

STATE OF ALASKA

Bill Sheffield, Governor

Annual Performance Report for

BUSKIN RIVER WEIR

by

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ALASKA DEPARTMENT OF FISH AND GAME
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RESEARCH PROJECT SEGMENT

State: Alaska Name: Sport Fish
Investigations
of Alaska

Project: F-9-18

Study: S-41 Study Title: KODIAK SALMON STUDIES

Job: S-41-2 Job Title: Buskin River Weir

Cooperator: John B. Murray

Period Covered: July 1, 1985 to June 30, 1986

ABSTRACT

Buskin River weir fish escapement counts from April 21 through October 26, 1985, were comprised of 21,857 out-migrant Dolly Varden, *Salvelinus malma* (Walbaum); 20,540 in-migrant Dolly Varden; 223 out-migrant steelhead, *Salmo gairdneri* Richardson; 57 in-migrant steelhead; 18,010 sockeye salmon, *Oncorhynchus nerka* (Walbaum); 9,474 coho salmon, *Oncorhynchus kisutch* (Walbaum); 7 chum salmon, *Oncorhynchus keta* (Walbaum); and 149,693 pink salmon, *Oncorhynchus gorbuscha* (Walbaum). A summary of the weir count and the fish sampled at the weir is presented.

KEY WORDS

Salmon, char, escapement, size and age, Buskin River, Kodiak, Alaska.

BACKGROUND

Buskin River (Figure 1) is centrally located between Kodiak City and the U.S. Coast Guard base on northeast Kodiak Island, Alaska. Prior to World War II only an 8.0 km long trail accessed the river from the city; this probably resulted in a low sport fish effort. Although historical records are not available, it is presumed sport fish effort increased dramatically in the early 1940s when a U.S. Navy base containing up to 30,000 people was built near the river. During this era a road was also constructed between the base and Kodiak City, providing public access. However, public use was considered low through the mid-1960's as the U.S. Navy allowed only 50 civilians per day to fish the river (pers comm, Ben Ballenger, Kodiak, 1986). In 1971 a cooperative agreement between the Alaska Department of Fish and Game (ADF&G) and the Navy gave ADF&G fish and wildlife management authority on the base and allowed the public unrestricted access to the river, excluding the Buskin Lake antenna field (unpublished papers located in Kodiak Sport Fish office

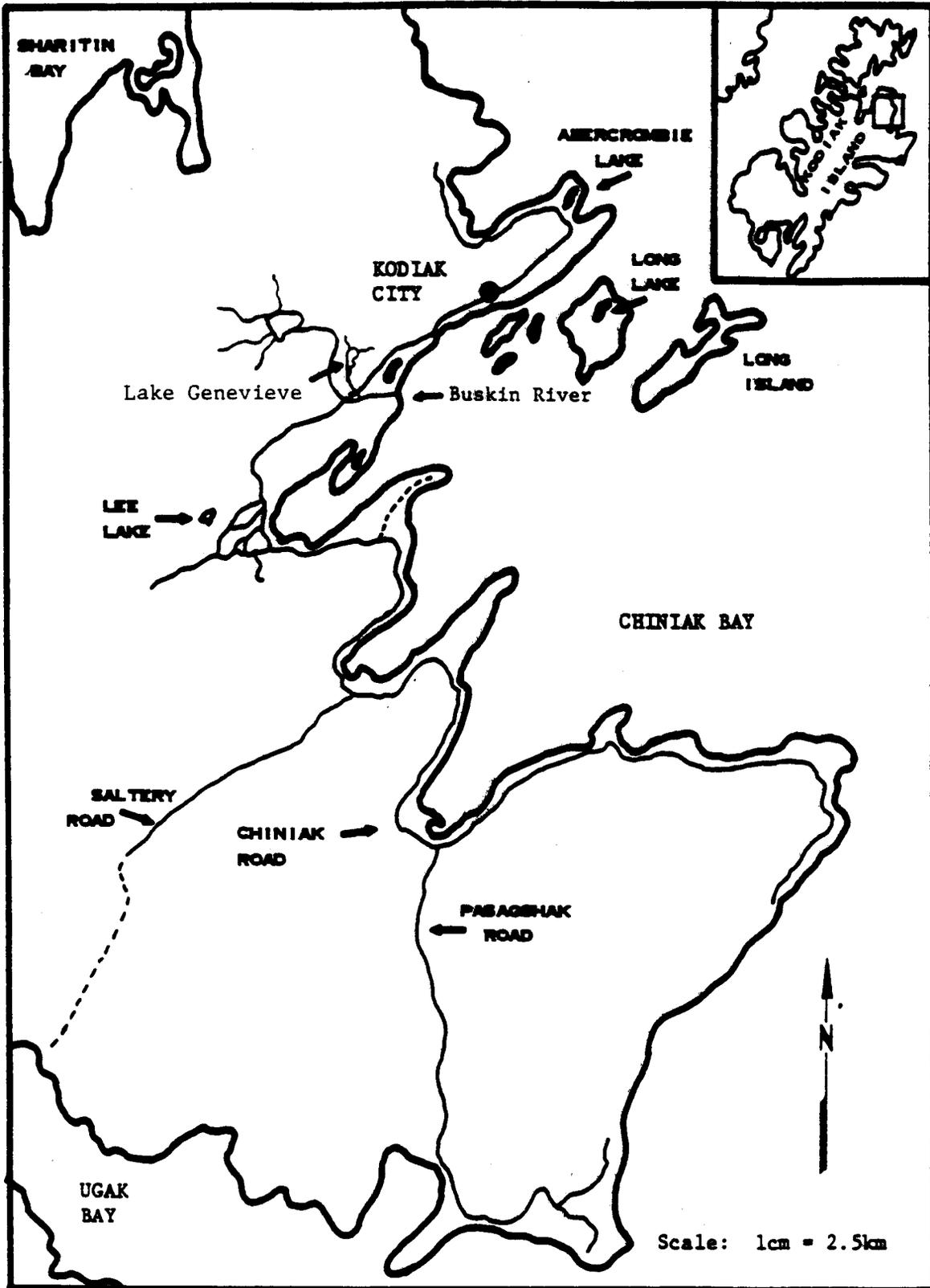


Figure 1. Location of Buskin River, Kodiak Island, Alaska, 1985.

files, 1986). Consequently, sport fish effort increased to 24,024 angler-days in 1984 (Mills 1985), and a record harvest of 2,870 coho salmon occurred in 1979 (Mills 1981a).

In 1984 Buskin River supported 49.6% (n=24,024 angler-days) of the sport fish effort and 38.7% (n=17,196) of the sport fish harvest for all Kodiak lakes and streams (Mills 1985). A total of 7,667 coho salmon were caught in Kodiak Island streams in 1984, and 1,871 of these fish (24.4%) came from Buskin River. An undetermined number of Buskin coho salmon were also caught in the subsistence and commercial fisheries. The total harvest is presumed high because the 1984 reported subsistence and commercial harvests near Buskin River and Woman's Bay were 200 and 8,862 fish, respectively (Manthey et al. 1984). The 1984 coho salmon escapement index count was 939 fish (Murray 1985); consequently, the Buskin River coho population had probably reached its maximal harvest. Buskin coho salmon were probably overharvested in 1983, as only 243 fish were observed in the escapement index count (Murray 1984).

The 1985 minimal coho salmon escapement goal for Buskin River was set at 2,000 fish; i.e., 819 fish (20-year average index count) multiplied by an expansion factor of 2.44.

The 1984 Dolly Varden harvest comprised 40.8% (n=18,278) of all fish harvested from Kodiak lakes and streams, and over half (50.7%, n=9,265) of these char were caught in Buskin River (Mills 1985). During the last 8 years, the annual Buskin River Dolly Varden harvest has ranged between 8,003 and 15,150 fish (Mills 1979-1985), and the mean fish size has ranged between 293 and 316 mm (Van Hulle and Murray 1977-1981; Murray 1982-1985). Because of the increased fishing pressure and a lack of population data, there is concern the Dolly Varden population may be overharvested.

In 1984 a total of 4,113 sockeye salmon were caught with sport gear in Kodiak Island streams, and 1,197 (29.1%) of these fish came from Buskin River (Mills 1985). The subsistence and commercial harvests of Buskin sockeye salmon are presumed high; the 1984 reported catch in the Chiniak Bay area was 610 and 1,735 fish, respectively (Manthey et al. 1984). The post-season index survey on Buskin Lake totaled 4,665 fish (Murray 1985); therefore, the total harvest (n=3,542 fish) by all user groups is probably approaching the maximal allowable harvest.

Lake Genevieve is a 19.3 hectare lake located in the Buskin Lake drainage that historically supported a small coho and sockeye salmon population and numerous threespine stickleback and Dolly Varden (Van Hulle and Murray 1972). The lake was chemically rehabilitated in 1972 and stocked with rainbow trout from 1973 through 1976. This produced a viable sport fishery (Van Hulle and Murray 1974-1977); however, the lake was not stocked for 7 years because suitable rainbow trout were not available. Subsequently, Lake Genevieve was stocked with coho salmon fingerlings (Buskin River origin) in 1983 (n=35,472, \bar{x} wt = 1,218/kg) and 1984 (n=23,443, \bar{x} wt = 1,334/kg) so that a projected annual return of approximately 470 adult fish could be produced; i.e., utilizing Division of Fisheries Rehabilitation, Enhancement and Development's (F.R.E.D.) standard assumptions or a 2% survival rate (fingerling to adult)

multiplied by 23,443 fingerlings equals 468 adult coho salmon. The first adults from the lake stocking returned in 1985.

Table 1 presents a list of the fishes observed or studied in this report.

RECOMMENDATIONS

1. A weir should be operated on Buskin River during April through October to manage the salmon and char fisheries.
2. Age and/or length data should be collected from a representative sample of salmon and char that pass through Buskin River weir.
3. Dolly Varden in Buskin River, Chiniak Bay streams, Lake Rose Tead and Afognak Lake should be tagged to determine their migratory pattern, possible mixing, and their resultant contribution to the sport fisheries.
4. The contribution of Lake Genevieve coho stocking to the Buskin River coho salmon escapement should be determined.

OBJECTIVES

1. To enumerate the total number of kelt steelhead, spring run Dolly Varden, sockeye salmon, pink salmon, fall run Dolly Varden, coho salmon and fall run steelhead that utilize the Buskin River.
2. To estimate the Lake Genevieve coho salmon contribution to the Buskin River coho run.
3. To determine the mean length of spring and fall Dolly Varden.
4. To determine the age composition and mean size of steelhead, red salmon, coho salmon and chum salmon.

TECHNIQUES USED

An aluminum picket weir with 21 mm pipe spacing was installed and operated on lower Buskin River April 21 through October 26, 1985. All fish were counted as they passed through the weir gates. The counting schedule was 0730 to 1330 hours and 1330 to 1930 hours from April 21 through May 15 and September 16 through October 26. During May 16 through September 15, the counting schedule was 0500 to 1100, 1100 to 1700, and 1700 to 2300 hours. A white counting board (13 mm x 81.2 cm x 121.9 cm) was placed in front of the weir gate to facilitate identification of fish as they passed through the weir.

Table 1. List of Common Names, Scientific Names and Abbreviations.

Common Name	Scientific Name and Author	Abbreviations
Chum salmon	<i>Oncorhynchus keta</i> (Walbaum)	CS
Coho salmon	<i>Oncorhynchus kisutch</i> (Walbaum)	SS
Dolly Varden	<i>Salvelinus malma</i> (Walbaum)	DV
Pink salmon	<i>Oncorhynchus gorbuscha</i> (Walbaum)	PS
Sockeye salmon	<i>Oncorhynchus nerka</i> (Walbaum)	RS
Rainbow trout*	<i>Salmo gairdneri</i> Richardson	SH
Threespine stickleback	<i>Gasterosteus aculeatus</i> Linnaeus	TS

* The term steelhead is applied to sea-run rainbow trout.

A downstream and upstream trap was operated on the weir as needed for capturing fish and subsequently collecting fish age and/or size data. A beach seine (16 m long x 1.5 m wide with 10 mm knotless mesh) was also used for capturing out-migrant Dolly Varden.

Fish escapement count records were maintained at the weir and the Kodiak Sport Fish office, and a daily report was given to the Commercial Fish Division for management purposes.

The ratio of marked to unmarked coho salmon captured in the weir trap was used to extrapolate the number of coho salmon produced by stocking Lake Genevieve. (Note: Lake Genevieve was stocked with 35,472 and 23,443 coho fingerlings [adipose clipped and coded wire tagged] in 1983 and 1984, respectively.)

A minimum of 2.5% of the sockeye salmon, coho salmon and steelhead were sampled for age-growth data. One scale was removed from both sides of the fish in the preferred scale area (four scales above the lateral line and below the posterior portion of the dorsal fin) and mounted on gum cards. All fish fork lengths (FL) were measured in millimeters on a standard fish-measuring cradle, and data were recorded on standard age and length forms. Salmon and steelhead were aged by projecting an acetate scale impression on a Brunning-220 microfiche projector. Salmon ages were coded for brevity as discussed by Koo (1962).

All fish sampled for age and/or size data were anesthetized with a standard solution of MS-222 (0.2%) or by bubbling carbon dioxide (CO₂) into a fish holding tank to induce CO₂ narcosis.

FINDINGS

Buskin River Weir Escapement Counts

Buskin River weir fish escapement counts from April 21 through October 26, 1985 (Table 2) were comprised of 21,857 outmigrant Dolly Varden, 223 out-migrant steelhead, 18,010 sockeye salmon, 149,693 pink salmon, 20,540 in-migrant Dolly Varden, 57 in-migrant steelhead and 7 chum salmon. The fish escapement counts are complete for steelhead, sockeye salmon, and in-migrant Dolly Varden. Out-migrant Dolly Varden counts are incomplete because an undetermined number of fish moved downstream when flood conditions caused the weir to be inoperable July 3 through July 7. The total pink salmon escapement estimate was 167,693 fish; approximately 18,000 fish spawned downstream of the weir and were never accounted for in the weir counts. The coho salmon escapement estimate was 9,266 fish; approximately 208 coho salmon were caught in the sport fishery upstream of the weir (unpublished data, Kodiak sport fish files). Only seven chum salmon were counted through the weir; this probably reflects the true population size, as few chum salmon have been caught and/or observed in Buskin River.

A large coho salmon escapement was obtained in 1985; the in-migration was extremely late; i.e., less than 1,000 fish had passed through the weir by September 20. The minimal escapement goal, which will be

Table 2. Summary of Dolly Varden, Steelhead, Sockeye Salmon, Pink Salmon and Coho Salmon Enumerated Through Buskin River Weir, April 21 through October 26, 1985.

Weekly Time Period	Outmigrant Dolly Varden		Outmigrant Steelhead		Sockeye Salmon		Pink Salmon		Coho Salmon		Inmigrant Dolly Varden		Inmigrant Steelhead	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
April 21-27	2	0.0	...	...	...	...	...	...	...	...	...	...	...	...
April 28-May 4	241	1.1	...	...	...	...	...	...	...	...	...	...	...	...
May 5-11	158	0.7	...	...	1	0.0	...	...	...	...	...	...	...	...
May 12-18	1,859	8.5	...	...	3	0.0	...	...	...	...	...	...	...	...
May 19-25	7,584	34.7	6	2.7	24	0.1	...	...	...	...	...	...	...	...
May 26-June 1	6,456	29.5	11	4.9	190	1.1	...	...	...	...	...	...	...	...
June 2-8	5,505*	25.2	10*	4.5	2,415*	13.4	...	...	...	...	...	...	...	...
June 9-15	0	0.0	0	0.0	2,020	11.2	...	...	...	...	...	...	...	...
June 16-22	2	0.0	4	1.8	1,471	8.2	1	0.0	...	...	...	...	...	...
June 23-29	0	0.0	8	3.6	2,997	16.6	2	0.0	...	...	...	...	...	...
June 30-July 6	0	0.0	70	31.4	2,174	12.1	7	0.0	...	...	...	...	...	...
July 7-13	2	0.0	108	48.4	2,046	11.4	36	0.0	...	...	152	0.7	...	...
July 14-20	0	0.0	6	2.7	2,172	12.1	105	0.1	...	...	5,798	28.2	...	...
July 21-27	0	0.0	...	...	350	1.9	7,887	5.3	...	...	6,624	32.3	...	...
July 28-Aug. 3	48	0.2	...	...	1,084	6.0	31,210	20.8	14	0.1	2,896	14.1	...	...
August 4-10	...	...	...	...	496	2.8	63,657	42.5	31	0.3	1,263	6.2	...	...
August 11-17	...	...	...	...	340	1.9	21,861	14.6	55	0.6	701	3.4	...	...
August 18-24	...	...	...	...	126	0.7	5,163	3.4	178	1.9	164	0.8	...	...
August 25-31	...	...	...	...	80	0.4	7,593	5.1	135	1.4	70	0.3	1	1.8
September 1-7	...	...	...	...	11	0.1	7,555	5.0	55	0.6	65	0.3	1	1.8
September 8-14	...	...	...	...	1	0.0	3,383	2.3	1	0.0	31	0.2	0	0.0
September 15-21	...	...	...	...	9	0.0	844	0.6	541	5.7	28	0.1	0	0.0
September 22-28	...	...	...	...	...	...	383	0.3	6,336	66.9	228	1.1	3	5.3
Sept. 29-Oct. 5	...	...	...	...	...	...	4	0.0	1,970	20.8	1,730	8.4	8	14.0
October 6-12	...	...	...	...	...	...	1	0.0	100	1.1	349	1.7	17	29.8
October 13-19	...	...	...	...	...	...	1	0.0	43	0.4	368	1.8	19	33.3
October 20-26	...	...	...	...	...	...	0	...	15	0.2	73	0.4	8	14.0
Total**	21,857***	99.9	223	100.0	18,010	100.0	149,693****	100.0	9,474*****	100.0	20,540	100.0	57	100.0

* Estimated escapement as the weir was inoperable June 3-7; i.e., 7 day pre and post count average used for daily estimate when weir was inoperable.

** A total of seven chum salmon moved through the weir during August through October.

*** Approximately 8,172 Dolly Varden were caught in the sport fishery before they migrated down through the weir. Also, an undetermined number of Dolly Varden migrated downstream between June 3 and June 7 when the weir was inoperable.

**** Approximately 18,000 pink salmon spawned below the weir, therefore, the actual escapement was 167,693 fish.

***** Approximately 208 coho salmon were caught by anglers above the weir, therefore, the actual escapement was 9,266 fish.

altered when precise escapement data are collected, was 2,000 fish. Consequently, the river was closed to sport fishing from September 11 through September 27, and only 2 days of commercial fishing were allowed in the Buskin area during September 1 through September 28. Nearly two-thirds of the total escapement (n=9,266 fish) moved through the commercial, subsistence and sport fisheries, and 6,336 fish migrated upriver from September 22 to 28. Without a weir to manage the coho fishery, Buskin River coho salmon probably would have been overharvested in 1985.

Lake Genevieve Coho Salmon

Fish sampling at the Buskin River weir indicated four of 256 coho salmon sampled for age and length data bore adipose fin clips. Utilizing the ratio of marked to unmarked fish to extrapolate the total return, an estimated 181 adipose-clipped fish returned in 1985; i.e., 0.0159 (ratio of marked to unmarked) multiplied by 11,367 fish (total return) equals 181 marked fish. These fish resulted from the 35,472 fingerlings stocked in Lake Genevieve in 1983 (Murray 1984). The Age 1.1 returning adults were from 1,014 smolts enumerated through the Lake Genevieve weir in 1984 (Murray 1985). The 1985 Lake Genevieve smolt out-migration totaled 5,387 fish (unpublished data in the Kodiak Sport Fish office) which should produce 269-539 fish in 1986; i.e., returns based on 5 to 10% smolt survival.

Dolly Varden

A total of 1,119 spring run Dolly Varden (out-migrant fish) captured by weir trapping and beach seining during May and June 1985 averaged 351 mm in length (range of 175-645 mm [Figure 2]). Fall run or in-migrant fish (n=520) captured by weir trapping during July through October had a mean length of 347 mm (range of 190-543 mm [Figure 3]). A comparison of the length frequencies of spring and fall run fish (Figures 2 and 3) shows approximately 10% of the fish were in a 171-270 mm size range. The low catch of smaller fish, which theoretically should have been a high percentage in a normal Dolly Varden population, probably resulted from smaller fish swimming between the weir pipes; i.e., pipe spacing on the weir pickets was 21 mm wide.

Age Composition and Mean Size of Salmon and Steelhead

Sockeye Salmon:

Sockeye salmon (n=456) analyzed for age-growth data (Table 3) were comprised of 182 males and 254 females; 20 fish that had unreadable scales. Scale analysis indicated a total of seven age classes; however, most fish (96.5%) smolted at Age 1.0, while 44.5% and 50.9% of the fish were Age 1.2 and Age 1.3, respectively. Age 1.3 males (n=97) and females (n=125) had mean lengths of 585 and 557 mm, respectively.

Coho Salmon:

Coho salmon (n=256) analyzed for age-growth data (Table 4) were comprised of 122 males and 105 females; 29 fish had unreadable scales.

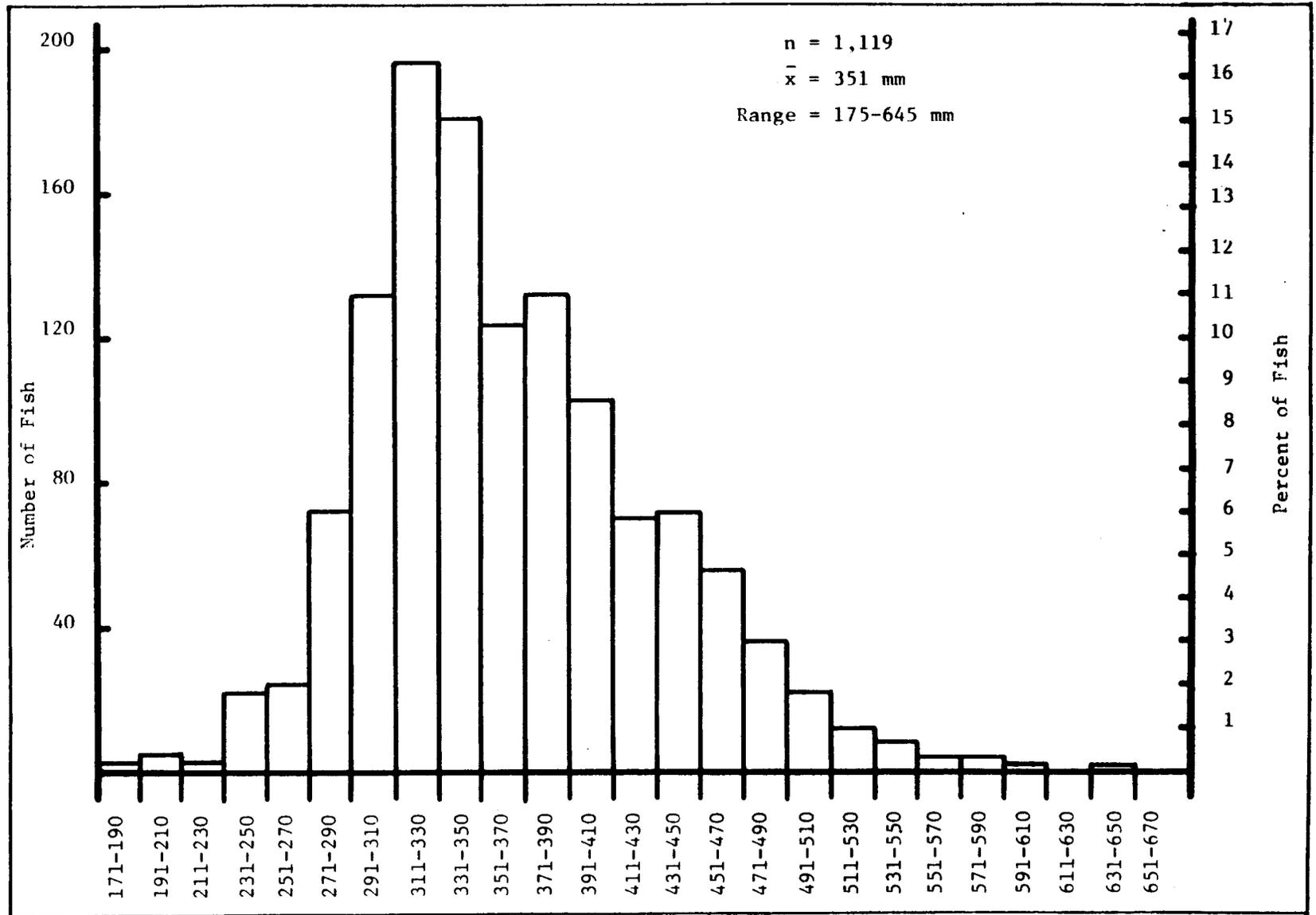


Figure 2. Number and Percent of Buskin River Dolly Varden by 20 Millimeter Size Groups Sampled at Buskin River Weir, May and June, 1985.

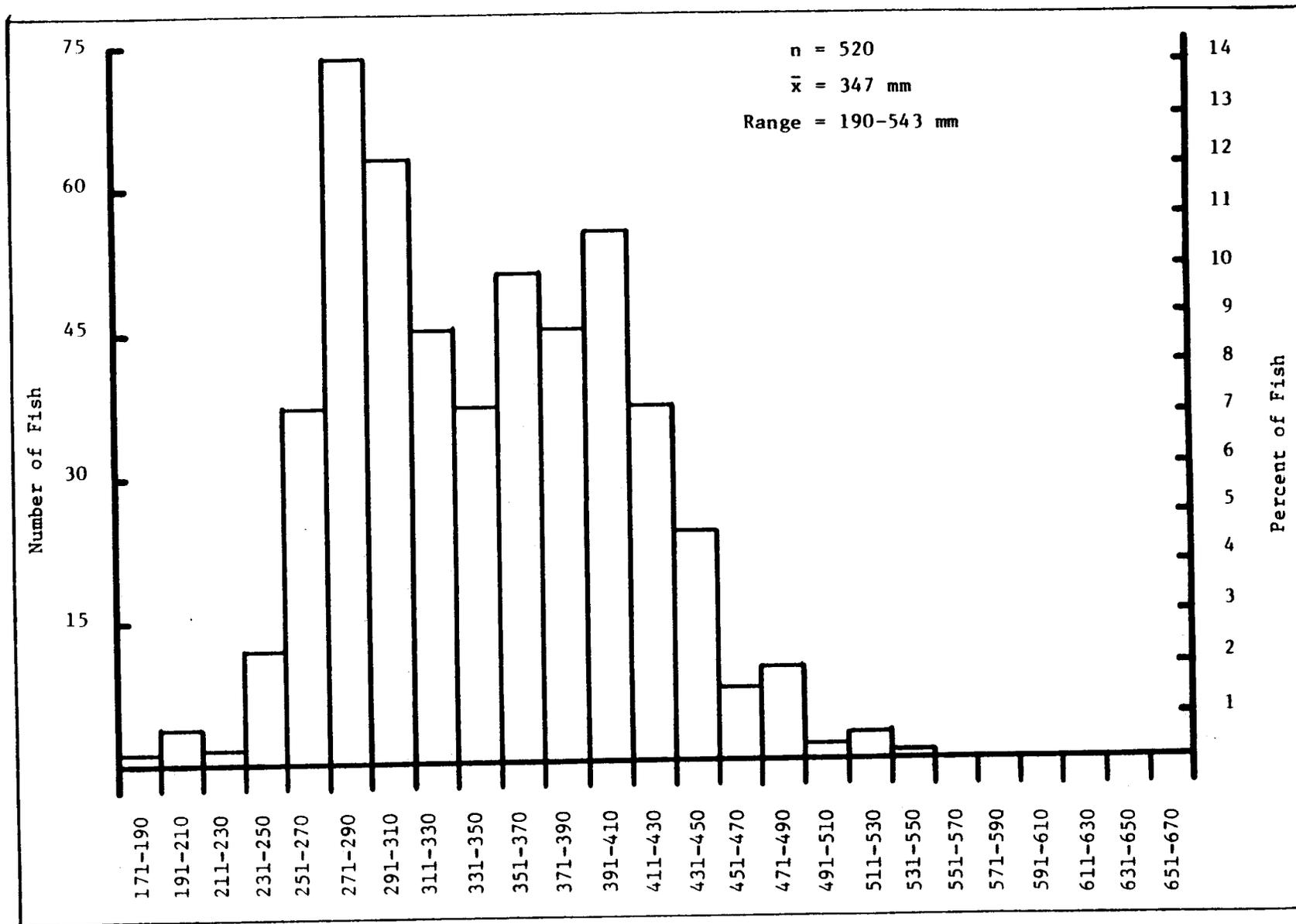


Figure 3. Number and Percent of Buskin River Dolly Varden by 20 Millimeter Size Groups Sampled at Buskin River Weir, July through October, 1985.

Table 3. Age, Sex and Length of Buskin River Sockeye Salmon Sampled at Buskin River Weir, 1985.

Age Class	Males			Females			Total	
	n	%	Mean Ln(mm)	n	%	Mean Ln(mm)	n	%
1.1	3	1.6	405	1	0.4	360	4	0.9
1.2	76	41.8	525	118	46.4	506	194	44.5
1.3	97	53.3	585	125	49.2	557	222	50.9
1.4	1	0.6	650	0	...	...	1	0.2
2.1	2	1.1	445	2	0.8	385	4	0.9
2.2	3	1.6	484	6	2.4	505	9	2.1
2.3	<u>0</u>	<u>...</u>	...	<u>2</u>	<u>0.8</u>	562	<u>2</u>	<u>0.5</u>
Total	182	100.0		254	100.0		436*	100.0

* Twenty additional fish had unreadable scales.

Table 4. Age, Sex and Length of Buskin River Coho Salmon Sampled at Buskin River Weir, 1985.

Age Class	Males			Females			Total	
	n	%	Mean Ln (mm)	n	%	Mean Ln (mm)	n	%
1.0	4	3.3	355	0	...	...	4	1.8
2.0	26	21.3	360	0	...	...	26	11.4
1.1	58	47.5	720	56	53.3	690	114	50.2
2.1	<u>34</u>	<u>27.9</u>	733	<u>49</u>	<u>46.7</u>	715	<u>83</u>	<u>36.6</u>
Total	122	100.0		105	100.0		227*	100.0

* Twenty-nine additional fish had unreadable scales.

Scale analysis indicated a total of four age classes, with 52.0 and 48.0% of the fish smolting at Age 1.0 and Age 2.0, respectively. A majority of the fish (50.2%) were Age 1.1, and were comprised of 58 males and 56 females averaging 720 and 690 mm in length, respectively.

Chum Salmon:

Age composition and size data are not presented for chum salmon because only seven fish moved through the weir, and no fish were sampled for age-growth data.

Steelhead:

Age composition and size data are not presented for steelhead as insignificant numbers of out-migrant fish (n=8) and in-migrant fish (n=10) were captured. Out-migrant steelhead would not enter the downstream trap or pass through the weir gates; therefore, three or four weir pickets were pulled to facilitate fish passage. Only 10 of 57 in-migrant steelhead were captured in the upstream trap, and five of these fish had unreadable scales.

ACKNOWLEDGEMENTS

I gratefully acknowledge the assistance and cooperation of the Kodiak Fisheries Rehabilitation Enhancement and Development Division, Commercial Fisheries Division and the National Oceanic and Atmospheric Administration.

LITERATURE CITED

- Koo, T.S.Y. 1962. Studies of Alaska red salmon. University of Washington Press, Seattle, WA: pp. 39-48.
- Manthey, K., D. Prokopowich and J. Strickert. 1984. Commercial Fish Division, Westward Region, Fin Fish Data Report No. 2-85. Alaska Department of Fish and Game. Division of Commercial Fisheries. Annual Finfish Management Report, 1984: 338 pp.
- Mills, M.J. 1979. Alaska statewide sport fish harvest studies. Alaska Department of Fish and Game. Federal Aid in Fish Restoration, Annual Performance Report, 1978-1979, Project F-9-11, 20(SW-I-A): 112 pp.
- _____. 1980. Alaska statewide sport fish harvest studies. Alaska Department of Fish and Game. Federal Aid in Fish Restoration, Annual Performance Report, 1979-1980, Project F-9-12, 21(SW-I-A): 65 pp.
- _____. 1981a. Alaska statewide sport fish harvest studies (1979). Alaska Department of Fish and Game. Federal Aid in Fish Restoration, Annual Performance Report, 1980-1981, Project F-9-13, 22(SW-I-A): 77 pp.

- _____. 1981b. Alaska statewide sport fish harvest studies (1980). Alaska Department of Fish and Game. Federal Aid in Fish Restoration, Annual Performance Report, 1980-1981, Project F-9-13, 22(SW-I-A): 107 pp.
- _____. 1982. Alaska statewide sport fish harvest studies (1981). Alaska Department of Fish and Game. Federal Aid in Fish Restoration, Annual Performance Report, 1981-1982, Project F-9-14, 23(SW-I-A): 115 pp.
- _____. 1983. Alaska statewide sport fish harvest studies (1982). Alaska Department of Fish and Game. Federal Aid in Fish Restoration, Annual Performance Report, 1982-1983, Project F-9-15, 24(SW-I-A): 118 pp.
- _____. 1984. Alaska statewide sport fish harvest studies (1983). Alaska Department of Fish and Game. Federal Aid in Fish Restoration, Annual Performance Report, 1983-1984, Project F-9-16, 25(SW-I-A): 122 pp.
- _____. 1985. Alaska statewide sport fish harvest studies (1984). Alaska Department of Fish and Game. Federal Aid in Fish Restoration, Annual Performance Report, 1984-1985, Project F-9-17, 26(SW-I-A): 135 pp.
- Murray, J.B. 1982. Inventory and cataloging of the sport fish and sport fish waters in southwestern Alaska. Alaska Department of Fish and Game. Federal Aid in Fish Restoration, Annual Performance Report, 1981-1982, Project F-9-14, 23(G-I-B): 44 pp.
- _____. 1983. Inventory and research of the sport fish and sport fish waters in southwestern Alaska. Alaska Department of Fish and Game. Federal Aid in Fish Restoration, Annual Performance Report, 1982-1983, Project F-9-15, 24(G-I-B): 26 pp.
- _____. 1984. Inventory and research of the sport fish and sport fish waters in southwestern Alaska. Alaska Department of Fish and Game. Federal Aid in Fish Restoration, Annual Performance Report, 1983-1984. Project F-9-16, 25(G-I-B): 37 pp.
- _____. 1985. Inventory and research of the sport fish and sport fish waters in southwestern Alaska. Alaska Department of Fish and Game. Federal Aid in Fish Restoration, Annual Performance Report, 1984-1985, Project F-9-17, 26(G-I-B): 38 pp.
- Van Hulle, F. and J.B. Murray. 1972. Inventory and cataloging of sport fish and sport fish waters of southwestern Alaska. Alaska Department of Fish and Game. Federal Aid in Fish Restoration, Annual Report of Progress, 1971-1972, Project F-9-4, 13(G-I-B): pp. 17-41.
- _____. 1974. Inventory and cataloging of the sport fish and sport fish waters in southwestern Alaska. Alaska Department of Fish and

Game. Federal Aid in Fish Restoration, Annual Performance Report, 1973-1974, Project F-9-6, 15(G-I-B): 21 pp.

_____. 1975. Inventory and cataloging of the sport fish and sport fish waters in southwestern Alaska. Alaska Department of Fish and Game. Federal Aid in Fish Restoration, Annual Performance Report, 1974-1975, Project F-9-7, 16(G-I-B): 68 pp.

_____. 1976. Inventory and cataloging of the sport fish and sport fish waters in southwestern Alaska. Alaska Department of Fish and Game. Federal Aid in Fish Restoration, Annual Performance Report, 1975-1976, Project F-9-8, 17(G-I-B): 34 pp.

_____. 1977. Inventory and cataloging of the sport fish and sport fish waters in southwestern Alaska. Alaska Department of Fish and Game. Federal Aid in Fish Restoration, Annual Performance Report, 1976-1977, Project F-9-9, 18(G-I-B): 27 pp.

_____. 1978. Inventory and cataloging of the sport fish and sport fish waters in southwestern Alaska. Alaska Department of Fish and Game. Federal Aid in Fish Restoration, Annual Performance Report, 1977-1978, Project F-9-10, 19(G-I-B): 41 pp.

_____. 1979. Inventory and cataloging of the sport fish and sport fish waters in southwestern Alaska. Alaska Department of Fish and Game. Federal Aid in Fish Restoration, Annual Performance Report, 1978-1979, Project F-9-11, 20(G-I-B): 47 pp.

_____. 1980. Inventory and cataloging of the sport fish and sport fish waters in southwestern Alaska. Alaska Department of Fish and Game. Federal Aid in Fish Restoration, Annual Performance Report, 1979-1980, Project F-9-12, 21(G-I-B): 58 pp.

_____. 1981. Inventory and cataloging of the sport fish and sport fish waters in southwestern Alaska. Alaska Department of Fish and Game. Federal Aid in Fish Restoration, Annual Performance Report, 1980-1981, Project F-9-13, 22(G-I-B): 32 pp.

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