

**The Marking of Sockeye
Salmon Fry (*Oncorhynchus
nerka*) at Fulton River and
Pinkut Creek, Babine Lake
B.C. (1971-1972)**

by A. S. Coburn and J. McDonald

FISHERIES RESEARCH BOARD OF CANADA

TECHNICAL REPORT NO. 372

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THE MARKING OF SOCKEYE SALMON FRY (ONCORHYNCHUS NERKA)

AT FULTON RIVER AND PINKUT CREEK, BABINE LAKE, B.C.

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Pacific Biological Station, Nanaimo, B.C.

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INTRODUCTION

Babine Lake is one of the most important sockeye salmon producers in British Columbia and provides the major part of the nursery area for Skeena River sockeye. The Fisheries Service of the Department of the Environment is currently attempting to increase sockeye production by increasing the number of fry entering the lake, thus making fuller use of its potential as a nursery area (Dep. Fish 1965; McDonald 1969). The project involves extension and improvement of spawning grounds by constructing artificial spawning channels and by controlling stream flow on Fulton River (two channels) and Pinkut Creek (one channel). The construction phase of the project was completed in 1971.

A mark and recovery program was carried out in 1966, 1967 and 1968 to compare the distribution, growth and survival of channel-produced fry with wild fry (McDonald 1969; Coburn and McDonald 1972; Scarsbrook and McDonald 1970). In 1971, a second mark and recovery program was initiated for the purpose of examining the effects of increased population size resulting from fry outputs from spawning channels at Fulton River and Pinkut Creek on distribution, growth, and survival in the lake. This report deals with the marking and release of sockeye fry at Fulton River and Pinkut Creek for the years 1971-1972.

MATERIALS AND METHODS

Newly emerged sockeye fry from the spawning channel at Pinkut Creek and number two spawning channel at Fulton River were captured with floating inclined screen traps installed at the outlet of each channel. The fry were anaesthetized and marked by removal of one or both pelvic fins with surgical scissors. Sampling of 10 marked fry from each marker was carried out daily throughout the marking period for quality control. The marks were graded on the basis of the length of fin remaining. A perfect mark (none of the fin remaining) was assigned a score of 3. The highest possible score for the sample of 10 fish was therefore 30 (see Coburn and McDonald 1972 for further details). In 1971 and 1972 the Pinkut fry were marked by removing the right pelvic fin. In 1971 the Fulton fry were marked by removing either the left pelvic fin or both pelvic fins (a double pelvic mark). In 1972 the Fulton fry were marked with removal of both pelvic fins.

After marking, the fry were released to continue their migration to Babine Lake. Recoveries from the 1971 and 1972 releases will continue through to 1975 and will be reported in this series.

RESULTS

The number of fry marked and released at Pinkut Creek and Fulton River in 1971 and 1972 were as follows:

	<u>1971</u>	<u>1972</u>
Pinkut Creek (right pelvic)	308,779	550,062
Fulton River (left pelvic)	245,757	
(double pelvic)	120,904	1,168,184

Daily and accumulative totals are given in Tables 1 and 2.

Estimated daily and accumulative numbers of fry migrating from Pinkut Creek, and Fulton River in 1971 and 1972 are given in Tables 3-6 (from information provided by Fisheries Service - Operations Branch, Vancouver, B.C.).

Accumulative daily proportions of the fry migration and total marked and released are compared in Fig. 1 for the 1971 and 1972 seasons.

Results of sampling to estimate marking quality are summarized in Table 7. Scores given are the mean scores of usually 8 to 10 markers.

ACKNOWLEDGEMENT

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Table 1. Sockeye fry marking at Pinkut Creek and Fulton River.
1971

Date	No. marked and released								
	Pinkut			Fulton					
	Right pelvic			Left pelvic		Double pelvic			
	Daily	Accum.	%	Daily	Accum.	Daily	Accum.	Accum.	%
May 4	-			3,753	3,753	-		3,753	1.02
5	-			6,785	10,538	-		10,538	2.87
6	-			7,710	18,248	-		18,248	4.98
7	-			7,316	25,564	-		25,564	6.97
8	-			-		-			
9	-			-		-			
10	-			-		9,948	9,948	35,512	9.69
11	-			-		11,561	21,509	47,073	12.84
12	3,091	3,091	1.0	16,718	42,282	-		63,791	17.40
13	3,450	6,541	2.12	10,449	52,731	-		74,240	20.25
14	4,610	11,151	3.61	14,437	67,168	-		88,677	24.19
15	-			-		-			
16	-			-		-			
17	4,751	15,902	5.15	-		12,603	34,112	101,280	27.62
18	8,303	24,205	7.84	-		15,374	49,486	116,654	31.82
19	7,859	32,064	10.38	19,718	86,886	-		136,372	37.19
20	9,163	41,227	13.35	19,954	106,840	-		156,326	42.64
21	10,223	51,450	16.66	15,661	122,501	-		171,987	46.91
22	-			-		-			
23	-			-		-			
24	-			-		12,376	61,862	184,363	50.28
25	11,529	62,979	20.4	-		17,772	79,634	202,135	55.13
26	12,956	75,935	24.59	22,464	144,965	-		224,599	61.26
27	11,477	87,412	28.31	23,687	168,652	-		248,286	67.71
28	14,189	101,601	32.90	24,287	192,939	-		272,573	74.34
29	16,057	117,658	38.10	9,109	202,048	-		281,682	76.82
30	-			-		-			
31	18,686	136,344	44.16	-		20,111	99,745	301,793	82.31
June 1	13,528	149,872	48.54	-		21,159	120,904	322,952	88.08
2	19,544	169,416	54.87	17,344	219,392	-		340,296	92.81
3	21,286	190,702	61.76	11,299	230,691	-		351,595	95.89
4	19,487	210,189	68.07	15,066	245,757	-		366,661	100.0
5	4,019	214,208	69.37	-		-			
6	-			-		-			
7	15,839	230,047	74.5	-		-			
8	19,835	249,882	80.93	-		-			
9	19,849	269,731	87.35	-		-			
10	19,177	288,908	93.56	-		-			
11	19,871	308,779	100.0	-		-			
Totals		308,779	100%		245,757		120,904	366,661	100%

Table 2. Sockeye fry marking at Pinkut Creek and Fulton River.
1972

Date		No. marked and released					
		Pinkut			Fulton		
		Right pelvic			Double pelvic		
		Daily	Accum.	%	Daily	Accum.	%
May	2	-			11,037	11,037	.94
	3	-			13,471	24,508	2.1
	4	-			15,242	39,750	3.40
	5	-			23,991	63,741	5.46
	6	-			-		
	7	-			-		
	8	-			30,162	93,903	8.04
	9	-			35,582	129,485	11.08
	10	7,473	7,473	1.36	38,025	167,510	14.34
	11	13,784	21,257	3.86	23,949	191,459	16.39
	12	6,504	27,761	5.05	25,767	217,226	18.60
	13	-			-		
	14	-			-		
	15	19,954	47,715	8.67	43,809	261,035	22.35
	16	22,487	70,202	12.76	46,276	307,311	26.31
	17	22,818	93,020	16.91	51,487	358,798	30.71
	18	24,471	117,491	21.36	50,681	409,479	35.05
	19	25,733	143,224	26.04	52,621	462,100	39.56
	20	-			-		
	21	-			-		
	22	15,863	159,087	28.92	-		
	23	24,858	183,945	33.44	49,436	511,536	43.79
	24	12,150	196,095	35.65	56,168	567,704	48.60
	25	-			44,466	612,170	52.40
	26	30,548	226,643	41.20	57,149	669,319	57.30
	27	-			-		
	28	-			-		
	29	30,211	256,854	46.70	61,528	730,847	62.56
	30	33,896	290,750	52.86	54,168	785,015	67.20
	31	32,998	323,748	58.86	58,317	843,332	72.19
June	1	29,169	352,917	64.16	55,260	898,592	76.92
	2	34,615	387,532	70.45	47,073	945,665	80.95
	3	-			-		
	4	-			-		
	5	33,642	421,174	76.57	36,058	981,723	84.04
	6	30,766	451,940	82.16	45,293	1,027,016	87.92
	7	33,040	484,980	88.17	55,730	1,082,746	92.69
	8	30,948	515,928	93.79	48,304	1,131,050	96.82
	9	34,134	550,062	100.0	37,134	1,168,184	100.0
Totals			550,062	100%		1,168,184	100%

Table 3. The daily and accumulated sockeye fry migration estimates from Pinkut Creek and Pinkut Spawning Channel.
1971

Date	Pinkut Creek		Pinkut Channel	
	Number		Number	
	Daily	Accum.	Daily	Accum.
April 15-16	450	450	-	
16	1,200	1,650	996	996
17	50	1,700	1,105	2,101
18	100	1,800	661	2,762
19	50	1,850	1,414	4,176
20	100	1,950	1,640	5,816
21	50	2,000	1,662	7,478
22	425	2,425	1,679	9,157
23	325	2,750	1,814	10,971
24	300	3,050	2,697	13,668
25	400	3,450	4,611	18,279
26	1,025	4,475	6,569	24,848
27	6,075	10,550	8,056	32,904
28	6,500	17,050	4,689	37,593
29	5,800	22,850	6,221	43,814
30	3,000	25,850	5,042	48,856
May 1	3,200	29,050	4,633	53,489
2	4,475	33,525	9,305	62,794
3	5,850	39,375	11,658	74,452
4	5,925	45,300	9,052	83,504
5	3,700	49,000	7,478	90,982
6	6,175	55,175	16,147	107,129
7	4,900	60,075	19,445	126,574
8	5,425	65,500	16,882	143,456
9	5,900	71,400	14,312	157,768
10	9,800	81,200	55,006	212,774
11	21,800	103,000	133,219	345,993
12	40,175	143,175	332,919	678,912
13	33,425	176,600	156,174	835,086
14	24,250	200,850	101,294	936,380
15	24,713	225,563	110,906	1,047,286
16	25,175	250,738	120,517	1,167,803
17	44,725	295,463	160,998	1,328,801
18	51,700	347,163	998,569	2,327,370
19	71,650	418,813	712,299	3,039,669
20	152,650	571,463	1,053,387	4,093,056
21	102,775	674,238	707,784	4,800,840
22	129,000	803,238	944,159	5,744,999
23	156,000	959,238	1,359,675	7,104,674
24	155,700	1,114,938	717,907	7,822,581
25	263,250	1,378,188	1,217,952	9,040,533
26	133,650	1,511,838	1,180,199	10,220,732

Table 3 (cont'd)

Date	Pinkut Creek		Pinkut Channel		
	Number		Number		
	Daily	Accum.	Daily	Accum.	
May	27	84,075	1,595,913	764,830	10,985,562
	28	93,800	1,689,713	834,974	11,820,536
	29	82,363	1,772,076	785,702	12,606,238
	30	71,100	1,843,176	736,429	13,342,667
	31	50,300	1,893,476	494,512	13,837,179
June	1	83,225	1,976,701	550,071	14,387,250
	2	103,975	2,080,676	864,876	15,252,126
	3	104,450	2,185,126	1,178,124	16,430,250
	4	99,025	2,284,151	1,326,620	17,756,870
	5	81,150	2,365,301	870,800	18,627,670
	6	73,500	2,438,801	1,095,326	19,722,996
	7	71,125	2,509,926	340,836	20,063,832
	8	81,775	2,591,701	417,365	20,481,197
	9	82,250	2,673,951	345,725	20,826,922
	10	65,900	2,739,851	199,282	21,026,204
	11	40,675	2,780,526	81,171	21,107,375
	12	29,063	2,809,589	77,306	21,184,681
	13	17,450	2,827,039	73,441	21,258,122
	14	12,250	2,839,289	83,202	21,341,324
15	9,725	2,849,014	12,828	21,354,152	
16	9,325	2,858,339	9,755	21,363,907	
17	7,150	2,865,489	6,682	21,370,589	
Estimated fry below fence		326,910	FRB fry marking	80,000	
			Fry in channel	36,000	
Totals		3,192,399		21,486,589	
Estimated survival		19.23%		56.84%	
Grand total		24,678,988			

Table 4. The daily and accumulated sockeye fry migration estimates from Pinkut Creek and Pinkut Spawning Channel.
1972

Date	Pinkut Creek		Pinkut Channel	
	Number		Number	
	Daily	Accum.	Daily	Accum.
April 18-19	-		50	50
19	-		65	115
20	-		55	170
21	-		30	200
22	275	275	115	315
23	100	375	95	410
24	75	450	185	595
25	225	675	160	755
26	375	1,050	260	1,015
27	362	1,412	405	1,420
28	350	1,762	550	1,970
29	600	2,362	1,100	3,070
30	275	2,637	1,120	4,190
May 1	387	3,024	2,075	6,265
2	500	3,524	2,570	8,835
3	1,550	5,074	4,410	13,245
4	2,550	7,624	6,570	19,815
5	4,075	11,699	7,765	27,580
6	9,925	21,624	11,955	39,535
7	11,175	32,799	18,025	57,560
8	6,325	39,124	22,000	79,560
9	7,275	46,399	19,755	99,315
10	11,475	57,874	19,970	119,285
11	8,900	66,774	15,685	134,970
12	9,425	76,199	24,720	159,690
13	12,050	88,249	37,670	197,360
14	14,675	102,924	42,790	240,150
15	19,350	122,274	56,055	296,205
16	33,775	156,049	106,140	402,345
17	80,037	236,086	116,575	518,920
18	126,300	362,386	174,095	693,015
19	206,400	568,786	241,185	934,200
20	-		357,788	1,291,988
21	-		1,223,955	2,515,943
22	-		299,455	2,815,398
23	-		135,020	2,950,418
24	-		95,895	3,046,313
25	-		124,240	3,170,553
26	-		178,730	3,349,283
27	-		285,415	3,634,698
28	-		817,175	4,451,873
29	-		2,133,055	6,584,928

Table 4 (cont'd)

Date	Pinkut Creek		Pinkut Channel	
	Number		Number	
	Daily	Accum.	Daily	Accum.
May 30	-		2,544,965	9,129,893
31	-		800,940	9,930,833
June 1	-		441,245	10,372,078
2	-		349,380	10,721,458
3	-		280,495	11,001,953
4	-		448,675	11,450,628
5	-		659,960	12,110,588
6	-		850,980	12,961,568
7	-		883,540	13,845,108
8	-		903,790	14,748,898
9	-		1,316,315	16,065,213
10	-		756,607	16,821,820
11	-		196,900	17,018,720
12	-		63,790	17,082,510
13	-		76,515	17,159,025
14	-		6,655	17,165,680
*Estimated	-	2,230,000	2,350	17,168,030
Total		2,230,000		17,168,030
% survival				52.02%
Grand total	19,398,030			

*High water conditions prevented sampling of Pinkut Creek fry after May 20th. Estimate of 2.23 mil is based on the survival rate obtained from hydraulic sampling and the egg deposition.

Table 5. The daily and accumulated sockeye fry migration estimates from Fulton River and spawning channels.
1971

Date	River		Channel #1		Channel #2	
	Number		Number		Number	
	Daily	Accum.	Daily	Accum.	Daily	Accum.
March 5-6	-		-		1,843	1,843
6	-		-		1,803	3,646
7	-		-		1,329	4,975
8	-		-		1,634	6,609
9	-		-		1,917	8,526
10	100	100	-		1,854	10,380
11	100	200	-		2,784	13,164
12	550	750	-		3,585	16,749
13	550	1,300	-		3,986	20,735
14	1,000	2,300	-		4,386	25,121
15	280	2,580	-		4,750	29,871
16	360	2,940	-		4,049	33,920
17	1,270	4,210	-		6,361	40,281
18	2,180	6,390	-		8,672	48,953
19	1,410	7,800	-		7,539	56,492
20	1,025	8,825	-		6,972	63,464
21	640	9,465	-		6,405	69,869
22	640	10,105	-		6,733	76,602
23	640	10,745	-		7,061	83,663
24	878	11,623	-		7,693	91,356
25	1,115	12,738	-		8,324	99,680
26	1,590	14,328	-		8,925	108,605
27	2,065	16,393	-		9,525	118,130
28	2,540	18,933	-		10,725	128,855
29	2,180	21,113	-		11,784	140,639
30	1,820	22,933	-		12,843	153,482

Table 5 (cont'd)

Date	River		Channel #1		Channel #2	
	Number		Number		Number	
	Daily	Accum.	Daily	Accum.	Daily	Accum.
March 31	1,640	24,573	-	-	14,171	167,653
April 1	1,460	26,033	-	-	15,499	183,152
2	1,730	27,763	-	-	14,457	197,609
3	2,000	29,763	-	-	13,936	211,545
4	2,540	32,303	-	-	13,415	224,960
5	2,450	34,753	-	-	13,672	238,632
6	2,360	37,113	-	-	13,929	252,561
7	2,140	39,253	-	-	13,722	266,283
8	1,920	41,173	-	-	13,514	279,797
9	3,280	44,453	-	-	17,543	297,340
10	4,640	49,093	-	-	21,572	318,912
11	7,360	56,453	31,490	31,490	29,629	348,541
12	8,540	64,993	37,970	69,460	45,068	393,609
13	9,720	74,713	63,525	132,985	60,507	454,116
14	7,680	82,393	40,269	173,254	49,918	504,034
15	5,640	88,033	39,356	212,610	39,328	543,362
16	7,685	95,718	49,944	262,554	42,225	585,587
17	9,730	105,448	68,461	331,015	45,121	630,708
18	13,820	119,268	62,603	393,618	50,914	681,622
19	14,680	133,948	91,928	485,546	51,694	733,316
20	15,540	149,488	93,831	579,377	52,474	785,790
21	18,450	167,938	84,982	664,359	63,660	849,450
22	21,360	189,298	111,508	775,867	74,845	924,295
23	22,000	211,298	109,851	885,718	73,023	997,318
24	62,590	273,888	144,335	1,030,053	96,380	1,093,698
25	103,180	377,068	178,819	1,208,872	119,737	1,213,435
26	55,280	432,348	197,130	1,406,002	124,655	1,338,090
27	109,360	541,708	204,096	1,610,098	145,088	1,483,178

Table 5 (cont'd)

Date	River		Channel #1		Channel #2	
	Number		Number		Number	
	Daily	Accum.	Daily	Accum.	Daily	Accum.
April 28	123,920	665,628	165,128	1,775,226	112,335	1,595,513
29	53,774	719,402	127,586	1,902,812	149,415	1,744,928
30	155,578	874,980	231,503	2,134,315	132,600	1,877,528
May 1	242,476	1,117,456	185,714	2,320,029	184,083	2,061,611
2	329,374	1,446,830	139,926	2,459,955	235,565	2,297,176
3	1,097,570	2,544,400	267,930	2,727,885	254,471	2,551,647
4	1,343,648	3,888,048	281,472	3,009,357	255,508	2,807,155
5	817,830	4,705,878	225,390	3,234,747	248,604	3,055,759
6	1,053,976	5,759,854	187,724	3,422,471	357,989	3,413,748
7	1,597,114	7,356,968	332,926	3,755,397	318,114	3,731,862
8	1,205,172	8,562,140	282,988	4,038,385	335,971	4,067,833
9	1,131,751	9,693,891	233,049	4,271,434	353,828	4,421,661
10	1,319,578	11,013,469	354,402	4,625,836	512,825	4,934,486
11	1,089,806	12,103,275	804,694	5,430,530	1,079,466	6,013,952
12	1,065,214	13,168,489	672,206	6,102,736	945,706	6,959,658
13	1,240,508	14,408,997	547,652	6,650,388	762,471	7,722,129
14	1,478,308	15,887,305	440,072	7,090,460	744,269	8,466,398
15	1,805,682	17,692,987	455,418	7,545,878	821,847	9,288,245
16	1,770,296	19,463,283	466,764	8,012,642	679,430	9,967,675
17	1,203,181	20,666,464	552,859	8,565,501	1,255,616	11,223,291
18	1,228,616	21,895,080	718,344	9,283,845	1,517,630	12,740,921
19	1,111,739	23,006,819	540,001	9,823,846	1,397,600	14,138,521
20	1,034,290	24,041,109	517,690	10,341,536	2,038,663	16,177,184
21	1,125,355	25,166,464	518,285	10,859,821	1,851,673	18,028,857
22	1,016,452	26,182,916	687,768	11,547,589	2,432,439	20,461,296
23	925,210	27,108,126	409,070	11,956,659	1,499,103	21,960,399
24	912,446	28,020,572	332,034	12,288,693	1,388,480	23,348,879
25	877,721	28,898,293	283,779	12,572,472	1,552,000	24,900,879

Table 5 (cont'd)

Date	River		Channel #1		Channel #2	
	Number		Number		Number	
	Daily	Accum.	Daily	Accum.	Daily	Accum.
May 26	757,144	29,655,437	292,736	12,865,208	1,487,133	26,388,012
27	653,552	30,308,989	197,168	13,062,376	902,995	27,291,007
28	480,760	30,789,749	115,360	13,177,736	545,048	27,836,055
29	381,110	31,170,859	82,892	13,260,628	434,271	28,270,326
30	281,460	31,452,319	50,423	13,311,051	323,494	28,593,820
31	167,320	31,619,639	21,356	13,332,407	250,506	28,844,326
June 1	291,320	31,910,959	15,353	13,347,760	139,753	28,984,079
2	175,120	32,086,079	9,217	13,356,977	87,058	29,071,137
3	109,320	32,195,399	7,000	13,363,977	54,302	29,125,439
4	55,120	32,250,519	5,000	13,368,977	21,545	29,146,984
5	41,840	32,292,359	4,000	13,372,977	14,594	29,161,578
6	28,560	32,320,919	-	-	7,643	29,169,221
7	24,960	32,345,879	-	-	3,008	29,172,229
8	22,500	32,368,379	-	-	10,310	29,182,539
9	15,840	32,384,219	-	-	7,720	29,190,259
10	30,560	32,414,779	-	-	652	29,190,911
11	15,840	32,430,619	-	-	-	-
Estimated fry below fence		2,765,840	Estimate of residue fry	65,000		
Total estimate		35,196,459		13,437,977		29,190,911
Estimated survival		17.96%		30.62%		27.61%
Grand total	77,825,347					

Table 6. The daily and accumulated sockeye fry migration estimates from Fulton River and spawning channels.
1972

Date	River		Channel #1		Channel #2	
	Number		Number		Number	
	Daily	Accum.	Daily	Accum.	Daily	Accum.
April 6-7	1,360	1,360	-	-	5,890	5,890
7	1,410	2,770	-	-	6,211	12,101
8	1,460	4,230	-	-	6,531	18,632
9	1,800	6,030	-	-	7,578	26,210
10	2,140	8,170	-	-	8,625	34,835
11	2,480	10,650	-	-	9,672	44,507
12	2,820	13,470	-	-	10,719	55,226
13	2,795	16,265	-	-	11,794	67,020
14	2,770	19,035	-	-	12,869	79,889
15	2,745	21,780	-	-	13,944	93,833
16	2,720	24,500	-	-	15,018	108,851
17	3,360	27,860	-	-	15,664	124,515
18	4,000	31,860	-	-	16,310	140,825
19	3,230	35,090	-	-	14,218	155,043
20	2,460	37,550	-	-	12,126	167,169
21	2,090	39,640	8,090	8,090	12,730	179,899
22	1,905	41,545	-	-	13,333	193,232
23	1,720	43,265	-	-	14,539	207,771
24	3,130	46,395	-	-	15,784	223,555
25	4,540	50,935	10,007	18,097	17,028	240,583
26	7,590	58,525	-	-	22,060	262,643
27	10,640	69,165	12,424	30,521	27,091	289,734
28	36,910	106,075	-	-	40,031	329,765
29	63,180	169,255	23,314	53,835	52,971	382,736
30	62,140	231,395	-	-	63,348	446,084
May 1	61,100	292,495	39,821	93,656	73,725	519,809
2	59,010	351,505	35,697	129,353	86,724	606,533

Table 6 (cont'd)

Date	River		Channel #1		Channel #2	
	Number		Number		Number	
	Daily	Accum.	Daily	Accum.	Daily	Accum.
May 3	56,920	408,425	43,112	172,465	99,722	706,255
4	61,510	469,935	53,213	225,678	105,207	811,462
5	66,100	536,035	60,168	285,846	110,692	922,154
6	274,820	810,855	76,830	362,676	140,568	1,062,722
7	483,540	1,294,395	113,842	476,518	170,444	1,233,166
8	795,540	2,089,935	131,321	607,839	204,101	1,437,267
9	996,000	3,085,935	155,805	763,644	255,893	1,693,160
10	825,880	3,911,815	185,240	948,884	260,465	1,953,625
11	840,974	4,752,789	216,206	1,165,090	236,319	2,189,944
12	535,368	5,288,157	247,172	1,412,262	282,827	2,472,771
13	457,360	5,745,517	293,750	1,706,012	407,923	2,880,694
14	379,352	6,124,869	340,328	2,046,340	533,019	3,413,713
15	788,310	6,913,179	364,510	2,410,850	657,889	4,071,602
16	1,948,226	8,861,405	384,174	2,795,024	742,354	4,813,956
17	1,929,820	10,791,225	444,560	3,239,584	743,113	5,557,069
18	1,938,540	12,729,765	677,280	3,916,864	1,259,783	6,816,852
19	1,462,132	14,191,897	690,308	4,607,172	1,284,418	8,101,270
20	1,220,582	15,412,479	914,059	5,521,231	2,492,878	10,594,148
21	979,021	16,391,500	1,137,809	6,659,040	1,711,610	12,305,758
22	788,535	17,180,035	796,405	7,455,445	1,241,692	13,547,450
23	645,414	17,825,449	930,706	8,386,151	1,192,549	14,739,999
24	630,369	18,455,818	920,291	9,306,442	1,730,592	16,470,591
25	381,348	18,837,166	1,017,232	10,323,674	2,221,613	18,692,204
26	432,801	19,269,967	762,539	11,086,213	2,900,883	21,593,087
27	460,870	19,730,837	941,148	12,027,361	3,787,961	25,381,048
28	488,938	20,219,775	1,115,302	13,142,663	4,675,038	30,056,086
29	606,880	20,826,655	1,133,000	14,275,663	4,872,198	34,928,284
30	502,205	21,328,860	1,829,455	16,105,118	12,264,856	47,193,140
31	509,942	21,838,802	1,249,378	17,354,496	5,324,128	52,517,268

Table 6 (cont'd)

Date	River		Channel #1		Channel #2	
	Number		Number		Number	
	Daily	Accum.	Daily	Accum.	Daily	Accum.
June 1	688,546	22,527,348	855,874	18,210,370	3,994,827	56,512,095
2	397,549	22,924,897	535,651	18,746,021	3,291,405	59,803,500
3	301,516	23,226,413	376,994	19,123,015	2,295,583	62,099,083
4	205,483	23,431,896	218,337	19,341,352	1,333,456	63,432,539
5	264,660	23,696,556	194,925	19,536,277	1,120,213	64,552,752
6	141,400	23,837,956	146,563	19,682,840	812,973	65,365,725
7	142,040	23,979,996	93,770	19,776,610	419,967	65,785,692
8	119,260	24,099,256	77,789	19,854,399	390,714	66,176,406
9	57,220	24,156,476	51,573	19,905,972	147,353	66,323,759
10	41,770	24,198,246	55,322	19,961,294	86,294	66,410,053
11	26,320	24,224,566	9,950	19,971,244	25,235	66,435,288
12	Below fence estimate	3,000,000				
Totals		27,224,566		19,971,244		66,435,288
Estimated survival		11.60%		46.99%		34.17%
Grand total	113,631,098					

Table 7. Daily mean marking scores for quality control.
1971-1972

Date	Pinkut Creek		Fulton River				
	1971	1972	1971			1972	
	Right pelvic	Right pelvic	Left pelvic	Double pelvic		Double pelvic	
			Right	Left	Right	Left	
May 1	-	-	-	-	-	-	-
2	-	-	-	-	-	25.55	27.22
3	-	-	-	-	-	27.40	28.10
4	-	-	12.37	-	-	29.20	28.90
5	-	-	20.75	-	-	29.00	29.30
6	-	-	21.37	-	-	-	-
7	-	-	24.37	-	-	-	-
8	-	-	-	-	-	29.44	29.44
9	-	-	-	-	-	29.30	29.40
10	-	20.44	-	20.62	26.75	29.30	29.50
11	-	23.00	-	20.62	22.87	30.00	30.00
12	9.87	22.50	26.50	-	-	29.90	29.90
13	17.62	-	26.29	-	-	-	-
14	18.00	-	24.00	-	-	-	-
15	-	25.00	-	-	-	29.90	29.80
16	-	24.80	-	-	-	29.70	29.70
17	22.12	25.10	-	26.28	27.57	29.90	29.70
18	22.75	26.70	-	19.12	22.00	30.00	29.70
19	21.86	27.20	23.88	-	-	30.00	29.60
20	23.50	-	26.50	-	-	-	-
21	24.50	-	24.83	-	-	-	-
22	-	27.66	-	-	-	-	-
23	-	27.80	-	-	-	29.66	29.33
24	-	27.70	-	25.00	29.20	29.70	29.90
25	23.86	-	-	25.57	29.00	30.00	30.00
26	23.12	26.55	28.86	-	-	29.55	29.55
27	27.37	-	29.29	-	-	-	-
28	26.37	-	28.29	-	-	-	-
29	27.37	27.70	28.40	-	-	29.80	29.80
30	-	24.40	-	-	-	29.30	29.20
31	28.50	28.20	-	28.14	29.14	29.70	29.20
June 1	28.33	27.66	-	29.50	29.50	28.66	28.66
2	28.43	27.50	29.43	-	-	29.75	29.62
3	28.25	27.88	30.00	-	-	-	-
4	28.62	-	30.00	-	-	-	-
5	28.00	-	-	-	-	-	-
6	-	27.75	-	-	-	-	-
7	28.50	27.22	-	-	-	-	-
8	29.00	27.77	-	-	-	-	-
9	28.86	27.55	-	-	-	-	-
10	29.57	-	-	-	-	-	-
11	29.86	-	-	-	-	-	-
Grand means	24.95	26.36	25.27	24.02	26.89	29.33	29.38

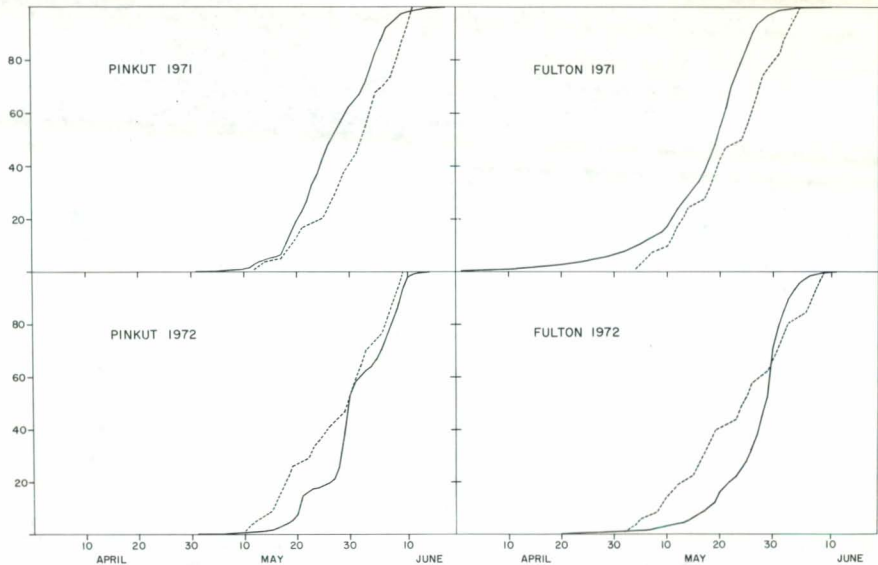


Fig. 1. The accumulated percent of fry migration (solid line) and marked fry released (dotted line) from Pinkut Channel and Fulton Channel in 1971 and 1972.