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California Department of Fish and Game
722 Capitol Avenue
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1959 KING SALMON SPAWNING POPULATION
ESTIMATES FOR THE SACRAMENTO-SAN JOAQUIN RIVER SYSTEMS

Marine Resources Branch

INTRODUCTION

The king salmon (Oncorhynchus tshawytscha) spawning population of Central Valley streams is inventoried annually by the Department of Fish and Game. These inventories are made in order to estimate the number of spawners, their spawning success, condition, distribution and the stream conditions affecting them.

The surveys provide information as to the general status of the resource, data needed to evaluate proposed water project developments, and information on which to base regulations.

METHODS

The survey was begun on September 22, 1959 and concluded on January 15, 1960.

Population estimates are primarily for fall-run fish. Some overlap in spawning time between fall and spring-run salmon occurs on the upper Sacramento River and in the canyons of the Feather River; therefore, some spring-run salmon are included in the counts for these areas. On Butte and Chico creeks estimates are for spring-run fish. Mill Creek counts are for both spring-run and fall-run fish. No estimates are made of the size of the population of winter-run salmon.

The size of the salmon run on upper Mill Creek was determined by counting at Clough Dam. Similarly, the run on the Mokelumne was counted at Woodbridge Dam.

Salmon taken from Keswick Dam traps on the Sacramento River and from Battle Creek and spawned artificially at the U. S. Fish and Wildlife Service's Coleman Hatchery as well as those taken from the American River and spawned at Nimbus Hatchery are included in the totals.

Population estimates were calculated primarily by counting dead salmon carcasses, estimating the percentage of the run that had been counted and then computing the spawning population for the stream or stream section. Factors affecting carcass recovery such as the physical characteristics of the stream, turbidity, volume of flow and number of survey trips, as well as information obtained from previous surveys, were considered in making the estimates. No tagged or marked fish data were used in making the estimates.

Two and three man crews conducted the salmon recovery work. All salmon carcasses found were cut in half with a machete to prevent recounting the same fish on subsequent trips, and to determine spawning success.

Aerial redd counts were used to estimate the spawning population in the Sacramento downstream from Squaw Hill Bridge and in the Feather River canyons.

Live fish counts formed the basis for several of the estimates.

Figures 1, 2 and 3 indicate the streams which were surveyed during the season.

PERSONNEL

The survey was conducted by 15 men in two and three-man crews. Marine Resources Branch provided nine, including one man from Dingell-Johnson Project F7R, Region 1 one, Region 2 three and Region 4 two.

SACRAMENTO RIVER

During most of the spawning season releases from Keswick Dam were on the order of 3,500 c.f.s. As a result of the low flows and almost total lack of rainfall, conditions for recovery of carcasses were excellent.

In addition to the 7,100 salmon taken at the Keswick trap and spawned at Coleman Hatchery, 9,810 carcasses were recovered for a total of 16,910 examined. The king salmon spawning population estimate is 266,600 for the area between A.C.I.D. dam in Redding and Colusa.

Population estimates for the stream below Squaw Hill Bridge were based on aerial redd counts. Aerial redd counts were possible during the season downstream as far as Colusa due to the clarity of the stream.

The 1959 run in the Sacramento River was considerably better than that of 1958. Distribution, however, was much different. The main concentration of spawners as usual was between Redding and Anderson but fewer spawners were seen in the downstream areas, particularly between Iron Canyon and Squaw Hill Bridge.

TABLE 1

King Salmon Carcass Recovery and Population
Estimates for the Sacramento River, 1959

River Section	No. of counting trips	No. of salmon counted*	Estimated spawning population
Keswick Dam Fish Trap	-	7,100	7,100
A.C.I.D. Dam to Highway 44 Bridge	14	3,654	73,000
Hwy. 44 Bridge to Upper Anderson Bridge	14	3,872	100,000
Upper Anderson Bridge to Ball's Ferry	13	1,707	43,000
Ball's Ferry to Jelly's Ferry	12	498	25,000
Jelly's Ferry to Iron Canyon	4	15	6,000
Iron Canyon to Red Bank Creek	4	13	2,600
Red Bank Creek to Tehama	7	46	6,900
Tehama to Squaw Hill Bridge	5	5	1,000
Squaw Hill Bridge to Highway 32 Bridge	-	-	1,200**
Highway 32 Bridge to Ord Ferry	-	-	600**
Ord Ferry to Colusa	-	-	200**
Totals		16,910	266,600

* Includes skeletons

** Estimates based on aerial redd counts

SACRAMENTO RIVER TRIBUTARIES NORTH OF BUTTE CREEK

Mill Creek

Mill Creek, as was the case with most of the small tributaries of the Sacramento, suffered from low flows which restricted the entry and spawning of salmon. Spring run counts over Clough Dam totaled 1,580; the fall run above Clough Dam amounted to 64 fish, the smallest fall run ever recorded there.

Four survey trips were made between Clough Dam and the mouth; a total of 58 carcasses was recovered. For this area the fall king salmon spawning population is estimated to number 725.

Forty-eight king salmon spawned in the U. S. Fish and Wildlife Service's experimental area on the North Fork of Mill Creek.

It is estimated that 2,417 king salmon, fall and spring run, spawned in Mill Creek in 1959.

Battle Creek

Fourteen survey trips were made between Coleman Station and the mouth, in addition Gover Ditch and the area between the powerhouse and Coleman Station were surveyed once. Between Coleman Station and the mouth 5,106 carcasses were recovered. The salmon spawning population estimate for this area is estimated to be 19,000.

The spawning population estimate for the area between Coleman Power House and Coleman Station is 100 and for Gover Ditch 300. A total of 10,833 king salmon entered Coleman Hatchery and were artificially spawned. Total spawning population for Battle Creek was 30,233. This is the largest run recorded for this stream.

Clear Creek

Sixty-two carcasses were recovered on four counting trips between McCormick-Saeltzer Dam and the mouth. The spawning population estimate for Clear Creek is 775 king salmon. Low flows restricted spawning to the stream area below McCormick-Saeltzer Dam.

Cottonwood Creek

Four survey trips were made on Cottonwood Creek between the confluence with the South Fork and the mouth. Flows were supplemented by water from the A.C.I.D. Canal permitting a fairly sizable run to spawn. A total of 666 carcasses was recovered. The spawning population of king salmon in Cottonwood Creek is estimated to number 3,300.

Other Tributaries North of Butte Creek

King salmon spawning populations of the other tributaries surveyed are: Cow Creek 680, Bear Creek 10, Chico Creek 200 (spring run), and Deer Creek 10. Spring Gulch and the South Street Overflow in Redding had runs of

955 and 51 king salmon respectively. All eggs deposited in Spring Gulch and the South Street Overflow were eventually lost because of lack of water.

Toomes, Dye, Churn, Stillwater, Ash, Thomes, Pine, Paynes, Antelope and Stony creeks were surveyed but were dry or had insufficient water to support a run of salmon.

Data on the streams north of Butte Creek are summarized in Table 2.

TABLE 2

King Salmon Carcass Recovery and Population Estimates
for Sacramento River Tributaries North of Butte Creek, 1959

Stream	No. of counting trips	No. of salmon counted*	Estimated spawning population
Mill Creek (above Clough Dam, fall run)	-	64	64
(above Clough Dam, spring run)	-	1,580	1,580
(below Clough Dam, fall run)	4	58	725
(North Fork, fall run)	-	48	48
Stream total			(2,417)
Deer Creek	3	1	10
Clear Creek	4	62	775
Cow Creek	3	41	680
Bear Creek	2	-	10
Cottonwood Creek	4	666	3,300
Spring Gulch	2	382	955
Chico Creek (spring run)	2	-	200
Battle Creek (Coleman Station)	-	10,833	10,833
(below Coleman Stn.)	14	5,106	19,000
(above Coleman Stn.)	1	6	100
(Gover Ditch)	1	-	300
Stream total			(30,233)
South Street Overflow (A.C.I.D.)			51
Totals		18,847	38,631

* Includes skeletons

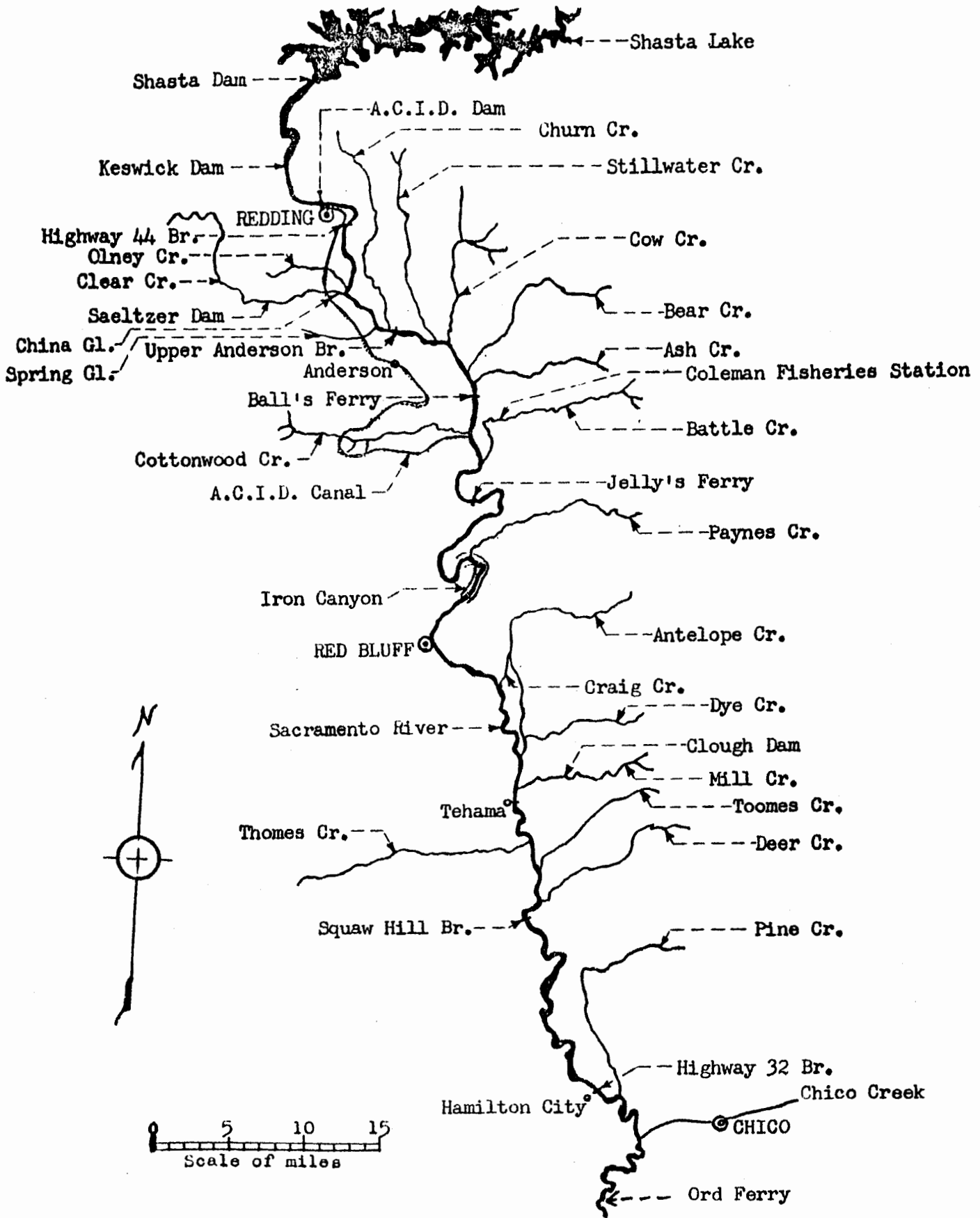


Figure 1. Upper Sacramento River and Tributaries Above Butte Creek Covered During the 1959 King Salmon Spawning Survey

SACRAMENTO RIVER TRIBUTARIES SOUTH OF CHICO CREEK

Butte Creek

The stream section between Centerville Power House and Parrot-Phelan Dam was surveyed twice for spring-run salmon. A total of 54 carcasses was recovered; the king salmon spawning population is estimated to number 500. Flows between Centerville and Parrot-Phelan were adequate to support the run; most of the flow was being diverted at Parrot-Phelan; therefore, there were no spring run fish below that point. One survey trip was made between Helltown Road and the Centerville Power House. Flows were practically nil and there was no possibility that spring salmon could have survived throughout the summer in this area. A few spring run salmon had been seen between DeSabra and Helltown Road early in the summer, however, this area was not surveyed during the spawning season.

FEATHER RIVER

West Branch of the North Fork

On the basis of live counts 50 spring-run salmon were estimated to have spawned in the West Branch upstream from the Yankee Hill Bridge. Flows were quite low as they have been in the past several years. Water temperatures were in the low sixties.

South Fork to confluence with Middle Fork

No estimates. No salmon or redds were seen from the air. The stream was extremely low.

North Fork downstream to Oroville Dam site

The spawning population in this area is a combination of spring and fall-run salmon. Based on aerial redd counts the spawning population is estimated to number 1,500 fish.

Middle Fork - Bald Rock Falls to confluence with North Fork

A total of eight carcasses was recovered in the Middle Fork area during two survey trips. Flows were lower during the spawning season than they had been during the previous three years but access to the area was no easier. The basis for the population estimate of 3,000 spring and fall run is aerial redd counts.

Main stream - Oroville Dam site to Oroville

Based on aerial redd counts the spawning population for this stream section is 600.

Main stream - Oroville to Honcut Creek

Nine survey trips were made on each of the three stream sections between Oroville and Honcut Creek. A total of 7,792 carcasses was recovered

during the season. The spawning population of fall-run salmon in this area is estimated to be 75,000, the bulk of which spawned between Sutter-Butte Dam and Gridley.

The salmon spawning population estimate for the entire Feather River is estimated at 80,150, fall and spring run. This was the largest run since 1955.

YUBA RIVER

For the third consecutive year a portion of the salmon spawning run on this stream was lost.

The 1959 loss was a major one consisting of approximately one-third of the total run. The spawning population estimate for the Yuba was 10,000 salmon, including those spawners which were lost. A total of 2,101 carcasses was recovered. The spawning population downstream from Daguerre Point Dam was estimated to be 3,500; all of these fish or their redds were lost.

The extensive fish loss was the result of attraction of salmon into the stream by relatively large flows with subsequent cutbacks and diversion which resulted in an almost dry streambed in the spawning area below Daguerre Point Dam.

AMERICAN RIVER

Between Nimbus Racks and the Del Paso Gravel Plant 3,992 carcasses were recovered. The salmon spawning population estimate for this stream section is estimated to be 16,000. An additional 1,900 salmon were estimated to have spawned between Nimbus Racks and the dam. A total of 13,243 salmon entered Nimbus Hatchery and were spawned artificially. The total number of king salmon spawning in the American River is estimated to be 31,143.

Water temperatures again were higher than required for satisfactory egg development. Salmon taken at Nimbus during this period were moved to a holding base at higher elevations where temperatures were suitable. Flows were quite uniform during the season and remained in the vicinity of 500 c.f.s.

Although a salmon tagging program was underway in the American River during the season, its primary purpose was to develop methods; therefore no tagging data was used in estimating the population.

TABLE 3

King Salmon Carcass Recovery and Population Estimates
for Sacramento River Tributaries South of Butte Creek, 1959

Stream and/or stream section	No. of counting trips	No. of salmon counted*	Estimated spawning population
Butte Creek, DeSabra to Highway 99E	2	54	500
Feather River			
Middle Fork - Bald Rock to junction with North Fork	2	8	3,000**
North Fork and downstream to Oroville dam site	1	-	1,500**
West Branch of North Fork	2	-	50
Main Section			
Oroville Dam Site to Oroville	2	-	600**
Oroville to Sutter Butte Dam	8	1,337	11,100
Sutter Butte Dam to Gridley	9	5,381	53,800
Gridley to Honcut Creek	9	1,074	10,100
Stream total		(7,800)	(80,150)
Yuba River			
Blue Pt. Mine to Highway 20 Bridge	5	239	1,200
Highway 20 Bridge to Daguerre Pt. Dam	4	797	5,300
Daguerre Pt. Dam to Baldwin Gravel Pl.	4	1,065	3,500
Stream total		(2,101)	(10,000)***
American River			
Nimbus Hatchery	-	13,243	13,243
Nimbus Dam to hatchery racks	-	1,751	1,900
Racks to Del Paso Gravel Plant	10	3,992	16,000
Stream total		(18,986)	(31,143)
Totals		28,941	121,793

* Includes skeletons

** Based on aerial redd count

*** Includes 3,500 fish loss

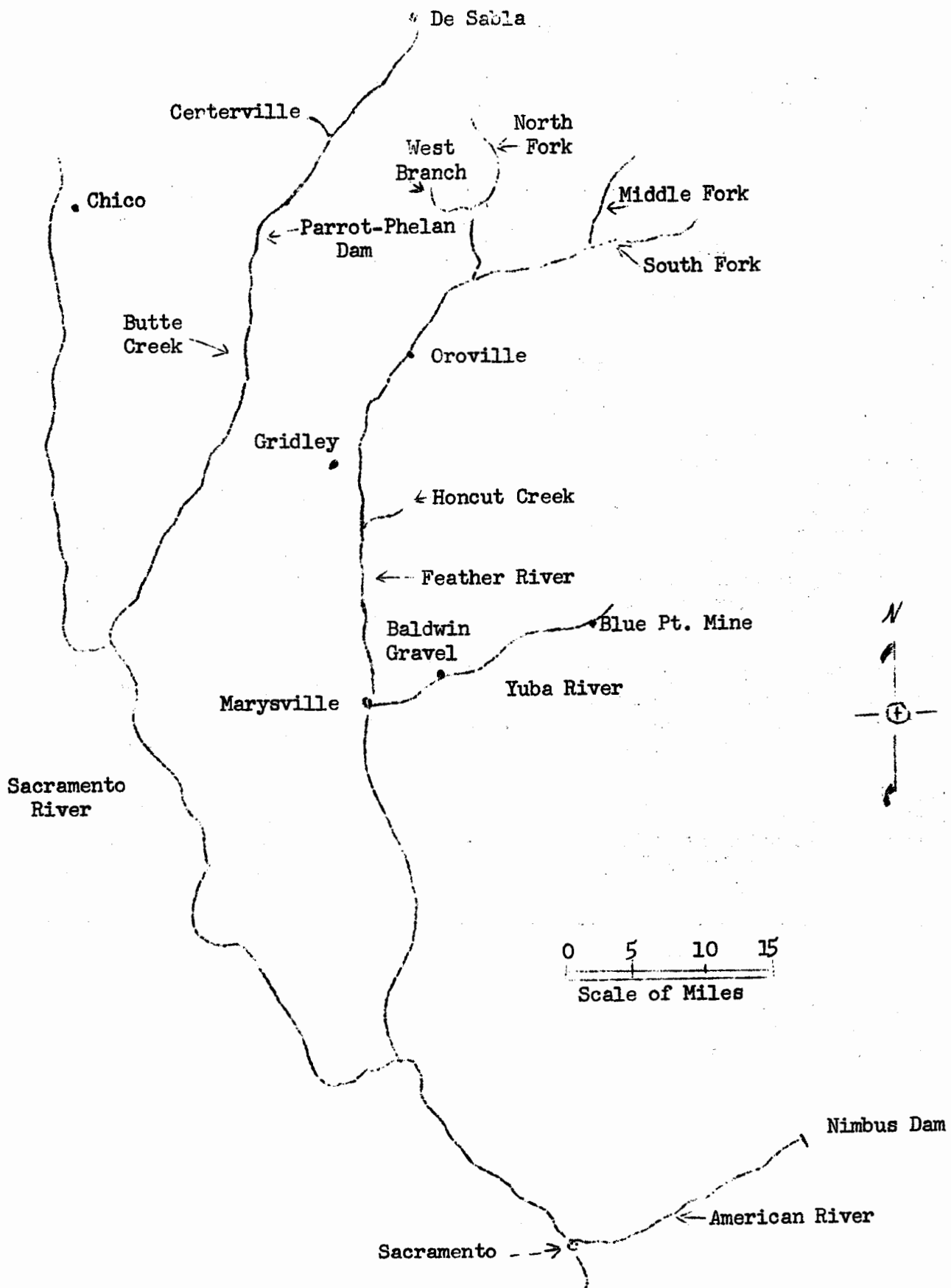


Figure 2. Sacramento River Tributaries South of Chico Creek Covered During the 1959 Spawning Area Survey

SAN JOAQUIN RIVER SYSTEM

Cosumnes River

No spawning population estimate was made for the Cosumnes. The lower sections of this stream were dry until January 12. Several salmon were noted in the stream shortly after access became possible.

Mokelumne River

The Mokelumne River run was counted at the counting station on Woodbridge Dam which was in operation from October 1 to January 13. The total count of salmon in that period was 2,106.

Stanislaus River

Six counting trips were made in the vicinity of Two-Mile Bar and five on the remaining spawning area of the Stanislaus River. A total of 1,125 carcasses was recovered. The king salmon spawning population is estimated to be 4,300. Flows during the spawning seasons were approximately 35 c.f.s. with little change, less than essential for good spawning or even migration in this stream. Silt pollution from the plant on the downstream side of Oakdale posed another hazard at the flows present. This siltation was in evidence as far downstream as Riverbank. High water temperatures and even low flows during the downstream migration in the spring culminated a dismal spawning season on this stream.

Tuolumne River

Although flow fluctuations from LaGrange Dam occurred during the spawning season as they normally do they did not appear to be as damaging as those during the 1958 season. The run was one of the best in years. A total of 5,615 carcasses was recovered by the survey crew. The spawning population estimate is 45,900 king salmon.

Merced River

The king salmon spawning population of the Merced River for 1959 is estimated to be 400 based on the recovery of 27 carcasses. Flows were, as they have been during a number of recent spawning seasons, extremely low.

TABLE 4

King Salmon Carcass Recovery and Population Estimates
for San Joaquin River Tributaries, 1959

Stream and/or stream section	No. of counting trips	No. of salmon counted*	Estimated spawning population
Cosumnes River			
Michigan Bar to Sloughhouse	1	0	0
Mokelumne River	-	2,106	2,106
Stanislaus River			
Goodwin Dam to Knights Ferry	6	25	100
Knights Ferry to Orange Blossom Br.	5	525	1,700
Orange Blossom Br. to Oakdale	5	341	1,100
Oakdale to Riverbank	5	234	1,500
Stream total		(1,125)	(4,300)
Tuolumne River			
La Grange to Rairden's Farm	6	3,618	24,100
Rairden's to Roberts Ferry Bridge	6	1,459	14,600
Roberts Ferry to Reed Rock Plant	6	538	7,200
Stream total		(5,615)	(45,900)
Merced River			
Shaffer Dam to Cressey Bridge	3	27	400
Totals		8,873	52,806

* Includes skeletons

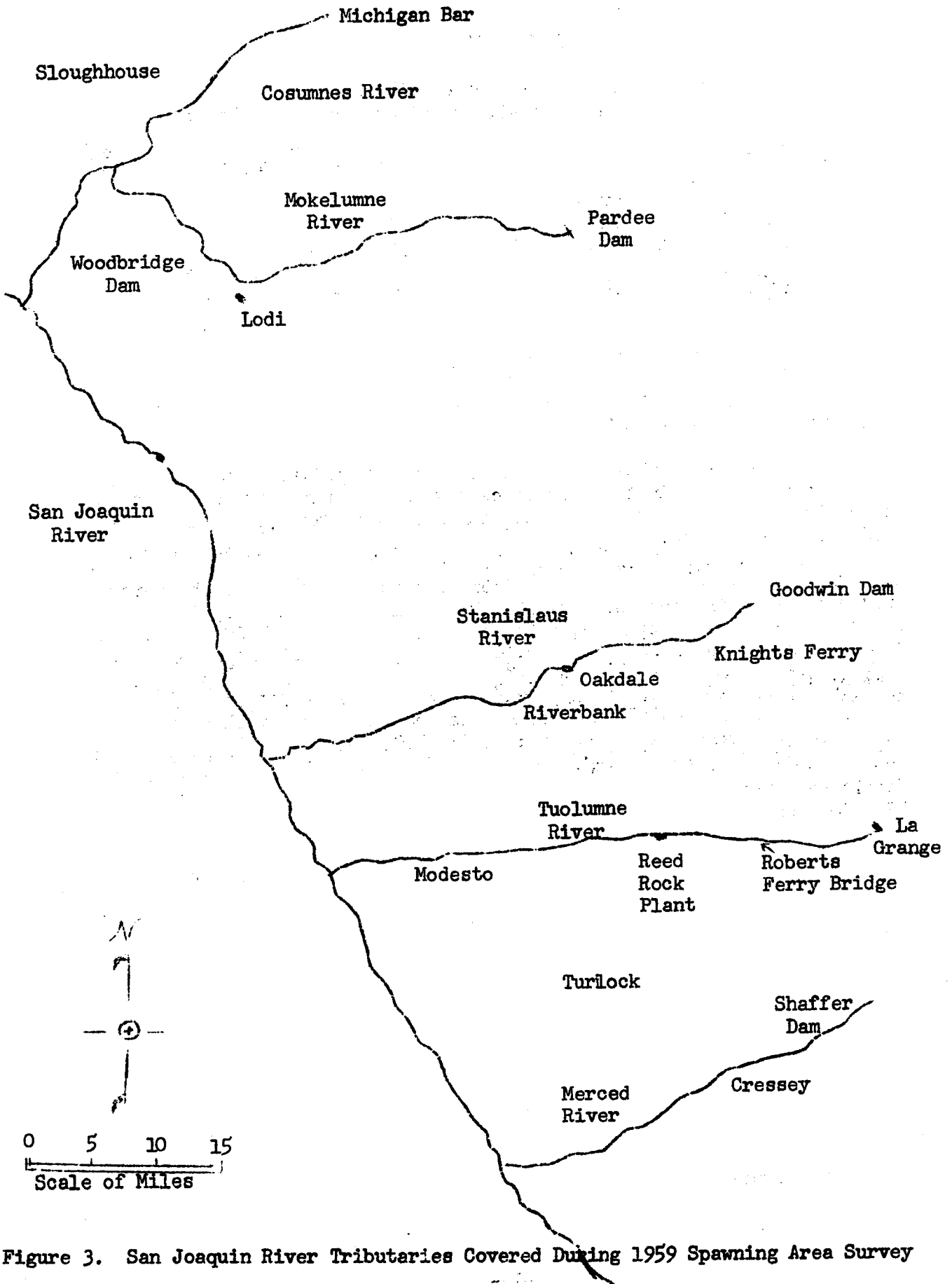


Figure 3. San Joaquin River Tributaries Covered During 1959 Spawning Area Survey

SILVER SALMON

Spawning population estimates of silver salmon in Central Valley streams were not made. Counts of silver salmon were as follows:

Clear Creek	2	
Sacramento River	4	
Mill Creek, below Clough Dam	11	
Mill Creek, Clough Dam	57	
Battle Creek, Coleman Hatchery	341,	42 of which were taken at Keswick trap
Battle Creek below Coleman Hatchery	29	

SUMMARY

A survey of the king salmon spawning stocks in Central Valley streams was made again in 1959.

Spawning population estimates were made primarily by counting salmon carcasses, estimating the percentage of the run counted and calculating the total population for each stream. Live fish counts and aerial redd counts were also used.

A total of 73,571 king salmon, carcasses and live fish, were examined during the season. The 1959 king salmon spawning population of the Central Valleys was estimated to be 480,000, of which 427,100 spawned in the Sacramento River system and 52,800 in the San Joaquin River system.

The 1959 total of 480,000 spawners is the largest recorded since 1954 when an estimated 482,000 salmon spawned in Central Valley streams. Totals for other recent years were: 1955, 400,000; 1956, 170,000; 1957, 120,000; and 1958, 290,000.

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