Scientific Excellence • Resource Protection & Conservation • Benefits for Canadians
Excellence scientifique • Protection et conservation des ressources • Bénéfices aux Canadiens

Summary of Reported Atlantic Salmon (*Salmo salar*) Catches and Sightings in British Columbia in 1992

A. J. Thomson and S. McKinnell

Biological Sciences Branch
Department of Fisheries and Oceans
Pacific Biological Station
Nanaimo, British Columbia
V9R 5K6

1993

Canadian Manuscript Report of Fisheries and Aquatic Sciences 2215

Fisheries and Oceans Pêches et Océans

Canada

Canadian Manuscript Report of Fisheries and Aquatic Sciences

Manuscript reports contain scientific and technical information that contributes to existing knowledge but which deals with national or regional problems. Distribution is restricted to institutions or individuals located in particular regions of Canada. However, no restriction is placed on subject matter, and the series reflects the broad interests and policies of the Department of Fisheries and Oceans, namely, fisheries and aquatic sciences.

Manuscript reports may be cited as full publications. The correct citation appears above the abstract of each report. Each report is abstracted in *Aquatic Sciences and Fisheries Abstracts* and indexed in the Department's annual index to scientific and technical publications.

Numbers 1-900 in this series were issued as Manuscript Reports (Biological Series) of the Biological Board of Canada, and subsequent to 1937 when the name of the Board was changed by Act of Parliament, as Manuscript Reports (Biological Series) of the Fisheries Research Board of Canada. Numbers 901-1425 were issued as Manuscript Reports of the Fisheries Research Board of Canada. Numbers 1426-1550 were issued as Department of Fisheries and the Environment, Fisheries and Marine Service Manuscript Reports. The current series name was changed with report number 1551.

Manuscript reports are produced regionally but are numbered nationally. Requests for individual reports will be filled by the issuing establishment listed on the front cover and title page. Out-of-stock reports will be supplied for a fee by commercial agents.

Rapport manuscrit canadien des sciences halieutiques et aquatiques

Les rapports manuscrits contiennent des renseignements scientifiques et techniques qui constituent une contribution aux connaissances actuelles, mais qui traitent de problèmes nationaux ou régionaux. La distribution en est limitée aux organismes et aux personnes de régions particulières du Canada. Il n'y a aucune restriction quant au sujet; de fait, la série reflète la vaste gamme des intérêts et des politiques du ministère des Pêches et des Océans, c'est-à-dire les sciences halieutiques et aquatiques.

Les rapports manuscrits peuvent être cités comme des publications complètes. Le titre exact paraît au-dessus du résumé de chaque rapport. Les rapports manuscrits sont résumés dans la revue *Résumés des sciences aquatiques et halieutiques*, et ils sont classés dans l'index annuel des publications scientifiques et techniques du Ministère.

Les numéros 1 à 900 de cette série ont été publiés à titre de manuscrits (série biologique) de l'Office de biologie du Canada, et après le changement de la désignation de cet organisme par décret du Parlement, en 1937, ont été classés comme manuscrits (série biologique) de l'Office des recherches sur les pêcheries du Canada. Les numéros 901 à 1425 ont été publiés à titre de rapports manuscrits de l'Office des recherches sur les pêcheries du Canada. Les numéros 1426 à 1550 sont parus à titre de rapports manuscrits du Service des pêches et de la mer, ministère des Pêches et de l'Environnement. Le nom actuel de la série a été établi lors de la parution du numéro 1551.

Les rapports manuscrits sont produits à l'échelon régional, mais numérotés à l'échelon national. Les demandes de rapports seront satisfaites par l'établissement auteur dont le nom figure sur la couverture et la page du titre. Les rapports épuisés seront fournis contre rétribution par des agents commerciaux.

Canadian Manuscript Report of

Fisheries and Aquatic Sciences 2215

1993

SUMMARY OF REPORTED ATLANTIC SALMON (*Salmo salar*) CATCHES AND SIGHTINGS IN BRITISH COLUMBIA IN 1992

by

A. J. Thomson[1] and S. McKinnell

Biological Sciences Branch

Department of Fisheries and Oceans

Pacific Biological Station

Nanaimo, British Columbia V9R 5K6

[1]3639 Place Road, Nanaimo, B.C., V9T 1M9

Cat. No. Fs 97-4/2215E ISSN 0706-6473

Correct citation for this publication:

Thomson, A. J. and S. McKinnell. 1993. Summary of reported Atlantic salmon (*Salmo salar*) catches and sightings in British Columbia in 1992. Can. Manuscr. Rep. Fish. Aquat. Sci. 2215: 15 p.

ABSTRACT

Thomson, A. J. and S. McKinnell. 1993. Summary of reported Atlantic salmon (*Salmo salar*) catches and sightings in British Columbia in 1992. Can. Manuscr. Rep. Fish. Aquat. Sci. 2215: 15 p.

A program to monitor the abundance and distribution of Atlantic salmon (*Salmo salar*) in British Columbia was conducted jointly by the Canadian Department of Fisheries and Oceans and the British Columbia Ministry of Agriculture, Fisheries and Food in 1992. The study consisted of contacting a total of 108 individuals, primarily fisheries officers, conservation officers, community advisors, hatchery managers, and major commercial fish buyers, advising them to return or report all encountered Atlantic salmon. Catches of Atlantic salmon in the Department of Fisheries and Oceans sales slip and mark recovery databases were reviewed. A total of 408 Atlantic salmon were either returned or reported, 49 of which were sighted or captured in freshwater. Of the 408, 61 were returned to the Pacific Biological Station for analysis and species verification. An additional 4 fish were returned but were found not to be Atlantic salmon, suggesting that some of the reported Atlantics may also have been misidentified. The vast majority of Atlantic salmon reported were caught in statistical area 12, upper Johnstone Strait. In addition one Atlantic salmon was reported commercially caught in Alaskan waters in 1992 and 165 were commercially caught in Washington State waters in the same period.

RÉSUMÉ

Thomson, A. J. and S. McKinnell. 1993. Summary of reported Atlantic salmon (*Salmo salar*) catches and sightings in British Columbia in 1992. Can. Manuscr. Rep. Fish. Aquat. Sci. 2215: 15 p.

En 1992, il y avait un programme pour étudier l'abondance et la répartition des saumons de l'atlantique (*Salmo salar*) dans les eaux de la Columbie Britannique. L'étude a été conduite conjointement par le ministère fédéral des Pêche et de la Nourriture de la Columbie Britannique. Pour cette étude, nous nous sommes mis en contact avec 108 individus, en majorité des agents de la pêche et de la conservation, des répresentants de la communauté, des directeurs des centres de pisciculture et des acheteurs commerciaux majeurs des poissons, et leur ont demandé de nous envoyer ou de nous signaler tous les saumaons de l'atlantique qu'ils rencontraient. Aussi, nous avons examiné les renseignements des saumons de l'atlantique dans la base des données du ministère des Pêches et des Océans qui recueille les reprises de poissons étiquetés et les bordereaux d'achat. Au total cela a fait 408 saumons de l'atlantique rendus ou signalés, dont 49 ont été trouvés dans l'eau douce. Sur ce 408, 61 étaient envoyés a la Station de biologie Pacifique ou nous les avons analysés et verifiés l'espèce. En plus, nous ont réçu quatre poissons qui n'étaient pas des saumons de l'atlantique, ce qui laisse croire que quelques uns des poissons signalés auraient pu être mal identifiés. La vaste majorité des saumons de l'atlantique ont été pêchés dans le secteur statistique douze, du haut détroit de Johnstone. Pendant la même annńee, on a aussi rapporté qu'un saumon de l'atlantique a été pris commercialement dans les eaux d'Alaska, et que 165 en été capturés par la pêche commerciale dans les eaux de Washington.

INTRODUCTION

In 1991, a joint federal / provincial program was initiated by the British Columbia Ministry of Agriculture, Fisheries and Food and the Canadian Department of Fisheries and Oceans to monitor the presence of Atlantic salmon (*Salmo salar*) in British Columbia (B.C.) coastal streams. Based on recommendations following the first season of monitoring (Burt et al. 1992), the program was expanded to include monitoring in all B.C. waters (freshwater and marine) and a biological database was established.

The monitoring program had four main objectives: increasing the general awareness of the presence of Atlantic salmon in B.C. waters, expanding the reporting of Atlantic salmon, developing and maintaining a database of the number of Atlantic salmon reported and/or observed in B.C., and preparing an annual report of catches or sightings of Atlantic salmon. The biological sampling of available Atlantic salmon was expanded to include a variety of ageing and growth structures and tissues. An Atlantic salmon biological database was also developed.

METHODS

The program consisted of three main efforts: contacting a large number of individuals working in fisheries related activities to alert them to the monitoring program, collecting and analyzing as many of the captured Atlantic salmon as possible, and retrieving catch data from several sources to provide information about the number of Atlantic salmon observed in B.C. in 1992.

A total of 108 individuals and/or facilities were contacted to alert them to the presence of Atlantic salmon, to provide them with the necessary information to identify Atlantic salmon, and to request that they provide any information they receive or Atlantic salmon they encounter. The individuals contacted were primarily Department of Fisheries and Oceans fisheries officers, hatchery managers and community advisors as well as Ministry of Environment, Lands and Parks conservation officers and fisheries biologists (Appendix A). The Department of Fisheries and Oceans staff were contacted twice by mail, once in August to alert them to the program and once in February 1993 to request a summary of Atlantic salmon sightings in 1992 or null sighting replies to ensure full geographical coverage. The Ministry of Environment, Lands and Parks staff were only contacted in February 1993. Of the 104 requests for summary information that were mailed, 30 were returned, two of which provided previously unreported records of Atlantic salmon. In addition to government contacts, the major fishing companies were also contacted several times during the months of August and September. J.S. McMillan Ltd. and Ocean Fisheries Ltd. provided a total of 51 Atlantic salmon samples which they had received at their Vancouver plants, 9 of these were known to be from the Nootka chum

McMillan Ltd. and Ocean Fisheries Ltd. provided a total of 51 Atlantic salmon samples which they had received at their Vancouver plants, 9 of these were known to be from the Nootka chum fishery, the remainder were from summer fisheries.

The fish that were sent to the Pacific Biological Station were examined to verify species and then sampled for basic biological information and tissue collection. Where possible the fish were examined for sex, fork-length, weight, gonad weight, anal fin ray counts, stomach contents, and fin wear. Scales, otoliths and dorsal fins were sampled for age and/or scale growth determination, muscle and liver tissues were sampled for electrophoretic analysis, liver tissues were sampled for DNA analysis, and scales were sampled for elemental analysis. All of the fish were photographed. Not all of the fish received were suitable for the complete sampling procedure. Some of the fish were already dressed, some had obviously not been handled carefully and were decomposing, and some of the fish had been processed prior to the implementation of a more comprehensive biological sampling program that was begun in the fall, 1992.

Atlantic salmon catch data were obtained from two main sources: the Department of Fisheries and Oceans sales slip database and the Mark Recovery Program database. Catch data for Washington State were also obtained from the Washington State Department of Fisheries. Monthly exports of Atlantic salmon from B.C. to Washington State for 1992 were obtained from Statistics Canada.

RESULTS AND DISCUSSION

The total reported number of Atlantic salmon in 1992 was 408 (Table 1). The 1992 survey of selected British Columbia fisheries workers produced 266 reported Atlantic salmon. The majority of the sightings in both marine (Fig. 1) and freshwater (Fig. 2) were from southern British Columbia. There were no reported sightings of Atlantic salmon in British Columbia north of DFO Statistical Area 8 (Fitzhugh Sound) although Atlantic salmon were reported in Alaskan waters (Wing et al. 1993). Of the total reported Atlantic salmon recorded in British Columbia in 1992, 61 were made available to the Pacific Biological Station.

The Department of Fisheries and Oceans Mark Recovery database lists 61 Atlantic salmon landed by 18 different commercial fishing vessels in 1992. The reporting of Atlantic salmon by the Mark Recovery Program samplers is entirely voluntary. It is not part of their contract with D.F.O. to collect this information and therefore this sample should be considered a minimum. None of these vessels reported Atlantic salmon catches through the sales slip system. The Department of Fisheries and Oceans sales slip database for commercial fishing vessels contains an additional 81 Atlantic salmon.

In addition to the 61 Atlantic salmon that were returned to the Pacific Biological Station, 4 fish were returned as Atlantic salmon but were misidentified. Three of the four were brown trout (*Salmo trutta*) and the other was a steelhead (*Oncorhynchus mykiss*). This suggests that even experienced fisheries workers may have difficulty correctly identifying Atlantic salmon. It is plausible that some small proportion of the fish reported to us as Atlantic salmon may have been some other species. Only those samples which were returned to the Pacific Biological Station for identification can be confirmed to be Atlantic salmon.

The results of the biological sampling of the Atlantic salmon are summarized in Figures 4 and 5. Fork lengths ranged from 470 mm to 935 mm with a mean of 616.5 mm. Round body weights ranged from 1.5 kg to 8.9 kg with a mean of 2.83 kg. Of 13 males recovered from marine landings the mean gonad weight was 35.0 grams. The mean gonad weight for 25 females returned from marine landings was 39.1 grams. Two freshwater recoveries were measured for gonad weight. One female prespawning mortality from the Harrison River had a gonad weight of 248 g. A male recovered from Flores Island had a gonad weight of 39.9 grams. The age of the Atlantic salmon based on scale patterns was judged to be difficult to determine. This may be resolved in the future by collecting scales from known aged adults, or from examination of fin rays and/or otoliths. 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.

As this program is the first attempt at monitoring the catch of Atlantic salmon in B.C. waters, there is no way of relating the 1992 count of 408 to historical figures. That vessels known to have landed Atlantic salmon in B.C. do not appear with Atlantic salmon catches in the D.F.O. sales slip database indicates that the sales slip database underestimates the total Atlantic salmon catch in B.C. In spite of the varied sources of information on Atlantic salmon catches in B.C, there is no accurate method to expand these reports to estimate the total catch of Atlantic salmon in 1992. The obvious problem in developing catch estimates with existing monitoring programs is that they are not based on a statistical design to estimate the total Atlantic salmon catch in B.C. The addition of a new species creates reporting problems. Fish buyers are required to improvise to accurately record Atlantic salmon catches on existing sales slips, or they report them as some other species such as coho. In 1992, the reported numbers are low enough to suggest that the recovery of an Atlantic salmon was a rather rare event when compared to the catches of Pacific salmon or steelhead trout.

The reporting of Atlantic salmon by B.C. fishing companies seems to be company specific. The majority of the Atlantic salmon samples contributed to the program for biological sampling were provided by two fishing companies. At least one other large B.C. company reported no Atlantic salmon catch even though vessel sampling indicated that Atlantic salmon had been landed by the company.

No attempt was made to determine the number of Atlantic salmon escapees that occurred in 1992 from B.C. farms. The reporting system for escapees is not perceived to provide an accurate number of fish lost.

In Washington State the commercial catch of Atlantic salmon is monitored through the buyer reporting program administered by the Washington State Department of Fisheries. The recorded catch of Atlantic salmon in Washington State commercial fisheries was 165 fish (Fig. 3). In 1992 Washington State reported a total of 14,440 lbs (6564 kg) of Atlantic salmon commercially landed, although only 1,149 lbs (522 kg) were caught in commercial fisheries for Pacific salmon in Washington State waters. The remaining 13,291 lbs (6041 kg) were imported directly from Canadian fish farms and recorded as commercially landed.

As yet, the State of Alaska has no formal reporting program for Atlantic salmon. The Auke Bay Laboratory in Juneau has recorded recoveries of Atlantic salmon since they first appeared in 1990 (Wing et al., 1992). In 1991 four or five fish were reported in the commercial fishery. In 1992 only one fish was reported. It was caught in a commercial seine fishery in southeastern Alaska (B. Wing, pers. comm.). There are no commercial salmon farms in Alaska.

ACKNOWLEDGEMENTS

We gratefully acknowledge the support and assistance of Edward Black of the British Columbia Ministry of Agriculture, Fisheries and Food, Ron Ginetz of the Department of Fisheries and Oceans, and Bryan Ludwig of the British Columbia Ministry of Environment, Lands and Parks in the production of this report. We also thank Brian Riddell for providing a critical review of the draft report and thanks to all those who reported Atlantic salmon sightings and captures.

REFERENCES

Burt, D. W., C. Groot, E. Black, and A. J. Thomson. 1993. Presence of cultured Atlantic salmon in British Columbia rivers in 1990 and 1991. Unpublished report to the B.C. Ministry of Agriculture, Fisheries, and Food. 40 p.

Wing, B. L., C. M. Guthrie, and A. J. Gharrett. 1992. Atlantic Salmon in Marine Waters of Southeastern Alaska. Trans. Am. Fish. Soc. 121: 814-818.

Table 1. Summary of Atlantic salmon reports for 1992 by source and statistical area.

STAT. AREA	M.R.P. DATA	CATCH DATA	REPORTED	RETURNED	TOTAL
8		1			1
9	1	1		1	3
10		6	7	2	15
11		1			1
12	43	70	151	3	267
13	2			1	3
16		2			2
18	1				1
20	3		1	1	5
21	4		1		5
25	6		3	9	18
29	1				1
UNKNOWN				37	37
TOTAL	**61**	**81**	**163**	**54**	**359**
FRESHWATER			42	7	49
TOTAL	**61**	**81**	**205**	**61**	**408**

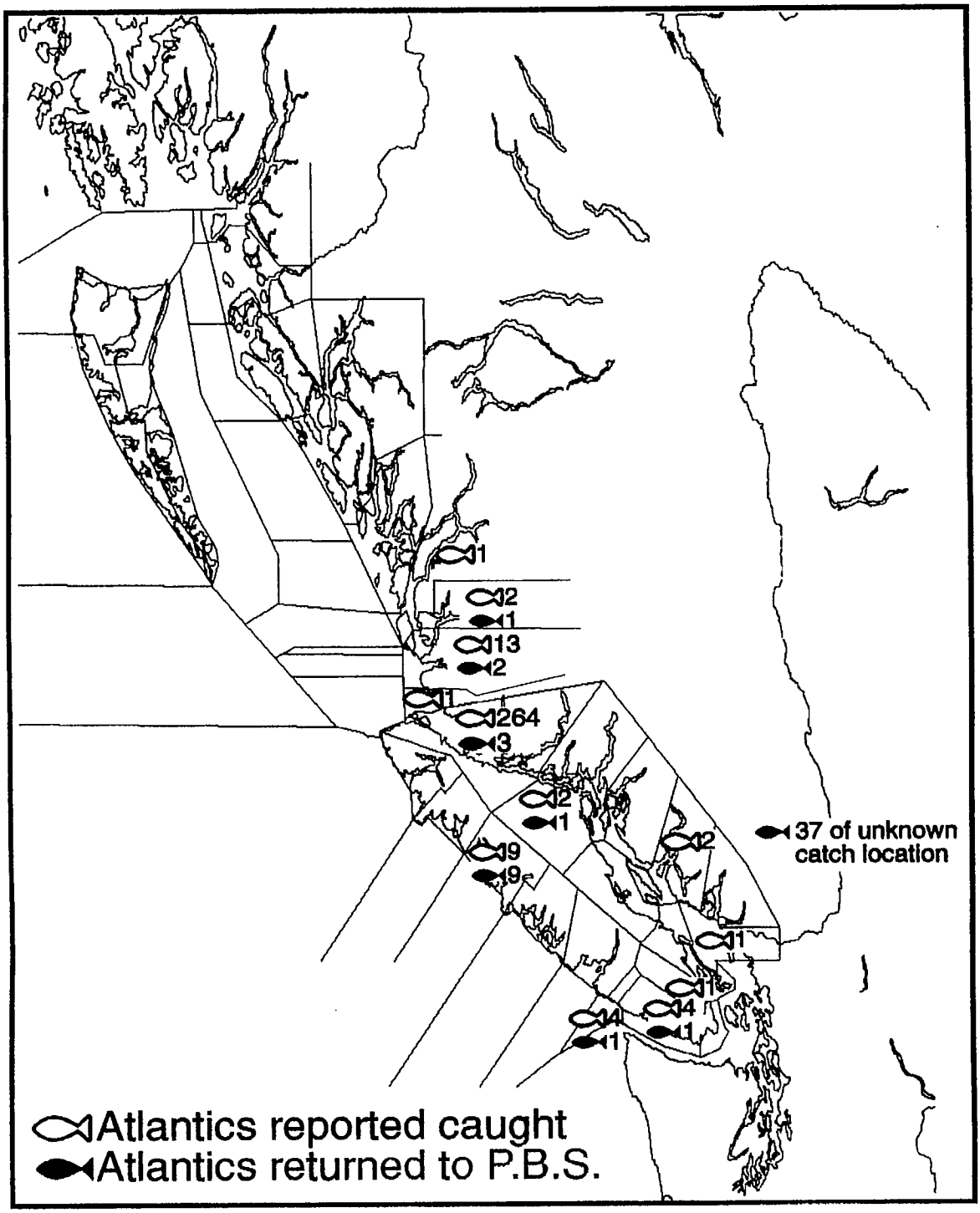

Figure 1. Atlantic salmon recovered from marine waters in British Columbia in 1992 by D.F.O. statistical area.

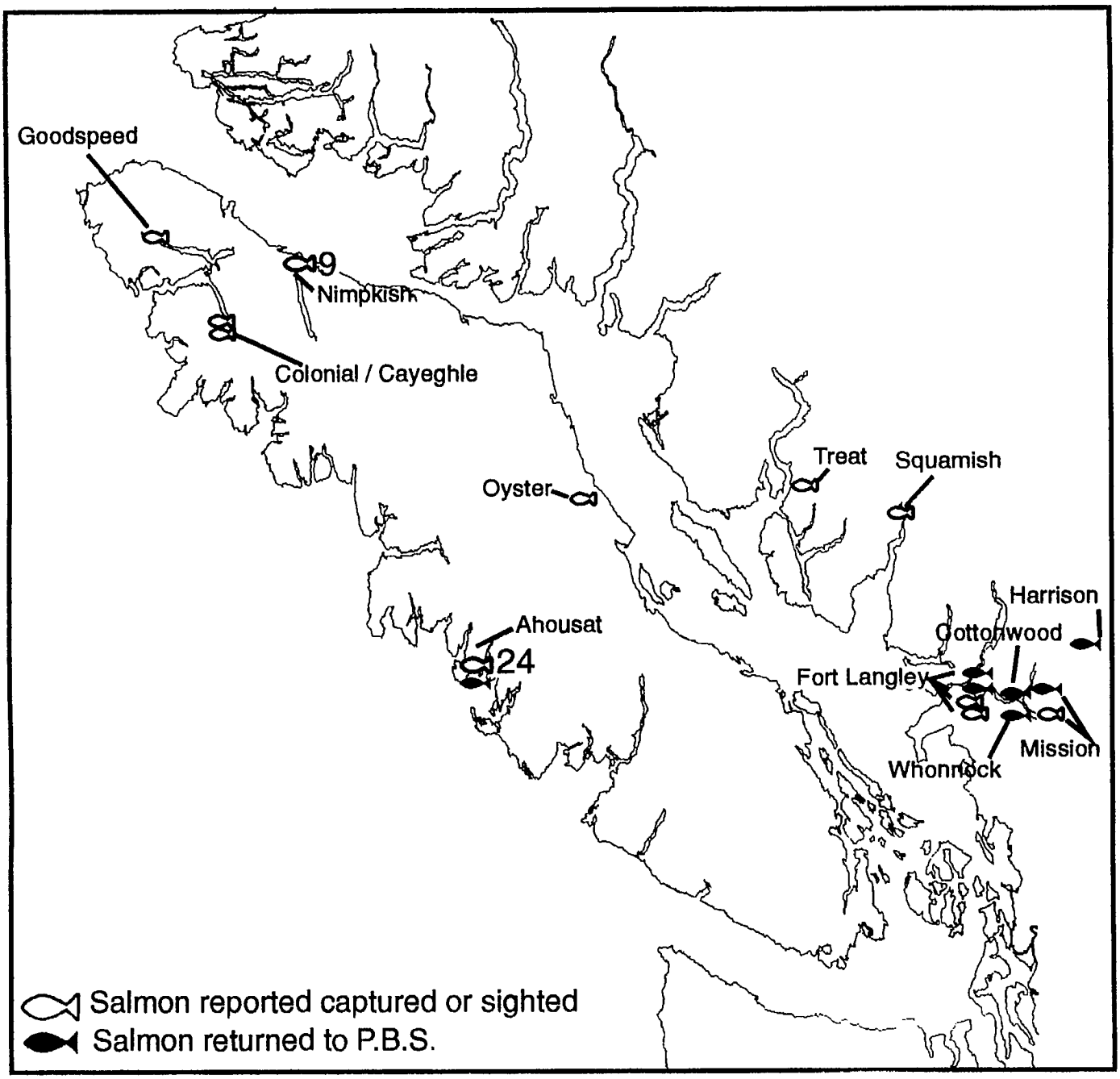

Figure 2: Freshwater recoveries of Atlantic salmon in British Columbia in 1992.

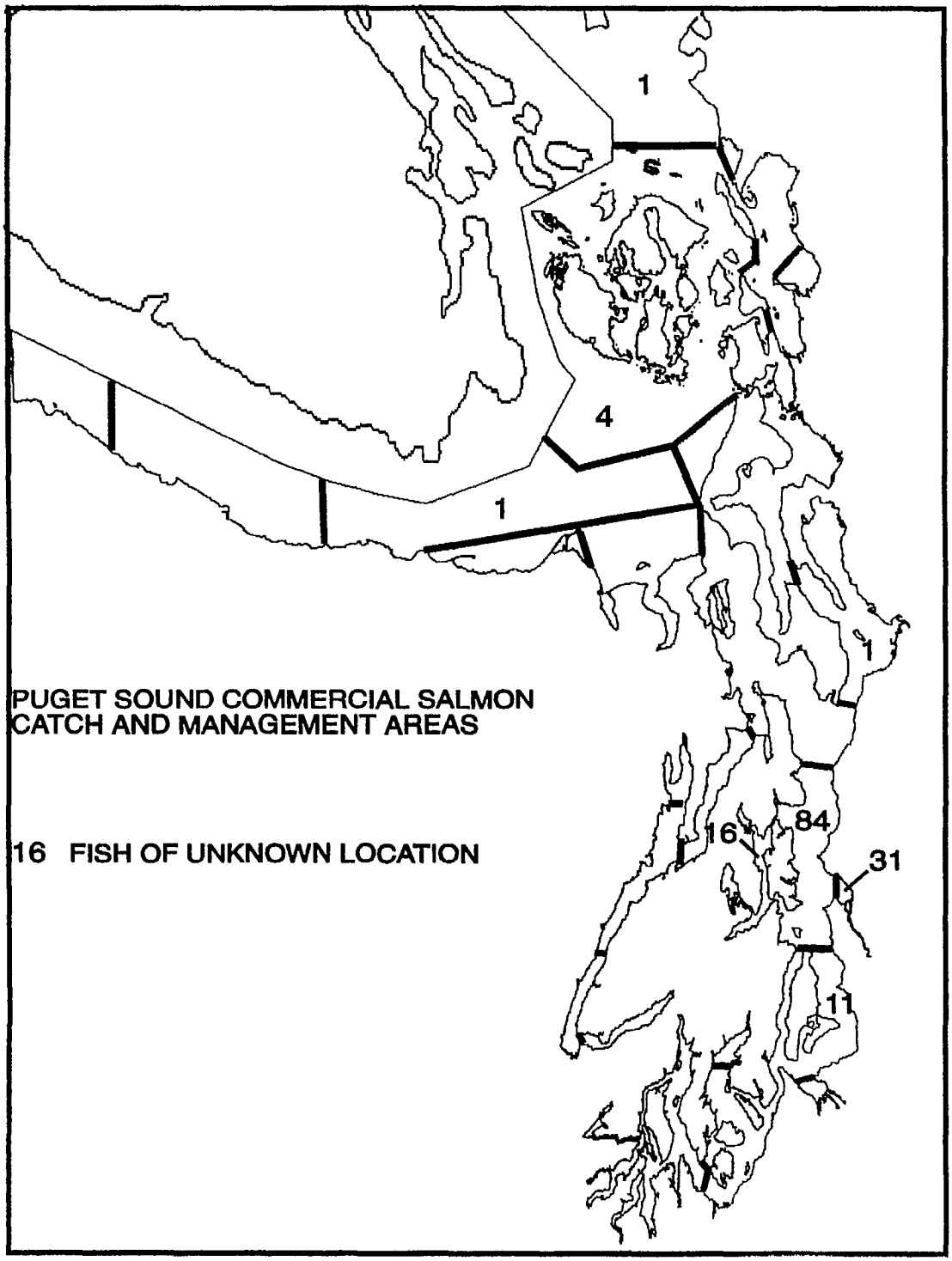

Figure 3. Commercial catch of Atlantic salmon in Washington State in 1992.

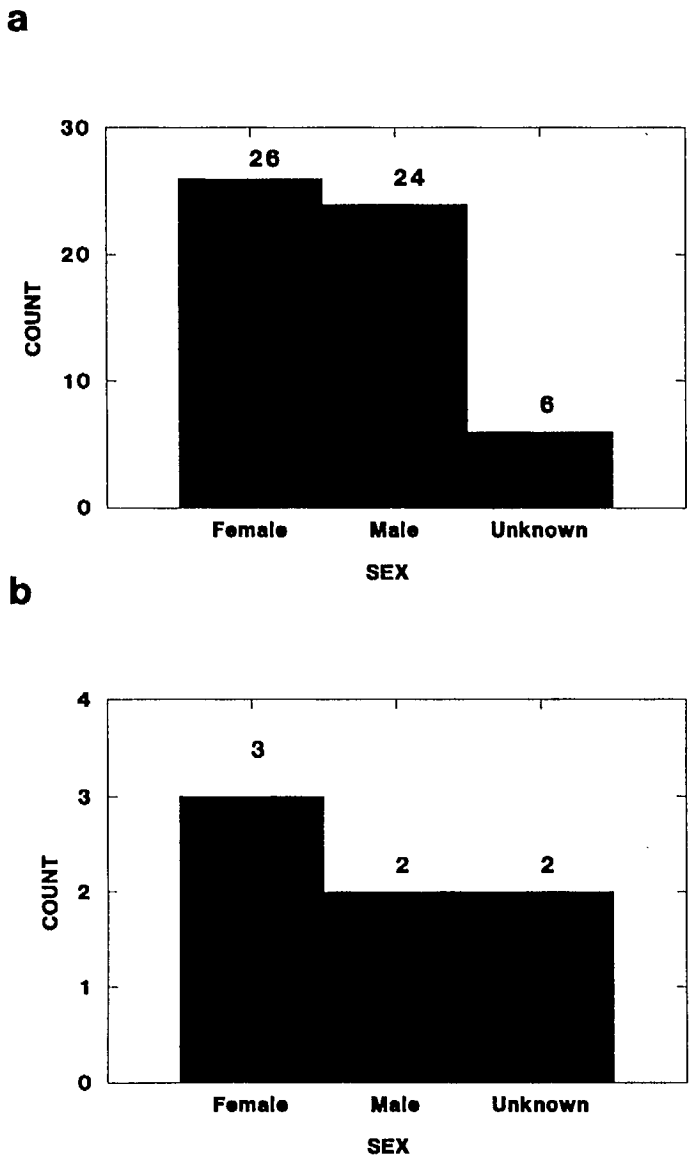

Figure 4. Sex ratio of returned Atlantic salmon., (a) marine recoveries (n=56), (b) freshwater recoveries (n=7).

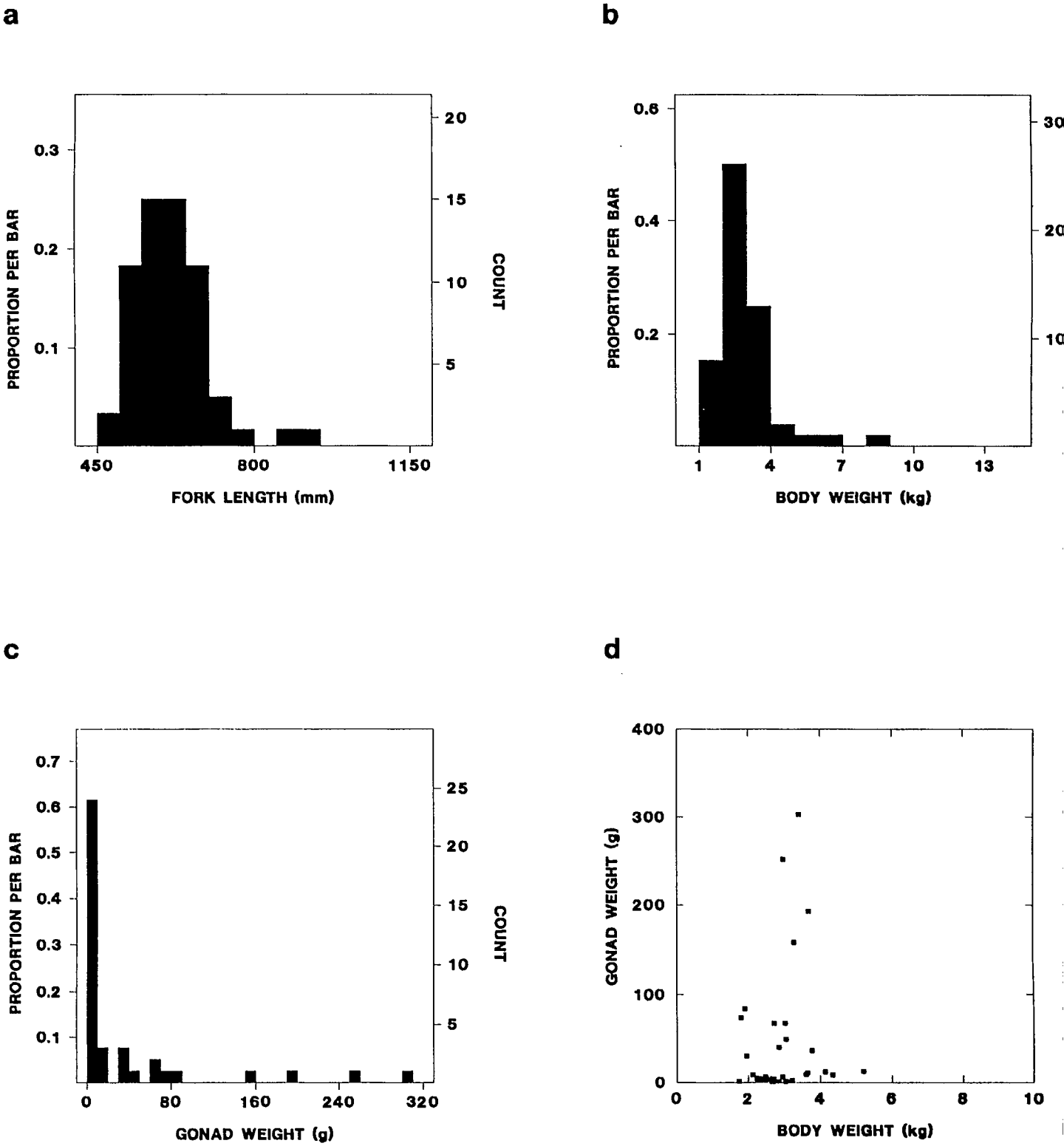

Figure 5. Biological data obtained from returned Atlantic salmon; (a) fork lengths (n=61), (b) body weights (n=52), (c) gonad weights (n=40), gonad weight by body weight (n=39).