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Sturgeon Landings During The 1989 Zone 6 Set Line Fisheries

Columbia River Laboratory Progress Report 91-12

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April 1991

INTRODUCTION

The Columbia River Compact allowed 114 1/2 fishing days for the 1989 Zone 6 Treaty set line sturgeon fishery. Fishing was allowed 24 hours per day from midnight January 1 until noon March 21 and from noon March 26 until noon April 30. Sturgeon landed by hook and line were included with set line landings.

This report presents the sturgeon landing statistics and sampling results for the 1989 treaty set line fishery and compares them to previous years.

METHODS

Landing Statistics

Landing statistics were defined as number of pounds, deliveries, and fish landed, and number of pounds per delivery (catch per unit effort - CPUE). The number of pounds landed, deliveries made, and pounds per delivery were determined by compiling Washington and Oregon fish tickets after the fishery closed. The number of fish landed was determined by applying average weight per fish (determined by biological sampling) to the number of pounds landed. The values in this report are considered final.

Buyer Sampling

The sturgeon catch was sampled at fish buying stations. Data collected included: date and pool of landing, fork length, weight, sex, maturity, sample size, number of tagged and tag scarred fish.

Weight was measured in pounds and fork length was measured in centimeters (cm). Total length for white sturgeon was estimated using the formula; Total length = 2.06 + 1.09 x fork length (Tracy, 1987). Sex was determined by visual observation of gonads, and maturity was classified by gonad development (i.e., immature, maturing, mature, ripe, or spent). A fish was considered mature if gonads were mature or ripe.

RESULTS

Landing Statistics

A total of 436 white sturgeon weighing 16,796 pounds were landed during the 1989 Zone 6 Treaty set line fishery (Tables 1 - 3). Bonneville pool sturgeon landings accounted for 53 percent of the pounds landed, 52 percent of the fish landed, and 46 percent of the deliveries made during the fishery. By contrast, landings in John Day pool comprised 13 percent of the pounds and fish landed and less than 1 percent of the deliveries made.

Combined Zone 6 sturgeon pounds landed was more than 3 times greater in April than any other month during 1989 (Table 1). The

season total of pounds landed by pool ranged from 2,268 pounds in John Day pool to 8,832 pounds in Bonneville pool. The peak month of pounds landed by pool was April for Bonneville and John Day pool and January for The Dalles pool.

Combined Zone 6 sturgeon deliveries were greatest during April, accounting for about 38 percent of all 1989 set line deliveries (Table 1). The season total sturgeon deliveries ranged from 13 in John Day pool to 80 in Bonneville pool. Sturgeon deliveries by pool peaked in April for Bonneville and John Day pools and in January for The Dalles pool. The April deliveries from John Day pool comprised 85 percent of all John Day pool set line deliveries.

Combined Zone 6 fish landings were 3 times greater in April than any other month during the 1989 set line season (Table 1). The season number of fish landed by pool ranged from 57 fish in John Day pool to 224 fish in Bonneville pool. The highest monthly landings by pool were recorded during April for Bonneville and John Day pool and during January for The Dalles pool.

Combined Zone 6 CPUE was 95 pounds per delivery and was greatest in April (Table 2). The season CPUE by pool ranged from 68 pounds per delivery in The Dalles pool to 174 pounds per delivery in John Day pool. The highest monthly CPUE was recorded during April in Bonneville and The Dalles pool and March in John Day pool. One delivery recorded from John Day pool in March landed 993 pounds of sturgeon, although Washington Department of Fisheries sampling determined that those fish were caught with a set net and were likely from The Dalles pool.

Buyer Sampling

Mark Sampling. A total of 55 white sturgeon, or 13 percent of the white sturgeon set line catch, was sampled for tags and tag scars during the 1989 fishery (Tables 4, 5). The mark sample included 17 fish from Bonneville pool, 37 fish from The Dalles pool, and 1 fish from John Day pool. Mark sampling of The Dalles pool catch occurred during all 4 months of the season. Mark sampling of Bonneville pool catch occurred February through April and John Day pool catch was sampled during April only. Mark sample rates for Bonneville pool, The Dalles pool, and John Day pool were 8 percent, 24 percent, and 2 percent, respectively. Two tagged fish from the Bonneville pool catch and 1 tagged fish from The Dalles pool catch were recorded during sampling. One tag scarred fish was recorded during sampling of The Dalles pool catch.

Biological sampling. Biological sampling was performed on 55 white sturgeon, 13 percent of the catch (Tables 4, 5). Biological sampling was completed on 17 fish from Bonneville pool, 37 sturgeon from The Dalles pool, and 1 fish from John Day pool. Biological sampling of The Dalles pool catch occurred during all 4 months of the season. Biological sampling of Bonneville pool catch occurred from February through April and John Day pool catch was sampled during April only. Biological sample rates for Bonneville pool, The Dalles pool, and John Day pool were 8 percent, 24 percent, and 2 percent respectively.

Average Weight. The combined Zone 6 season average weight of

white sturgeon was 38.9 pounds (Table 4). The average weight of sturgeon sampled from The Dalles pool catch was greatest at 41.3 pounds. The average weight of sturgeon sampled from Bonneville pool averaged 34.6 pounds and the 1 male sturgeon sampled from John Day pool weighed 24.0 pounds.

The combined Zone 6 average weight of males and females was 42.3 pounds and 35.4 pounds, respectively. The average weight of male sturgeon sampled from The Dalles pool and Bonneville pool was 44.0 pounds and 39.3 pounds, respectively. The average weight of female sturgeon sampled from The Dalles pool and Bonneville pool was 37.7 pounds and 32.0 pounds, respectively. No female sturgeon were sampled from the John Day pool catch.

Average Length. The combined Zone 6 season average fork length of white sturgeon was 125 cm (Table 4 and Figure 1). Average estimated total length was 138 cm. The average fork length of sturgeon sampled from The Dalles pool and Bonneville pool was 126 cm and 124 cm, respectively. The lone male fish from John Day pool catch measured 117 cm, fork length.

The combined Zone 6 season average fork length for males and females was 128 and 122 cm, respectively. The average fork length of male sturgeon from Bonneville pool and The Dalles pool was 130 cm and 128 cm, respectively. The average fork length of female sturgeon from Bonneville pool and The Dalles pool was 120 cm and 123 cm, respectively. No female sturgeon from John Day pool catch were sampled.

The size class distribution (in inches, total length TL) of sturgeon landed during the 1989 set line fishery was extrapolated by pool from fork lengths of biological sampled fish (Table 6). Extrapolations could not be completed for John Day catch because of low number of sturgeon measured from that pool. A total of 6 percent, 1 fish, from the Bonneville pool sample measured less than 4 feet TL. A total of 16 percent, 6 fish, of The Dalles pool sample was less than 4 feet TL.

Sex and Maturation. The combined Zone 6 season male to female ratio was 51:49 (Table 4). Male to female ratio in Bonneville pool and The Dalles pool was 35:65 and 57:43, respectively. Only 1 male sturgeon was sampled from John Day pool. No mature sturgeon were observed.

DISCUSSION

The number of pounds and fish landed during the 1989 Treaty set line fishery increased 41 and 37 percent, respectively from 1988 landings (Table 7). The number of pounds landed increased for the first time in 3 years, but was the lowest number of pounds landed since 1982. The number of pounds landed in 1989 was below 20,000 pounds for the second consecutive year.

In 1989 the number of fish landed was less than 1,000 for the second consecutive year (Table 7). The Zone 6 set line sturgeon landings have not been less than 1,000 fish since the initial 4 years (1976 -1979) of the fishery (Washington Department of Fisheries, *et. al.*, 1990). The number of set line fish landed during the 1989 season were less than 15 percent of the 1986

record high set line catch (Table 7).

The combined Zone 6 set line fishery CPUE increased about 10 percent relative to 1988 (Table 7). In 1989 CPUE increased for the first time in 5 years.

Reduced sturgeon landing statistics for the 1989 Zone 6 Treaty set line fishery were due to the implementation of a sturgeon harvest guideline which reduced fishing time. The 1989 set line season was reduced about 25 percent compared to 1988. The number of fishing days allowed in 1989, 91.5, was the lowest since the 61 day seasons during 1976 and 1977 (Washington Department of Fisheries, *et. al.*, 1990). Set line seasons from 1980 - 1988 averaged 268 days.

Illegal sturgeon landings during the 1989 set line fishery were at least 55 fish or about 13 percent of the fish landed (Tables 6, 7). Illegal landings included undersize fish, fish landed during a closed season, and fish landed by illegal fishing gear. The estimated percent of illegal landings was considered a minimum because a TL size class estimate for the John Day pool catch could not be determined. Landing of illegal sturgeon in Zone 6 set line fisheries has been a continuing occurrence during the 1980's. Increased enforcement action during Zone 6 fisheries will be required to decrease landings of illegal sturgeon.

The combined Zone 6 mark and biological sample rates for the 1989 set line were 13 percent. The combined Zone 6 sample rates were the best since 1976. The 1989 sample rates increased for the third consecutive year, but were only slightly higher than 1987 and 1988 set line mark and biological sample rates (Tracy, 1988, Wright, 1989). Continued improvement of Zone 6 mark and biological sampling rates reflects increased effort to sample the Zone 6 set line sturgeon catch.

Mark and biological sample rates by pool varied widely in the 1989 set line fishery. Only mark and biological sample rates of The Dalles pool sturgeon catch exceeded the preferred rate of 20 percent. Mark and biological sampling rates for Bonneville pool and John day pool were each less than 10 percent. Low sample rates for Bonneville pool catch were attributed to a lack of sampling effort. Low sample rates for John Day pool catch were due to low catch rate and low sampling effort.

Reaching the preferred sampling rate of 20 percent for the Zone 6 set line sturgeon fishery will require increased mark and biological sampling effort focused on Bonneville pool and John Day pool sturgeon catch. Reaching the goal for John Day pool will require travelling great distances to sample relatively few fish.

Landing statistics from the 1989 Zone 6 set line fishery were presented by pool for the first time. The new reporting format should improve the ability of fishery managers to track sturgeon landings and sampling effort. Pool by pool analysis should give fishery managers a clearer image of Zone 6 commercial sturgeon fisheries.

References

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Table 1. Combined Washington and Oregon white sturgeon landings (in pounds, deliveries, and number of fish) by pool, by month for the 1989 Treaty set line fishery.

Pounds

Landing Dates	Pool			Total
	Bonneville	The Dalles	John Day	
Jan 1 - 31	756	2,207	84	3,047
Feb 1 - 29	557	358	0	915
Mar 1 - 31 1/	877	1,037	993 3/	2,907
Apr 1 - 30	6,642	2,094	1,191	9,927
Season Total	8,832 2/,4/	5,696 2/	2,268 3/	16,796

Deliveries

Jan 1 - 31	14	36	1	51
Feb 1 - 29	14	8	0	22
Mar 1 - 31 1/	13	23	1 3/	37
Apr 1 - 30	39	17	11	67
Season Total	80 2/,4/	84 2/	13 3/	177

Number of fish

Jan 1 - 31	19	60	2	81
Feb 1 - 29	15	10	0	25
Mar 1 - 31 1/	24	31	25 3/	80
Apr 1 - 30	166	54	30	250
Season Total	224 2/,4/	155 2/	57 3/	436

1/ Season closed from noon March 21 to noon March 26.
2/ Includes landings from hook and line; 676 pounds, 15 deliveries, and 19 fish from Bonneville pool, and 1,659 pounds, 42 deliveries, and 51 fish from The Dalles pool.
3/ Sampling determined 993 pounds, 1 delivery, and 25 fish were set net landings from The Dalles pool.
4/ Does not include 1 delivery of 2 fish for 47 pounds landed during a closed season.

Table 2. Combined Washington and Oregon white sturgeon landings (in pounds/delivery) by pool, by month for the 1989 Treaty set line fishery.

Landing Dates	Pool			
	Bonneville	The Dalles	John Day	Total
Jan 1 - 31	54	61	84	60
Feb 1 - 29	40	45	0	42
Mar 1 - 31 1/	67	45	993 2/	79
Apr 1 - 30	170	123	108	148
Season Total	110 3/,4/	68 3/	174	95 3/

1/ Season closed noon March 21 to noon March 26.
2/ Sampling determined these fish were set net landings from The Dalles pool.
3/ Includes hook and line landings.
4/ Does not include 1 delivery of 2 fish for 47 landed during a closed season.

Table 3. Washington and Oregon white sturgeon landings (in pounds deliveries, and number of fish) by pool for the 1989 Treaty set line fishery.

	Pool			
	Bonneville	The Dalles	John Day	Total
Oregon				
Lbs	1,431	728	674	2,833
Del	24	11	4	39
Fish	36	19	16	71
Washington				
Lbs	7,401 1/,2/	4,968	1,594 3/	13,963
Del	56 1/,2/	73	9 3/	138
Fish	188 1/,2/	136	41 3/	365
Season Totals				
Lbs	8,832 1/,2/	5,696	2,268 3/	16,796
Del	80 1/,2/	84	13 3/	177
Fish	224 1/,2/	155	57 3/	436

1/ Includes landings from hook and line.
2/ Does not include 1 delivery of 2 fish fro 47 pounds during a closed season.
3/ Sampling determined that 1 delivery of 993 pounds for 25 fish were set net landings from The Dalles pool.

Table 4. Summary of monthly biological sampling by pool for white sturgeon landed during the 1989 Zone 6 Treaty set line fishery.

Landing Date	No. Sampled Mark.	No. Sampled Bio.	Sex Ratio M:F 1/	Avg. Wt. (lbs.)	Avg. Length Fork (cm)	No. Mature	Tag Recoveries	No. Tag Scars
Bonneville Pool								
Jan 1 - 31	0	0						
Feb 1 - 29	10	10	30:70 (10)	34.7	124	0	1	0
Mar 1 - 31	4	4	75:25 (4)	31.1	121	0	1	0
Apr 1 - 30	3	3	00:100 (3)	38.8	125	0	0	0
Total	17 2/	17 2/	35:65 (17)	34.6	124	0	2	0
The Dalles Pool								
Jan 1 - 31	5	5	80:20 (5)	35.2	121	0	0	0
Feb 1 - 29	2	2	50:50 (2)	22.8	109	0	0	1
Mar 1 - 31	26	26	58:42 (26)	44.1	128	0	1	0
Apr 1 - 30	4	4	25:75 (4)	39.7	126	0	0	0
Total	37	37	57:43 (37)	41.3	126	0	1	1
John Day Pool								
Jan 1 - 31	0	0						
Feb 1 - 29	0	0						
Mar 1 - 31	0	0						
Apr 1 - 30	1	1	100:00 (1)	24.0	117	0	0	0
Total	1	1	100:00 (1)	24.0	117	0	0	0
Season Total	55	55	51:49 (55)	38.9	125	0	3	1

1/ Number in parentheses indicates number sexed.
2/ Includes 14 samples from hook and line sturgeon landings.

Table 5. Mark sample data by pool for white sturgeon landed during the 1989 Zone 6 Treaty set line fishery.

Pool	Number						Sampling Rate	
	Total Catch	Mark Sampled	Tagged	Tag Scars	Percent Tagged	Percent Marked 1/	Percent Mark	Percent Bio
Bonneville	224 2/,3/	17	2	0	11.8	11.8	8	8
The Dalles	155	37	1	1	2.7	5.4	24	24
John Day	57 4/	1	0	0	0	0	2	2
Season Total	436	55	3	1	5.5	7.3	13	13

1/ Sum of tagged and tag scarred fish
2/ Does not include 2 sturgeon landed during a closed season.
3/ Includes 14 sturgeon hook and line landed during February and March.
4/ Includes 25 fish that were determined to be set net fish from The Dalles pool.

Table 6. Extrapolated sturgeon catch by pool and size class for the 1989 Zone 6 Treaty set line fishery. Number of fish sampled in parentheses.

Pool	Size class (total length)				
	< 4 feet	4 - 5 feet	5 - 6 feet	> 6 feet	Total
Bonneville pool	13 (1)	198 (15)	13 (1)	0	224 (17) 1/
The Dalles pool	25 (6)	88 (21)	42 (10)	0	155 (37)
John Day pool	-	-	-	-	57 (1)

1/ Does not include 2 fish landed during a closed season.

Table 7. Sturgeon landing statistics, fishing days, and illegal fish landed by year from the Zone 6 Treaty set line fishery, 1982 - 1989. - data not available.

Year	Landing Statistics			Fishing Days	% Illegal Fish Landed
	Nos.	Lbs.	Pounds/Delivery		
1989	438 1/	16,843 1/	95	91.5	13.0 2/
1988	320	11,968	86	120.5	10.0 3/
1987	3,237	114,288	108	303	15.0 3/
1986	3,329	124,355	165	303	2.0 3/
1985	2,011	67,656	245	303	-
1984	1,712	53,465	253	273	0.0 3/
1983	1,094	39,139	188	272	6.0 3/
1982	1,114	38,537	249	272	-

1/ Includes landings of 2 fish for 47 pounds during a closed season.
2/ Includes landings of 28 undersize size fish from Bonneville pool and The Dalles pool, 2 fish during a closed season, and 25 fish landed with illegal gear. Assumes no illegal size fish from John Day pool.
3/ Includes landings of illegal size fish only.

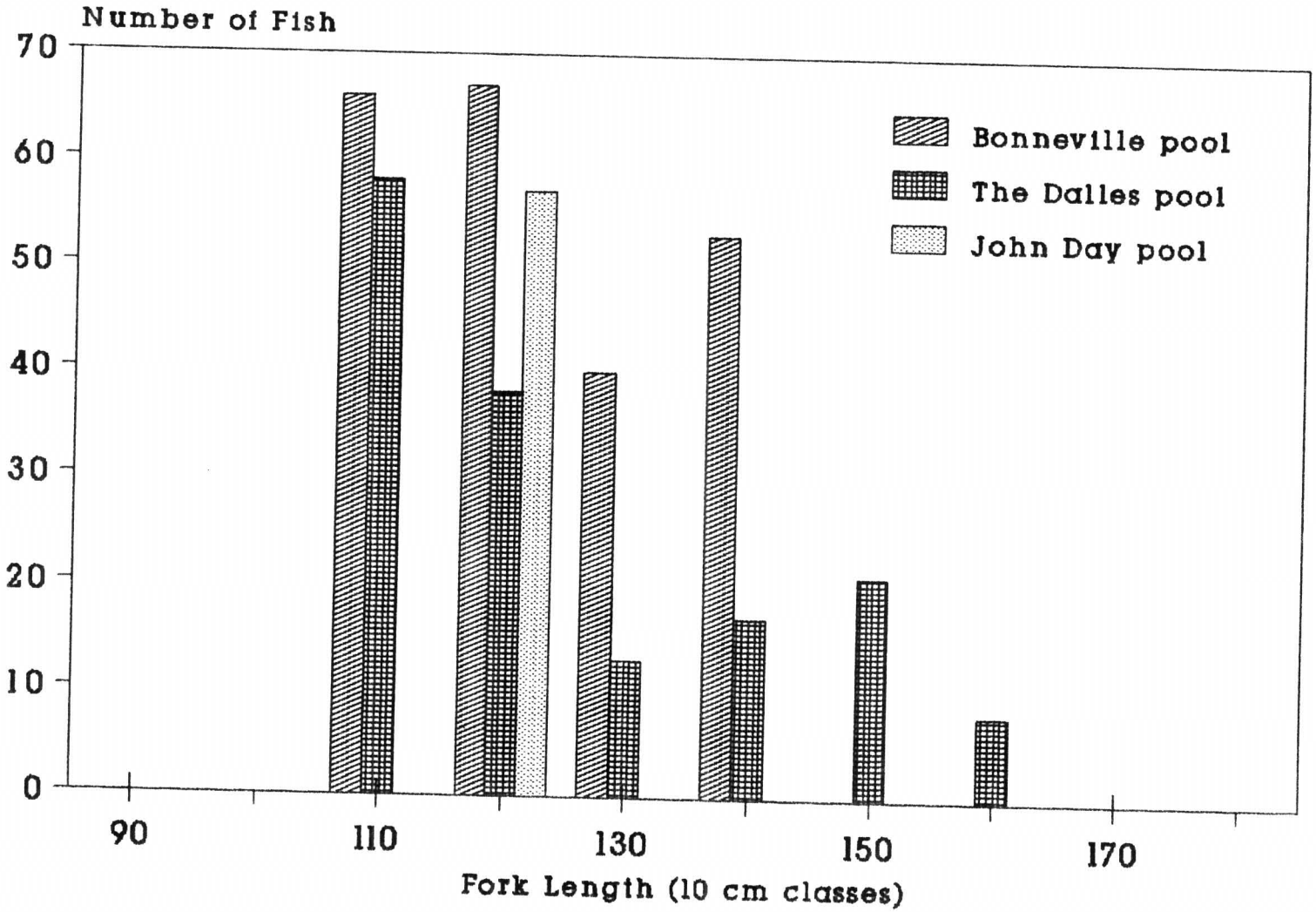

Figure 1. Fork length frequency of sturgeon white sturgeon catch from 1989 Zone 6 Treaty set line fishery.