	May 9 - July 5
		ALL SALMON	3 FISH	July 6 - Sept. 13
		ALL SALMON		
		EXCEPT COHO	3 FISH	Sept. 14 - Oct. 31*
2	OREGON/WASHINGTON, NORTH OF CAPE FALCON	ALL SALMON	3 FISH	May 9 - July 5
		(only 2 of which may be coho or chinook)		
		ALL SALMON	3 FISH	July 6 - Sept. 13
		ALL SALMON		
3	OREGON, SOUTH OF CAPE FALCON	ALL SALMON	2 FISH	May 9 - July 14
		ALL SALMON	3 FISH	July 15 - Sept. 13
		ALL SALMON		
		EXCEPT COHO	3 FISH	Sept. 14 - Oct. 31*
	OREGON/WASHINGTON, NORTH OF CAPE FALCON	ALL SALMON	3 FISH	May 9 - July 14
		(only 2 of which may be coho or chinook)		
		ALL SALMON	3 FISH	July 15 - Sept. 13
		ALL SALMON		
	OREGON, SOUTH OF CAPE FALCON	ALL SALMON	3 FISH	May 30 - Sept. 7
		(Possible change to 3 fish bag limit, only 2 of which may be coho or chinook)**		
		ALL SALMON, EXCEPT COHO	3 FISH	Sept. 8 - Oct. 31*
	OREGON/WASHINGTON, NORTH OF CAPE FALCON	ALL SALMON	3 FISH	May 30 - Sept. 7
		(Possible change to 3 fish bag limit, only 2 of which may be coho or chinook)**		

\* Optional proposal.

\*\* Two alternative methods of making this change are proposed: (1) Use of the in-season management procedure; or (2) automatic change in bag limit on June 15.

Figure 7.

## RECREATION

RECREATION  
OPTIONS 1981<sup>c/</sup>

c/ The presentation of the options on this page does not preclude Council consideration of more or less restrictive options based on information and proposals received during the public comment period as long as the options are based on up-to-date technical information regarding the status of the fishery and are reasonably calculated to achieve the goals of this plan amendment. (See page 13-14.)

	1980			4			5			6		
	CA	OR	WA	CA	OR	WA	CA	OR	WA	CA	OR	WA
<b>DATES:</b>	ALL CALIFORNIA	SO. OF CAPE FALCON	NO. OF CAPE FALCON	SO. OF LEADBETTER PT.	NO. OF LEADBETTER PT.	ALL CALIFORNIA	SO. OF CAPE BLANCO	NO. OF CAPE BLANCO	ALL WASHINGTON	ALL CALIFORNIA	SO. OF CAPE FALCON	NO. OF CAPE FALCON
FEB 14 - MAY 15												
MAY 16-31												
JUNE 1-15												
JUNE 16-30												
JULY 1-15												
JULY 16-31												
AUG 1-15												
AUG 16-31												
SEPT 1-15												
SEPT 16-30												
OCT 1-15												
OCT 16-31												
NOV 1-15												
BAG LIMIT	2	3/2	a/	2	b/	2	b/	2	b/	2	b/	

OPEN



ALL SALMON EXCEPT COHO



CLOSED



a/ 1980 SEASON BEGAN WITH 3-FISH BAG LIMIT;  
THIS WAS REDUCED TO 2 FISH.

## b/ BAG LIMITS

OPTION	AREA	SPECIES	BAG LIMIT	DATES (inclusive)
4	OREGON, SOUTH OF CAPE BLANCO	ALL SALMON (only 2 of which may be chinook or coho)	3 FISH	May 2 - Sept. 27
		ALL SALMON EXCEPT COHO	3 FISH	Sept. 28 - Oct. 31
	OREGON/WASHINGTON, NORTH OF CAPE BLANCO	ALL SALMON (only 2 of which may be coho or chinook)	3 FISH	May 2 - Sept. 27
5	OREGON, SOUTH OF CAPE BLANCO	ALL SALMON (only 2 of which may be coho or chinook)	3 FISH	May 9 - Sept. 27
		ALL SALMON EXCEPT COHO	3 FISH	Sept. 28 - Oct. 31
	OREGON, NORTH OF CAPE BLANCO	ALL SALMON (only 2 of which may be coho or chinook)	3 FISH	May 9 - Sept. 27
6	WASHINGTON	ALL SALMON (Adjustment to 2+1 pink at any time it appears the total recreational coho catch will exceed 40% of total allowable ocean harvest by seasons end.)	3 FISH	May 9 - Sept. 20
	OREGON, SOUTH OF CAPE FALCON	ALL SALMON (only 2 of which may be coho or chinook)	3 FISH	May 30 - Sept. 7
		ALL SALMON, EXCEPT COHO	3 FISH	Sept. 8 - Oct. 31 (Optional)
	OREGON/WASHINGTON, NORTH OF CAPE FALCON	ALL SALMON (only 2 of which may be coho or chinook)	3 FISH	May 30 - Sept. 7

NOTE: Apply in-season management harvest guidelines to all options.

Figure 8.

## V. ANALYSIS OF CRITICAL SOCIO-ECONOMIC MANAGEMENT ISSUES

### Issues to be Analyzed

#### Scope of Analysis

Biological and legal requirements define the range within which salmon managers may work to achieve Council goals and minimize negative social and economic impacts. In particular, the scope of management alternatives is limited by the need to provide special ocean protection to depressed Columbia River and Klamath River chinook stocks and other stocks for escapement and treaty Indian allocation purposes. This need has been addressed by the Council in its establishment of goals for escapement from the ocean salmon fisheries.

In addition to these goals, policy decisions, such as the Council's decision to maintain specific catch ratios between ocean fishery participants, further restrict the range of alternatives. Options 1 - 6 presented in the proposed Amendment, as well as the Council's adopted regulation package, are similar in many respects because they are all constrained by the same policy decisions and the same biological and legal realities.

However, within the range defined by biological, legal and policy requirements, socio-economic issues do arise. Salmon fishery managers must consider alternative ways of meeting those requirements; each alternative may address a different socio-economic problem and may have different socio-economic implications.

Biological and legal issues are discussed in the Amendment itself; the summary of problems in Section III of this RIR is included as general background. This RIR focuses on the most immediately important socio-economic issues, which have arisen from examination of Options 1 - 6, the Council's adopted regulation package, public testimony and Salmon Advisory Subpanel discussions. Many other socio-economic questions could be raised, including issues underlying past Council policy and management decisions with respect to salmon. However, this RIR focuses on critical issues of immediate relevance to the 1981 Amendment.

The focus on critical issues and the formulation of these issues in terms of analytical questions are attempts to maximize the usefulness of this analysis to decision-makers. Although this RIR only discusses the costs and benefits of alternative incremental changes to the 1980 management regime, it is considered the first step toward a complete analysis of the short and long-term trade-offs, needed to make responsible management decisions.

This RIR has proceeded on the assumption that any of the individual option elements discussed in Section V are equally acceptable in terms of meeting biological, legal and policy requirements (e.g., meeting spawning escapement goals, providing for "inside" treaty and non-treaty harvests, and maintaining specified ocean troll/recreational harvest ratios). However, it is recognized that many of the option elements, when combined in option packages, could allow overharvest of specific stocks. Trade-offs among socio-economic option elements must be made to achieve the Council's ocean escapement and allocation goals. When biological analysis indicates that the combined impact of the

elements of a given option package is expected to exceed allowable harvest levels (i.e., insufficient short-term trade-offs have been made), this will be indicated in Section VI.

Further general assumptions must also be made. First, except where otherwise indicated, 1981 effort levels and patterns will be assumed to be similar to those in 1980. Second, it is assumed that management agencies other than the Council will cooperate with the Council in its salmon planning effort and will not implement conflicting management regimes.

### Analytical Parameters

Although the management measures included in the 1981 Salmon Plan Amendment could affect any of the groups of people listed in Section II of this RIR, data and time constraints require that this analysis focus on social and economic impacts on ocean recreational and troll fisheries.

Analysis of recreational fishery management questions will focus on the following parameters:

- changes in angler effort levels and patterns;
- changes in the value of the ocean sport fisheries; and
- changes in gross revenues to the ocean charterboat fleets.

Analysis of troll fishery management questions will focus on the following parameters:

- changes in ex-vessel value/gross revenues to the troll fleets;
- distributional effects within the troll fleets (in cases where data are available).

Lack of information precludes analysis of changes in net income and fuel consumption considerations for both the troll and recreational fleets. In addition, data are only generally available to analyze economic impacts on the fisheries as a whole while costs and benefits may be unevenly distributed. Changes in total costs and benefits may not reflect changes in costs and benefits to individuals.

Whenever possible, analyses will attempt to indicate expected changes in coastal community economic activity and employment levels. In addition, other socio-economic parameters may be discussed where appropriate.

### Critical Questions to be Analyzed

This RIR analyzes the following socio-economic questions:

- (1) What is the probable economic effect of a 2-fish rather than a 3-fish bag limit for the Oregon and Washington ocean salmon recreational fisheries? Analysis of this question must deal with the following four cases:
  - 2-fish bag limit all season;
  - an early season 2-fish bag limit changing automatically to a 3-fish bag limit on a pre-determined day;

- an early season 3-fish bag limit changing automatically to a 2-fish bag limit on a pre-determined day;
  - an early season 3-fish bag limit possibly changing to a 2-fish bag limit through in-season management.
- (2) What are the probable economic effects of shortening or lengthening the Washington, Oregon and California recreational seasons in comparison with the 1980 seasons? Particular attention must be paid to the difference between season changes made to the early versus late ends of the season [e.g., an extra week in early May (early opening) versus an extra week in September (late closure)].
  - (3) What are the probable economic effects of eliminating all or a part of the early May chinook-only<sup>1/</sup> troll fishery off California, Oregon and Washington?
  - (4) What are the probable economic effects of allowing a 1-2 week extension of the central and/or northern California early all-species salmon troll seasons (June 1-15)?
  - (5) What are the probable economic effects of shifting the Oregon experimental chinook troll fishery one or two weeks earlier than in 1980?
  - (6) What are the probable economic effects of shifting the Oregon and Washington all-species troll fisheries so that they open and close 1 or 2 weeks earlier than in 1980?
  - (7) What are the probable economic effects of instituting an automatic closure/quota system for coho off Washington, Oregon and California as adopted for 1981?
  - (8) What are the probable economic effects of shortening the Washington/Oregon all-species troll season north of Cape Falcon by 3 weeks compared to 1980 (August 19 closure instead of September 8)?
  - (9) What are the probable economic effects of changing the management boundary for the experimental Oregon chinook-only troll fishery from Cape Blanco to Cape Ferrelo, Cape Sebastian or the Oregon/California border?
  - (10) What are the probable economic effects of changing the management boundary for the special late-season Oregon recreational chinook-only fishery from Cape Falcon to Cape Blanco?

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<sup>1/</sup> Because of their life cycle characteristics, pink salmon appear in the Pacific Coast ocean salmon fisheries only in odd-numbered years. Pink salmon will be available again in 1981. Therefore, all references to "chinook-only" fisheries are more properly called "all species except coho" fisheries.

- (11) What are the probable economic effects of allowing a special coho-only troll fishery between Cape Falcon and Leadbetter Point out to 12 miles, from September 20 to October 3, with coho gear only and a maximum of ten participating vessels, all with observers aboard?
- (12) What are the probable economic effects of raising the recreational coho size limit from 16 inches to 20 inches, off Washington while retaining the 16-inch size limit off Oregon?
- (13) What are the probable economic effects of reducing the chinook minimum size limit from 28" to 24" for treaty fishermen fishing in the Makah fishing area?
- (14) What are the probable economic effects of instituting an automatic closure/quota system for chinook off the north and south coasts of California, as adopted for 1981?

In Section VI, these issues will be placed in the context of the six option packages proposed in the 1981 Amendment, and the Council's adopted regulation package.

#### Analysis of Issues

1. What is the probable economic effect of a 2-fish rather than a 3-fish bag limit for the Oregon and Washington ocean salmon recreational fisheries?

This question can be broken down into the following socio-economic subissues:

- ° How sensitive is angler demand to limits on the quantity of fish to be caught? I.e., would fewer ocean trips be taken if the ocean salmon bag limit were reduced?
- ° Would angler effort shift to "inside" marine or freshwater areas? If so, how much effort shift is likely to occur?

The discussion below attempts to provide a partial answer to these questions.

Effort level, rather than catch, is the primary factor in determining economic benefits of recreational fisheries (although effort level depends to some extent on catch). The more angler trips taken at a given value per trip, the greater the total economic value of the fishery. This is true, not only with regard to economic benefits to anglers, but also with respect to gross revenues to the charterboat fleet: charter fleet revenue levels are a direct function of numbers of charter angler trips taken.

This situation is contrary to the commercial fisheries where economic benefits to fishermen are based on the ex-vessel value of the fisheries, which is, in turn, based on the quantity of fish caught. In the recreational fisheries, number of fish caught and perceived opportunity to catch fish are important primarily insofar as they affect effort levels.

Data are lacking as to the impact of bag limit reductions on effort levels. However, Crutchfield and Schelle (1978) analyzed social and economic

characteristics of the Washington recreational salmon fisheries and attempted to estimate the economic impact of a change in bag limit from 3-fish to 2-fish in Washington State. Their study focused on Grays Harbor County and Pacific County which harbor the vast majority of Washington's charter vessels and were the launching points for 83-86% of all Washington ocean salmon angler trips from 1976 to 1980. Washington angler effort constituted 35.8% of the coastwide ocean salmon angler effort in 1980.

Unfortunately for the purposes of this analysis, Crutchfield and Schelle (1978) did not report their estimate of expected change in angler effort (angler trips) as a result of the change in bag limit, although they apparently used such a figure for their other calculations. An estimate of the expected change in effort would have made it possible to calculate the expected change in total net economic benefits to anglers resulting from the bag limit change. No other source of quantified information on such a change of effort is currently available, although the National Marine Fisheries Service/Pacific Marine Fisheries Commission's Marine Recreational Survey will be able to provide this information in the future. Crutchfield and Schelle estimated that anglers who fished in Washington ocean areas in 1977 would have increased their effort (angler trips) in the Straits of Juan de Fuca and Puget Sound by an estimated 26% (109,000 angler trips) if a 2-fish bag limit were imposed in ocean areas. Crutchfield and Schelle suggested that this result would probably not change radically if the 2-fish limit were imposed in "inside" as well as ocean areas, since most anglers know that such a limit would rarely be a binding constraint in non-ocean areas, where angler fishing success is relatively low. If this increase in "inside" marine salmon fishing effort corresponds to an identical decrease in ocean salmon sport fishing effort, we can calculate the loss in consumer surplus (net economic benefits) to ocean anglers resulting from the reduction in the ocean salmon bag limit. Using Crutchfield and Schelle's (1978) best estimate of the average value of an ocean angler trip (\$40.43 per angler day), the loss to ocean anglers would be in the range of \$4,406,000 (1977 dollars)<sup>1/</sup>. This is about 20.6% of Crutchfield and Schelle's estimate of total net benefits of the 1977 recreational fisheries (\$21,426,500). This loss would, however, be compensated for, in part, by the increased effort in "inside" areas. Although no estimate of economic value per angler trip in "inside" marine waters is available, this value is probably significantly less than the value per angler trip in ocean areas. Value per angler trip for freshwater salmon fishing in Washington is estimated at \$20, less than half the estimated value for ocean areas (Brown, Sorhus and Gibbs, 1980). The above calculations are based on numerous unverified assumptions and must be interpreted with care.

Multiplier losses of economic activity in coastal communities would not, however, be compensated for (nor would there be a simple transfer to Puget Sound communities since trips would be shorter and less likely to involve overnight accommodation, etc.). Table 4 presents Crutchfield and Schelle's (1978) estimates of total impacts of the reduction in bag limit on economic activity in the Washington coastal counties under consideration.

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1/ Since the length of an angler trip sometimes exceeds one day, \$40.43 is probably an underestimate of the value of an angler trip, and therefore \$4,406,000 probably is also an underestimate of the total loss to ocean anglers resulting from the reduction in the ocean salmon bag limit.

Table 4. Estimated economic impacts on Grays Harbor and Pacific counties of a bag limit reduction from 3-fish to 2-fish.

Analytical Assumption	Loss of Value Added (1977 dollars)	Loss of Labor Income (1977 dollars)	Number of Jobs Lost
Consumption as a function of value added	\$5,177,441	\$2,678,775	245.6
Consumption as a function of labor income	Not reported	\$2,622,813	239.6

Source: Crutchfield and Schelle, 1978

The majority of the jobs would be lost in the charterboat industry, although wholesale and retail establishments, hotels, motels and campgrounds would also be heavily affected. Expenditures on charterboat services in the two counties would be expected to decline by \$1,895,328 (1977 dollars) (Crutchfield and Schelle, 1978).

Although the information obtained from the Crutchfield and Schelle (1978) study provides a general idea of likely changes resulting from a change in bag limit from 3-fish to 2-fish, several factors must be borne in mind when considering the impact of such a change in 1981.

First, the effect of the generally depressed state of the national and regional economies on demand for ocean salmon fishing is unclear. Crutchfield and Schelle's study indicates that in 1977, demand for ocean salmon fishing was highly sensitive to the cost of a fishing trip. Washington charterboat operators feel that, with rising costs of fuel and other expenses, and corresponding rising costs in charter trip prices, sport fishing demand is particularly sensitive to a reduction in bag limit.

Second, at the time that Crutchfield and Schelle did their survey, the salmon bag limit in Washington had never dropped below three fish. Angler reaction to a similar survey in 1981 might be markedly different, given that Washington ocean salmon anglers experienced a 2-fish bag limit all season in 1979 and an in-season bag limit reduction to two fish in 1980.

Third, average angler success rates in 1980 were relatively high in Washington and Oregon. This fact may have altered angler catch expectations for 1981.

Finally, most of the bag limit reductions being contemplated for Oregon and Washington in 1981 were not changes to 2 fish but to "3 fish, only 2 of which may be coho or chinook" ("2+1"). This is because of the presence of pink salmon in the fisheries in 1981. The opportunity to catch the "bonus pink" may mitigate, to some extent, the impact of bag limit reductions for chinook and coho but could also cause a coho quota to be reached more quickly than with a 2-fish limit.



Information of the type provided by Crutchfield and Schelle is not available for the Oregon ocean recreational fisheries. However, Oregon charterboat operators have generally observed that recreational fishermen in Oregon are less sensitive to bag limit reductions than their counterparts in Washington. It has been suggested that in most cases, average charter vessel size, average fishing trip length and average charter trip price are less in Oregon than in Washington, and average ocean angler success is also lower, so that a 3-fish bag limit is less important to the Oregon angler than to the Washington angler. Average salmon angler success rates are presented in Table 5. Average success rates are much lower than the prevailing bag limits at the time, and these success rates have rarely exceeded two salmon per trip. However, the opportunity to catch fish appears to be at least as great a determinant of angler participation as are average angler success rates.

Examination of Oregon and Washington ocean recreational effort statistics for 1978-1980 sheds some further light on differential impacts of bag limit reductions in the two states.

Table 5. Historical bag limits and average ocean salmon angler success rates in Washington, Oregon and California (fish per angler per trip).

Year	Washington		Oregon		California	
	Bag Limit	Success Rate	Bag Limit	Success Rate	Bag Limit	Success Rate
1971	3	2.07	3	1.12	3	0.93
1972	3	1.54	3	0.88	3	1.04
1973	3	1.42	3	0.84	3	0.93
1974	3	1.74	3	1.05	3	0.92
1975	3	1.41	3	0.81	3	0.72
1971-75 Average	3	1.60	3	0.93	3	0.90
1976	3	2.07	3	1.08	3	0.73
1977	3	1.31	3	0.64	3	N.A.
1978	3	1.17	3	0.70	3	N.A.
1979a/	2+1 <sup>b/</sup>	1.24	2+1 <sup>b/</sup>	0.59	2	0.79
1980a/	3/2 <sup>c/</sup>	1.48	3/2 <sup>c/</sup>	0.98	2	0.75

a/ Preliminary

b/ 2+1 indicates a 3-fish bag limit, only 2 of which may be coho or chinook.

c/ 3/2 indicates a 3-fish bag limit reduced to 2 fish by in-season management in mid-July.

Source: 1981 Salmon Amendment, Pages 6-II, 18-II and 31-II.

During the 1978 salmon season, a three-fish bag limit was in place for both states, but this was changed to 2 fish in 1979. Oregon effort in 1979 was down in June and July compared to 1978, but up in May and August. Washington showed a similar pattern, except that August effort was also significantly down. This information is difficult to interpret, however, since the bag limit reduction was not the only change; the 1979 season length was also significantly reduced compared to 1978, and 1979 recreational salmon fishing was generally considered poor.

In 1980, the scheduled bag limit was returned to 3 fish for both states. Angler effort in Washington did not appreciably rise compared to 1979 although it did in Oregon (after a slow start in May). With the in-season reduction of the bag limit back to 2 fish in mid-July, angler effort in both states fell below 1979 levels (after a short time lag). In Oregon, however, angler effort recovered in September.

Owens (1981) estimates 34%-38% of ocean anglers who fished in 1978 but decided not to fish in 1979 made this decision in response to the preseason bag limit reduction to two fish. Owens also estimates that in 1980, there was a 20%-30% reduction in ocean angler effort in response to the in-season bag limit reduction to two fish in mid-July.

These changes in angler effort should be interpreted with care, since factors other than the bag limit (e.g., season length, weather, run-size reports, the general state of the economy) may have influenced salmon angler behavior.

One final factor must be considered in assessing the impact of a 2-fish bag limit; that is, the timing of the change in bag limit. Crutchfield and Schelle's (1979) analysis assumed the implementation of a 2-fish bag limit all season. This was proposed for 1981 in Options IV and VI and was included in the Council's adopted regulation package. However, a 2-fish limit may be implemented in other ways. In 1980, the recreational season began with a 3-fish bag limit but was adjusted through in-season management down to 2 fish. It is also possible to make this change automatically on a predetermined day. A 3-fish/2-fish bag limit was proposed for 1981 in Options III and V. Options I and II proposed a recreational season beginning with a 2-fish bag limit which would later be increased to 3 fish on a predetermined day. The consequences of each arrangement may be quite different.

Although Crutchfield and Schelle (1978) did not identify different groups of fishermen with different sensitivities to bag limit reductions, there is some evidence for such distinctions.

Washington charterboat operators note the existence of two basic categories of sport fishermen using charter services. The first category is sometimes called the "novice sport fisherman." They generally fish for salmon from a charterboat once or twice per season, renting fishing gear for the trip. On average, anglers in this category are married, have children, and are regularly employed. Fishermen of this type predominate as users of charterboat services from late June through August, which corresponds to the school vacation period. Charterboat operators have observed that while "novice sport fishermen" are interested in catching fish, much of the value they derive from the fishery is associated with the "excursion" atmosphere, such as the opportunity to spend time outdoors, and participation in a family vacation.

The second category of angler identified by Washington charterboat operators is sometimes called the "dedicated sport fisherman." These anglers tend to go sport salmon fishing on charterboats five or more times per season, using their own fishing gear. Many of these anglers are retired or semi-retired, and prefer to fish in the early and late parts of the fishing season to avoid mid-season crowds. Charterboat operators have observed that, while "dedicated" anglers and "novice" anglers both enjoy the "excursion" aspects of the charterboat trip, the two categories differ in that the "dedicated" angler is primarily interested in the opportunity to catch fish.

It must be noted that factors other than the bag limit (reported fishing successes, run size reports, weather, etc.) can have significant impacts on angler effort patterns. However, if the above two categories of fishermen do exist, it is possible that a 2-fish bag limit which increases to 3 fish on a predetermined day could encourage "dedicated sport fishermen" to delay their fishing trips until after the change of bag limit. This would cause significant economic losses to the charter fleet in the early part of the season, which could not readily be recouped in mid-season when the fleets are working at full capacity. A 3-fish bag limit early in the season could encourage "dedicated sport fishermen" to participate at that time. Bag limit reductions (whether on a predetermined day or through in-season adjustment) at a later time (eg. June 15 or later) could have a less severe economic effect since the change would involve "novice sport fishermen" who are thought to be generally less concerned with the opportunity to catch many fish. A two-fish bag limit all season would probably discourage participation in the fishery in a general way (see discussion above) but at least it would not be likely to cause the severe effort shifts expected from a 2-fish/3-fish arrangement.

It is not clear whether the above two categories of salmon sport fishermen (with their associated sensitivities to bag limits) are also distinguishable in Oregon. Early season sport fishery openings and the 3-fish bag limit appear to be less important determinants of angler effort levels in Oregon than in Washington.

2. What are the probable economic effects of shortening or lengthening the Washington, Oregon and California recreational salmon fishing seasons in comparison with the 1980 season?

Recreational fishing requires, on average, substantial amounts of fishing time per salmon caught so that the viability of the charterboat fisheries and the value of the salmon sport fisheries depend to a large degree on a prolonged fishing season. The majority of angler effort is concentrated in the period from Memorial Day weekend through Labor Day weekend, but effort in the early and late ends of the season may make a significant contribution to the net economic value of the fisheries and the gross revenues of charterboat operators. This analysis will attempt to estimate the magnitude of this contribution.

Data are currently unavailable to assess the importance of early or late-season openings for the California recreational salmon fisheries. However, Table 6 presents levels of Washington and Oregon salmon sport fishery effort (angler trips) during the early and late ends of the season, as a percentage of total season angler effort. Although these figures, unfortunately, include the two holiday weekends themselves, they do give some indication of the relative importance of the two ends of the recreational season.

Table 6. Early<sup>a/</sup> and late<sup>b/</sup> season angler effort as a percentage of total season angler effort in the Washington and Oregon recreational salmon fisheries.

Year	Season/Bag Limit	Washington		Oregon	
		Early	Late	Early	Late
1971-75 <sup>c/</sup> Average	-	6.2% (Sept. only: 17.5%)	19.2%	3.1% (Sept. only: 16.5%)	17.8%
1978	April 29 - Oct. 31	4.2% (Sept. only: 15.2%)	17.2%	3.0% (Sept. only: 9.3%)	12.6%

a/ Prior to June 1.

b/ After August 31.

c/ 1974-75 average in the case of Oregon.

Source: Adapted from 1981 Salmon Plan Amendment, Tables II-18 and II-28.

It is clear from the table that effort in the late part of the recreational season has traditionally made much more of a contribution to the total seasonal effort than has effort in the early part of the season.

Oregon charterboat operators have noted that early season effort is generally fairly low, except for a rush of effort on opening day. They also point out that the anglers who participate in the salmon fisheries at the end of season would not normally shift their effort to the period prior to Labor Day if deprived of their late season. In other words, most late season anglers are probably lost to the fisheries when the late season is cut short. This is apparently due to the fact that many late-season anglers are concerned with avoiding the mid-season crowds. They schedule their vacations after Labor Day, when coastal areas are less crowded and hotel and motel accommodations are often cheaper.

Washington charterboat operators have pointed out similar trends, although they place more emphasis on the importance of the very early part of the season, and slightly less emphasis on a late September season. They also place more emphasis on the importance of a 3-fish bag limit than do most Oregon charterboat operators.

If we assume that it is, in fact, true that late season anglers are lost to the fisheries when the season is cut short after Labor Day, then we may conclude from Table 5 that reopening the September recreational season could add 9-20% on to total season angler effort levels, the value of the sport fishery to anglers, and gross revenues to charterboat operators. The tables in Appendix B of this draft RIR provide more up-to-date information on number of ocean angler trips and recreational catch by month, but it is impossible to draw reliable conclusions from these tables as to the number of angler trips lost through late openings and early closures. The difficulty with using

these data arises from the fact that season length is not the only variable that distinguishes each fishing year; bag limits, weather, fuel costs and fish availability also differ. Effort information of the type contained in Appendix B is not currently available for the California ocean sport fishery.

A final important element in setting the recreational salmon seasons is the need for a stable, guaranteed season length so that charterboat operators can honor preseason bookings, and anglers can plan their vacations. The Salmon Plan Development Team has stated that early recreational season openings increase the possibility that the season may have to close early. They also point out that Options IV and V propose seasons that are longer than can be reasonably assured, given the status of the stocks and the need to achieve historic harvest ratios. With any type of low harvest ceiling such as the coho quotas adopted by the Council for 1981, early season openings and/or a high bag limit (3-fish or even "2+1"-fish) could cause very early closures. If an unscheduled closure occurs after Labor Day in 1981, fishery net values and charterboat gross revenues could be reduced by up to 20% (as noted above) and social disruption in the form of cancelled vacations, could occur. If the quota closure occurs before Labor Day, losses would probably be substantially greater, since the closure would be cutting into the most valuable part of the recreational season. Although the 3-fish bag limit and early and late seasons are important, the Memorial Day to Labor Day period is by far the most critical element in the economic viability of the charterboat fisheries and the socio-economic value of the recreational fisheries.

3. What are the probable economic effects of eliminating all or a part of the May chinook-only troll fishery off California, Oregon and Washington?

The economic value of the ocean troll fisheries is based on the number of fish landed, and the size and quality of those fish. This discussion attempts to identify the potential reductions in ex-vessel value of the troll fleet associated with elimination of the May chinook troll fisheries. Data on ex-vessel values often do not include consideration of end-of-season bonuses sometimes paid to fishermen by processors. However, this factor is considered negligible in light of the already large error margins in this analysis.

Preliminary analysis indicates that the loss of ex-vessel value that would be incurred if the entire May chinook-only troll fishery were removed by regulation is likely to fall within the following ranges:

Washington:	3-6% of total season ex-vessel value
Oregon:	0-3% of total season ex-vessel value
California:	6-12% of total season ex-vessel value.

These conclusions are based on the following assumptions:

- (a) If post-May troll seasons in 1981 are similar to or more restrictive than the 1980 post-May troll seasons (as in the Council's 1981 adopted regulations), approximately 60% of the catch of chinook (in numbers of fish) normally caught in May would eventually be recaptured later in the season in a given area.

- (b) The 1981 poundage and price structures will be similar to those in 1980, i.e., the relationship between early and later season average prices and average pounds per fish will remain similar to 1980.
- (c) If the May season were allowed, the May chinook catches (numbers of fish and weight) would make a similar relative contribution to total chinook catch in 1981 as they did in 1980.
- (d) The percentage contribution of the May troll chinook catch to the total season chinook catch in terms of pounds dressed weight is about a 5-20% overestimate of percentage contribution of the May troll chinook catch in terms of ex-vessel value.
- (e) Because of its larger average size and higher average price per pound, an average chinook salmon has approximately 2-4 times the dollar value of an average coho salmon.

Assumptions (d) and (e) are only necessary for calculation of impacts in Washington, because of gaps in price and value data for this state.

A brief discussion of the validity of the assumptions underlying this analysis is necessary.

- (a) Inability of many troll fishermen to recoup more than 60% of May catch losses. Most trollers who currently fish the May chinook-only season also fish the later all-species season to the fullest extent possible. Thus, with 1981 all-species seasons similar to 1980, and a similar catch-per-unit-effort, many trollers would not be able to expand their effort in later periods to make up for time, catch and revenues lost because of a May closure.<sup>1/</sup> However, preliminary unpublished data from the state fishery management agencies indicate that May closures would probably increase catch-per-unit-effort later in the season. Although the degree of increase would vary by area under consideration due to stock distribution patterns, on average, there would be a 60% "recapture rate." Only about 40% of May catch losses would be true "losses" to the ocean fisheries.
- (b) Similarity of 1981 poundage and price structures to 1980. Slightly smaller chinook salmon tend to predominate in troll catches in May as compared to the latter part of the season. Table 7 indicates the high percentage of Medium No. 1 grade chinook (8-12 lbs. dressed) and the slightly lower percentage of Large No. 1 grade chinook (over 12 lbs. dressed) in the May Washington troll catch. The percentage of Large No. 1 grade chinook rises as the season progresses. In 1980, the percentage of Large No. 1 grade chinook increased to 67.2% of the monthly troll catch in August. In recent years, this late season monthly

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<sup>1/</sup> Many of the large vessels that fish in May turn to albacore fishing later in the season. It is considered unlikely that these vessels would expand their effort on salmon at the expense of albacore fishing, unless albacore fishing was poor.

percentage has occasionally exceeded 81%. Similar trends of gradually increasing poundage per fish are evident in the Oregon and California troll fisheries, although California chinook of Klamath River origin are generally smaller than other chinook.

These trends in chinook size have been consistently observed over many years, and are related to the growth characteristics of the species. Similar trends can be expected in 1981.

Table 7. Large No. 1 and Medium No. 1 grade May chinook catch as a percentage of total May chinook catch, Washington troll fishery<sup>a/</sup>.

	Large No. 1	Medium No. 1
1978	29.1	61.4
1979	44.6	50.6
1980	38.0	56.6

a/ Calculated in terms of numbers of fish.

Source: Washington Department of Fisheries, preliminary unpublished data.

Average ex-vessel troll fishery prices per pound also generally rise gradually from an early season low. Oregon's 1979 troll fishery was an exception to this rule and in any given port or within any given month, prices may fluctuate slightly. Tables 8 and 9 document the general rising price trend for Washington and Oregon; California is also similar. In part, this trend may be attributed to increasing average poundage per fish, but in recent years, market conditions have also gradually changed during each season (see Table 8). This trend in prices during the season can be assumed to continue in 1981.

Salmon market studies appear to indicate that smaller and larger salmon may enter separate markets and demand for smaller salmon may be growing (see discussion in Appendix A).

Chinook and coho market prices on the Pacific coast appear to be governed primarily by factors other than supply from the Pacific Council's jurisdiction. (As noted in Table 1, during the 1975-77 period, chinook and coho catches off the three west coast states amounted to 2.0%-3.6% of the world landings of Pacific salmon.) Salmon inventories in Japan and other countries, expected catches of pink, chum and sockeye in Japan and Alaska, and demand levels are thought to be the primary determining factors (see Appendix A of this draft RIR). Thus, it may be assumed that any reduction in supply caused by elimination of the May troll chinook fishery would be unlikely to cause significant price increases later in the season. (Such price increases might have compensated for lost May revenues.)

Table 8. Average monthly ex-vessel prices per pound for chinook and coho salmon, Washington commercial troll fishery, 1972-1976 and preliminary 1977.

Year	April	May	June	July	August	September	October
Large red No. 1 grade troll chinook (over 12 lb. dressed)							
1972	.81	.84	.87	.87	.87	.94	.95
1973	.97	1.02	1.07	1.16	1.26	1.33	1.35
1974	1.05	1.05	1.12	1.16	1.18	1.21	1.21
1975	1.06	1.06	1.08	1.09	1.08	1.13	1.25
1976	Closed	1.42	1.52	1.82	1.76	1.81	1.94
1977	Closed	1.63	1.94	2.18	2.19	2.22	2.25
Medium red No. 1 grade troll chinook (8-12 lb. dressed)							
1972	.61	.65	.66	.66	.66	.71	.75
1973	.79	.83	.87	.90	.96	1.32	1.34
1974	.87	.89	.94	.97	.99	1.01	1.05
1975	.89	.90	.91	.98	1.03	1.13	1.27
1976	Closed	1.24	1.31	1.75	1.76	1.76	1.88
1977	Closed	1.33	1.63	1.73	1.76	1.79	1.82
Small red No. 1 grade troll chinook (under 8 lb. dressed)							
1972	.49	.54	.55	.54	.55	.59	.61
1973	.66	.71	.74	.77	.86	1.29	1.34
1974	.67	.69	.74	.77	.78	.81	.85
1975	.68	.70	.74	.81	.99	1.10	1.22
1976	Closed	.97	1.09	1.58	1.61	1.63	1.87
1977	Closed	1.08	1.15	1.34	1.50	1.55	1.76
Troll coho (all grades)							
1972	Closed	Closed	.47	.51	.59	.68	.75
1973	Closed	Closed	.68	.77	.89	1.03	1.11
1974	Closed	Closed	.73	.73	.78	.81	.86
1975	Closed	Closed	.73	.76	.83	.87	1.04
1976	Closed	Closed	1.11	1.26	1.26	1.32	1.46
1977	Closed	Closed	Closed	1.05	1.16	1.22	1.25

Source: PFMC, 1978 Salmon FMP, Page 49

Table 9. Average monthly ex-vessel prices per pound for all grades of chinook salmon, Oregon commercial troll fishery, 1978-80.

Year	April	May	June	July	August	September	October	November
1978	1.66	1.72	1.75	1.85	1.90	1.96	2.36	2.19
1979	-	2.56	2.76	2.59	2.56	2.64	2.52	2.65
1980a/	-	2.09	2.20	2.22	2.52	2.81	2.84	3.04

a/ Preliminary.

Source: Oregon Department of Fish and Wildlife, preliminary unpublished data.

- (c) Similarity of contribution of May chinook catch (numbers of fish and weight) to total chinook catch in 1980 and 1981. Table 10 presents May troll chinook catch as a percentage of total season troll chinook catch for all three states.



Table 10. Washington, Oregon and California May troll chinook catch as a percentage of season chinook totals. <sup>a/</sup>

	Washington	Oregon	California
Percentage May contribution in numbers of fish			
1971-75 Average	17.7%	4.0%	26.3%
1978	16.6	1.7	41.0
1979	30.2	4.4	31.2
1980	32.5	12.3	40.3
Percentage May contribution in dressed weight (lbs.)			
1978	13.2	1.6	-
1979	27.4	5.0	25.8%
1980	29.5	12.6	34.4%
Percentage May contribution in value (\$)			
1978	-	1.5	-
1979	-	5.0	24.4%
1980	-	10.8	32.1%

a/ 1979-80 preliminary.

Sources: PFMC, 1981 Salmon Plan Amendment, pages 4-II, 12-II and 27-II.

WDF, preliminary unpublished data.

ODFW, preliminary unpublished data.

The May troll chinook contribution in terms of numbers of fish has become increasingly important in recent years, probably due to regulatory restrictions later in the season. Depending on the Council's choice of a management regime for later in the season, this trend may or may not continue. Since the Council's adopted regulation package is expected to allow chinook harvest levels and patterns similar to 1980, this analysis will assume a May chinook contribution similar to 1980.

- (d) Percentage May chinook contribution in terms of pounds dressed weight is about a 5-20% overestimate of percentage May chinook contribution in terms of ex-vessel value. Ex-vessel value data by month is currently only available for the Oregon and California troll fisheries. For Washington, inferences may be made from Table 10.

The Oregon and California data show that, despite month-to-month differences in average size of fish and average price per pound, percentage May contribution in terms of ex-vessel value follows percentage May contribution in terms of dressed weight fairly closely. The "dressed weight" percentages are, however, an overestimate of percentage contribution in terms of value, because of generally lower than average prices early in the season. Comparing the available data in Table 11 on percentage contribution in terms of numbers of fish, dressed weight and ex-vessel value, the average pounds-per-fish/value

overestimate appears to lie within the range of 5-20% and the average numbers of fish/value overestimate is 10-30%. More complete data are necessary for Washington and California to better verify this assumption.

- (e) On average, a chinook salmon has approximately 2-4 times the dollar ex-vessel value of a coho salmon. Table 11 shows how the ratio of ex-vessel values of Washington chinook compared to coho has fluctuated in the general range of 2/1 to 4/1 since 1975. No information of this type is available for Oregon and California but individuals knowledgeable in the fisheries indicate that on average, the 2/1-4/1 ratio range has generally held true coastwide.

Coho prices were very low in 1980 after falling from a record high in 1979. This drop apparently resulted from high 1979 Japanese salmon inventories followed by record chum and sockeye runs in Japan and Alaska, and Japanese consumer resistance to high salmon prices (see Appendix A). It is expected that coho prices in 1981 may recover somewhat, which could alter the ex-vessel value ratio. However, any changes in the ratio are expected to remain in the 2/1 to 4/1 range.

Table 11. Ratio of average ex-vessel chinook values to coho values, Washington troll fishery.<sup>a/</sup>

Year	Ratio
1975	2.38
1976	2.97
1977	4.27
1978	3.08
1979	2.54
1980	3.32 <sup>b/</sup>

a/ Calculated according to the following formula:

$$\frac{\text{Chinook value}}{\text{Coho value}} = \frac{\text{Chinook avg. wt/fish}}{\text{Coho avg. wt/fish}} \times \frac{\text{Chinook avg. price/lb.}}{\text{Coho avg. price/lb.}}$$

b/ Based on Oregon price data. Washington price data were used in all other cases.

Source: WDF, preliminary unpublished data.  
ODFW, preliminary unpublished data.

This ratio (R) makes it possible to calculate the percentage contribution of the total season chinook ex-vessel value to the total season all-species ex-vessel value (%C)<sup>1/</sup>. This calculation can be made using the following formula:

$$\%C = \frac{(R) \times (\text{season chinook catch in numbers of fish})}{[(R) \times (\text{season chinook catch in numbers of fish}) + (\text{Season coho catch in numbers of fish})]}$$

<sup>1/</sup> The contribution of pink salmon to the ex-vessel value of the troll fisheries was considered relatively negligible and has been omitted for simplicity's sake.

The above assumptions allow us to answer the original question, i.e., the economic impact of closing the May chinook-only troll fishery coastwide. For Oregon, ODFW preliminary unpublished monthly ex-vessel value data provide the following estimates of the contribution of the May chinook-only fishery to the total season all-species ex-vessel value:

Table 12. Percentage contribution of May chinook-only fishery to total season all-species ex-vessel value, Oregon and California.

Year	Percentage May Contribution	
	Oregon	California
1978	0.7%	N.A.
1979	1.9%	21.6%
1980	7.0%	31.1%

Source: ODFW, preliminary unpublished data.  
CDF&G, preliminary unpublished data.

For the period 1978-80, the contribution of the May chinook-only troll fishery to Washington troll gross revenues to total season revenues has ranged from 10% to 17%.

Depending on 1981 regulatory, weather, market and stock conditions, the contribution of the May chinook-only troll fishery to Oregon troll gross revenues may range from approximately 1% to 7% or more. For California, the May value contribution has recently fallen in the range of 21% to 32%.

For Washington, the percentage May contribution may be calculated using existing data according to the formula:

$$\frac{\%MC}{1+\%OE} \times \%C = \%MV$$

%MC: percentage contribution of May chinook fishery to chinook season totals (in pounds dressed weight).

%OE: percentage overestimate factor to correct for low early season and prices per pound.

%C: percentage contribution of the total season chinook ex-vessel value to the total season all-species value.

%MV: percentage contribution of May chinook fishery ex-vessel value to total season all-species ex-vessel value.

With a 60% "recapture rate" of fish "lost" through closure of the May ocean fisheries and a 10%-30% increase in the value of these fish because of increased growth (more pounds per fish) and higher prices per pound later in the season, the economic impacts of elimination of the May chinook-only troll seasons are estimated in Table 13.

Table 13. Economic impact of the removal of the 1981 May chinook-only troll seasons coastwide.

State	% of All-Species Season Ex-Vessel Value	1980 Total Ex-Vessel Value	Potential Loss of Ex-Vessel Value
Washington	3-6%	-	-
Oregon 0-3%	\$ 8,192,000a/	0-\$246,000	
California	30-36%	\$13,149,000a/	\$789,000-1,578,000

a/ Source: Adapted from 1981 Salmon Plan Amendment, pages 5-II and 14-II.

It should be noted that, in Oregon and Washington, where some trollers specialize in chinook fishing, the potential loss of ex-vessel value might be focused on a relatively small number of fishermen. Furthermore, the burden might or might not fall on local trollers, since some segments of the troll fleet are highly mobile. The above calculations were based on state landings which include landings by mobile out-of-state vessels. In California, poor weather conditions often preclude participation in the May troll fishery by small local boats. Instead, most of the economic benefits of early season fishing accrue to the larger, more mobile boats, some of which have home ports in Washington and Oregon. Some of these early season salmon trollers may change to albacore fishing later in the season. Additional data and analysis are required in order to assess the distributional impacts of a May season closure.

In all three states, potential economic losses will not be confined to changes in trollers' gross revenues. The importance of the commercial salmon industry to communities along the Pacific coast are documented in terms of input-output multipliers and percentages of sector inputs spent on within-county labor payments and out-of-county import, in Tables 14 and 15. A more complete explanation of these data is included in Appendix B of the 1981 Salmon Plan Amendment.

Finally, since Option III and VI in the 1981 Amendment propose a partial May season closure both in terms of areas and number of weeks that would be closed, this analysis must briefly address this situation.

Examination of Oregon data on ex-vessel value of the troll fishery by week indicates that approximately 25-40% of the total May chinook catch is usually landed during the first two weeks of May (the period which Option III proposes to close). For the north coast of California, biweekly ex-vessel value data indicate that in 1980, approximately 51% of the total May chinook catch was landed during the first two weeks of May.

Information is not currently available to assess the impact of the partial area closure proposed in Option III. However, it should be noted that the major ports to be excluded from the closure as proposed in Option III would be Tillamook, Newport, Coos Bay, San Francisco and Monterey.

Table 14. Percentages of sector inputs spent directly on payments to households (H) and on out-of-county imports (I) (1977).

	Humboldt Co.		Mendocino Co.		Tillamook Co.		Clatsop Co.	
	H	I	H	I	H	I	H	I
Salmon fishermen	46% (17th)*	33% (8th)*	48%	17%	49%	**	21%	5%
Other fishermen	71% (6th)*	10% (25th)*	68%	11%	47%	**	68%	7%
Salmon processors	23% (29th)*	4% (31st)*	18%	13%	19%	**	8%	24%
Other fish processors	33% (21st)*	3% (32nd)*	28%	9%	**	**	16%	58%
Sport fishing (marine)	**	**	**	**	38%	**	**	**

\* Ranking out of 32 sectors

\*\* Information not available

Source: OSU Study, Vol. B (1978)

Table 15. Input-output multipliers and total generated sales by sector and by coastal county, 1977.

County	Sector	Salmon Trawl	Combination Salmon Trawl	Salmon Gillnet	Other Fishing	Salmon Processing	Other fish Processing	Sport fishing (Marine)	Salmon Fishing & Processing Output as % of County Sales
Humboldt	a. Multiplier		3.11 (19)		3.83 (2)	3.75 (4)	4.15 (1)	-	
	b. Ranking out of 32				15.32	12.38	-	-	0.3%
	c. Generated Sales (\$10 <sup>6</sup> )		6.28						
Mendocino	a. Multiplier		2.88 (7)		2.69 (12)	3.38 (1)	3.21 (2)	-	
	b. Ranking Out of 24		5.4		-	10.1	-	-	0.6%
	c. Generated Sales (\$10 <sup>6</sup> )								
Tillamook	a. Multiplier	2.43 (3)	2.26 (13)	-	1.95 (21)	2.39 (6)	2.04 (19)	2.43 (4)	
	b. Ranking out of 27		3.48	-	4.71	2.63	40.25	1.48	0.6%
	c. Generated Sales (\$10 <sup>6</sup> )	0.67							
Clatsop	a. Multiplier	2.57 (12)	2.04 (20)	2.44 (14)	3.16 (1)	2.73 (8)	2.06 (19)	-	
	b. Ranking out of 26		16.51	2.72	19.51	18.86	123.04	-	2.7%
	c. Generated Sales (\$10 <sup>6</sup> )	3.17						-	
Puget Sound	a. Multiplier		1.21 (13)		1.21 (14)	1.90 (1)	-	-	
	b. Ranking out of 21						-	-	0.3%

--: Information not available  
Source: OSU, Vol. B, 1978

4. What are the probable economic effects of allowing a 1-2 week extension of the central and/or northern California early all-species salmon troll seasons (June 1-15)?

Sufficient data are currently unavailable to answer this question thoroughly. However, the following information is presented to give the decision-maker a general idea of the importance of this period of time (June 1-15) for California trollers.

The north coast of California (major ports of Crescent City, Eureka and Fort Bragg) has been the focus of 90-95% of the California season's coho harvest (in numbers of fish) and 52-67% of the chinook harvest over the period 1977-1980.

Landings data are available in Table 16 for the 1971-75 period average and 1978, when the entire month of June was open to coho and chinook fishing, as well as for 1979, when the first two weeks of June were open.

Table 16. Salmon landings (numbers of fish) in California in June, as a percentage of total California season landings, by species.

	June Season Dates	June Coho Catch % of Season Coho Catch	June Chinook Catch % of Season Chinook Catch
1971-75 Average	June 1-30	37.6%	27.4%
1978	June 1-30	66.8	32.1
1979	June 1-15	31.0	13.8
1980	Closed	-	-

Source: 1981 Salmon Plan Amendment, page 4-II.

It is not clear whether troll fishermen could increase their catch later in the season to compensate for the loss of fishing time in June. Poundage, value and distributional data are unavailable. However, the above information indicates that a reopening of the early June all-species salmon season in California could substantially boost troll catch and revenues, particularly in the north coast area. This could be particularly important to California trollers who suffered severe economic losses following the 1980 salmon season. However, since early June weather frequently prevents small, local dayboats from fishing, much of the benefit of an early June season would accrue to the larger vessels, many of which are based in Washington and Oregon, and fish albacore as well as salmon.

During the fall of 1980, the California counties of Humboldt, Del Norte, Sonoma, Mendocino, Marin, Alameda, San Francisco, San Mateo, Santa Cruz and Monterey, as well as the Oregon counties of Clatsop, Coos, Curry, Douglas, Lane, Lincoln and Tillamook were declared to be economically dislocated by the federal Small Business Administration (SBA). The SBA made available low-interest loans to fishermen (and participants in related industries) who suffered substantial economic injury during the 1980 season and who could not

obtain loans from other sources. The SBA loans could not be used to pay off other loans (e.g., boat payments) and were designed only to permit the fishermen to survive until next season.

As of about March 11, 1981, approximately 1,046 interviews for loans had been conducted and 177 applications had been returned, 122 of which had been processed. Seventy of these applications had been approved for a total of \$977,100. (The value of the claims of the 177 applications received totalled \$5,388,700.) Forty-eight applications were declined and four were withdrawn. With 55 remaining applications still to be processed, 1981 budget cuts required that the loan program be discontinued.

This information indicates that many California and Oregon trollers suffered substantial economic losses in 1980, so that the economic opportunities afforded by the proposed season extensions could be highly significant.

It should also be noted that openings in California in early June could cause substantial shifts of effort from more northerly areas which might be closed during that period, thus causing the benefits of the early June season to be distributed among more participants.

5. What are the probable economic effects of shifting the Oregon experimental chinook troll fishery one or two weeks earlier than in 1980?

In 1980, the Oregon experimental chinook-only troll fishery was open from June 16-30 between Cape Falcon and Cape Blanco. This season was designed to serve two purposes: first, to test the selectivity of certain types of troll gear toward catching chinook when coho are also present; and, second, to allow troll fishermen to harvest relatively healthy Oregon coastal chinook stocks. Lack of adequate monitoring limited the usefulness of the special season for its primary purpose (i.e., experimentation), while troll fishermen have stated that the season was unsuccessful financially because of the time period and area that were chosen. Troll fishermen recommend that the area be extended (Question 9) and the season be shifted one or two weeks earlier.

The ex-vessel value of the Oregon experimental chinook fishery in 1980 was approximately \$641,200. This is 12% of the ex-vessel value of chinook landings all-season, and 7.8% of total chinook and coho ex-vessel value.

No weekly historical landings data by port are available to give an idea of the likely difference in ex-vessel values between an early June season and a late June troll season. The fish may "bite" better earlier in June, but average size of fish may also be expected to be slightly smaller. Although salmon prices generally rise gradually throughout the commercial fishing season, chinook prices in June often fluctuate somewhat, so that average early June prices are not necessarily lower than later June prices in any given year.

In 1980, Oregon's experimental chinook season was the only open area on the coast in late June. Two-week closed periods before and after the experimental season allowed Washington and California vessels time to leave and return to their own states' troll fisheries. Fifteen percent of the vessels participating in the experimental fishery were from Washington and 12% were from California. They caught 19% and 15% of the catch, respectively. There



is concern that if weather conditions are better in 1981, even more significant shifts of effort may occur. Moving the experimental fishery to the first two weeks of June so that it immediately succeeds the regular May open-access chinook-only troll fishery would eliminate the extra time for out-of-state vessels to travel to the Oregon open area, thus potentially reducing shifts of effort. At the same time, however, the move to early June may make it more difficult to enforce the special season as an experimental, closely monitored season. Logbook and observer programs would have to be initiated in mid-season, and trip-boat landings might overlap the starting date of the experimental season (i.e., a trip-boat's refrigerated hold might contain fish from both the open-access season and the more closely monitored experimental season). It may, however, be possible to overcome these problems. The Salmon Plan Development Team has stated that the shift of the experimental season to early June (see Troll Option V) may be a viable option.

Shifting the season to June 7-21 would coordinate this opening with the International Pacific Halibut Commission's (IPHC) two week halibut season for the area south of the Washington/Canada border. In the past, the IPHC has not allocated a separate halibut quota for this southern region; most halibut were caught off Canada and Alaska. Many salmon trollers do not have the ability to switch to halibut longline gear for the special halibut opening, but could take advantage of the opening by taking halibut incidentally to a chinook fishery.

6. What are the probable economic effects of shifting the Oregon and/or Washington all-species troll fisheries so that they open and close 1 or 2 weeks earlier than in 1980 (i.e., July 1 or July 6 instead of July 15?)

Historically, there has tended to be a 5-20% rise in salmon prices during each season, and there is also an intraseasonal increase in the average size of both coho and chinook. Thus, theoretically and simplistically, for a given total troll catch, it may be preferable to catch the fish late rather than early in the season. However, a number of other considerations may also be relevant.

First, it appears that small salmon enter different markets than do larger salmon (see Appendix A of this draft RIR). Demand for small salmon for supermarkets and other retail outlets appears to be growing.

Second, although the Council has made the policy decision to allocate salmon catches according to historic harvest ratios, in practice, this allocation is difficult to achieve. Each year, either the recreational or the commercial fishermen take a share of the resource that is greater than their historical share. Thus, although this analysis has had to assume, due to lack of prior biological analysis, that all six management options are equally capable of meeting escapement and allocation goals, this may not, in fact, be a valid assumption. The Salmon Plan Development Team has indicated that, as packages, Options IV and V probably cannot meet the goals, although some elements of those packages appear to be workable management alternatives. (See Section VI).

At the time the Council originally began considering an early opening of the all Washington and Oregon all-species troll season, no coho quota system was attached to the proposal. In-season management was the only control on total harvest. At that time, the proposal that the Oregon and Washington all-

species troll seasons be shifted one or two weeks earlier than in 1980 was aimed primarily at the allocation question. Troll fishermen were concerned that they be able to catch their "share" of the fish. By opening the all-species season earlier, they would be reducing the recreational fishery's "head-start" on the troll fishery. In addition, chinook, and especially coho salmon, tend to bite better earlier in the season, so that the catch-per-unit-effort is higher at this time. With the adoption of a coho quota system for 1981, the allocation problem between troll and recreational fisheries is basically resolved and the issue is reduced to the effect of the season change on catch-per-unit-effort. This analysis will consider the case of the early opening coupled only with in-season management. The addition of a coho quota will be discussed in Question 7.

To compare the differential economic impacts of the three proposed seasons (July 1-August 26, July 6 to August 31, and July 15-September 8), Table 17 sets out the 1978 and 1979 weekly Oregon catches (pounds and value) for the starting and ending weeks of the period in question. (In 1980, the actual troll season was open from July 15 to August 25 north of Leadbetter Point and July 15 to September 1 southward. Thus, early July and late August/early September data are not available.)

Table 17. 1978 and 1979 Oregon chinook and coho catches (pounds, price/lb. and ex-vessel value) by statistical week,<sup>a/</sup> early July, late August and early September.

	June 26- July 2	July 3-9	July 10-16	August 21-27	August 28- September 3	September 4-10
<u>1978</u>						
<u>Chinook</u>						
Lbs.	134,309	79,061	194,719	64,161	99,266	63,553
Price/lb.	\$1.80	\$1.82	\$1.80	\$1.93	\$1.95	\$1.86
Value	\$242,149	\$144,150	\$351,230	\$123,860	\$194,009	\$118,207
<u>Coho</u>						
Lbs.	555,851	290,968	219,484	93,410	71,478	21,880
Price/lb.	\$1.31	\$1.35	\$1.40	\$1.54	\$1.55	\$1.58
Value	\$725,645	\$391,777	\$306,731	\$143,918	\$110,540	\$34,481
<u>1979</u>						
<u>Chinook</u>						
Lbs.	- <sup>b/</sup>	324,072	143,899	259,580	167,307	- <sup>c/</sup>
Price/lb.	-	\$2.56	\$2.57	\$2.50	\$2.55	-
Value	-	\$829,234	\$370,459	\$648,968	\$427,417	-
<u>Coho</u>						
Lbs.	-	1,233,948	837,326	273,367	130,789	-
Price/lb.	-	\$2.24	\$2.24	\$2.27	\$2.43	-
Value	-	\$2,762,084	\$1,873,308	\$620,540	\$317,221	-

a/ Statistical weeks in 1979 began and ended one day earlier than the 1978 dates listed.

b/ The 1979 season began on July 1.

c/ The 1979 season ended on September 3.

Source: ODFW, preliminary unpublished data.

It should be noted that 1978 was a fairly average year for coho catch (in comparison with recent years), but it was a poor year for chinook, both in quantity and price. On the other hand, 1979 was the best year in recent years for both chinook and coho commercial catch and prices. It would be unrealistic to expect 1981 troll catches to be as good as 1979, given the status of the stocks. Catch levels on the scale of 1978 catches, with prices similar to 1980 are probably a fairly good estimate of what the 1981 season may be like. (This may, however, be an underestimate of chinook catches.) Table 18 presents an estimate of troll catches and ex-vessel values based on such an assumption of 1981 conditions.

Differences between the dates of statistical weeks and fishing weeks in 1978 and 1981 contribute additional error and make this very much a "guesstimate." However, keeping in mind all of the assumptions and potential sources of error in this analysis, we can add the coho and chinook ex-vessel values for the beginnings and endings of the alternative season proposals to get some idea of the trade-offs involved. Table 19 presents these estimates.

Table 18. Hypothetical 1981 Oregon chinook and coho catches (pounds, price/lb. and ex-vessel value) by week, early July, late August and early September.

	July 1-7	July 8-14	August 19-25	August 26- September 1	September 2-8
<u>Chinook</u>					
Lbs.	79,000	195,000	64,000	99,000	64,000
Price/lb.	\$2.25	\$2.25	\$2.65	\$2.75	\$2.80
Value	\$178,000	\$439,000	\$170,000	\$272,000	\$179,000
<u>Coho</u>					
Lbs.	291,000	219,000	93,000	71,000	22,000
Price/lb.	\$1.35	\$1.40	\$1.55	\$1.55	\$1.60
Value	\$393,000	\$307,000	\$144,000	\$110,000	\$35,000

Source; Adapted from ODFW, preliminary unpublished data.

Table 19. Potential 1981 ex-vessel values of salmon catch for alternative 8-week all-species troll seasons.

Season	Ex-Vessel Value
July 1 - August 25	\$1,631,000 + $\chi^a$ /
July 8(6?) - August 31	\$1,442,000 + $\chi^a$ /
July 15 - September 8	\$910,000 + $\chi^a$ /

a/ X = ex-vessel value of salmon catch for the period July 15-Aug. 19, 1981, i.e., a constant.

Source: Based on Table 18.

Table 19 indicates that in Oregon, the earlier the fishing season during this period, the greater the ex-vessel value of the catch, primarily because of higher coho catch rates early in July.

These gains could be particularly important for Oregon trollers who experienced a poor salmon season in 1980. As discussed under Question 4, Oregon coastal counties were declared economically dislocated as a result of salmon fishery restrictions. Data provided by the Southern Oregon Production Credit Association, which currently finances approximately 220 salmon trollers in the Brookings to Reedsport area, indicate the following:

- The number of delinquent troll borrowers has risen from 33 to 69 between September 1978 and February 1981.
- The number of separate delinquent troll loans has risen from 45 to 110 during the same period.
- Delinquencies (interest and principal combined) have risen from \$205,000 to \$972,000 during the same period.

These data are further indications of the financial difficulties currently plaguing the Oregon salmon troll fisheries, reinforcing the desirability of establishing regulations which will benefit these fisheries in 1981.

Weekly historical catch and value data are not currently available for the Washington troll fishery, so that the above analysis cannot be performed for shifts of the Washington troll season.

Obviously, this analysis for Oregon is based on numerous assumptions which may or may not be valid. The data, analysis and conclusions should be interpreted with care. Furthermore, although the analysis seems to indicate that an earlier all-species troll season may be preferable to a later one, such a shift might not be biologically acceptable if it directed fishing pressure onto more depressed stocks or stocks requiring Indian allocation.

The above analysis assumes that no separate coho quotas are imposed on the troll and ocean recreational fisheries, i.e., there would be only in-season management with a total allowable harvest for the two fisheries combined. For a discussion of the implications of the coho quota system adopted by the Council for 1981, see Question 7.

7. What are the probable economic effects of instituting an automatic closure/quota system for coho off Washington, Oregon and California, as adopted for 1981?

The coho quota system adopted by the Council for 1981 includes two area quotas, one north and one south of Cape Falcon in northern Oregon. Each area quota is divided into separate quotas for the ocean troll and recreational fisheries in that area, based on specified catch ratios; 60% troll/40% recreational in Washington and Oregon north of Cape Falcon, and 71% troll/29% recreational in California and Oregon south of Cape Falcon. A given fishery (troll or recreational) in a given area would close when its quota for that area was met. Although California is included in the southern quota for catch accounting purposes, only Oregon fishing would close if a southern quota were reached.

There are several socio-economic benefits to such a coho quota system. First, it prevents the harvest ratios between ocean fishery participants from becoming severely out of balance, as has occurred in previous years. Second, when coupled with an early opening of the all-species troll season (as adopted by the Council south of Cape Falcon), the quota provides troll fishermen more flexibility as to when and where they harvest "their" fish, than is afforded by a time-area closure system alone. This flexibility may allow for increased bargaining power for fishermen in price negotiations with processors/buyers. If fishermen decide to take the fish earlier in the season, they may benefit from the higher early catch-per-unit-effort, with consequent lower operating costs and higher profit margins. However, most of the benefits of an early troll opening described under Question 6 were due to increased catches. With the quota system in place, troll catches are fixed (unless in-season management allows catch increases near the end of the season). Thus, the benefits described under Question 6 do not apply in the coho quota situation (except possibly with regard to chinook harvests since chinook-only fishing will be allowed between Cape Falcon and Cape Sebastian after any troll coho closure). In fact, benefits of lower operating costs and increased fishing flexibility may be offset by lower prices per pound and lower pounds per fish if a quota is taken very early in the season.

The coho quota system also has other disadvantages for the troll and ocean sport fisheries. The inclusion of California in the catch accounting for the southern coho quota may require unexpectedly early closures off Oregon if the California coho catch is high. Furthermore, the southern quota would have to be reduced by the number of expected coho hooking mortalities associated with any late chinook-only fishing, thus requiring an even earlier coho closure.

These unscheduled early closures would probably cause social and economic turmoil in both the troll and recreational fisheries. For both fisheries, financial and other planning may be frustrated by the unscheduled closures. In addition, if the Washington and Oregon all-species troll fisheries close prior to mid-August, opportunity to catch pink salmon available in 1981 will be lost. Although pink salmon are a fairly insignificant part of the Oregon troll catch, the pink catch has contributed up to \$1.8 million to the ex-vessel value of the Washington troll fishery. Table 20 illustrates the relative importance of chinook, coho and pink salmon to the troll fisheries of Washington and Oregon.

Table 20. Ex-vessel value (millions of dollars) and percentage of total season ex-vessel value, by species, Oregon and Washington.

State	Year <sup>a/</sup>	Chinook		Coho		Pink		Total Value
		Value	%	Value	%	Value	%	
Oregon	1977	6.6	39.0	10.4	60.5	0.1	0.5	17.1
	1979	7.9	67.5	3.5	30	0.3	2.5	11.7
Washington	1977	4.1	30	7.6	56	1.8	13	13.5
	1979	6.1	52	4.8	40	0.9	8	11.8

<sup>a/</sup> Pink salmon only occur in the fisheries in odd numbered years.

Sources: WDF and ODFW, preliminary unpublished data.

Troll effort shifts may also result from the combination of separate quotas and differential opening dates. For instance, it is possible that the coho harvest guideline south of Cape Falcon will be met before the coho harvest guideline north of Cape Falcon is met. If this occurs, many Oregon trollers may move into the Columbia River area from Cape Falcon to the Oregon/Washington border and into waters off Washington to take advantage of the all-species fishing there, rather than fish for chinook only between Cape Falcon and Cape Sebastian. This could cause the northern quota to be reached more quickly.

Many other vessels may move down into California to compete for any remaining chinook quota there. Such effort shifts divide the salmon resource in a given area among more fishermen, with less average revenue for each than would have been earned by local fishermen fishing the resource alone.

Although the coho quota system will ensure that the recreational fisheries are allowed to harvest their coho allocation, the system does not guarantee them a full season. As noted under Question 2, time is a critical element for the recreational fisheries. Question 2 discusses the socio-economic implications of premature closures of the ocean recreational seasons.

8. What are the probable economic effects of shortening the Washington-Oregon all-species troll season north of Cape Falcon by 3 weeks compared to 1980 (i.e. August 19 closure instead of September 8)?

The area under consideration in this question includes all of the Washington coast plus the port of Astoria in Oregon.

To get an idea of the economic impact of the early closure on troll fishermen in Washington, we can examine monthly catch data (weekly data are not available).

The 12 days of August under consideration (August 20-31) constitute 39% of the month of August. The 8 days of September under consideration (September 1-8) constitute 27% of the month. Catch rates vary, but Figure II-2 in the Amendment appears to indicate that these percentages may represent reasonable estimates of the percentages of Washington's troll catch historically taken in the last 12 days of August and the first 8 days of September.

With this assumption, we can estimate that during the 1971-75 period, and more recently, in 1978, 1979 and 1980, 7-12% of Washington's season total troll chinook catch (in numbers of fish) was landed during the August 19-September 8 period, and 13-17% of Washington's season total coho troll catch was landed during that period.

Time constraints preclude a more complete analysis of the type attempted for Question 3. However, with the assumption made in the Question 3 analysis regarding the ratio of ex-vessel value of chinooks to cohos (i.e., one chinook is worth 2-4 times as much as a coho), Table 21 gives a general idea of that part of the entire season's troll ex-vessel value attributable to the August 20-September 8 period.

Note that these estimates do not include the contributions of Astoria coho and chinook landings, nor do they take account of the higher prices per pound and pounds per fish observed late in the season compared to the season averages.

Table 21. Ex-vessel value of the Washington coho and chinook catch during August 20-September 8 as a percentage of total season ex-vessel value.<sup>c/</sup>

Year	Percentage
1971-75 Average	10.3% - 11.3%
1978	11.0% - 11.8%
1979 <sup>a/</sup>	14.6% - 15.4%
1980 <sup>b/</sup>	11.4% - 12.7%

a/ Season closed September 3.

b/ Season closed September 8 south of Leadbetter Point and August 25 north of Leadbetter Point.

c/ Without adjusting for higher than average prices in the late part of the season.

Source: Calculated from 1981 Salmon Plan Amendment, page 27-II.

9. What are the probable economic effects of changing the management boundary for the experimental Oregon chinook-only troll fishery from Cape Blanco to Cape Ferrelo, Cape Sebastian or the Oregon/California border?

Changing the management boundary to Cape Ferrelo or Cape Sebastian would cause the areas of Port Orford and Gold Beach to be included in the 1981 experimental chinook-only troll fishery. These two ports participated in 1980 only as ports of landing for fish caught further north. In 1978, when the month of June was open for trolling off Oregon, Port Orford and Gold Beach contributed about 4% of the weekly total Oregon chinook catch (by ex-vessel value) for the first week of June, 31% for the second week, 16% for the third week, and 8% for the fourth week of June. The Cape Ferrelo or Cape Sebastian lines would also make the experimental chinook fishery much more accessible for the larger fleets operating out of Brookings and Crescent City. Using the California/Oregon border as the management boundary would include Brookings in the fishing area. Brookings is approximately 20 miles south of Cape Sebastian, and about 5 miles south of Cape Ferrelo. Brookings' chinook catch in 1978 constituted 11% of the Oregon catch in the first week of June, 5% in the second week, 8% in the third week and 5% in the fourth week.

More extensive information to assess the economic impacts of this management boundary change is not currently available.

The major biological objection to moving the boundary line southward is that it would allow fishing on depressed Klamath River chinook stocks present off southern Oregon during this period.

10. What are the probable economic effects of changing the management boundary for the special late-season Oregon recreational chinook-only fishery from Cape Falcon to Cape Blanco?

This management boundary change would shift the northern limit of the special chinook-only recreational fishery southward by approximately 215 miles. Reducing the area for this fishery was proposed by Oregon charterboat operators. They have pointed out that, north of Cape Blanco in September and October, coho are reaching maturity and are still present in the ocean fishing grounds. Oregon charter operators feel that sport fishing gear is not sufficiently selective so that numerous coho are caught incidentally and die despite the fact that they are returned to the water. This situation is damaging to the coho resource and misleading to anglers expecting a good chinook catch. However, south of Cape Blanco, chinook appear to be more available and incidental catches of coho are lower. Therefore, in this southern area, the special chinook-only season allows a viable fishery to continue.

Thus, if the opinions of Oregon charterboat operators are representative of ocean recreational fishermen in general, shifting the boundary line for this special fishery from Cape Falcon to Cape Blanco will inflict few losses on sport fishermen and charter operators in the northern area. Instead, it will benefit the coho resource and constitute a more realistic season for anglers.

11. What are the probable economic effects of allowing a special coho-only troll fishery between Cape Falcon and Leadbetter Point out to 12 miles, from September 20 to October 3, with coho gear only and a maximum of ten participating vessels, all with observers aboard?

Because of the time of year and number of vessels in such a coho only fishery, it is expected that the fishery would make no significant contribution to the total gross revenues of the salmon troll fleet in 1981. Coho abundance in that area at that time is expected to be low. It is likely that weather may preclude fishing a high percentage of the 140 boat days available (10 boats X 14 days). In fact, it may not even be profitable for the 10 participating vessels to operate during the special season. Participation will, however, be on a voluntary basis and enough fishermen may want to take the chance that the fishery will turn out to be profitable.

Although short-term benefits to the coho-only troll fishery will be minimal, the special opening may contribute long-term benefits by providing an opportunity to investigate the selectivity of fishing gear and fishing techniques with regard to coho salmon.

12. What are the probable economic effects of raising the recreational coho size limit from 16" to 20" off Washington, while retaining the 16" size limit off Oregon?

This size limit change was originally proposed by Washington charterboat representatives upon recognition that the 1981 coho quota north of Cape Falcon would be extremely low. The socio-economic impact of this change is unclear. It may slow the attainment of the northern coho quota by discouraging sports fishermen from targeting on coho early in the season when fish are small, possibly preventing premature closure of the recreational



season. In addition, charterboat operators claim that jack salmon in sport catches sometimes are mistakenly counted as adult coho and would thus be improperly counted against the Washington recreational quota. (The quotas are designed to exclude jack catches.) For this reason also, the 20" size limit may help slow the attainment of the coho quota and prevent premature closures. As discussed in Question 2, it is critical to the economic viability of the charterboat fleets and to the economic value of the ocean recreational salmon fisheries that the season remain open through Labor Day weekend.

It is also possible that anglers may derive greater benefit from the fishing experience if the fish they take home are larger.

A disadvantage is the difficulty of enforcing differential coho size limits in the Columbia rivermouth area where Oregon and Washington boats intermingle.

In addition, the 20" size limit will not allow harvestable jack salmon to be caught in the ocean fisheries. Many of these jacks will not be harvested by "inside" fisheries and will die in the rivers. (Jack salmon do not contribute to the salmon stocks as spawners.) Thus, these salmon will actually be wasted. There will also be increased hooking mortalities associated with the 20" size limit (i.e., small fish that are released but die) and these coho will also be wasted in terms of harvest and escapement.

13. What are the probable economic effects of reducing the chinook minimum size limit from 28" to 24" for treaty fishermen fishing in the Makah fishing area?

In March 1981, a U.S. District court enjoined the state of Washington from imposing a 28" minimum size troll chinook catch limit upon members of the Makah tribe fishing in coastal waters on the basis that it was not necessary for conservation, was discriminatory and deprived the tribe of the power to determine what is the wisest use of its share of the salmon resource. The Council's adopted salmon regulations for 1981 are consistent with this court ruling.

The effect of this size limit change on the salmon resource is unclear. In terms of short-term economic impacts, the change will benefit Makah fishermen in that they may keep and sell fish that they would otherwise have had to release. The number of chinook between the sizes of 24" and 28" expected to be caught by Makah fishermen is currently unknown.

In many cases, small chinook are thought to compete with coho by entering the same markets.

14. What are the probable economic effects of instituting an automatic closure/quota system for chinook off the north and south coasts of California, as adopted for 1981?

The chinook quota system adopted by the Council for 1981 includes two California area quotas, one north and one south of Point Arena. The northern area includes the major salmon ports of Crescent City, Eureka and Fort Bragg; the southern area includes the major salmon ports of San Francisco and Monterey. Other smaller ports include Trinidad in the north and Bodega Bay and Morro Bay in the south, and numerous other small coastal communities.

Each area quota is divided into separate quotas for the ocean troll and recreational fisheries in that area, based on historical catch levels. Provision is made for reallocation of part of one fishery's quota to the other fishery in a given area, if it becomes evident that the fishery will not be able to harvest its share. A given fishery (troll or recreational) in a given area would close when its quota for that area was met.

The chinook quota system has long- and short-term benefits and costs. For the long term, it is intended that the quotas provide for larger future salmon harvests by achieving California chinook spawning escapement goals for 1981. In the short term, the quota system provides benefits in two major areas: fishing flexibility and assurance that allocation ratios will be maintained. As in the case of the coho quota system (see Question 7), the chinook quota system may provide more flexibility in achieving harvest guidelines than would be allowed under time/area closures alone. With a quota in combination with longer seasons than could otherwise be allowed, troll and recreational fishermen have more flexibility in choosing where and when to fish, according to price levels, fish availability, weather patterns, and other variables. On the other hand, it has been suggested that the chinook quota system will create a rush by each fisherman to catch as many fish as possible before the quota is reached, resulting in carelessness in vessel handling, fish handling (with subsequent reduced quality), and release of undersized fish.

There are other socio-economic problems associated with implementation of the chinook quota system. For instance, if the "highliners" of the fleet catch the California troll chinook quotas quickly, fishermen who operate smaller vessels and fish salmon all season (rather than shifting to albacore late in the season as many of the "highliners" do) could be deprived of their late season fishing due to premature closures.

Effort shifts may also become a problem. If the troll quota in one area is met, many fishermen may move to the other area, causing its quota to be reached more quickly. There may also be effort shifts by Oregon and Washington boats moving into the California quota areas. Common season opening dates in California and Oregon south of Cape Falcon should help minimize such shifts.

Finally, chinook quota implementation may encounter problems of data collection and enforcement. It may be difficult to collect landings data on a sufficiently timely basis to monitor harvests and know when a quota has been met. Furthermore, the quota system creates the incentive to misreport landings and to transfer catches out of the quota areas (e.g., chinook caught in the northern California quota area may be landed in southern Oregon to prevent these catches from being counted against the quota).

## VI. ESTIMATED SOCIAL AND ECONOMIC IMPACTS OF PROPOSED OPTION PACKAGES

Section V focused on the impacts of 1981 choices on specific issues; one variable was analyzed at a time. The options considered for 1981 were not, however, limited to changing a single variable at a time. Instead, Options I-VI and the Council's adopted regulations are option packages, combining changes in several different variables in different ways. Analysis in Section VI focuses on the interaction of the variables discussed in Section V, when they are combined into the six option packages and the Council's adopted package presented in the Amendment.

### Council's Adopted Regulations

In March, 1981, the Council adopted the troll and recreational seasons depicted in Figures 3 and 6 and summarized in Appendix C of this RIR. These regulations differ from the management regime adopted in 1980 in the following major ways:

- (1) An almost 5-week extension of the California recreational fishing season in the fall. (See Question 2.)
- (2) A 5-day later opening and a 6-day later closure of the Oregon recreational adopted season (1981 closure date is 18 days later than 1980 actual emergency closure). (See Question 2.)
- (3) The late Oregon chinook-only recreational season south of Cape Falcon opens 6 days later than in 1980 to follow the all-species closure [see (2) above]. The boundary line for this special Oregon chinook fishery is shifted from Cape Falcon (1980) to Cape Blanco (1981). (See Question 10.)
- (4) A 2+1 fish bag limit all season in Oregon, instead of 1980's 3-fish bag limit reduced by inseason management to 2 fish. (See Question 1.)
- (5) A 2-week later opening and a 1-week earlier closure of the recreational season north of Cape Falcon compared to 1980 adopted regulations (1981 closure is one week later than 1980 actual emergency closure). (See Question 2.)
- (6) A 2-fish bag limit between Cape Falcon and the Queets River and a "2+1" fish bag limit north of the Queets River, instead of 1980's 3-fish bag limit in both areas, reduced by in-season management to 2 fish. (See Question 1.)
- (7) A 20" minimum size limit for coho for the recreational fisheries off Washington (compared to 16" for Washington and Oregon in 1980). (See Question 12.)
- (8) A two-week earlier opening of the California all-species troll fishery north of Cape Vizcaino. (See Question 4.)
- (9) Elimination of the Oregon experimental chinook-only fishery in June. (See Question 5.)

- (10) A two-week earlier opening of the Oregon all-species troll season south of Cape Falcon, followed by an all-species-except-coho season between Cape Falcon and Cape Sebastian after any coho quota closure [see (14) below], until September 9. (See Question 7.)
- (11) A one-week earlier closure of the Washington and Oregon all-species troll season north of Cape Falcon (1981 closure is 6 days later than 1980 actual emergency closure). (See Questions 7 and 8.)
- (12) A 24" minimum chinook size limit for Indians fishing in the Makah area (compared to 28" for all troll fisheries in 1980). (See Question 13.)
- (13) A 24" minimum chinook size limit for Indians fishing in the Makah area (compared to 28" for all troll fisheries in 1980). (See Question 13.)
- (14) Separate troll and recreational coho quotas for the areas north and south of Cape Falcon, with an automatic closure when the quota for a given fishery in a given area is met. Fishing for all salmon except coho will be allowed between Cape Falcon and Cape Sebastian after the southern troll coho quota is reached. (See Question 7.)
- (15) Separate California troll and recreational chinook quotas for the areas north and south of Point Arena, with an automatic closure when the quota for a given fishery in a given area is met. (There is provision for reallocation between fisheries in a given area if it appears that one fishery will not be able to harvest its share.) (See Question 14.)

Regulations adopted by the Council in 1981 are likely to result in substantially higher gross revenues to the troll fleet as a whole in Oregon and California south of Cape Falcon compared to 1980. Total gross revenues in the troll fisheries of Washington and the Columbia River area are expected to be significantly reduced compared to 1980 which was already a poor year for these fisheries. Recreational charter vessel revenues and total economic benefits to anglers are likely to be significantly reduced compared to 1980 in Washington and the Columbia River mouth area, and reduced to a lesser degree in Oregon south of Cape Falcon.

It is generally anticipated that coastwide salmon prices will recover somewhat from low 1980 levels. These increased prices, in conjunction with the increased troll catch levels expected as a result of the Council's 1981 regulations in Oregon south of Cape Falcon, could increase total gross troll revenues in the area by 25-30% over 1980. In California, increased coho catch levels, chinook catch levels similar to 1980, and increased prices are expected to result in generally increased total gross revenues to the troll fleet. Common season dates between Oregon and all of California should help minimize effort shifts and associated reductions in average gross revenues per local boat. In 1980, total troll catches off California were similar to the 1971-75 average but increased effort levels (and low chinook prices) resulted in relatively low average gross revenues per California boat. The two-week extension of the California all-species season in the north coast area allows the troll fleet more flexibility in meeting their harvest guideline than regulations in 1980. The extra time may reduce the need for vessels to fish in bad weather. However, if the "highliners" in the fleet catch the California chinook harvest guidelines quickly, the seasons may be cut short, negatively impacting the fishermen who operate smaller vessels and the coastal communities closely associated with these small boat fleets.

The elimination of the Oregon experimental chinook fishery in June is unlikely to reduce per boat revenues greatly.

The early opening and longer scheduled all-species season adopted for the Oregon troll fishery may provide Oregon trollers with increased bargaining power in price negotiations with salmon processors. However, this advantage may be offset by lower average poundage of coho caught earlier in the season.

The coho harvest guideline in Oregon south of Cape Falcon is expected to be reached fairly quickly, because of:

1. The early (July 1) all species troll season opening -- coho "bite" better early in the season and are more abundant.
2. Furthermore, a price dispute between fishermen and buyers in California kept coho catches down in 1980. Assuming price agreements can be reached in 1981, California coho catches are expected to be much higher than in 1980.

Although the season will remain open for all species except coho after the Oregon coho harvest guideline is reached, this season extension will be restricted to the Cape Falcon to Cape Sebastian area. All of the southern Oregon troll ports are included in this zone except Brookings. Brookings is approximately 20 miles south of Cape Sebastian, so that the open area would still be accessible to small vessels from this port.

Low coho harvest guidelines in Washington and Oregon north of Cape Falcon are likely to result in the shortest troll season ever experienced in Washington. Even with potentially increased salmon prices in 1981 compared to 1980, the total gross economic value of the Washington troll fisheries is expected to be significantly less than the low level experienced in 1980.

It is possible that the coho harvest guideline south of Cape Falcon will be met before the coho harvest guideline north of Cape Falcon is met. If this occurs, many Oregon trollers may move into the Columbia River area from Cape Falcon to the Oregon/Washington border and into waters off Washington to take advantage of the all-species fishing there, rather than fish for chinook only between Cape Falcon and Cape Sebastian. This could cause the northern quota to be reached more quickly.

Puget Sound "inside" net fishery total gross revenues are likely to be reduced over the high average revenues in these fisheries in 1980. Gross revenues in most coastal treaty-Indian fisheries north of the Quinault River are expected to be low. Columbia River treaty and non-treaty net fisheries are projected to experience continued low average gross revenues in 1981.

In the recreational fisheries, the two-fish bag limit all season in Oregon and Washington south of the Queets River is likely to result in a significant reduction in angler effort levels, the economic value of angler benefits, charterboat gross economic revenues and coastal community economic levels compared to 1980. This is especially true of the Westport and Columbia River areas. The "three fish, only two of which may be coho or chinook" (i.e., "2+1") bag limit north of the Queets River may lessen the economic impact of the coho/chinook bag limit for the northern Washington coastal communities of Neah Bay and La Push.

The Oregon and Washington recreational seasons have been reduced to the shortest ever. The 1981 recreational coho harvest guidelines will be 23% lower than the 1980 coho catch south of Cape Falcon and 37% less than the 1980 coho catch north of Cape Falcon. With such low coho harvest guidelines, it is possible that the recreational fisheries may have to close even before the end of their abbreviated seasons, further reducing the economic value of these fisheries.

The net socio-economic impact of increasing the Washington recreational coho size limit from 16" to 20" is unclear. It may slow the attainment of the recreational harvest guideline, possibly preventing an in-season closure.

The Council's adopted regulations restore the California sport fisheries to their traditional fishing season, with a 2-fish bag limit. It is unlikely that the chinook harvest guideline imposed on the California sport fisheries will require early closures, in light of recent trends in the reduction of charter fleet effort levels.

The impacts described above will be reflected in the economic condition of the communities--Indian and non-Indian, coastal and "inside"--that are heavily involved in the commercial, recreational and subsistence salmon fisheries.

High fuel prices and other factors outside the Council's control will continue to place economic pressure on all the Pacific coast salmon fisheries in 1981.

Analysis by the Salmon Team indicates that in general, as long as the California chinook quota system and other regulations can be implemented effectively, the Council's 1981 adopted regulations should meet the escapement and allocation goals of the plan.

#### Option I

For the recreational fisheries, the major differences between Option I and the 1980 management regime are:

- (1) a 2-1/2 week longer recreational season in California;
- (2) a 2-fish bag limit in Washington and Oregon, automatically changing to 3 fish with the opening of the all-species troll season;
- (3) a 2-3 week longer Washington and Oregon sport season compared to what actually occurred in 1980.

In Question 2 (Section V), it was pointed out that data are currently unavailable to assess the economic importance of adding 2 weeks to the end of the California recreational fishery. The extra time relative to the rest of the Pacific coast should not cause significant effort shift problems. In the recreational salmon fisheries, the only area in which major interstate effort shifts sometimes occur is in the Columbia River region.

Question 1 (Section V) discussed the impact of bag limit changes, pointing out that in the case of the Washington charterboat fisheries and potentially for Oregon, too, an automatic shift from a 2-fish bag limit to a 3-fish bag limit on a predetermined day could have a significant negative impact. This would be due to a shift of effort by "dedicated sport fishermen" from the early part of the season to mid-season (see Question 1 for a more complete discussion). The 2-fish/3-fish arrangement would probably have a greater negative impact on

the recreational fisheries than either a 2-fish bag limit all season or a 3-fish bag limit reduced in mid-season to 2 fish. All three arrangements are attempting to address the same biological and allocation problems, but the 2-fish/3-fish arrangement is likely to have the greatest negative economic impact.

The analysis in Question 2 pointed out that in Washington and Oregon, a significant percentage of the season's angler effort has traditionally occurred in September (9.3%-17.5%, see Table 5). Option I proposes to open the first two weeks in September to recreational fishing, thus potentially increasing the value of the recreational fisheries and the gross revenues of charterboat operators significantly.

The troll fishery management regime proposed in Option I is similar to 1980 in that it includes a May chinook season coastwide (see Question 3) and retains the Oregon experimental chinook fishery in the last 2 weeks of June with the original Cape Blanco boundary line (see Questions 5 and 9). However, Option I does propose the following major changes:

- (1) Extension of the early all-species troll fishery by 2 weeks in central California only.
- (2) A shift of the all-species troll season in Washington and Oregon north of Cape Blanco one week earlier than in 1980.

As the discussion under Question 4 points out, the extension of the central California early season could add significantly to troll revenues in this area, although an extension of the season on the north coast would probably have had a greater positive impact. The fact that only the south coast would be extended, making it the only open area on the coast during this 2-week period, could cause substantial effort shifts from northern areas. This would add fishing pressure on the area's salmon stocks, while potentially dissipating the economic benefits by distributing them coastwide. The local troll fleet of central California would probably benefit less from the opening in this way than if the opening also coincided with openings in other areas.

Question 6 discusses the potential impacts of shifting the Oregon and Washington troll seasons one week earlier. This discussion indicates that the troll fleets in these two states would benefit by the 1-week earlier season (although additional benefits could be received if a 2-week shift were made instead of the proposed 1-week shift).

In summary, Option I would be likely to have some significant positive economic impacts on the troll fleets, but a potentially negative economic impact on the Oregon and Washington recreational fleets because of the bag-limit arrangement included in this option.

From the viewpoint of spawning escapement and allocation, Option I would not allow for any significant in-river harvest of Klamath River chinook and would not provide adequate escapement for OPI coho. It would not meet Sacramento chinook goals and would fall slightly below the interim Columbia River fall run chinook goal. Option I (as well as all of the other Options except Option VI) would not meet the run-by-run escapement goals on Washington coastal coho.

## Option II

Combined Option II is essentially the same as the 1980 salmon management regime, with the exception that it proposes a 2-fish/3-fish bag limit arrangement and a slightly extended Oregon/Washington recreational season, as described under Option I. Thus, Option II avoids the negative impacts on fishermen that could occur if significant season cuts were made (see Questions 3 and 8), but also does not improve economically on the 1980 commercial and recreational management regime (see Questions 2, 4, 5, 6, 9 and 10). As pointed out under Question 2 and Option I, the slightly later closing of the Washington and Oregon recreational seasons compared to the actual 1980 seasons could have some positive benefits to those fisheries. On the other hand, the 2-fish bag limit automatically changing to 3-fish is likely to have an important negative impact on the recreational fisheries. Particularly in Washington, the negative impacts of the bag limit arrangement could be avoided through use of a 2-fish bag limit all season or a 3-fish bag limit, later reduced to 2 fish.

Option II would come closer to meeting 1981 escapement goals than Option I. It probably would meet the Sacramento River chinook goals. It would almost meet the Puget Sound coho terminal run size goal. It would not meet 1981 OPI escapement goals or Washington coastal coho goals but would meet Oregon coastal chinook goals.

## Option III

The major differences between combined Option III and the 1980 salmon management regime are:

- (1) Substantial cuts in the Oregon and Washington recreational seasons, both at the early and late ends of the seasons, while maintaining the 3-fish bag limit (at least until June 15).
- (2) Elimination of the first two weeks of the May chinook troll fishery except south of Cape Vizcaino and in the Cape Blanco to Cape Falcon area.

Because of its similarity to 1980, combined Option III avoids at least one potential set of negative impacts (see Question 8) but does not improve on the 1980 management regime in economic terms (see Questions 4, 5, 6, 9 and 10). Option III's differences from the 1980 regime could have significant negative economic impacts on recreational and commercial fishery participants.

If conditions in 1981 are similar to those in the 1971-75 period and in 1978, the early Washington and Oregon recreation season cuts proposed in Option III could reduce net economic benefits to anglers, and gross revenues to charterboat operators by 3-6%. The all-species recreation season closures in the two states would be 1-2 weeks later than the actual 1980 closures, but could fail to restore much of the substantial potential economic value of the full month of September (9-18% of the total season's angler effort: see Question 2).



The retention of the 3-fish bag limit (at least until June 15, at which time the bag limit might be reduced) would have a positive economic impact on the recreational fisheries. However, at least in Oregon, it is unlikely that the benefits of the 3-fish bag limit would outweigh the costs of the short season. (See Questions 1 and 2.)

The partial elimination of the coastwide May chinook troll season could have a major impact on troll revenues. This burden could particularly fall on Washington and Oregon troll fishermen who specialize in chinook fishing, and on northern California trollers. Most of the California season troll catch is composed of chinook, and 90-95% of California's season chinook harvest has traditionally taken place off the north coast. Many of the participants in the northern California May chinook fishery are large vessels, frequently from out of state. (See Question 3.)

In summary, Option III is likely to have some significant negative economic impacts coastwide, particularly on the northern California troll fishery and the Oregon recreational fishery.

Biological modeling by the Salmon Team indicates that Option III probably would meet Sacramento River chinook goals and Puget Sound coho goals. It would not meet OPI escapement goals and the run-by-run escapement goals on Washington coastal coho. However, Option III would meet Oregon coastal chinook goals and would provide increased in-river run sizes for Klamath and Columbia River chinook. Such increased in-river run sizes would benefit "inside" sport fishermen on both rivers, Indian and non-Indian fishermen on the Columbia River and Indian fishermen on the Klamath River.

#### Option IV

Combined Option IV is substantially more liberal than Options I-III, and the Salmon Plan Development Team has stated that Option IV, as proposed, probably could not meet escapement and Indian allocation goals. Instead of making trade-offs among different types and different magnitudes of short-term economic costs and benefits, Option IV trades the long-term benefits of conservation for short-term economic benefits. The Team is of the view that some of the individual elements of Option IV are workable; these include the "2+1"-fish bag limit all season in Oregon and Washington, the elimination of the Oregon experimental chinook troll fishery, and the extension (earlier opening and later closure) of the early chinook and all-species troll fisheries south of Cape Vizcaino. However, Option IV taken as a package could produce more fishing pressure than is biologically acceptable.

Option IV proposes the following changes from the adopted 1980 season:

- (1) An almost 5-week extension of the California recreational fishing season in the fall. (No information is currently available on the economic impact of this extension.)
- (2) A one-week earlier opening and a 2-week later closure of the Oregon and Washington recreational fisheries. (The closure would be 4-5 weeks later than the actual 1980 season.)

- (3) A "2+1" bag limit all season in Oregon and Washington, instead of 1980's 3-fish bag limit reduced by in-season management to 2 fish.
- (4) A shift of the boundary line for the special Oregon chinook recreational fishery from Cape Falcon to Cape Blanco.
- (5) A one-week earlier opening of the early (May) chinook troll fishery south of Cape Vizcaino.
- (6) A one-week extension of the early all-species troll fishery off both the north and south coasts of California, plus a July 1 rather than a July 15 opening of the all-species troll fishery north of Cape Vizcaino.
- (7) Elimination of the Oregon experimental chinook fishery in June.
- (8) A two-week earlier opening of the Oregon and Washington all-species troll seasons.

As the analysis of Question 2 points out, the May Oregon and Washington season extension proposed in Option IV probably would have a fairly small positive economic impact on the fisheries, although the September season extension could have more significant economic benefits, particularly in Oregon. These benefits must be weighed against the costs associated with the "2+1"-fish bag limit. As described under Question 1, these costs may be substantial, especially in Washington. Question 10 discusses the relative costs and benefits of the shift of recreational boundary line from Cape Falcon to Cape Blanco, reducing the area of the special recreational chinook fishery. In general, Oregon recreational fishermen and charterboat operators appear to consider this a beneficial change.

Information on the short-term economic benefits of an extension of the early all-species California troll fishery is discussed under Question 4. These benefits may be quite substantial and particularly important to California trollers who suffered major financial losses in 1980. The fact that both the north and south coasts of California are included in this proposed season extension could reduce the potential effort-shift problems associated with a proposed season extension for the south coast only (see discussion of Option I).

In the same way, effort shifts are likely to be minimized by the proposed extension to the north coast of the July 1 all-species California troll opening. Time and data constraints have precluded full analysis of the economic implications of this earlier north coast opening.

The ex-vessel value of Oregon chinook landings during the 1980 experimental chinook fishery was approximately \$641,200 or 12% of the ex-vessel value of Oregon chinook landings all season (7.8% of total chinook and coho ex-vessel value). With similar landings and market conditions in 1981, elimination of the experimental fishery could constitute a serious loss to participating trollers. However, in 1980, these gross revenues were divided among 921 vessels, each with substantial operating expenses, so that average net revenues per vessel were probably low.

Questions 7 and 8 discuss the short-term economic benefits and costs of a longer Oregon and Washington troll season with an earlier start than in 1980. If a 2-week earlier troll opening without a quota system were acceptable in terms of escapement and Indian allocation goals (the Salmon Team has indicated that this is unlikely), the economic benefits to commercial troll fishermen could be significant. The pros and cons of an early opening with an early in-season quota closure are briefly discussed in Question 7.

In summary, although Option IV proposes some important management measures to curtail the ocean fisheries which could negatively impact ocean participants in the short term, most of the proposed measures would have positive short-term economic benefits. However, the Salmon Team considers that Option IV, as a package, would not meet 1981 management goals except for Oregon coastal chinook. (Their analysis assumed Option IV would not be accompanied by a quota system.)

#### Option V

Like Option Package IV, Option Package V is more liberal than all of the other options proposed in the Amendment. The Salmon Plan Development Team has stated that the combination of management measures proposed in Option V, and particularly the longer all-species troll and recreational seasons, probably would preclude attainment of biological and Indian allocation objectives. However, the Salmon Team has stated that some of the individual elements of Option V appear workable; these include the time shift of the Oregon experimental troll chinook fishery, the 3-fish bag limit changing to "2+1" in Oregon and Washington, and the extended early all-species troll season south of Cape Vizcaino.

Combined Option V proposes the following major changes to the 1980 management regime:

- (1) An extension of approximately 2 weeks to the California recreational season. (As discussed in Question 2, no data are currently available to evaluate the economic impacts of this change.)
- (2) A "2+1" bag limit and a September 27 closure of the Oregon recreational fishery (2 weeks later than proposed in 1980, but 3 weeks later than the actual 1980 season).
- (3) A 3-fish bag limit for the Washington recreational fisheries, which could be reduced to "2+1" by in-season management, or automatically on June 15. This 3-fish/2-fish bag limit arrangement would be accompanied by a September 20 closing date (1 week later than the scheduled closing date in 1980, and 2-3 weeks later than the actual closing date).
- (4) A 2-week extension of the early all-species California troll season statewide, and a July 1 rather than July 15 opening of the troll fishery north of Cape Vizcaino.
- (5) A shift of the Oregon experimental chinook troll fishery from late June to early June, so that it adjoins the regular open-access May fishery.

- (6) A shift of the Oregon all-species troll season south of Cape Falcon so that it opens and closes 2 weeks earlier than in 1980.
- (7) A 3-week extension (earlier opening) of the all-species troll fisheries in Washington and Oregon north of Cape Falcon.
- (8) A change of the management boundaries for both the commercial and recreational special chinook seasons, as described in Questions 9 and 10.

The economic impacts of alternative bag limit and recreational season lengths are discussed under Questions 1 and 2. Both the bag limit arrangements and the later closures proposed in Option V would increase the short-term net economic benefits of the recreational fisheries in the two states, and each combination of bag limit and season length is consistent with the special conditions in the two states. However, the Salmon Plan Development Team has stated that the proposed seasons are longer than can be reasonably assured in a fishery where predictability and the ability to take bookings and make advance vacation plans are important. There is the further complication that Option V proposes a bigger bag limit in Washington than in Oregon in May and June, while Oregon would close one week later than Washington in September. Two different sets of recreational regulations in the Columbia River region could be difficult to enforce and could cause shifts of angler effort.

The economic impacts of the extension of the early California all-species troll fishery are discussed under Question 4. The short-term economic benefits of Option V's 2-week season extension could be quite significant, especially for north coast trollers. The coastwide nature of the season extension is likely to minimize effort shifts. In the same way, effort shifts are likely to be minimized by the proposed extension to the north coast of the July 1 all-species California troll opening. Time and data constraints have precluded full analysis of the economic implications of this earlier north coast opening.

The economic benefits of shifting the Oregon experimental troll chinook fishery to early June may be significant and are discussed in Question 5.

Analysis under Question 6 indicates that shifting the Oregon all-species troll season 2 weeks earlier could have important economic benefits for trollers, although a 2-week shift may or may not be workable in terms of meeting biological and Indian allocation goals.

The proposed early opening (extended season) for the troll fisheries north of Cape Falcon may be similarly impractical for biological and Indian allocation reasons. The economic benefits and costs of such a season are discussed under Questions 6 and 7.

In summary, Option V could have substantial short-term economic benefits for all ocean users, although biological and allocation analysis by the Salmon Team indicates that Option V would not meet 1981 management goals except for Oregon coastal chinook escapement goals (assuming no quota system were in place).

### Option VI

Option VI is the most restrictive option in the 1981 Amendment. It was proposed in case stock assessments, to be available in March for the Council's decision on the 1981 salmon management regime, indicated that regulations more restrictive than Options I-V were needed to protect the resource, and to meet Indian allocation goals.

The major differences between Combined Option VI and the 1980 adopted management regime are:

- (1) Substantial cuts in the Oregon and Washington recreational season, both at the early and late ends of the seasons (as in Option III).
- (2) A "2+1" fish bag limit all season for the Oregon and Washington recreational seasons.
- (3) Elimination of the May troll fisheries coastwide except in the Cape Blanco to Cape Falcon area.
- (4) Elimination of the Oregon experimental troll chinook fishery.
- (5) A reduction of the Washington/Oregon all-species troll season north of Cape Falcon by 3 weeks (August 19 closure instead of September 8).

The only ocean fishery on the coast that would not be significantly curtailed compared to 1980 would be the California recreational fishery. The negative economic impacts of this option are likely to be severe. These impacts are discussed in Questions 1, 2, 3, 4, 5, 8, and 9.

Analysis by the Salmon Team indicates that Option VI would exceed the OPI, Puget Sound and Washington coastal coho escapement goals, as well as the Oregon coastal, Sacramento River chinook goals. It would also provide increased in-river run sizes and allowable in-river harvests for Columbia River and Klamath River chinook stocks.

Clearly, all of the estimates of economic and social impacts discussed in this Regulatory Impact Review are based on limited data and should, therefore, be interpreted with care. However, the RIR is intended to facilitate a general understanding of the social and economic implications of the salmon management actions considered and adopted by the Pacific Fishery Management Council.

## VII. DATA REQUIREMENTS FOR IMPROVED REGULATORY ANALYSIS

This section is not intended to be a "wish list" of data elements that would probably make improved social and economic analysis possible, but are also unlikely to be available in the near future.

Instead, a short list of fundamental data elements which are currently unavailable but believed to be obtainable is presented here. Often data are collected by state or federal agencies but are not aggregated in ways useful for this analysis. In other cases, representatives of fishery participants may be able to provide an up-to-date understanding of social and economic conditions to include in the Regulatory Impact Review.

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The following are data elements which could provide the first step to a better Regulatory Impact Review:

- (1) Troll catch in numbers of fish, dressed weight and ex-vessel value, by species, week and port of landing for all three states.
- (2) Average size of fish by species, week and port of landing for all three states.
- (3) Troll catch by size of vessel and state of registration, by month, to help analyze the distributional impacts of management options.
- (4) Recreational salmon catch and effort by species, week and port of landing for all three states.
- (5) Recreational surveys on the importance of bag limits to anglers.
- (6) General predictions of world market conditions for salmon in 1981.
- (7) Information on the mobility of salmon trollers with regard to fishing location, salmon species fished, and other species fished. Also information on projected opportunities for fishing in other areas (e.g., Alaska) or other species (e.g., albacore).

Although numerous other data and sophisticated bio-economic models would be useful and are desirable in the long term, the data elements listed above could provide an important first step toward improved social and economic analysis.

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## APPENDIX A: GENERAL DESCRIPTION OF THE SALMON PROCESSING AND MARKETING SECTOR

A brief description of the structure and dynamics of the salmon marketing system is provided here. This description is based primarily on Oregon State University's Socio-Economics of the Idaho, Washington, Oregon and California Coho and Chinook Salmon Industry (1978) and an unpublished article by R. Lent and R. Johnston entitled, "The Marketing of Pacific Salmon," (1979).

Figure B-1 provides a simplified overview of marketing channels for Pacific Northwest salmon. Processors, brokers, distributors and retailers provide the link between harvesters and consumers. Salmon may be channelled into domestic or export markets. Complexities not taken into account in the diagram include: 1) the considerable trade that occurs between market participants throughout the process; and 2) the vertical integration often found in the salmon industry (e.g., processing companies may own fishing vessels, brokerage firms or transportation facilities).

### Salmon Products

Pacific salmon is processed and sold in many forms. Major product forms include fresh and frozen fillets, steaks and small whole fish, canned salmon, smoked sides and slices, and salmon roe. Different "types" of salmon are preferred for processing into different product forms for different markets. The salmon typology is based on species (chinook, coho, pink, chum or sockeye), size (e.g., under 4 pounds, 4-6 pounds, 6-9 pounds and over 9 pounds), harvest gear type (troll, gillnet, seine, etc.), geographical origin (e.g., "Yakutat Kings" from the Yakutat area in Alaska), and, in some cases, boat type ("dayboat" versus "trip boat"). These features are indicators of freshness, oil content, condition (e.g., bruising), color and size. They determine suitability for processing into various product forms.

Fresh and frozen salmon products have been gaining in popularity in the United States and in export markets in recent years. Chinook and coho salmon have traditionally supplied the majority of the non-canned market, although these two species also contribute to the canned market. From 1960 to 1977, the percentage of United States coho landings entering the non-canned market rose from 52% to 92%, while for chinook the percentage rose from 72% to 98%. In many cases, troll-caught chinook and coho are preferred over net-caught fish for the fresh, frozen and smoked markets. Net-caught coho do, however, enter these markets (OSU, 1978).

Sockeye, pink and chum salmon have traditionally entered the canned market. This situation is changing, however, particularly with regard to chum and sockeye salmon. The percentage of chum landings entering non-canned markets rose from 8% to 39% from 1960 to 1977, and for sockeye the percentage rose from 3.5% to 29.7% (OSU, 1978). Sockeye and chum salmon were particularly popular in fresh and frozen form on the Japanese market.

Troll-caught chinook and coho have traditionally been considered the most desirable types of salmon for smoking. Bruises often associated with gillnet salmon turn black in the smoking process and must be excised, so that this type of fish is considered less desirable. Larger fish are also generally preferred by many smokers. However, depending on relative prices and other



circumstances, many types of salmon -- all five species, troll and gillnet-caught, large, medium and small -- may be used for the smoked salmon market (OSU, 1978).

Chum salmon roe is preferred for the Japanese salmon roe market, although roe from other salmon species is also used. In 1975, salmon roe was Japan's most highly valued seafood import from the United States.

The preceding discussion indicates that some substitutional relationships with regard to product form exist among the different types of salmon. In addition, some substitutional relationships appear to exist between canned tuna and some types of canned salmon.

As Figure B-1 points out, Pacific salmon is distributed to both domestic and export markets. Information is available on four major domestic market centers (San Francisco, Los Angeles, Chicago and New York) and several export markets. In recent years, the major countries importing North American salmon have been Japan and the European countries, particularly France.

#### Supply Regions

The OSU Study (1978) provides information on the destination of salmon handled by processors in the various Pacific coast supply regions in 1977. It should be noted that, in some cases, these destinations are not final since salmon are re-exported after further processing. Highlights of the OSU information base are presented here.

Salmon caught by troll gear off the northern California/southern Oregon coast were distributed in a variety of markets in 1977. The majority of small chinooks went to markets in the San Francisco Bay and Puget Sound areas, while the majority of medium and large chinooks was destined for southern California. Seventy-seven percent of small cohos went into markets in Puget Sound. Of the medium-sized and large cohos, 71-91% were exported out of the U.S.

High percentages of troll-caught chinook landed at Columbia River ports were also exported in 1977. Most of the net-caught chinook in this region in 1977 were shipped to southern California and Oregon. Export markets were most important for coho, although the east coast, southern California and the Great Lakes region also received Columbia River coho.

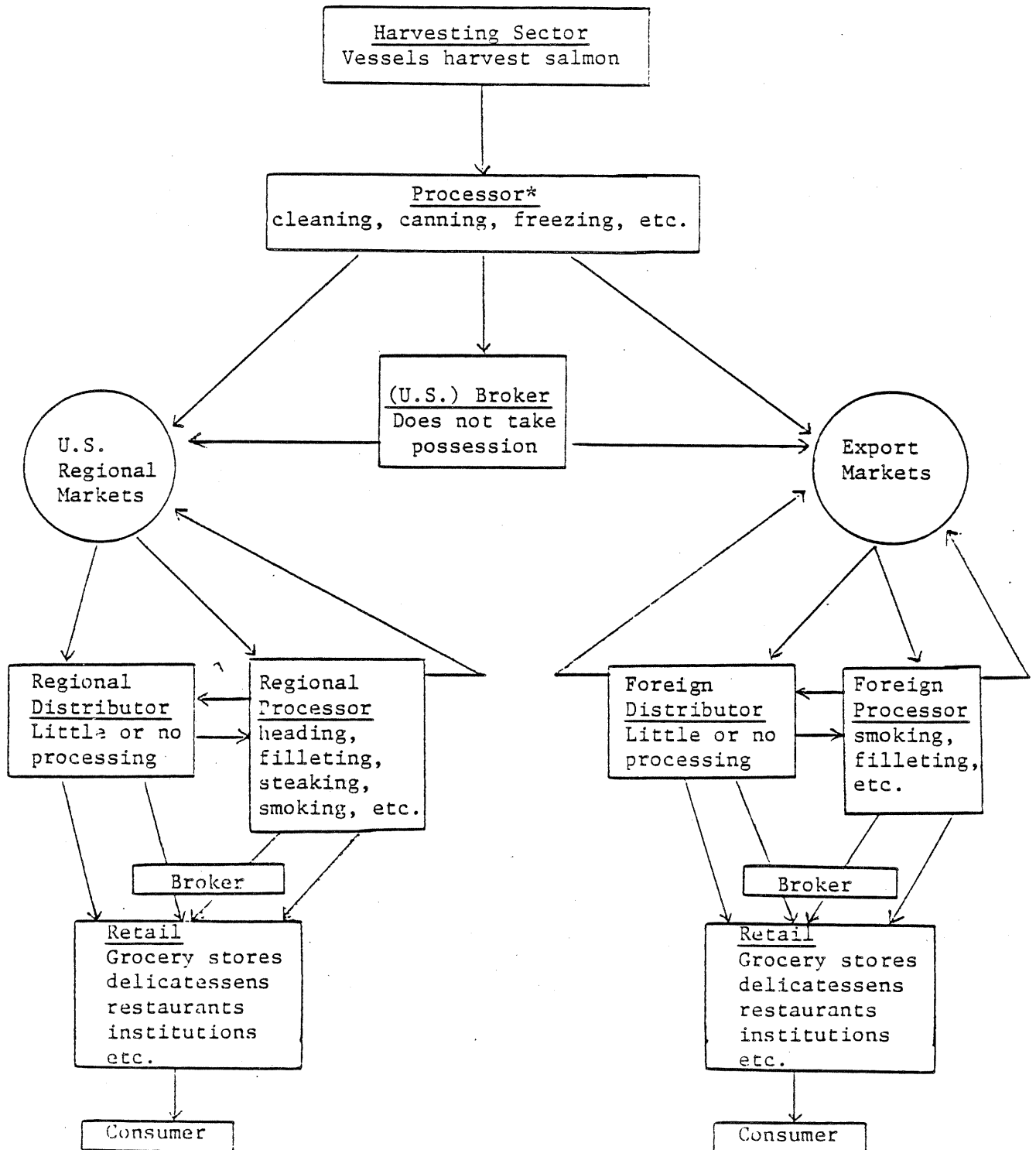
Information on the destination of salmon caught on the Washington coast was not available at the time of writing.

#### Domestic Demand Regions

Data on the San Francisco Bay area suggest that restaurants, institutions and wholesale and retail outlets are important users of salmon products. Four to seven pound salmon tend to be preferred by restaurants for filleting, while smaller salmon, particularly coho, are preferred by institutional users and retail outlets because of their lower price.

Los Angeles area "imports" of salmon are dominated by large chinooks which are used for smoking and curing and are subsequently "reexported" from the area.

Figure A-1. Marketing channels of Pacific Northwest salmon.



Smokers in the Chicago area also prefer large troll-caught chinook and coho, although price differentials have caused some shift to chum salmon and net-caught salmon. Retail outlets in New York and Chicago preferred small cohos in 1977, while restaurants generally preferred 6 to 10 pound chinook and coho.

### Export Markets

In 1977, an estimated twenty percent of total United States and Canadian Pacific salmon landed was exported. Seventy percent of the total volume of non-canned salmon from the region was exported. [U.S. and Canadian data in the OSU Study (1978) were aggregated for statistical purposes.] Table B-16 shows how North American fresh and frozen salmon exports have risen dramatically over time. Table A-1 also presents the percentage of salmon imports by country.

The United Kingdom was one of the world's largest importers of canned Pacific salmon in 1977. Sockeye is the preferred species, although some substitution of pink and chum salmon occurs, depending on price. U.S.-caught salmon competes with Japanese and Soviet-caught Pacific salmon for the U.K. canned salmon market. In the U.K. fresh and frozen market, small cohos were preferred in 1977, although silverbrite chums, pinks and sockeyes may substitute. The U.K. market is highly sensitive to price fluctuations, apparently as a result of inflation and the devaluation of the British pound.

In France, canned salmon imports have historically been low. Fresh and frozen Pacific salmon imports are high and have been increasing, coinciding in part with a decline in the supply of Atlantic salmon and increases in population and real per capita income. Similar trends are found in West Germany and Sweden. Much of the fresh and frozen salmon imported into France is smoked, although supermarkets are a new and expanding French market for smaller salmon (particularly coho and sockeye).

Empirical evidence suggests that, unlike the U.K., demand for salmon in France is relatively inelastic, i.e., the quantity demanded is fairly stable relative to price fluctuations (OSU, 1978).

One potentially important future competitor for Pacific salmon in European markets is Norwegian-farmed salmon. These fish are well liked for their uniformity, quality and freshness, and production is increasing. If prices should decline over time, Norwegian farmed salmon may seriously compete with Pacific salmon exports to European markets.

Some of Japan's sources of domestically-caught salmon have been reduced in recent years, due to restrictions on Japanese fishing in United States and Soviet waters. Rising population, rising real per capita income and the strength of the yen relative to the dollar have also contributed to a generally increasing trend in fresh and frozen salmon imports. Small, high quality sockeye and pink salmon were favored by Japanese buyers in 1977. More recently however, imports of fresh and frozen Pacific salmon from the United States have slowed. Apparently, excessively high levels of imports in 1978 left large Japanese inventories at the end of that year. Subsequent record runs of chum salmon in Japan and sockeye and other species in Alaska, in

conjunction with Japanese consumer resistance to high salmon prices, compounded the market situation in Japan. This led to a substantial drop in the price of coho, processing/distributing company financial losses worldwide, and a slowing of Japanese salmon imports.

Japanese imports of canned salmon have traditionally been low; Japan is a net exporter of canned salmon. Salmon roe imports (primarily chum roe) were by far the highest valued fishery product imports from the United States in 1977, and roe remains a very important export for Pacific Northwest producers.

In summary, the salmon marketing sector is extremely complex. Numerous steps exist in the distribution of salmon from harvesters to consumers. Domestic and foreign markets have varying preferences and rates of substitution with regard to types of salmon and end products, and may be more or less sensitive to price fluctuations.

# APPENDIX B. COMMERCIAL AND RECREATIONAL CATCH AND EFFORT STATISTICS

Table B-1. Summary of ocean salmon fisheries of California, Oregon and Washington. Base years for management plans of 1977 and 1978 were 1971 to 1975 (in thousands of fish).

Year	Troll		Ocean Sport		Total		Troll		Ocean Sport		Total	
	Chinook	Coho	Chinook	Coho	Chinook	Coho	Chinook	Coho	Chinook	Coho	Chinook	Coho
C A L I F O R N I A												
1971	434	442	188	67	622	509	103	1,490	30	312	133	1,802
1972	492	158	200	45	692	203	127	825	44	248	171	1,073
1973	817	348	198	32	1,015	380	363	796	61	232	424	1,028
1974	492	656	157	77	649	733	224	1,137	37	314	261	1,451
1975	579	204	104	21	683	225	225	657	76	252	301	909
1971-75 Average	563	362	170	48	733	410	209	981	49	272	258	1,253
1976	540	622	81	58	621	680	184	1,827	79	501	263	2,328
1977 <sup>a/</sup>	563	35	127	27	690	62	340	446	61	195	401	641
1978 <sup>a/</sup>	519	238	84	44	603	282	192	612	23	260	215	872
1979 <sup>a/</sup>	659	164	123	16	782	180	245	715	21	181	266	896
1980 <sup>a/</sup>	575	50	86	21	661	71	209	383	18	332	227	715
W A S H I N G T O N												
1971	252	1,264	160	747	412	2,011	789	3,196	378	1,126	1,167	4,322
1972	203	575	212	542	415	1,117	822	1,558	456	835	1,278	2,393
1973	317	702	204	472	521	1,174	1,497	1,846	463	736	1,960	2,582
1974	353	1,038	215	595	568	1,633	1,069	2,831	409	986	1,478	3,817
1975	274	774	262	481	536	1,255	1,078	1,635	442	754	1,520	2,389
1971-75 Average	280	871	210	567	490	1,438	1,052	2,214	429	887	1,481	3,101
1976	361	1,385	171	943	532	2,328	1,085	3,834	331	1,502	1,416	5,336
1977 <sup>a/</sup>	268	716	175	490	443	1,206	1,171	1,197	363	712	1,534	1,909
1978 <sup>a/</sup>	166	610	97	470	263	1,080	877	1,460	204	774	1,081	2,234
1979 <sup>a/</sup>	147	666	77	290	224	956	1,051	1,545	221	487	1,272	2,032
1980 <sup>a/</sup>	133	386	54	362	187	748	917	820	158	715	1,075	1,535
T O T A L - A L L S T A T E S												

a/ Preliminary.

b/ Includes catches from Alaska and Oregon landed in Washington.

NOTE: Totals may be inconsistent with figures in the text because of rounding.

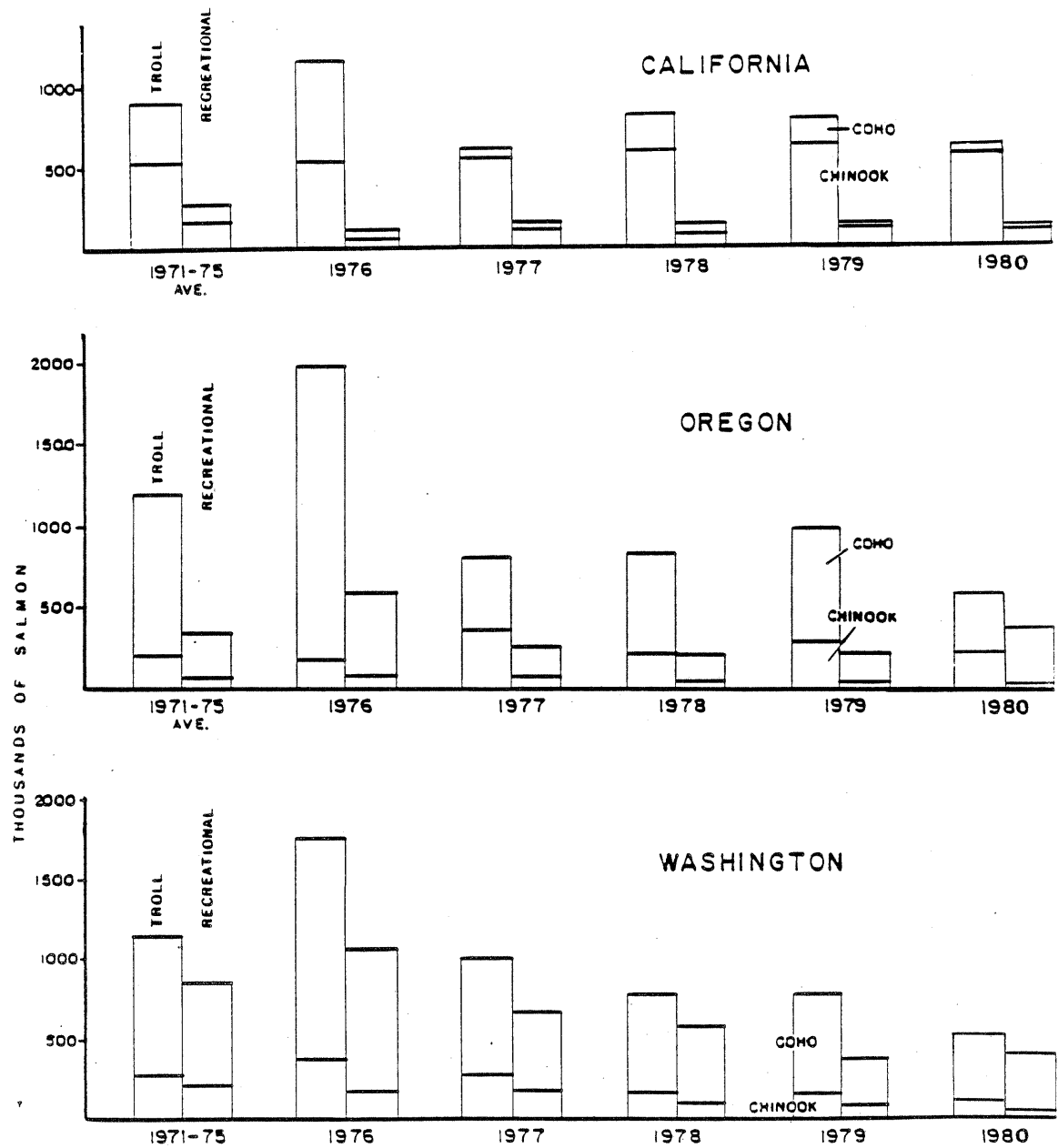


Figure B-1. Summary of ocean salmon landings of California, Oregon and Washington 1976-80, with 1971-75 average.

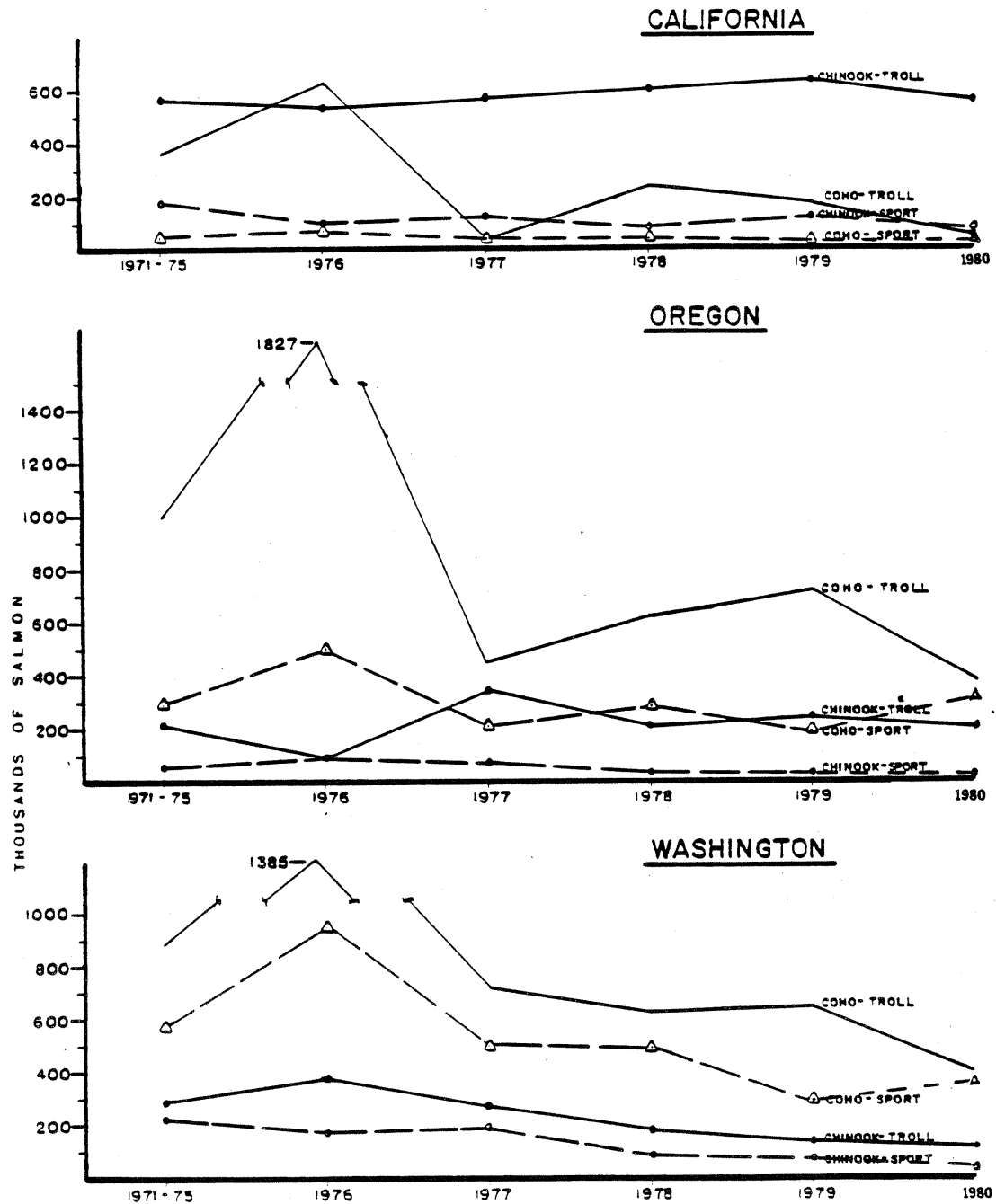


Figure B-2. Summary of ocean salmon landings of California, Oregon and Washington, 1976-80 and 1971-75 average, showing trends by species and type of fishery.

Table B-2. California ocean recreational chinook and coho landings in numbers of salmon by month for 1978-80, with average of 1971-75<sup>a/</sup>

		February	March	April	May	June	July	August	September	October	November	Season
<b>CHINOOK</b>												
1971-75 Average	Monthly	17,233	26,389	16,659	10,586	17,290	30,806	25,390	12,981	8,791	3,454	
	Cumulative	17,233	43,622	60,281	70,867	88,157	118,963	144,353	157,334	166,130	169,584	169,584
1978	Monthly	14,735	11,866	3,366	3,016	9,026	15,073	9,195	6,081	7,735	3,777	
	Cumulative	14,735	26,601	29,967	32,983	42,009	57,082	66,277	72,358	80,093	83,870	83,870
1979	Monthly	7,876	15,516	11,596	5,178	16,238	29,944	16,227	13,331	6,945	-	
	Cumulative	7,876	23,392	34,988	40,165	56,404	86,348	102,625	115,956	122,901	-	122,851
1980	Monthly	4,703	12,033	6,094	5,573	18,231	19,413	8,752	7,270	4,340	-	
	Cumulative	4,703	16,736	22,830	28,403	46,634	66,047	74,799	82,069	86,409	-	86,409
<b>COHO</b>												
1971-75 Average	Monthly	1	109	1,315	3,971	8,555	24,938	8,532	821	41	6	
	Cumulative	1	110	1,425	5,396	13,951	38,889	47,421	48,242	48,283	48,289	48,289
1978	Monthly	0	0	0	0	19,846	21,015	3,392	29	-	-	
	Cumulative	0	0	0	0	19,846	40,861	44,253	44,282	-	-	44,282
1979	Monthly	10	39	20	169	3,613	8,956	2,710	290	-	-	
	Cumulative	10	49	69	238	3,851	12,807	15,517	15,807	-	-	15,807
1980	Monthly	0	0	17	23	3,837	14,948	1,928	147	4	-	
	Cumulative	0	0	17	40	3,877	18,825	20,753	20,900	20,904	-	20,904

<sup>a/</sup> 1978-80 data are preliminary.



Table B-3. Oregon ocean salmon recreational effort and catch(numbers of fish) by month, 1974-75 average and 1978-80.

		April <sup>a/</sup>	May	June	July	August	September	October	November	Season
<u>EFFORT (Angler Trips)</u>										
1974-75 <sup>b/</sup>	Monthly	1,757	9,788	39,348	124,660	129,779	61,275	5,067	-	
Average	Cumulative	1,757	11,545	50,893	175,553	305,332	366,607	371,674	-	371,674
1978	Monthly	-	12,278	78,669	144,534	115,855	37,582	13,284	1,528	
	Cumulative	-	12,278	90,947	235,481	351,336	388,918	402,212	403,740	403,740
1979	Monthly	-	15,290	53,371	112,650	143,167	11,332	4,791	1,169	
Prelim.	Cumulative	-	15,290	68,861	181,311	324,478	335,810	340,601	341,770	341,770
1980	Monthly	-	11,739	85,087	146,357	93,303	20,594	-	-	
Prelim.	Cumulative	-	11,739	96,826	243,183	336,486	357,080	-	-	357,080
<u>CHINOOK</u>										
1974-75 <sup>b/</sup>	Monthly	165	899	4,789	19,678	19,732	9,193	1,768	-	
Average	Cumulative	165	1,064	5,853	25,531	45,263	54,456	56,224	-	56,224
1978	Monthly	130	869	4,708	4,963	9,573	1,611	911	79	
	Cumulative	130	999	5,707	10,670	20,243	21,854	22,765	22,844	22,844
1979	Monthly	-	823	4,740	5,115	9,365	202	582	75	
	Cumulative	-	823	5,563	10,678	20,043	20,245	20,827	20,902	20,902
1980	Monthly	-	301	4,652	7,060	5,337	1,144	-	-	
Prelim.	Cumulative	-	301	4,953	12,013	17,350	18,494	-	-	18,494
<u>COHO</u>										
1974-75 <sup>b/</sup>	Monthly	779	5,772	36,510	102,519	103,028	33,866	881	-	
Average	Cumulative	779	6,551	43,061	145,580	248,608	282,474	283,355	-	283,355
1978	Monthly	181	5,130	101,523	71,423	67,810	13,208	494	-	
	Cumulative	181	5,311	106,834	178,257	246,067	259,275	259,769	-	259,769
1979	Monthly	-	5,402	35,834	73,799	64,156	1,643	-	-	
	Cumulative	-	5,402	41,236	115,035	179,191	180,834	-	-	180,834
1980	Monthly	-	6,498	117,644	158,124	45,776	4,400	-	-	
Prelim.	Cumulative	-	6,498	124,142	282,266	328,042	332,442	-	-	332,442

a/ April value includes any early season catches.

b/ Only 1974 and 1975 of 1971-75 period are available on a monthly basis.

NOTE: 1979 and 1980 monthly totals are sum of statistical weeks' estimates with closest fit to calendar month.

Table B-4. Washington ocean sport salmon angler trips, and numbers of chinook and coho caught, by month--1971-75 mean and 1978-1980.

	April	May	June	July	August	September	October	Total
<u>EFFORT</u>								
1971-75								
Average	Monthly	7,400	22,300	51,200	127,400	182,000	84,300	8,300
	Cumulative	7,400	29,700	80,900	208,300	390,300	474,600	482,900
1978								
	Monthly	2,900	17,300	71,600	148,700	159,400	73,200	9,700
	Cumulative	2,900	20,200	91,800	240,500	399,900	473,100	482,800
1979a/								
	Monthly	-	19,300	54,200	105,600	127,700	3,900	-
	Cumulative	-	19,300	73,500	179,100	306,800	310,700	-
1980a/								
	Monthly	-	15,700	54,900	104,100	101,500	3,900	-
	Cumulative	-	15,700	70,600	174,700	276,200	280,100	-
<u>CHINOOK</u>								
1971-75								
Average	Monthly	5,900	13,100	33,900	66,900	64,100	24,800	1,700
	Cumulative	5,900	19,000	52,900	119,800	183,900	208,700	210,400
1978								
	Monthly	2,500	9,200	33,900	21,000	23,900	4,500	1,400
	Cumulative	2,500	11,700	45,600	66,600	90,500	95,000	96,400
1979a/								
	Monthly	-	9,900	24,500	15,200	27,200	100	-
	Cumulative	-	9,900	34,400	49,600	76,800	76,900	-
1980a/								
	Monthly	-	2,600	13,500	21,800	15,400	300	-
	Cumulative	-	2,600	16,100	37,900	53,300	53,600	-
<u>COHO</u>								
1971-75								
Average	Monthly	2,900	26,600	56,900	150,000	231,100	93,000	6,900
	Cumulative	2,900	29,500	86,400	236,400	467,500	560,500	567,400
1978								
	Monthly	1,400	13,700	105,400	149,500	127,900	68,300	3,600
	Cumulative	1,400	15,100	120,500	270,000	397,900	466,200	469,800
1979a/								
	Monthly	-	7,900	47,800	115,700	116,800	2,100	-
	Cumulative	-	7,900	55,700	171,400	288,200	290,300	-
1980a/								
	Monthly	-	24,800	96,300	143,400	95,000	2,000	-
	Cumulative	-	24,800	121,100	264,500	359,500	361,500	-

a/ Preliminary.

Table B-5. California commercial, troll chinook and coho landings, in numbers of salmon by month, for 1978-80, with average of 1971-75. a/

		April	May	June	July	August	September	Season
<u>CHINOOK</u>								
1971-75	Monthly	38,791	148,224	154,012	135,142	60,868	25,638	
Average	Cumulative	38,791	187,015	341,027	476,169	537,037	562,675	562,675
1978	Monthly	20,891	212,507	166,233	90,160	21,650	7,114	
	Cumulative	20,891	233,398	399,361	489,791	511,441	518,555	518,555
1979 <sup>b/</sup>	Monthly	Closed	205,596	91,196	201,301	115,202	45,517	
	Cumulative	Closed	205,596	296,792	498,093	613,295	658,812	658,812
1980	Monthly	Closed	231,738	8,347	248,026	50,154	36,801	
	Cumulative	Closed	231,738	240,085	488,111	538,265	575,066	575,066
<u>COHO</u>								
1971-75	Monthly	-	88,718	135,970	110,520	24,367	2,046	
Average	Cumulative	-	88,718	224,688	335,208	359,575	361,621	361,621
1978	Monthly	Closed	36,167	159,361	38,170	3,781	943	
	Cumulative	Closed	36,167	195,528	233,698	237,479	238,422	238,422
1979 <sup>c/</sup>	Monthly	Closed	12,828	50,800	84,500	15,522	460	
	Cumulative	Closed	12,828	63,628	148,128	163,650	164,110	164,110
1980 <sup>d/</sup>	Monthly	Closed	1,326	60	31,466	11,212	5,576	
	Cumulative	Closed	1,326	1,386	32,852	44,064	49,640	49,640

a/ 1978-80 data are preliminary.

b/ Last two weeks of June were closed in 1979.

c/ Last week of May and last two weeks of June were closed.

d/ See text for 1980 closures.

Table B-6. Oregon commercial troll effort and chinook and coho landings (numbers of fish) by month, 1971-75 average and 1978-80.

		April	May	June	July	August	September	October	November <sup>a/</sup>	Season
<u>EFFORT (Boat Days)</u>										
1971-75		NA	NA	NA	NA	NA	NA	NA	NA	NA
Average										
1979	Monthly	-	1,246	334	24,438	18,215	1,273	2,176	645	
	Cumulative	-	1,246	1,580	26,018	44,233	45,506	47,682	48,327	48,327
1980	Monthly <sup>b/</sup>	-	2,099	3,681	12,069	14,291	4,685	2,324	490	
Prelim.	Cumulative	-	2,099	5,780	17,849	32,140	36,825	39,149	39,639	39,639
<u>CHINOOK</u>										
1971-75	Monthly	532	8,325	27,528	56,647	69,725	31,442	13,701	1,313 <sup>c/</sup>	
Average	Cumulative	532	8,857	36,385	93,032	162,757	194,199	207,900	209,213	209,213
1978	Monthly	-	3,216	40,597	63,087	46,870	25,023	9,288	3,451	
	Cumulative	-	3,216	43,813	106,900	153,770	178,793	188,081	191,532	191,532
1979	Monthly	-	10,870	375	80,383	109,729	16,289	25,726	2,101	
	Cumulative	-	10,870	11,245	91,628	201,357	217,646	243,372	245,473	245,473
1980	Monthly <sup>b/</sup>	-	25,765	29,671	39,203	72,533	25,998	15,150	1,054	
Prelim.	Cumulative	-	25,765	55,436	94,639	167,172	193,170	208,320	209,374	209,374
<u>COHO</u>										
1971-75	Monthly	-	-	227,843	414,383	305,753	29,691	3,286	2 <sup>c/</sup>	
Average	Cumulative	-	-	227,843	642,226	947,979	977,670	980,956	980,958	980,958
1978	Monthly	-	-	279,618	227,231	92,810	10,378	1,599	2	
	Cumulative	-	-	279,618	506,849	599,659	610,037	611,636	611,638	611,638
1979	Monthly	-	-	436 <sup>d/</sup>	544,900	162,541	6,757	-	-	
	Cumulative	-	-	436	545,336	707,877	714,634	-	-	714,634
1980	Monthly	-	-	-	188,849	177,215	17,150	-	-	
Prelim.	Cumulative	-	-	-	188,849	366,064	383,214	-	-	383,214

a/ Late season at mouth of Elk and Chetco Rivers only which was initiated in 1974.

b/ In 1980, May includes May 1 -June 1 landings, June includes June 16-July 6 landings, and July includes July 15-July 31 landings.

c/ Average from 1974 and 1975 only.

d/ Caught off California and landed in Oregon.

Table B-7. Washington commercial troll effort, and numbers chinook and coho caught, by month - 1971-75 mean and 1978-1980<sup>a/</sup>.

		April	May	June	July	August	September	October	Total
<u>EFFORT</u> (Days fished)									
1973-75	Monthly	1,800	3,700	6,700	16,800	13,700	8,000	2,700	
Average	Cumulative	1,800	5,500	12,200	29,000	42,700	50,700	53,400	53,400
1978	Monthly	800	3,000	3,100	14,800	10,800	6,900	2,000	
	Cumulative	800	3,800	6,900	21,700	32,500	39,400	41,400	41,400
1979 <sup>b/</sup>	Monthly	1,000	4,200	200	15,100	20,800	200	100	
	Cumulative	1,000	5,200	5,400	20,500	41,300	41,500	41,600	41,600
1980 <sup>b/</sup>	Monthly	900	4,600	200	9,200	11,500	500	<100	
	Cumulative	900	5,500	5,700	14,900	26,400	26,900	26,900	26,900
<u>CHINOOK</u>									
1971-75	Monthly	20,500	48,100	58,100	77,400	37,800	21,900	8,600	
Average	Cumulative	20,500	68,600	126,700	204,100	241,900	263,800	272,400	272,400
1978	Monthly	9,000	25,500	23,600	49,600	26,700	8,200	2,900	
	Cumulative	9,000	34,500	58,100	107,700	134,400	142,600	145,500	145,500
1979 <sup>b/</sup>	Monthly	13,600	40,700	1,000	36,800	39,100	800	500	
	Cumulative	13,600	54,300	55,300	92,100	131,200	132,000	132,500	132,500
1980 <sup>b/</sup>	Monthly	11,300	44,900	800	44,900	25,500	500	300	
	Cumulative	11,300	56,200	57,000	101,900	127,400	127,900	128,200	128,200
<u>COHO</u>									
1971-75	Monthly	-	-	162,900	339,200	232,600	98,000	22,900	
Average	Cumulative	-	-	162,900	502,100	734,700	832,700	855,600	855,600
1978	Monthly	1,800	100	1,600	316,200	112,700	112,900	9,500	
	Cumulative	1,800	1,900	3,500	319,700	432,400	545,300	554,800	554,800
1979 <sup>b/</sup>	Monthly	200	1,200	5,400	366,000	263,100	4,300	-	
	Cumulative	200	1,400	6,800	372,800	635,900	640,200	-	640,200
1980 <sup>b/</sup>	Monthly	100	2,100	22,900	205,000	138,500	5,400	-	
	Cumulative	100	2,200	25,100	230,100	368,600	374,000	-	374,000

a/ Excluding Washington landings from California, Oregon and Alaska catch areas. Includes Indian troll catch and effort for all years.

b/ Preliminary.

## APPENDIX C

## Adopted 1981 Ocean Salmon Management Measures

## TROLL

CALIFORNIA (entire state)

All salmon except coho	May 1-15
All Salmon	May 16-31
*All salmon	July 1-September 30
Chinook minimum size limit:	26 inches
Coho minimum size limit:	22 inches

OREGON/CALIFORNIA BORDER TO CAPE FALCON

All salmon except coho	May 1-31
*All salmon	July 1-September 8
Note: If there is an in-season closure on coho, then an all-species except coho season will be allowed from Cape Sebastian to Cape Falcon, with whole bait or 5" plugs only, starting at the time of the closure through September 8.	
All salmon except coho	September 9-October 31
Chinook minimum size limit:	26 inches
Coho minimum size limit:	16 inches

CAPE FALCON TO US/CANADA BORDER

All salmon except coho	May 1-31
*All salmon	July 15-September 1
Chinook minimum size limit:	28 inches
Coho minimum size limit:	16 inches

CAPE FALCON TO LEADBETTER POINT

Coho only	September 20-October 3
(maximum 10 boats with observers; coho gear only; out to 12 miles)	

## RECREATIONAL

CALIFORNIA (entire state)

All salmon	2-fish bag limit	February 14-November 15
Chinook/coho minimum size limit:	22 inches, except that one chinook or coho salmon per day may be less than 22 inches but not less than 20 inches.	

OREGON/CALIFORNIA BORDER TO CAPE FALCON

\*All salmon 2-fish bag limit May 15-September 20  
 Chinook minimum size limit: 22 inches  
 Coho minimum size limit: 16 inches (entire state of Oregon)

OREGON/CALIFORNIA BORDER TO CAPE BLANCO

All salmon except coho 2-fish bag limit September 21-October 31

CAPE FALCON TO US/CANADA BORDER

\*All salmon 2-fish bag limit May 23-September 7  
 EXCEPT 3-fish bag limit (only 2 of which may be chinook or coho) from  
 Queets River mouth north to US/Canada border (Areas 3 and 4)  
 Chinook minimum size limit: 24 inches  
 Coho minimum size limit: 20 inches (entire state of Washington)

\*Subject to modification by in-season management provisions.

IN-SEASON MANAGEMENT

Oregon and Washington (OPI and WPP) Coho

1. For the 43-day period ending on August 12 in the area from Cape Falcon south and on August 26 in the area from Cape Falcon north

Separate harvest guidelines were established for the ocean troll and recreational fisheries, based on the 1971-75 harvest ratios, as follows:

Washington Production Projection Area (WPP),  
 Cape Falcon to US/Canada Border

Total quota for area: 620,000 coho  
 Recreational allocation guideline: 40% or 248,000 coho  
 Troll allocation guideline: 60% or 372,000 coho

Oregon Production Index Area (OPI) South of Cape Falcon  
 (including California)

Total quota for area: 772,000 coho  
 Recreational allocation guideline: 29% or 224,000 coho  
 Troll allocation guideline: 71% or 548,000 coho

When the separate harvest guideline is projected to be reached by either fishery, i.e., troll or recreational, that fishery would automatically close in the appropriate area, excluding California.

2. For the period after August 12 for the area from Cape Falcon south to Oregon/California border and after August 26 for the area north of Cape Falcon

In-season modifications following procedures similar to those used in 1980 may be made by the Regional Director as follows:

- a. Adjust pre-season estimates of coho abundance, as appropriate, based on in-season data;
- b. Modify troll and recreational seasons (shorten or lengthen) and harvest guidelines for either area or any portion thereof, based on adjusted abundance levels, projected catch and effort levels, and harvest ratios between commercial and recreational fisheries.

#### California Chinook

Separate harvest guidelines were established for the California ocean troll and recreational fisheries as follows:

##### For the Area South of Point Arena

Total quota for area: 380,000 chinook  
 Troll fishery: 265,000 chinook  
 Recreational fishery: 115,000 chinook

##### For the Area North of Point Arena to the Oregon/California Border

Total quota for area: 315,000 chinook  
 Troll fishery: 300,000 chinook  
 Recreational fishery: 15,000 chinook

When the separate harvest guideline in either area is projected to be reached by either fishery, i.e., troll or recreational, that fishery would automatically close in the appropriate area. If it appears that either one of the fisheries will not catch all of its harvest guideline in either area by the end of the regularly scheduled season, the unused surplus can be reallocated to the other fishery.

#### TREATY INDIAN FISHERIES

##### Makah Area

All salmon May 1-October 31  
 Chinook minimum size limit: 24 inches  
 Coho minimum size limit: 16 inches

##### Quileute, Hoh, Quinault Tribal Areas

All salmon May 1-October 31  
 Chinook minimum size limit: 28 inches  
 Coho minimum size limit: 16 inches



Table C-1. Adopted 1981 Ocean Salmon Fishing Regulations as Compared with 1980 Regulations.

1981 Proposed Regulations <sup>a/</sup> (Adopted by Pacific Council on 3/19/81)		1980 Regulations <sup>a/</sup>	
***** NORTH OF CAPE FALCON, OREGON TO WASHINGTON/CANADA BORDER ***** (unless otherwise specified)			
<u>Commercial Troll Fishery</u>			
1. May 1-31, all salmon except coho.		1. May 1-31, all salmon except coho.	
2. July 15-September 1, all salmon. Automatic closure when troll coho harvest guideline projected to be reached (if before August 26).		2. July 15-September 8, all salmon (emergency in-season closure implemented on August 26 north of Leadbetter Point).	
3. September 20-October 3, coho only with maximum of 10 boats and coho gear, between Cape Falcon and Leadbetter Point out to 12 miles.			
4. 28" minimum chinook (except 24" minimum chinook in Makah fishing area), 16" minimum coho		3. 28" minimum chinook, 16" minimum coho.	
<u>Recreational Fishery</u>			
1. May 23-September 7, all salmon. If coho recreational harvest guideline projected to be reached before August 26, automatic closure.		1. May 10-September 14, all salmon. (Emergency in-season closure implemented on August 26 north of Leadbetter Pt. and on September 2 south of Leadbetter Pt.).	
2. 2-fish bag limit south of Queets River mouth and 3-fish bag limit, only 2 of which may be coho or chinook ("2+1") north of Queets River mouth (Areas 3 and 4).		2. Begin season with 3-fish bag limit. Adjust downward to 2 fish if in-season data indicate the total catch by September 1 will exceed 333,000 coho. Fishery will be monitored weekly. Projections will be made July 15 and August 15. (Bag limit was reduced by Oregon Dept. of Fish & Wildlife and Washington Dept. of Fisheries from 3 fish to 2 fish on July 16.)	
3. 24" minimum chinook, 20" minimum coho off Washington, and 16" minimum coho off Oregon.		3. 24" minimum chinook, 16" minimum coho.	
***** SOUTH OF CAPE FALCON, OREGON TO OREGON/CALIFORNIA BORDER ***** (unless otherwise specified)			
<u>Commercial Troll Fishery</u>			
1. May 1-31, all salmon except coho.		1. May 1-31, all salmon except coho.	
2. July 1-September 8, all salmon. Automatic closure when troll coho harvest guideline projected to be reached (if before August 12). If there is a closure for coho due to troll harvest guideline being reached, an all salmon except coho season will be allowed from Cape Falcon to Cape Sebastian using whole bait or 5" plugs, from the time of the coho closure through September 8.		2. June 16-30, chinook only from Cape Falcon south to Cape Blanco. Terminal gear restricted to whole bait or 6" minimum plugs. Minimum hook size 6/0.	
3. September 9-October 31, all salmon except coho.		3. July 15-September 8, all salmon.	
4. Size limits and other regulations same as in 1980.		4. September 9-October 31, all salmon except coho.	
		5. 26" minimum chinook, 16" minimum coho.	
<u>Recreational Fishery</u>			
1. May 15-September 20, all salmon. If coho recreational harvest guideline projected to be met before August 12, automatic closure.		1. May 10-September 14, all salmon. (Emergency in-season closure implemented September 2.)	
2. September 21-October 31, all salmon except coho for Cape Blanco to Oregon/California border only.		2. September 15-October 31, all salmon except coho.	
3. 2-fish bag limit.		3. Begin season with 3-fish bag limit. Adjust downward to 2 fish if in-season data indicate the total catch by September 14 will exceed 240,000 coho in Oregon Production Index (OPI) area. Fishery will be monitored weekly. Projections will be made on July 15 and August 15. (Bag limit was reduced by Oregon Dept. of Fish & Wildlife on July 16.)	
4. Same size limits and other regulations as in 1980.		4. 22" minimum chinook; 16" minimum coho.	
***** NORTH OF CAPE VIZCAINO, CALIFORNIA <sup>b/</sup> TO OREGON/CALIFORNIA BORDER *****			
<u>Commercial Troll Fishery</u>			
1. May 1-15, all salmon except coho.		1. May 1-15, all salmon except coho.	
2. May 16-31, all salmon.		2. May 16-31, all salmon.	
3. July 1-September 30, all salmon. Automatic closure when troll chinook harvest guideline projected to be reached.		3. July 16-September 30, all salmon.	
4. Same size limits and other regulations as in 1980.		4. 26" minimum chinook, 22" minimum coho.	
<u>Recreational Fishery</u>			
1. February 14-November 15, all salmon. Automatic closure when recreational harvest guideline projected to be reached.		1. February 17-October 13, all salmon.	
2. 2-fish bag limit.		2. 2-fish bag limit.	
3. Same size limits and other regulations as in 1980.		3. 22" minimum size except that one chinook or coho salmon per day may be less than 22" but not less than 20".	
***** SOUTH OF CAPE VIZCAINO, CALIFORNIA TO CALIFORNIA/MEXICO BORDER *****			
<u>Commercial Troll Fishery</u>			
1. May 1-15, all salmon except coho.		1. May 1-15, all salmon except coho.	
2. May 16-31, all salmon.		2. May 16-31, all salmon.	
3. July 1-September 30, all salmon. Automatic closure when troll chinook harvest guideline projected to be reached.		3. July 1-September 30, all salmon.	
4. Same size limits and other regulations as in 1980.		4. 26" minimum chinook, 22" minimum coho.	
<u>Recreational Fishery</u>			
1. February 14-November 15, all salmon. Automatic closure when recreational chinook harvest guideline projected to be reached.		1. February 17-October 13, all salmon.	
2. 2-fish bag limit.		2. 2-fish bag limit.	
3. Same size limit and other regulations as in 1980.		3. 22" minimum, except that one chinook or coho salmon per day may be less than 22" but not less than 20".	

a/ 1980 and 1981 regulations include in-season management.

b/ Cape Vizcaino is located approximately 20 miles north of Fort Bragg at 39°49'4".