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1968 LAKE SUPERIOR SPORT FISHING PRESSURE CHECK,
CREEL CENSUS, AND CHARTER BOAT TROLLING

by

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Abstract: In 1968 the sport fishery on Wisconsin waters of Lake Superior was monitored by means of car counts, creel census, and cooperative charter boat census. Information was collected on 269 private boat trips and 414 voluntarily reported charter boat trips. From these data it is estimated that more than 14,500 trout and salmon were caught by sport fishermen in 1968. Lake trout comprised 61% of the total catch, while coho salmon comprised 19%. Brown trout, rainbow trout, and brook trout constituted decreasing proportions of the total catch.

October, 1969

INTRODUCTION

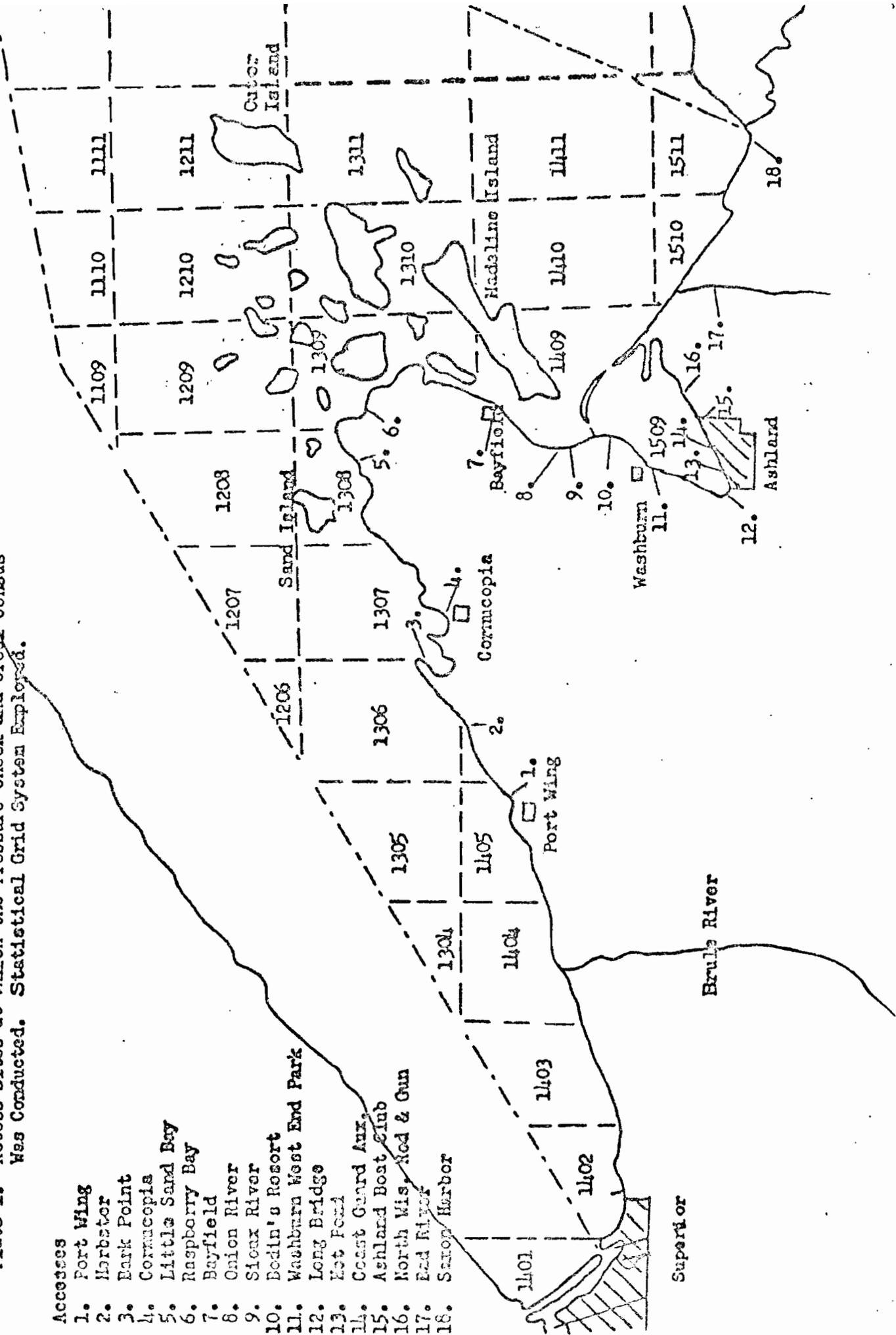
A steady increase in Great Lakes sport fishing has been apparent during the last few years. This fishing resurgence was largely due to the introduction of large numbers of trout to the inshore waters of the Great Lakes. In 1967 alone, Wisconsin introduced 136,000 brook, brown, and rainbow trout, and 349,000 lake trout to Lake Superior waters. Such massive plantings require critical evaluation in order to justify these efforts. The classic method of evaluating a sport fishery is creel census.

In 1968 a count of cars with boat trailers was conducted simultaneously with a creel census at 18 access sites (Plate 1) on Lake Superior. In all, 728 checks were made at the 18 sites, mainly on weekends, from April through October. Checks were made on 62 days during this period.

Plate 1. Access Sites at Which the Pressure Check and Creel Census Was Conducted. Statistical Grid System Employed.

Accesses

1. Port Wing
2. Harbster
3. Bark Point
4. Cornucopia
5. Little Sand Bay
6. Raspberry Bay
7. Bayfield
8. Onion River
9. Sioux River
10. Bodin's Resort
11. Washburn West End Park
12. Long Bridge
13. Kat Point
14. Coast Guard Aux.
15. Ashland Boat Club
16. North Wis. Rod & Gun
17. East River
18. Saron Harbor



Sport Fishing Pressure Check

The car count portion was designed to provide information needed to make an estimate of the total trout and salmon harvest by fishermen using boats. It provided a basis for determining the total number of cars with boat trailers using access sites and the percentage of boating activity oriented towards fishing. In addition, the percentage of nonresidents at access sites was determined by examination of each car's license plates.

	April	May	June	July	Aug.	Sept.	Oct.
Average Number of Cars With Boat Trailers At Each Access Site, Trout And Salmon Trips Only	3.5	5.1	4.8	4.7	2.3	4.1	1.4
Percentage of Boats Utilized for Fishing	100.0	99.1	97.1	61.3	76.7	96.0	100.0
Percentage of Cars At Access Sites Owned By Nonresidents	Unk.	18.5	22.4	26.0	18.4	18.8	9.1

There was a 22.7 percent increase in the average number of cars with boat trailers at each access site from 1967 to 1968. Comparison was made only between those sites which had data for both years.

	1967	May	June	July	Aug.	Avg. of 4 mos.
Average Number of Cars With Boat Trailers at Each Access Site Each Sample Day	1967	3.8	4.0	8.4	3.2	4.4
	1968	6.5	5.7	5.8	3.4	5.4

The amount of activity at each access site, May through September, 1968, is expressed below in the average number of cars with boat trailers each sample day.

		Lake Superior Dis. Power Co.	
Washburn West End Park	12.2	(Hot Pond)	4.2
Bayfield	11.8	Sioux River	2.6
Little Sand Bay	11.6	Bark Point	2.2
Cornucopia	9.4	Saxon Harbor	2.0
Bad River at Highway 2	8.5	Herbster	1.5
Ashland Boat Club	7.2	Onion River	1.4
Coast Guard Auxiliary	6.5	Raspberry Bay	1.3
North Wis. Rod & Gun Club	6.4	Port Wing	1.1
Bodin's Resort	4.3	Long Bridge	1.0

Creel Census

On March 29th, the ice began to break up along the shore of Lake Superior allowing open water fishing. From April 1 through October, creel census produced information on 269 boat fishing trips made by 690 anglers of which 16.9 percent were women. The average length of a boat fishing trip was 3.9 hours, while the average number of angler occupants per boat was 2.6. 30.7 percent of the anglers contacted from April through October were successful.

From data collected in 1967, 200 randomly selected fishing trips reported were grouped as to the day of the week on which they occurred. Of these, 37.5 percent were found to occur on the weekend. An assumption was then made that the weekly distribution of fishing pressure in 1968 was similar to that of 1967. Thus, 37.5 percent was considered the percentage of fishing pressure on weekends and 62.5 percent the amount of fishing pressure on week days.

The equation used for calculating total monthly angler trips was:

$$\frac{C D S A}{P} = \text{No. angler trips for month were}$$

P

C = Average no. of cars at each site

D = No. of weekend days

S = No. of sites

A = Average number of angler occupants per car

P = Average weekend proportions of cars at sites

Based on this creel census and pressure check information, the following estimates were made.

	April	May	June	July	Aug.	Sept.	Oct.	Total
% of Anglers Successful	27.4	30.4	31.4	30.2	15.9	18.8	21.8	-
No. of A Angler Trips	3,656	5,502	4,911	3,141	1,921	5,294	1,526	25,951
No. of Successful Angler Trips	902	1,773	1,542	949	305	991	333	6,795
Lake Trout	-	628	1,588	873	40	862	360	4,351
Brown Trout	171	248	324	76	153	198	-	1,170
Rainbow Trout	244	319	31	28	40	-	54	716
Brook Trout	-	-	-	123	153	327	83	686
Coho Salmon	830	1,082	46	104	-	-	27	2,089

The catch was distributed between 8 quadrats of the statistical grid system set up for Lake Superior by the U. S. Fish and Wildlife Service, Statistics Section (Plate 2). Grid number 1409 produced the highest percent of all species of trout and salmon except brook trout. Grid number 1309 produced the most brook trout.

Grid No.	Lake Trout		Coho Salmon		Rainbow Trout		Brown Trout		Brook Trout	
	Number*	%	Number*	%	Number*	%	Number*	%	Number*	%
1306	470	10.8	85	4.1	-	-	216	18.5	40	5.9
1307	861	19.8	44	2.1	72	10.0	-	-	-	-
1308	905	20.8	217	10.4	36	5.0	88	7.5	-	-
1309	117	2.7	44	2.1	72	10.0	43	3.7	444	64.7
1405	117	2.7	-	-	108	15.0	173	14.8	-	-
1409	1,255	28.8	1,045	50.0	320	45.0	390	33.3	-	-
1509	548	12.6	654	31.3	108	15.0	260	22.2	202	29.4
1510	78	1.8	-	-	-	-	-	-	-	-

*Estimated

The following table shows the length frequency, average length and percent hatchery origin of the actual catch sample. As shown by the table, lake trout had the largest average size followed by brown trout and coho salmon. The percentage of fish caught which were of hatchery origin indicates the prominent role of hatchery production on trout and salmon stocks in Wisconsin waters of Lake Superior.

Total Length (Inches)	Lake Trout	Coho Salmon	Brown Trout	Rainbow Trout	Brook Trout
10.0 - 10.9	1			5	16
11.0 - 11.9				1	10
12.0 - 12.9			1	1	6
13.0 - 13.9				1	2
14.0 - 14.9	4		1		2
15.0 - 15.9	6	11	1	1	1
16.0 - 16.9	4	17			2
17.0 - 17.9	16	14	1	4	
18.0 - 18.9	15	5	3		
19.0 - 19.9	5	7	2	2	
20.0 - 20.9	12		7	1	
21.0 - 21.9	6		4	3	
22.0 - 22.9	11	1	3		
23.0 - 23.9	9		3	2	
24.0 - 24.9	9		1	3	
25.0 - 25.9	9		3	2	
26.0 - 26.9	4				
27.0 - 27.9	1		1		
28.0 - 28.9	2				
29.0 - 29.9	2				
Average Length (inches)	20.4	16.7	20.5	17.6	11.4
% Hatchery Origin	91.3	100.0	5.5	35.4	100.0

Information concerning fishing in Wisconsin waters of Lake Superior from shore is not complete enough to make a catch estimate. Two hundred and forty-five shore anglers were contacted of which 33 were women. Fifteen percent were successful. The average shore angler's trip lasted 1.9 hours. Shore trips would contribute most to the harvest of brook trout, and least to the harvest of lake trout with brown, rainbow trout, and coho salmon in between. In 1969, a procedure will be developed to make a shore angler estimate.

Charter Boat Trolling

In 1968, the first charter boat trolling trip was reported on April 27 and the last was reported on October 30. In all, 12 charter trollers were in operation; one out of Houghton Point, six out of Bayfield, one out of Little Sand Bay, and four out of Cornucopia. Charter trollers fish with from five to ten lines out and average about eight lines. Charter boat troller guides reported 414 trips voluntarily on standard sport fishing log forms (Plate 3). The 414 trips reported were approximately 41 percent of the total trips made, based on the number of trips booked.

Following is a comparison of the summary for charter boat trips and private boat trips. The catch reflects a greater selectivity for lake trout by charter boats as well as a greater success.

	<u>Charter Trollers</u>	<u>Private Boats</u>
Average number of hours per boat trip	6.1	3.9
Average number of anglers per boat trip	4.6	2.6
Average number of trout and salmon per boat trip	5.6	.9
Average number of trout and salmon per fisherman	1.2	.3
Average number of lake trout per boat trip	4.2	.4
Average number of lake trout per fisherman	.9	.1
Percentage of nonresident anglers	28.5	18.8
Number of angler trips	4,591	25,951
Number of angler hours	28,005	101,209
Percentage of hatchery origin lake trout	95.4	91.3
Number of lake trout caught	4,540	4,351
Number of coho salmon caught	737	2,089
Number of brown trout caught	185	1,170
Number of rainbow trout caught	74	716
Number of brook trout caught	12	686

The percentage of total nonresident anglers using the charter boat trolling service varied:

May	June	July	August	September	October
20.0%	20.1%	26.0%	44.1%	30.7%	25.8%

Charter boat trolling trips were most successful during the month of May when each angler averaged 1.5 trout and salmon. The most successful trips for lake trout were made in September when anglers averaged 1.2 lake trout each.

Trout and Salmon per Angler	May	June	July	August	September	October
	1.5	1.4	1.0	1.2	1.2	1.0
Lake trout per Angler						
	0.7	1.0	0.9	1.1	1.2	0.8

Charter boat troller guides reported catching trout and salmon in ten of the quadrats previously mentioned (Plate 2): Grid number 1409 produced the highest number of fish of any quadrat but it was not high for either rainbow or brook trout. Grid number 1307 led for the former, and 1308 for the latter. Grid numbers 1209 and 1210 were not represented in the creel census. From examination of Plate 2, it will be noted that these quadrats are considerably removed from the mainland and not as accessible to small boats.

Grid No.	Lake Trout		Coho Salmon		Rainbow Trout		Brown Trout		Brook Trout	
	Number*	%	Number*	%	Number*	%	Number*	%	Number*	%
1209	64	3.5	-	-	-	-	-	-	-	-
1210	104	5.7	6	1.9	1	3.6	-	-	-	-
1306	11	0.6	2	0.6	-	-	4	5.3	1	20.0
1307	237	12.9	25	8.0	12	42.8	9	12.0	-	-
1308	270	14.8	17	5.4	4	14.3	19	25.0	4	80.0
1309	21	1.2	1	0.3	1	3.6	11	14.7	-	-
1310	1	0.1	-	-	-	-	-	-	-	-
1311	25	1.3	11	3.5	1	3.6	-	-	-	-
1409	1,070	58.6	252	80.3	9	32.1	30	40.0	-	-
1509	22	1.2	-	-	-	-	2	2.7	-	-
Unk.	60		13		3		2		-	

*Reported

The average total length of lake trout indicates fishing during the month of October produces the largest fish. The average size jumped from 18.8 in September to 23.3 in October. The charter trollers at this time move into shallow waters near shore and fish the lake trout as they move into the spawning grounds. The average length of coho salmon would increase each month but in September yearlings began to enter the catch for the first time lowering the average total length to 16.5 inches from the previous month's 21.6 inches. Brown, rainbow, and brook trout samples were too small to be considered representative.

Average Total Length

	<u>May</u>	<u>June</u>	<u>July</u>	<u>August</u>	<u>September</u>	<u>October</u>
Lake Trout	19.8	19.3	19.8	19.0	18.8	23.3
Sample Size	128	445	353	462	357	73
Coho Salmon	17.3	17.9	19.5	21.6	16.5	23.7
Sample Size	68	88	30	7	4	3
Brown Trout	22.0	21.8	20.6	17.6	17.0	16.8
Sample Size	27	25	3	5	6	4
Rainbow Trout	20.0	20.5	24.5	20.3	15.8	19.3
Sample Size	1	9	2	3	4	9
Brook Trout					18.0	14.0
Sample Size					1	2

Eighty-three percent of the reported lake trout caught by charter trollers were over 17.0 inches total length. With a 17 inch minimum size limit as existed in the past, the legal catch would have been reduced by 16.7 percent. Early in the season when most of the coho salmon were being caught, charter troller guides did not report the size of each coho because of the large number caught. Later when fewer were caught, the length of most were reported. This has affected the length frequency as the smaller sizes of early fishing are not as well represented as the larger fish caught later. Almost all of the rainbows and browns caught are represented in the length frequency and 3 of 5 brook trout are present. Only 6 percent of the browns, brooks, and rainbows were under the 1967 thirteen inch minimum size limit.

Length Frequency

Total Length (Inches)	Lake Trout	Coho Salmon	Brown Trout	Rainbow Trout	Brook Trout
10.0 - 10.9					
11.0 - 11.9	1			1	
12.0 - 12.9	1		1	1	
13.0 - 13.9	4	1	2	1	
14.0 - 14.9	33	2	2	2	2
15.0 - 15.9	101	8	1	1	
16.0 - 16.9	163	14	2	2	
17.0 - 17.9	247	48	4	2	
18.0 - 18.9	275	53	7	1	1
19.0 - 19.9	229	29	5	1	
20.0 - 20.9	202	18	7	1	
21.0 - 21.9	135	9	6	1	
22.0 - 22.9	95	4	6	5	
23.0 - 23.9	80	1	13	1	
24.0 - 24.9	87	1	5	4	
25.0 - 25.9	60	2	2	1	
26.0 - 26.9	39		2	1	
27.0 - 27.9	27		2	1	
28.0 - 28.9	18		1		
29.0 - 29.9	11		1		
30.0 - 30.9	7		1		
31.0 - 31.9	2				
32.0 - 32.9	1				

Charter trolling guides reported lamprey wounding on lake trout. Total wounds listed below includes fresh wounds and old scars. The pattern of increased numbers of fish wounded as the size of fish increases is typical of lamprey wounding data.

Total Lamprey Wounding On Lake Trout

Size Group	Sample	Total Wounding
- 16.9	303	0.33%
17.0 - 20.9	953	2.30%
21.0 - 24.9	397	14.80%
25.0 - 28.9	144	29.80%
29.0 -	21	47.60%

Fin clips were only reported for lake trout. 95.4 percent of all lake trout reported were of hatchery origin. Indicating, as did creel census data, the lake trout population at present depends heavily on hatchery stocks. There are indications however that the percentage of hatchery stocks in the catch may begin to drop. 21.9 percent of the native fish reported were under 17 inches compared to 16.7 percent of the catch as a whole.

The 1968 creel census and sport fishing pressure check procedures are being reviewed to provide the best possible data in 1969 based on problems associated with censuses on large bodies of water. The charter boat trolling information gathering procedure will remain the same in 1969 except an attempt will be made to gather information on all trips made.