DISTRIBUTION OF THE DRIFT GILL NET SOCKEYE SALMON HARVEST IN UPPER COOK INLET 1980-1986

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INTRODUCTION

Frequently, the professional staff of the Alaska Department of Fish and Game (ADF&G), as well as the public, have questions about the distribution of the Upper Cook Inlet (Figure 1) commercial sockeye salmon (*Oncorhynchus nerka*) harvest by permit holder. Reasons for these request are diverse and range from planning sampling programs (e.g. catch sampling) to mere curiosity as to how one is preforming in the fishery.

Therefore, this report presents the distribution of the drift gill net fleet harvest of sockeye salmon for the period 1980 to 1986.

METHODS

Data summarized in this report were compiled from the ADF&G fish ticket system by permit holder for the years 1980-1986. However, because of technical problems in the system, the data for 1984 were not final and therefore have been excluded from this analysis.

The fish ticket harvest data were processed by SAS Institute, Inc. software system. Specifically, the Univariate procedures used included calculation of the mean, standard deviation, variance, skewness, kurtosis, maximum and minimum values, range of values, quartiles, median, and test for normality. The Shapiro-Wilk statistic was computed for the test of normality. In addition, harvest figures were summarized in 200 fish increments for plotting purposes only.

RESULTS AND DISCUSSION

The distribution of the drift gill net fleet sockeye salmon harvest for the subject years are presented in Figures 2 through 7. Mean harvest ranged from 1087 sockeye salmon in 1981 to 5528 fish in 1983 (Appendix A.1 - A.6). In 1982, 1983, and 1986 the hypothesis that the distribution of the harvest was normal was accepted (p .05). Even in the years when the hypothesis was rejected positive measures of skewness and kurtosis did not indicate large deviations (Appendix A.1 - A.6).

The above data are intended to provide guidance to future research efforts. Before statistical procedures are used which assume normal distributions the procedures should be evaluated for sensitivity to non-normal distributions as evidenced in the data set.

A common belief within various user groups is that a few fisherman catch most of the fish. This popular myth is often cause of frustration for a number of fisherman and hopefully the above data set will help to minimize that frustration.

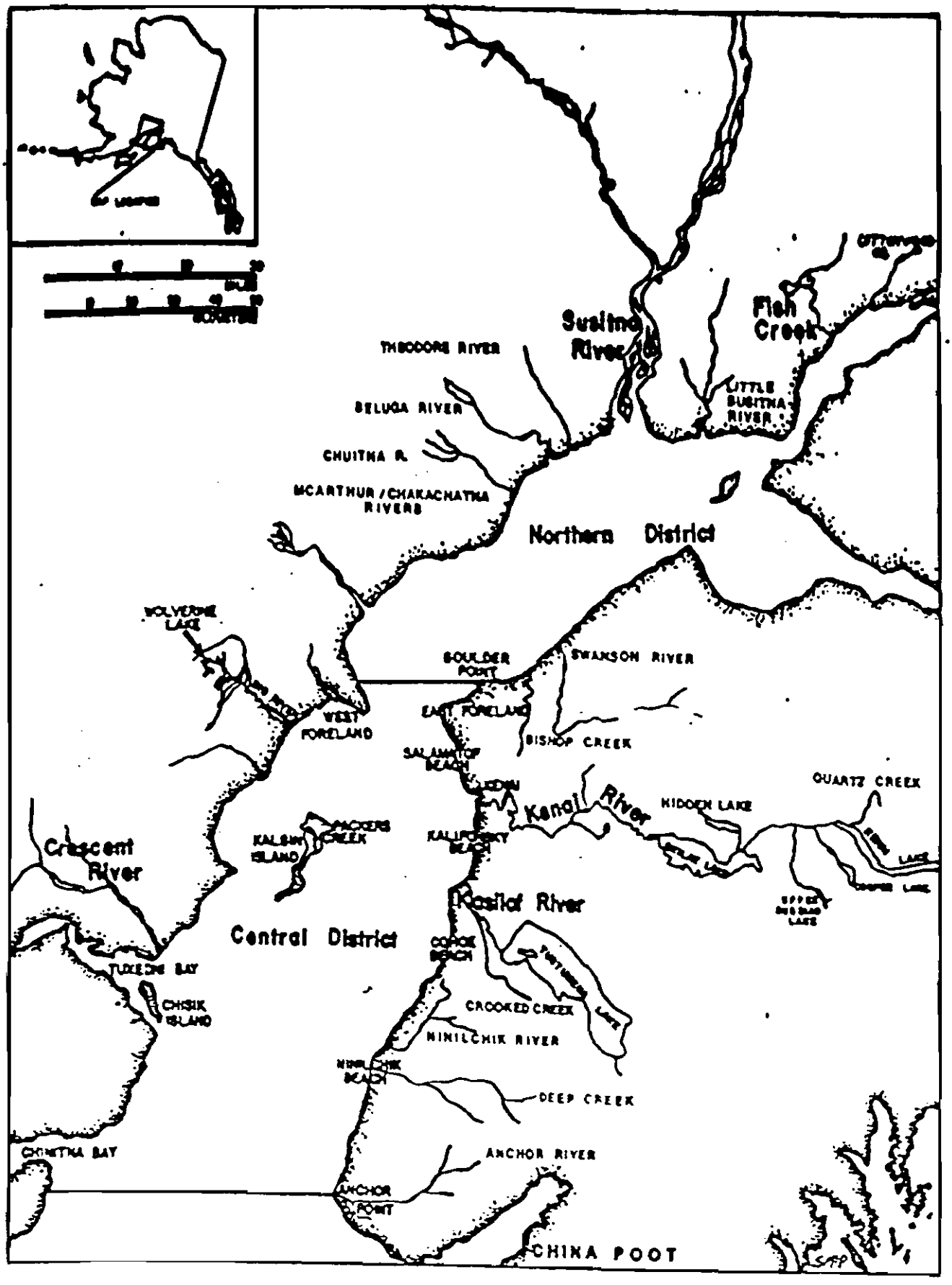

Figure 1. The Upper Cook Inlet area showing the locations of the Northern and Central Districts and the major sockeye salmon spawning drainages.

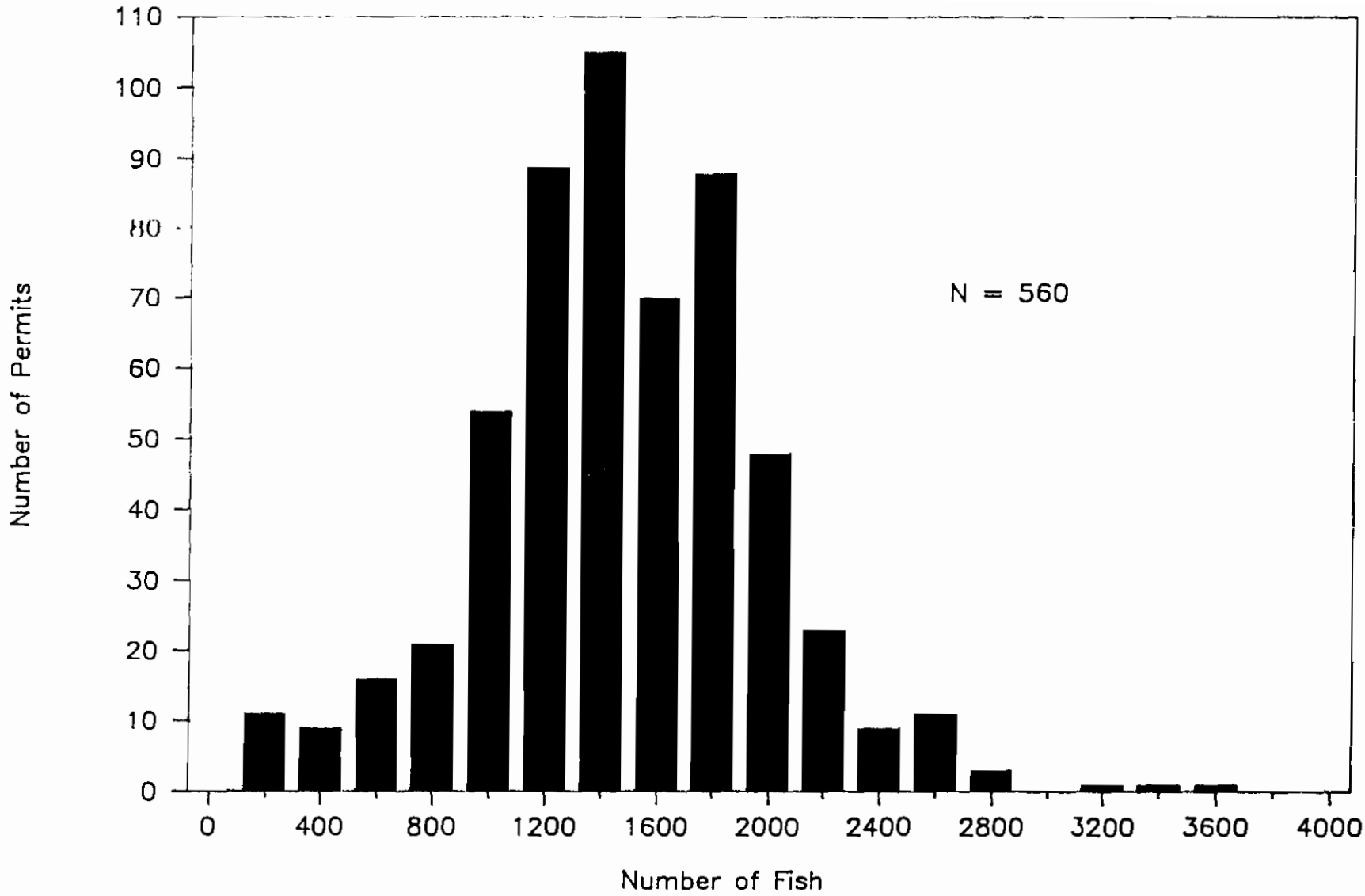

Figure 2. Frequency distribution of sockeye salmon harvest per drift gill net permit, 1980.

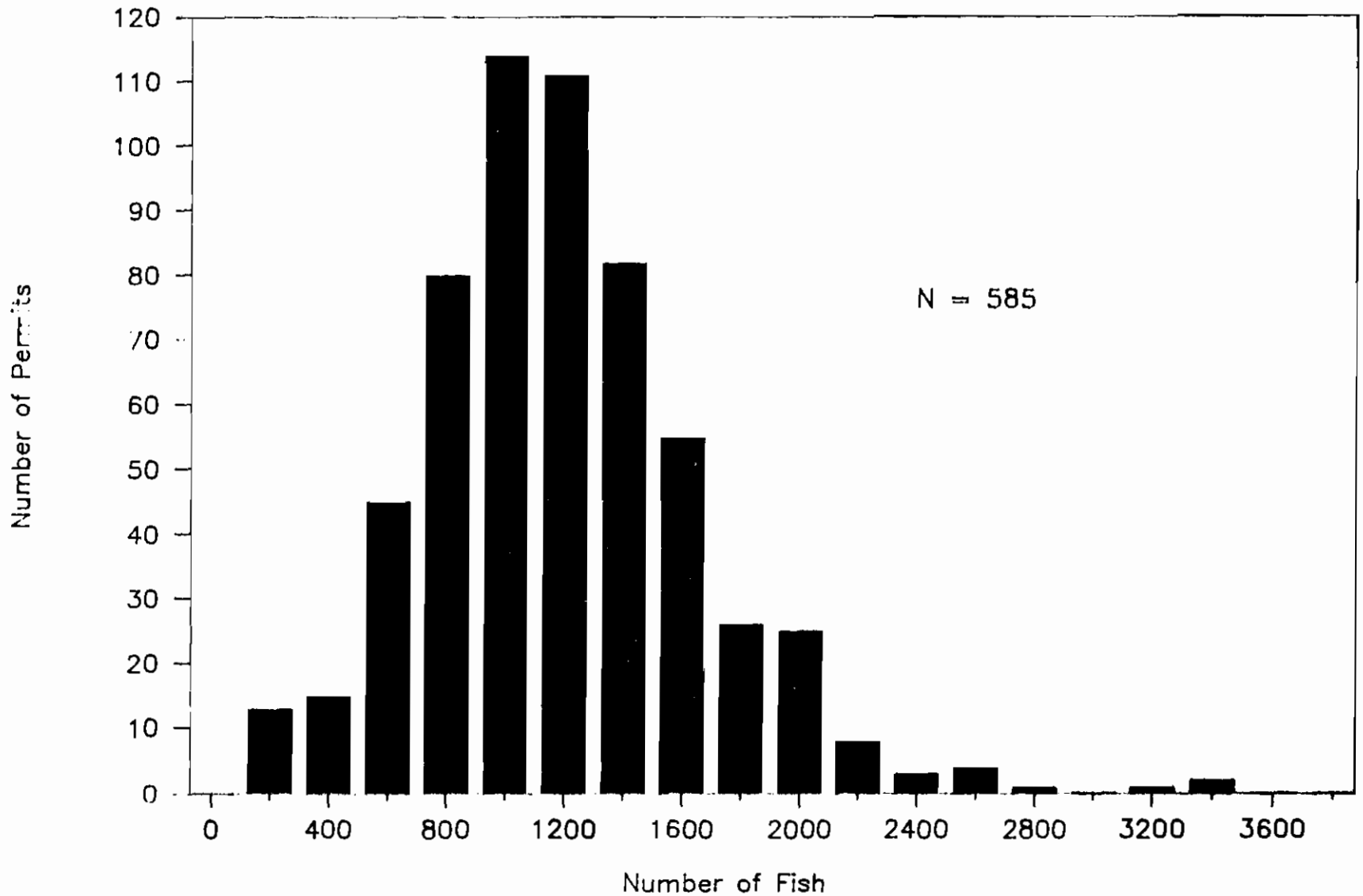

Figure 3. Frequency distribution of sockeye salmon harvest per drift gill net permit, 1981.

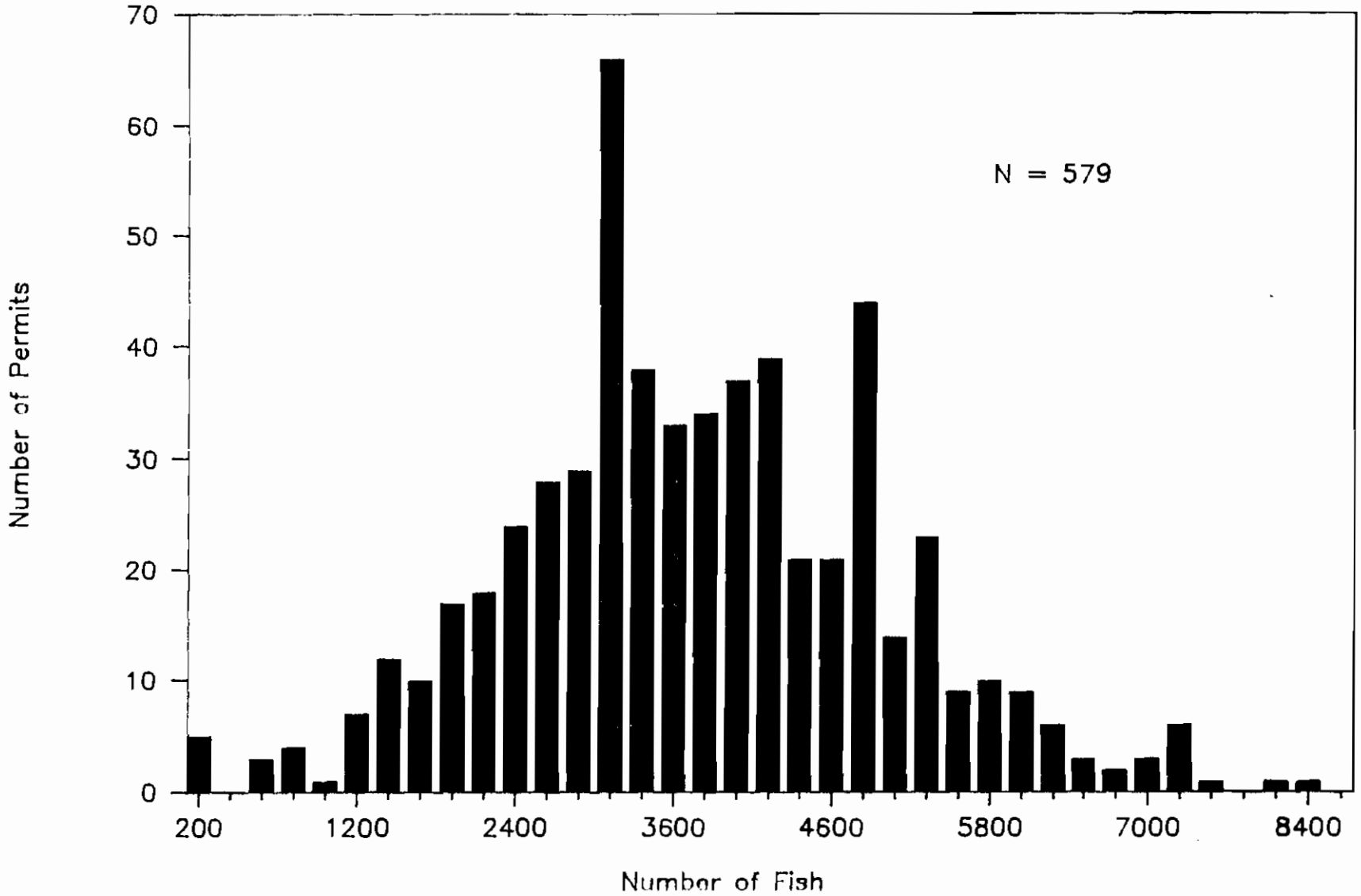

Figure 4. Frequency distribution of sockeye salmon harvest per drift gill net permit, 1982.

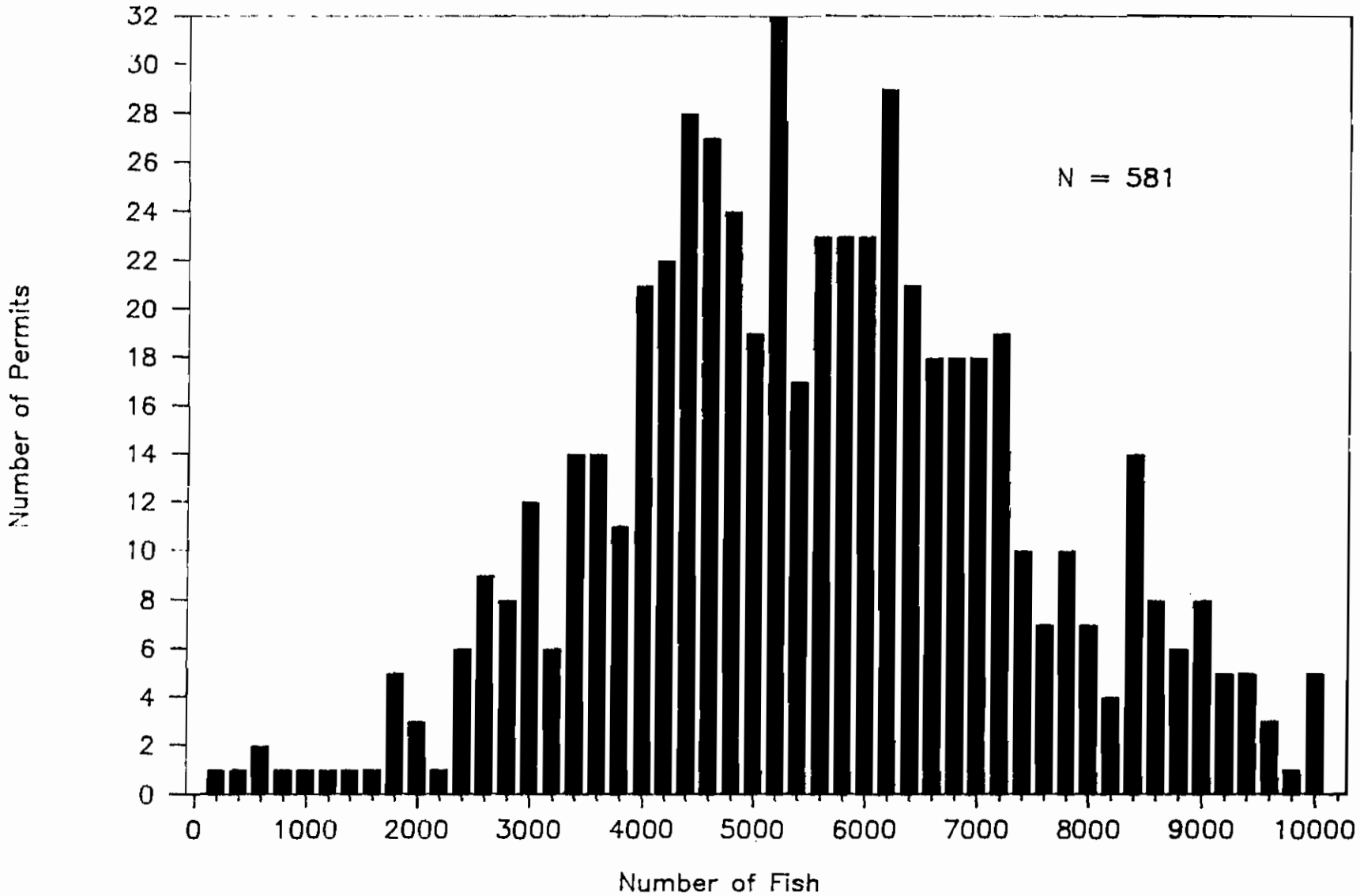

Figure 5. Frequency distribution of sockeye salmon harvest per drift gill net permit, 1983.

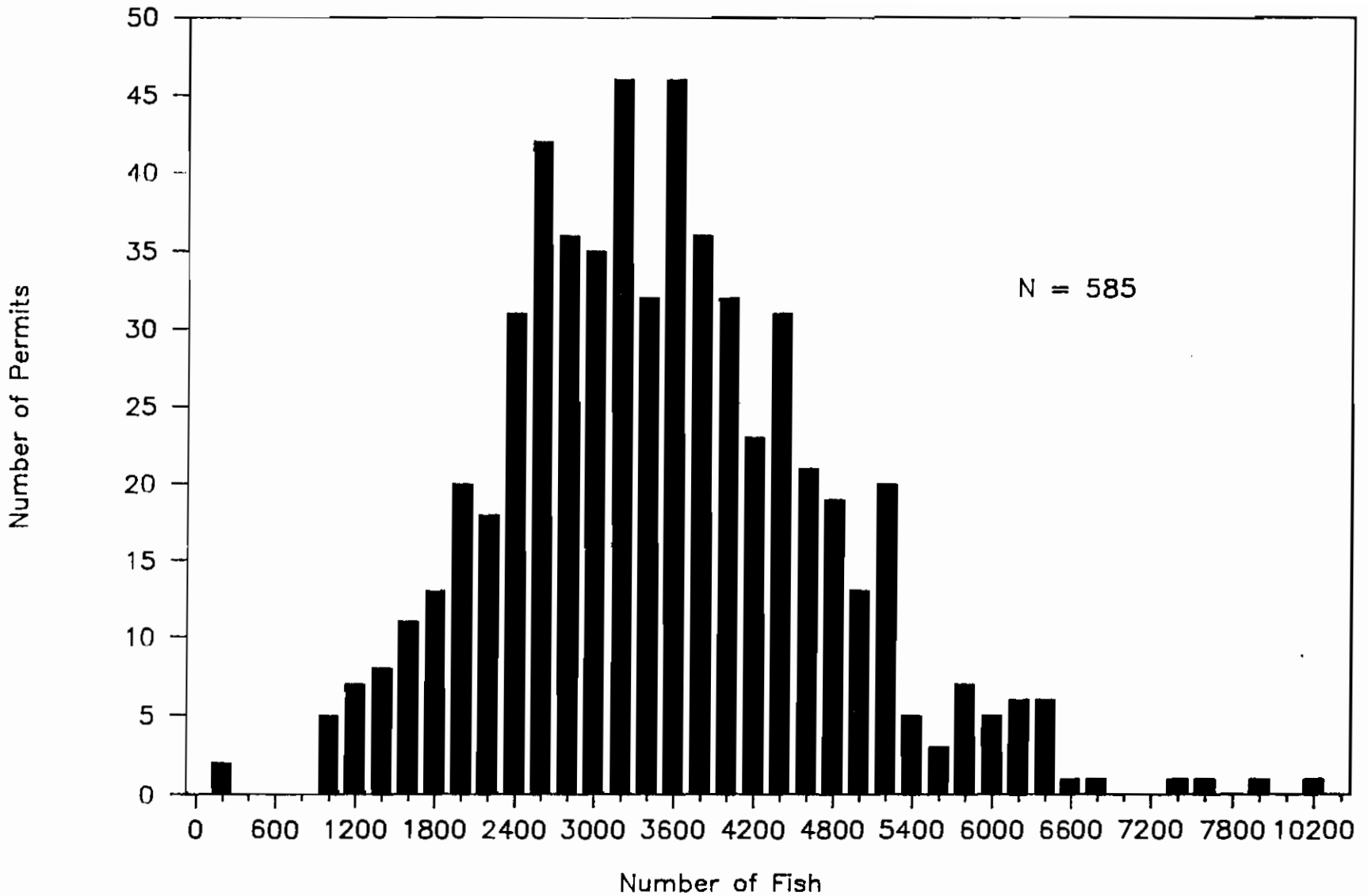

Figure 6. Frequency distribution of sockeye salmon harvest per drift gill net permit, 1985.

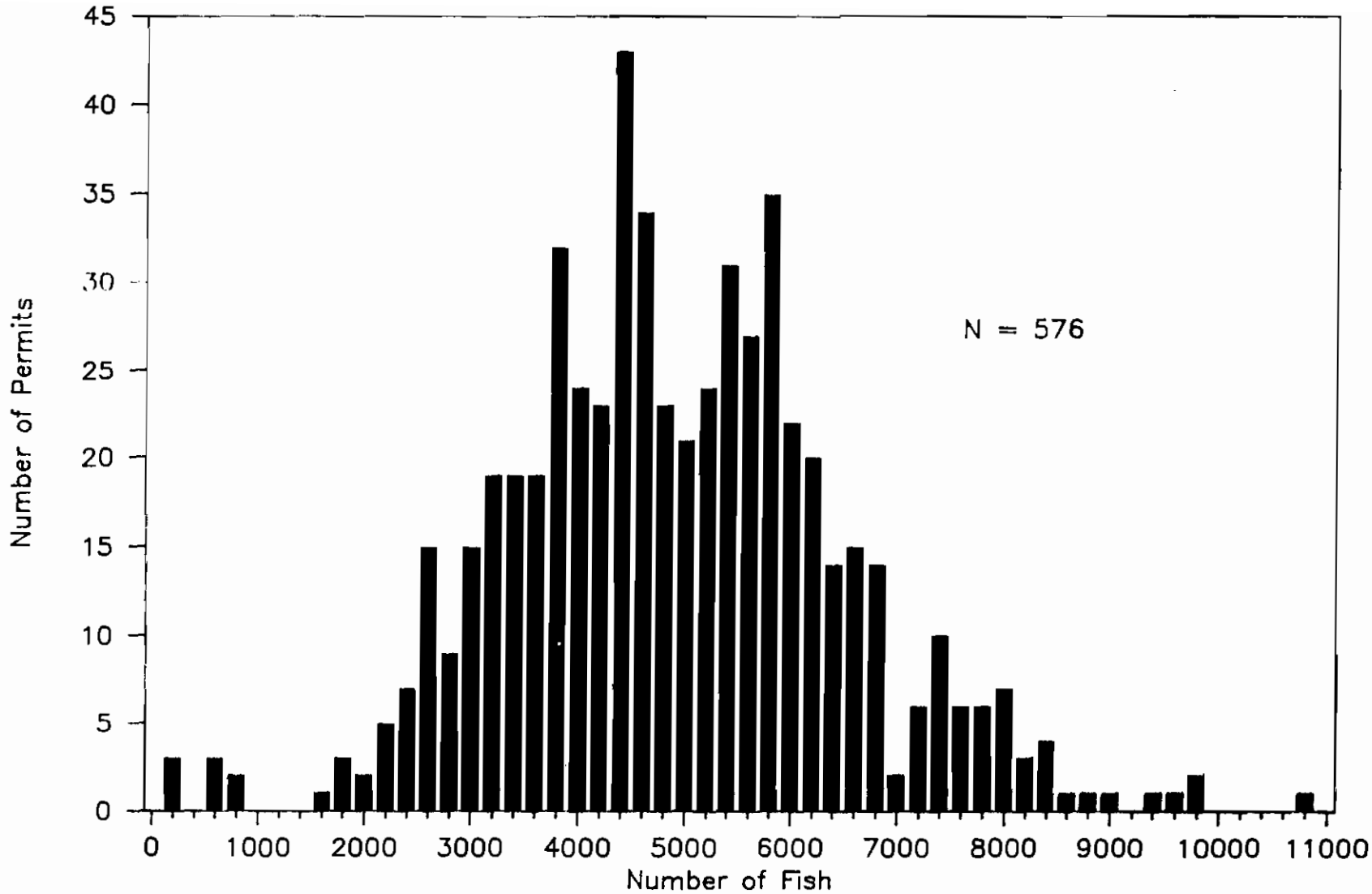

Figure 7. Frequency distribution of sockeye salmon harvest per drift gill net permit, 1986.

Appendix A.1. Statistics associated with the 1980 drift gill net harvest of sockeye salmon in Upper Cook Inlet, Alaska.

Moments

N	560	Sum Wgts	560
Mean	1372.813	Sum	768775
Std Dev	504.2694	Variance	254287.6
Skewness	0.129007	Kurtosis	1.124947
USS	1.1975E9	CSS	1.4215E8
CV	36.73258	Std Mean	21.30927
T:Mean=0	64.42325	Prob>|T|	0.0001
Sgn Rank	78540	Prob>|S|	0.0001
Num ^= 0	560		
W:Normal	0.97892	Prob<W	0.0226

Quantiles

100% Max	3501	99%	2678
75% Q3	1672.5	95%	2178
50% Med	1343	90%	1975
25% Q1	1085	10%	794
0% Min	2	5%	494
		1%	49
Range	3499		
Q3-Q1	587.5		
Mode	727		

Extremes

Lowest	Obs	Highest	Obs
2	40	2753	55
4	1	2791	178
9	49	3030	368
13	64	3286	54
46	355	3501	387

Appendix A.2. Statistics associated with the 1981 drift gill net harvest of sockeye salmon in Upper Cook Inlet, Alaska.

Moments

N	585	Sum Wgts	585
Mean	1086.733	Sum	635739
Std Dev	468.3501	Variance	219351.8
Skewness	0.770047	Kurtosis	2.03235
USS	8.1898E8	CSS	1.281E8
CV	43.09706	Std Mean	19.36389
T:Mean=0	56.12164	Prob>|T|	0.0001
Sgn Rank	85702.5	Prob>|S|	0.0001
Num ^= 0	585		
W:Normal	0.960883	Prob<W	0.0001

Quantiles

100% Max	3291	99%	2555
75% Q3	1357	95%	1917
50% Med	1040	90%	1659
25% Q1	785	10%	558
0% Min	8	5%	418
		1%	53
Range	3283		
Q3-Q1	572		
Mode	875		

Extremes

Lowest	Obs	Highest	Obs
8	427	2568	292
14	557	2516	303
19	40	3001	305
44	22	3286	452
47	79	3291	58

Appendix A.3. Statistics associated with the 1982 drift gill net harvest of sockeye salmon in Upper Cook Inlet, Alaska.

Moments

N	579	Sum Wgts	579
Mean	3621.387	Sum	2096783
Std Dev	1348.789	Variance	1819231
Skewness	0.20817	Kurtosis	0.33635
USS	8.6448E9	CSS	1.0515E9
CV	37.24509	Std Mean	56.05375
T:Mean=0	64.60562	Prob>|T|	0.0001
Sgn Rank	83665.5	Prob>|S|	0.0001
Num ^= 0	578		
W:Normal	0.983003	Prob<W	0.2219

Quantiles

100% Max	8262	99%	7092
75% Q3	4480	95%	5915
50% Med	3555	90%	5344
25% Q1	2709	10%	1981
0% Min	0	5%	1539
		1%	419
Range	8262		
Q3-Q1	1771		
Mode	1944		

Extremes

Lowest	Obs	Highest	Obs
0	38	7228	369
8	424	7303	175
11	148	7414	293
28	548	8050	402
80	249	8262	52

Appendix A.4. Statistics associated with the 1983 drift gill net harvest of sockeye salmon in Upper Cook Inlet, Alaska.

Moments

N	581	Sum Wgts	581
Mean	5528.077	Sum	3211813
Std Dev	1974.532	Variance	3898776
Skewness	0.380808	Kurtosis	0.745922
USS	2.002E10	CSS	2.2613E9
CV	35.71824	Std Mean	81.91738
T:Mean=0	67.48357	Prob>|T|	0.0001
Sgn Rank	84535.5	Prob>|S|	0.0001
Num ^= 0	581		
W:Normal	0.984228	Prob<W	0.3548

Quantiles

100% Max	14378	99%	10465
75% Q3	6737	95%	8960
50% Med	5424	90%	8233
25% Q1	4229	10%	3164
0% Min	144	5%	2531
		1%	810
Range	14234		
Q3-Q1	2508		
Mode	3913		

Extremes

Lowest	Obs	Highest	Obs
144	22	10753	298
202	231	10812	86
510	553	11549	399
565	3	12977	413
714	27	14378	49

Appendix A.5. Statistics associated with the 1985 drift gill net harvest of sockeye salmon in Upper Cook Inlet, Alaska.

Moments

N	585	Sum Wgts	585
Mean	3399.364	Sum	1988628
Std Dev	1213.06	Variance	1471514
Skewness	0.492614	Kurtosis	0.697288
USS	7.6194E9	CSS	8.5936E8
CV	35.6849	Std Mean	50.15385
T:Mean=0	67.77873	Prob>|T|	0.0001
Sgn Rank	85702.5	Prob>|S|	0.0001
Num ^= 0	585		
W:Normal	0.978549	Prob<W	0.0136

Quantiles

100% Max	8408	99%	6515
75% Q3	4176	95%	5630
50% Med	3339	90%	4978
25% Q1	2548	10%	1913
0% Min	22	5%	1578
		1%	984
Range	8386		
Q3-Q1	1628		
Mode	3420		

Extremes

Lowest	Obs	Highest	Obs
22	146	6676	445
70	1	7275	85
908	10	7418	289
923	20	7990	413
979	280	8408	48

Appendix A.6. Statistics associated with the 1986 drift gill net harvest of sockeye salmon in Upper Cook Inlet, Alaska

Moments

N	576	Sum Wgts	576
Mean	4800.054	Sum	2764831
Std Dev	1578.139	Variance	2490522
Skewness	0.210952	Kurtosis	0.616028
USS	1.47E10	CSS	1.4321E9
CV	32.87752	Std Mean	65.75579
T:Mean=0	72.9982	Prob>|T|	0.0001
Sgn Rank	83088	Prob>|S|	0.0001
Num ^= 0	576		
W:Normal	0.983688	Prob<W	0.2950

Quantiles

100% Max	10682	99%	8964
75% Q3	5751.5	95%	7577
50% Med	4675.5	90%	6731
25% Q1	3726	10%	2921
0% Min	6	5%	2445
		1%	599
Range	10676		
Q3-Q1	2025.5		
Mode	3965		

Extremes

Lowest	Obs	Highest	Obs
6	543	9391	115
96	1	9551	439
157	316	9738	395
414	141	9770	86
433	111	10682	44