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AN ANALYSIS OF THE EFFECT OF AN EXTENDED ANGLING SEASON ON CALIFORNIA STEELHEAD RUNS [1]

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The last day of February has for many years been the closing date of the general winter angling season for adult steelhead in California. Periodically the Fish and Game Commission has received requests to extend this season through the month of March. This brief report summarizes the available pertinent information and outlines the probable effects of such an extension on the steelhead resource.

Fortunately, complete records of steelhead runs are available for the South Fork of the Eel River (Humboldt County), the Mad River (Humboldt County), and Waddell Creek (Santa Cruz County), so that the numbers of steelhead ascending these streams before March, during March, and after March can be determined. This information is summarized for the three streams in Tables 1, 2, and 3 and Figure 1. The South Fork of Eel River and the Mad River, representing California's large and medium-sized steelhead streams, respectively, have much larger runs than Waddell Creek. However, since small streams like Waddell Creek are more numerous, the best available estimate of the over-all percentages of California steelhead migrating during these three periods is considered to be an average of the percentages for each of the three streams, giving each stream equal weight in the estimate.

On this basis (Table 4) 61.6 percent of all California steelhead pass upstream to their spawning grounds during the present general winter angling season and 38.4 percent following its closure. Extension of the season through March would expose an additional 28.1 percent, or a total of 89.7 percent of all California steelhead, to angling.

At the Benbow Dam (South Fork of Eel River) and Sweasey Dam (Mad River) counting stations of the Department of Fish and Game it has not been possible to examine the fish individually, so that sex and life-history[2] determinations of the runs in these streams are not available. At Waddell Creek, however,

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[1] Submitted February, 1954.

[2] Since steelhead spend varying periods both in fresh water and at sea and are capable of spawning more than once, the life histories of individual fish of both sexes vary considerably.

TABLE 1

Benbow Dam Steelhead:

Adult Upstream Fish Arranged by Time Period

Season	Number of fish			
	Before March	March	After March	Seasonal total
1938-39	9,570	3,193	232	12,995
1939-40	11,777	1,984	715	14,476
1940-41	16,281	1,758	269	18,308
1941-42	10,882	5,643	831	17,356
1942-43	20,182	3,753	1,097	25,032
1943-44	16,686	5,660	1,099	23,445
Total	85,378	21,991	4,243	111,612
Percent of seasonal run	76.5	19.7	3.8	

TABLE 2

Sweasey Dam Steelhead:

Adult Upstream Fish Arranged by Time Period

Season	Number of fish			
	Before March	March	After March	Seasonal total
1938-39	1,385	1,635	184	3,204
1939-40	1,693	1,140	297	3,130
1940-41	4,204	1,137	365	5,706
1941-42	1,346	1,460	1,777	4,583
1951-52	1,950	1,873	1,785	5,608
1952-53	2,482	2,320	786	5,588
Total	13,060	9,565	5,194	27,819
Percent of seasonal run	46.9	34.4	18.7	

TABLE 3

Waddell Creek Steelhead:

Adult Upstream Fish Arranged by Sex and Time Period

Season	Number of fish											
	Before March			March			After March			Seasonal total		
	Males	Females	Males and females combined	Males	Females	Males and females combined	Males	Females	Males and females combined	Males	Females	Males and females combined
1933-34	141	156	297	20	51	71	5	16	21	166	223	389
1934-35	173	118	291	75	126	201	17	30	47	265	274	539
1935-36	132	115	247	43	90	133	27	43	70	202	248-	450
1936-37	97	71	168	111	145	256	20	29	49	228	245	473
1937-38	134	136	270	20	38	58	11	34	45	165	208	373
1938-39	114	97	211	84	127	211	14	19	33	212	243	455
1939-40	186	159	345	27	61	88	1	8	9	214	228	442
1940-41	203	173	376	2	11	13	0	1	1	205	185	390
1941-42	108	71	179	42	101	143	15	40	55	165	212	377
Total	1,288	1,096	2,384	424	750	1,174	110	220	330	1,822	2,066	3,888
Percent of seasonal run	33.1	28.2	61.3	10.9	19.3	30.2	2.8	5.7	8.5	46.8	53.2	100.0
Percent of run in period	54.1	45.9	100.0	36.1	63.9	100.0	33.3	66.7	100.0			

FIGURE 1

Time Pattern of Upstream Migration of Steelhead in Three California Streams: South Fork of Eel River (at Benbow Dam); Waddell Creek; and Mad River (at Sweasey Dam)

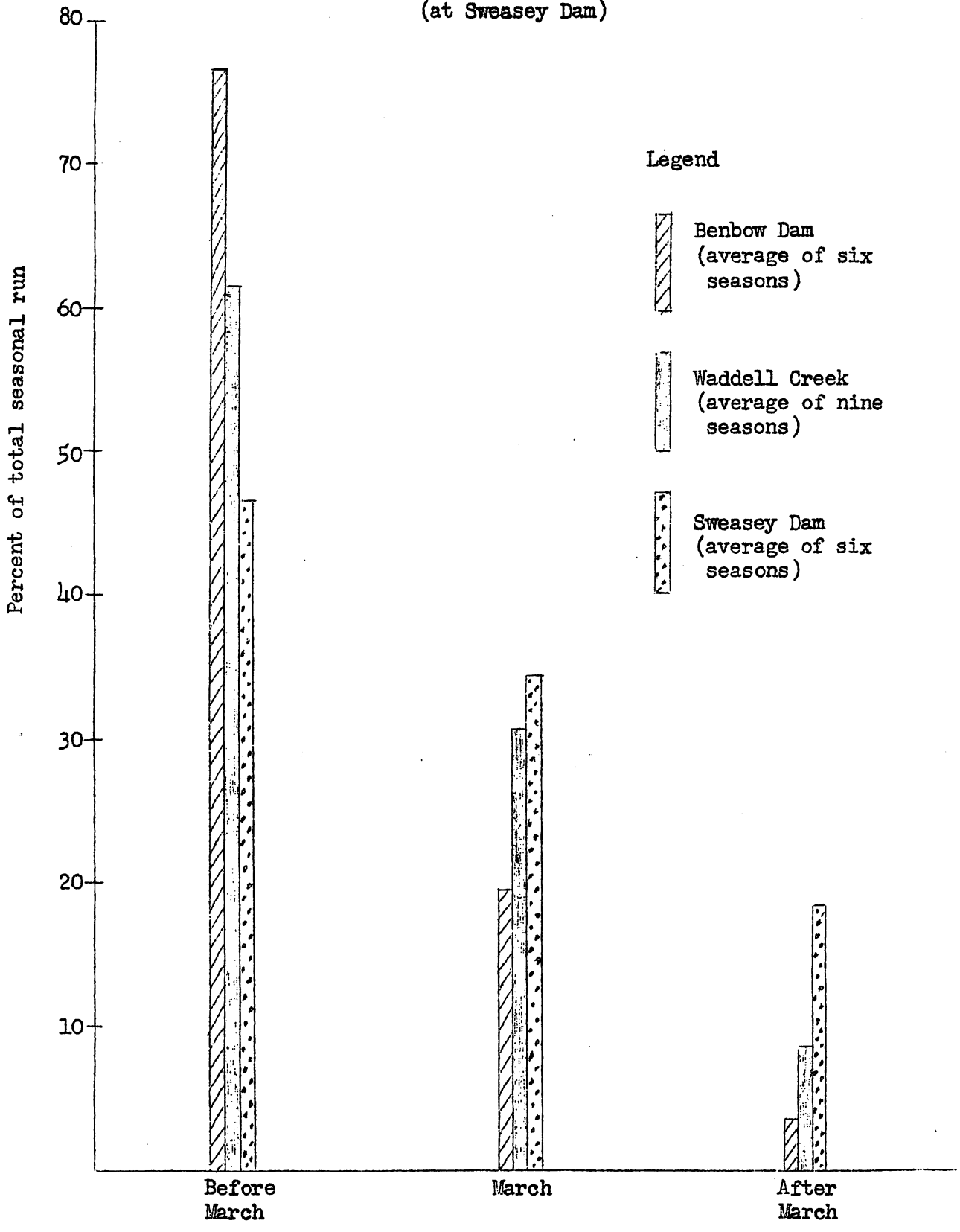


TABLE 4

Upstream Steelhead in Three California Streams,
Arranged by Time Period

	Percent of total run		
	Before March	During March	After March
South Fork Eel River	76.5	19.7	3.8
Mad River	46.9	34.4	18.7
Waddell Creek	61.3	30.2	8.5
Average	61.6	28.1	10.3

FIGURE 2
Time Pattern of Upstream Migration of Male and Female Waddell Creek Steelhead
(average of nine seasons)

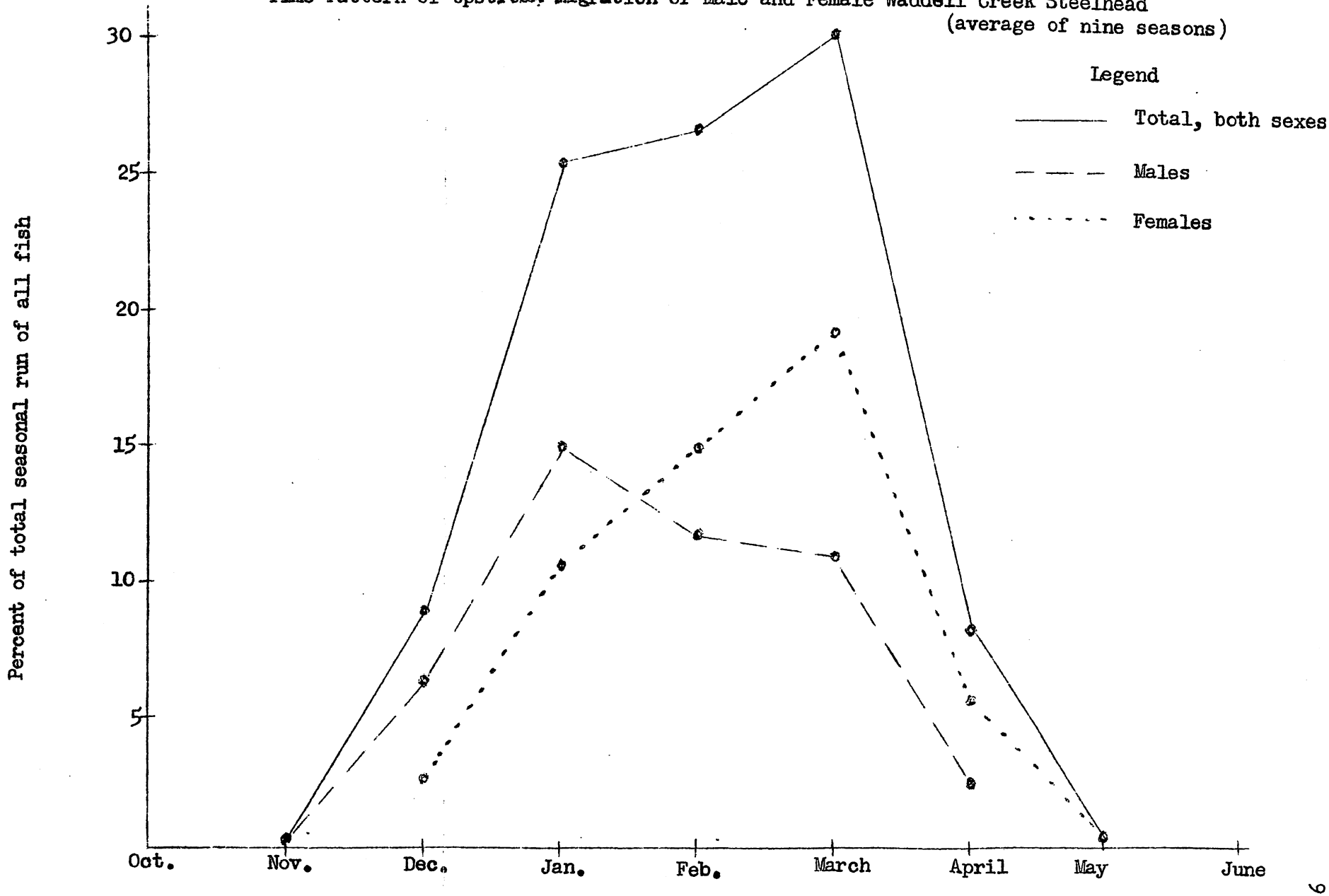
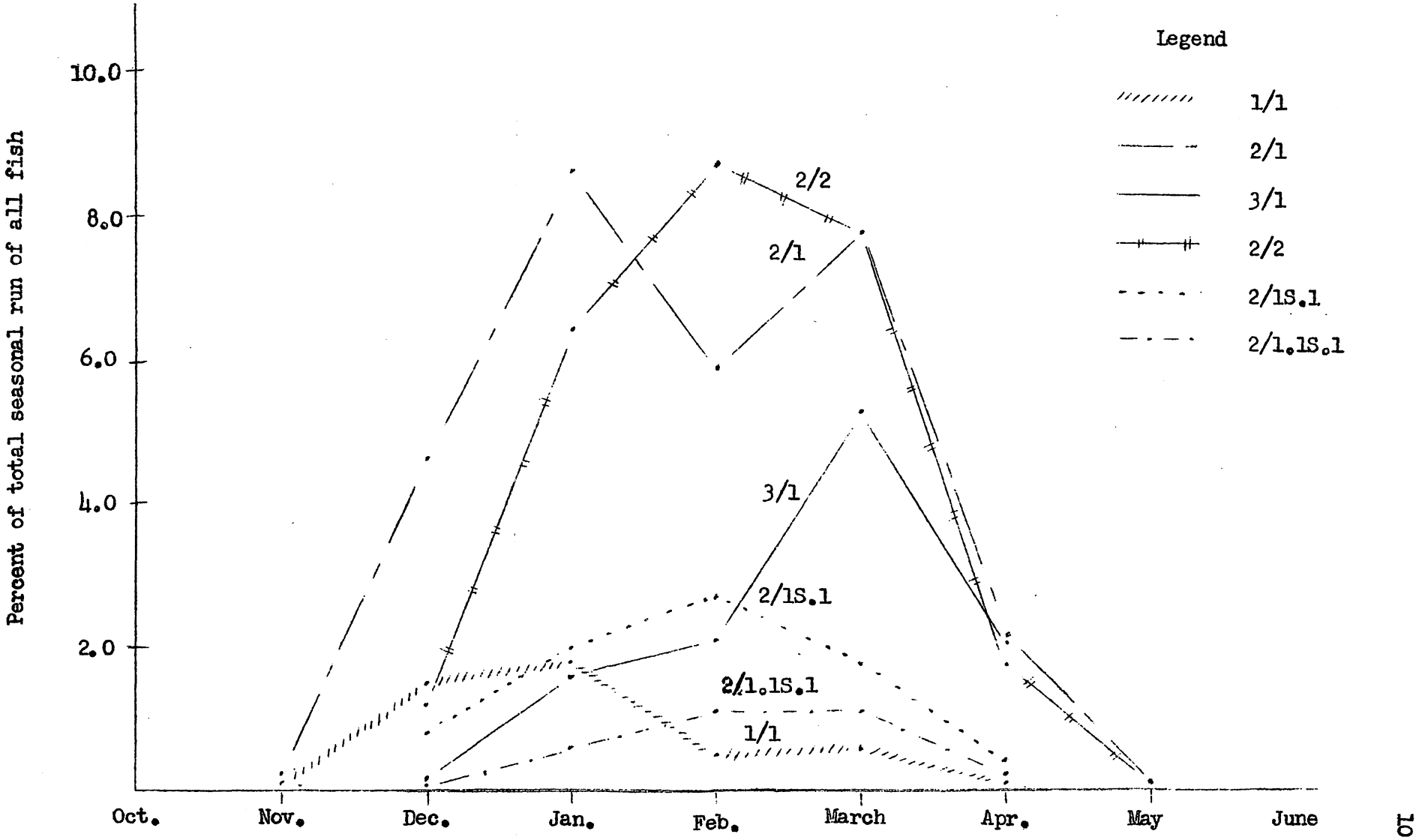


FIGURE 3

Time Pattern of Upstream Migration of the Six Most Important Life-History Categories of Waddell Creek Steelhead
(which include 82.4 percent of all upstream migrants) (average of nine seasons)



large 2/2 fish gain dominance; and in the latter part of the season (March and April) the medium-sized 3/1 fish become nearly as abundant as the 2/1 and 2/2 groups.

From the viewpoint of total age, it may be seen that the youngest fish (1/1 = two years) run first and are followed in succession by progressively older fish (2/1 = three years; 2/2 and 3/1 = four years).

Thus, other factors (such as angling pressure and availability of fish to anglers because of climatic conditions) being equal, the extent of the open angling season has an important bearing not only on the total numbers, but also on the kinds of steelhead exposed to angling. The present general open season of November through February, especially in the first three months, exposes mainly males and younger fish, while an extension of the season through March would expose an additional group in which females and older fish predominated.

Unfortunately, the two most critical factors bearing on an extension of the steelhead season have not been determined: (1) the proportion of the total run which is being harvested by anglers each year in various types of streams is not known; (2) it is not known if the progeny of fish running in March return to spawn primarily in March, like their parents, or scatter throughout the season.

While it is possible that the offspring of steelhead which run in March also return as adults primarily in March, it appears more probable that they do not, in view of the preponderance of females in March. These late-running fish may be important out of all proportion to their numbers in maintaining the runs, since survival of eggs and fry is probably highest from late spawners because of reduced loss from floods and in view of the preponderance of females.

The Department of Fish and Game plans to begin a long-range investigation of steelhead in coastal streams in July of 1954. Efforts will be directed toward obtaining the answers to the two problems outlined above, but it will take several years to get the answers. Until we are sure of the facts, it seems wise to take no chance of jeopardizing our valuable steelhead resources. The Department of Fish and Game, therefore, recommends against any extension of the winter steelhead season at the present time.