

STATE OF CALIFORNIA

**DEPARTMENT OF FISH AND GAME****INTRAOFFICE CORRESPONDENCE**

DATE : January 14, 1954

TO: Willis A. Evans, Fisheries Management Supervisor - Region III

FROM: Herbert E. Pintler, Asst. Fisheries Biologist - Region III

SUBJECT: Rough Fish Control Through Chemical Treatment - Maacama Creek, Sonoma County

**SUMMARY**

Maacama Creek and its tributaries were chemically treated with about 350 pounds of 6.03% rotenone powder during the period from October 13 to 15, 1953, inclusive, in an attempt to control the rough fish population. Slightly more than 20 miles of stream were treated. Short sections of the headwater areas were omitted since rough fish were not observed there. The operation was undertaken by four two-man crews plus two helpers and four service vehicles. A total of 23½ man-days was required, of which 7 man-days were spent on preliminary and post surveys and retreatment.

Recommendations are for a careful follow-up to determine benefits resulting from the rough fish eradication and changes in the total fish population. A rough fish barrier is also recommended for the creek.

**BACKGROUND**

Maacama Creek, Sonoma County, a tributary of the Russian River, comprises a total of approximately 120 stream miles. It rises in the high foothills on the western and southwestern slopes of Mt. St. Helena, located between Middletown, Lake County, on the north and Calistoga, Napa County on the south. From this area, the creek flows in a southwesterly direction into the Russian River about four miles east of Healdsburg, Sonoma County.\* Local residents sometimes refer to Maacama Creek as McDonnell Creek or Maacama Creek. The name McDonnell Creek is also applied by them to that part of Maacama Creek upstream from its junction with Briggs Creek.

The main branch of Maacama Creek, including its minor upper tributaries, Bear and Ingalls Creeks, has a length of about 35 miles.

\*On the California State Division of Forestry map of Sonoma County, dated 1945, Maacama Creek is shown as a tributary to Franz Creek, the two streams joining about one-half mile east of the Russian River. Considering the relatively larger size of the Maacama Creek drainage, it is most more appropriate to consider Franz Creek as a tributary to Maacama Creek.

The other major tributaries bearing names are (1) Briggs Creek and its tributary streams, little Briggs and Goon Creeks, with a length of about 20 miles, (2) Redwood Creek and its tributaries, Foot (e), Kellog (g), and Yellow Jacket Creeks, with a length of about 24 miles and (3) Franz Creek with a length of about 40 miles. The distances listed above include the numerous unnamed tributaries in the drainage. A map of the Maacama Creek drainage is attached.

The Maacama Creek drainage is located in a typical section of the Coast Range where the terrain is very broken up. The lower section of the creek flows through open grasslands and agricultural areas while the majority of the tributaries are located in an oak-grassland association. A few tributaries flow through a sparse redwood stand.

More than two-thirds of the creek channel is well shaded and narrow with steep banks. At no place does the creek channel exceed 100 feet across the average width being not more than 30 feet. Throughout the drainage the channel bottom is composed of gravel, rocks and boulders as well as bedrock. The gradient of the stream is quite steep in its upper reaches where many small falls exist. Even the lower sections maintain a good flow because of some grade.

Water flows in Maacama Creek fluctuate greatly. Water levels in the narrower channels sometimes rise to as much as 15 feet above the bed during peak periods of winter runoff. Nearly all of the tributaries are intermittent and neither their flow nor the main creek flow reaches their mouths during the dry part of the year. Temperatures along the stream remain reasonable even during the warmest parts of the year, undoubtedly because of the steep, narrow canyons and excellent shade. On August 25, 1953 at 11 a.m. the air temperature in the shade was 75 farenheit and the water temperature was 64° farenheit at a point only four miles above the mouth,

Maacama Creek and its tributaries are closed to winter steelhead fishing, as are all of the other tributaries of the Russian River with the exception of a portion of the East Branch. The stream is open for summer trout fishing, but most of the land bordering the creek is in private hands and posted. What fishing exists is less than mediocre and the fish taken are undoubtedly young steelhead using the area as a nursery, Maacama Creek is one of the major steelhead spawning tributaries of the Russian River. Because of this, it would appear that the principal value of the stream is in raising young steelhead, and that the management plan should be geared accordingly.

The fish population of Maacama Creek was sampled by electric shocking in two typical areas on August 25, 1953. A list of the species collected, together with their abundance, size range and percentage in the population, follows:

SPECIES		Nos.	Size Range Fork Length in Inches	Percentage
Common Name	Scientific Name			
Rainbow (Steelhead) Trout	<u>Salmo gairdneri</u>	33	2.0" - 7.3"	12.3
Western Sucker	<u>Catostomus occidentalis</u>	26	1.5" - 14.4"	10.0
Hardhead	<u>Mylopharodon conocephalus</u>	13	1.9" - 6.9"	4.9
Sacramento Squawfish	<u>Ptychocheilus grandis</u>	44	1.1" - 12.7"	16.4
Western Roach	<u>Hesperoleucus symmetricus</u>	147	0.8" - 3.6"	55.0
Green Sun Fish	<u>Lepomis cyanellus</u>	3	3.6" - 5.9"	1.1
Tule(Fresh-water Viviparous)				
Perch	<u>Hysterocarpus traski</u>	1	2.8" )	0.3
Sculpin	<u>Cottus sp.</u>	1	6.0" )	
Total		268		100.0

Crayfish and Pacific lamprey ammocoetes were also abundant.

Gross examinations of sections of Maacama Creek and its tributaries have shown a rather scanty population of invertebrate aquatic life. Compared with Sulphur Creek, Sonoma County, the present stream contains much less fish food. A detailed bottom sample analysis would be necessary, however, before this could be judged an active limiting factor for fish life.

#### OBJECTIVE

The chemical treatment of Maacama Creek was undertaken in order to eliminate the population of rough fish and thereby provide a better habitat for trout and young steelhead. Reference is made to a letter report by H. E. Pintler to W. A. Evans, dated Nov. 3, 1953, subject; "Rough Fish Control Through Chemical Treatment: Dry Creek, Sonoma County", which contains objectives and methods applicable to the Maacama Creek operation.

#### PERSONNEL

A total of ten men participated in the project. They are listed below, together with vehicles they brought along:

#### Yountville Game Farm

Tom Harrison - and Chevrolet Carryall  
 Bill Fountain  
 Myron Slawson

Dingell-Johnson Stream Improvement Crew

John McBride, San Francisco  
George Jennings, San Francisco

Inland Fisheries Branch

Willis A. Evans, San Anselmo - and Plymouth Station Wagon  
William C. Johnson, Walnut Creek  
Herbert E. Pintler, Palo Alto - and Chevrolet Carryall

Wildlife Protection Branch

Capt. Lee Shea, Santa Rosa - and Jeep  
Warden Ray Bruer, Santa Rosa - and Ford Sedan  
Warden Harley Groves, Cloverdale - and Chevrolet Sedan  
Warden Jack Wilson, Sebastopol

OPERATIONS

The actual application of the rotenone powder was preceded by a careful check on Monday, October 12, 1953 to learn the upstream limits of rough fish populations in Maacama Creek. These limits have been indicated on the attached map by black bars across the various tributaries. Redwood Creek was nearly dry and was not flowing into Maacama Creek. Consequently, only a small portion near its mouth was treated despite its long drainage. It was decided that Franz Creek should also not be treated at this time for the above reason as well as the fact that it joins Maacama Creek below the point of any feasible rough fish barrier site. Furthermore, it is large enough to be considered a separate drainage.

The chemical treatment began on the morning of October 13 and was completed by dusk of October 14. A distance of about 20 miles was treated, including the live tributaries, as indicated by the red line on the map. About 23½ man-days were expended on the entire operation, of which 7 man-days were spent on preliminary and post survey and treatment and 16½ man-days on the two days devoted exclusively to treatment. Approximately 350 pounds of 6.03% rotenone powder were used. This is a rate of 17.5 pounds per mile as contrasted with an application of only 12.6 pounds per mile on Dry Creek. The heaviest application was considered necessary because of the increased flow, although even this larger dosage was not entirely sufficient as noted under RESULTS below, despite the higher concentration of rotenone in the powdered product.

Throughout the entire two days, the rainfall was heavy and the creek level rose as much as eight inches in some sections. The flow,

which was about one cubic foot per second on October 12, 1953, had increased to approximately three second feet by the evening of October 14th. Water temperatures remained rather constant with a low of 58° farenheit on the first day and a high of 63° farenheit on the last day.

During the treatment of Maacama Creek, it was noted that different brands of back pumps varied considerably in their ease of carrying. The Indian brand back pump was by far the easiest to use. The best pump mechanism, however, was the double-action, two-handled Hudson brand, which gave a sustained spray and could be used with its built-in nozzle. On the other back pumps, the nozzles had to be removed because of frequent clogging.

#### RESULTS

Rechecks of Maacama Creek and its tributaries on October 19 and 20, 1953 revealed that the chemical treatment was incomplete in some sections. The overall picture, however, was very much the same as in Dry Creek to which reference has already been made. An estimate of the total number of fishes killed in the 20 miles of treated stream is given in the following table.

Species	Estimated Numbers	Percent
Rainbow (Steelhead) Trout	3,500	7
Western Sucker	12,000	24
Hardhead	3,000	6
Sacramento Squawfish	9,000	18
Western Roach	22,500	45
Tule Perch	Trace	-
Sculpin	Trace	-
Total	50,000	100

The table of estimated numbers of fishes killed is calculated from two typical pool and riffle sections checked after treatment. Some allowance was made for fishes not observed and for sections of the creek where no pools existed, or where there appeared to be no fish present. It is believed that this estimate is extremely conservative. It is interesting to note that an estimated 4,000 fishes (all species) per mile were killed on Dry Creek, as compared with but 2,500 fishes per mile killed on Maacama Creek. For purposes of further comparison, the table following shows differences in species composition by percent as revealed by electric shocking and by chemical treatment in both Dry Creek and Maacama Creek.

Species'	Percent by			
	Electric Shocking		Chemical Treatment	
	Dry Cr.*	Maacama Cr.	Dry Cr.	Maacama Cr.
Rainbow(Steelhead)Trout	20.9	12.3	1	7
Western Sucker	16.4	10.0	40	24
Carp	-	-	Trace	-
Hardhead	0.9	4.9	10	6
Sacramento Squawfish	8.3	16.4	20	18
Western Roach	53.5	55.0	29	45
Green Sunfish	-	1.1	-	-
Tule Perch	- Trace)	" )	Trace	Trace
Sculpin	Trace	0.3	Trace	Trace
Three-spined Stickleback	Trace	-	Trace	-

\*Part of this section was chemically treated in 1952.

The apparent existing differences between the electric shocking samples and the complete chemical treatment are (1) fewer trout were found proportionately in the drainage when treated, than were found in the supposedly typical sample areas which were shocked, (2) roaches and hardheads were found to be less abundant than the electric shocking sample areas had previously indicated, although hardheads suckers, and squawfish proved more abundant upon subsequent chemical treatment, and (3) ratio of rough fish to game fish was 6 to 1 in the shocking samples, but as high as 25 to 1 in the chemical treatment results.

The recheck of the Maacama Creek drainage, subsequent to treatment, disclosed the fact that Redwood Creek contained a population of rough fish which had not been observed during the preliminary check. About one-quarter of a mile was therefore treated, yielding an abundance of small trout, a few roach and sculpins and two small Sacramento squawfish. A small unnamed tributary was also overlooked in the initial treatment. Rotenone powder was applied with similar results.

The chemical treatment of the Maacama Creek stream system should result in a greatly improved habitat for steelhead and trout by eliminating the rough fish population, providing a rough fish barrier is installed. A check of the fish population in Sulphur Creek, Sonoma County, by electric shocking, one year after chemical treatment, showed over 90 percent of the fish to be trout or young steelhead in an area where scarcely any existed previously. Sulphur Creek contains a falls near its mouth which appears high enough to stop the migration of most rough fish. While this recheck

by itself is too little for an overall generalization regarding other waters, discounting the results by 75 percent should still effect a significant improvement.

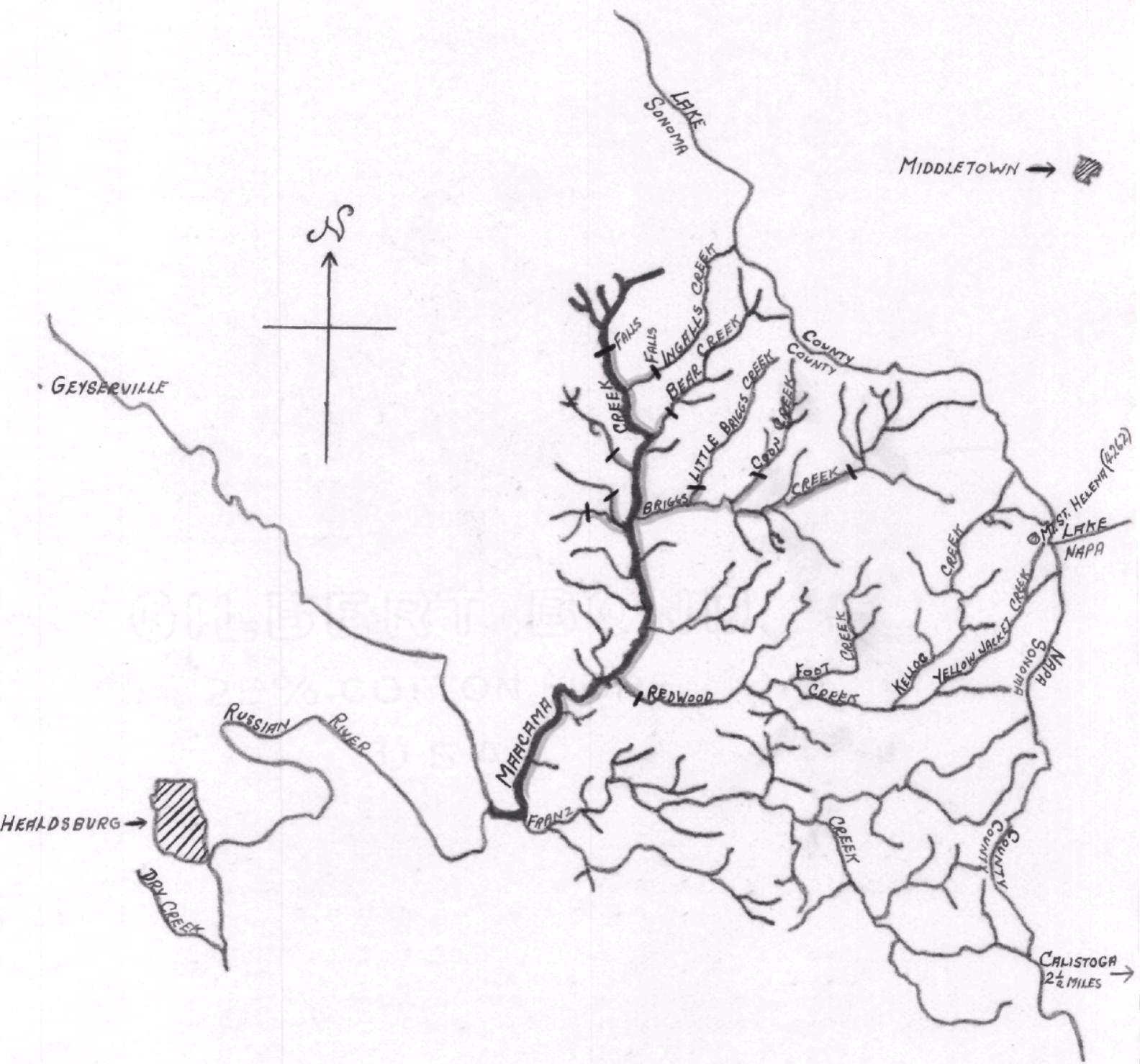
CONCLUSIONS

1. A complete kill of fishlife was accomplished throughout the treated area of Maacama Creek.
2. There is at present no barrier on Maacama Creek which will prevent the ingress of rough fishes from Franz Creek and the Russian River during the high water period.
3. A sample of the fish population showed that a few roaches, and a population of small rainbow (steelhead?) trout exist in the extreme upper sections of the Maacama Creek headwaters which were not treated. These fish will drop down in the main creek now that rough fish have been reduced or eliminated.

RECOMMENDATIONS

1. A recheck of the fish population ratio in Maacama Creek should be undertaken between August and October of 1954 by electric shocking, rotenone treatment, or both.
2. A comparison should be made between the recheck data and the data regarding the previously existing fish populations.
3. A careful census of trout fishing success during the opening week of the 1954 trout season should be made for comparison with previously known fishing success on this stream.
4. Sites for a rough fish barrier on Maacama Creek should be examined and action taken to erect such a barrier, preferably before the rains this winter. In lieu of this, flashboards should be installed on the small dam below the Campfire Girls' camp. (Note: This action has already begun as of November 17, 1953.)
5. When future chemical treatment is undertaken, it is recommended that Indian brand back pumps be used. If possible, however, the hand pump portions from Hudson brand back pumps should be used with the Indian brand back pump tanks. It is also preferable to have a longer hose between the tanks and the hand pumps.
6. Other recommendations follow those in the Dry Creek Chemical Treatment report regarding (a) the possibility of periodic retreatment in case a barrier is unfeasible, (b) the use of respirators when handling rotenone powder, and (c) the use of the product "Fishtox", whenever possible.

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SCALE:  $\frac{1}{2}$  INCH = 1 MILE