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ANADROMOUS FISH INVENTORY

SUMMARY VOLUME

Prepared For

Fish and Wildlife Service

by

Arctic Environmental Information and Data Center

University of Alaska, Anchorage

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Alaska Resources
Library & Information Services
Anchorage, Alaska

Habitat Summary

Anadromous Fish Inventory

	<u>RS</u>	<u>CS</u>	<u>KS</u>	<u>SS</u>	<u>PS</u>	<u>AC</u>
Arctic NWR		20			20	453
Noatak NAR	125	590			200	280
Selawik NWR		282	35		120	197
Yukon Flats NWR		1,135	891	631		
Koyukuk NWR	195	833	593	495	45	195
Yukon Delta NWR	570	1,237.5	833	725	730	472
Togiak NWR	768	546	257	404	259	148
Iliamna NRR	1,878	1,269	1,157	889	903	775
Coastal NWR						
Total	3,536	5,912.5	3,766	3,144	2,277	2,520

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Key Area Summary

Anadromous Fish Inventory

	<u>RS</u>	<u>CS</u>	<u>KS</u>	<u>SS</u>	<u>PS</u>	<u>AC</u>
Arctic NWR						116
Noatak NAR	10	330			155	
Selawik NWR		219			105	7
Yukon Flats NWR		448	448			
Koyukuk NWR		425	340			
Yukon Delta NWR	15	634	399	289	283	
Togiak NWR	338	274	103	112	43	
Iliamna NRR	993	645	193	256	555	28
Coastal NWR						
Total	1,356	2,975	1,483	657	1,141	151

Average Annual Escapement Counts (Estimates) (1963-1972)

Anadromous Fish Inventory

	<u>RS</u>	<u>CS</u>	<u>KS</u>	<u>SS</u>	<u>PS</u>	<u>AC</u>
Arctic NWR						20,097
Noatak NAR		63,580 (172,000)				
Selawik NWR		20,132 (57,000)				
Yukon Flats NWR		(110,000)	(20,000)			
Koyukuk NWR		215,000				
Yukon Delta NWR		(1,875,000)*	(128,000)*			
Togiak NWR	132,448	111,912 (250,000)	8,246	1,505 (12,000)	15,462	
Iliamna NRR	8,240,594	2,364 (88,200)*	14,369 (55,000)**		502,500	
Coastal NWR						
Count Total	8,373,092	412,988	22,615	1,505	517,962	20,097
Total Incl. Estimate		(2,769,500)	(225,615)	(12,000)		

* Yukon River only

**Nushagak River only

Average Annual Subsistence Harvest (1963-1972)

Anadromous Fish Inventory

	<u>RS</u>	<u>CS</u>	<u>KS</u>	<u>SS</u>	<u>PS</u>	<u>AC</u>
Arctic NWR						
Noatak NAR		11,614				14,097
Selawik NWR		4,448				
Yukon Flats NWR		10,623	2,178			
Koyukuk NWR		9,245	2,896			
Yukon Delta NWR		14,721	47,705	3,556	min.	
Togiak NWR		195,695	2,967	2,259	481	
Iliamna NRR	107,800	9,550	5,202	3,730	2,300	
Coastal NWR						
Total	108,285	261,078	60,948	9,545	2,781	14,097

Average Annual Commercial Harvest (1963-1972)

Anadromous Fish Inventory

<u>Area</u>	<u>RS</u>	<u>CS</u>	<u>KS</u>	<u>SS</u>	<u>PS</u>	<u>AC</u>
Arctic NWR						
Noatak NAR		82,868	2		48	3,065
Selawik NWR						
Yukon Flats NWR		861	1,444	52		
Koyukuk NWR	min.	1,875	3,839	min.	min.	
Yukon Delta NWR	min.	163,882	128,948	55,988		
Togiak NWR	157,749	119,958	24,223	19,377		
Iliamna NRR	7,164,775	497,762	87,113	63,570	744,084	
Coastal NWR	(1,264,839)	(1,557,742)	(5,796)	(63,913)	(8,558,359)	
Subtotal*	7,322,524	867,206	245,569	138,987	795,936	
Total **	(8,587,363)	(2,424,948)	(251,365)	(202,900)	(9,354,295)	

* excludes Coastal NWR

** includes Coastal NWR

Project Summary
Anadromous Fish Inventory Update System

Without question, in a report of this magnitude, additional data remains which could be incorporated into this study. Also revisions of some figures might be required in response to more recent data which finalize previous preliminary statistics. Particularly subsistence, commercial and sport harvests, values and effort for recent years have not been formally published and could be collected with little additional effort. Aerial escapements counts for the past two to three years are available, but have not been formally published. These also could be obtained.

Bibliographies are quite complete, but a number of informal departmental reports exist which are not included. These studies are often internal management documents which contain valuable data but whose existence is not widely known. The incorporation of this unpublished or limited distribution information would increase the value of the bibliographies.

Additional data exist on escapement counts since only the maximum observed escapement for each year was recorded in this study. Additional early and late run escapement counts exist but are considered of small value to the main purpose of this inventory.

Information not included in the original inventory but of potential value would be data concerning timing of the spawning run of various species. This timing is variable between species and between areas of the state and would be extremely valuable in formulating management decisions and rationales.

A critical review of this inventory by Alaska Department of Fish and Game management biologists at the regional level, particularly for the 1:250,000 scale mylar overlays would be extremely valuable. It is important that this be done by regional field personnel who are intimately knowledgeable about the particular areas and would be able to refine data presented on these mylars.

Personal knowledge of the fisheries of many of these areas is rare and extremely valuable.

An annual incorporation of data which become available each year would entail approximately one-half man month of work each year spread over a two-month period to allow for the accumulation of various reports and information. The ideal two-month period this annual update would probably be between April 15 and June 15 prior to the summer field season, and yet the previous year's data should be available in final form.

Project Summary
Anadromous Fish Inventory Study Needs

1. Species lists - Species inhabit these refuges which have both resident and anadromous forms, or the degree of anadromy is inadequately understood. The extent of migration of these species needs to be studied to understand the movement of fish populations and stocks from salt water into and through many of the larger river drainages. Particularly, this comment relates to several species of whitefish, Arctic char, Dolly Varden, rainbow and Arctic smelt and inconnu. Tagging studies will most probably be required to determine the migratory habits of these species and the extent that these populations inhabit and traverse the proposed refuge areas.
2. Commercial history - Lacking for commercial history is an adequate documentation of effort expended and amount of gear fished. Any past records which could provide this information should be sought out and compiled.
3. Subsistence history - Required here is an understanding of the changing patterns of subsistence, the degree of dependence upon subsistence and the various methods of subsistence harvest. In many cases an adequate accounting of the number of fish harvested for subsistence is unavailable.
4. Sport history - Documentation needs to be made of the changing use of an area by various sport fishing interests. Much of this information has never been published and exists in the personal recollections of various Alaska Department of Fish and Game personnel who have worked in particular areas over a number of years.
5. Habitat - Study is required particularly on habitat for species other than salmon generally, and for all species in the headwaters of many of the larger drainage systems. An adequate understanding of anadromous fish

utilization of headwaters is particularly lacking.

6. Key spawning and rearing areas - This section is one of the most poorly studied and documented of this inventory. The identification of key areas is, in many cases, quite subjective and, where rivers are highly turbid, open to considerable question. A standard method for the evaluation of spawning and rearing areas needs to be formulated and utilized commonly by the various fishery management agencies. This would clarify the subjective valuations of spawning and rearing areas. Particularly important is the question of what values? From a commercial standpoint, more fish means higher value as opposed to a unique stock standpoint where a small population in one drainage might be particularly valuable from the standpoint of being an isolated, unique population of that particular species. In many cases, the spawning populations have not been adequately observed or enumerated on these rivers, so the identification of key areas is extremely tenuous.

7. Run and escapement data - Although aerial escapement counts are relatively easy to obtain, their value from a management standpoint is questionable due to variations in timing of runs and problems in visibility from an aircraft. In addition, aerial counts are prone to irregularity due to difficult weather conditions, stream turbidity, and in the chance coincidence of the survey flight with escapement or spawning peaks. Such escapement counts were found by the Fisheries Research Institute of the University of Washington to seldom exceed 20 percent of the escapement monitored by counting towers or weirs in the Kvichak River. Tagging studies could be more effective for population estimates in some of the larger rivers where establishment of weirs or towers is neither economical nor feasible. In addition to the use of some of the newer sonar and sonic fish counting devices might increase the knowledge of escapement in the more turbid river systems.

8. Commercial harvest - Study needs to be made of more adequate ways for portraying effort and the fishing intensity which a stock, species or spawning run encounters. In addition, harvest data should be collected, where possible, by smaller statistical subdistricts so that apportionment of the catch may be made to individual segments of the fishery.

9. Subsistence harvest - Adequate monitoring of subsistence harvest is not available. Particularly data is lacking for species other than salmon. These can be extremely significant, as in the case of the Arctic char subsistence harvest in the Togiak River drainage system.

10. Sport harvest - Study needs to be made of more effective methods of collecting sport fishery data. The effect of this fishery, though minor in many areas, warrants a more complete understanding. An effective method of compiling sport harvest data and effort is essential to this end.

Proposed Refuges with Existing Refuges and the State as a Whole

Existing Refuges¹

Aleutian Islands National
Wildlife Refuge

Arctic National
Wildlife Range

Bering Sea National
Wildlife Refuge

Total Acreage

2,720,000

8,900,000

41,000

Average Escapement
in Numbers of Fish
(period of time)

No Data

No Data

No Data

Spawning or Rearing
area (miles)

No Data

No Data

No Data

Habitat (miles)

No Data

No Data

No Data

Average Annual
Commercial Harvest
in Numbers of Fish
(period of time)

No Data

No Data

No Data

Average Fathoms Set
Annual (period of time)
Fathoms Drift
Net (period of time)
Year

No Data

No Data

No Data

No Data

No Data

No Data

Average Annual Number of
Commercial Fishermen
(period of time)

No Data

No Data

No Data

Average Annual Size of
Commercial Catch in
Numbers of Fish
(period of time)

281,226 (1963-64, 66-71)

Average Annual Value
of Commercial Catch
(period of time)

\$145,354 (69-71)

1. First value = salmon
Second value = other anadromous species combined

Existing Refuges¹ (continued)

ogoslof National Wildlife Refuge	Chamisso National Wildlife Refuge	Cape Newenham National Wildlife Refuge	Clarence Rhode National Wildlife Refuge
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390

641

265,000

2,817,000

No Data

No Data

No Data

No Data

No Data

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2 Commercial licenses (average number)
number of nets

Existing Refuges¹ (continued)Forrester Island National
Wildlife RefugeHazen Bay National
Wildlife RefugeHazy Islands National
Wildlife RefugeIzembek National
Wildlife Range

2,800

6,800

42

415,000

No Data

No Data

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4. Fish wheels = Annual average 21 (64-73)

5. Fish wheels = 4 (1973)

6. Fish wheels = 4 (1973)

Existing Refuges¹ (continued)

Kenai National Moose Range	Kodiak National Wildlife Refuge	Nunivak National Wildlife Refuge	St. Lazaria National Wildlife Refuge
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1,730,000

1,815,000

1,109,400

65

No Data

Pink
1,504,250 (1964-72)
Sockeye
699,998 (1968-72)
Chum
267,700 (?)
Chinook
3,800 (?)
Coho
32,000-54,000 (?)

No Data

No Data

No Data

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No Data

7 Entire Bristol Bay region
because of a lack of anadromous fishery information in existing refuges
or in the state of Alaska as a whole during comparable years, percentage
comparisons with the proposed refuges are not possible.

Existing Refuges¹ (continued)Proposed Refuges or Additions, Including Areas of Ecological Concern¹

Semidi National Wildlife Refuge	Simeonof National Wildlife Refuge	Tuxedni National Wildlife Refuge	Arctic National Wildlife Refuge
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8,400	10,400	6,400	17,665,070
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No Data	No Data	No Data	2,096 (1971-73)
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No Data	No Data	No Data	116
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No Data	No Data	No Data	40 525
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No Data	No Data	No Data	2500 lbs. 2500 lbs.
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No Data	No Data	No Data	No Data
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No Data	No Data	No Data	No Data
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No Data	No Data	No Data	No Data
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No Data	No Data	No Data	No Data
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No Data	No Data	No Data	No Data
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9 Total of Southeastern pink, Prince William Sound pink and chum, Kodiak pink, Ignik sockeye, and Bristol Bay sockeye escapements only. 1975 data are preliminary figures.

Proposed Refuges¹ (continued)

Noatak National Wildlife Refuge	Selawik National Wildlife Refuge	Yukon Flats National Wildlife Refuge	Koyukuk National Wildlife Refuge
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9,420,000	5,360,455	23,178,000	7,835,000
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60,652 (1963-74)	20,132 (1963-72) 9,223 (1966-71)	130 (1963-72)	215,000 (1963-72) 1,710 (1969)
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495	324 97	896	765 765
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915 280	437 527	2,657 328	2,161 910
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Includes Kotzebue

16,062 (1963-72)
Arctic char
9,534 (1963, 70-72)
Inconnu
6,801 (1967-72)

11,423 (1963-72)	17,617 (1963-72)
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9,975 (1963-74)	163 (1964-73) ⁴	25 ³ (1964-73) ⁵
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0	2 ³ (1970-73)	11 ³ (1964-73)
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157 ² (1963-74) 157 ² (1963-74)	43 ² (1964-73)	35 ² (1964-73)
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14 ⁵ 1789 (1963-74) 5,038 (1966-74)	2,357 (1963-72)	5,714 (1963-72)
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\$274,153 (1963-74) \$ 3,914 (1967-73)	\$8,956 (1964-73)	\$19,457 (1964-73)
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1
Proposed Refuges (continued)

Yukon Delta National Wildlife Refuge	Togiak National Wildlife Refuge	Iliamna National Resource Range	Alaska Coastal National Wildlife Refuges
18,868,799	5,999,700	8,470,000	44,000
2,003,000 (1963-72)	269,573 (1963-72)	8,759,827 (1963-72)	
1,620	870	2, 2,642 28	
4,096 1,268	2,234 148	6,096 830	
6,956 (1963-72)	11,374 (1963-72) Arctic char 100,000 (estimate)	128,582 (1963-72)	
503 ³ (1964-73) ⁶	19 ³ (1964-73)	375 ³ (1964-71)	
551 ³ (1964-73)	125 ³ (1963-73)	1,344 ³ (1964-71)	
894 ² (1964-73)	64 ² (1964-73)	3,836 ² (1963-73) ⁷	
348,818 (1963-72) 7,064 (1967-73)	343,111 (1963-72)	8,55 7,304 (1963-72)	11,450,649 (1963-72)
\$771,940 (1964-73) \$ 3,456 (1967-73)	\$366,781 (1963-71)	\$5,687,141 (1963-72)	

State of Alaska^{1,8}

 wide

375,296,000

17,481,867⁹ (1963-75)

Not Available

Not Available

 75-98 (1970-74)

2,130³ (1966-74)

3,695³ (1966-74)

21,621² (1970-74)

246,385,584 lbs. (1963-73)

\$46,944,366 (1963-73)

