Summary of Reported Atlantic Salmon (*Salmo salar)* Catches and Sightings in British Columbia and Adjacent Waters in 1996

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SUMMARY OF REPORTED ATLANTIC SALMON (*Salmo salar*) CATCHES AND SIGHTINGS IN BRITISH COLUMBIA AND ADJACENT WATERS IN 1996

by

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ABSTRACT

Thomson, A. J. and S. McKinnell. 1997. Summary of reported Atlantic salmon (*Salmo salar*) catches and sightings in British Columbia and adjacent waters in 1996. Can. Manuscr. Rep. Fish. Aquat. Sci. 2407: 37 p.

A program to monitor the abundance and distribution of Atlantic salmon (*Salmo salar*) in British Columbia was conducted jointly by the Fisheries and Oceans Canada (D.F.O.) and the British Columbia Ministry of Agriculture, Fisheries and Food in 1996, with the co-operation of the British Columbia Ministry of Environment, Lands and Parks. The study consisted of contacting individuals and agencies involved with salmonid fisheries, research and enhancement as well as all commercial fish buyers, advising them to return or report all Atlantic salmon to D.F.O.. Catches of Atlantic salmon in the Fisheries and Oceans Canada sales slip database were reviewed. Six hundred and seventy-one Atlantic salmon were either returned or reported to D.F.O. from marine fisheries. Two hundred and ten Atlantic salmon were reported sighted or captured in freshwater, surpassing all previous years combined. Two hundred and eighty-seven fish were returned to the Pacific Biological Station for analysis and species verification. One hundred and thirty-five Atlantic salmon were reported caught in Alaskan commercial fisheries in 1996 and 112 were reported caught in Washington State.

RÉSUMÉ

Thomson, A. J. and S. McKinnell. 1996. Summary of reported Atlantic salmon (*Salmo salar*) catches and sightings in British Columbia and adjacent waters in 1995. Can. Manuscr. Rep. Fish. Aquat. Sci. 2407: 37 p.

En 1996, le ministère des Pêches et des Océans du Canada (MPO) et le ministère de l'Agriculture, des Pêches et de l'Alimentation de la Colombie-Britannique ont réalisé en collaboration un programme de surveillance de l'abondance et de la distribution du saumon atlantique (*Salmo salar*) en Colombie-Britannique; le ministère de l'Environnement, des Terres et des Parcs de la Colombie-Britannique a aussi participé au programme. Dans le cadre de cette étude, il a fallu joindre chacun des organismes et chacune des personnes qui oeuvrent dans le domaine de l'exploitation, de la recherche ou de la mise en valeur des salmonidés, ainsi que tous les acheteurs de poissons, pour leur demander de remettre ou de signaler au MPO tous les saumons atlantiques capturés. Les chiffres de captures de la base de données du MPO, élaborée à partir des bordereaux d'achat, ont été vérifiés. Six cent soixante et onze saumons atlantiques pêchés en mer ont été remis ou signalés au MPO. Deux cent dix saumons atlantiques - un chiffre qui dépasse le volume de toutes les années antérieures combinées - ont été repérés, ou pêchés en eau douce. Deux cent quatre-vingt-sept poissons ont été remis à la Station de biologie du Pacifique pour y être analysés et identifiés. Cent trente-cinq saumons atlantiques auraient été capturés par les pêches commerciales de l'Alaska en 1996, et cent douze auraient été pêchés dans l'État de Washington.

INTRODUCTION

In 1991, a joint federal / provincial program was initiated by the British Columbia Ministry of Agriculture, Fisheries and Food and the Fisheries and Oceans Canada monitor the presence of Atlantic salmon (*Salmo salar*) in British Columbia (B.C.) coastal streams. Since 1991, the Atlantic Salmon Watch program has been expanded and now monitors commercial and sport catches and observations of Atlantic salmon throughout British Columbia, Alaska and Washington with the co-operation of the B.C Ministry of Environment, Lands and Parks, the Alaska Department of Fish and Game and the Washington Department of Fish and Wildlife. (Thomson and McKinnell, 1993, 1994, 1995, 1996). The program relies on fishers, fish processors, government field staff and hatchery workers to report Atlantic salmon.

The monitoring program's main objectives are: increasing the general awareness of the presence of Atlantic salmon in B.C. waters, expanding the reporting of Atlantic salmon, maintaining a database of the number of Atlantic salmon reported and/or observed in B.C., obtaining biological information from returned Atlantic salmon and preparing annual reports of catches or sightings of Atlantic salmon.

METHODS

The program consisted of four main efforts: 1) contacting a large number of individuals working in fisheries related activities to alert them to the monitoring program, 2) collecting and analyzing as many of the captured Atlantic salmon as possible, 3) retrieving catch data from several sources to provide information about the number of Atlantic salmon observed in B.C. in 1996, and 4) maintaining a public access information line for the reporting of Atlantic salmon.

Fisheries and Oceans Canada field offices, hatcheries, and Public Involvement Program Hatcheries, Ministry of Environment, Lands and Parks coastal offices, commercial salmon processors, small craft harbours and Washington Department of Fish and Wildlife hatcheries were contacted. They were alerted to the presence of Atlantic salmon and provided with a full colour poster to assist in identifying Atlantic salmon and advertise the 1-800 toll free reporting line.

Since 1995 Fisheries and Oceans Canada has conducted regular swim surveys to assess chinook salmon populations in the streams of the west coast of Vancouver Island. Included in their mandate is to record and report Atlantic salmon. In 1996, 50 different river streams or portions thereof were surveyed, covering a total of 165 km. In addition the B.C. Ministry of Environment, Lands and Parks (M.E.L.P.) conducted surveys of 25 rivers on Vancouver Island and the islands of the Broughton Archipelago for adult and juvenile Atlantic salmon.

Atlantic salmon sent to the Pacific Biological Station (PBS) were examined to verify species and origin. Sex, fork length, body weight, gonad weight, stomach contents, and a qualitative index of fat content were recorded. Scales and otoliths were sampled for age and/or scale growth determination.

Fat content of each fish was assessed visually on a qualitative scale from 0 to 4. Zero indicated a dressed or greatly decomposed fish where no fat could be found, 1 indicated trace amounts of fat present, 2 indicated larger amounts of fat on major organs, 3 indicated extensive fat throughout the pyloric caeca, and 4 indicated organs completely encased in fat.

Atlantic salmon catch statistics data for B.C. were obtained from Fisheries and Oceans Canada sales slip database, westcoast troll test fishery and the sports creel survey data. Catch data for Washington State were obtained from the Washington State Department of Fisheries. Alaskan catch data is supplied by the Alaskan Department of Fish and Game. This report also revises some totals previously reported.

RESULTS AND DISCUSSION

Escapes of Atlantic salmon

Salmon farmers are required to report escapes of Atlantic salmon to Fisheries and Oceans Canada. From 1991 to 1995, 141,887 Atlantic salmon escaped from B.C. marine aquaculture facilities in 22 reported incidents. In 1996, 12,667 Atlantic salmon were reported escaped in British Columbia in two incidents at marine net-pen sites on the north-east coast of Vancouver Island. The actual number of fish that escape is unknown. Escapes of fish from farm sites may go unnoticed or unreported by the farm management.

On July 2, 1996 approximately 101,000 Atlantic salmon escaped from a farm site at Cypress Island, in northern Puget Sound. The fish were comprised of two year-classes, 1995's and 1996's. Approximately 35,000 of the total were 1996's at a body weight range of 0.4 to 0.54 kg, the remainder were from the 1995 year class (approximately 66,000) ranging from 2.7 to 3.7 kg. A large, but unknown number of these fish were killed during the destruction of the pens and did not escape.

In addition to these marine escapes, 40,000 fry were accidentally spilled on April 27, 1996 during transfer into lake net-pens. in Georgie Lake, northern Vancouver Island.

Marine Recoveries and Sightings

Within B.C. waters, Atlantic salmon were reported from as far north as Area 3, and as far south as Area 20 (Figures 1 and 2). The number of documented recoveries of Atlantic salmon caught in marine fisheries in 1996 was 671. This total was obtained by summing the reported catches of Atlantic salmon in the D.F.O. sales slip database, the D.F.O. creel survey database, D.F.O. westcoast troll test fishery data and those received by the Atlantic Salmon Watch program (A.S.W.P.). The true number of Atlantic salmon caught exceeds this by some unknown factor. The largest annual catch (4,543 Atlantic salmon) was in 1993 (Thomson and McKinnell, 1994).

Fisheries and Oceans Canada sales slip database for commercial fishing vessels lists 505 Atlantic salmon sold. The largest single week (151 fish) was reported by the Pacific Salmon

Commission's' three gill-net vessels conducting test fishing in Area 20. Anecdotal information indicates that the Atlantic salmon catches reported in the D.F.O. sales slip database underestimate the true catch.

In 1996 the total commercial fishing effort for B.C. was considerably reduced due to conservation measures. In statistical area 12 (Johnstone St.) the commercial fishing effort was only 6.7% of the mean effort of the previous eight years. However, the catch per unit effort (C.P.U.E.) of Atlantic salmon in Area 12 was 162.9% higher than the mean C.P.U.E. of the previous eight years.

In Washington State the commercial catch of Atlantic salmon is monitored through the buyer reporting program administered by the Washington State Department of Fisheries. In 1996, the combined recorded catch of Atlantic salmon in Washington State commercial, tribal and test fisheries was 112 fish (Figure 3). The majority of the catch occurred in lower Puget Sound with 31 fish reported from north of Puget Sound. Thomson and McKinnell (1996) reported 67 Atlantic salmon caught in Washington State in 1995, that number has been revised to 197 fish.

The Alaska Department of Fish and Game records the catches of Atlantic salmon in Alaskan waters through a mark recovery program. In 1996, 135 fish were reported. The majority of which were captured in the commercial net fisheries of south-east Alaska.

Freshwater recoveries and sightings

In 1996, 210 Atlantic salmon were reported caught or sighted in rivers through the A.S.W.P. (Figure 5). This total exceeds the total of all previous years combined. Swim surveys provided the majority of the data, and probable recounts of the same fish are not included in this total. Therefore the total should be considered a minimum estimate of the actual number of Atlantic salmon in the rivers and streams of B.C.

DFO swim surveys counted 295 Atlantic salmon in 12 stream or river systems, of which a minimum of 94 were not replicated counts of the same fish. The greatest number of Atlantic salmon counted in one river on one day was 40 in the Zeballos River on Oct. 1, 1996. They accounted for 5.06% of all salmonids counted in the river that day. The M.E.L.P. conducted swim surveys in search of Atlantic salmon and observed 93 Atlantic salmon in five rivers. Their observations were included in the A.S.W.P. data.

The M.E.L.P. conducted sampling by gillnet and net-trap in both Georgie and Lois lakes. In Georgie Lake 7 days of sampling yielded 33 Atlantic salmon parr, pre-smolts and smolts. A downstream trap at the fence on the outlet of the lake captured an additional 8 smolts from June 1, 1996 to Oct. 15, 1996. Lois Lake was sampled May 22 - 24, 1996 using a floating net-trap and gillnets, 13 Atlantic salmon were captured in the net-trap (Lough and Law, 1996).

In Washington State, anecdotal information on recoveries and sightings were reported to the Washington Department of Fish and Wildlife and the A.S.W.P. Approximately 30 fish were

reported in the Dungeness River and an estimate of 50 - 100 in the Elwha River. Atlantic salmon were also captured or angled in the Nooksack, Skagit, Snohomish and Green Rivers and sighted in Lake Washington (D. Seiler, pers. comm.).

Biological sampling

A) Recoveries from B.C.

One hundred and fourteen marine recoveries of Atlantic salmon from B.C. fisheries were returned to the Pacific Biological Station for biological sampling (Figure 6). The results of the biological sampling of these Atlantic salmon are summarized in Figures 7 and 8. The detailed data are reported in Table 1. Fork lengths ranged from 525 to 775mm with a mean of 630.9mm. Round body weights ranged from 1.7 to 5.8kg with a mean of 3.0kg.

Murza and Khristoforov (Murza and Khristoforov, 1991) developed a scale of maturity for Atlantic salmon based on weights and external appearance of gonads. Stages I - III are maturing fish, stage IV is a fully mature fish, and stages V and VI are post reproductive stages. Of 64 males the median gonad weight was 5 grams. Thirteen males were at stage III or higher maturity level. The median gonad weight for 47 females was 7.5 grams, 12 were at maturity level of III(late) or greater (Figure 9).

The median fat content for the B.C. Marine caught fish was 3 (n=111), whereas the median fat content for the Alaskan caught fish was 2 (n=125). A study of B.C. farm-fish at time of harvest confirmed that fat level 4 is the normal level for Atlantic salmon while in net-pens.

Of 111 fish analyzed for stomach contents, 2 fish had fish remains in their stomachs, 1 contained commercial fish food pellets, 1 had euphausids and 4 had miscellaneous digested matter. The remaining 103 fish had no identifiable food matter in their stomachs.

Age of the Atlantic salmon based on scale patterns was judged to be difficult to determine. All of the sampled fish had some degree of fin wear, primarily on the dorsal and caudal fins. Fin wear is indicative of net-pen rearing and is an established procedure for the identification of farm raised fish. Aquaculture husbandry techniques appear to have improved to the point that the absence of fin wear is not necessarily an indication of a feral fish.

Thirty-eight Atlantic salmon from streams or rivers were returned to the Pacific Biological Station for analysis (Figure 10). The results of the biological sampling of these fish are summarized in Table 2. The Salmon River on the north-east coast of Vancouver Island provided the largest observed sports catch (33) of Atlantic salmon. The majority of the fish appeared to be from the same group, in that, they were all of the same approximate size and maturity level. Of the 19 that were analysed at P.B.S., 10 contained prey items in their stomachs.

Thirty Atlantic salmon from Georgie Lake have been sampled. Their fork lengths ranged from 124mm to 187mm with a mean of 152mm, weights ranged from 20g to 80g with a mean of

41g, and 16 contained prey items (insect larvae or invertebrates) in their stomach contents (Thomson 1996).

Thirteen Atlantic salmon were captured in Lois Lake by the M.E.L.P. Fork lengths of these fish ranged from 146mm to 247mm with a mean of 196 mm, body weights ranged from 27g to 227g with a mean body weight of 75g. Of the thirteen, 11 contained insect larvae in their stomachs.

B) Recoveries from Alaska

One hundred and thirty-five Atlantic salmon were caught in Alaska and shipped to P.B.S. for analysis. Fork lengths of the Alaskan recoveries ranged from 460 to 825 mm with a mean of 635.5 mm. Round body weights ranged from 1.0 to 5.8 kg with a mean of 2.6 kg. Of 68 males recovered from marine landings the median gonad weight was 3.0 grams, none were classed as Stage III or higher in maturity. Sixty-two females were caught with a median gonad wt of 7.75 g in Alaska. Eighteen were classed as Stage III(late) or higher in maturity (Figure 9). Of 131 fish stomachs examined, 5 contained herring, sandlance or other fish remains, 6 contained miscellaneous organic matter, and the remaining 120 were empty. The results of the biological sampling of these fish are summarized in Table 3. There are no Atlantic salmon aquaculture facilities in Alaska.

C) Recoveries from Washington.

Fourteen Atlantic salmon from the Dungeness and Elwha Rivers were sampled by the Washington Department of Fish and Wildlife. All appeared to be immature and all were found with empty stomachs (D. Seiler, pers. com.).

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Table 1. Biological data of the sampled B.C. marine caught Atlantic salmon.

FISHNO	Sex	Fork Length (mm)	Weight (kg)	Body State	Gonad Weight (g)	Stomach Contents	Fat
96016	F	579	2.125	Round	8.5	E	3
96019	M	599	2.371	Round	2	E	3
96020	F	610	2.87	Round	7.5	KELP	3
96021	F	610	2.736	Round	10	E	4
96022	M	605	2.51	Round	3.5	E	3
96023	M	646	3.204	Round	7.5	E	3
96024	M	665	3.348	Round	6	E	3
96026	F	669	3.024	Round	10	E	3
96027	M	587	2.516	Round	2	E	3
96028	F	602	2.661	Round	5.5	E	3
96029	M	705	2.576	Round	3.5	E	3
96030	M	575	2.316	Round	2	E	3
96031	F	590	2.548	Round	10	E	3
96032	M	629	2.956	Round	5	E	3
96033	M	569	2.448	Round	7	E	3
96034	F	650	3.428	Round	6	E	2
96035	M	550	1.815	Round	0.5	E	3
96036	M	600	2.61	Round	7	E	4
96037	M	627	3.356	Round	38	E	4
96038	M	615	2.815	Round	46.5	E	4
96039	M	610	2.842	Round	2.5	E	3
96098	M	627	2.661	Round	5	E	3
96099	M	620	2.022	Round	6	E	2
96100	M	600	2.591	Round	6	E	4
96101	M	694	3.036	Round	6	E	2
96102	F	662	3.132	Round	12.5	E	3
96103	M	697	3.448	Round	5	E	4
96104	M	720	3.538	Round	2	EUPHAUSIDS	4
96105	F	630	2.531	Round	7	E	3
96183	M	689	3.622	Round	5	KELP	3
96184	M	698	3.57	Round	3	E	3
96185	F	625	2.81	Round	5	E	3
96186	F	559	1.843	Round	5	E	2
96187	M	616	2.397	Round	3	E	3
96188	F	569	2.138	Round	4	E	2
96189	M	745	4.34	Round	6	E	2
96190	M	650	2.655	Round	3	E	2
96191	M	624	2.313	Round	1.5	E	2
96192	M	650	3.118	Round	3	E	3
96193	F	592	2.06	Round	7	E	2
96194	F	581	1.971	Round	5	E	2
96199	M	655	2.799	Round	4	E	2
96200	M	629	2.466	Round	4	E	3
96201	M	600	2.342	Round	1.8	E	3
96202	M	758	5.015	Round	137.2	E	3
96203	M	690	3.653	Round	22.8	E	3
96204	M	765	4.799	Round	3	GM	3
96205	M	705	3.848	Round	4.8	E	3
96207	F	592	2.432	Round	4	E	3
96208	F	600	2.46	Round	7.2	E	3
96209	M	620	2.963	Round	7.51	E	3
96210	M	625	3.244	Round	9.88	E	4

FISHNO	Sex	Fork Length (mm)	Weight (kg)	Body State	Gonad Weight (g)	Stomach Contents	Fat
96211	F	591	2.681	Round	3.4	E	2
96212	F	650	2.801	Dressed	8.5	E	3
96213	M	660	2.937	Round	3.6	E	2
96214	M	729	4.677	Round	4.4	E	3
96215	M	547	1.894	Round	7.6	E	3
96216	M	550	2.264	Round	84.2	E	2
96217	F	681	3.121	Dressed	13.1	E	3
96218	M	525	1.675	Round	1.5	E	2
96219	M	600	1.968	Round	1	E	2
96220	F	671	2.999	Dressed	9.4	E	3
96221	F	620	3.078	Round	4.4	E	2
96222	M	600	2.746	Round	1.5	E	3
96223	M	601	2.765	Round	109.3	E	3
96224	F	594	3.003	Round	211.9	E	2
96225		562	1.874	Dressed			
96226	F	609	2.835	Round	194.3	E	3
96227	F	672	3.377	Round	10	E	2
96228	M	745	4.296	Round	.2	E	3
96229	F	594	2.348	Round	4.4	E	2
96230	M	578	2.66	Round	53.9	E	3
96231	F	740	4.29	Round	13	E	3
96232	M	582	2.243	Round	2.2	E	2
96233	F	741	4.318	Round	13.6	E	3
96234	M	561	2.388	Round	87.5	E	2
96235	F	624	2.905	Round	7.5	E	3
96236	F	571	2.308	Round	138.1	E	2
96237	M	622	3.375	Round	2.4	E	3
96238	M	627	2.994	Round	.2	FF	3
96239	F	614	2.462	Dressed	4.8	E	3
96240	M	559	1.918	Dressed	1.5	E	2
96241	F	595	2.85	Round	130.1	E	3
96242	F	689	3.824	Round	10	E	3
96243	F	640	2.627	Round	11.6	E	3
96244	F	687	2.471	Round	5.2	E	2
96245	M	629	2.87	Round	37.9	E	3
96246	F	590	2.268	Round	4.4	E	2
96247		684	3.342	Dressed			
96248	F	578	3.038	Round	5.8	E	2
96249	M	624	2.64	Round	1.6	E	3
96250		573	1.831	Dressed			
96251	M	582	2.556	Round	72.6	FR	3
96252	M	675	3.37	Round	2.8	FR	3
96253	M	775	5.779	Round	6.8	E	3
96254	M	630	3.404	Round	91.1	E	3
96255	F	620	2.296	Round	9.4	E	2
96256	F	610	2.329	Round	5.6	E	3
96257	F	672	3.5	Round	13.6	E	3
96258	F	685	3.974	Round	12.8	E	3
96259	M	649	3.285	Round	99	E	3
96260	F	680	3.915	Round	14.4	E	3
96261	M	652	3.316	Round	3.6	E	3
96262	M	622	3.757	Round	2	E	2
96263	F	610	2.575	Round	6.6	E	3
96264	M	639	2.693	Round	3	E	3
96265	F	590	2.371	Round	7.2	E	3

FISHNO	Sex	Fork Length (mm)	Weight (kg)	Body State	Gonad Weight (g)	Stomach Contents	Fat
96266	F	592	2.437	Round	4.6	E	3
96267	F	602	2.756	Round	8.6	E	3
96268	M	610	2.618	Round	3.6	E	3
96269	F	634	2.569	Round	7.2	KELP	3
96270	M	632	2.859	Round	2.2	E	3
96271	F	644	3.028	Round	8.2	E	3
96273	M	625	3.173	Round	14.2	E	3

LEGEND
Stomach Contents
E = Empty
FF = Commercial Fish Food Pellets
FR = Indistinguishable Fish Remains
GM = Indiscernible Digested Material

Table 2. Biological data of the sampled B.C. freshwater caught Atlantic salmon.

FISHNO	Sex	Fork Length (mm)	Weight (kg)	Body State	Gonad Weight (g)	Stomach Contents	Location	FAT
96001	M	674	3.117	Round	2.5	E	KOKISH R.	3
96002	M	765	4.052	Round	7.5	INVERT	SALMON R.	2
96003	M			Head	9	ROCK	SALMON R.	4
96004	M			Head	5	WOOD	SALMON R.	3
96005	F			Head	23	INSECT	SALMON R.	2
96006	M			Head	8.5	E	SALMON R.	4
96007	F			Head	46	INSECT	SALMON R.	4
96008	F			Dressed	37.5	STONE FLY N	SALMON R.	3
96009	M			Dressed	24.5	WOOD	SALMON R.	2
96010	M			Dressed	14	STONE FLY N	SALMON R.	3
96011	F			Dressed	36	STONE FLY N	SALMON R.	3
96012	F			Dressed	45	STONE FLY N	SALMON R.	3
96013	M			Dressed		STONE FLY N	SALMON R.	3
96014	F			Dressed	29.5	WOOD	SALMON R.	3
96015	M			Dressed	22	E	SALMON R.	3
96017	M			Dressed		STONE FLY N	SALMON R.	3
96018	M	890		Dressed	10	WOOD	SALMON R.	3
96025	M	801	5.332	Dressed	8	ORGANIC	SALMON R.	3
96195	M	615	3.146	Round	124	E	LEINER CK.	2
96196	F	574	2.448	Round	102.5	E	LEINER CK.	2
96197	M	592	2.377	Round	53	E	LEINER CK.	3
96198	M	569	2.431	Round	61.5	E	LEINER CK.	3
96206	M	705	3.524	Round	178	E	QUATSE R	1
96272	F	692	2.873	Round	13.8	E	OYSTER R	2
96274	M	690	2.86	Round	3	BLOOD	OYSTER R	3
96275	M	659		Dressed	3	E	CAMPBELL R	2
96276	M	646		Dressed	2	IP	CAMPBELL R	2
96277	M	749		Dressed	3	E	CAMPBELL R	
96278		640	2.841	Dressed		E	FRASER R	
96279	F	658	3.576	Round	354.5	E	BEDWELL R	1
96280	F			Dressed	211	E	BEDWELL R	
96281	M	644	2.689	Round	166	E	SOOKE R	1
96282	M	444	1.145	Round	74.5	E	WASHLAWLIS R.	2
96283	M	548	2.212	Round	48.5	E	ZEBALLOUS R	3
96284	F	501	1.765	Round	105.5	E	ZEBALLOUS R	2
96285	F			Dressed		E	ZEBALLOUS R	1
96286	F	552		Dressed		E	ZEBALLOUS R	2
96287	M			Dressed		E	SALMON R	3
96288	M			Dressed		FR	SALMON R	3

LEGEND
Stomach Contents
E = Empty
INVERT. = Invertebrates
FR = Indistinguishable Fish Remains
IP= Icthyoplankton

Table 3. Biological data of the sampled Alaskan marine caught Atlantic salmon.

FISHNO	Sex	Fork Length (mm)	Weight (kg)	Body State	Gonad Weight (g)	Stomach Contents	Fat
96040	M	661	2.552	Round	1.5	E	3
96041	F	673	3.216	Round	11.7	E	3
96042	M	656	2.662	Round	1.8	E	3
96043	M	680	3.104	Round	4.3	BLOOD	3
96044	M	610	2.43	Round	1.6	E	2
96045	F	700	3.865	Round	15.3	E	2
96046	F	578	1.805	Round	6.7	E	2
96047	M	668	2.754	Round	4.1	E	3
96048	F	460	1.063	Round	2.1	E	2
96049	M	640	2.764	Round	1	E	2
96050	M	637	2.579	Round	1.5	E	2
96051	F	625	2.572	Round	9	E	3
96052	M	641	2.567	Round	4	E	2
96053	F	670	2.946	Round	7.5	E	3
96054	F	540	1.592	Round	5	E	2
96055	M	660	2.922	Round	3	E	3
96056	M	631	2.404	Round	2.5	E	3
96057	M	642	2.77	Round	3	E	2
96058	F	618	2.279	Round	6	E	2
96059	M	642	2.274	Round	3	E	2
96060	F	662	2.925	Round	10.5	E	2
96061	F	560	1.487	Round	5	E	3
96062	M	628	2.706	Round	4.5	E	3
96063	M	650	2.507	Round	2.5	E	2
96064	F	641	2.697	Round	7.5	E	3
96065	M	712	3.74	Round	3	E	3
96066	M	629	2.174	Round	3	E	3
96067	M	682	3.63	Round	4	E	3
96068	M	616	2.404	Round	4	E	2
96069	F	646	2.195	Round	6	E	3
96070		590	2.122	Dressed			
96071	F	587	2.261	Round	6	E	2
96072	F	620	2.17	Round	6	E	2
96073	F	590	2.422	Round	9.5	E	1
96074	F	550	3.166	Round	7.5	E	2
96075	M	642	2.272	Round	3.5	E	2
96076	F	658	2.867	Round	11.5	E	3
96077	F	730	4.31	Round	16.5	E	3
96078	F	605	2.779	Round	13	E	3
96079	M	630	2.389	Round	3	E	3
96080	F	578	2.039	Round	7	E	3
96081	M	660	3.078	Round	5	E	3
96082		630	2.241	Dressed			
96083	M	705	4.056	Round	3	E	3
96084	M	630	3.094	Round	1	HERRING	2
96085	F	692	3.57	Round	8	E	3
96086	F	480	1.269	Round		E	
96087	F	582	1.904	Round	7	E	2
96088	F	589	1.907	Round	8	E	2
96089	F	550	1.644	Round	4	E	2
96090	M	643	3.014	Round	5	E	3
96091	F	682	3.776	Round	18.5	E	3

FISHNO	Sex	Fork Length (mm)	Weight (kg)	Body State	Gonad Weight (g)	Stomach Contents	Fat
96092	F	654	2.902	Round	9.5	E	2
96093	F	622	2.022	Round	7	E	2
96094	M	686	3.16	Round	3	E	2
96095	M	540	1.587	Round	1.5	E	2
96096	F	697	3.56	Round	12	E	2
96097	M	548	2.137	Round	1	E	3
96106	F	625	2.35	Round	7	E	2
96107	M	632	2.587	Round	2	FR	2
96108	M	630	2.527	Round	2	E	2
96109	M	604	2.557	Round	3	GM	3
96110	M	718	4.036	Round	2	E	2
96111	M	659	2.536	Round	3	E	3
96112	F	635	2.645	Round	6	E	3
96113	M	616	2.53	Round	5	E	3
96114	M	602	2.068	Round	3	E	2
96115		662	2.663	Dressed			
96116	F	698	3.108	Round	9.5	E	3
96117	M	612	2.329	Round	3	E	3
96118	F	705	3.984	Round	17.5	E	3
96119	F	711	3.682	Round	11	E	3
96120	F	604	2.451	Round	7.5	E	3
96121	M	715	3.794	Round	3	E	2
96122	M	688	3.324	Round	9	E	3
96123	F	549	1.877	Round	8	E	2
96124	F	617	2.341	Round	12	E	3
96125	M			Dressed	2	E	2
96126	F	609	2.168	Round	6	E	3
96127	F	600	2.009	Round	7	E	2
96128	F	645	2.49	Round	8	E	3
96129	M	645	2.739	Round	3	E	2
96130	M	657	2.698	Round	3	E	3
96131	F	654	2.586	Round	11	E	2
96132	M	590	1.987	Round	2	E	2
96133	F	670	2.593	Round	18	E	1
96134	M	638	2.424	Round	2.5	E	3
96135	F	720	4.018	Round	8	E	3
96136	M	688	3.116	Round	6	E	3
96137	F	643	2.44	Round	8	E	2
96138	M	673	2.739	Round	3	E	2
96139	M	569	1.642	Round	2	E	2
96140	F	627	2.448	Round	7.5	E	2
96141	M	699	2.828	Round	8	HERRING	1
96142	M	701	3.462	Round	3	E	2
96143	F	653	2.828	Round	5	SANDLANCE	2
96144	M	684	3.212	Round	4	MISC	2
96145	F	619	2.378	Round	10	KELP	2
96146	M	690	3.876	Round	3	E	3
96147	F	609	2.52	Round	7	E	2
96148	F	585	2.115	Round	7	E	2
96149	M	825	5.758	Round	6	E	3
96150	F	630	2.635	Round	8	E	3
96151	M	620	2.367	Round	2	E	3
96152	M	650	2.459	Round	2	E	2
96153	F	642	2.879	Round	7	GM	3
96154	M	682	3.348	Round	3	GM	3

FISHNO	Sex	Fork Length (mm)	Weight (kg)	Body State	Gonad Weight (g)	Stomach Contents	Fat
96155	M	657	3.052	Round	4	E	2
96156	M	657	3.114	Round	2	E	2
96157	M	694	3.514	Round	3	E	2
96158	M	681	3.276	Round	7	E	2
96159	M	660	2.683	Round	2	E	2
96160	F	660	3.036	Round	11	E	2
96161	F	522	1.499	Round	4	E	2

LEGEND
Stomach Contents
E = Empty
MISC. = Miscellaneous
FR = Indistinguishable Fish Remains
GM = Indiscernible Digested Material

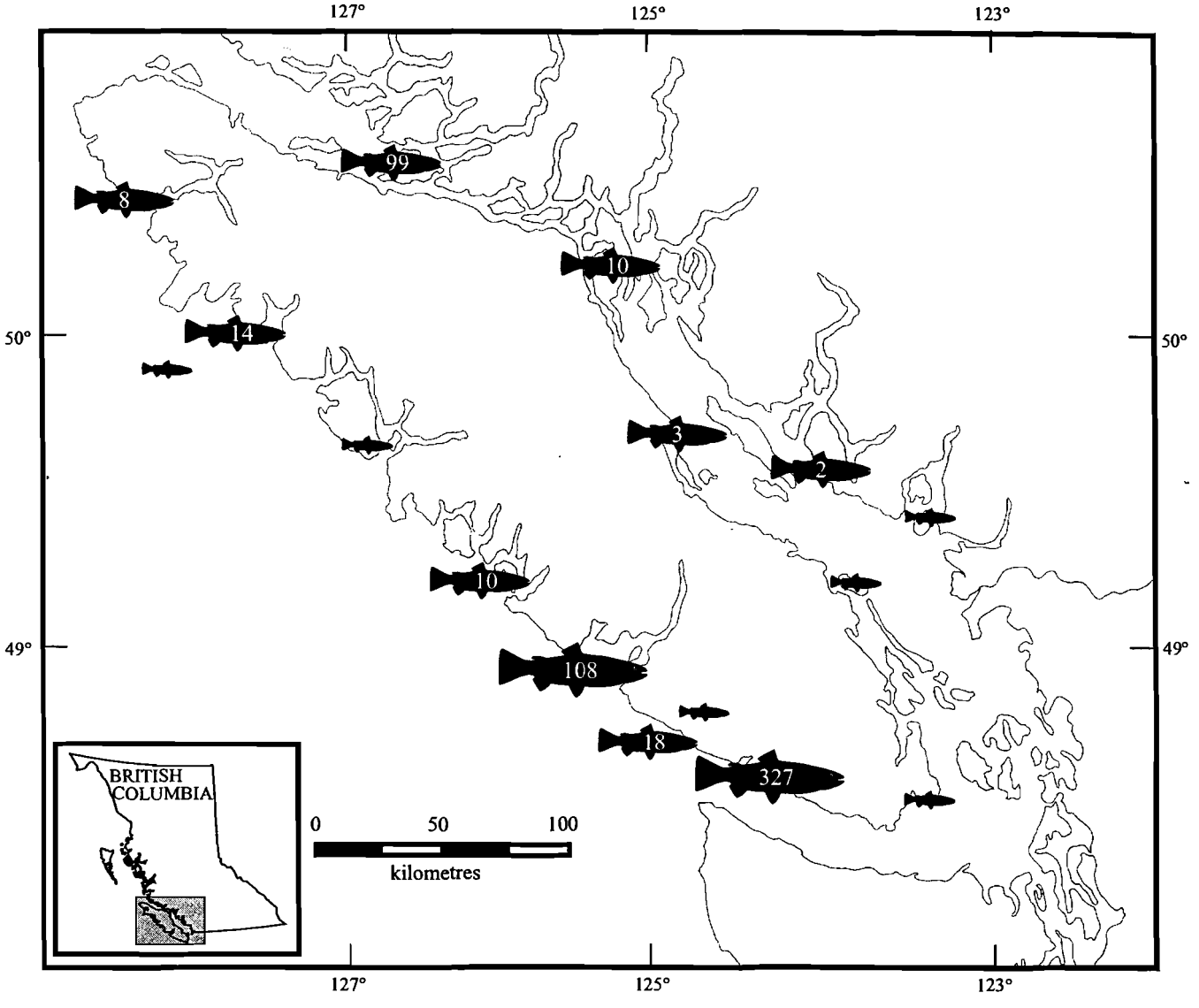

Figure 1. Atlantic salmon reported from marine waters in Southern British Columbia in 1996 by D.F.O. statistical area. Data compiled from sales slip database and Atlantic Salmon Watch program.

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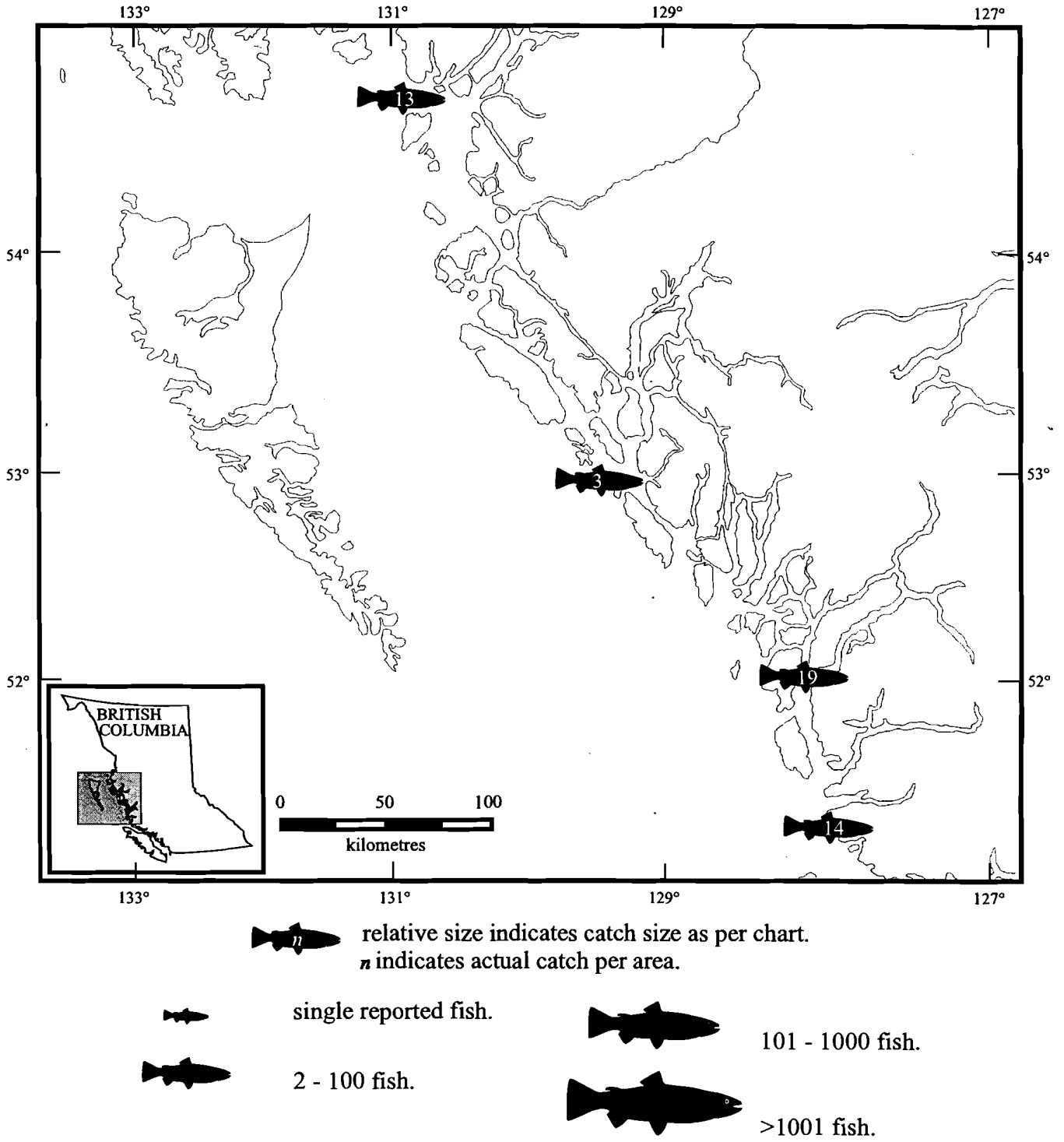

Figure 2. Atlantic salmon reported from marine waters in Northern British Columbia in 1996 by D.F.O. statistical area. Data compiled from sales slip database and Atlantic Salmon Watch program.

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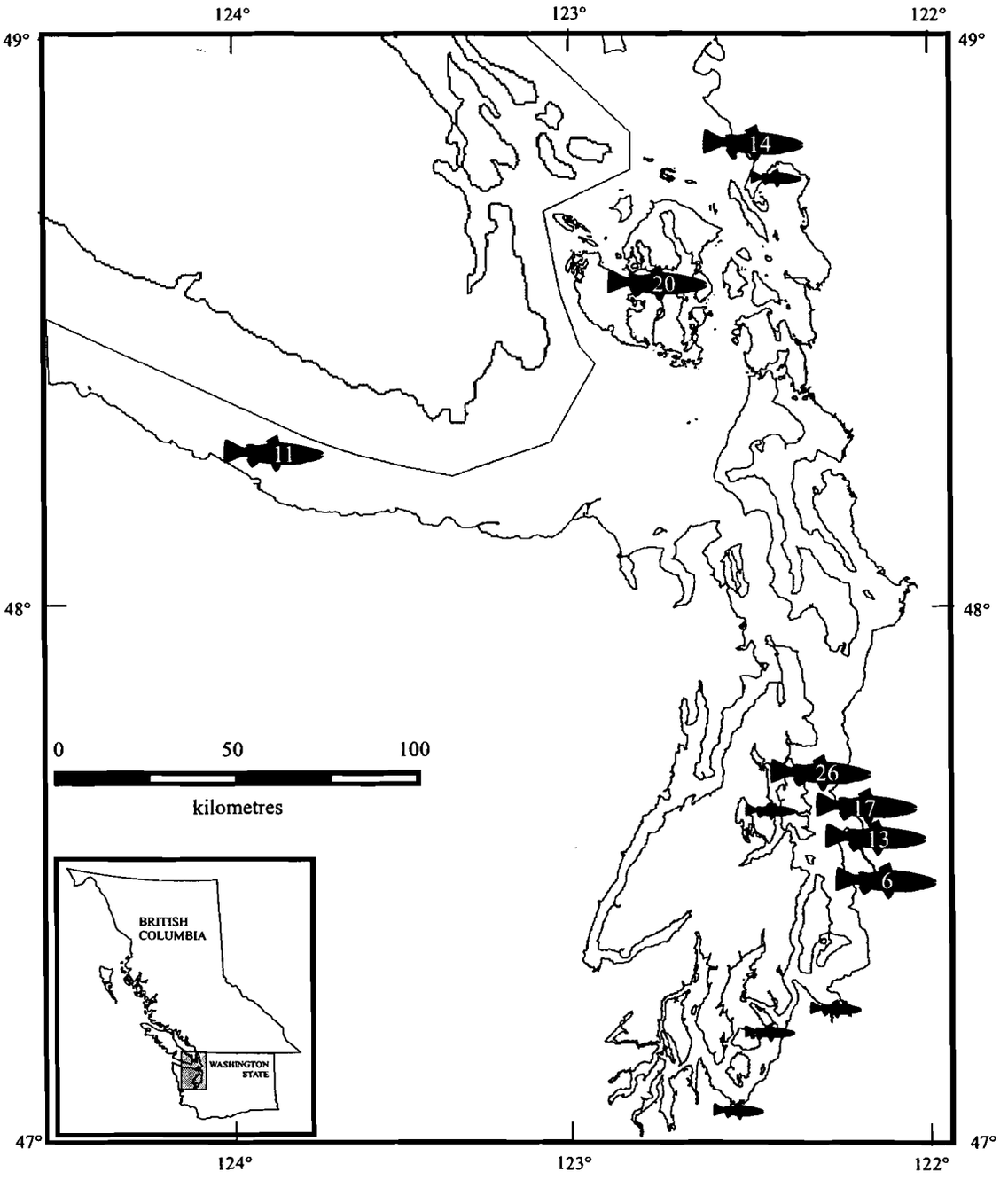

Figure 3: Catch of Atlantic salmon in Washington State in 1996, by catch region.

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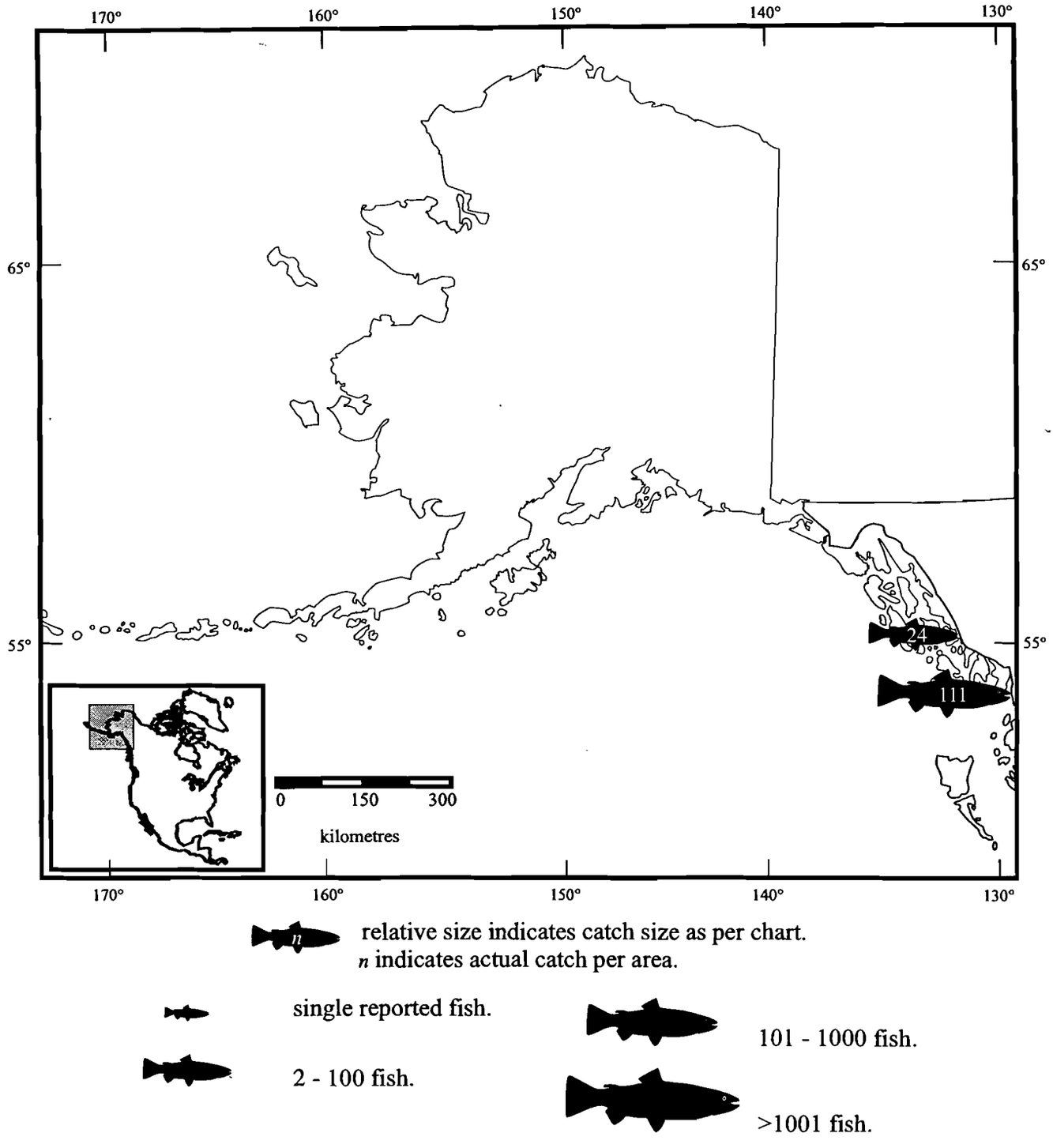

Figure 4. Atlantic salmon catch in Alaskan waters in 1996.

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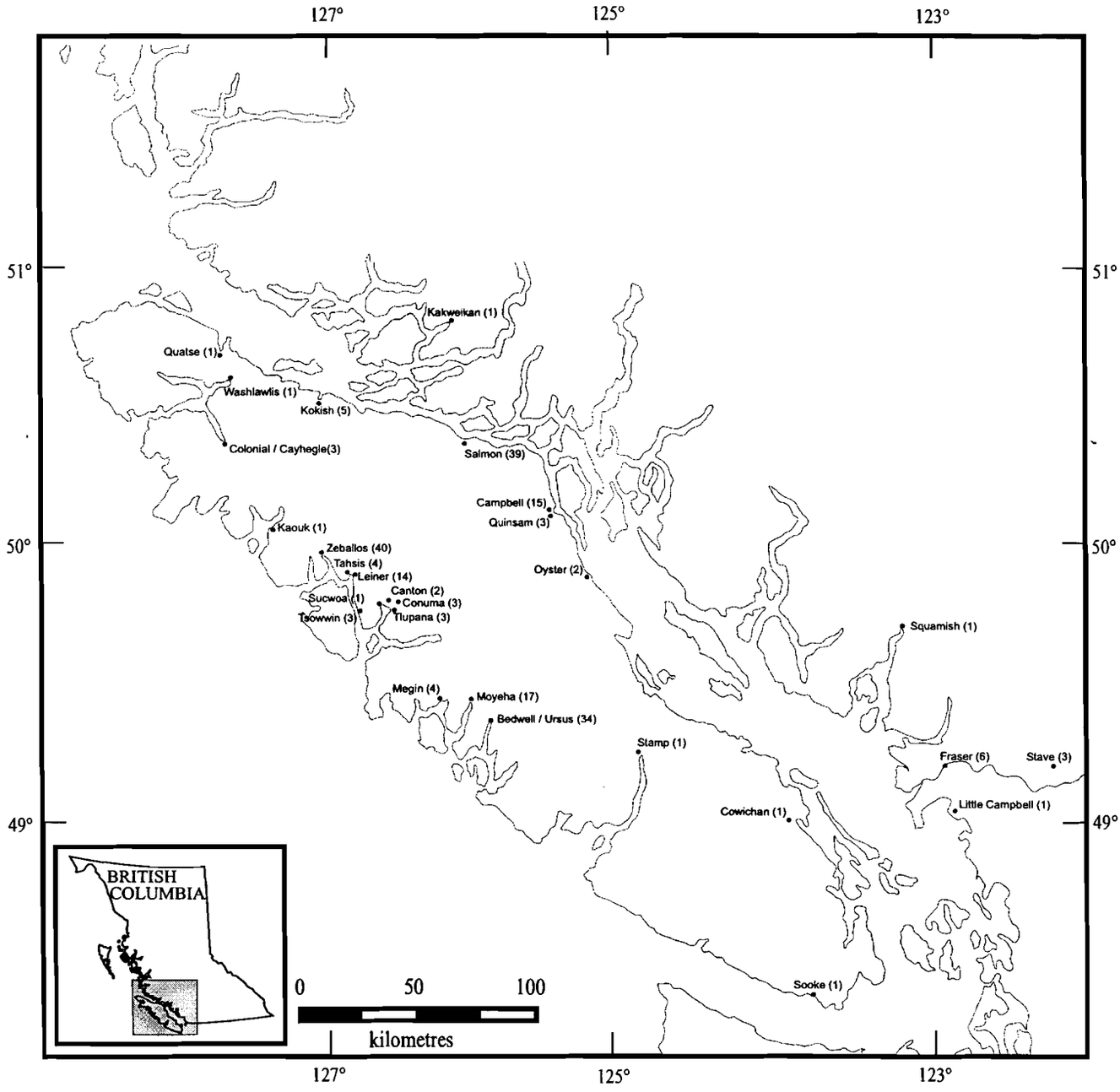

River System (*n*)

n = estimated total number of fish sited or captured in 1996

Figure 5. Atlantic salmon reported from freshwater sites in British Columbia in 1996. Includes fish recovered and shown in Figure 9.

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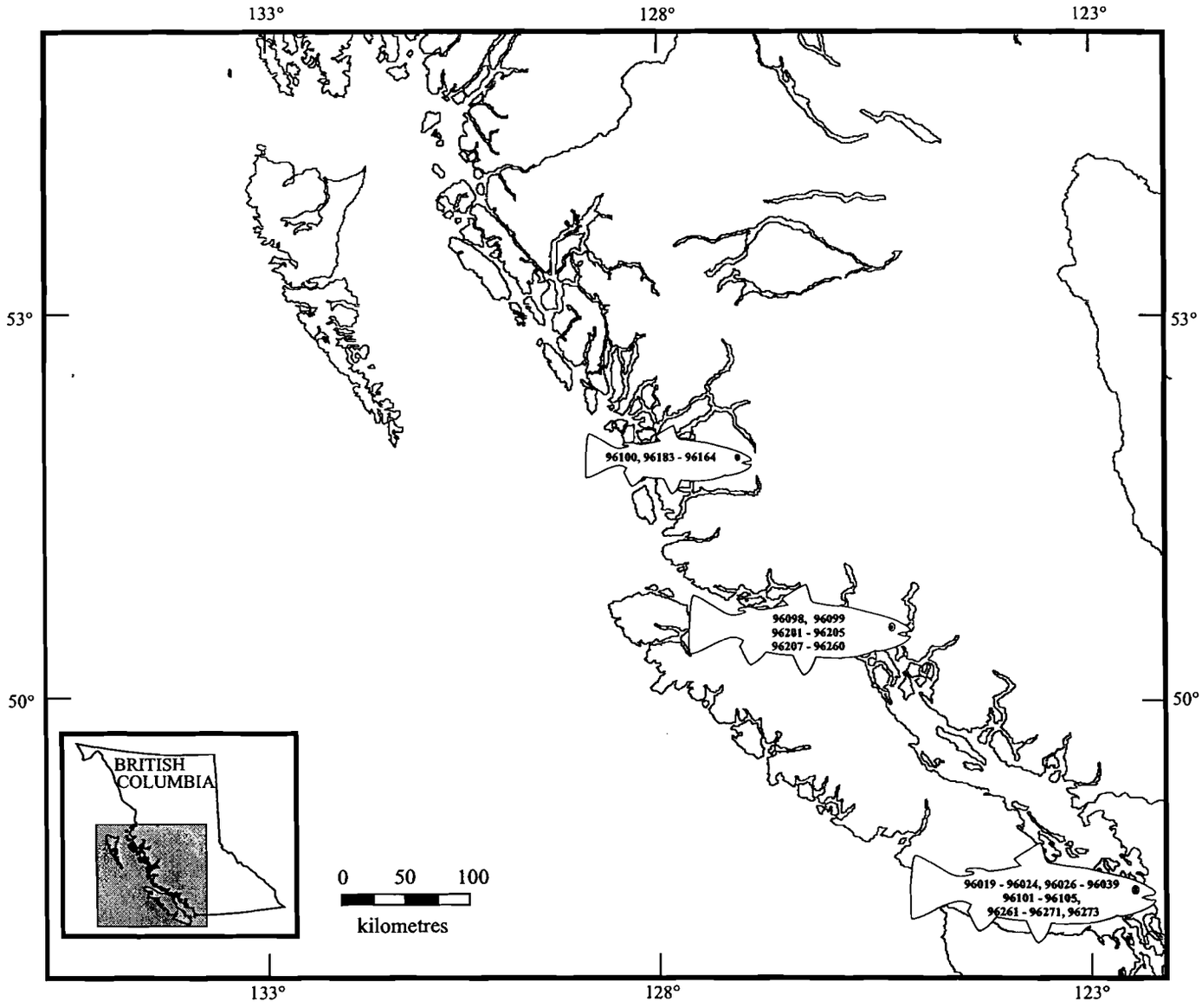

Figure 6. Atlantic salmon recovered from marine sites in British Columbia in 1996. Identified by Fish Number as listed in Table 1. Locations are by statistical area and not meant to be precise catch locations.

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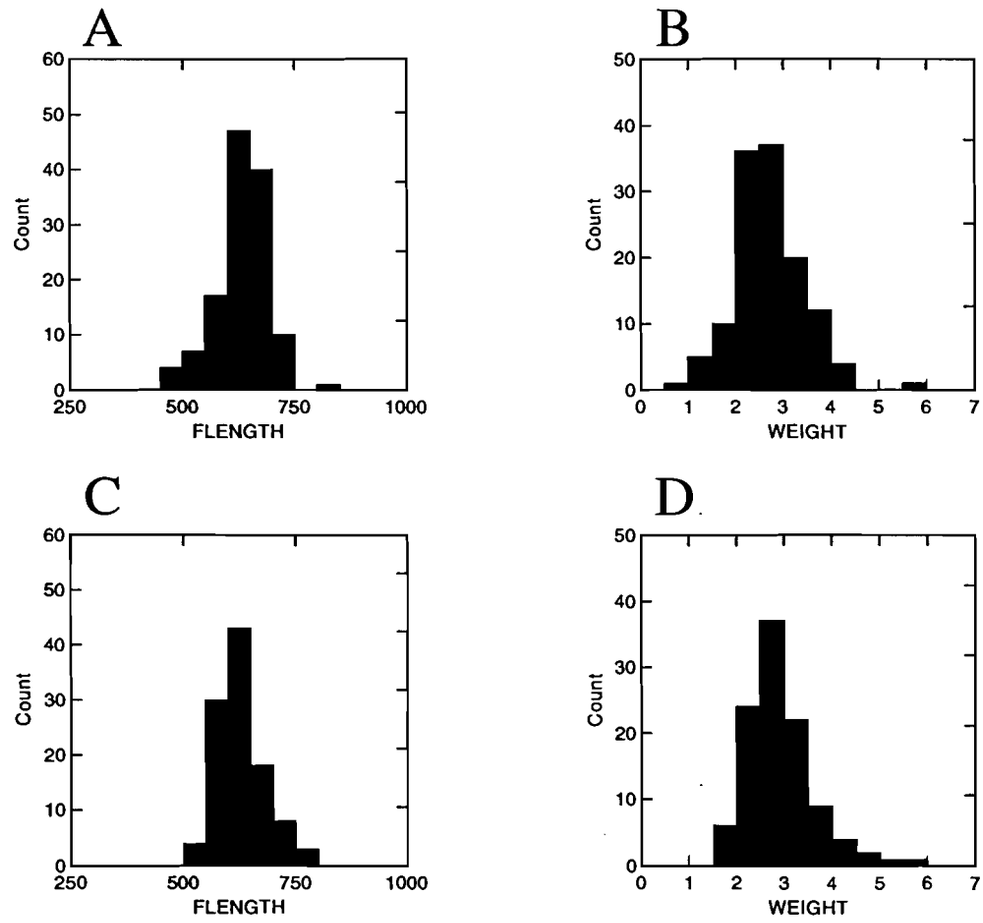

Figure 7. Biological data obtained from returned marine caught Atlantic salmon; (A) fork lengths for Alaskan fish (n=126), (B) body weights for Alaskan fish (n=126), (C) fork lengths for B.C. (n=106), (D) body weights for B.C. fish (n=106).

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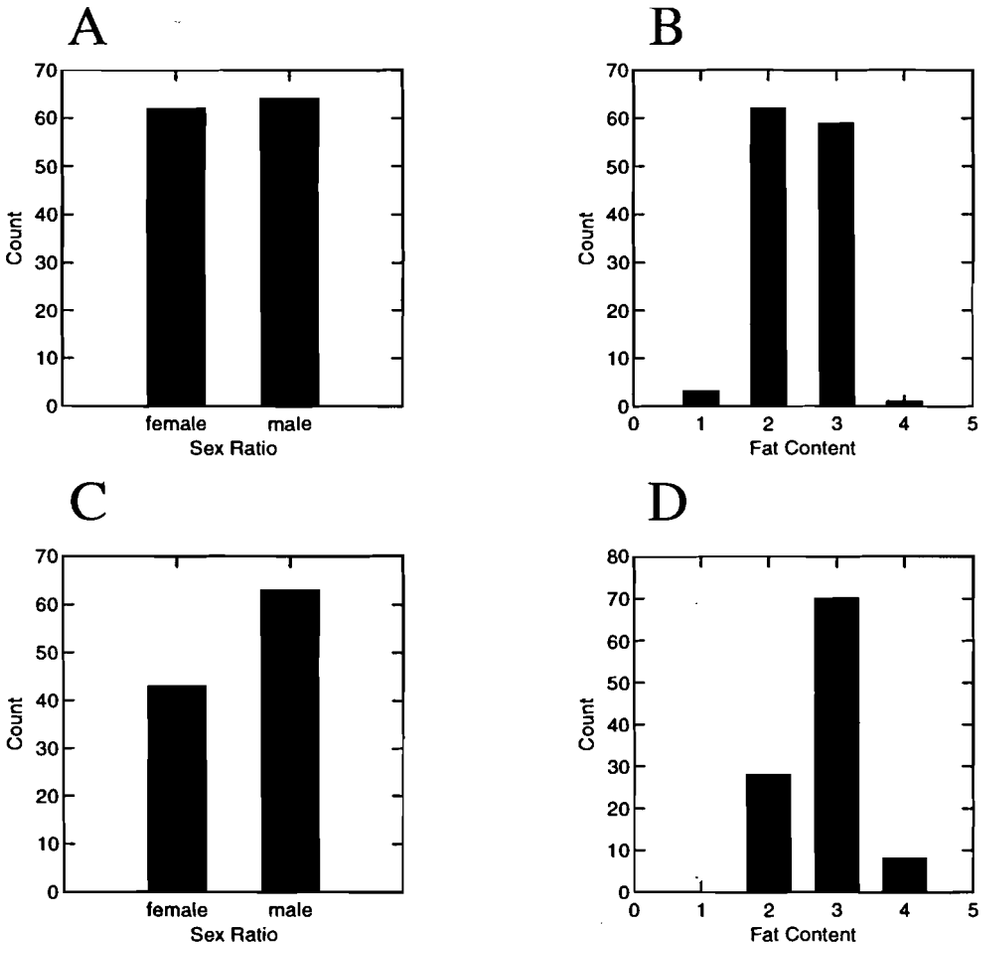

Figure 8. Biological data obtained from returned marine caught Atlantic salmon; (A) Sex Ratio for Alaskan fish, (B) Fat Content for Alaskan fish (C) Sex Ratio for B.C. , (D) Fat Content for B.C. fish .

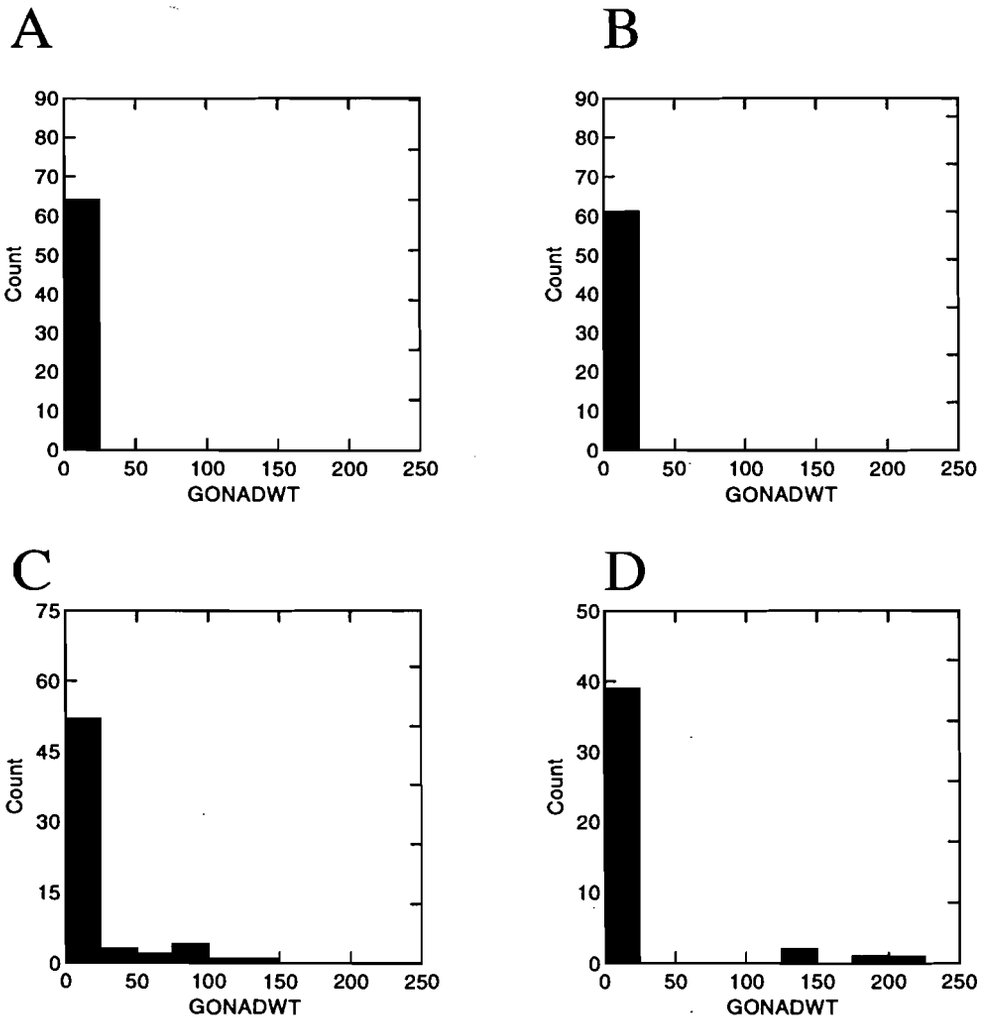

Figure 9. Biological data obtained from returned marine caught Atlantic salmon; (A) Alaskan male gonad weights (n=64), (B) Alaskan female gonad weights (n=61), (C) B.C. male gonad weights (n=63). (D) B.C. female gonad weights (n=43).

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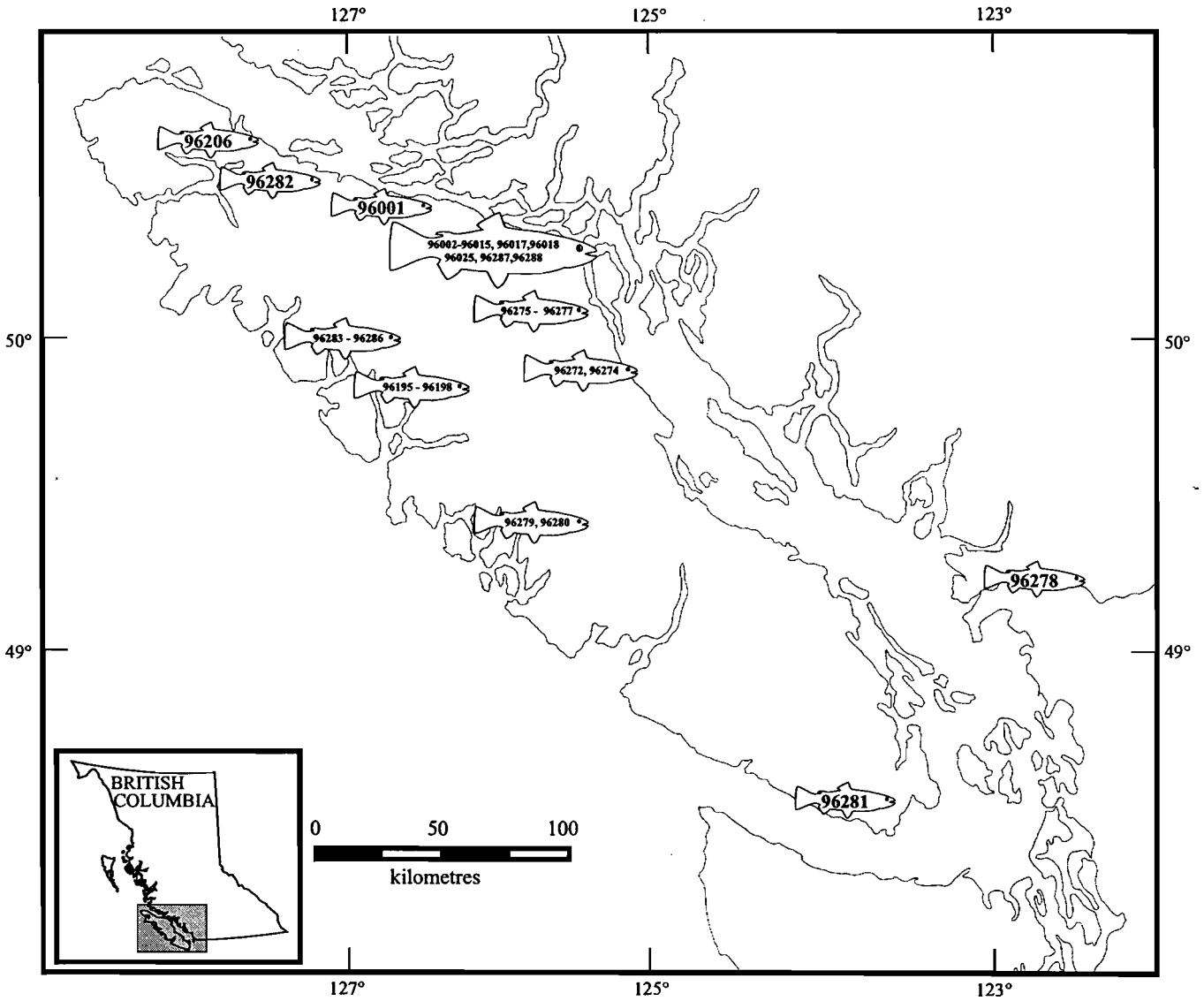

96nnn recovered fish by system and assigned Fish No's.

Figure 10. Atlantic salmon recovered from freshwater sites in British Columbia in 1996. Recovered fish identified by Fish Number as listed in Table 2.