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Biennial Report 1936-1938.

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STATE OF CALIFORNIA

DEPARTMENT OF NATURAL RESOURCES

# Division of Fish and Game

THIRTY-FIFTH BIENNIAL REPORT

For the Years 1936-1938





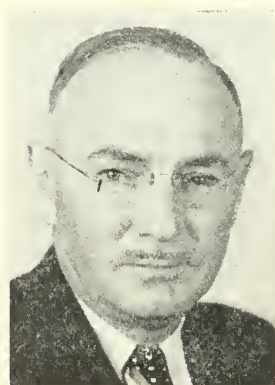
I. ZELLERBACH



DR. E. C. MOORE, *President*



NEWON G. BOOTH



RAYMOND GREY



HERBERT C. DAVIS

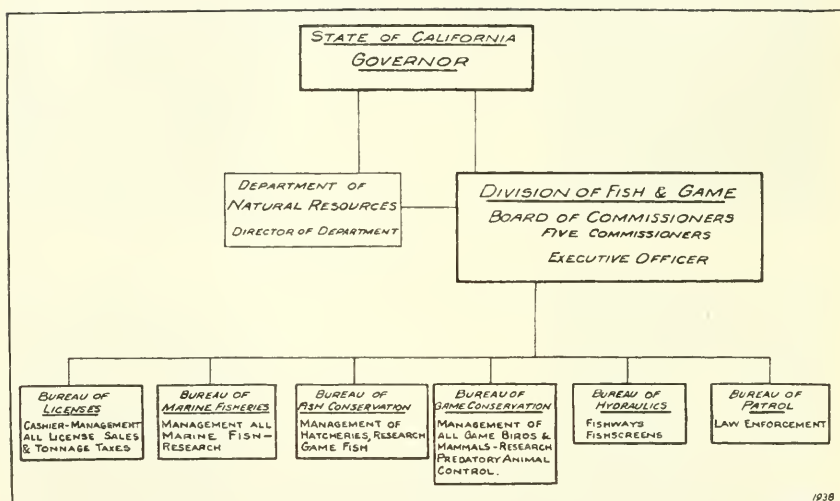


E. L. MCKENZIE

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## In Memoriam

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It is with much regret the Division reports the following deaths and retirements of members of its staff during the biennium and wishes at this time again to give recognition to the faithful and efficient service rendered by these men.

|                      | <i>Entered service</i> | <i>Died</i>    |
|----------------------|------------------------|----------------|
| E. W. Smalley-----   | 5/1/09                 | Aug. 9, 1936   |
| Chas. Bouton-----    | 1/1/16                 | July 11, 1937  |
| McPherson Lough----- | 7/1/18                 | Nov. 9, 1937   |
|                      |                        | <i>Retired</i> |
| R. C. Marshall-----  | 9/9/24                 | July 15, 1936  |
| J. E. Newsome-----   | 12/1/06                | Aug. 2, 1936   |

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## LETTER OF TRANSMITTAL

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September 1, 1938.

*To His Excellency, FRANK F. MERRIAM,  
Governor, State of California,  
Sacramento.*

SIR: Complying with the provisions of section 32 of the Fish and Game Code, we respectfully submit the Thirty-fifth Biennial Report of the Fish and Game Commission, covering the period July 1, 1936, to June 30, 1938.

The report consists of a brief statement by the Fish and Game Commission, a report to us from the Executive Officer on the several major accomplishments of the Commission, together with a detailed report by the chiefs of the several bureaus covering the proceedings of these bureaus which go to make up the Division during the two year period. There are also submitted complete statistical summaries of the receipts and disbursements of the moneys in the fish and game preservation fund and also statistics on fish and game management.

We desire to express to you our appreciation for the help and sympathy that you have given to this Division. We also wish to thank the heads of the various State departments and members of the legislature for this cooperation.

Respectfully submitted.

E. C. MOORE, President.  
NEWTON G. BOOTH, Commissioner.  
RAYMOND GREY, Commissioner.  
E. L. MCKENZIE, Commissioner.  
I. ZELLERBACH, Commissioner.



## THIRTY-FIFTH BIENNIAL REPORT

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### REPORT OF BOARD OF FISH AND GAME COMMISSIONERS TO THE GOVERNOR OF CALIFORNIA

During this biennial period, July 1, 1936, to June 30, 1938, your Board of Fish and Game Commissioners has devoted its attention to continuing its efforts to bring into full operation the six-point program for fish and game administration and management which your excellency outlined in 1934. For the details of this program and the specific points involved, we respectfully refer you to our report contained in the Thirty-fourth Biennial Report covering the period July 1, 1934, to June 30, 1936.

Your excellency is of course familiar with the fact that during the biennium the number of members of this Board was increased by the legislature from three men to five. The additional commissioners did not take office until close to the end of the biennium and therefore this report for the most part is a report of the Commission as it was constituted prior to the establishment of the five-member board.

The biennium just past and which is the subject of this report has been unusually successful from the standpoint of fish and game management because during this period the organization of the Division has had full opportunity to concentrate on the six-point program with all of the financial and personnel facilities at our command.

The results of the program speak readily for themselves and we refer you to the statistical reports included at the back of this report. You will see during this period the number of our people in California who have availed themselves of the opportunity to hunt and fish has materially increased. You will also see that the financial resources of the Commission have increased proportionately. We respectfully call your attention to the increased take of all sport fish and game, thus showing that in spite of the increase in the numbers of fishermen and hunters, the State has been able to maintain a supply of fish and game to meet reasonable demands.

We are glad to report that the increased take has not resulted in the depletion of any of the more popular species. In fact we believe that the story of the deer herds of California is indicative of the effectiveness of good management. The records show a continuous increase in the supply of deer available. Our annual census shows that the breeding stock has not only maintained its abundance but in some areas owing to our protection of females has increased to an extent where their numbers exceed the carrying capacity of the range, and in northeastern California have actually damaged the range through their abundance. In other sections of the State, no great damage has yet been done to the range, but they have become a burden upon the agricultural and livestock interests of our State.

This is a program that we feel needs specific attention and undoubtedly will require legislation which will enable the Fish and Game

Commission to reduce the size of the herds in these several areas to conform with the range carrying capacity and thereby relieve agriculture of the damage which it suffers. We believe that this report on the deer situation is applicable to most of our other species of both fish and game.

Our records indicate that in spite of the individual catch per man of trout having declined somewhat, the total catch has been maintained to a remarkable degree. We must never lose sight of the fact that the amount of fish we produce annually is dependent upon the amount of water and food in our lakes and streams and regardless of the demand we of course can not exceed our capacity to produce.

Waterfowl particularly have shown a remarkable recovery under careful management. While this particular species of game is migratory in nature and not solely a product of California, our State-owned and operated refuges have contributed much to the recovery of this game in numbers.

We regret to report to you that during the biennium we have suffered some very substantial losses in our hatcheries through food conditions which prevailed in the winter of 1937 and 1938. Cold Creek Hatchery located in Mendocino County was lost entirely. The Forest Home Hatchery in San Bernardino County, which was a large institution supplying all of southern California, was damaged beyond repair. The Commission is now studying locations for the replacement of both of these hatcheries.

We likewise regret to report that in spite of the diligent efforts of your Commission, through the failure to obtain adequate legislation we have failed to stop the overexploitation of several of our major commercial species, particularly the sardine and mackerel. However, we did obtain the cooperation of the canning interests in establishing a voluntary closed season on mackerel for several months during the spring of 1938, which was a definite step forward in the conservation of this species. The sardine must wait for its protection until such time as the people of the State by their vote at the polls give adequate laws to effect their conservation.

The four outstanding accomplishments which the Commission has concentrated upon for this biennium are:

1. The establishment of a definite fiscal policy.
2. The establishment of a policy and system for recruiting and training personnel in cooperation with the State Personnel Board.
3. The establishment of the California Junior Game Patrol which program is educational in its nature for the benefit of the young of California.
4. The establishment of an extensive system of predatory animal control which has laid the foundation for cooperation between the Fish and Game Commission and the agricultural interests of the State upon which we hope there may be built a farmer-sportsman relationship which can be extended to the production of game, the management of range and a satisfactory improvement in relationship between these two groups and utilization of the lands of the State for the benefit of both.

We respectfully refer to the Executive Officer's report for the details of all four of these major activities.

The Commission is very happy to report that the policy of complete cooperation between the Commission and the sportsmen and commercial industry whom they are called upon to manage was brought to a concrete realization during this biennium with the appointment by the sportsmen of the California Waterfowl Advisory Committee, which committee met with the Fish and Game Commission to assist and advise them on the waterfowl regulations which they would request from the United States Bureau of Biological Survey.

The California Sardine Advisory Committee was appointed by the industry to sit with the Commission to study and advise them on the individual problem of management of the sardine fishery and the proper allocations of tonnages to be used by the industry. Both of these committees were of great help to the Commission and demonstrated the soundness of the policy of cooperation and working together with these various interests.

The Fish and Game Commission is very grateful to you for having supported their efforts to carry out the splendid program which you announced and which we are happy to say has brought results and improvement in fish and game conditions to the State of California.

Respectfully submitted.

E. C. MOORE, President.

NEWTON G. BOOTH, Commissioner.

RAYMOND GREY, Commissioner.

E. L. MCKENZIE, Commissioner.

I. ZELLERBACH, Commissioner.

## REPORT OF THE EXECUTIVE OFFICER TO THE BOARD OF FISH AND GAME COMMISSIONERS

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Your Executive Officer has endeavored during the biennium to perfect the organization and financial structure of the Division in accordance with your instructions to the end that the program of fish and game management outlined by you during the thirty-fourth biennium could be made effective and produce the most desirable results. The reports of the several bureaus of the Division cover in detail the management of that portion of the fish and game with which each was charged. I will not summarize these in my report as was the custom in the past, but rather devote my report to a number of specific matters which you charged me with perfecting, none of these being new as far as this biennium was concerned but all being matters designed to carry out more effectively the general program of fish and game management.

During the biennium, your Executive Officer has made several trips out of the State. The first one was to Grand Rapids, Michigan, in 1936 for the purpose of attending the annual meeting of the International Association of Fish and Game Commissioners and the American Fisheries Society. No trip was necessary to meet with the Western Association of Game and Fish Commissioners as this organization met in San Francisco, California, during this year. A trip was made during the year 1937 to attend the meeting of the Western Association of State Game and Fish Commissioners at Denver, Colorado, and proceeding from there to Mexico City to attend the meeting of the International Association of Fish and Game Commissioners and the American Fisheries Society. During 1938 your Executive Officer made one trip to Washington, D.C., at the request of the Secretary of State for the purpose of discussing with them the necessity and advisability of a fisheries treaty with the Republic of Mexico. During the summer of 1938 your Executive Officer attended a meeting of the International Association of Fish and Game Commissioners at Asheville, North Carolina. In the spring of 1938 your Executive Officer traveled to Portland, Oregon, where he met with the Chief of the United States Bureau of Biological Survey to discuss the future expenditures under the so-called Pittman-Robertson Act, known specifically as "An act to provide that the United States shall aid the states in wildlife-restoration projects, and for other purposes."

The 1937 session of the California Legislature increased the number of members of the Board of Fish and Game Commissioners from three men to five. At the opening of the biennium and before the enactment of this statute, the Fish and Game Commission was composed of Dr. E. C. Moore, President; A. T. Jergins, Commissioner, and I. Zellerbach, Commissioner. Toward the latter part of the biennium, Mr. Jergins resigned and the Governor of California appointed Mr. Raymond Grey, of Taft, Mr. Newton G. Booth of Harbin Springs and Mr. E. L. McKenzie, of Red Bluff, to fill the vacancy created by Mr. Jergins'



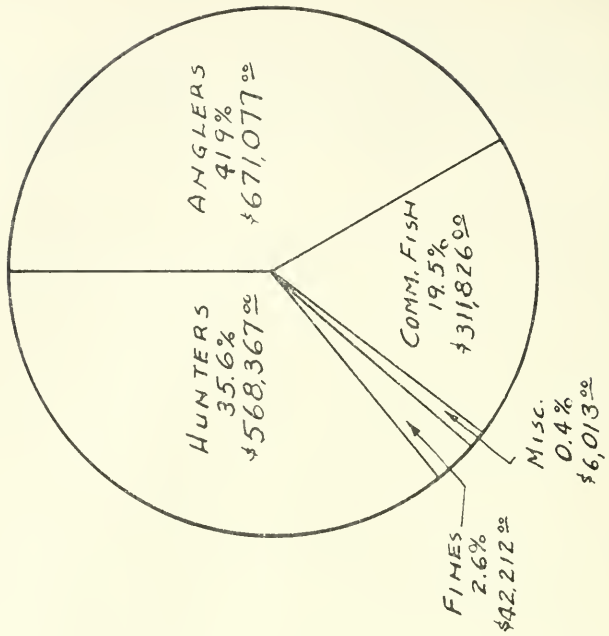
resignation and to fill the two additional positions created by the legislature. At the close of the biennium, therefore, the Board of Fish and Game Commissioners consisted of Dr. E. C. Moore, President, Newton G. Booth, Commissioner; Raymond Grey, Commissioner; E. L. McKenzie, Commissioner, and I. Zellerbach, Commissioner, and Herbert C. Davis as Executive Officer and Secretary to the Commission.

One of the matters which your honorable board placed in the hands of the Executive Officer for solution was that of adjusting the financial structure of the Division of Fish and Game to conform with the fiscal policy outlined by you during the thirty-fourth biennium, which policy consisted of making each activity of the Division self-supporting as far as possible, all money being returned to the fund from which it came. For example, all money received from hunting license sales was expended on the protection, propagation and administration of game; money received from sport fishing licenses to the preservation, propagation and planting of fish; and the money received from commercial fishing applied to the administration, propagation and preservation of commercial fish in accordance with the Fish and Game Code.

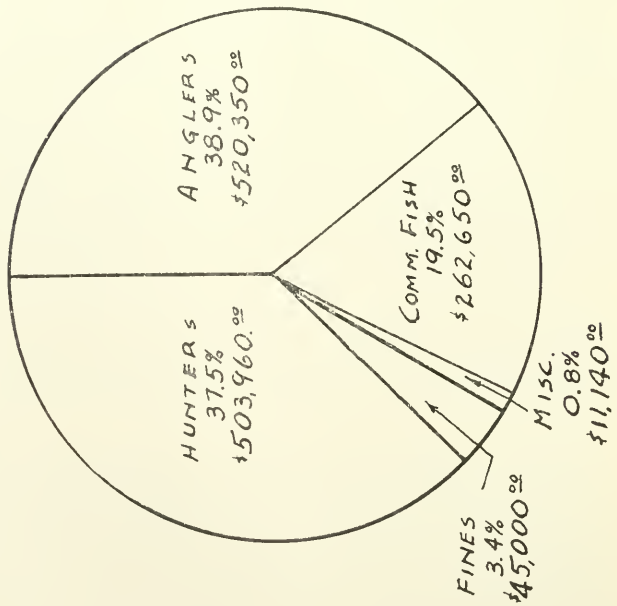
You asked that a further break down be made in this policy to the end that each species of fish and game should have assigned to it as far as possible that portion of the funds derived from hunting and fishing licenses which statistics of the Commission indicated was paid in by hunters and fishermen who hunted and fished for specific species. I am happy to report to you that this fiscal policy has to a large extent been placed in operation as far as conditions would permit. Complete fulfillment of the policy can only come with time as we had certain facilities for production which had to be carried on and adjusted gradually to meet the policy.

I am submitting herewith a series of charts which I believe more completely show the principals of your fiscal policy and the extent to which it has been put into effect. Each chart is self-explanatory and I will therefore not waste your time by attempting to describe them here. The charts are based on experience factors and you will note that they refer to the 91st and 92nd fiscal years which will be the years that compose the thirty-sixth biennial period. These charts were prepared at the time that the budget was written for submission to the Legislature when they convene in January, 1939.

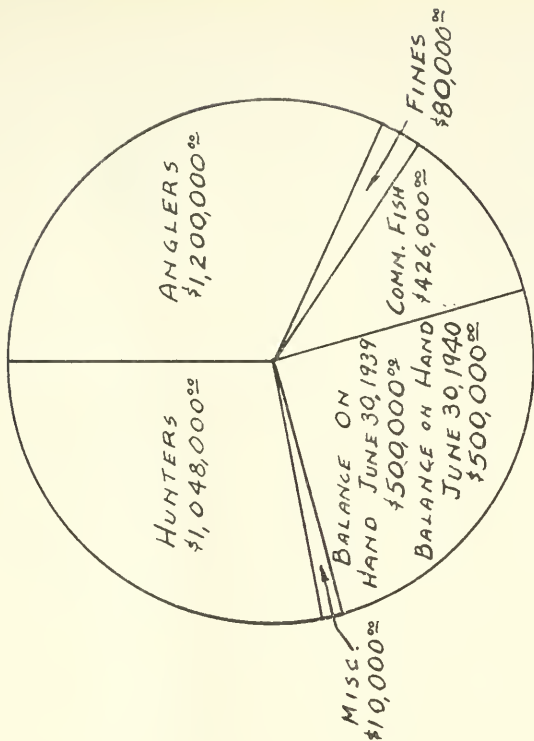
ACTUAL INCOME  
89<sup>th</sup> FISCAL YEAR  
\$1,599,495<sup>00</sup>



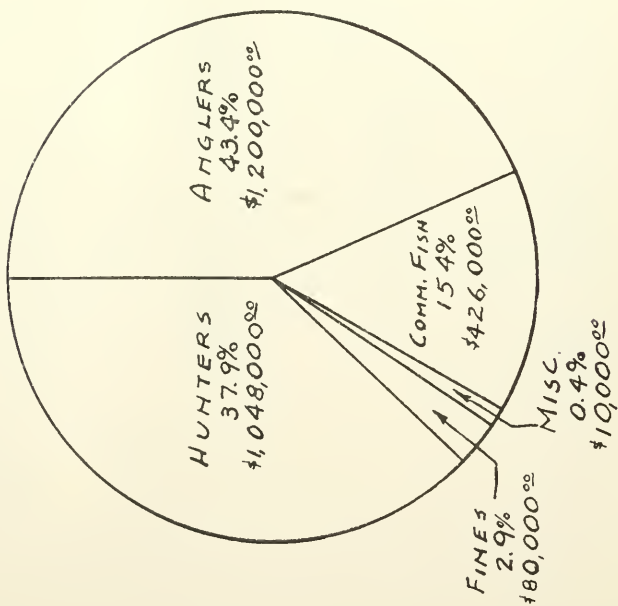
ESTIMATED INCOME  
89<sup>th</sup> FISCAL YEAR  
\$1,343,100<sup>00</sup>



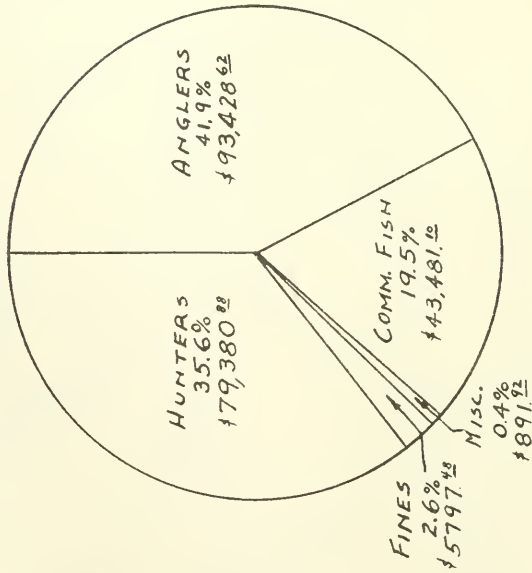
ESTIMATED AVAILABLE FUNDS  
FOR BUDGET PURPOSES  
91<sup>ST</sup> & 92<sup>ND</sup> FISCAL YEARS  
\$3,764,000<sup>00</sup>



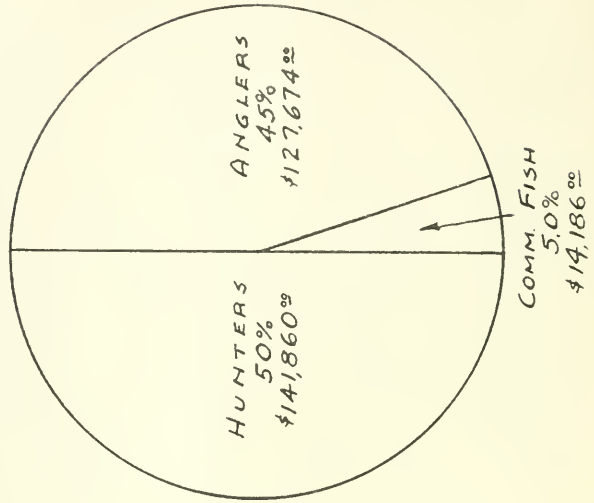
ESTIMATED INCOME  
91<sup>ST</sup> & 92<sup>ND</sup> FISCAL YEARS  
\$2,764,000<sup>00</sup>



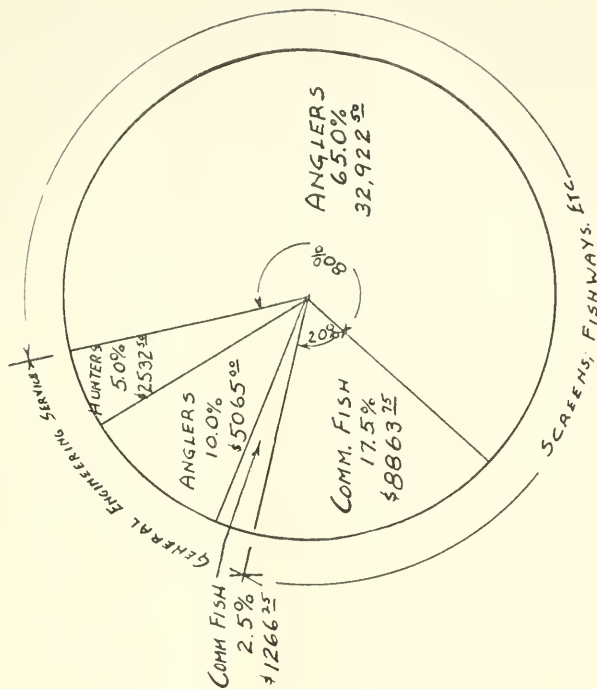
SOURCES OF MONEY  
 91<sup>st</sup> & 92<sup>nd</sup> FISCAL YEARS  
 ADMINISTRATION  
 \$222,980<sup>00</sup>



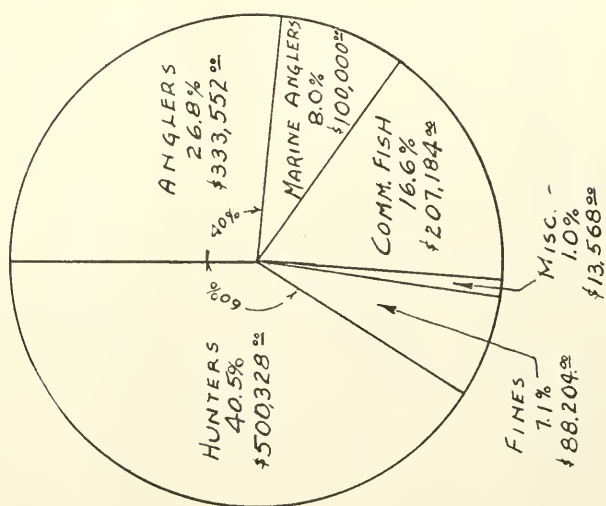
SOURCES OF MONEY  
 91<sup>st</sup> & 92<sup>nd</sup> FISCAL YEARS  
 LICENSE BUREAU  
 \$283,720<sup>00</sup>



SOURCES OF MONEY  
 91<sup>ST</sup> & 92<sup>ND</sup> FISCAL YEARS  
 HYDRAULICS BUREAU  
 \$50,650<sup>00</sup>



SOURCES OF MONEY  
 91<sup>ST</sup> & 92<sup>ND</sup> FISCAL YEARS  
 PATROL BUREAU  
 \$1,242,836<sup>00</sup>



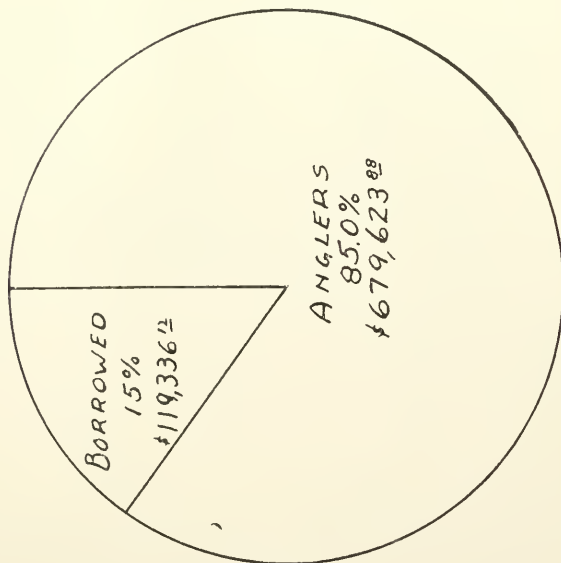
SOURCES OF MONEY  
 91<sup>st</sup> & 92<sup>nd</sup> FISCAL YEARS  
 BUREAU OF GAME FARMS  
 \$144,000<sup>00</sup>



SOURCES OF MONEY  
 91<sup>st</sup> & 92<sup>nd</sup> FISCAL YEARS  
 BUREAU OF GAME CONSERVATION  
 \$288,038<sup>00</sup>



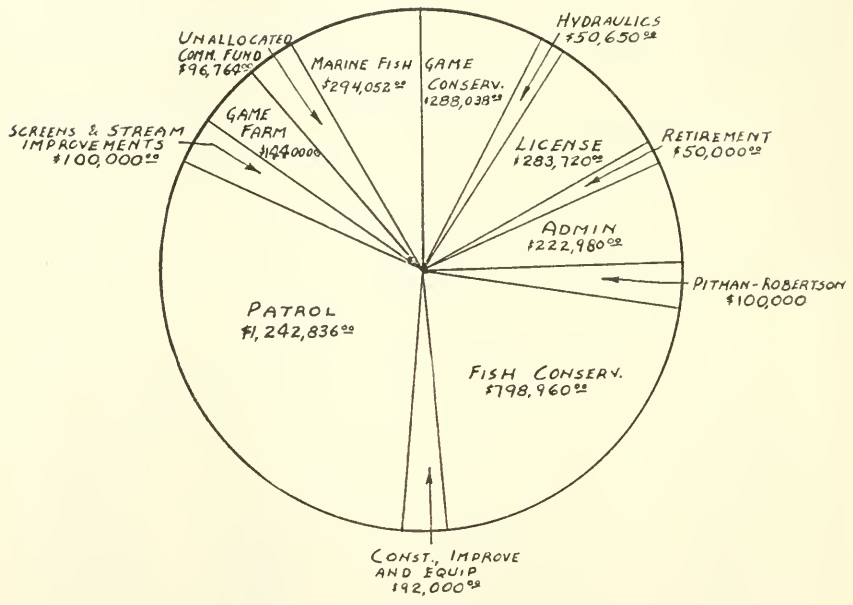
SOURCES OF MONEY  
 91<sup>ST</sup> & 92<sup>ND</sup> FISCAL YEARS  
 BUREAU OF FISH CONSERVATION  
 \$798,960<sup>00</sup>



SOURCES OF MONEY  
 91<sup>ST</sup> & 92<sup>ND</sup> FISCAL YEARS  
 BUREAU OF MARINE FISHERIES  
 \$294,052<sup>00</sup>

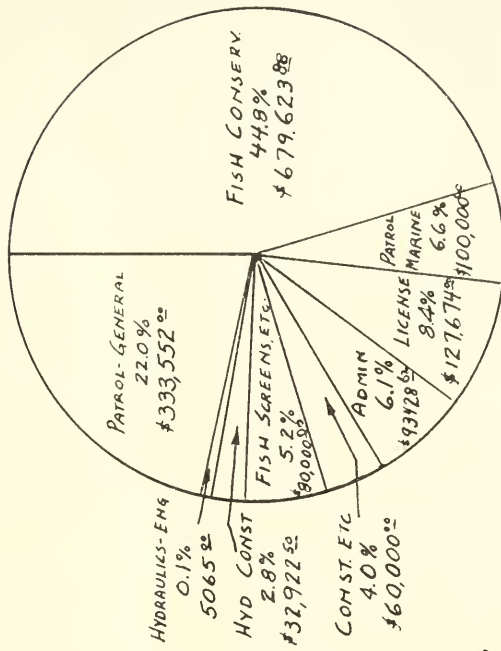


ESTIMATED BUDGET AS ALLOTTED TO VARIOUS FUNCTIONS - 91<sup>ST</sup> & 92<sup>ND</sup> FISCAL YEARS  
\$3,764,000<sup>00</sup>

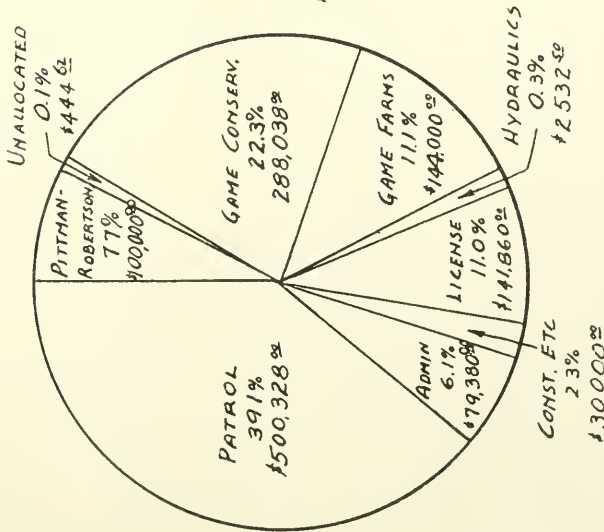




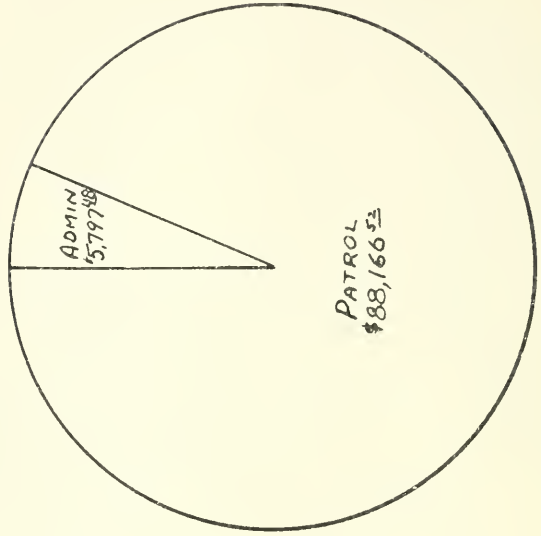
DISPOSITION OF ANGLING  
INCOME BY FUNCTIONS  
91<sup>ST</sup> & 92<sup>ND</sup> FISCAL YEARS  
\$1,514,266.00



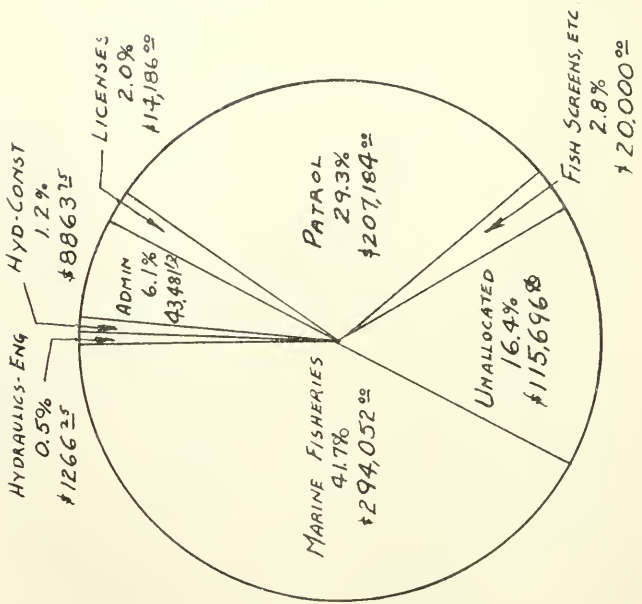
DISPOSITION OF HUNTING  
INCOME BY FUNCTIONS  
91<sup>ST</sup> & 92<sup>ND</sup> FISCAL YEARS  
\$1,286,584.00



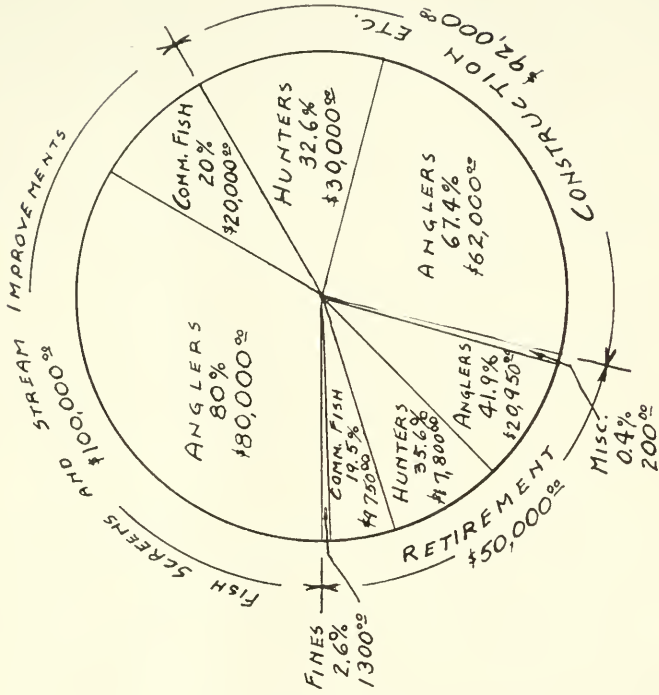
DISPOSITION OF FINES  
BY FUNCTIONS  
91<sup>ST</sup> & 92<sup>ND</sup> FISCAL YEARS  
\$93,964.<sup>00</sup>



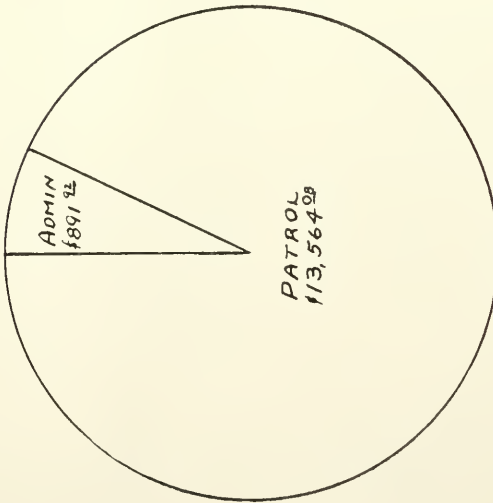
DISPOSITION OF COMM. FISH  
INCOME BY FUNCTIONS  
91<sup>ST</sup> & 92<sup>ND</sup> FISCAL YEARS  
\$704,730.<sup>00</sup>



SOURCES OF MONEY  
FOR SPECIAL ITEMS  
91<sup>ST</sup> & 92<sup>ND</sup> FISCAL YEARS  
\$242,000<sup>00</sup>



DISPOSITION OF MISCELLANEOUS  
INCOME BY FUNCTIONS  
91<sup>ST</sup> & 92<sup>ND</sup> FISCAL YEARS  
\$14,456<sup>00</sup>



A second intricate problem which your honorable board directed the Executive Officer to perfect was a system of recruiting and personnel management to the end that the Fish and Game Commission might have at its command the best possible type of personnel, carefully trained and selected for the purpose of carrying out the fish and game management program essential to the welfare of the State.

The State Personnel Board and the civil service laws of the State made it comparatively easy for us to perfect one of the outstanding recruiting and training systems for fish and game personnel in the United States. A system, by the way, which has attracted national attention and has been studied and complimented by many of the States in the Union.

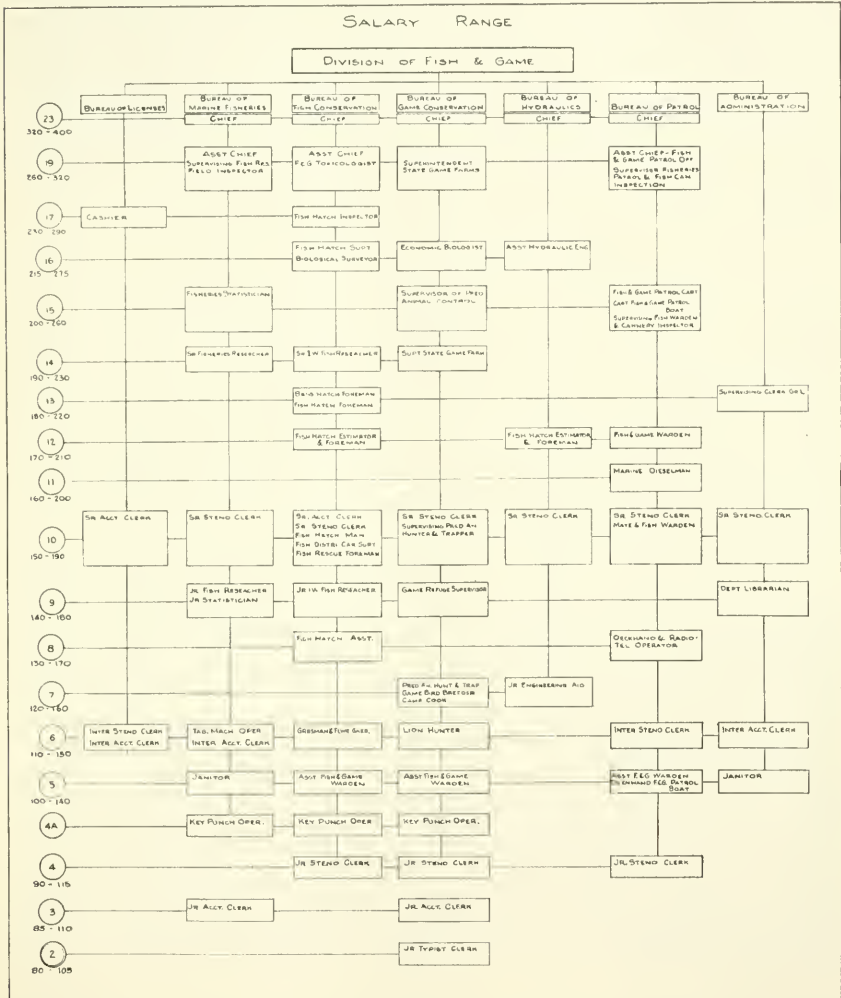
The procedure is comparatively simple. A recruiting grade entitled assistant fish and game warden with specifications broad enough to permit the use of this personnel in all functions of the Division was established. From this grade, a system of promotion was inaugurated making it possible for us to encourage college trained men of high type to enter this recruiting grade with an opportunity for a career as all positions between that of assistant fish and game warden and the chiefs of the various bureaus are filled by promotion from the grades below.

I submit herewith a chart showing all of the positions in the Division together with their salary ranges and a brief glance at this chart will indicate to you just how the personnel management program is worked out. Like the financial charts, this is self-explanatory and I will not attempt to go into detail in this report. *See Chart on page 25.*

May I point out, however, that there are two additional positions needed in order to make the system of promotion uniform and equitable without giving one branch of the service a greater degree of attraction to our recruits than another. The first of these positions is that of junior economic biologist in the Bureau of Game Conservation to fill the gap which you will notice there to provide a position comparable with that of junior fisheries researcher and junior inland water fisheries researcher, a recruiting grade to that of economic biologist which you will note is a higher position. In the Bureau of Patrol there should be established a position of fish and game warden, Grade I to fill the gap between assistant fish and game warden and fish and game warden. You will note that the maximum salary for assistant fish and game warden is \$140 per month, whereas the minimum salary of warden is \$170 per month. There should be an intermediate grade corresponding with that of supervising trapper and fish hatcheryman in other bureaus so that promotion may be uniform.

I think one of the most outstanding accomplishments during the biennium is the establishment and development of the California Junior Game Patrol. This has attracted wide attention in the State and much favorable comment. It is essentially an organization of young men of an average age of 15 to 16 who have been uniformed and officially recognized by the Fish and Game Commission. They are organized into units known as troops for the purpose of teaching them the principals of conservation, the art of fishing and hunting, the game laws of the State and reasons for them to the end that when these boys reach maturity they will be law abiding citizens having full appreciation of the principals of conservation and the necessity for it.

We believe that this training will in time eliminate much of the expense that the Fish and Game Commission carries in law enforcement work. We anticipate, and this is based on experience in other juvenile organizations, that it will not be necessary to employ officers to watch and protect the game from these men when they become the adult citizens of the State.



We are reprinting as a part of the report of the Bureau of Patrol an article which was published in CALIFORNIA FISH AND GAME on the organization of the Junior Game Patrol. I respectfully refer you to this article for details of the organization.

The fourth matter which you directed the Executive Officer to perfect was an organization within the Bureau of Game Conservation to handle a greatly expanded program of predatory animal control. This has been done. The details of this work will be found in the

report of the Bureau of Game Conservation and I will therefore not report it in detail here.

In organizing this work and carrying it forward during the last two years, something has developed which was not foreseen. This something has turned out to be a spirit of harmony and cooperation between the Fish and Game Commission and the live stock interests of the State which heretofore had never existed. In fact, over a period of years a definite degree of animosity had developed between the Commission and the live stock group as each was definitely in competition with the other on the utilization of the range and the installation of our predatory animal control system has brought us together. This is so pronounced that the Fish and Game Commission has consistently during the last couple of years been paid many compliments by the cattlemen and the wool growers of the State in their various publications over the work that we have done.

Most important of all in my opinion is that this was the first step toward a farmer-sportsman agreement which could ultimately develop into the dual usage of much of the land that is now of no use to the Fish and Game Commission nor to the sportsmen for propagating and utilizing game birds and mammals. May I suggest that the Commission grasp this opportunity that has been offered to carry forward the cooperation that we have developed and expanded into these various other fields believing that by so doing we can not only avail ourselves of 10 or 15 per cent of additional range land for both birds and mammals for the use and benefit of the sportsmen, but also that this usage may be turned to some financial benefit to the landowner and agriculturist.

Your Executive Officer, together with the staff of the Division, respectfully submits for your consideration the possibility of gaining the consent of the people of the State of California through proper legislation to the establishment of a Fish and Game Commission on staggered terms for the sole purpose of maintaining and continuing in operation the splendid policies for fish and game management that you have laid down for us during the last four years. They are fundamentally sound. We have checked them against policies in operation in other States of the Union, we have results to show for them, and we believe that a continuous production of fish and game in California can be maintained under this program as it is one that is far reaching and anticipated conditions over a long period of years rather than just a day to day or year to year policy. As we, the employees of the Commission, see it, a smooth, continuous administration of these policies would be of the greatest benefit to the fish and game and the people of the State.

#### LIBRARY

We believe this period has been a satisfactory one. Although during the latter half thereof, we have been greatly handicapped by lack of adequate working space, and the difficulty in utilizing much of our material, we are glad to report progress in the circulation and service, especially that to our employees, the principal objectives toward which this library is constantly striving. We are quite unwilling, however, to estimate the library's usefulness by means of loans or attendance. Many of our assets are intangible and a great

portion of the librarian's time is spent in hunting references and giving other assistance.

The library, with its limited budget, depends to a large extent for its growth on its exchanges and gifts with and from other scientific and educational institutions. It is a pleasure to note that of the 483 bound volumes acquired during this period, 202 represent gifts. Likewise of the 140 periodicals regularly received, 102 are on the exchange or free basis.

The record of bound volumes at the end of this period number 2250, with a valuation of \$8,004.48. Scientific and other pamphlets on record number 5657, with a value of \$908.79. Of these 770 were received during this period.

Considerable binding of back issues of periodicals was continued under a WPA project, which unfortunately, due to a governmental ruling on one-man projects, was terminated April, 1938. A large amount of binding still remains to be done, and hundreds of pamphlets are yet to be accessioned and made available.

Through the listing of the library's periodical inventory with the San Francisco Special Libraries Association and embodying same in the publication "Union List of Periodicals," more people are learning that the Division's library has material not to be found elsewhere in this bay area, and consequently many requests are being made for reference to such material. Students of universities and schools continue to use our facilities.

We are grateful to the libraries of the California Academy of Sciences, University of California, United States Forest Service, and our own Terminal Island office for the kind assistance given in lending to us literature, which we already possess, however, but which is not easily available while in storage.

Your Executive Officer desires to express his sincere appreciation and that of the entire personnel of the Division for the firm, fair and kindly treatment and assistance that your honorable board has rendered us during this two-year period.

Respectfully submitted,

HERBERT C. DAVIS,  
Executive Officer.

## REPORT OF THE BUREAU OF FISH CONSERVATION

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By A. C. TAFT, Chief

The present biennium has been the most disastrous in the history of the Bureau as a result of heavy storms in December, 1937, and again in March, 1938, that caused unprecedented damage to hatcheries and egg taking stations. This type of damage was the most obvious but equally important was the actual loss of fish in the streams and the destruction of their food and cover.

This series of storms undoubtedly had serious effects on the fresh-water game fish of California. Practically all streams in the State reached higher stages than have been observed for many years past and in some instances were subjected to torrential flows that seriously altered the streams themselves. This erosion of the stream beds during the storm of December was most harmful to the fall spawning species such as the King salmon and the Loch Leven and Eastern Brook trout, as in many instances nests have been dug out and in others buried under many feet of gravel. The Steelhead runs which were very good this year were aided in reaching the spawning grounds by high and muddy water which made fishing very difficult. Reports on the north coast streams between San Francisco and Eureka indicated that a larger number of fish gained the upper reaches of the streams than have been seen for several years but the successful spawning of these fish is also dependent upon water conditions after the eggs are deposited.

In southern California the recent floods have had very severe effects on the streams and many of them have been changed so as to be scarcely recognizable. Such great amounts of gravel were moved that for many miles the old stream channels have been entirely obliterated. The trees that bordered the streams have been torn out and during the summer there will be less shade to keep the water cool and favorable for trout. In some places it will probably be found that a large portion of the water will flow through the loosened gravel and rocks that have been newly deposited and as a result, the surface flow will be small in amount and high in temperature.

In addition to the loss of fish that are native to the streams, the work of replacement through planting was made much more difficult through the severe damage done by the storms to hatcheries, egg taking stations and the young fish which were being reared in the hatcheries. The total damage was nearly \$100,000 and included the complete destruction of two hatcheries and such serious damage to another that it could not be operated during 1938. Steelhead and Rainbow egg taking stations throughout the State were damaged to varying extents and some of them had to be replaced as many as three times.

The first great loss was the total destruction of the Cold Creek hatchery near Ukiah. This hatchery was situated at the junction of



Cold Creek and the Russian River and obtained its water supply from Cold Creek. On the evening of December 10th the water rose rapidly in the two streams and by 9.30 p.m. it was between three and four feet deep on the hatchery grounds. Shortly thereafter all buildings were swept away. This included the hatchery building with its connected living quarters and 52 troughs, a two car garage and woodshed, a four-room house and a tool house and storage shed. These buildings and the equipment therein were a total loss. The two pickup trucks at the station were taken to higher ground and thus saved but the three employees at the hatchery lost practically all of their personal effects. This hatchery was valued at \$30,000.

Damage at other stations is summarized as follows, in order of importance:

Kings River Hatchery—5000 feet of pipe line destroyed, grounds and buildings damaged. All roads washed out and grounds littered with debris. The water rose above the level of the hatchery floor. The hatchery is still accessible only by temporary road as the roads and bridges have not yet been repaired. It was impossible to operate this hatchery as repairs could not be made in time for the 1938 season's work. Estimated cost of repairs \$10,000.

Kaweah Hatchery—water system completely wrecked, hatchery shifted on its foundation and grounds damaged. Repair work was rushed at this hatchery and it operated during 1938. Cost of repairs was \$4,000.

Burney Creek Hatchery—diversion dam destroyed and part of pipe line washed out, roads damaged. Temporary repairs were made and this hatchery was then put into operation. Estimated cost of complete repairs was \$2,000.

Yosemite Hatchery—damage to pipe line. This hatchery operated on an auxiliary water supply and repairs were made to the pipe line at a cost of \$500.

Mt. Tallac Hatchery—damage to buildings, rearing tanks, diversion dam and pipe line. Cost of repairs \$500.

Yuba River Hatchery—damage to water system. Cost of repairs \$300.

Madera Hatchery—damage to water system and roads. Estimated cost of repairs \$500.

The following egg collecting stations were damaged: Snow Mountain, Klamathon, Shackelford Creek, Shasta River, Domingo Springs, Warner Creek, Chester, Hamilton Branch, Taylor Creek, Lake Eleanor, Kosk Creek and San Lorenzo. Cost of repairs \$7,500.

As a result of the storm damage there was some curtailment in the number of fish produced. The areas served by the Cold Creek and Kings River hatcheries were taken care of as far as possible through other stations. The take of Rainbow eggs was reduced through the fact that two important stations in the Lake Almanor area, one on the Pit River and one at Lake Eleanor, were so badly damaged that they could not be repaired so as to operate during the 1938 season. The number of Rainbow eggs handled was increased as far as possible through purchases.

On March 2d an exceptionally heavy storm in southern California caused the nearly total destruction of the Forest Home Hatchery. This included the total loss of two dwelling houses, the garage and tool room, the food preparation house, two small storage buildings and an open shed which was used for storage of certain heavy equipment. As the culmination of a succession of heavy rain storms and a final series of cloudbursts Mill Creek, upon which the hatchery was situated, rose to such heights that it spread across the entire valley floor and moved great volumes of boulders and gravel. Even small streams such as Lost Man Creek just above the hatchery carried so heavy a load of gravel that it covered the grounds at the Torrey Resort to a depth of many feet.

The loss of the buildings and the destruction of the hatchery was a progressive affair and Mr. Clanton, the superintendent, and his crew apparently made every effort to protect the State property and save the hatchery, even at considerable risk to their own persons. There were five families resident on the property and the women and children were taken to Mr. Clanton's house early during the first day. It is very fortunate, indeed, that no lives were lost. While the men were working in an attempt to save the houses and protect the ponds, Mrs. Clanton removed most of the automotive equipment to the ground surrounding her house and to the highest point of land accessible on the Torrey property. It is probably due to her efforts that all of the trucks and other cars were saved.

The ponds were almost completely obliterated and in some places covered with many feet of heavy boulders and gravel. The hatchery building was damaged and the lower floor was also partly filled with boulders. Mr. Clanton's house was undamaged and served as a refuge for the crew after the other buildings had been destroyed. The bachelor quarters also remained undamaged but is not used as it is still in a dangerous situation due to the change in the creek bed which now flows through a portion of the hatchery grounds.

At the close of the biennium plans were being formulated for replacement of the Cold Creek and Forest Home hatcheries. Delay was unavoidable due to the difficulty of finding satisfactory sites in both of the areas to be served by the new hatcheries.

In southern California these requirements are particularly difficult to meet. In that area it has been the practice to rear approximately 400,000 fish each year to a catchable size before planting. In order to obtain satisfactory growth during the winter months a supply of spring water is essential. Since the old site in Mill Creek was so altered that it would be practically impossible to bring the spring water to a point where it could be used, an entirely new site is being sought.

The water supply at the Cold Creek Hatchery was very unsatisfactory due to pollution and a new site is also under consideration in that area. It is hoped that a large enough supply of water can be found so that the present Fort Seward Hatchery can be dismantled and its operations combined with the new hatchery. The Fort Seward Hatchery was located many years ago when the only transportation was by rail and it was designed to produce small fish for planting very early in the season. By July the water temperatures become extremely high and the flow becomes insufficient for satisfactory opera-

tion. Present day transportation by truck makes it more advantageous to have a hatchery situated with better access to the main highway.

As was indicated by Dr. J. O. Snyder, former chief of the bureau, in his last biennial report the new name, Bureau of Fish Conservation, indicates a wider responsibility than the sole production of fish for planting. This enlarged view of the activities of the bureau has brought an extension of certain types of work.

For a number of years it has become increasingly apparent that there was a serious gap between the production of fish in the hatcheries and the production of fish for the angler's creel. In the early days a large portion of the planting work was done by individuals or groups largely beyond the control or direction of the Division. In many instances the Division had no adequate records of where the fish went, or the results obtained. This condition was, in part, corrected by detailing the work of planting to the wardens but there still remained, however, a certain lack of coordination and the division of responsibility was unsatisfactory.

Starting in 1936 the planting work was designated as the responsibility of the Bureau of Fish Conservation. The men who had put in long months in rearing the fish were given an opportunity to see that the results of their work depended upon the care that was given in planting them. The practice of filling applications for fish from private individuals and groups was discontinued at the same time.

Direction of planting work was placed in the hands of a single individual of wide experience and under his direction the fish planting is done by the men at the hatcheries or by organized planting crews. Specialized equipment in the form of aerated tank trucks and pickups was obtained and the use of the railway fish cars was discontinued in 1937. Starting in 1938 most shipments of fish by pack train were accompanied by employees of the bureau in order to see that the fish were given proper care enroute and that they were delivered to the waters for which they had been allotted. Certain details of organization and technique still offer opportunity for improvement but the progress made during the last two years is very gratifying.

The work still suffers from the lack of knowledge as to what happens after the fish are planted. Even after the fish are delivered to the stream or lake it still remains largely a matter of chance whether the final results to be obtained will be satisfactory. To most sportsmen it seems that the size of the fish planted is the chief determining factor. Experience both in California and elsewhere has demonstrated that there can be many other reasons for the relative success in maintaining the productivity of a given body of water which either singly or cumulatively may be of equal importance.

The men concerned with the rearing and planting of fish from the hatcheries have accumulated a great fund of practical information which forms the basis upon which most of the work is now done. Their work, however, leaves them little time for the more detailed study and accumulation of knowledge which would make further progress possible.

As a step toward the solution of this difficulty a new type of work was initiated by the Bureau and some others have been expanded. During the two preceding bienniums the Division has had a cooperative arrangement with the U. S. Bureau of Fisheries whereby an

organization was set up called the California Trout Investigations. Two experienced fisheries biologists were assigned by the federal bureau for work in California and two trained men were supplied by the Division. Much effective work has been accomplished by this group that will be of both immediate and future value to the Division. However, with the extension of various federal activities in California such as the Central Valleys project, the proposed debris dams on the Yuba and American rivers and the growing interest of the U. S. Forest Service in fish and game, increasing demands were made upon the U. S. Bureau of Fisheries for technical assistance and advice. It was, therefore, mutually decided by them and the Division that it would be best if the cooperative work could be carried on under a less formal arrangement.

There was an additional belief on the part of the Division that this type of work in the Bureau of Fish Conservation justified its being more firmly established through the employment of permanent personnel who would give increasingly valuable service through the accumulation of experience and work under the direct supervision of the Division.

Early in 1938, therefore, two senior fisheries biologists and one junior biologist were employed by the Bureau. These trained men, together with two others formerly employed in other work and one who had been assigned to the trout investigations, were assigned to carry on the survey and biological work.

As a basis for organizing their work the State was divided into seven districts. Biologists were then detailed for work in five of these in which the need for this type of work seemed most pressing. District 1, comprising the Central Valleys area below an elevation of 2500 feet, was placed in charge of Merrill Brown, who also has charge of the small mouth bass hatchery and fish rescue work, with headquarters at the new Central Valleys Hatchery. District 2, including the drainages of the upper Sacramento, the McCloud, Pit and Feather rivers, was assigned to J. H. Wales, with headquarters at the Mt. Shasta Hatchery. District 3, in turn, included the Yuba, American, Stanislaus, Tuolumne, Merced and Truckee drainages, in charge of Brian Curtis, with headquarters in Sacramento. District 4 includes all streams from the San Joaquin to the Kern, inclusive, and is to be covered by William Dill with headquarters in Fresno. In Sacramento we have been very fortunate in that the Sacramento Junior College has kindly consented to supply laboratory quarters and in Fresno arrangements have been made for similar facilities through the cordial cooperation of the Fresno State College. District 5 includes all of the coastal Steelhead and salmon streams and has been placed in charge of Leo Shapovalov, with headquarters at Stanford University. The university has cooperated to the fullest extent through furnishing laboratory quarters both for the Cooperative Trout Investigations and to other fisheries biologists in the employ of the Division.

It will be the first duty of these biologists to assemble and bring up to date the planting and stream survey records for their districts. In addition, they will immediately start work on a detailed study of certain problem waters in each area. During the present year, 1938, a thorough study is being made of the Eel, McCloud and Kern rivers and of the lakes in the Desolation Valley region. Since one of the

greatest present problems is the maintenance of suitable environment for fishes as a result of encroaching civilization they will be called upon to supply much of the necessary biological information for the Division's programs for pollution control and check dam, fish ladder and fish screen construction.

Furthermore, each man has been assigned a special project of statewide importance to be carried on over a period of years. These special projects include fish disease studies and their application to hatchery operation, analysis of sport catch statistics, study of the environmental relationship of trout and other fishes and the continuation of the Steelhead and salmon studies with emphasis on the completion of the Waddell Creek work.

The pollution control work which is growing of greater importance in fisheries work with the further development of the State is handled as a joint operation of this Bureau and the Bureau of Patrol. This detail is under the direction of Paul A. Shaw and a separate report is made upon it by him. Too great an emphasis can not be made on the importance of this work to fish conservation. Mr. Shaw has also rendered great service to the Bureau during the biennium in carrying on chemical work in connection with hatchery operations.

The following table indicates the hatchery units that were in operation or partial operation during the three years or portions thereof that are included within the biennium.

TABLE I—HATCHERIES

| 1936            | 1937            | 1938            |
|-----------------|-----------------|-----------------|
| Alpine          | Alpine          | Alpine          |
| Basin Creek     | Basin Creek     | Basin Creek     |
| Big Creek       | Big Creek       | Big Creek       |
| Blackwood       | Blackwood       | Brookdale       |
| Brookdale       | Brookdale       | Burney Creek    |
| Burney Creek    | Burney Creek    | Central Valleys |
| Cold Creek      | Central Valleys | Fall Creek      |
| Domingo Springs | Cold Creek      | Feather River   |
| Fall Creek      | Fall Creek      | Fern Creek      |
| Feather River   | Feather River   | Forest Home     |
| Fern Creek      | Fern Creek      | Fort Seward     |
| Forest Home     | Forest Home     | Hot Creek       |
| Fort Seward     | Fort Seward     | Huntington Lake |
| Hot Creek       | Hot Creek       | Kaweah          |
| Huntington Lake | Huntington Lake | Lake Almanor    |
| Kaweah          | Kaweah          | Madera          |
| Kings River     | Kings River     | Mt. Shasta      |
| Lake Almanor    | Lake Almanor    | Mt. Shasta      |
| Madera          | Madera          | Experimental    |
| Mt. Shasta      | Mt. Shasta      | Mt. Tallac      |
| Mt. Shasta      | Mt. Shasta      | Mt. Whitney     |
| Experimental    | Experimental    | Prairie Creek   |
| Mt. Tallac      | Mt. Tallac      | Tahoe           |
| Mt. Whitney     | Mt. Whitney     | Yosemite        |
| Prairie Creek   | Prairie Creek   | Yuba River      |
| Tahoe           | Tahoe           | Snow Mountain   |
| Yosemite        | Yosemite        |                 |
| Yuba River      | Yuba River      |                 |

The reduction in the number of hatcheries operated during 1938 was in large part the result of the storm damage previously recounted, one exception being the Blackwood Tanks. This plant consists of 12

rearing tanks housed in a frame building. It was originally planned to be used for the rearing of Steelhead transferred from the Tallac Hatchery. Experience over a period of several years has demonstrated that early summer temperatures in Blackwood Creek are too low to make it suitable for this purpose. It is, therefore, planned to move this station to a more suitable site in the near future.

In Table II is shown the various egg taking stations operated during the three seasons covered by the biennium and it will be noted that two new stations have been added, Carmen Lake, Mono County, and Pasadena Reservoir. Both of these stations were operated on a trial basis and it was found that a very satisfactory number of Eastern Brook eggs could be obtained at Carmen Lake. At Pasadena work was not successful due to extremely high water in the San Gabriel River. Since this reservoir is closed to fishing by the city of Pasadena, a further effort will be made to develop it as a source of Rainbow eggs for southern California.

TABLE II—EGG COLLECTING STATIONS

| 1936                | 1937                   | 1938                   |
|---------------------|------------------------|------------------------|
| Arrowhead Lake      | Bear Lake              | Bear Lake              |
| Bear Lake           | Beaver Creek           | Blue Lake              |
| Beaver Creek        | Blue Lake              | Bogus Creek            |
| Blue Lake           | Bogus Creek            | Carmen Lake            |
| Bogus Creek         | Domingo Springs        | Clear Creek            |
| Cottonwood Lakes    | Fall Creek             | Cottonwood Lakes       |
| Deep Creek          | Forest Home            | Deep Creek             |
| Domingo Springs     | Gull Lake              | Fall Creek             |
| Fall Creek          | Hamilton Branch        | Gull Lake              |
| Forest Home         | Hobart Creek Reservoir | June Lake              |
| Friant Bass Ponds   | Hornbrook              | Hobart Creek Reservoir |
| Gull Lake           | Hot Creek Ponds        | Hornbrook              |
| Hamilton Branch     | June Lake              | Hot Creek Ponds        |
| Hornbrook           | Klamathon              | Klamathon              |
| June Lake           | Kosk Creek             | Little Walker Lake     |
| Klamathon           | Lake Eleanor           | Marlette Lake          |
| Lake Eleanor        | Little Walker Lake     | Mt. Shasta Ponds       |
| Little Walker Lake  | Marlette Lake          | Mt. Whitney Ponds      |
| Marlette Lake       | Mt. Shasta Ponds       | Mud Creek              |
| Mt. Shasta Ponds    | Mt. Whitney Ponds      | Prairie Creek          |
| Mt. Whitney Ponds   | Mud Creek              | Rush Creek             |
| Mud Creek           | Prairie Creek          | San Lorenzo River      |
| Prairie Creek       | Rush Creek             | Scott Creek            |
| Rush Creek          | San Lorenzo River      | Shackleford Creek      |
| San Lorenzo River   | Scott Creek            | Shasta River           |
| Scott Creek         | Shackleford Creek      | Snow Mountain          |
| Shackleford Creek   | Shasta Dam             | Upper Truckee River    |
| Shasta Dam          | Snow Mountain          | Warner Creek           |
| Snow Mountain       | Taylor Creek           | Pasadena Reservoir     |
| Taylor Creek        | Upper Truckee River    |                        |
| Upper Truckee River | Warner Creek           |                        |
| Warner Creek        |                        |                        |

All of the following stations were damaged by high water in 1938 and, with the exception of Lake Eleanor, no plans have as yet been made for replacing them: Lake Eleanor, Kosk Creek, Hamilton Branch, Domingo Springs. The Beaver Creek station in the Klamath area has also been abandoned due to the fact that the terms of the lease did not permit of satisfactory operation.

The Bureau is still in need of a larger supply of Rainbow eggs and definite steps have been taken to increase the number of this species reared and to reduce the number of Loch Leven. During the summer of 1937 thirty thousand Rainbow fingerlings were transferred from the Hot Creek ponds to Mt. Shasta and they have grown exceptionally well. These fish were derived from fall spawning stock and will undoubtedly make a valuable addition to the number of Rainbow eggs available in 1939. The supply of this species during the past two years has also been augmented by increased purchases from private dealers.

During 1937 the rebuilt Prairie Creek and Basin Creek hatcheries were put into full operation. The Central Valleys small mouth bass hatchery and fish rescue headquarters were put into partial operation. This station, although still under construction by the Works Progress Administration, at the end of the biennium operated at nearly full capacity. The small mouth bass produced are being planted in certain selected localities with a view to determining the possibility of establishing these fish.

The construction of the Central Valleys Hatchery has also made possible an expansion of the fish rescue work in the valley area. During 1937 four crews were operated and a total of 11,500,000 fish were obtained. During 1938 this work was further increased by the addition of two more crews. A detailed list of the fish saved during 1937 will be found in the statistical appendix.

One fish rescue crew was also used in the salvage of trout and salmon in Del Norte and Humboldt counties. It is hoped that it will be possible to extend the fish rescue work in the north coast area during the coming biennium.

## REPORT OF THE BUREAU OF GAME CONSERVATION

By J. S. HUNTER, Chief

The biennium for July 1, 1936-June 30, 1938, was particularly noteworthy for the unusual climatic conditions that prevailed throughout the State. The fall and early winter of 1936 was generally warm with scant rainfall. December turned cold and with copious rains well above normal. The early months of 1937 were particularly cold and at higher elevation the snowfall heavy. In the northeastern part of the State, the thermometer recorded the lowest temperature ever experienced reaching more than 40 degrees below zero. Excessive cold prevailed throughout the entire mountain areas.

The very low temperatures and heavy snowfall caused considerable loss of game. The antelope herd wintering in eastern Lassen and across the line in Nevada was severely hit. Survey of winter areas made from air and on the ground gave reason to believe that the loss may have been as high as 25 per cent. Mule deer had a hard time also, but suffered nowhere near as badly as antelope.

The fall of 1937 also opened warm and dry; especially so in the southern part of the State. November brought heavy rains in the north, but the south experienced the driest condition on record until unprecedented storms in the spring months. Temperatures were high, seldom reaching zero where previous winters 40 degrees below was not uncommon.

The abundant rainfall with good growing temperatures has resulted in the best feed conditions for many years. Many of the lakes and marsh areas in the high plateau sections that have been dry, or practically so, are now restored. Areas believed destroyed by overgrazing are now in good condition showing that the overgrazed condition was brought about probably as much from underwatering as from any other cause.

Tulare Lake at the end of June, 1938, had more than 200 square miles of surface, Buena Vista more than 50. Honey Lake filled to practically a maximum level and covered more than 100 square miles. Goose Lake is nearly three-fourths full. Even in the extreme dry portions of the State bordering Death Valley, the springs are unusually strong—enough flow to carry water a considerable distance from its source. All of these improved water conditions have brought about better game environment and if it is true that we are entering a cycle of normal or better than normal rainfall, we can look into the future with hope and optimism.

The waterfowl situation in California is by no means satisfactory to anyone. The policy of the Federal authorities in not fixing a definite date for the opening of the duck and goose season has resulted in much criticism by those still interested in hunting of waterfowl.



During the past seven years, the opening date has varied from October 20th to November 27th and this year October 15th. Only in the years 1932 and 1933 was the opening date the same—November 1st.

The first ducks from the north reach our State in late July or early August. In the Imperial the arrival date is usually the second week in August. It is decidedly to the advantage of the birds to have water conditions satisfactory on the only marsh areas left, the duck hunting grounds, when the birds arrive. As long as there is uncertainty as to the opening of the season; in fact, as to whether there will be any season at all, there will be irregularity in water conditions, most marshes will be dry. Rains can not be depended upon. Water in California must be bought or pumped. With the opening date in question, few landowners are willing to go to the expense of putting water on their land until well after the early flight has passed.

There is also dissatisfaction as to the 7 a.m. opening hour. With the sun rising approximately a minute later each day, there is so much daylight time between sunrise and 7 a.m. in October that the average duck hunter can not resist the temptation to shoot ahead of time. A violator of this provision of the law is particularly difficult to apprehend. The arresting officer must be in a most favorable spot if he is to swear to a complaint. The general result is criticism of the officer and a general disregard for the law by unattached shooters.

It can be definitely said that there has been an increase in the number of ducks in the past few years. This has been particularly so with nesting conditions during the last two seasons. More ducks nested in California during the spring of 1938 than for many years. California waterfowl refuges have certainly been a factor in increasing waterfowl. When these areas were set aside, there was scarcely an acre of open water where a duck could find security. Millions of birds have taken advantage of the refuge areas and have survived the barrage of duck shot. These are the birds that provide the future crop for the hunter.

Elk are still a problem in California. A few years ago, enthusiastic citizens in Owens Valley, believing that a herd of elk would be an added attraction, prevailed upon the National Park Service and our Commission to move the Yosemite herd of elk and others from the State Elk Refuge in Kern County to the Owens Valley. The new home proved entirely satisfactory to the elk and the numbers have increased. Now with the change in the agricultural policy of the Valley, many are wondering if the animals were so much of an asset. It will probably be necessary for some agency to construct a fence to prevent damage to cultivated crops.

The California elk on the Kern Refuge have had an average increase of 22 for the past two years. On this refuge, we had a rather strenuous time during high water conditions both in 1937 and 1938. By the construction of a levee around the adobe headquarter's house and the installation of pumps to take care of seepage water, we were able to save this house from destruction and comparatively little damage was done. It was also necessary to keep the elk from flooded areas. On account of the high water, feed conditions on this refuge have been particularly good and it has not been necessary to purchase feed.

### GAME FARMS

During the past two years the production and distribution of game birds from our two game farms has been materially increased over previous bienniums.

The main factor in this increased production and distribution is further development of the holding pen program. At the close of the previous biennium we were serving 750 pens. During the present biennium this number was increased to 987. Many more clubs have become interested and constructed units of rearing pens in their locality.

Another factor in this increased production and distribution is the fact that several clubs that were operating holding pens have added brooding facilities as well. At both Fresno and Redding, where the Division of Fish and Game has units of 48 or more pens, 24 colony type electric brooders have been added to this equipment. In addition to the projects at Fresno and Redding, the Livermore, Dixon, Eureka, Petaluma, Cloverdale, Grass Valley and Lake County Wildlife Association added electric brooders to their equipment. These extra brooders gave us an additional output as we had the incubating capacity to supply this extra number of birds. Birds for these brooding units are hatched at our Game Farms and transported to the various units as day old chicks. With this added equipment, the production of the present biennium was increased from 64,573 to 81,934 birds of all kinds.

Another factor that has helped to increase the production of birds in the wild is the interest that various clubs have shown in providing closed areas into which birds from their holding pens are released. These closed areas provide a protected home where the birds may adjust themselves to their new environment and reproduce according to their own particular habits.

When a closed area is formed it is usually for a period of three years, and a planting of birds is made in this area each year. When a closed area is formed and receives a plant of birds each year, it will insure a sufficient number of birds to cause an overflow into adjoining properties where public shooting is permitted.

With a sufficient number of protected areas, with regular yearly plantings, a regular level of shooting is possible annually. In many cases the areas are closed for an indefinite period as it has been found advisable to continue them in order to keep the bird population of the closed area and adjoining territory at a sufficient level to warrant good shooting each season.

Still another means of using closed areas to improve shooting conditions has been experimented with in southern California during the past two years—the trapping of wild quail from refuges for the purpose of stocking depleted areas. It has long been our contention that quail may be reared more successfully under natural conditions than on the game farm, particularly when a proper balance of food, water and cover is maintained. In some States—New Mexico in particular—it has already been demonstrated that areas that have been depleted may be successfully repopulated with wild trapped birds. We see no reason why California should not make use of properly con-

trolled natural propagation to supplement the production of its game farms, particularly where native species are concerned.

A limited quail trapping program was carried on in the fall of 1937. Less than one thousand birds were trapped and reliberated in selected areas, all birds being banded with State bands so that it will be possible to follow their movements and get some idea concerning the percentage of kill during the open season. The trapping program will be prosecuted with the utmost vigor during the 1938 and 1939 seasons and we feel sure that by the end of the next biennium it will have become a permanent and valuable part of our game bird propagation set-up.

Believing that the experimental work on Chukar Partridges during the past five or six years justifies increased production and distribution, we have added more mating pens and increased the breeding stock several fold at both Game Farms.

Reports from various sections of the State where these birds have been liberated in the past five or six years seem to indicate that the birds are taking hold and multiplying well in the wild state. It is felt that this bird will fill a vacant niche in the upland game bird program of California.

These birds seem well suited for arid regions and for that reason there is justification for increased production and distribution of these fine game birds.

Due to the popularity of the bird with the average sportsmen, pressure is being continually brought to bear on the farms to produce more of these birds.

Shortly after the opening of the pheasant shooting season a few years ago, it became apparent to upland game bird shooters that a hunting dog was absolutely necessary for good field sport.

In the past three years the breeding of hunting dogs has become a real business. Activity along this line is best reflected in the number and quality of field trials held in various parts of the State. Believing that the use of hunting dogs is a real conservation measure we have, to some extent, advocated the breeding of dogs and holding of field trials. To this end, we have agreed to furnish and handle the birds for five major trials during the year. Two of these trials are held in the south and three in the northern part of the State. Each year the number of dogs participating in these field trials has increased.

Dog owners from Oregon, Washington and Idaho have participated in many of these trials, especially during the last two years. There is no question that the use of hunting dogs is a real conservation measure. Not only does the use of hunting dogs save time for the hunter, but they also more than pay for their upkeep by retrieving crippled birds that would otherwise be lost.

The following table shows the egg production and general distribution of birds for the biennium.

|                        | <i>Eggs<br/>laid</i> | <i>Eggs<br/>distributed</i> | <i>Birds<br/>liberated</i> |
|------------------------|----------------------|-----------------------------|----------------------------|
| Ring-necked Pheasant,  |                      |                             |                            |
| Mongolian Pheasant and |                      |                             |                            |
| Reeves Pheasant -----  | 166,096              | 27,304                      | 49,843                     |
| Partridges -----       | 25,797               | -----                       | 4,941                      |
| Quail -----            | 90,399               | 11,151                      | 27,150                     |

During the past two years the Los Serranos Game Farm has had to contend with a serious problem in the form of quail disease. The disease has been responsible for a high rate of mortality among both mature breeders and young birds and the annual production of quail has been greatly reduced in consequence. An investigation of the nature of the disease and possible means of control is being carried on in cooperation with the University of California and other agencies. The experimental vaccination of a number of birds during the 1938 season did not yield the expected results and it will be necessary to devise some more effective treatment if the large scale production of valley quail is to continue at Chino. Chukar partridges and other species of game birds reared at Chino have not been affected by this disease.

The California valley quail is not only subject to disease when confined on the game farm, and it has been demonstrated on several occasions that wild birds also suffer from maladies which are frequently responsible for the decimation of coveys over considerable areas. It is when we are faced with conditions of this kind that we realize how pitifully meager is the information that we have relative to disease among wild game species. The outbreak of quail disease at Chino brings home to us again the crying need for a disease research laboratory which will provide us with the knowledge that we must have if we are to successfully combat these epidemics.

AUGUST BADE, *Superintendent,*  
Game Farms of California,  
Yountville, California.

#### PREDATORY ANIMAL CONTROL

During the month of July, 1936, an entirely new principle was injected into the Division's Predatory Animal Control organization. Before entering into a detailed discussion of this new departure from the old scheme of things, however, it will be well to briefly summarize the history of the Division's Predatory Animal Control Program—exclusive of lion hunting—from the time of its inception up to the beginning of the present biennium.

Although this Division has been engaged in the control of mountain lions for many years, it was not until January, 1932, that an organized trapping campaign was launched for the purpose of controlling coyotes, bobcats, and other predators. At this time nine trappers were employed to control predatory species within the boundaries of State game refuges and in other game concentration areas. The staff of trappers was maintained at this level until June 30, 1933, when—due to the lack of funds—the number of men was reduced to four. Shortly after this, the addition of one more man was made possible and this group of five constituted the Division's entire trapping force up to July 1, 1936.

All of the trappers who were employed during these first few years were drafted from the ranks of experienced trappers who had learned their business trapping for fur and bounty in various parts of California. Not one of them had received any formal instruction in predatory animal control methods; their only training being that

which is acquired in the school of practical experience. They had varying degrees of ability and when it became necessary to reduce the number of men in 1933 the most efficient were, of course, retained. The group of five trappers who remained on the payroll represented the cream of this crop and became the firm foundation on which it was possible to begin the construction of a new predatory animal control organization.

It was at this time—July, 1936—that it became necessary to materially increase the Division's Predatory Animal Control activities—necessary, due to the fact that the Legislature had set aside the sum of \$80,000 to be spent solely for the control of predators during the 87th and 88th fiscal years. It was at this same time that the Fish and Game Commission decided that the Division should have its own trappers rather than to rely on the selection of experienced men from the ranks of the commercial hunters. This departure from the established way of doing things has resulted in the development of a predatory animal control force of which the State of California may well be proud—and following is the manner in which it has been accomplished.

The first step in the development of this new organization was the division of the State into five predatory animal control districts: the northeastern California, the north coast, the southern Sierra, the south coast and the southern California districts. Each of the five men who comprised the predatory animal control force at this time was placed in charge of one of these districts and to each of these supervising trappers—as they are now called—was assigned a group of young men for training. These young men, most of them in their early twenties, were recruited from the ranks of the assistant fish and game wardens, the apprentice grade from which this Division draws most of its permanent personnel. Except in a few cases none of these men had received any training in predatory animal control methods prior to the time that he was assigned to this work.

This training program has continued for a period of two years and during that time a total of forty assistant wardens have been instructed in the art of trapping predatory animals. Most of them—contrary to expectations—have shown an extraordinary amount of aptitude for this work and have turned in very creditable records during their various terms of service. There has been, of course, considerable variation in the catches of the student trappers, but the man's catch record should by no means be the yardstick by which his ability is measured. A low or a high catch record is just as frequently a measure of the coyote or bobcat population as it is a measure of efficiency of the trapper. Following table gives the catch of coyotes, bobcats and other predators in each county of the State during each year of the biennium. It will be noted that the catch during the second year is far greater than that for the first year of operation of the new program. This remarkable increase is due, not only to the progressive increase in efficiency of the trapping force, but to the gradual improvement in equipment and in methods of instruction as well. Further, more men received training during the last half of the biennial period covered by this report.

During the year beginning July 1, 1936, and ending June 30, 1937, the average number of trappers employed was 12 men per month. These men ran a total of 67,960 miles of trap line and made

86,381 day sets—an average of 5661 miles of trapline and 7198 day sets per man. During this next year, ending June 30, 1938, an average of 19 men per month was employed, 137,696 miles of trap line were run and 179,406 day sets were made. The average miles of trap line per man was 7247. Each man made an average of 9442 day sets. Most of the trap lines set out by student trappers are run on foot which accounts for a low daily average length of trap line of less than twenty miles per day for student trappers.

PREDATORY ANIMAL CATCH BY COUNTIES

| County          | July 1, 1936, to June 30, 1937 |        |                 |       | July 1, 1937 to June 30, 1938 |        |                 |       | Total for biennium |
|-----------------|--------------------------------|--------|-----------------|-------|-------------------------------|--------|-----------------|-------|--------------------|
|                 | Coyote                         | Bobcat | Other predators | Total | Coyote                        | Bobcat | Other predators | Total |                    |
| Butte           |                                |        |                 |       | 26                            | 15     | 190             | 231   | 231                |
| El Dorado       | 12                             |        |                 | 12    | 15                            | 3      | 13              | 31    | 43                 |
| Fresno          |                                |        |                 |       | 63                            | 44     | 136             | 243   | 243                |
| Glenn           | 10                             | 19     | 13              | 42    | 24                            | 35     | 5               | 64    | 106                |
| Humboldt        | 42                             | 93     | 42              | 177   | 9                             | 142    | 64              | 215   | 392                |
| Inyo            | 16                             |        | 16              | 32    | 170                           | 8      | 52              | 230   | 262                |
| Kern            | 11                             | 10     |                 | 21    | 100                           | 78     | 8               | 186   | 207                |
| Lassen          | 45                             | 5      | 25              | 75    | 51                            | 4      | 7               | 62    | 137                |
| Los Angeles     |                                |        |                 |       | 28                            | 1      | 10              | 39    | 39                 |
| Mariposa        | 26                             | 4      |                 | 30    | 26                            | 4      | 37              | 67    | 97                 |
| Merced          |                                |        |                 |       | 16                            | 1      | 66              | 83    | 83                 |
| Modoc           | 4                              | 2      | 2               | 8     | 47                            | 3      | 11              | 61    | 69                 |
| Monterey        | 7                              | 5      | 11              | 23    | 71                            | 64     | 81              | 216   | 239                |
| Napa            |                                |        |                 |       | 10                            | 51     | 31              | 92    | 92                 |
| Plumas          |                                |        |                 |       | 3                             |        | 1               | 4     | 4                  |
| Riverside       | 16                             | 3      | 2               | 21    | 98                            | 11     | 37              | 76    | 97                 |
| San Benito      | 245                            | 77     | 90              | 412   | 23                            | 7      | 19              | 49    | 461                |
| San Bernardino  | 33                             | 4      | 21              | 58    | 217                           | 17     | 55              | 289   | 347                |
| San Diego       | 39                             | 7      | 66              | 112   | 185                           | 57     | 126             | 368   | 480                |
| San Luis Obispo | 44                             | 45     | 49              | 138   |                               |        |                 |       | 138                |
| Santa Barbara   |                                |        |                 |       | 92                            | 18     | 99              | 209   | 209                |
| Santa Clara     |                                |        |                 |       | 47                            | 23     | 39              | 109   | 109                |
| Shasta          |                                |        |                 |       | 16                            | 10     | 6               | 32    | 32                 |
| Siskiyou        |                                |        |                 |       | 107                           | 28     | 51              | 186   | 186                |
| Trinity         | 87                             | 26     |                 | 113   |                               |        | 120             | 120   | 233                |
| Tulare          | 267                            | 104    | 18              | 389   | 215                           | 116    | 97              | 428   | 817                |
| Ventura         | 29                             | 17     | 33              | 79    |                               |        |                 |       | 79                 |
| Totals          | 933                            | 421    | 388             | 1,742 | 1,589                         | 740    | 1,361           | 3,690 | 5,432              |

Coyote and bobcat catch by counties and other predators.

In March, 1938, another step was taken which will go still further in providing us with the type of predatory animal control organization that we have been striving to build. A promotional examination was given for the position of predatory animal hunter and trapper, open only to assistant wardens who had been trained under our supervision since July, 1936. More than half of the men who had had trap line experience applied for permission to take this examination and on July 1, 1938, the ten highest on the list were promoted to the new grade and sent out on permanent assignments. At the close of the next biennium we will—we are sure—be able to report that the records of these ten men have demonstrated to the satisfaction of everyone that “a college education is no bar to becoming a good trapper.”

DEER STUDIES

The study of the Rocky Mountain mule deer was continued and in addition similar work was carried on in other parts of the State on California mule deer and southern mule deer. The problems studied

were the same as those relative to Rocky Mountain mule deer, namely; actual census work, information on numbers, sex ratio, condition of the deer herd, disease outbreaks and range conditions. Much definite and practical information has been gathered from these studies.

The southern California studies gave much information that the Division needed. Some of the more interesting facts determined were those relative to population per square mile, sex ratio, food conditions and migration.

In the Rocky Mountain mule deer region of northeastern California, the following tabulation covers a period of four years of fall and winter observation:

|                            | Total<br>deer | Total<br>bucks | Spike<br>bucks | Does<br>and<br>fawns | Does   | Fawns  | Ratio<br>bucks<br>to<br>does | Ratio<br>bucks<br>to<br>fawns | Ratio<br>does<br>to<br>fawns |
|----------------------------|---------------|----------------|----------------|----------------------|--------|--------|------------------------------|-------------------------------|------------------------------|
| 1933-34 -----              | 9,263         | 1,449          | 143            | 7,814                | 5,690  | 2,124  | 1-3.9                        | 1-1.4                         | 2.6-1                        |
| 1934-35 -----              | 26,473        | 4,172          | 207            | 22,301               | 14,885 | 7,416  | 1-3.5                        | 1-1.8                         | 2-1                          |
| 1935-36 -----              | 8,928         | 1,353          | 125            | 7,575                | 5,361  | 2,214  | 1-3.9                        | 1-1.6                         | 2.4-1                        |
| 1936-37 -----              | 21,517        | 3,904          | 147            | 17,613               | 13,652 | 3,961  | 1-3.5                        | 1-1.0                         | 3.4-1                        |
| Four-year<br>summary ----- | 66,181        | 10,918         | 622            | 55,303               | 39,588 | 15,715 | 1-3.62                       | 1-1.44                        | 2.52-1                       |

It will be noted in the above tabulation that there was a total of 622 spike bucks. Most of these were observed in the Fall River-Burney Region and in eastern Siskiyou County where there has been considerable mixing between Columbian black-tailed deer and Rocky Mountain mule deer. Even when mixed and remixed many times, the yearling bucks with any black-tail blood generally are spikes rather than forked horns. Normally, about one full-blooded Rocky Mountain mule deer yearling buck out of fifty is a spike. About one out of ten is a three-pointer and very rarely a four-pointer.

1937 and 1938 were very good years producing an abundance of deer feed on the deer ranges of the State. The average growth on bitter brush or antelope brush *Purshia tridentata* in northeastern California during 1937 was about  $2\frac{1}{2}$  inches and slightly more in 1938. Other food plants made a good growth and provided an abundance of forage and browse.

The reduction or elimination of sheep and substitution of cattle on some parts of the mule deer range has augmented the carrying capacity of this range.

In southern California particular studies were made bordering the two refuges, 4-A in San Bernardino County and 4-B in Los Angeles and San Bernardino counties. California mule deer in areas adjacent to Refuge 4-A averaged about 6 per square mile and the same subspecies adjacent to Refuge 4-B averaged about 6.5 per square mile. Areas within Refuge 4-A averaged about 9.3 per square mile and in Refuge 4-B about 9.8 per square mile.

Two areas adjacent to Refuge 4-E in San Diego County averaged 5.3 southern mule deer per square mile and two areas within the same refuge averaged 5.8 per square mile.

One area adjacent to Refuge 4-G in Riverside County averaged 16.2 deer per square mile and in the refuge averaged 14.3.

An estimate of the total range of the six subspecies of deer commonly found in California has been made. There are 155,652 square

miles in the State of which 84,300 square miles or 54% can be classed as deer range, where these animals may be found in varying numbers. Of this about 46,000 square miles can be classed as good deer country supporting a population of about 7 deer per square mile on the average. About 20,000 square miles may be classed as fair deer territory with an average of about 3 deer per square mile, leaving about 18,000 square miles of poor deer range with an average of about 1 per square mile.

The approximate square miles of range for each of the six subspecies of deer in California are as follows:

|                                  |                 |
|----------------------------------|-----------------|
| Columbian black-tailed deer..... | 44.5% or 43,500 |
| California mule deer.....        | 23.2% or 22,500 |
| Rocky Mountain mule deer.....    | 15.9% or 15,500 |
| Southern mule deer.....          | 6.3% or 6,100   |
| Inyo mule deer.....              | 5.4% or 5,250   |
| Burro deer.....                  | 4.7% or 4,600   |
|                                  | 97,450          |

Of this total, there are about 13,150 square miles of overlapping ranges between adjoining subspecies. Thus we find that the total deer range is about 84,300 square miles.

The average counts per square mile on ranges of the different subspecies of deer have shown the following to be the approximate density:

|   |                     |
|---|---------------------|
| Columbian black-tailed deer.....          | 4.3 per square mile |
| California mule deer.....                 | 4.5 per square mile |
| Rocky Mountain mule deer.....             | 5.8 per square mile |
| Southern mule deer.....                   | 2.6 per square mile |
| Inyo mule deer (partially estimated)..... | 2.2 per square mile |
| Burro deer (estimated).....               | .2 per square mile  |

By multiplying the number of deer per square mile by the number of square miles in their range, we find the population of the various subspecies to be about as follows:

|   |         |
|---|---------|
| Columbian black-tailed deer.....                  | 186,900 |
| California mule deer.....                         | 101,500 |
| Rocky Mountain mule deer.....                     | 90,000  |
| Southern mule deer.....                           | 16,000  |
| Inyo mule deer.....                               | 11,500  |
| Burro deer.....                                   | 920     |
|   | 406,820 |
| Approximate deer population the entire State..... | 406,820 |

#### SAGE HENS

During the last two years the sage hen condition in the north-eastern sagebrush plateau area has improved greatly. The population has doubled or possibly tripled due to good food and hatching conditions. The situation in eastern Lassen County can be expected to improve even more since a major part of the sheep range is now cattle range. The cattle are not as destructive to sage hen food or nest sites as are sheep; nor are the cattle brought into the sage hen range at such an early date in the spring as are the sheep.

In Mono and Inyo counties, the sage hen have also increased quite satisfactorily, due to better food and range conditions.



**ANTELOPE**

After having reached a peak of population in 1936, the antelope went into the winter of 1936-37 in only fair physical condition and were badly hit by snows, intense cold and lack of feed on their winter range in southeastern Lassen County and the western part of the State of Nevada bordering Lassen County.

On a survey made by air and horseback, the loss was concluded to be at least 25 per cent reducing the herd to an estimated 9,000 to 11,000 head. Most of the animals lost were old individuals. On parts of the winter range, the loss was better than five per square mile. The animals have been slow to recuperate from this loss. Although, the winter of 1937-38 had a heavy snowfall, there was no intense cold or great scarcity of feed on the winter range and they came through in much better condition. The fawn crop of 1938 was the best in ratio to does since 1935.

## REPORT OF THE BUREAU OF PATROL

By E. L. MACAULAY, Chief

The division of patrol activities into three districts mentioned in the thirty-fourth biennial report has been continued with satisfactory results. Two promotional examinations from the grade of assistant warden to fish and game warden have provided an increase in our patrol force of twenty wardens.

Our Marine Fisheries Patrol has been materially enlarged by the addition of four sea-going patrol boats for southern California waters, and a new boat has also been built for upper San Francisco Bay. All of our ocean-going boats have been equipped with radio telephone installations, providing an effective means of communication from shore to ship as well as between ships.

A separate pollution detail in the Bureau of Patrol has been set up and a detailed report by Paul A. Shaw, chemist in charge, is included herewith. A new activity, the Junior Game Patrol, was organized in 1936 to interest young people under 21 years of age in the principles of fish and game conservation. The Junior Game Patrol is supervised by Warden M. F. Joy, Jr., who has written the article describing the aims and purposes of this movement included in this report.

Conferences with all wardens in attendance were held at Sacramento in February, 1937, and April, 1938. These meetings are very beneficial, as they give our men an opportunity to become acquainted with fish and game problems in other portions of the State.

During the past biennium the following members of this department retired from active service:

R. C. Marshall on July 15, 1936;  
Captain J. E. Newsome on August 2, 1936;

and the following passed away:

Captain E. W. Smalley on August 9, 1936;  
Warden Charles Bouton on July 11, 1937;  
Warden McPherson Lough on November 9, 1937.

After August 27, 1937, one-half of all fines collected for violations of the Fish and Game Code are paid into the county treasury of the county in which the defendant is tried, the other half going to the fish and game preservation fund. While this procedure has resulted in a reduced income from fines to the Fish and Game Commission, it has helped recompense the counties for the costs of prosecuting fish and game cases.

Patrol efficiency continues at a high standard. A recapitulation of arrests and convictions will be found in the appendix on page 91.

## CALIFORNIA'S JUNIOR GAME PATROL

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By M. F. JOY, JR., Warden, Superintendent Junior Game Patrol

The Junior Game Patrol was first organized in 1936 by the Division of Fish and Game because of the need for educating society in the principles of conservation, so that the Division's work in the preservation of California's resources for the benefit of the public may not be in vain. The number of violations of the fish and game laws in California since 1926 has increased greatly, and it was apparent that a large proportion of the violators were young men between the ages of 21 and 30. The purpose of conservation is to assure the constant use of the resources and to leave a sufficient breeding stock, and the fish and game laws are therefore enacted by the people of the State to aid in the management and wise utilization of the resources. Hence, the Bureau of Patrol of the Division of Fish and Game is vested with the duties of enforcement of these laws. The Bureau's aim is to make the public realize the significance of the inestimable damage that can be done through carelessness and of their responsibility in preserving Nature's gifts for future generations, and it is not the Bureau's sole purpose to apprehend violators as so many are prone to believe. This is in keeping with the modern trend to prevent rather than punish. For example, since 1926, there have been 23,345 persons arrested and convicted for fish and game violations in this State, but many of these offenses could have been prevented. Fines for such violations amounted to nearly half a million dollars and the violators served some 70,000 days in jail, an aggregate of 191 years. Although it may be too late to educate the older people, we can do a great deal of good by teaching our youth the principles of conservation so they will not become violators.

A plan, originated and furthered by Mr. A. T. Jergins, Fish and Game Commissioner of California, was therefore initiated to educate our younger generation along these conservation lines, teaching them to appreciate and protect the wildlife, the perpetuation of which is in the hands of the public. Such was the origin of the Junior Game Patrol, which is making even more rapid strides than the Division of Fish and Game had anticipated. The sportsmen's organizations have aided materially in furthering this work by taking an active interest.

The Junior Patrol, under the direct supervision of the Division, is made up of troops, the members of which are boys of 10 to 21 years of age. Their membership is solicited throughout the schools, and the troops are locally sponsored by sportsmen's clubs, civic organizations or interested individuals. The sponsoring agency furnishes the required adult supervision, namely, troop leaders—one for each platoon consisting of 19 boys—and also special instructors whenever necessary. If the patrol leaders are adept in some particular phase of the program, such as natural history, specimen mounting, drilling, sport fishing, etc., their

knowledge will be of benefit to the troop. However, in any case the officers of the Division of Fish and Game are prepared to instruct in specialized conservation fields in addition to directing the general activities. The sponsor of the troop provides a meeting place, which is usually a civic hall, school or other convenient place.

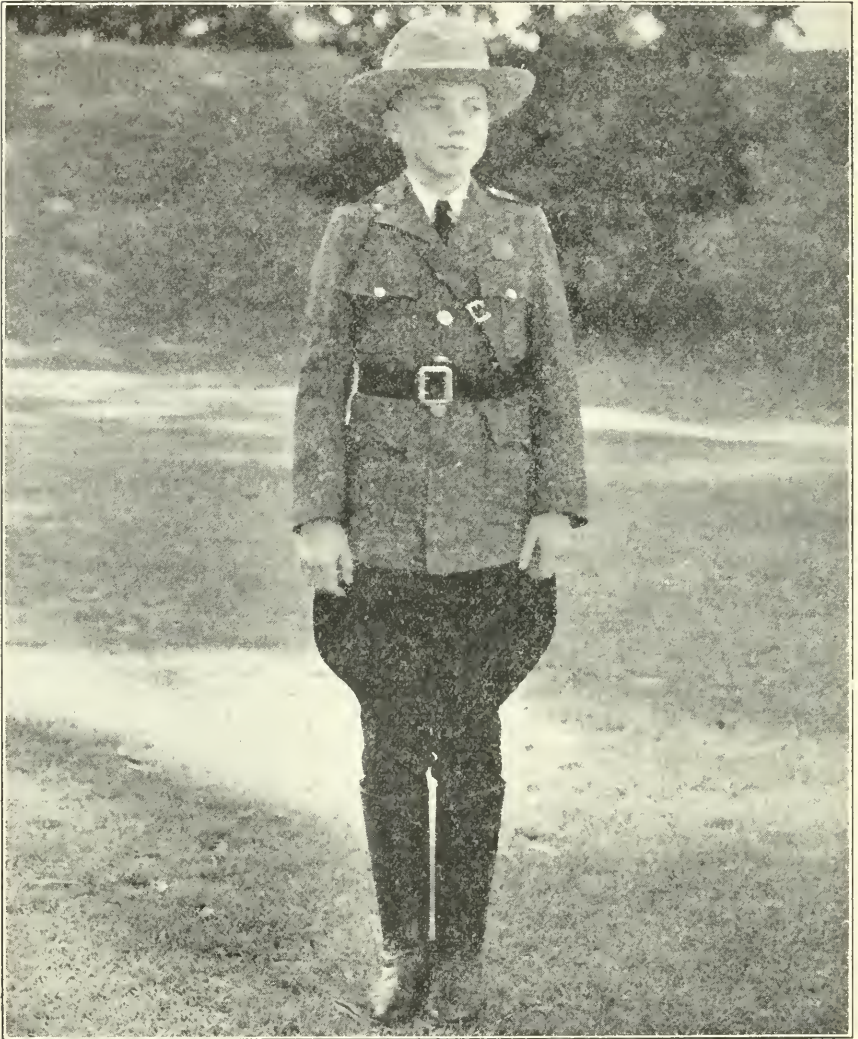


FIG. 40. A Ranger of the Junior Game Patrol. The uniform is modeled on that of the Canadian Northwest Mounted Police.

In organizing a troop, a group of boys is called together by the Division of Fish and Game and the purpose of the Junior Game Patrol is explained to them. The boys are given literature on fish and game laws and on natural history subjects, and are provided with applications for membership. Weekly meetings are held thereafter. After

four weeks of instructions on fish and game laws and the reasons for them, a preliminary examination is given. The successful boys take the oath of office and are given badges and credentials signed by the three California Fish and Game Commissioners and the Division's Executive Officer. Thus, they become Rangers of the Junior Game Patrol. Then they are ready to commence with the course of instructions, outlined below, which is made as interesting as possible. Field trips are an important feature, as it is only through actual contact



FIG. 41. The badge of the Junior Game Patrol.

with nature that the desired results can be secured. The course consists of the following activities:

Instructions in fish and game laws and the reasons for them.

Identification of birds, fish and other animals; mounting of specimens.

Drill work.

Fishing—fly and bait casting.

Making of flies and leaders, rewinding rods.

Hunting in field; dog training.

Hiking, camping, forest fire prevention.

Rifle and pistol shooting.

Trapping; predatory animal control.

Athletics.

Red Cross life saving.

Game management on the farm; restoration of cover for upland game; soil erosion.

Game bird raising.

The organization of the patrol is as follows:

|                    |       |                         |       |
|--------------------|-------|-------------------------|-------|
| Squad              |       | 1 Company               |       |
| 1 Corporal -----   | 1     | 4 Platoons -----        | 64    |
| 3 Rangers -----    | 3     | 8 Sergeants -----       | 8     |
|                    | 4     | 4 Lieutenants -----     | 4     |
|                    |       | 2 Captains -----        | 2     |
|                    |       |                         | <hr/> |
| 1 Platoon          |       |                         | 78    |
| 4 Squads -----     | 16    |                         |       |
| 2 Sergeants -----  | 2     | 1 Troop                 |       |
| 1 Lieutenant ----- | 1     | Any number of companies |       |
|                    | <hr/> | 1 Major                 |       |
|                    | 19    |                         |       |
| 2 Platoons         |       |                         |       |
| 1 Captain          |       |                         |       |



FIG. 42. The shoulder insignia of the Junior Game Patrol.

The Division of Fish and Game has designed uniforms (see Fig. 40) for these boys, and the cost is approximately \$7.75 each. The sponsoring agency, if it so desires, may uniform the boys but the Division of Fish and Game recommends that the funds for their purchase be raised by the rangers themselves through social functions or other means. There never should be any financial obligation on the part of the individual member or his parents. In this way, the uniforms will be the property of the troop.

At the present time (June, 1937), there are approximately 250 members who have received their commissions. The average age of the boys is 15 years. Troops have been organized in San Francisco, Oakland, Traey, Stockton, Napa and in Marin County, and sponsored by the following clubs:

Foothill Sportsmen's Club, Oakland.  
 San Francisco Rod and Gun Club, San Francisco.  
 Ingleside Sportsmen's Club, San Francisco.  
 Daly City Sportsmen's Club, San Francisco.  
 Tracy Wildlife Association, Tracy.  
 Napa Rod and Gun Club, Napa.  
 Marin Rod and Gun Club, San Rafael.

The rangers are not vested with any law enforcement authority and it is not the intention of the Division to grant it. Above all, they

FRANK F. MERRIAM, GOVERNOR



State of California

Division of Fish and Game

[Dated] FEBRUARY 2, 1937

By the Authority of the fish and Game Commission

ALAN C. WILSON

of FOOTHILL JUNIOR SPORTSMEN CLUB

County of ALAMEDA, State of California,

is hereby constituted and appointed a

RANGER

of the

Junior Game Patrol

fish and Game Commission



I will endeavor to be a good sportsman and work for the conservation of fish and game at all times. My aim will be to build up body and character clean, fine and sturdy, in keeping with the great outdoors.

Alan C. Wilson

*E. C. Moore*  
 President  
*W. J. Higgins*  
*Fred C. Davis*  
 Executive Officer

FIG. 43. A Ranger's commission in the Junior Game Patrol, signed by the three Fish and Game Commissioners and the Executive Officer of the Division of Fish and Game.

are not to work in the guise of "stool-pigeons." They are taught conservation practices, to appreciate and protect wildlife, to be aware of the beauties of nature, to be sportsmanlike, and in general to become better citizens for having become rangers. These boys can carry the knowledge thus gained to their homes and associates and so spread the conservation movement. They will understand that violating fish and game laws and the laws of the forest is not smart or clever, but a dishonorable crime against nature. We know this work is worthwhile but we need the public's cooperation and assistance in order to make this "conservation through education" undertaking a state-wide organization.



## POLLUTION DETAIL

By PAUL A. SHAW

In order to cope with increased sources of pollution and with public demand for the maintenance of cleaner waterways, the pollution detail was expanded during the biennium for a three- to an eight-man unit. The Division toxicologist is in charge with a senior warden handling enforcement. Three recently appointed wardens, two assistant wardens, and a laboratory man complete the assignment. Due to the rapid expansion of the work, it appears desirable to record this activity in considerable detail.

The problem of pollution control is fundamentally one of law enforcement and therefore a function of the Bureau of Patrol. However, the establishment of scientific facts and the application of proper engineering principles to the correction of existing conditions are equally important problems which necessitate the assignment of specially trained men for effective investigation and remedial action.

Preliminary investigation in response to complaints, or conditions observed on regular patrol, are reported in detail and followed up by any research or technical data necessary to ascertain the facts. Samples, pictures, statements of witnesses and other pertinent facts are also essential features of the investigation. Upon completing the evidence, notices of inspection may be issued indicating the violation and condition to be corrected.

The nature of the violation and the attitude of the offender determines the manner of procedure; the general policy being to secure a remedy through cooperative effort in so far as possible. Problems common to an industry are often approached through a group representative with the thought of establishing approved methods of practice relative to waste disposal. If suitable preventative measures have not been developed, the industry is urged to instigate research work and, in the event of active cooperation, time is granted to develop and install proper equipment rather than to force temporary methods that might prove unsatisfactory and costly. The staff of the pollution detail aids in such programs and in many instances are able to suggest proper procedures at a considerable saving to the industry. Cooperative programs of this type are in progress with the major oil companies, commercial fishing interests, the Cannery League, Wine Institute, Gold Producers of California and others.

Failure to accomplish the desired result through educational and cooperative effort necessitates active enforcement. However, immediate action is indicated when substances specifically prohibited by law are discharged or when the discharge of waste is known to be detrimental or causes visible damage to aquatic life. Even in such instances, the enforcement action may consist in notification to remedy the condition at once, for, in the final analysis, the goal is to secure correction

rather than court fines. Immediate prosecutions are confined to conditions resulting from negligence or wilful disregard of law and to substances which are widely known to be prohibitive through previous publicity and educational effort.

In both the technical studies and the enforcement activities the cooperation of various municipal, State and Federal agencies has been solicited and received. Valuable technical assistance has been received from the State Bureau of Sanitary Engineering, district sanitary engineers and the major oil companies. Federal agencies charged with the enforcement of similar pollution laws in navigable waters have rendered active assistance on law enforcement. Pollution patrol of harbor and beach areas by the U. S. Coast Guard, reports from customs officials and legal support of the War Department through their district engineers have all aided materially in pollution control. Evidence obtained by the pollution detail and Federal agencies is freely exchanged and may be utilized for prosecution by either one or both. In this connection it is understood that Federal fines imposed on pollution cases in California during the last three months alone will total over \$37,000.

It is impossible to determine the expenditure of various enterprises to correct conditions found unsatisfactory by the pollution detail but the amount unquestionably totals several million dollars for the present biennium. Corrective measures include installations to screen, settle, filter, incinerate and impound in addition to chemical and biological treatment methods. In numerous instances these installations have resulted in the recovery of by-products producing added profit for the concern.

Particular emphasis has been given to the exclusion of substances causing visible pollution of State waters since items of this type are the most common source of complaint. Solids that blanket the bottom or produce gases during decomposition are extremely damaging to aquatic life. Invisible polluting agents such as acids, metals and organic substances in solution require more detailed technical study to determine sources and in general are more difficult to treat or exclude. Organic wastes are dangerous due to their ability to remove oxygen, producing lethal areas or complete barriers to fish migration. Many such conditions have been corrected and investigations to remedy others of a similar nature are in progress.

Beach, harbor, and general aquatic conditions in southern California have shown remarkable improvement during the biennium. In this area, where oil has been the largest contributor to pollution, improvements have been effected through cooperation at all the major oil fields and pollution from loading terminals and bilge pumping have been largely controlled through cooperation and enforcement. Improvement may also be noted through the reduction of garbage, citrus products, fish cannery waste and other refuse formerly discharged indiscriminately. In this connection, a rotary screen designed by one of the pollution detail to eliminate fish cannery solids has proven profitable to concerns installing the device.

Food and beverage industries, including canneries, sugar refineries, wineries, distilleries, dairy products, and meat plants have required active attention in many parts of the State. Programs to

eliminate solid or other prohibitive substances from such sources have been partially effected and are in progress at many other plants.

The rapid development of the mining industry has resulted in a major pollution problem. Quartz mills, dredgers and hydraulic operations all produce effluents that menace spawning areas, fish foods, recreational activities, domestic, industrial and agricultural water supplies and even navigation. Considerable progress has been made in providing permanent impounding of mill tailings and in the Trinity and Klamath area. The revision of section 482 through the Quinn bill has aided materially in maintaining river clarity for the period from July 1 to November 30. During the restricted season constant patrol has been maintained in cooperation with an engineer assigned by the Gold Producers of California.

Tailings from bucket and drag line dredges have been particularly difficult to control and due to their tendency to stay in suspension and remain muddy after settling and filtration, the pollution staff undertook research work which resulted in the development of a chemical method of clarification that can be installed and operated at small expense. Recent installations indicate that satisfactory clarification of the most refractory effluent can be obtained by this method.

Tunnel drainage from both active and abandoned mines causes extensive damage to certain streams due to the presence of acid and metals dissolved from deposits of ore through the action of air and water. The gravest danger from this source occurs when large volumes of tunnel water are pumped out to dewater a tunnel preparatory to resuming operations at an abandoned shaft. In one such instance fish were killed for sixty miles downstream and immediate action was necessary to minimize further damage.

While it is not desired to emphasize court action, the record, as shown below, is indicative of the increased attention being given to pollution control.

#### POLLUTION CASES

| <i>Period</i>  | <i>Arrests</i> | <i>Fines imposed</i> |
|----------------|----------------|----------------------|
| 7/1/35-6/30/36 | 14             | \$550 00             |
| 7/1/36-6/30/37 | 46             | 2,210 00             |
| 7/1/37-6/30/38 | 64             | 6,305 00             |

Section 481 of the Fish and Game Code, on water pollution, is well worded and more recent interpretation of its provisions has permitted the control of various substances, obviously damaging to water resources, which had not been considered covered by this section previously. At the present time no changes in its provisions are recommended.

## REPORT OF THE BUREAU OF MARINE FISHERIES

By N. B. SCOFIELD, Chief

During the two past calendar years of 1936 and 1937 the commercial fisheries of California continued to lead all other States both in total production and in the value of its fishery products. The total landings of fish and shellfish by California fishermen amounted to 1,247,987,000 pounds in 1936 and 1,169,570,000 pounds in 1937, thus completing the fourth successive year in which the landings have exceeded the billion pound mark.

The combined total landings for the two years 1936 and 1937 amounted to 2,417,557,000 pounds, as compared with 2,339,959,000 pounds for the preceding two year period of 1934 and 1935, which in turn exceeded the two year period 1932 and 1933 by 105 per cent. The great expansion of the industry is therefore, at the present time, in its fifth year.

The value of the fishery products in either of the past two years exceeded \$50,000,000. The fish packing and by-products plants, excluding the plants handling fresh fish and shellfish, have an investment value exceeding \$10,000,000 and employ 10,000 persons. The number of commercial fishermen's licenses issued in the license year 1936-1937 (April 1 to March 31) was 6,986, while for the license year 1937-1938, 7,771 licenses were issued.

The value of commercial fishing boats is conservatively estimated at \$33,000,000.

The details of the fish catch and fish pack for the calendar years of 1936 and 1937, and the special sardine report for the seasons 1936-1937 and 1937-1938 may be found in the appendix to this report or in Statistical Circular Nos. 11 and 12.

### SARDINES

The sardine fishery of California within the last few years has developed into one of the major fisheries of the world. It is by far the largest fishery ever developed in North America. Its size as compared with the other fisheries of this State is shown in Figure 1 while its actual weight in pounds and its expansion during the past twelve seasons can be seen in the following table:

**Sardine Catch Delivered to California Shore Plants and to Floating Plants Operating Off the California Coast in Tons**

| <i>Season</i> | <i>Shore plants</i> | <i>Floating plants</i> | <i>Total</i> |
|---------------|---------------------|------------------------|--------------|
| 1927-28 ----- | 181,176             | -----                  | 181,176      |
| 1928-29 ----- | 252,433             | -----                  | 252,433      |
| 1929-30 ----- | 322,600             | -----                  | 322,600      |
| 1930-31 ----- | 172,001             | 10,200                 | 182,201      |
| 1931-32 ----- | 131,320             | 14,100                 | 145,420      |
| 1932-33 ----- | 190,166             | 55,890                 | 246,056      |

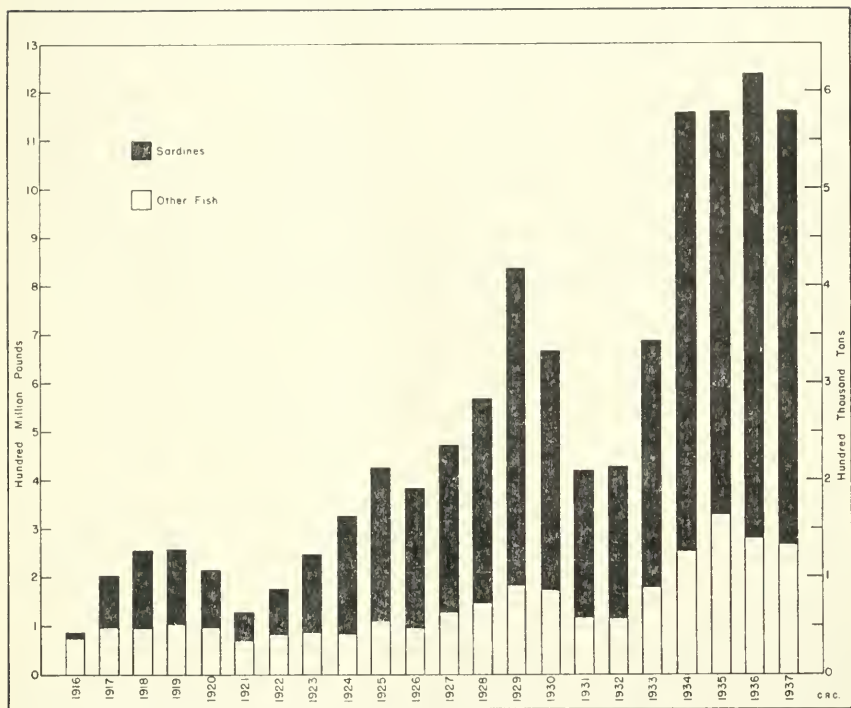


FIG. 1. Total landings of fish (exclusive of mollusks, crustaceans, amphibia and reptiles), in California. Importations from Gulf of California, Hawaii, and Japan have been omitted.

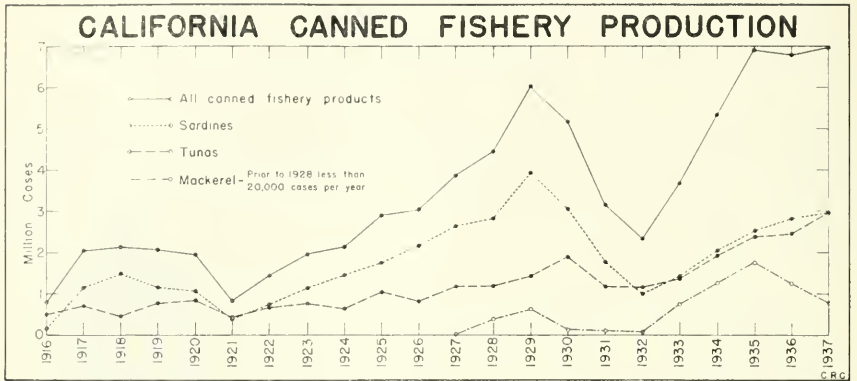


FIG. 2. "Tuna" includes Albacore, Bonito, Skipjack (Striped Tuna), Bluefin, Yellowfin, Tonno, Tuna Flakes and Tuna, unclassified.

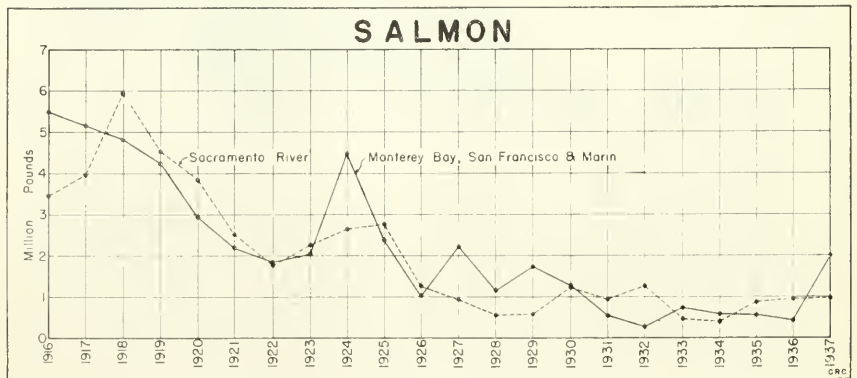


FIG. 3. This graph shows the decline of the King salmon fishery as shown by the Commercial catch in the river and in the adjacent ocean districts.

| <i>Season</i> | <i>Shore plants</i> | <i>Floating plants</i> | <i>Total</i> |
|---------------|---------------------|------------------------|--------------|
| 1933-34 ----- | 313,842             | 77,132                 | 390,974      |
| 1934-35 ----- | 480,746             | 128,190                | 608,936      |
| 1935-36 ----- | 407,166             | 158,754                | 565,920      |
| 1936-37 ----- | 488,141             | 239,257                | 727,398      |
| 1937-38 ----- | 345,834             | 74,334                 | 420,168      |

The sardines are used for canning, for reduction into oil and fish meal and as bait for sport angling and for commercial fishing. The amount of sardines used for bait each year is not given in our records but it is estimated at 25,000,000 pounds. The amount of sardines used for canning and the number of cases produced during the past four seasons is shown in the following table:

| <i>Season</i> | <i>Amount received for canning</i> | <i>Cases 1-lb. oval cans</i> | <i>Equivalent cases in other size cans</i> | <i>Total</i> |
|---------------|------------------------------------|------------------------------|--|--------------|
| 1934-35 ----- | 138,109 tons                       | 1,486,343                    | 390,279                                    | 1,876,622    |
| 1935-36 ----- | 237,537 tons                       | 1,936,154                    | 1,280,761                                  | 3,216,915    |
| 1936-37 ----- | 212,278 tons                       | 1,647,332                    | 1,341,714                                  | 2,989,046    |
| 1937-38 ----- | 160,928 tons                       | 1,182,714                    | 1,117,715                                  | 2,300,429    |

Due to the lack of adequate control over the fishery, a much larger amount of the sardines caught are used for reduction into oil and meal than is used for canning. The following table gives the amount of sardines used by shore plants in the past four seasons for reduction purposes, with the oil and meal produced from this amount and from the offal and overage discarded by canning plants. The table does not include the sardines used by floating reduction plants operating off-shore beyond the State's jurisdiction.

| <i>Season</i> | <i>Received for reduction</i> | <i>Oil produced</i> | <i>Meal</i> |
|---------------|-------------------------------|---------------------|-------------|
| 1934-35 ----- | 342,339 tons                  | 16,870,565 gal.     | 77,651 tons |
| 1935-36 ----- | 168,922 tons                  | 13,200,692 gal.     | 59,904 tons |
| 1936-37 ----- | 274,272 tons                  | 14,299,923 gal.     | 75,115 tons |
| 1937-38 ----- | 183,858 tons                  | 9,175,277 gal.      | 52,981 tons |

The great expansion of the fishery has been accompanied by unmistakable signs of depletion in the sardine population and it is imperative that the fishing intensity be brought under control and the present large production be reduced, if we are to avoid the ruin of the State's sardine supply. The expansion of this fishery has been brought about by an increase in the number of fishermen and by a greater increase in the number and efficiency of fishing boats and processing plants. Our repeated warnings that we are drawing too heavily on our sardine supply have failed to bring about legislative action until now we have an industry with an investment in men, boats and plants which can not be supported by the available supply of fish.

It is inevitable that fishermen and plant operators must stand a great loss in investment and occupation and that the State must struggle along with a fishery resource to a point far below what it was capable of producing if it had been wisely managed. As for the future, we will continue to have a sardine industry but it will of necessity be reduced in size and be restricted to canning and the production of high potency, vitamin fortified oil.

### TUNA

The second largest of our fisheries is that of the tuna which is almost entirely a canning industry, only a very small per cent going to the fresh fish markets. Unlike the sardine industry which has what amounts to an unlimited market for the oil and meal products, the tuna industry must depend upon a market for its canned product.

At the time of our last report in 1936 there was an excellent and growing market for all of our canned fishery products which resulted in increased canning of tuna as well as of sardines and mackerel. In the year 1936 the industry produced close to two and one-half million cases of tuna which exceeded the previous high year of 1935 by about 150,000 cases. The expansion of the industry was accelerated by the building of more and large tuna fishing boats. Early in 1937 tuna were landed in such quantities that the pack exceeded the market requirements. In order to stabilize the market and prevent price cutting or a reduction in the price paid to fishermen, canning operations were curtailed by an agreement with fishermen to hold their boats in port for a time. In spite of this curtailment the pack for 1937 came very near reaching the three million case mark and the industry went into the 1938 season with a considerable carry-over of canned tuna. Again in this year, 1938, packing has been slowed down by holding the boats in port for two months, but this did not prevent a ruinous drop in the price of canned tuna.

As the supply of tuna is drawn from an extensive area reaching to the Equator and as the catch will be limited by the market demand for canned tuna, we are not greatly worried about the supply being depleted, although we are watching this very carefully.

Due to the expense of capturing tuna in far away waters, the canned product must bring a much higher price than canned sardines or mackerel, for example, which are taken by more economical methods and in waters near the canneries. The higher selling price of canned tuna restricts the catch to supplying a market which may not expand sufficiently to strain the tuna supply for some years to come. The tendency to over expand, especially in number and efficiency of fishing boats, exists in this fishery only to a less extent than with the other larger fisheries of the State. It is probable that cheaper methods of catching and canning tuna will be worked out. A good deal of experimenting with refrigeration methods on the boats is being carried on by fishermen and the canning companies so as to reduce the loss of tuna from spoilage or deterioration in the long haul from the tropics. The new fisheries research boat now building for this bureau will be equipped for carrying on refrigeration experiments on a commercial scale. Such experiments are designed to improve the quality of the fish and prevent what at present represents a serious loss to both fishermen and canners.

### MACKEREL

Third in importance in the fisheries is that of the mackerel which is also our youngest fishery, being now in its eleventh year since the first important pack of canned mackerel in 1928. The reasons for the rapid development of this fishery were: a fair abundance of fish; a good demand for a moderately low-priced canned fish; and an abundance of purse seiners which could fish for mackerel when they were not



fishing for sardines. In 1935, only eight years after this fishery started to develop, fishermen brought to the canneries in southern California and at Monterey 146,427,000 pounds of mackerel. We were at that time quite worried for fear that this heavy catch would deplete the supply of fish. The fishery was yet so young and the investigations of the California State Fisheries Laboratory covered so few years, we were without knowledge as to how much the fishery could stand. However, we did recommend in our 1936 report that the Fish and Game Commission should be given the power by the legislature "to regulate or limit the catch, in order that a reasonable annual catch can be tried out and thus determine what the maximum production of the fishery should be without depletion of the supply." As the 1937 legislature was being importuned to grant similar powers to the Commission to save the sardine fishery from destruction, it was deemed advisable not to ask the legislature for too much at one time. Sardines being more important than mackerel at the time, no bill was pressed on behalf of mackerel. As it happened, no legislation was obtained for sardines, and it is doubtful if mackerel would have fared better.

In 1936 the mackerel catch dropped from the high mark of 146,427,000 pounds of the year before to 100,541,800 pounds and in 1937 dropped still further to 60,936,700 pounds. This falling off in the mackerel catch has been in spite of a continued good market, a higher price paid to fishermen and more boats engaged in the fishery. In other words, an increased fishing effort failed to hold the production at its former level. In the meantime the work of the California State Fisheries Laboratory has shown up other signs of depletion. Fishermen and canners have realized that the mackerel can not stand this heavy strain, and at the request of the Commission voluntarily agreed to observe a two-month's closed season in the spring of 1938, which was scrupulously observed by all.

I recommend again that power be given the Commission by the legislature to regulate or limit the catch of mackerel, as the best method of managing this fishery.

### CONSERVATION

The marine fisheries of California which annually produce commercial fishery products valued at \$50,000,000 and support a sport fishing industry of large proportions, have attained a place among the major industries of the State. Likewise, the fish along the coast of California upon which this great industry depends constitutes one of the State's most valuable resources.

It is amongst the duties of the Division to gain a sufficient knowledge of the fisheries to formulate fisheries management policies to safeguard the fisheries of the State and at the same time to get the most possible from the fishery resources, without reducing the breeding stock below the point where the fishery will produce a continuous and sustained yield.

The Division, through the Fish and Game Commission, can recommend measures for the management of the fisheries which the legislature may enact into law. So far very few regulatory powers have been given to the Commission. The Commission besides the authority to employ assistants to gain the information upon which to manage the fisheries, is charged with the duty of employing assistants to enforce

the laws as passed by the legislature and to carry out such regulatory powers as have been granted.

To facilitate this work, the Commission established the Bureau of Commercial Fisheries. Its title has recently been changed to Bureau of Marine Fisheries, and its field extended to include the marine sport fisheries.

The enforcement of the commercial fisheries laws which at one time was under the Bureau of Commercial Fisheries was transferred to the Bureau of Patrol and Law Enforcement, with the idea of greater efficiency and economy. Under this arrangement a special marine patrol has been established and toward which the Bureau of Marine Fisheries acts in an advisory capacity as it is considered necessary that the Marine Fisheries Bureau be in close touch with the enforcement of the fisheries measures.

The principal duties of the Bureau of Marine Fisheries are therefore concerned with fisheries research, with the object of getting sufficient knowledge for the proper management of the fisheries.

To carry out this work the Bureau from the time it was organized some twenty-five years ago began developing a fisheries research staff which has grown in numbers but this growth has not been more rapid than that of the fisheries themselves or the problems raised by their rapid development. A laboratory and statistical building have been built to accommodate this staff of workers. Ocean-going patrol boats have been built and these have been equipped for carrying on the necessary investigations at sea. A new vessel is now under construction which will be used mainly for fisheries research work.

The cost of the research work and the marine patrol and law enforcement, plus the Bureau's proportionate share of such other activities as administration, fish culture, pollution, fish screens and ladders, is entirely paid for from fees, licenses and fisheries taxes collected from the marine fishing industries. The total cost of this work is proportionately small as it amounts to less than one-half of one per cent of the annual value of the commercial fishery products.

The research program for the management of fisheries, to be effective, must be well planned and continuous. The research program which is being followed is set forth in the following report of the California State Fisheries Laboratory.

It is not enough that information be obtained upon which the fisheries may be managed so as to get from them the greatest sustained yield. This information must be used or it is effort largely wasted. This applies with equal weight to the management of game and the inland fisheries. Fish and game management has become a very important enterprise rather highly developed and much of it rather technical. Experience has shown that many of the problems of fish and game management are not best decided by a legislature. What is needed is a stable commission, free from political pressure and upheavals, endowed with sufficient regulatory powers to adopt and carry out those conservation measures which are based on technical investigations.

## REPORT OF THE CALIFORNIA STATE FISHERIES LABORATORY

By W. L. SCOFIELD, Supervisor

The California State Fisheries Laboratory, established in 1917, has followed continuously a well planned and consistent policy for the past twenty years. It is appropriate here to restate the policy with a brief resume of the program now in operation which is based upon it.

### POLICY

The management policy of the Bureau of Marine Fisheries is that of conservation, which means the fullest possible utilization consistent with sustained yield. The goal sought in applying the policy is to harvest each year the largest crop possible without reducing the spawning stock for the future, which would thereby reduce future yields. The maximum continuous crop possible for any stock is about equal to the replacements spawned each season. The larger the breeding stock the more replacements spawned, so it is evident that the maximum continuous yield from a fishery is the annual increase from a full spawning stock in the sea.

### FUNCTION OF THE RESEARCH LABORATORY

The California State Fisheries Laboratory is established for the purpose of supplying the administrative officers with the facts most needed in the management of the State's marine fisheries. In applying the above management policy, four types of information are necessary:

1. The present state of the supply of each species in order to know whether or not any regulation of a fishery is needed.
2. Knowledge of the species and the fishery to determine the kind and degree of regulatory measures needed.
3. Continuous observation of the fish supply to determine the effectiveness of regulations already in operation.
4. Complete knowledge of the annual crop harvested.

With adequate knowledge of (1) the stock in the ocean, (2) replacements surviving from spawnings, and (3) catch removed, it is possible to so regulate the annual catch that a balance between catch and replacements can be struck so as to maintain a full spawning stock to insure future yields continuously. This is maximum utilization consistent with sustained yield.

### RESEARCH PROGRAM FOR ANY FISHERY

In any fishery, a research program designed to furnish the administrators with the necessary information would include:

1. Studies of the supply on hand.

2. Knowledge of the species and fishery.
3. Continuous observation of abundance.
4. Catch statistics.

In applying this program, a piece of information gained does not fit neatly into one of the four pigeonholes but usually applies to or is useful in an understanding of more than one of the categories outlined.

Studies of the supply approximate a census by picturing relative abundance from year to year by one or both of the following:

- a. Return in catch per unit of fishing effort.  
Involves character, amount and intensity of fishing effort.
- b. Departures from normal proportion of size or age classes in the fish population.

Studies of the species should determine:

- a. One uniform population or more than one local race.  
Racial studies  
Migrations  
Tagging  
Sampling
- b. Spawning.  
Season, areas, intensity
- c. Growth rate.  
Age at sexual maturity  
Mortality rate
- d. Abundance of each entering age class.

A plan for continuous observation of abundance depends upon the character of the fishery and knowledge of the species but is usually a simplification of methods developed in the studies of relative abundance.

Detailed catch statistics are basic in determining:

- a. Crop harvested
- b. Intensity of fishing effort
- c. Population abundance
- d. Balanced regulation of the fishery

Although catch statistics are mentioned last in the above outline, actually an adequate system for gathering accurate catch records, not only to show the total crop harvested but in sufficient detail to give return per unit of effort, is the first point of attack in the study of any fishery and for this reason the initiation of such a system was coincident with the establishment of the research laboratory.

#### PROBLEMS STUDIED

Such a research plan as outlined above requires several years of intensive preliminary study as well as continuous observation of the fishery, so obviously it could not be applied to all of the fisheries of

the State without the expenditure of more funds than are available. For that reason the research program of the laboratory gives first consideration to our four major fisheries:

1. Sardine
2. Mackerel
3. Tuna
4. Flatfishes

In addition to these four major problems, preliminary work is being conducted in several of our less prominent fisheries, for example:

1. Oyster culture
2. Striped bass
3. Salmon
4. Marine sport catch

Secondary consideration is given to a variety of special studies which usually are completed in a short time interval. These include the gathering of information about our lesser fisheries and general data desired by administrative officers and legislative committees. The diversity of such studies is illustrated by the titles of reports and articles published by the laboratory.

#### Sardine

Since the sardine fishery has been the major concern of our research program for years past, much of the preliminary work is already accomplished and is not being continued. Most of the work now being conducted is for the purpose of measuring changing abundance of age classes as well as variation in abundance of the whole sardine population. The sardine studies now being pursued may be briefly outlined as follows:

#### Supply

##### Egg and larvae studies

- Distribution and concentration
- Yearly measures of abundance

##### Immature fish

- Distribution
- Nursery grounds
- Strength of each age class
- Character and volume of the bait fishery

##### Adolescent and adult fish

- Analysis of proportion of size classes
- Boat catch analysis and scouting time
- Yield from different fishing areas
- Intensity of fishing measured by tag returns

#### Life-history of the species

- Racial studies, especially vertebral counts on young fish

### Migrations by

Sampling bait and commercial catch in different areas  
Fish tagging

### Spawning

Areas  
Intensity  
Larval drift

### Growth

Size of maturity  
Duration within range of commercial sizes  
Rate of decline in abundance of each age class

The threatened collapse of this our most important fishery emphasizes the benefit of having at hand the accumulated knowledge of this fishery and accentuates the need for strict regulation of future catches based upon the accumulated research data.

### Mackerel

The mackerel canning industry developed suddenly, late in 1928, and in less than ten years the signs of depletion of the mackerel supply had appeared. Biological studies have already yielded us much information as to age and size composition of the catch, spawning season, distribution, migrations and population replacements. The greatest need, from an administrative standpoint, is some approximation of the possible maximum sustained yield for this fishery and the present investigations therefore include:

1. Analysis of boat catches to show effect of each year's catch upon the supply.
2. Yield from each fishing area.
3. Estimates of amount of young fish replacements contributed by each area.
4. Age composition and mortality rate of year classes in the population.
5. Migrations. Tagging to show dependence of each area upon migrants from other regions.
6. Spawning. Extent and volume of eggs and larvae by areas.
7. Determination of the most feasible and effective method of regulating the fishery to check the present over-utilization.

### Tuna

The tuna fishery, involving at least five species, is scattered over a fishing area extending southward to the Equator in which our boats make catches for delivery to California canneries. Yellowfin and skipjack account for most of the cannery supply and these two species are widely distributed whereas bluefin tuna are found locally off our own coast. Albacore and bonito are handled in smaller quantities.

The key question in greatest need of solution and upon which several other problems depend is whether we draw upon single migratory populations or upon several localized and separated groups in the

various fishing areas. The answer to this question will affect other biological work, such as studies of abundance, spawning and growth rate. Our tuna program therefore includes the following investigations:

#### Yellowfin tuna and skipjack

1. Measurements, counts and other morphological work on samples from different areas.
2. Tagging to determine migrations.
3. Collection of biological data for life-history studies.
4. Data to determine desirability of closed seasons and revision of existing size limits.
5. Complete field investigation of the effects of various factors in boat refrigeration of tuna.

#### Albacore, bonito and bluefin

1. Determine distribution and migrations.
2. Morphological studies for comparison with the species of Japan and Hawaii.
3. Life-history studies.

#### Bottom Fish

As yet we have very incomplete knowledge of the life-history of bottom fish (soles, flounders, sand dab, rockfishes, sablefish and Pacific cultus); yet an outstanding accomplishment in these fisheries has been the checking of the destructive fishing of small meshed trawl nets. This has been accomplished by demonstrations which have resulted in the adoption of modified nets of large mesh to allow escapement of small fish.

Work is being continued to determine, for the population of each species, the point in intensity of fishing which will give the maximum sustained yield as well as the greatest economic return. The investigations consist of:

1. Analysis of fishing intensity to measure changes in abundance.
2. Determination of age, growth rate and fecundities.
3. Extent of intermingling between geographical regions.
4. Measures of natural mortality rates and the effect of fishing upon these rates.

#### Salmon

Our salmon runs have been reduced to a small fraction of their former magnitude by the long continued operation of overfishing, reduced spawning area resulting from power and irrigation development, and destruction of seaward migrants in irrigation ditches. The immediate administrative problem is to build back the runs, chiefly by catch limitation, so that the breeding stock can be increased.

Investigations of the past have provided a great deal of the life-history knowledge, such as growth rate, age and the parent stream

theory, so that recent work has attempted to supply a basis for yield management for both king and silver salmon as follows:

1. Volume of present runs in each stream.
2. Contributions of each stream to the ocean catch.
3. Relation of existing and proposed stream obstructions to spawning areas.
4. Measurement of escapement at present and desirable for the future, leading toward maximum sustained yield for each stream.

#### **Striped Bass**

Past work has supplied most of the needed biological knowledge, with three minor exceptions noted below. The problem now is to manage the fishery so as to maintain the present high recreational value. The investigative program is therefore planned as follows:

1. Further development of our sport catch records so as to measure changes in abundance.
2. Basis for regulation to maintain a high population level.
3. More complete knowledge of
  - a. Food habits
  - b. Migrations
  - c. Spawning areas and intensity

#### **Oysters**

Unlike most of our other fisheries, the need here is to develop the industry in this State so the program for oysters is the collection of essential biological information to aid in the establishment and maintenance of beds for the native, eastern and Japanese oysters. The work involves:

1. Determinations of salinity, temperatures and pH, spat counts and examination of gravid oysters to aid the industry when setting out spat collectors.
2. Experiments with more efficient methods of spat collection.
3. Experimentation in establishment of a spawning stock of Japanese oysters in this State.

The oyster work has centered at Humboldt Bay, due to the assistance rendered by Humboldt County, with some work conducted at Elkhorn Slough and Drakes Estero.

#### **Marine Sport Catch**

The catch by marine anglers has grown to such magnitude that it must be considered in population studies and management policy. Several years ago preliminary data were gathered to try out a system of recording this catch and fairly comprehensive figures have been collected for the last three years, but the system should be extended and improved and in some instances supplemented by more detailed records as checks. The present program includes:

1. Collection and analysis of marine sport catch statistics as a measure of population and fishing intensity.



2. Comparison of commercial and sport catches for certain species as an aid to measuring effectiveness of present or needed legislation.

3. Preliminary records of salmon, shad and striped bass catches in river and bay areas.

#### Statistics

Detailed statistics are the basis for the study and management of our fisheries. In order to facilitate tabulation and to make available the details of our fisheries data, the records since 1931 have been handled by the system of punched cards. Monthly reports are prepared for each of eight geographical regions of the State, showing species, pounds, boat, dealer, price, locality of catch and point of delivery segregated by:

1. Species.
2. Daily and monthly catch of each individual fishing boat.
3. Pounds of each species handled by each dealer.
4. Species and weights landed in each city.

In addition a cross-reference index is maintained for all fishing vessels and the yearly records of boat registrations have been tabulated. Other records, such as commercial fishing licenses issued, are systematically filed at the laboratory.

The above activities have been organized into routine procedure but in addition, most valuable assistance to the research and administrative work has been rendered by a variety of special reports made up to meet a specific need, and the wealth of detailed information made available by these special reports has justified the punched card system for handling mass data.

The following examples illustrate the wide range of information made available by these special reports:

1. Sardine boat catches for analysis of fishing effort.
2. Mackerel catches by type of boat for past years.
3. Tuna catches by boat type for each of the five species for past and current years.
4. Bottom fish trawl catches from 1924 to date to show species of flatfish and incidental catches of other species.
5. Rockfish catches and incidental species for selected areas.
6. Water area yield tables for the most important species.
7. Tabulations of marine sport catches by party boats, charter boats, barges and from piers.

Since equipment and trained personnel were available, the statistical department has been charged with the compilation and reporting of:

1. Hunting license applications and records of game kill.
2. Angling license applications and records of freshwater angling catches.
3. Deer kill in the State.

4. U. S. Forest Service biological data on deer killed in the national forests of the State.

#### PUBLICATIONS

Progress and final reports are prepared on practically all work done at the laboratory. Occasionally, typewritten reports are made to the administrative officers but in most cases results are published for distribution to the public. Reports are printed as bulletins or in the form of special articles in:

1. Fish Bulletins
2. California Fish and Game (quarterly magazine)
3. California Conservationist
4. Trade journals or biological bulletins

During the past biennium, five Fish Bulletins have been issued as follows:

- No. 47. Interseasonal and intraseasonal changes in size of the California sardine (*Sardinops caerulea*). By Frances N. Clark. 28 pp. 1936.
- No. 48. Fishing localities for the California sardine, *Sardinops caerulea*, 1928-1936. By Frances N. Clark. 11 pp. 1937.
- No. 49. The commercial fish catch of California for the year 1935. By the Bureau of Commercial Fisheries. 170 pp. 1937.
- No. 50. Sizes of California sardines caught in the different areas of the the Monterey and San Pedro regions. By J. B. Phillips. 31 pp. 1937.
- No. 51. The high seas tuna fishery of California. By H. C. Godsil. 41 pp. 1938.

Articles and notes contributed by the laboratory staff for publication in "California Fish and Game" and other periodicals are:

#### CALIFORNIA FISH AND GAME

##### BONNOT, PAUL

- California sea lion census for 1936. vol. 23, pp. 108-112, 1937.
- Report of the oyster investigation at Humboldt Bay for 1935. vol. 22, pp. 284-293, 1936.
- Report on the California oyster industry for 1936. vol. 23, pp. 163-173, 1937.
- Report on the California oyster industry for 1937. vol. 24, pp. 191-195, 1938.
- Setting and survival of spat of the Olympia oyster, *Ostrca lurida*, on upper and lower horizontal surfaces. vol. 23, pp. 224-228, 1937.

##### BONNOT, PAUL, and PHILLIPS, J. B.

- Red water, its cause and occurrences. vol. 24, pp. 55-59, 1938.

##### CLARK, FRANCES N.

- Further notes on the jumbo squid, *Dosidicus gigas*. vol. 23, pp. 246-247, 1937.
- Grunion in southern California. vol. 24, pp. 49-54, 1938.
- Small sardines taken off Oregon. vol. 24, p. 71, 1938.
- Snake eel, *Ophichthous triscariatis*, taken off San Pedro. vol. 23, p. 246, 1937.
- Yield per area of the California sardine fishing grounds, 1935-1937. vol. 23, pp. 307-309, 1937.

##### CLARK, FRANCES N., and CROKER, RICHARD S.

- Has the closed area increased the Pismo clam population? vol. 23, no. 2, pp. 161-162, 1937.
- The Pismo clam in 1935. vol. 22, no. 3, pp. 249-250, 1936.

## CLARK, G. H.

- Cooperative tests on mesh size. vol. 22, no. 3, p. 248, 1936.  
A second report on striped bass tagging. vol. 22, no. 4, pp. 272-283, 1936.  
Trawler catch. vol. 22, no. 3, pp. 248-249, 1936.  
Trawler investigations, station line. vol. 22, no. 3, pp. 247-248, 1936.  
Weight and age determination of striped bass. vol. 24, pp. 176-177, 1938.

## CONNOR, GERALDINE

- Change in presentation of fisheries statistics. vol. 24, no. 3, pp. 307-308, 1938.  
Fish and game statistics. vol. 23, no. 2, pp. 113-118, 1937.

## CROKER, RICHARD S.

- King salmon in southern California, 1936. vol. 22, no. 4, p. 323, 1936.  
Let's go fishing. vol. 24, pp. 280-287, 1938.  
Monterey Spanish mackerel taken at Long Beach. vol. 23, pp. 245-246, 1937.  
Occurrence of mackerel-sead in southern California. vol. 23, pp. 331-333, 1937.

## FRY, DONALD H., JR.

- The changing abundance of the Pacific mackerel. *Pneumatophorus diego*, a preliminary boat catch study. vol. 23, pp. 296-306, 1937.  
Magnetic recovery of fish tags. vol. 23, no. 2, pp. 119-124, 1937.  
A metal plankton net. vol. 23, pp. 329-330, 1937.  
Tagging Pacific mackerel. vol. 23, no. 2, pp. 125-131, 1937.  
Trout fishing in southern California streams—instructions for the beginner. vol. 24, pp. 84-117, 1938.

## GODSIL, HARRY C.

- Tuna tagging. vol. 24, pp. 245-250, 1938.

## JANSSEN, JOHN F., JR.

- Air bubbles as a fish scare. vol. 24, pp. 295-296, 1938.  
"Christmas trees" in the California sardine fishery. vol. 24, pp. 178-184, 1938.  
First report of sardine tagging in California. vol. 23, pp. 190-204, 1937.  
Northern recovery of California sardine tags. vol. 24, pp. 70-71, 1938.  
Radio telephones on fishing boats. vol. 24, pp. 293-294, 1938.  
Rubber floats for nets. vol. 24, p. 296, 1938.  
Weight loss in barracuda during preparation for market. vol. 23, pp. 157-160, 1937.

## KARMELICH, KATHERINE

- California fish and game: author and subject indexes, volumes 1-20, inclusive. 1914-1934. vol. 22, no. 4, appendix, pp. 1-60, 1936.  
A fisheries library and its uses. vol. 24, pp. 224-232, 1938.

## PHILLIPS, J. B.

- Notes on sardine gear changes at Monterey. vol. 23, pp. 221-223, 1937.  
Record mackerel taken at Monterey. vol. 23, p. 337, 1937.

## ROEDEL, PHIL M.

- The 1937 Pismo clam census. vol. 24, pp. 196-197, 1938.  
Tuna canning methods in California. vol. 24, pp. 251-272, 1938.

## SCOFIELD, W. L.

- Ocean sunfish in San Pablo Bay. vol. 23, p. 336, 1937.  
An outline of fishing gear. vol. 24, pp. 185-190, 1938.  
Sardine fishing fleet at Monterey. vol. 22, p. 250, 1936.  
Sardine oil and our troubled waters. vol. 24, pp. 210-223, 1938.  
A silver salmon at Los Coronados Islands. vol. 23, p. 245, 1937.  
Tag recoveries from the first thousand sardines. vol. 24, pp. 69-70, 1938.  
Voluntary closed season for mackerel canning. vol. 24, pp. 289-290, 1938.

## TIBBY, RICHARD B.

- The relation between surface water temperature and the distribution of spawn of the California sardine, *Sardinops caerulea*. vol. 23, pp. 132-137, 1937.  
Study of ocean currents. vol. 23, pp. 175-176, 1937.

American Fisheries Society. Transactions

How California is measuring the angler's catch. By Richard S. Croker. vol. 66 (1936), pp. 301-305, 1937.

California Conservationist. (Department of Natural Resources, Sacramento)

The staff has contributed articles and notes to this monthly magazine. In addition, excerpts from "California Fish and Game" and "Fish Bulletins" have been published in the "Conservationist."

Pacific Fisherman. (Seattle)

Sardine tagging in California. By John F. Janssen, Jr. vol. 35, no. 7, June, p. 43, 1937.

#### LIBRARY

The library occupies an important niche in the fisheries research work of the Laboratory. Its collection of literature on marine biological subjects, especially fish and fisheries, is not only of use to the purely scientific person but also to the man engaged in commercial enterprises. The number of people consulting the library is increasing constantly. Perhaps in some cases it is the result of present economic conditions which press men to investigate other fields of occupation with a view of entering them if feasible.

Two methods of increasing the use of the library have been initiated. A list of the literature received during each month is compiled and distributed to the employees of the Division stationed away from headquarters. In this way they are informed of the current publications which are made available to them. The list is also supplied to those not in the employ of the Division who have requested copies. This was begun in 1937. A circulating library for the use of the employees, especially the wardens, was started in 1938 and is meeting with success in that it reaches those who have no adequate means of securing books otherwise.

During the biennial period, 7037 pamphlets and 197 books were added, making a total of 31,365 pamphlets and 2102 bound volumes in the library (June 30, 1938). In 1937, the library was enlarged to take care of the increased number of volumes, accumulated over a period of about twenty years, and additional shelving units were secured. The library now occupies practically the entire upper floor of the Laboratory building.

#### PUBLIC TALKS

Members of the research staff, when called upon, give talks on marine fisheries before nature clubs, service organizations and scientific societies. During the biennium 75 such talks, including five radio talks, were given by staff members.

#### ASSISTANCE BY THE BUREAU OF PATROL AND LAW ENFORCEMENT

The successful operation of our statistical system has depended upon the field work of law enforcement officers of the Division of Fish and Game, and the gathering of much of our biological data has been possible only through the whole-hearted cooperation of these same officers. We are most deeply indebted to the men of the Marine Patrol Detail, who have given us assistance far beyond the requirements of mere cooperation and have cheerfully made our needs a part of their own work.

**WORKS PROGRESS ADMINISTRATION PROJECTS**

During the biennium two WPA projects operated at Terminal Island. One, now completed, was the erection of a 38x54 foot two-story building, renovation of the biological and office buildings and improvement of the grounds including grading, planting, sidewalks and flagpole. The other is the continuation of a clerical and statistical project begun several years ago in the early days of SERA, and we gratefully acknowledge the very material aid given us by this federal agency.

## REPORT OF THE BUREAU OF HYDRAULICS

By JOHN SPENCER, Chief

This past biennium has been a most active one for this Bureau. Work has materially increased, due to a number of factors and a slight increase in personnel has been necessary.

The Bureau does considerable engineering work for other bureaus, such as surveys, plans and estimates in connection with hatchery water supplies, examination of proposed new sites, and other examinations; designs and investigations for the patrol and game conservation, and such other work as can be done to better advantage by this Bureau. On July 1, 1936, one of the personnel of this Bureau was assigned to the work going forward on the Central Valley Hatchery and so continued until its completion.

The work on fishways has gone forward and a number of new ones have been installed and placed in operation. Installations in place have been checked, and wherever necessary arrangements have been made for repairs or improvements.

The exceptional high waters throughout the State in 1937-1938 took out several dams and some of these will probably not be rebuilt. In addition, it has been possible to effect the removal of a number of other dams that have become obsolete. The removal of these dams very materially improves stream conditions for migrating fish.

On the South Fork of the Eel River is a dam maintained by the Benbow Company which has received considerable attention from the public and conservationists. Much of this adverse criticism had its origin during the early period of construction and use of this dam, and unfortunately, the first concrete fishway was taken out by high waters, due to the poor foundation work by the owners. A temporary fishway was installed and fish, except for a slight delay, passed this barrier. This was replaced by a reinforced concrete structure which has functioned satisfactorily.

In addition, there has been built a second fishway on the opposite side of the dam, and just recently a slight addition has been made with the hope that this fishway will be more effective, though it is doubtful if it can ever be classed as an entirely satisfactory one, as water regulations may not be had and its location is not in the general line of fish movement.

In years past the Fish Conservation Bureau has counted fish at the original fishway, and plans provide for a more elaborate count in the fall of 1938. The information thus obtained will without doubt give considerable data as to the kind and number of fish moving up beyond this barrier.

Every effort is expended to have fishways repaired or improved, or new ones installed on dams where required, without resorting to law. In two cases, however, it was necessary to invoke court action. One of

these was decided in favor of the Commission and the obstruction removed. The other case is still pending.

Of the many adverse conditions affecting fish life in this State the greatest undoubtedly is the passing of fish into the water diversions and their ultimate destruction. This could in a very great measure be prevented by the installation of proper fish screens at or near the head-works of these diversions. This is a phase of the Commission's activities which has been before it for forty years, though accomplishment has been limited as there has been an aversion by the water users to the installation of necessary fish protection.

From 1933, to August, 1937, the fish screen law provided that the cost of installation of fish screens be divided equally between the Commission and the owners, the latter being responsible for the operation and maintenance. The serious defect in this bill, however, was that one-half the cost was to be advanced to the owner by the Commission and there was no provision made whereby the Commission could supervise or protect itself against poor or inefficient construction, with the result that practically nothing was accomplished while this law was in effect. The need for fish screen installation was recognized and it appeared for a time that Federal aid would be received, but this did not materialize and finally the writer entered into a cooperative arrangement with the supervisors of the United States Forest Service in seven of the forests. The Forest Service was to furnish labor and transportation from the CCC camps, and this Commission would furnish design and materials. Under this arrangement sixty-seven diversions were selected by the forest supervisors for fish screen installations and the material for such construction has been on the ground for some time. Some screens have been installed, but due to a decreasing personnel of the CCC camps, extremely heavy fire prevention work, and other causes, progress has not been as rapid as hoped for under this plan. I have been assured by the forest supervisors that they will continue on this work until the screen installations have been effected. This cooperative arrangement has more significance than just the number of fish screens installed, as it directed attention to the need of fish screens and was of general educational value. I desire to express my appreciation for the cooperation and consideration received from the personnel of the United States Forest Service.

In 1937 the legislature rewrote the fish screen law, and in brief, the Commission may now install a fish screen on a water diversion where it is required and bill the owner for one-half the cost; provided, that such installation may be made only after the Commission and the owner have arrived at an agreement as to type, size, location, time of construction, and cost, and failing to agree, the matter is referred to the Chief of the Division of Water Resources, whose decision is final and conclusive. This procedure may consume four months. In addition, an agreement must also be arrived at as to operation and maintenance cost, and failing of agreement the matter is referred to the Director of Finance for his final and conclusive decision. One-half of the cost of operation and maintenance is borne by the Commission, the bills being rendered by the owner of the diversion, with no check provided as to the correctness of the charge.

The exception to this law is that where the water is used for the generation of electric energy the owner of the diversion pays the entire cost of fish screen installation, operation and maintenance.

It appeared that this law was unsatisfactory and unworkable, and the Commission adopted a policy whereby it would replace ineffective screens heretofore installed. This was permitted under a section of the fish screen law.

In December, 1937, I was authorized to proceed under this policy, and on March 1, 1938, a crew started work in Siskiyou County. This work is proceeding at the present time with one crew, and probably best results will be obtained by confining the activities of this crew in one section until the diversions in that section are screened and then move to another location. This will avoid excessive travel and will without doubt actually save more fish, as if one diversion is protected and another is not on the same stream, the loss in the unprotected diversion will without question be greater than that experienced up to this time. Additional funds could be used to advantage to expedite this work.

The two main types of fish screens being installed are a rotary screen, operating counter-currentwise and propelled by a water power wheel; and the other, a parallel steel bar screen with a cleaning attachment operated by a water power wheel. All screens installed are placed within concrete structures and all are of substantial construction and hence will last for many years, requiring the minimum of operation and maintenance expense. Experience to date shows these screens require inspection only at rare intervals.

With respect to fish screens, there is pending a court action which it is hoped will be determined before the next legislative session, as the decision in this case will unquestionably have an important bearing on any future fish screen legislation. Briefly, the history of this case is that the Commission ordered the Pacific Gas and Electric Company to install a fish screen on the outlet of its Fuller Lake, in Nevada County, and thus prevent fish from entering the penstock line to a power house. Under the law the company would have been required to bear the entire cost of installation, as this water is used for the generation of electricity. Extended negotiations were carried on but no satisfactory agreement was reached, and on October 7, 1937, the company filed an injunction proceeding in the Sacramento superior court in an effort to restrain the Commission from enforcing its order requiring a screen on the outlet from this lake. This matter was heard and the superior court found for the company. I understand that an appeal is to be taken by the Attorney General of the State on this matter.

The Bureau of Reclamation of the Department of the Interior is operating within this State in the construction of the Central Valleys project. In the northern part of the State the Shasta Dam is being constructed, and near Fresno the Friant Dam is in process. Connecting canals and other features will have a very material effect on fish life. Under consideration at the present time is the required fish protection for the Contra Costa Canal, which will take water out of Rock Slough, above Antioch. The maximum capacity of this canal is about 350 second feet. Fish protection has been accepted in principle, but the



location, type, and other matters in connection with the protection have not as yet been determined. It is hope that a satisfactory arrangement will be arrived at.

The Bureau of Reclamation is also constructing the Boca Dam on the Little Truckee River in Nevada County, the impounded waters to be used in the State of Nevada. The fish protection for the outlet on this dam has been arranged for and construction is in progress.

The work of the Bureau of Hydraulics is such that it affects individuals and companies using water throughout the State. Practically all people recognize the importance of the State's waters and the users jealously guard their rights. No structure placed in a diversion may interfere with the flow of water or hinder the use thereof. Much of the trouble that this Commission has had in the past with respect to fishways and fish screens has been brought on by lack of understanding as to the water user's viewpoint and needs. Beginning with the writer's first employment with this Commission every effort has been made to bring about a better understanding between the water user and the Commission. It is felt that such improved relations may best be realized by having the responsibilities in connection with the Bureau work rest entirely in the chief in order that a well-defined policy may be carried out; and this will also reflect in more economical operations.

It is to be hoped that the conservationists concerned in the protection of fish life will interest and educate themselves in fishway and fish screen matters, so that they in turn and with understanding will realize the problems of the water users and this Commission and assist in the consummation of better relations.

There is also a need for a more reasonable fish screen law, and it appears that there is a realization that the sportsmen through their agency, the Commission, will necessarily absorb in part, if not entirely, the installation costs—with certain reservations as to special users of water—and the responsibility for operation and maintenance, which will be materially less with good original construction resting upon the owner and the water user.

## REPORT OF THE BUREAU OF LICENSES

By H. R. DUNBAR, Chief

In the report submitted by this bureau for the biennium of 1934-36, statements were given showing the trend of the increase and decrease of the fish and game revenue over a period of eight years. The income for the fiscal year ending June 30, 1937, amounted to \$1,650,995.58, an increase of \$213,298.12. The greater portion of this increase was made up from license sales.

The 1936 series of angling licenses brought in an income of \$608,815.50, the largest sale of angling licenses in the history of the division up to that time.

Hunting licenses and deer tag sales also showed a substantial increase. To take care of this large sale of licenses, the division had the law amended providing for license distribution so that now all licenses are distributed direct to the various license agencies. Approximately 3000 agencies are established throughout the State where angling, hunting, and deer tag licenses may be obtained by the sportsmen. It is the plan of this bureau to increase this number, as we desire to make it possible for the sportsmen to procure licenses wherever they may need them.

On November 1, 1937, at the request of the State Department of Finance, the accounts of all license agencies were transferred from the offices of this bureau to the departmental accounting office. This transfer permits the Bureau of Licenses to devote more time to the establishing of agencies, and contacting agencies already established, explaining the various problems in connection with distribution and license work, particularly the matter of obtaining statistical information on the application as to the previous year's take.

## STATISTICAL REPORTS

### DEPARTMENT OF NATURAL RESOURCES, DIVISION OF FISH AND GAME, STATEMENT OF REVENUE

For the Period July 1, 1936, to June 30, 1937, of the Eighty-eighth Fiscal Year

#### Revenue for the Fish and Game Preservation Fund, Current Year

|   | Detail       | Total          |
|---|--------------|----------------|
| License sales:  |              |                |
| Angling licenses, 1936.....   | \$441,686 50 |                |
| Angling licenses, 1937.....   | 147,116 95   |                |
| Commercial hunting club licenses, 1936-1937.....                      | 750 00       |                |
| Commercial hunting club operators' licenses, 1936-1937.....           | 145 00       |                |
| Deer tags, 1936.....  | 126,852 00   |                |
| Deer tags, 1937.....  | 2 00         |                |
| Fish breeders' licenses, 1936.....                                    | 30 00        |                |
| Fish breeders' licenses, 1937.....                                    | 340 00       |                |
| Fish importers' licenses, 1936.....                                   | 5 00         |                |
| Fish importers' licenses, 1937.....                                   | 80 00        |                |
| Fish packers and wholesale shellfish dealers licenses, 1936-1937..... | 1,130 00     |                |
| Fishing party vessel permit, 1937.....                                | 231 00       |                |
| Fishing party vessel permit, 1936.....                                | 50 00        |                |
| Game breeders' licenses, 1936.....                                    | 120 00       |                |
| Game breeders, 1937.....  | 1,075 00     |                |
| Hunting licenses, 1934-1935.....                                      | 661 16       |                |
| Hunting licenses, 1935-1936.....                                      | 19,851 00    |                |
| Hunting licenses, 1936-1937.....                                      | 414,225 50   |                |
| Hunting licenses, 1937-1938.....                                      | 60 00        |                |
| Kelp licenses, 1936.....  | 10 00        |                |
| Kelp licenses, 1937.....  | 20 00        |                |
| Market fishermen's licenses, 1936-1937.....                           | 41,760 00    |                |
| Market fishermen's licenses, 1937-1938.....                           | 32,690 00    |                |
| Trapping licenses, 1936-1937.....                                     | 2,093 00     |                |
| Total license sales.....  |              | \$1,230,993 11 |
| Other income:   |              |                |
| Court fines.....  | \$63,094 02  |                |
| Fish packers tax.....   | 317,052 19   |                |
| Fish tag sales.....   | 2,727 54     |                |
| Game tag sales.....   | 211 17       |                |
| Importers' contributions.....   | 230 00       |                |
| Interest on bank balances.....  | 6,086 10     |                |
| Kelp tax.....   | 174 80       |                |
| Lease of kelp beds.....   | 1,592 80     |                |
| Miscellaneous sales.....  | 5,651 24     |                |
| Publication sales.....  | 249 43       |                |
| Salmon tax—Chap. 1015-35.....   | 22,893 18    |                |
| Total other income.....   |              | \$419,962 47   |
| Prior year revenue \$7th fiscal year—                                 |              |                |
| Publication sales.....  | \$45 74      |                |
| Total revenue for the Fish and Game Preservation Fund.....            |              | \$1,651,001 32 |
| Revenue for the General Fund—   |              |                |
| Unclaimed checks and deposits.....                                    |              | 2 25           |
| Grand total, all funds.....   |              | \$1,651,003 57 |

## STATEMENT OF EXPENDITURES

For the Period July 1, 1936, to June 30, 1937, of the Eighty-eighth Fiscal Year

| Function   | Salaries and wages | Materials and supplies | Service and expense | Property and equipment | Total        |
|--|--------------------|------------------------|---------------------|------------------------|--------------|
| <b>OPERATING EXPENDITURES, EIGHTY-EIGHTH FISCAL YEAR</b> |                    |                        |                     |                        |              |
| <b>Administration:</b>                                   |                    |                        |                     |                        |              |
| Executive.....   | \$5,000 00         |                        |                     |                        | \$5,000 00   |
| General office.....                                      | 5,670 00           | \$1,701 34             | \$1,487 68          | \$250 31               | 9,109 33     |
| Printing, general.....                                   |                    | 4,148 39               |                     |                        | 4,148 39     |
| Printing Fish and Game Magazine.....                     |                    | 1,623 86               |                     |                        | 1,623 86     |
| Automobiles.....   |                    | 364 27                 |                     |                        | 583 04       |
| Traveling.....   |                    |                        | 218 77              |                        | 2,294 56     |
| Postage.....   |                    |                        | 2,294 56            |                        | 4,105 38     |
| Telephone and telegraph.....                             |                    |                        | 4,105 38            |                        | 4,175 44     |
| Freight, cartage and express.....                        |                    |                        | 4,175 44            |                        | 848 71       |
| Rent.....  |                    |                        | 848 71              |                        | 11,017 61    |
| Accident and death claims.....                           |                    |                        | 11,017 61           |                        | 3,734 55     |
| Departmental administration, pro rata.....               | 12,233 95          |                        | 266 05              |                        | 12,500 00    |
| Librarian.....   | 1,650 00           | 188 23                 | 72 63               | 140 02                 | 2,050 88     |
| Legal.....   |                    |                        | 4,770 83            |                        | 4,770 83     |
| Premiums on bonds.....                                   |                    |                        | 35 00               |                        | 35 00        |
| Publicity.....   |                    |                        | 1,238 22            |                        | 1,238 22     |
| Pro rata General Fund expense, Chap. 923-33.....         |                    |                        | 6,496 93            |                        | 6,496 93     |
| Sales tax on sales.....                                  |                    |                        | — 7 78              |                        | — 7 78       |
| Temporary help.....                                      | 394 19             |                        |                     |                        | 394 19       |
| Total Administration.....                                | \$24,948 14        | \$8,026 09             | \$40,754 58         | \$390 33               | \$74,119 14  |
| <b>Patrol and Law Enforcement:</b>                       |                    |                        |                     |                        |              |
| Chief and assistants.....                                | \$14,653 06        |                        |                     |                        | \$14,653 06  |
| General office.....                                      | 4,852 51           | \$263 78               | \$49 22             | \$68 17                | 5,233 68     |
| Automobiles.....   |                    | 35,539 27              | 15,114 81           | 26,138 20              | 76,792 28    |
| Traveling.....   |                    |                        | 50,603 89           |                        | 50,603 89    |
| Postage.....   |                    |                        | 793 17              |                        | 793 17       |
| Telephone and telegraph.....                             |                    |                        | 2,498 33            |                        | 2,498 33     |
| Freight, cartage and express.....                        |                    |                        | 2 73                |                        | 2 73         |
| Rent.....  |                    |                        | 876 48              |                        | 876 48       |
| Heat, light, water and power.....                        |                    |                        | 8 72                |                        | 8 72         |
| Captains and wardens.....                                | 205,685 86         | 645 37                 | 1,092 37            | 115 41                 | 207,539 01   |
| Launches.....  | 9,986 44           | 11,801 14              | 7,305 93            | 23,510 43              | 52,603 94    |
| Premiums on bonds.....                                   |                    |                        | 63 48               |                        | 63 48        |
| Temporary help.....                                      | 1,642 29           |                        |                     |                        | 1,642 29     |
| Assistant fish and game wardens, seasonal.....           | 22,814 03          |                        |                     |                        | 22,814 03    |
| Total Patrol and Law Enforcement.....                    | \$259,634 19       | \$48,249 56            | \$78,409 13         | \$49,832 21            | \$436,125 09 |
| <b>Commercial Fisheries:</b>                             |                    |                        |                     |                        |              |
| Chief and assistant.....                                 | \$10,440 00        |                        |                     |                        | \$10,440 00  |
| General office.....                                      | 8,419 11           | \$46 24                | \$25 34             | \$278 83               | 8,769 52     |
| Automobiles.....   |                    | 680 17                 | 332 46              | 623 15                 | 1,635 78     |
| Travel.....  |                    |                        | 7,343 61            |                        | 7,343 61     |
| Telephone and telegraph.....                             |                    |                        | 829 90              |                        | 829 90       |
| Freight, cartage and express.....                        |                    |                        | 223 92              |                        | 223 92       |
| Rent.....  |                    |                        | 151 51              |                        | 151 51       |
| Heat, light, water and power.....                        |                    |                        | 623 19              |                        | 623 19       |
| Research, oyster.....                                    | 2,280 00           | 66 59                  |                     |                        | 2,346 59     |
| Laboratory.....  | 30,062 42          | 2,361 55               | 1,712 52            | 2,375 69               | 36,512 18    |
| Fish tags.....   |                    | 327 33                 |                     |                        | 327 33       |
| Cooperative Research.....                                |                    | 30 38                  | 16,000 00           |                        | 16,030 38    |
| Statistics.....  |                    | 1,353 29               | 2,110 39            | 255 21                 | 3,718 89     |
| Temporary help.....                                      | 897 09             |                        |                     |                        | 897 09       |
| Terminal Island grounds.....                             | 1,050 00           | 26 23                  | 9 43                | 7 67                   | 1,093 33     |
| Fish cannery auditing.....                               |                    |                        | 2,665 00            |                        | 2,665 00     |
| Total Commercial Fisheries.....                          | \$53,148 62        | \$4,891 78             | \$32,027 27         | \$3,540 55             | \$93,608 22  |
| <b>Fish Conservation:</b>                                |                    |                        |                     |                        |              |
| Chief and assistant.....                                 | \$6,865 81         | \$4 53                 |                     |                        | \$6,870 34   |
| General office.....                                      | 4,838 12           | 12 26                  | \$13 15             | \$22 19                | 4,885 72     |
| Automobiles.....   |                    | 10,793 10              | 4,397 27            | 5,896 31               | 21,086 68    |
| Travel.....  |                    |                        | 10,062 47           |                        | 10,062 47    |
| Postage.....   |                    |                        | 184 34              |                        | 184 34       |
| Telephone and telegraph.....                             |                    |                        | 1,192 66            |                        | 1,192 66     |
| Freight, cartage and express.....                        |                    |                        | 573 90              |                        | 573 90       |
| Rent.....  |                    |                        | 1,875 49            |                        | 1,875 49     |
| Heat, light, water and power.....                        |                    |                        | 2,338 32            |                        | 2,338 32     |
| Research (oyster).....                                   |                    | 105 51                 | 309 17              | 82 03                  | 496 71       |
| Fish planting.....                                       |                    | 605 69                 | 1,754 77            | 583 50                 | 2,943 96     |
| Hatcheries.....  | 109,402 08         | 59,258 10              | 943 50              | 1,079 29               | 170,682 97   |
| Fish cars.....   | 1,800 00           | 1 44                   | 962 64              |                        | 2,764 08     |
| Blue printing.....                                       |                    |                        | 6 85                |                        | 6 85         |

## STATEMENT OF EXPENDITURES—Continued

For the Period July 1, 1936, to June 30, 1937, of the Eighty-eighth Fiscal Year

| Function  | Salaries and wages  | Materials and supplies | Service and expense | Property and equipment | Total                 |
|---|---------------------|------------------------|---------------------|------------------------|-----------------------|
| <b>Fish Conservation—Continued</b>  |                     |                        |                     |                        |                       |
| Cooperative Research.....   | \$2,263 23          | \$191 13               | \$180 14            | \$21 33                | \$2,655 83            |
| Statistical.....  | 1,598 71            | 77                     | 1,122 99            |                        | 2,722 47              |
| Temporary help.....   | 1,093 69            |                        |                     |                        | 1,093 69              |
| Special field.....  | 13,880 00           | 88 67                  | 10 71               | 11 49                  | 13,990 87             |
| Fish rescue.....  | 1,920 00            | 41                     | 25 50               |                        | 1,945 91              |
| Assistant fish and game wardens—seasonal.....   | 32,670 06           |                        |                     |                        | 32,670 06             |
| <b>Total Fish Conservation.....</b>   | <b>\$176,331 70</b> | <b>\$71,061 61</b>     | <b>\$25,953 87</b>  | <b>\$7,696 14</b>      | <b>\$281,043 32</b>   |
| <b>Hydraulics:</b>  |                     |                        |                     |                        |                       |
| Chief and assistant.....  | \$7,677 96          |                        |                     |                        | \$7,677 96            |
| General office.....   | 1,920 00            | \$72 78                | \$5 86              | \$26 32                | 2,024 96              |
| Automobiles.....  |                     | 364 58                 | 87 20               | 10 97                  | 462 75                |
| Traveling.....  |                     |                        | 2,287 32            |                        | 2,287 32              |
| Telephone and telegraph.....  |                     |                        | 1 20                |                        | 1 20                  |
| Blue printing.....  |                     | 1 65                   | 72 45               |                        | 74 10                 |
| Temporary help.....   | 84 64               |                        |                     |                        | 84 64                 |
| <b>Total hydraulics.....</b>  | <b>\$9,682 60</b>   | <b>\$439 01</b>        | <b>\$2,454 03</b>   | <b>\$37 29</b>         | <b>\$12,612 93</b>    |
| <b>Game Conservation:</b>   |                     |                        |                     |                        |                       |
| Chief and assistants.....   | \$16,033 29         |                        |                     |                        | \$16,033 29           |
| General office.....   | 4,035 00            | \$99 72                | \$27 60             | \$36 77                | 4,199 09              |
| Automobiles.....  |                     | 2,053 20               | 714 80              | 2,623 14               | 5,391 14              |
| Traveling.....  |                     |                        | 4,538 34            |                        | 4,538 34              |
| Telephone and telegraph.....  |                     |                        | 418 33              |                        | 418 33                |
| Freight, cartage and express.....   |                     |                        | 131 13              |                        | 131 13                |
| Heat, light, water and power.....   |                     |                        | 3,333 91            |                        | 3,333 91              |
| Maintenance of game farms.....  | 12,098 97           | 17,104 18              | 560 40              | 3,039 09               | 32,802 64             |
| Statistics.....   | 758 87              | 1 22                   | 1,101 20            |                        | 1,861 29              |
| Temporary help.....   | 8,486 46            |                        |                     |                        | 8,486 46              |
| Maintenance of game refuges.....  | 4,358 00            | 2,308 39               | 751 70              | 705 52                 | 8,123 61              |
| <b>Total Game Conservation.....</b>   | <b>\$45,770 59</b>  | <b>\$21,566 71</b>     | <b>\$11,577 41</b>  | <b>\$6,404 52</b>      | <b>\$85,319 23</b>    |
| <b>Licenses:</b>  |                     |                        |                     |                        |                       |
| General office.....   | \$14,850 00         | \$923 50               | \$215 60            | \$27 16                | \$16,016 26           |
| Printing licenses and applications.....   |                     | 3,466 93               |                     |                        | 3,466 93              |
| Traveling.....  |                     |                        | 384 27              |                        | 384 27                |
| Postage.....  |                     |                        | 1,136 13            |                        | 1,136 13              |
| Freight, cartage and express.....   |                     |                        | 43 39               |                        | 43 39                 |
| Premiums on bonds.....  |                     |                        | 1,253 67            |                        | 1,253 67              |
| Identification license buttons.....   |                     | 9,657 21               |                     |                        | 9,657 21              |
| License commissions.....  |                     |                        | 54,993 46           |                        | 54,993 46             |
| <b>Total licenses.....</b>  | <b>\$14,850 00</b>  | <b>\$14,047 64</b>     | <b>\$58,026 52</b>  | <b>\$27 16</b>         | <b>\$86,951 32</b>    |
| <b>Special Item:</b>  |                     |                        |                     |                        |                       |
| State Fair and other exhibits (payable from support, Chap. 341-35 or E. O. for support) | \$40 00             | \$117 37               | \$1,200 00          |                        | \$1,357 37            |
| Total eighty-eighth fiscal year expense paid from support appropriations.....           | \$584,405 84        | \$168,399 77           | \$250,402 81        | \$67,928 20            | \$1,071,136 62        |
| Prior year, eighty-seventh fiscal year for support.....                                 |                     |                        |                     |                        | 54 34                 |
| <b>Total eighty-seventh and eighty-eighth fiscal years for support.....</b>             |                     |                        |                     |                        | <b>\$1,071,190 96</b> |
| <b>Special Items:</b>   |                     |                        |                     |                        |                       |
| <b>Predatory Animal Control:</b>  |                     |                        |                     |                        |                       |
| <b>Eighty-eighth fiscal year:</b>   |                     |                        |                     |                        |                       |
| Chief and assistant.....  | \$3,700 00          |                        |                     |                        | \$3,700 00            |
| General office.....   | 897 72              |                        |                     | \$25 00                | 922 72                |
| Automobiles.....  |                     | \$3,321 63             | \$964 67            | 650 87                 | 4,937 17              |
| Traveling.....  |                     |                        | 3,152 36            |                        | 3,152 36              |
| Predatory animal control.....   | 20,765 76           | 1,420 37               | 6,354 99            | 15 14                  | 28,556 26             |
| Predatory animal hunters and trappers, seasonal.....                                    | 6,000 00            |                        |                     |                        | 6,000 00              |
| Freight, cartage and express.....   |                     |                        | 4 65                |                        | 4 65                  |
| <b>Total eighty-eighth fiscal year.....</b>   | <b>\$31,363 48</b>  | <b>\$4,742 00</b>      | <b>\$10,476 67</b>  | <b>\$691 01</b>        | <b>\$47,273 16</b>    |
| <b>Total expenditures, eighty-seventh and eighty-eighth fiscal years.....</b>           |                     |                        |                     |                        | <b>\$1,118,464 12</b> |

## STATEMENT OF EXPENDITURES—Continued

For the Period July 1, 1936, to June 30, 1937, of the Eighty-eighth Fiscal Year

| Function   | Salaries and wages | Materials and supplies | Service and expense | Property and equipment | Total          |
|--|--------------------|------------------------|---------------------|------------------------|----------------|
| Expenditures for Additions and Betterments:  |                    |                        |                     |                        |                |
| Permanent Improvements:  |                    |                        |                     |                        |                |
| Purchase of game refuges and public shooting grounds, and C. I. E. Chapter 341-35. | \$16,094 67        | \$26,221 94            | \$8,729 14          | \$18,596 26            | \$69,642 01    |
| Contribution to Employees' Retirement System, eighty-eighth fiscal year.           |                    |                        |                     |                        | 17,035 24      |
| Total current biennium   |                    |                        |                     |                        | \$1,205,141 37 |
| Special Items:   |                    |                        |                     |                        |                |
| Construction of Russian River jetties, Chapter 989-33:                             |                    |                        |                     |                        |                |
| Eighty-eighth fiscal year  |                    |                        | \$215 25            |                        | \$215 25       |
| California Code Commission, Chap. 645-33   |                    |                        | 1 50                |                        | 1 50           |
| Total operating expenditures, eighty-eighth fiscal year                            |                    |                        | \$216 75            |                        | \$216 75       |
| Grand totals   |                    |                        |                     |                        | \$1,205,358 12 |

## REPORTS

### DEPARTMENT OF NATURAL RESOURCES, DIVISION OF FISH AND GAME, STATEMENT OF REVENUE

For the Period July 1, 1937, to June 30, 1938, of the Eighty-ninth Fiscal Year

Revenue for the Fish and Game Preservation Fund, Current Year

|  | Detail       | Total          |
|--|--------------|----------------|
| License sales:   |              |                |
| Hunting, 1936-1937.....                                      | \$20,000 50  |                |
| Hunting, 1937-1938.....                                      | 418,934 53   |                |
| Hunting, 1938-1939.....                                      | 142 00       |                |
| Angling, 1937.....   | 391,848 35   |                |
| Angling, 1938.....   | 237,733 19   |                |
| Trapping, 1937-1938.....                                     | 2,574 00     |                |
| Trapping, 1938-1939.....                                     | 3 00         |                |
| Deer tags, 1937.....   | 124,109 68   |                |
| Deer tags, 1938.....   | 80 00        |                |
| Market fisherman, 1937-1938.....                             | 45,020 00    |                |
| Market fisherman, 1938-1939.....                             | 25,380 00    |                |
| Game breeders, 1937.....                                     | 117 50       |                |
| Game breeders, 1938.....                                     | 982 50       |                |
| Fish breeders, 1937.....                                     | 40 00        |                |
| Fish breeders, 1938.....                                     | 355 00       |                |
| Fish importers, 1937.....                                    | 20 00        |                |
| Fish importers, 1938.....                                    | 95 00        |                |
| Fish packers and wholesale shellfish dealers, 1937-1938..... | 1,070 00     |                |
| Fish packers and wholesale shellfish dealers, 1938-1939..... | 30 00        |                |
| Kelp license, 1937.....                                      | 20 00        |                |
| Kelp license, 1938.....                                      | 20 00        |                |
| Commercial hunting club, 1937-1938.....                      | 900 00       |                |
| Commercial hunting club operator, 1937-1938.....             | 280 00       |                |
| Fishing party boat permit, 1937.....                         | 186 00       |                |
| Fishing party boat permit, 1938.....                         | 377 00       |                |
| Fish tags.....   | 3,815 97     |                |
| Game tags.....   | 243 41       |                |
| Total license revenue.....                                   |              | \$1,274,377 63 |
| Other revenue:   |              |                |
| Fish packers tax.....  | \$237,688 40 |                |
| Salmon packers tax.....                                      | 37,284 65    |                |
| Kelp tax.....  | 253 45       |                |
| Lease of kelp beds.....                                      | 1,666 36     |                |
| Court fines.....   | 42,212 25    |                |
| Interest on bank balances.....                               | 712 73       |                |
| Publication sales.....                                       | 15 01        |                |
| Other miscellaneous sales.....                               | 5,285 45     |                |
| Total other revenue.....                                     |              | \$325,118 30   |
| Total revenue Fish and Game Preservation Fund.....           |              | \$1,599,495 93 |

## STATEMENT OF EXPENDITURES

For the Period July 1, 1937, to June 30, 1938, of the Eighty-ninth Fiscal Year

| Function  | Salaries and wages  | Materials and supplies | Service and expense | Property and equipment | Total               |
|---|---------------------|------------------------|---------------------|------------------------|---------------------|
| <b>OPERATING EXPENDITURES, EIGHTY-NINTH FISCAL YEAR</b> |                     |                        |                     |                        |                     |
| <b>Administration:</b>                                  |                     |                        |                     |                        |                     |
| Accident and death claims.....                          |                     |                        | \$2,255 29          |                        | \$2,255 29          |
| Cashier.....  | \$1,200 00          |                        |                     |                        | 1,200 00            |
| Executive.....  | 5,000 00            | \$233 08               | 3,352 10            | \$919 13               | 9,504 31            |
| Exhibits.....   |                     |                        | 1,200 00            |                        | 1,200 00            |
| General office.....                                     | 7,523 38            | 6,399 93               | 19,748 61           | 521 21                 | 34,193 13           |
| Legal.....  |                     |                        | 6,894 17            |                        | 6,894 17            |
| Library.....  | 1,800 00            | 43 23                  | 143 15              | 696 69                 | 2,683 07            |
| Property inspection.....                                | 741 33              | 35 27                  | 137 29              | 818 44                 | 1,732 33            |
| Pro rata department administration.....                 | 10,000 00           |                        | 6,000 00            |                        | 16,000 00           |
| Pro rata General Fund expense.....                      |                     |                        | 9,990 89            |                        | 9,990 89            |
| Publicity.....  |                     |                        | 2,035 88            |                        | 2,035 88            |
| <b>Total Administration.....</b>                        | <b>\$26,264 71</b>  | <b>\$6,711 51</b>      | <b>\$51,757 38</b>  | <b>\$2,955 47</b>      | <b>\$87,689 07</b>  |
| <b>Patrol and Law Enforcement:</b>                      |                     |                        |                     |                        |                     |
| Cannery inspection.....                                 | \$17,403 27         | \$1,009 04             | \$2,740 14          | \$266 48               | \$21,418 93         |
| Executive.....  | 14,220 00           | 874 22                 | 2,634 29            | 680 81                 | 18,409 32           |
| General office.....                                     | 5,947 80            | 940 25                 | 1,947 08            | 1,031 32               | 9,866 45            |
| Junior patrol.....                                      | 2,626 02            | 330 04                 | 677 64              |                        | 3,633 70            |
| Land patrol.....  | 191,731 55          | 37,471 22              | 64,147 88           | 35,203 03              | 325,553 68          |
| Marine patrol.....                                      | 52,800 61           | 20,210 59              | 33,517 21           | 17,786 67              | 124,315 08          |
| Pollution patrol.....                                   | 7,047 52            | 1,917 47               | 4,122 47            | 738 10                 | 13,825 56           |
| <b>Total, Patrol and Law Enforcement.....</b>           | <b>\$291,776 77</b> | <b>\$62,752 83</b>     | <b>\$109,786 71</b> | <b>\$55,706 41</b>     | <b>\$520,022 72</b> |
| <b>Marine Fisheries:</b>                                |                     |                        |                     |                        |                     |
| Executive.....  | \$7,320 00          | \$185 85               | \$503 21            | \$791 69               | \$8,800 75          |
| Field supervision.....                                  | 3,200 00            | 353 72                 | 1,894 81            |                        | 5,448 53            |
| Fish cannery auditing.....                              |                     |                        | 2,697 46            |                        | 2,697 46            |
| General office.....                                     | 8,535 39            | 142 30                 | 924 85              | 297 54                 | 9,920 28            |
| Research and statistics.....                            | 40,512 68           | 5,870 99               | 11,275 58           | 2,534 75               | 60,494 00           |
| <b>Total Marine Fisheries.....</b>                      | <b>\$59,588 27</b>  | <b>\$6,532 86</b>      | <b>\$17,295 91</b>  | <b>\$3,923 98</b>      | <b>\$87,361 02</b>  |
| <b>Fish Conservation:</b>                               |                     |                        |                     |                        |                     |
| Cooperative Research, Stanford University.....          | \$3,869 67          | \$289 43               | \$804 04            | \$696 82               | \$5,659 96          |
| Executive.....  | 6,460 00            | 235 61                 | 602 22              | 1,026 58               | 8,324 41            |
| Field supervision.....                                  | 10,059 15           | 1,307 04               | 3,788 47            | 3,123 86               | 18,278 52           |
| Fish planting.....                                      | 2,683 87            | 1,418 54               | 1,970 42            | 4,334 24               | 10,407 07           |
| Fish rescue.....  | 5,407 85            | 561 22                 | 1,507 10            | 2,179 29               | 9,655 46            |
| General office.....                                     | 4,756 40            | 1,003 86               | 55 84               | 452 27                 | 6,268 37            |
| Pollution inspection.....                               | 3,120 00            | 390 87                 | 763 87              | 38 56                  | 4,313 30            |
| Research.....   | 2,142 10            | 404 47                 | 1,004 08            | 428 46                 | 3,979 11            |
| Statistical.....  | 2,280 00            | 105 54                 | 1,050 50            | 109 09                 | 3,545 13            |
| Alpine.....   | 1,313 04            | 729 68                 | 304 26              | 550 65                 | 2,897 63            |
| Basin Creek.....  | 4,690 42            | 2,532 17               | 440 69              | 568 04                 | 8,231 32            |
| Bear Lake Egg Collecting Station.....                   | 433 87              | 105 47                 | 29 80               |                        | 569 14              |
| Beaver Creek Egg Collecting Station.....                | 250 00              |                        | 75 00               |                        | 325 00              |
| Beaver Creek.....                                       | 148 55              | 46 90                  | 8 58                |                        | 204 03              |
| Big Creek.....  | 3,331 67            | 2,600 55               | 326 80              | 557 36                 | 6,816 38            |
| Blackwood.....  | 302 81              | 218 39                 | 1 00                |                        | 522 20              |
| Blue Lakes Egg Collecting Station.....                  | 590 00              | 7 08                   | 16 00               | 105 55                 | 718 63              |
| Bogus Creek Egg Collecting Station.....                 | 407 09              | 79 94                  | 177 10              |                        | 664 13              |
| Brookdale.....  | 3,285 32            | 1,846 21               | 438 10              | 19 78                  | 5,589 41            |
| Burney Creek Hatchery.....                              | 5,500 09            | 3,369 62               | 885 77              | 611 62                 | 10,367 10           |
| Carmen Lake Egg Collecting Station.....                 | 312 00              | 2 24                   | 10 43               |                        | 324 67              |
| Central Valleys.....                                    | 3,565 14            | 1,544 46               | 1,913 70            | 2,202 68               | 9,225 98            |
| Cold Creek.....   | 2,492 27            | 1,807 59               | 617 71              | 579 48                 | 5,497 05            |
| Cottonwood Lakes Egg Collecting Station.....            | 263 04              | 43 05                  | 75 23               |                        | 381 32              |
| Deep Creek Egg Collecting Station.....                  | 200 00              |                        |                     |                        | 200 00              |
| Fall Creek Egg Collecting Station.....                  |                     | 29 21                  | 85 00               |                        | 114 21              |
| Fall Creek.....   | 6,178 55            | 5,002 96               | 256 99              | 6 06                   | 11,444 56           |
| Feather River.....                                      | 4,045 21            | 2,063 92               | 500 73              | 247 05                 | 6,856 91            |
| Fern Creek.....   | 1,667 89            | 373 61                 | 62 97               |                        | 2,104 47            |
| Fishing Creek Experiment Station.....                   | 358 06              | 22 25                  | 155 31              |                        | 535 62              |
| Forest Home.....  | 10,754 02           | 9,385 21               | 3,049 02            | 293 39                 | 23,481 64           |
| Fort Seward.....  | 4,294 71            | 1,210 22               | 156 55              | 708 72                 | 6,370 20            |
| Hat Creek Egg Collecting Station.....                   | 130 00              | 113 98                 |                     |                        | 243 98              |
| Hornbrook Egg Collecting Station.....                   | 243 84              | 58 63                  | 112 97              | 20 77                  | 436 21              |
| Hot Creek Hatchery.....                                 | 2,928 56            | 2,455 29               | 194 10              | 14 32                  | 5,592 27            |



## STATEMENT OF EXPENDITURES—Continued

For the Period July 1, 1937, to June 30, 1938, of the Eighty-ninth Fiscal Year

| Function                                       | Salaries and wages | Materials and supplies | Service and expense | Property and equipment | Total        |
|--|--------------------|------------------------|---------------------|------------------------|--------------|
| <b>Fish Conservation—Continued</b>             |                    |                        |                     |                        |              |
| Huntington Lake.....                           | \$731 99           | \$594 20               | \$256 76            | \$30 18                | \$1,613 13   |
| June Lake Egg Collecting Station.....          |                    |                        | 3 96                |                        | 3 96         |
| Kaweah.....                                    | 4,583 23           | 2,015 94               | 1,175 08            | 150 32                 | 7,924 57     |
| Kings River Hatchery.....                      | 4,257 61           | 1,327 01               | 1,336 25            | 47 87                  | 6,968 74     |
| Klamathon Egg Collecting Station.....          | 1,412 91           | 121 48                 | 321 76              | 12 21                  | 1,868 36     |
| Kosk Creek Egg Collecting Station.....         |                    | 8 44                   |                     |                        | 8 44         |
| Lake Almanor.....                              | 5,989 13           | 2,077 00               | 1,007 02            | 167 22                 | 9,240 37     |
| Lake Eleanor Egg Collecting Station.....       |                    | 18 94                  |                     |                        | 18 94        |
| Little Walker Lake Egg Collecting Station..... | 259 03             |                        |                     |                        | 259 03       |
| Madera.....                                    | 1,170 00           | 697 22                 | 326 41              | 11 02                  | 2,204 65     |
| Marlette Lake Egg Collecting Station.....      | 713 17             | 4 79                   | 56 90               |                        | 774 86       |
| Mt. Shasta Experiment Hatchery.....            | 1,061 29           | 619 29                 | 33 59               |                        | 1,714 17     |
| Mount Shasta.....                              | 28,990 38          | 17,345 83              | 2,915 92            | 235 65                 | 49,487 78    |
| Mount Tallac.....                              | 1,705 65           | 1,509 42               | 100 52              |                        | 3,315 59     |
| Mount Whitney.....                             | 11,012 85          | 4,474 64               | 2,329 00            | 882 21                 | 18,698 70    |
| Mud Creek Egg Collecting Station.....          | 259 49             | 17 97                  | 3 00                | 4 50                   | 284 96       |
| Pasadena Reservoir Egg Collecting Station..... | 325 00             | 4 81                   | 17 25               |                        | 347 06       |
| Prairie Creek.....                             | 5,528 15           | 1,659 84               | 557 18              | 640 09                 | 8,385 26     |
| Rush Creek Egg Collecting Station.....         | 511 21             | 49 81                  |                     |                        | 561 02       |
| San Lorenzo Egg Collecting Station.....        | 8 00               | 128 72                 | 1 00                |                        | 137 72       |
| Scott Creek.....                               | 1,500 00           | 140 40                 | 148 25              |                        | 1,788 65     |
| Shackleford Creek Egg Collecting Station.....  | 456 00             | 36 55                  | 70 00               |                        | 562 55       |
| Shasta River Experiment Station.....           | 152 00             | 94 74                  | 184 20              |                        | 430 94       |
| Shasta River Egg Collecting Station.....       | 853 54             | 150 33                 | 49 23               | 6 64                   | 1,059 74     |
| Snow Mountain Egg Collecting Station.....      | 2,305 61           | 257 91                 | 223 02              | 19 68                  | 2,806 22     |
| Tahoe.....                                     | 5,730 35           | 1,959 63               | 677 48              | 895 66                 | 9,263 12     |
| Taylor Creek Egg Collecting Station.....       |                    |                        |                     |                        |              |
| Upper Truckee Egg Collecting Station.....      | 254 84             | 48 34                  |                     |                        | 303 18       |
| Waddell Creek Station.....                     | 831 94             | 31 24                  | 53 09               | 21 95                  | 938 22       |
| Warner Creek Station.....                      | 402 53             | 54 35                  | 2 40                |                        | 459 28       |
| Yosemite.....                                  | 3,926 25           | 1,388 35               | 313 47              | 155 83                 | 5,783 90     |
| Yuba River.....                                | 3,176 64           | 1,252 10               | 318 02              | 3 12                   | 4,749 88     |
| Total Fish Conservation.....                   | \$186,576 98       | \$79,454 50            | \$33,921 11         | \$22,158 79            | \$322,111 38 |
| <b>Hydraulics:</b>                             |                    |                        |                     |                        |              |
| Engineering.....                               | \$4,911 43         | \$652 56               | \$1,965 65          | \$1,571 77             | \$9,101 41   |
| Executive.....                                 | 4,140 00           | 348 52                 | 857 49              | 623 41                 | 5,969 42     |
| Fish screens.....                              | 3,449 16           | 3,145 28               | 130 28              | 3,684 25               | 10,408 97    |
| General office.....                            | 1,920 00           | 93 43                  | 158 86              | 201 16                 | 2,373 45     |
| Total Hydraulics.....                          | \$14,420 59        | \$4,239 79             | \$3,112 28          | \$6,080 59             | \$27,853 25  |
| <b>Game Conservation:</b>                      |                    |                        |                     |                        |              |
| Elk refuge.....                                | \$2,176 32         | \$407 45               | \$539 33            | \$180 12               | \$3,303 22   |
| Executive.....                                 | 12,122 50          | 979 54                 | 2,334 68            | 578 03                 | 16,014 75    |
| Field.....                                     |                    |                        |                     | 17 06                  | 17 06        |
| Game bird distribution.....                    | 800 00             | 3,166 56               | 1,114 27            | 734 65                 | 5,815 48     |
| Game bird trapping.....                        |                    | 56 95                  |                     |                        | 56 95        |
| General office.....                            | 4,278 89           | 152 31                 | 28 45               | 103 06                 | 4,502 71     |
| Grey Lodge refuge.....                         | 3,880 00           | 1,547 34               | 1,994 19            | 1,155 36               | 8,576 89     |
| Imperial refuge.....                           | 1,895 16           | 367 46                 | 86 13               | 492 25                 | 2,841 01     |
| Los Banos refuge.....                          | 3,111 10           | 585 25                 | 632 50              | 633 39                 | 4,962 24     |
| Los Serranos game farm.....                    | 14,732 39          | 6,644 53               | 8,225 56            | 2,439 73               | 26,642 21    |
| Predatory animal control.....                  | 31,771 73          | 5,018 98               | 14,332 33           | 2,472 05               | 53,595 09    |
| Research.....                                  | 496 43             | 74 22                  | 295 57              | 718 05                 | 1,584 27     |
| Statistics.....                                | 1,412 74           | 57 97                  | 1,103 37            |                        | 2,574 08     |
| Suisun refuge.....                             | 2,151 77           | 742 68                 | 523 54              | 132 00                 | 3,549 99     |
| Winter feeding and salting of game.....        |                    | 475 12                 |                     |                        | 475 12       |
| Yountville game farm.....                      | 16,836 55          | 11,075 72              | 4,281 75            | 1,735 07               | 33,929 09    |
| Total Game Conservation.....                   | \$95,665 58        | \$31,352 08            | \$30,091 67         | \$11,390 83            | \$168,500 16 |
| <b>Licenses:</b>                               |                    |                        |                     |                        |              |
| Executive.....                                 | \$3,300 00         | \$60 43                | \$168 68            | \$1,071 20             | \$4,600 31   |
| General office.....                            | 1,543 67           | 171 22                 | 1,828 99            | 4,172 24               | 7,716 12     |
| License distribution.....                      | 10,987 63          | 17,856 78              | 60,973 23           | 355 15                 | 90,172 79    |
| Total Licenses.....                            | \$15,831 30        | \$18,088 43            | \$62,970 90         | \$5,598 59             | \$102,489 22 |

## STATEMENT OF EXPENDITURES—Continued

For the Period July 1, 1937, to June 30, 1938, of the Eighty-ninth Fiscal Year

| Function   | Salaries and wages | Materials and supplies | Service and expense | Property and equipment | Total          |
|--|--------------------|------------------------|---------------------|------------------------|----------------|
| Special Items:   |                    |                        |                     |                        |                |
| Cons. of research boat.....  |                    |                        |                     | \$37,504 00            | \$37,504 00    |
| Improvement of office, Ferry Bldg., San Francisco.....                             |                    |                        | \$25,000 00         |                        | 25,000 00      |
| Total Special Items.....   |                    |                        | \$25,000 00         | \$37,504 00            | \$62,504 00    |
| Total 89th fiscal year expenses paid from Support appropriations.....              |                    |                        |                     |                        | \$137,530 82   |
| Claim of Chief Accounting Officer, Dept. of Finance, Ch. 772-37.....               |                    |                        |                     |                        | 3,293 65       |
| Expenditures for Additions and Betterments:  |                    |                        |                     |                        |                |
| Permanent Improvements:  |                    |                        |                     |                        |                |
| Purchase of game refuges and public shooting grounds and C. I. E., Ch. 157-37..... | \$3,603 09         | \$8,968 02             | \$2,036 29          | \$1,690 85             | \$16,298 25    |
| Contributions to Employees' Retirement System.....                                 |                    |                        |                     |                        | 23,948 80      |
| Total current biennium.....  |                    |                        |                     |                        | \$1,422,371 52 |
| 89th fiscal year:  |                    |                        |                     |                        |                |
| Special Item: Expenses of California Code Commission, Ch. 645-33.....              |                    |                        |                     | \$0 37                 | \$0 37         |
| Support:   |                    |                        |                     |                        |                |
| Eighty-eighth fiscal year.....   |                    |                        |                     | \$53 57                |                |
| Eighty-fifth fiscal year.....  |                    |                        |                     | 106 50                 |                |
| Total Support.....   |                    |                        |                     |                        | \$160 07       |
| Special Item: Predatory animal control, 85th fiscal year.....                      |                    |                        |                     | -\$106 50              | -\$106 50      |
| Total prior biennium appropriations.....   |                    |                        |                     |                        | \$53 94        |
| Grand total.....   |                    |                        |                     |                        | \$1,422,425 46 |

## ANGLING LICENSE SALES, YEAR 1936

| County             | Total        | Citizen      | Duplicate | Non-resident | Alien       |
|--------------------|--------------|--------------|-----------|--------------|-------------|
| Alameda            | \$51,967 00  | \$51,070 00  | \$29 00   | \$78 00      | \$790 00    |
| Alpine             | 655 50       | 218 00       | 2 50      | 225 00       | 170 00      |
| Amador             | 2,075 00     | 2,048 00     | 2 00      |              | 25 00       |
| Butte              | 7,328 50     | 7,266 00     | 10 50     | 12 00        | 40 00       |
| Calaveras          | 1,380 50     | 1,372 00     | 50        | 3 00         | 5 00        |
| Colusa             | 1,274 00     | 1,268 00     | 1 00      |              | 5 00        |
| Contra Costa       | 14,011 50    | 13,670 00    | 11 50     | 15 00        | 315 00      |
| Del Norte          | 4,299 50     | 3,820 00     | 6 50      | 438 00       | 35 00       |
| El Dorado          | 4,124 50     | 4,058 00     | 7 50      | 24 00        | 35 00       |
| Fresno             | 18,444 00    | 18,226 00    | 18 00     | 15 00        | 185 00      |
| Glenn              | 1,289 00     | 1,276 00     | 4 00      | 9 00         |             |
| Humboldt           | 10,804 00    | 10,726 00    | 6 00      | 57 00        | 15 00       |
| Imperial           | 944 00       | 944 00       |           |              |             |
| Inyo               | 7,061 00     | 6,866 00     | 11 00     | 144 00       | 40 00       |
| Kern               | 8,536 50     | 8,528 00     | 8 50      |              |             |
| Kings              | 2,035 50     | 1,976 00     | 4 50      |              | 55 00       |
| Lake               | 1,762 50     | 1,748 00     | 2 50      | 12 00        |             |
| Lassen             | 2,443 50     | 2,850 00     | 5 50      | 48 00        | 40 00       |
| Los Angeles        | 142,319 00   | 139,048 00   | 186 00    | 225 00       | 2,860 00    |
| Madera             | 3,088 00     | 3,070 00     | 3 00      |              | 15 00       |
| Marin              | 7,313 00     | 7,064 00     | 11 00     | 18 00        | 130 00      |
| Mariposa           | 3,146 00     | 2,880 00     | 5 00      | 141 00       | 20 00       |
| Mendocino          | 5,749 50     | 5,614 00     | 6 50      | 24 00        | 25 00       |
| Mered              | 3,432 00     | 3,378 00     | 4 00      | 15 00        | 35 00       |
| Modoc              | 1,862 00     | 1,828 00     | 1 00      | 33 00        |             |
| Mono               | 11,470 00    | 6,476 00     | 4 00      | 4,965 00     | 25 00       |
| Monterey           | 6,342 50     | 5,882 00     | 12 50     | 3 00         | 445 00      |
| Napa               | 4,695 00     | 4,102 00     | 15 00     | 3 00         | 75 00       |
| Nevada             | 6,158 50     | 5,372 00     | 9 50      | 597 00       | 180 00      |
| Orange             | 13,016 00    | 12,544 00    | 6 00      | 21 00        | 45 00       |
| Placer             | 5,280 50     | 5,136 00     | 5 50      | 69 00        | 70 00       |
| Plumas             | 5,954 50     | 5,686 00     | 17 50     | 201 00       | 80 00       |
| Riverside          | 5,769 00     | 5,706 00     | 5 00      | 3 00         | 55 00       |
| Sacramento         | 23,443 50    | 20,936 00    | 108 50    | 84 00        | 2,315 00    |
| San Benito         | 1,006 50     | 960 00       | 1 50      |              | 45 00       |
| San Bernardino     | 13,613 00    | 13,504 00    | 3 00      | 21 00        | 25 00       |
| San Diego          | 20,047 00    | 19,612 00    | 14 00     | 186 00       | 155 00      |
| San Francisco      | 50,223 00    | 48,650 00    | 233 00    | 50 00        | 650 00      |
| San Joaquin        | 16,232 00    | 15,648 00    | 10 00     | 24 00        | 550 00      |
| San Luis Obispo    | 9,818 50     | 9,668 00     | 9 50      | 6 00         | 135 00      |
| San Mateo          | 4,767 00     | 4,514 00     | 3 00      |              | 170 00      |
| Santa Barbara      | 7,121 50     | 7,058 00     | 2 50      | 21 00        | 40 00       |
| Santa Clara        | 14,612 50    | 14,170 00    | 13 50     | 9 00         | 420 00      |
| Santa Cruz         | 7,143 00     | 6,816 00     | 13 00     | 9 00         | 305 00      |
| Shasta             | 5,789 50     | 5,616 00     | 6 50      | 42 00        | 45 00       |
| Sierra             | 1,423 00     | 1,248 00     | 3 00      | 162 00       | 10 00       |
| Siskiyou           | 8,379 00     | 7,686 00     | 9 00      | 309 00       | 375 00      |
| Solano             | 10,162 00    | 9,772 00     | 20 00     |              | 370 00      |
| Sonoma             | 11,960 00    | 11,706 00    | 20 00     | 39 00        | 225 00      |
| Stanislaus         | 7,742 00     | 7,632 00     | 14 00     | 21 00        | 75 00       |
| Sutter             | 1,187 00     | 1,146 00     | 3 00      | 3 00         | 35 00       |
| Tehama             | 2,710 00     | 2,700 00     | 7 00      | 3 00         |             |
| Trinity            | 1,132 00     | 1,126 00     | 3 00      | 3 00         |             |
| Tulare             | 7,789 50     | 7,652 00     | 6 50      | 36 00        | 95 00       |
| Tuolumne           | 3,783 50     | 3,756 00     | 4 50      | 3 00         | 20 00       |
| Ventura            | 5,919 00     | 5,878 00     | 1 00      |              | 40 00       |
| Yolo               | 2,604 00     | 2,524 00     | 2 00      | 3 00         | 75 00       |
| Yuba               | 3,356 00     | 3,156 00     | 4 00      | 6 00         | 150 00      |
| Totals             | \$608,515 50 | \$586,600 00 | \$637 50  | \$8,478 00   | \$12,440 00 |
| Number of licenses | 500,611      | 293,330      | 1,875     | 2,826        | 2,580       |

## ANGLING LICENSE SALES, YEAR 1937

| County          | Total        | Citizen      | Duplicate | Non-resident | Alien       |
|-----------------|--------------|--------------|-----------|--------------|-------------|
| Alameda         | \$55,157 00  | \$54,794 00  | \$39 00   | \$69 00      | \$255 00    |
| Alpine          | 671 50       | 358 00       | 50        | 303 00       | 10 00       |
| Amador          | 2,074 50     | 2,064 00     | 50        |              | 10 00       |
| Butte           | 7,665 00     | 7,576 00     | 6 00      | 33 00        | 50 00       |
| Calaveras       | 1,502 50     | 1,486 00     | 50        | 6 00         | 10 00       |
| Colusa          | 1,318 00     | 1,276 00     | 2 00      | 15 00        | 25 00       |
| Contra Costa    | 15,831 50    | 15,414 00    | 18 50     | 24 00        | 375 00      |
| Del Norte       | 3,853 50     | 3,436 00     | 2 50      | 375 00       | 40 00       |
| El Dorado       | 4,488 00     | 4,368 00     | 5 00      | 90 00        | 25 00       |
| Fresno          | 18,049 50    | 17,662 00    | 11 50     | 21 00        | 355 00      |
| Glenn           | 1,298 00     | 1,236 00     | 1 00      | 36 00        | 25 00       |
| Humboldt        | 12,167 50    | 11,920 00    | 7 50      | 150 00       | 90 00       |
| Imperial        | 1,240 00     | 1,240 00     |           |              |             |
| Inyo            | 4,152 50     | 3,946 00     | 4 50      | 177 00       | 25 00       |
| Kern            | 9,560 50     | 9,492 00     | 4 50      | 24 00        | 40 00       |
| Kings           | 2,511 50     | 2,444 00     | 2 50      | 15 00        | 50 00       |
| Lake            | 1,788 00     | 1,774 00     | 1 00      | 3 00         | 10 00       |
| Lassen          | 3,460 00     | 3,280 00     | 3 50      | 102 00       | 75 00       |
| Los Angeles     | 141,302 50   | 140,224 00   | 23 50     | 345 00       | 710 00      |
| Madera          | 3,125 50     | 3,084 00     | 1 00      | 15 00        | 25 00       |
| Marin           | 8,397 00     | 8,164 00     | 2 00      | 81 00        | 150 00      |
| Mariposa        | 2,744 00     | 2,682 00     | 5 00      | 27 00        | 30 00       |
| Mendocino       | 6,211 00     | 6,156 00     | 4 00      | 6 00         | 45 00       |
| Merced          | 3,802 50     | 3,742 00     | 2 50      | 33 00        | 25 00       |
| Modoc           | 1,872 00     | 1,842 00     |           | 30 00        |             |
| Mono            | 8,050 50     | 6,312 00     | 5 50      | 1,683 00     | 50 00       |
| Monterey        | 7,034 50     | 6,522 00     | 7 50      | 15 00        | 490 00      |
| Napa            | 5,213 50     | 5,164 00     | 10 50     | 9 00         | 30 00       |
| Nevada          | 6,598 50     | 5,550 00     | 7 50      | 906 00       | 135 00      |
| Orange          | 11,841 00    | 11,768 00    |           | 33 00        | 40 00       |
| Placer          | 5,652 00     | 5,480 00     | 12 00     | 75 00        | 85 00       |
| Plumas          | 6,557 00     | 6,078 00     | 29 00     | 300 00       | 150 00      |
| Riverside       | 6,927 00     | 6,844 00     | 1 00      | 12 00        | 70 00       |
| Sacramento      | 26,184 50    | 23,342 00    | 27 50     |              | 2,815 00    |
| San Benito      | 1,359 50     | 1,300 00     | 3 50      | 6 00         | 50 00       |
| San Bernardino  | 12,745 50    | 12,692 00    | 4 50      | 24 00        | 25 00       |
| San Diego       | 21,537 50    | 20,646 00    | 13 50     | 243 00       | 635 00      |
| San Francisco   | 59,459 50    | 57,118 00    | 13 50     | 168 00       | 2,160 00    |
| San Joaquin     | 17,868 00    | 17,080 00    | 20 00     | 18 00        | 750 00      |
| San Luis Obispo | 7,755 00     | 7,584 00     | 6 00      | 15 00        | 150 00      |
| San Mateo       | 6,430 00     | 6,238 00     | 2 00      | 15 00        | 175 00      |
| Santa Barbara   | 6,016 50     | 5,800 00     | 1 50      | 15 00        | 200 00      |
| Santa Clara     | 16,151 50    | 15,704 00    | 11 50     | 6 00         | 430 00      |
| Santa Cruz      | 7,245 50     | 6,744 00     | 4 50      | 42 00        | 455 00      |
| Shasta          | 5,837 50     | 5,740 00     | 5 50      | 42 00        | 50 00       |
| Sierra          | 1,367 50     | 1,318 00     | 1 50      | 18 00        | 30 00       |
| Siskiyou        | 8,219 00     | 7,562 00     | 2 00      | 330 00       | 325 00      |
| Solano          | 12,092 50    | 11,600 00    | 17 50     |              | 475 00      |
| Sonoma          | 13,417 50    | 13,124 00    | 22 50     | 21 00        | 250 00      |
| Stanislaus      | 8,810 00     | 8,714 00     | 16 00     | 30 00        | 50 00       |
| Sutter          | 1,820 50     | 1,742 00     | 3 50      |              | 85 00       |
| Tehama          | 2,850 50     | 2,832 00     | 3 50      | 15 00        |             |
| Trinity         | 1,179 50     | 1,168 00     | 3 50      | 3 00         | 5 00        |
| Tulare          | 7,445 50     | 7,352 00     | 3 50      | 15 00        | 75 00       |
| Tuolumne        | 4,203 00     | 4,134 00     | 7 00      | 27 00        | 35 00       |
| Ventura         | 5,488 50     | 5,484 00     | 4 50      |              |             |
| Yolo            | 2,572 00     | 2,490 00     | 2 00      | 15 00        | 65 00       |
| Yuba            | 3,890 00     | 3,800 00     | 3 00      | 12 00        | 75 00       |
| State of Nevada | 2,937 00     |              |           | 2,937 00     |             |
| State of Oregon | 136 00       | 100 00       |           | 36 00        |             |
| Totals          | \$637,147 00 | \$614,786 00 | \$425 00  | \$9,066 00   | \$12,870 00 |
| Number          | 313,819      | 307,393      | 850       | 3,022        | 2,554       |

## HUNTING LICENSE SALES, SERIES 1936-1937

| Counties        | Total        | Citizen      | Junior citizen | Duplicate | Non-resident | Alien      | Declarant alien |
|-----------------|--------------|--------------|----------------|-----------|--------------|------------|-----------------|
| Alameda         | \$17,578 00  | \$16,622 00  | \$752 00       | \$19 00   | \$10 00      | \$125 00   | \$50 00         |
| Alpine          | 177 00       | 94 00        | 3 00           |           | 80 00        |            |                 |
| Amador          | 2,187 00     | 1,974 00     | 154 00         | 9 00      |              |            | 50 00           |
| Butte           | 8,345 50     | 7,694 00     | 651 00         | 50        |              |            |                 |
| Calaveras       | 1,317 50     | 1,264 00     | 53 00          | 50        |              |            |                 |
| Colusa          | 3,347 00     | 3,072 00     | 254 00         | 11 00     |              |            | 10 00           |
| Contra Costa    | 6,230 00     | 5,886 00     | 296 00         | 8 00      |              |            | 40 00           |
| Del Norte       | 1,050 00     | 908 00       | 64 00          | 3 00      | 30 00        | 25 00      | 20 00           |
| El Dorado       | 2,764 50     | 2,640 00     | 119 00         | 5 50      |              |            |                 |
| Fresno          | 17,828 00    | 16,452 00    | 1,250 00       | 21 00     | 20 00        | 25 00      | 60 00           |
| Glenn           | 3,867 50     | 3,454 00     | 370 00         | 8 50      | 10 00        | 25 00      |                 |
| Humboldt        | 8,842 50     | 8,272 00     | 473 00         | 7 50      |              |            |                 |
| Imperial        | 3,777 00     | 3,452 00     | 325 00         |           |              |            |                 |
| Inyo            | 2,086 50     | 1,924 00     | 120 00         | 2 50      | 30 00        |            | 10 00           |
| Kern            | 13,477 00    | 12,742 00    | 708 00         | 7 00      | 20 00        |            |                 |
| Kings           | 3,310 50     | 3,060 00     | 224 00         | 1 50      |              | 25 00      |                 |
| Lake            | 2,930 50     | 2,714 00     | 214 00         | 2 50      |              |            |                 |
| Lassen          | 4,377 00     | 3,992 00     | 229 00         | 6 00      | 50 00        |            | 100 00          |
| Los Angeles     | \$1,651 00   | \$78,170 00  | 2,872 00       | 179 00    | 120 00       | 150 00     | 160 00          |
| Madera          | 2,391 50     | 2,226 00     | 137 00         | 3 50      |              | 25 00      |                 |
| Marin           | 3,279 50     | 2,978 00     | 238 00         | 3 50      |              |            | 60 00           |
| Mariposa        | 720 50       | 688 00       | 29 00          | 3 50      |              |            |                 |
| Mendocino       | 6,103 00     | 5,634 00     | 383 00         | 6 00      | 20 00        |            | 60 00           |
| Merced          | 5,627 50     | 5,028 00     | 523 00         | 11 50     |              | 25 00      | 40 00           |
| Modoc           | 4,137 00     | 3,270 00     | 217 00         | 5 00      | 620 00       | 25 00      |                 |
| Mono            | 2,639 00     | 1,084 00     | 5 00           |           | 1,550 00     |            |                 |
| Monterey        | 8,848 00     | 7,838 00     | 527 00         | 23 00     |              | 200 00     | 260 00          |
| Napa            | 4,646 00     | 4,090 00     | 397 00         | 19 00     | 20 00        |            | 120 00          |
| Nevada          | 4,326 50     | 3,648 00     | 141 00         | 7 50      | 440 00       |            | 90 00           |
| Orange          | 6,237 00     | 5,854 00     | 378 00         | 5 00      |              |            |                 |
| Placer          | 4,810 00     | 4,470 00     | 414 00         | 6 00      |              | 100 00     | 20 00           |
| Plumas          | 3,703 00     | 3,474 00     | 162 00         | 7 00      | 30 00        |            | 30 00           |
| Riverside       | 7,079 50     | 6,582 00     | 484 00         | 3 50      | 10 00        |            |                 |
| Sacramento      | 16,070 00    | 14,516 00    | 1,009 00       | 65 00     | 90 00        | 200 00     | 190 00          |
| San Benito      | 2,566 00     | 2,288 00     | 255 00         | 5 00      |              |            | 20 00           |
| San Bernardino  | 7,650 00     | 7,240 00     | 403 00         | 7 00      |              |            |                 |
| San Diego       | 12,788 50    | 11,884 00    | 771 00         | 18 50     | 60 00        | 25 00      | 30 00           |
| San Francisco   | 24,053 50    | 22,310 00    | 591 00         | 47 50     | 140 00       | 375 00     | 590 00          |
| San Joaquin     | 10,347 50    | 9,634 00     | 580 00         | 8 50      |              | 75 00      | 50 00           |
| San Luis Obispo | 7,635 50     | 6,948 00     | 627 00         | 20 50     | 10 00        |            | 30 00           |
| San Mateo       | 4,506 50     | 4,150 00     | 277 00         | 4 50      |              | 25 00      | 50 00           |
| Santa Barbara   | 8,135 50     | 7,396 00     | 668 00         | 6 50      | 40 00        | 25 00      |                 |
| Santa Clara     | 11,813 00    | 10,844 00    | 734 00         | 15 00     | 30 00        | 100 00     | 90 00           |
| Santa Cruz      | 6,054 00     | 5,282 00     | 416 00         | 6 00      |              | 200 00     | 150 00          |
| Shasta          | 5,389 50     | 5,236 00     | 107 00         | 6 50      | 40 00        |            |                 |
| Sierra          | 1,007 50     | 952 00       | 55 00          | 5 00      |              |            |                 |
| Siskiyou        | 12,086 00    | 8,484 00     | 467 00         | 15 00     | 2,940 00     |            | 180 00          |
| Solano          | 5,440 50     | 5,148 00     | 284 00         | 8 50      |              |            |                 |
| Sonoma          | 10,075 00    | 9,150 00     | 737 00         | 13 00     |              | 75 00      | 100 00          |
| Stanislaus      | 7,272 50     | 6,522 00     | 650 00         | 15 50     |              | 75 00      | 10 00           |
| Sutter          | 1,306 00     | 1,210 00     | 91 00          | 5 00      |              |            |                 |
| Tehama          | 3,802 50     | 3,580 00     | 216 00         | 6 50      |              |            |                 |
| Trinity         | 1,068 50     | 1,030 00     | 36 00          | 2 50      |              |            |                 |
| Tulare          | 9,572 00     | 8,872 00     | 683 00         | 7 00      |              |            | 10 00           |
| Tuolumne        | 2,104 00     | 1,978 00     | 83 00          | 3 00      |              |            | 40 00           |
| Ventura         | 5,416 50     | 5,242 00     | 171 00         | 3 50      |              |            |                 |
| Yolo            | 4,350 00     | 3,958 00     | 357 00         | 5 00      | 10 00        |            | 20 00           |
| Yuba            | 4,052 50     | 3,728 00     | 297 00         | 7 50      |              |            | 20 00           |
| Value sales     | \$434,255 00 | \$398,630 00 | \$23,731 00    | \$699 00  | \$6,420 00   | \$1,925 00 | \$2,850 00      |
| Number licenses | 225,448      | 199,315      | 23,731         | 1,398     | 642          | 77         | 285             |

## HUNTING LICENSE SALES, SERIES 1937-1938

| Counties        | Total        | Citizen      | Junior citizen | Duplicate | Non-resident | Alien      | Declarant alien |
|-----------------|--------------|--------------|----------------|-----------|--------------|------------|-----------------|
| Alameda         | \$19,558 00  | \$18,744 00  | \$796 00       | \$18 00   |              |            |                 |
| Alpine          | 216 00       | 216 00       |                |           |              |            |                 |
| Amador          | 2,210 00     | 2,060 00     | 150 00         |           |              |            |                 |
| Butte           | 9,462 00     | 8,738 00     | 715 00         | 9 00      |              |            |                 |
| Calaveras       | 1,412 00     | 1,330 00     | 82 00          |           |              |            |                 |
| Colusa          | 3,708 00     | 3,386 00     | 210 00         | 12 00     | \$20 00      |            |                 |
| Contra Costa    | 6,551 50     | 6,154 00     | 341 00         | 6 50      | 30 00        |            | \$20 00         |
| Del Norte       | 645 50       | 546 00       | 34 00          | 50        | 30 00        | \$25 00    | 10 00           |
| El Dorado       | 3,127 50     | 2,878 00     | 133 00         | 1 50      | 40 00        | 75 00      |                 |
| Fresno          | 18,722 00    | 17,256 00    | 1,409 00       | 17 00     |              |            |                 |
| Glenn           | 4,310 00     | 3,890 00     | 384 00         | 16 00     | 20 00        |            |                 |
| Humboldt        | 12,131 50    | 11,442 00    | 542 00         | 7 50      |              |            | 140 00          |
| Imperial        | 3,943 00     | 3,580 00     | 363 00         |           |              |            |                 |
| Inyo            | 2,034 00     | 1,864 00     | 95 00          |           | 50 00        | 25 00      |                 |
| Kern            | 16,917 00    | 16,070 00    | 813 00         | 14 00     | 20 00        |            |                 |
| Kings           | 3,633 00     | 3,362 00     | 271 00         |           |              |            |                 |
| Lake            | 3,376 00     | 3,126 00     | 248 00         | 2 00      |              |            |                 |
| Lassen          | 4,500 50     | 4,216 00     | 218 00         | 6 50      | 40 00        |            | 20 00           |
| Los Angeles     | 79,341 00    | 76,058 00    | 2,719 00       | 59 00     | 160 00       | 175 00     | 170 00          |
| Madera          | 2,673 00     | 2,510 00     | 161 00         | 2 00      |              |            |                 |
| Marin           | 3,840 00     | 3,560 00     | 280 00         |           |              |            |                 |
| Mariposa        | 40 00        | 40 00        |                |           |              |            |                 |
| Mendocino       | 5,897 50     | 5,476 00     | 412 00         | 9 50      |              |            |                 |
| Merced          | 5,466 50     | 5,000 00     | 449 00         | 7 50      | 10 00        |            |                 |
| Modoc           | 4,432 00     | 3,176 00     | 246 00         |           | 1,010 00     |            |                 |
| Mono            | 919 50       | 8 00         | 29 00          | 50        |              |            |                 |
| Monterey        | 9,315 00     | 8,258 00     | 670 00         | 12 00     | 30 00        | 275 00     | 110 00          |
| Napa            | 5,563 50     | 4,250 00     | 1,212 00       | 1 50      | 10 00        |            | 10 00           |
| Nevada          | 4,633 00     | 3,642 00     | 171 00         |           | 820 00       |            |                 |
| Orange          | 5,197 00     | 4,588 00     | 606 00         | 3 00      |              |            |                 |
| Placer          | 4,782 50     | 4,312 00     | 412 00         | 3 50      |              | 25 00      | 30 00           |
| Plumas          | 4,189 00     | 3,772 00     | 208 00         | 4 00      | 100 00       | 25 00      | 80 00           |
| Riverside       | 7,715 00     | 7,304 00     | 410 00         | 1 00      |              |            |                 |
| Sacramento      | 17,577 00    | 15,722 00    | 981 00         | 44 00     | 60 00        | 300 00     | 470 00          |
| San Benito      | 2,137 00     | 1,928 00     | 148 00         | 6 00      | 10 00        | 25 00      | 20 00           |
| San Bernardino  | 7,762 50     | 7,352 00     | 437 00         | 3 50      |              |            |                 |
| San Diego       | 14,459 50    | 13,516 00    | 887 00         | 16 50     |              |            | 40 00           |
| San Francisco   | 27,187 00    | 25,224 00    | 570 00         | 38 00     | 140 00       | 525 00     | 690 00          |
| San Joaquin     | 12,069 50    | 11,312 00    | 710 00         | 7 50      |              |            | 70 00           |
| San Luis Obispo | 4,242 00     | 3,656 00     | 581 00         | 5 00      |              |            |                 |
| San Mateo       | 4,826 00     | 4,416 00     | 305 00         |           |              | 75 00      | 30 00           |
| Santa Barbara   | 5,507 00     | 5,120 00     | 387 00         |           |              |            |                 |
| Santa Clara     | 12,500 50    | 11,662 00    | 853 00         | 15 50     | 20 00        |            | 40 00           |
| Santa Cruz      | 6,519 00     | 5,820 00     | 524 00         | 25 00     |              |            | 150 00          |
| Shasta          | 5,370 50     | 5,016 00     | 213 00         | 6 50      | 110 00       | 25 00      |                 |
| Sierra          | 888 00       | 850 00       | 38 00          |           |              |            |                 |
| Siskiyou        | 9,885 50     | 7,942 00     | 402 00         | 6 50      | 1,340 00     | 25 00      | 170 00          |
| Solano          | 5,096 00     | 4,786 00     | 305 00         | 5 00      |              |            |                 |
| Sonoma          | 10,223 50    | 9,356 00     | 809 00         | 8 50      | 30 00        |            | 20 00           |
| Stanislaus      | 6,836 00     | 6,110 00     | 629 00         | 7 00      | 10 00        |            |                 |
| Sutter          | 1,833 00     | 1,682 00     | 148 00         | 3 00      |              |            |                 |
| Tehama          | 3,705 00     | 3,500 00     | 202 00         | 3 00      |              |            |                 |
| Trinity         | 856 00       | 824 00       | 30 00          | 2 00      |              |            |                 |
| Tulare          | 10,406 00    | 9,652 00     | 750 00         | 4 00      |              |            |                 |
| Tuolumne        | 2,486 50     | 2,366 00     | 118 00         | 2 50      |              |            |                 |
| Ventura         | 5,829 00     | 5,428 00     | 388 00         | 3 00      |              |            |                 |
| Yolo            | 4,571 00     | 4,228 00     | 343 00         |           |              |            |                 |
| Yuba            | 4,439 00     | 4,158 00     | 281 00         |           |              |            |                 |
| State of Nevada | 1,500 00     | 200 00       |                |           | 1,300 00     |            |                 |
| State of Oregon | 1,839 50     | 458 00       | 20 00          | 1 50      | 1,300 00     |            |                 |
| Totals          | \$451,163 50 | \$414,118 00 | \$25,958 00    | \$427 50  | \$6,770 00   | \$1,600 00 | \$2,260 00      |
| Number          | 234,842      | 207,059      | 25,958         | 855       | 677          | 64         | 229             |

## DEER TAG LICENSE SALES BY COUNTIES, YEAR 1936

| County               | 1936         |
|----------------------|--------------|
| Alameda.....         | \$5,261 00   |
| Alpine.....          | 59 00        |
| Amador.....          | 799 00       |
| Butte.....           | 2,680 00     |
| Calaveras.....       | 534 00       |
| Colusa.....          | 1,154 00     |
| Contra Costa.....    | 1,788 00     |
| Del Norte.....       | 340 00       |
| El Dorado.....       | 1,272 00     |
| Fresno.....          | 4,188 00     |
| Glenn.....           | 1,284 00     |
| Humboldt.....        | 3,782 00     |
| Imperial.....        | 251 00       |
| Inyo.....            | 802 00       |
| Kern.....            | 3,823 00     |
| Kings.....           | 651 00       |
| Lake.....            | 1,448 00     |
| Lassen.....          | 1,987 00     |
| Los Angeles.....     | 18,279 00    |
| Madera.....          | 701 00       |
| Marin.....           | 1,249 00     |
| Mariposa.....        | 261 00       |
| Mendocino.....       | 2,891 00     |
| Merced.....          | 1,029 00     |
| Modoc.....           | 1,685 00     |
| Mono.....            | 590 00       |
| Monterey.....        | 2,923 00     |
| Napa.....            | 1,921 00     |
| Nevada.....          | 1,730 00     |
| Orange.....          | 1,471 00     |
| Placer.....          | 1,670 00     |
| Plumas.....          | 1,861 00     |
| Riverside.....       | 1,701 00     |
| Sacramento.....      | 3,676 00     |
| San Benito.....      | 908 00       |
| San Bernardino.....  | 2,099 00     |
| San Diego.....       | 2,312 00     |
| San Francisco.....   | 6,268 00     |
| San Joaquin.....     | 2,269 00     |
| San Luis Obispo..... | 2,741 00     |
| San Mateo.....       | 1,196 00     |
| Santa Barbara.....   | 2,651 00     |
| Santa Clara.....     | 3,773 00     |
| Santa Cruz.....      | 1,761 00     |
| Shasta.....          | 2,398 00     |
| Sierra.....          | 400 00       |
| Siskiyou.....        | 4,235 00     |
| Solano.....          | 1,649 00     |
| Sonoma.....          | 4,065 00     |
| Stanislaus.....      | 1,587 00     |
| Sutter.....          | 418 00       |
| Tehama.....          | 1,631 00     |
| Trinity.....         | 519 00       |
| Tulare.....          | 2,758 00     |
| Tuolumne.....        | 867 00       |
| Ventura.....         | 1,973 00     |
| Yolo.....            | 1,410 00     |
| Yuba.....            | 1,226 00     |
| Total sales.....     | \$126,855 00 |

## FISH AND GAME COMMISSION

## DEER TAG LICENSE SALES BY COUNTIES, YEAR 1937

| County          | 1937         |
|-----------------|--------------|
| Alameda         | \$5,624 00   |
| Alpine          | 71 00        |
| Amador          | 825 00       |
| Butte           | 1,887 00     |
| Calaveras       | 606 00       |
| Colusa          | 1,101 00     |
| Contra Costa    | 1,839 00     |
| Del Norte       | 244 00       |
| El Dorado       | 1,349 00     |
| Fresno          | 4,329 00     |
| Glenn           | 1,501 00     |
| Humboldt        | 3,875 00     |
| Imperial        | 186 00       |
| Inyo            | 651 00       |
| Kern            | 4,117 00     |
| Kings           | 650 00       |
| Lake            | 1,705 00     |
| Lassen          | 1,872 00     |
| Los Angeles     | 17,024 00    |
| Madera          | 770 00       |
| Marin           | 1,473 00     |
| Mariposa        | 18 00        |
| Mendocino       | 2,763 00     |
| Merced          | 1,070 00     |
| Modoc           | 1,003 00     |
| Mono            | 3 3 00       |
| Monterey        | 3,155 00     |
| Napa            | 2,031 00     |
| Nevada          | 1,781 00     |
| Orange          | 1,422 00     |
| Placer          | 1,675 00     |
| Plumas          | 2,048 00     |
| Riverside       | 1,773 00     |
| Sacramento      | 4,201 00     |
| San Benito      | 8 0 00       |
| San Bernardino  | 1,962 00     |
| San Diego       | 2,089 00     |
| San Francisco   | 7,018 00     |
| San Joaquin     | 2,421 00     |
| San Luis Obispo | 2,689 00     |
| San Mateo       | 1,413 00     |
| Santa Barbara   | 1,592 00     |
| Santa Clara     | 4,191 00     |
| Santa Cruz      | 1,779 00     |
| Shasta          | 2,435 00     |
| Sierra          | 449 00       |
| Siskiyou        | 3,816 00     |
| Solano          | 2,150 00     |
| Sonoma          | 4,223 00     |
| Stanislaus      | 1,503 00     |
| Sutter          | 472 00       |
| Tehama          | 1,586 00     |
| Trinity         | 426 00       |
| Tulare          | 2,789 00     |
| Tuolumne        | 1,051 00     |
| Ventura         | 2,120 00     |
| Yolo            | 1,501 00     |
| Yuba            | 1,444 00     |
| State of Nevada | 142 00       |
| State of Oregon | 303 00       |
| Total sales     | \$128,436 00 |



## MISCELLANEOUS LICENSE SALES

|   | License year                     | Fee                              | Value       |
|---|----------------------------------|----------------------------------|-------------|
| Market fisherman .....                                | License year, 4/1/37 to 3/31/38  | Fee, \$10 00                     | \$78,210 00 |
| Trapping license sales .....                          | License year, 7/1/37 to 6/30/38  | Fee 1 00 Cit.<br>Fee 2 00 Alien  | 2,502 00    |
| Fish packers and wholesale shellfish dealers          | License year, 7/1/37 to 6/30/38  | Fee 5 00 Cit.<br>Fee 10 00 Alien | 1,090 00    |
| Game breeders .....                                   | License year, 1/1/37 to 12/31/37 | Fee 2 50                         | 1,192 50    |
| Fish breeders .....                                   | License year, 1/1/37 to 12/31/37 | Fee 5 00                         | 380 00      |
| Domesticated fish importers license sales ..          | License year, 1/1/37 to 1/1/38   | Fee 5 00                         | 100 00      |
| Kelp license sales .....                              | Year 1937 .....                  | Fee 10 00                        | 40 00       |
| Commercial hunting gun club license sales ..          | License year, 7/1/37 to 6/30/38  | Fee 25 00 Cit.<br>100 00 Alien   | 900 00      |
| Commercial hunting club operators license sales ..... | License year, 7/1/37 to 6/30/38  | Fee 5 00 Cit.<br>25 00 Alien     | 290 00      |

## ARRESTS AND CONVICTIONS

## RECAPITULATION

|                             | Number of arrests | Fines imposed | Jail sentences (days) |
|-----------------------------|-------------------|---------------|-----------------------|
| Fish cases, 1936-1937 ..... | 1,618             | \$31,847 50   | 2,223½                |
| Game cases, 1936-1937 ..... | 1,480             | 40,121 56     | 5,533½                |
| Totals, 1936-1937 .....     | 3,098             | \$71,969 06   | 8,157                 |
| Fish cases, 1937-1938 ..... | 1,808             | \$38,028 00   | 3,332½                |
| Game cases, 1937-1938 ..... | 1,476             | 39,148 00     | 5,622¾                |
| Totals, 1937-1938 .....     | 3,284             | \$78,076 00   | 8,955¼                |
| Recapitulation—             |                   |               |                       |
| 1.36-1937 .....             | 3,078             | \$71,969 06   | 8,157                 |
| 1937-1.38 .....             | 3,284             | 78,076 00     | 8,955¼                |
| Totals .....                | 6,382             | \$150,045 06  | 17,112¼               |

## TOTAL ARRESTS FOR A PERIOD OF THIRTY-SIX YEARS

|                 |       |
|-----------------|-------|
| 1902-1904 ..... | 550   |
| 1904-1906 ..... | 774   |
| 1906-1908 ..... | 1,162 |
| 1908-1910 ..... | 1,771 |
| 1910-1912 ..... | 2,063 |
| 1912-1914 ..... | 1,993 |
| 1914-1916 ..... | 2,087 |
| 1916-1918 ..... | 1,797 |
| 1918-1920 ..... | 1,891 |
| 1920-1922 ..... | 2,258 |
| 1922-1924 ..... | 2,715 |
| 1924-1926 ..... | 3,207 |
| 1926-1928 ..... | 4,310 |
| 1928-1930 ..... | 5,388 |
| 1930-1932 ..... | 5,237 |
| 1932-1934 ..... | 3,795 |
| 1934-1936 ..... | 4,535 |
| 1936-1938 ..... | 6,382 |

## SEIZURES OF FISH AND GAME

|                             | July 1, 1936,<br>to<br>June 30, 1937 | July 1, 1937,<br>to<br>June 30, 1938 | Total               |
|-----------------------------|--------------------------------------|--------------------------------------|---------------------|
| Abalone.....                | 1,037                                | 1,337                                | 2,374               |
| Abalone, pounds.....        | 2,856                                | 60                                   | 2,916               |
| Barracuda.....              | 125                                  |                                      | 125                 |
| Barracuda, pounds.....      | 825                                  | 5,823                                | 6,648               |
| Bass—                       |                                      |                                      |                     |
| Black.....                  | 255                                  | 424                                  | 679                 |
| Black, pounds.....          |                                      | 34                                   | 34                  |
| Large Mouth Black.....      |                                      | 18                                   | 18                  |
| Rock.....                   | 4                                    |                                      | 4                   |
| Sand Bass, pounds.....      |                                      | 200                                  | 200                 |
| Sea, barrels.....           | 60                                   |                                      | 60                  |
| Sea, pounds.....            | 39                                   |                                      | 39                  |
| Striped.....                | 438                                  | 632                                  | 1,070               |
| Striped, pounds.....        | 250                                  | 418                                  | 668                 |
| Traps.....                  |                                      | 6                                    | 6                   |
| White Sea, pounds.....      | 30                                   |                                      | 30                  |
| Bluecod, pounds.....        | 4                                    |                                      | 4                   |
| Bluefin Tuna.....           |                                      | 3                                    | 3                   |
| Bluegills.....              |                                      | 152                                  | 152                 |
| Carp.....                   | 20                                   |                                      | 20                  |
| Carp, pounds.....           |                                      | 40                                   | 40                  |
| Catfish.....                | 46                                   |                                      | 46                  |
| Catfish, pounds.....        | 70                                   | 103 $\frac{1}{4}$                    | 173 $\frac{1}{4}$   |
| Clams.....                  | 5,860                                | 9,376                                | 15,236              |
| Clams, quarts.....          |                                      | 1                                    | 1                   |
| Clamforks.....              |                                      | 3                                    | 3                   |
| Cockles.....                | 1,227                                | 220                                  | 1,447               |
| Cockles, pounds.....        | 225                                  | 350                                  | 575                 |
| Crabs.....                  | 536                                  | 3,574                                | 4,110               |
| Crabs, dozens.....          |                                      | 4                                    | 4                   |
| Crab nets.....              |                                      | 8                                    | 8                   |
| Crab traps, boxes.....      |                                      | 46                                   | 46                  |
| Crappie.....                | 52                                   | 75                                   | 127                 |
| Croaker.....                | 1                                    |                                      | 1                   |
| Eastern Brook.....          |                                      | 41                                   | 41                  |
| Fishing rod.....            | 1                                    |                                      | 1                   |
| Flounder.....               |                                      | 2                                    | 2                   |
| Frogs.....                  |                                      | 141                                  | 141                 |
| Fyke nets.....              |                                      | 4                                    | 4                   |
| Grunion, pounds.....        | 10                                   | 10                                   | 20                  |
| Halibut.....                |                                      | 17                                   | 17                  |
| Halibut, pounds.....        |                                      | 106                                  | 106                 |
| Lake Tahoe Trout.....       |                                      | 40                                   | 40                  |
| Live car.....               | 1                                    |                                      | 1                   |
| Lobsters.....               | 1,012                                | 1,104 $\frac{1}{2}$                  | 2,116 $\frac{1}{2}$ |
| Lobsters, dozens.....       |                                      | 4                                    | 4                   |
| Lobsters, pounds.....       | 330                                  | 2,233                                | 2,563               |
| Lobster pots.....           | 3                                    | 74                                   | 77                  |
| Lobster receivers.....      |                                      | 16                                   | 16                  |
| Lobster traps.....          | 12                                   | 161                                  | 173                 |
| Mackinaw Trout.....         |                                      | 1                                    | 1                   |
| Minnows.....                | 11                                   |                                      | 11                  |
| Perch.....                  | 137                                  | 62                                   | 199                 |
| Pyramid Lake Trout.....     |                                      | 12                                   | 12                  |
| Rainbow Trout.....          |                                      | 151                                  | 151                 |
| Reel and line.....          | 1                                    |                                      | 1                   |
| Salmon.....                 | 76                                   | 66                                   | 142                 |
| Salmon, pounds.....         | 381                                  | 4,691                                | 5,072               |
| Set lines.....              | 1                                    |                                      | 1                   |
| Set lines, feet.....        |                                      | 300                                  | 300                 |
| Sheepshead, pounds.....     |                                      | 220                                  | 220                 |
| Skipjack, pounds.....       | 52,157                               |                                      | 52,157              |
| Steelhead.....              |                                      | 231                                  | 231                 |
| Steelhead, pounds.....      |                                      | 280                                  | 280                 |
| Sturgeon.....               |                                      | 2                                    | 2                   |
| Sturgeon, pounds.....       | 62                                   |                                      | 62                  |
| Sunfish.....                | 244                                  | 489                                  | 733                 |
| Tammel net, feet.....       | 1,500                                |                                      | 1,500               |
| Traps.....                  | 11                                   |                                      | 11                  |
| Trout.....                  | 1,615                                | 963                                  | 2,578               |
| Trout, pounds.....          | 156 $\frac{1}{2}$                    | 14                                   | 170 $\frac{1}{2}$   |
| Trout filets.....           |                                      | 27                                   | 27                  |
| Trout spawn, rolls.....     |                                      | 2                                    | 2                   |
| Tuna, pounds.....           | 6,421                                |                                      | 6,421               |
| Yellowfin Tuna, pounds..... | 85,035                               | 17,647                               | 102,672             |
| Yellowtail.....             | 1                                    |                                      | 1                   |

## SEIZURES OF FISH AND GAME

|                          | July 1, 1936,<br>to<br>June 30, 1937 | July 1, 1937,<br>to<br>June 30, 1938 | Total |
|--------------------------|--------------------------------------|--------------------------------------|-------|
| Antelope.....            |                                      | 1                                    | 1     |
| Antelope, head.....      |                                      | 1                                    | 1     |
| Beaver pelts.....        |                                      | 3                                    | 3     |
| Bear.....                | 1                                    | 1                                    | 2     |
| Bearskin.....            |                                      | 1                                    | 1     |
| Bird traps.....          |                                      | 2                                    | 2     |
| Brant, black sea.....    |                                      | 6                                    | 6     |
| Canary, wild.....        |                                      | 3                                    | 3     |
| Coot.....                |                                      | 1                                    | 1     |
| Curlew.....              |                                      | 5                                    | 5     |
| Deer.....                | 65                                   | 84½                                  | 149½  |
| Deerhead.....            | 2                                    | 1                                    | 3     |
| Deerhide.....            | 36                                   | 1                                    | 37    |
| Deermeat, pounds.....    | 3,207½                               | 4,406½                               | 7,614 |
| Doves.....               | 750                                  | 1,035                                | 1,785 |
| Ducks.....               | 2,571                                | 192                                  | 2,763 |
| Duck eggs.....           |                                      | 11                                   | 11    |
| Eagle.....               | 1                                    |                                      | 1     |
| Elk.....                 |                                      | 2                                    | 2     |
| Grebe.....               | 2                                    | 3                                    | 5     |
| Geese.....               | 42                                   | 8                                    | 50    |
| Godwit.....              |                                      | 1                                    | 1     |
| Grouse.....              | 5                                    | 2                                    | 7     |
| Hawk.....                |                                      | 2                                    | 2     |
| Killdeer.....            |                                      | 3                                    | 3     |
| Lesser Scaup.....        |                                      | 1                                    | 1     |
| Mallard, hen.....        |                                      | 1                                    | 1     |
| Marbled Godwit.....      |                                      | 1                                    | 1     |
| Meadowlark.....          | 4                                    | 7                                    | 11    |
| Minkhides.....           |                                      | 3                                    | 3     |
| Mockingbird.....         |                                      | 1                                    | 1     |
| Mudhens.....             | 25                                   | 43                                   | 68    |
| Muskrat pelts.....       | 19                                   | 19                                   | 38    |
| Nongame birds.....       | 143                                  | 14                                   | 157   |
| Pheasants.....           | 154                                  | 99                                   | 253   |
| Pigeons.....             | 1                                    | 1                                    | 2     |
| Plover.....              | 52                                   |                                      | 52    |
| Quail.....               | 709                                  | 306                                  | 1,015 |
| Rabbits.....             | 94                                   | 132                                  | 226   |
| Rail.....                | 1                                    |                                      | 1     |
| Robins.....              |                                      | 6                                    | 6     |
| Sandpiper.....           |                                      | 13                                   | 13    |
| Sea gulls.....           |                                      | 1                                    | 1     |
| Sea scoter.....          |                                      | 1                                    | 1     |
| Sparrow.....             |                                      | 33                                   | 33    |
| Spotted fawn.....        |                                      | 5                                    | 5     |
| Squirrel skin.....       |                                      | 4                                    | 4     |
| Surf scoter.....         |                                      | 2                                    | 2     |
| Swan.....                | 4                                    | 4                                    | 8     |
| Towhee.....              |                                      | 1                                    | 1     |
| Trap.....                |                                      | 1                                    | 1     |
| Tree squirrel.....       | 3                                    | 6                                    | 9     |
| Tree squirrel hides..... | 3                                    | 2                                    | 5     |
| Turkey.....              |                                      | 2                                    | 2     |
| Venison ham.....         |                                      | 1                                    | 1     |
| Willits.....             |                                      | 2                                    | 2     |
| Wood duck.....           | 1                                    |                                      | 1     |
| Woodpecker.....          | 3                                    | 2                                    | 5     |
| Yellowhammer.....        |                                      | 1                                    | 1     |

## FISH CASES

| Offense  | July 1, 1936, to<br>June 30, 1937 |            |       | July 1, 1937, to<br>June 30, 1938 |            |      |
|--|-----------------------------------|------------|-------|-----------------------------------|------------|------|
|  | Arrests                           | Fines      | Jail  | Arrests                           | Fines      | Jail |
| Abalone: overlimit, undersize, closed season, possession sliced in closed season, taken in less than 20 feet of water  | 224                               | \$4,041 50 | 339   | 203                               | \$3,075 00 | 52   |
| Anchoring: closed district   | 2                                 | 150 00     |       |                                   |            |      |
| Angling; no license  | 114                               | 871 00     | 2     | 82                                | 737 00     | 117½ |
| Barracuda: overlimit, possession and sale of undersized, closed season, take with net, closed season   | 4                                 | 115 00     |       | 4                                 | 125 00     |      |
| Bass:  |                                   |            |       |                                   |            |      |
| Black, overlimit, undersized, spearing closed district   | 36                                | 366 00     | 32    | 17                                | 190 00     |      |
| Sea: overlimit, undersized   | 6                                 | 520 00     |       |                                   |            |      |
| Striped: overlimit, undersize, selling, possession for sale, failure to deliver to Fish and Game Commission  | 79                                | 1,745 00   | 205   | 156                               | 2,570 00   |      |
| Bluegills: closed season   |                                   |            |       | 8                                 | 129 00     |      |
| Catfish: selling, undersized, retaining less than 9 in. in length  |                                   |            |       | 8                                 | 90 00      |      |
| Clams: closed season, overlimit, undersized, instrument in preserve, out of shell, failure to show on demand, taken in preserve, offering for transportation, selling, overlimit from refuge   | 194                               | 4,044 00   | 1,127 | 187                               | 3,388 50   | 885  |
| Cockles: Overlimit, undersized, no license   | 3                                 | 15 00      |       | 9                                 | 130 00     | 10   |
| Commercial fishing; no license, failure to keep records, failure to register boats   | 137                               | 972 50     | 5     | 206                               | 2,150 00   | 97½  |
| Crabs; possession female, undersized, closed season, holding in live box, mutilating, take from Dist. 1½ to Dist. 2  | 96                                | 1,660 00   | 100   | 71                                | 1,080 00   | 656  |
| Crappie: taking, closed season, no license   |                                   |            |       | 16                                | 130 00     |      |
| Crustaceans: fail to show on demand  |                                   |            |       | 1                                 |            |      |
| Diving for commercial purposes in less than 20 feet of water   |                                   |            |       | 1                                 | 100 00     |      |
| Failure to record fish purchased   | 1                                 | 25 00      |       | 5                                 | 1,800 00   | 50   |
| Fish spear; possession within 300 ft. of stream  |                                   |            |       | 4                                 |            |      |
| Fish wastage   | 3                                 | 100 00     |       |                                   |            |      |
| Fishing boat not registered  | 1                                 | 25 00      |       |                                   |            |      |
| Fishing; closed district, closed season, from fishway, too near dam; using prohibited gear, failure to provide license, over dam, failure to show license, using another's license, closed area, false statement in procuring license, through ice, taking brood fish from hatchery, disturbing nets | 450                               | 7,979 50   | 318½  | 367                               | 7,393 50   | 202½ |
| Fishing tackle in refuge   | 1                                 | 25 00      |       |                                   |            |      |
| Frogs, undersized, overlimit   | 1                                 | 25 00      |       | 3                                 | 75 00      |      |
| Fyke nets in District 12A, closed season   |                                   |            |       | 1                                 |            |      |
| Gaff, possession within 300 ft. of stream  |                                   |            |       | 2                                 |            |      |
| Game fish, no license, closed season   |                                   |            |       | 38                                | 425 00     |      |
| Gill net; in Dist. 2, in Old River, in Dist. 20, meshes less than 5½" in length, illegal mesh, operating in Sacramento River without floats or buoys   |                                   |            |       | 11                                | 145 00     |      |
| Grunion, closed season   | 1                                 |            |       | 3                                 | 15 00      |      |
| Halibut; undersized  |                                   |            |       | 1                                 | 10 00      |      |
| Illegal fishing  |                                   |            |       | 1                                 | 5 00       |      |
| Illegal gear   |                                   |            |       | 1                                 | 10 00      |      |
| License: using another's; making false statement, fail to show on demand, transferring   | 12                                | 130 00     | 35    | 52                                | 318 00     |      |
| Lobsters: closed season, undersized, overlimit, possession spiny lobsters less than 10½"   | 20                                | 205 00     | 10    | 51                                | 1,355 00   | 641½ |
| Mackerel, take with illegal net in Dist. 20  |                                   |            |       | 14                                | 850 00     |      |
| Minnows; transported   | 1                                 | 50 00      |       |                                   |            |      |
| Net: illegal operating in Dist. 1  | 25                                | 995 00     |       | 1                                 | 25 00      |      |
| Night fishing  | 36                                | 575 00     |       | 1                                 | 25 00      |      |
| Operating smokehouse, no packers license   | 1                                 |            |       |                                   |            |      |
| Perch; selling, closed season  | 3                                 | 75 00      |       | 14                                | 183 00     | 15½  |
| Pollution  | 46                                | 2,210 00   |       | 64                                | 6,305 00   |      |
| Roundhaul net in Dist. 19A   |                                   |            |       | 4                                 | 100 00     |      |
| Salmon: overlimit, undersized, spearing, gaffing, transporting, killing with rocks, shooting, taking in spawning area  | 21                                | 365 00     | 30    | 35                                | 900 00     | 285  |
| Sardines: exceeding sardine permit tonnage allotment, reducing without permit  | 5                                 | 2,500 00   |       |                                   |            |      |
| Seining in Dist. 20  |                                   |            |       | 4                                 | 1,200 00   |      |
| Set lines in White Slough, in Taylor Slough, Middle River, Honker Bay, Dist. 1, in San Joaquin River   |                                   |            |       | 16                                | 455 00     | 185  |
| Skipjack, selling undersized   | 3                                 | 50 00      |       |                                   |            |      |
| Spear in possession in creek   |                                   |            |       | 3                                 | 75 00      |      |

## FISH[CASES—Continued

| Offense   | July 1, 1936, to<br>June 30, 1937 |             |        | July 1, 1937, to<br>June 30, 1938 |             |        |
|---|-----------------------------------|-------------|--------|-----------------------------------|-------------|--------|
|   | Arrests                           | Fines       | Jail   | Arrests                           | Fines       | Jail   |
| Steelhead; overlimit, spearing, gaffing, closed season, no license, selling-----  | 2                                 | \$25 00     | -----  | 14                                | \$150 00    | 21     |
| Sturgeon; possession-----   | 1                                 | 20 00       | -----  | 1                                 | -----       | -----  |
| Sunfish, closed season, overlimit-----  | 21                                | 195 00      | -----  | 43                                | 690 00      | 37     |
| Tuna; yellowfin, selling undersized-----  | 10                                | 350 00      | -----  | 1                                 | 500 00      | -----  |
| Trout: taking with explosives, overlimit, using fresh spawn, using 2 poles, closed season, closed district, closed stream, selling, snagging----- | 54                                | 1,173 00    | 20     | 83                                | 1,924 00    | 77     |
| Using explosives to take fish, using dynamite-----  | 1                                 | 100 00      | -----  | 1                                 | 100 00      | -----  |
| Using fresh spawn-----  | 3                                 | 150 00      | -----  | -----                             | -----       | -----  |
| Totals-----   | 1,618                             | \$31,847 50 | 2,223½ | 1,808                             | \$38,928 00 | 3,332½ |

## GAME CASES

| Offense   | July 1, 1936, to<br>June 30, 1937 |             |        | July 1, 1937, to<br>June 30, 1938 |             |        |
|---|-----------------------------------|-------------|--------|-----------------------------------|-------------|--------|
|   | Arrests                           | Fines       | Jail   | Arrests                           | Fines       | Jail   |
| Antelope: possession buck   | 3                                 | \$100 00    |        | 1                                 |             |        |
| Bear: closed season   |                                   |             |        | 3                                 | \$75 00     |        |
| Beaver: hide, possession, no license, using saw-tooth traps   | 2                                 | 10 00       |        | 4                                 | 200 00      | 30     |
| Bird nets: possession   | 1                                 | 25 00       |        | 1                                 | 50 00       |        |
| Brant: take, black sea, closed season   |                                   |             |        | 3                                 | 50 00       |        |
| Deer: closed season, kill and possess spotted fawn, spike buck, doe, fail to tag deer, transferring tags, closed season, closed district, failure to retain hide and horns, failure to return tags, failure to mark packages, possession deer evidence of sex removed | 403                               | 12,839 50   | 3,761½ | 435                               | 17,188 00   | 4,068¾ |
| Destroying birds nests  | 1                                 | 25 00       |        |                                   |             |        |
| Distributing traps  | 2                                 | 20 00       |        |                                   |             |        |
| Dove: closed season, overlimit  | 71                                | 2,870 00    |        | 92                                | 2,690 00    |        |
| Ducks: operating commercial club no license, closed season, overlimit, possession woodducks, possess surfscoter, closed season  | 125                               | 7,190 00    | 1,385  | 58                                | 1,182 50    | 262    |
| Eagle: possession   | 1                                 | 100 00      |        |                                   |             |        |
| Elk: possession   | 3                                 |             |        |                                   |             |        |
| Firearms: in refuge   | 66                                | 850 00      | 89½    | 83                                | 1,766 00    | 2      |
| Game: possession 10 days after close of season  |                                   |             |        | 1                                 | 25 00       |        |
| Game birds: closed season, protected birds in possession, shoot from auto, sell wild game birds, no license   | 13                                | 115 00      | 120    | 14                                | 110 00      | 10     |
| Geese: overlimit, closed season, shoot after 4 p.m.   | 13                                | 425 00      |        | 7                                 | 120 00      |        |
| Grebe: possession   | 1                                 | 5 00        |        |                                   |             |        |
| Grouse: possession  | 5                                 | 360 00      |        | 1                                 | 50 00       |        |
| Hunting: no license, in refuge, closed area, no license, alien using citizens license, failure to show game on demand, false statement in procuring license   | 291                               | 4,208 00    | 237½   | 279                               | 4,342 50    | 367½   |
| Illegal shooting  | 88                                | 1,607 50    | 11     | 71                                | 1,070 00    | 30     |
| Interfering with officer discharging his duties   | 1                                 |             |        |                                   |             |        |
| Licenses: using another's, false statement  | 7                                 | 75 00       |        |                                   |             |        |
| Mink: trapping, closed season   |                                   |             |        | 3                                 | 20 00       | 5      |
| Mountain sheep: possession  | 1                                 | 50 00       |        |                                   |             |        |
| Mudhens: closed season, take after 4 p.m.   | 6                                 | 80 00       |        | 10                                | 80 00       |        |
| Muskrat pelts: illegal possession   |                                   |             |        | 2                                 |             |        |
| Net: larger than 6 ft. to take bait   |                                   |             |        | 1                                 | 25 00       |        |
| Night hunting   | 16                                | 410 00      |        | 5                                 | 45 00       | 10     |
| Nongame birds: in possession, closed season, killing, pursuit of  | 56                                | 1,047 50    | 16     | 41                                | 750 00      | 100    |
| Pheasants: closed season, overlimit, shipping in closed packages, kill hen, possession male, no license   | 104                               | 3,517 50    | 71     | 96                                | 3,745 00    | 327½   |
| Pigeon: closed season   | 2                                 | 25 00       |        | 1                                 | 100 00      |        |
| Poisoning birds   | 1                                 | 25 00       |        |                                   |             |        |
| Protected birds: no license, marbled godwit   |                                   |             |        | 39                                | 935 00      | 25     |
| Quail: closed season, overlimit, trapping, failure to tag domesticated  | 58                                | 1,408 56    | 95     | 58                                | 1,944 00    | 93     |
| Rabbits: closed season, no license  | 35                                | 741 00      | 2      | 71                                | 1,017 00    | 20     |
| Rail: killing   | 2                                 |             |        |                                   |             |        |
| Robins: killing   | 1                                 | 25 00       |        |                                   |             |        |
| Seagull: killing, possession  |                                   |             |        | 1                                 | 25 00       |        |
| Shorebirds: possession, possession killdeer, possession avocet  | 1                                 |             |        | 11                                | 140 00      |        |
| Sierra hare in possession   | 1                                 | 50 00       |        |                                   |             |        |
| Spotlighting  | 32                                | 1,195 00    | 135    | 21                                | 650 00      | 235    |
| Swan: possession, killing   | 7                                 | 225 00      |        | 1                                 | 25 00       |        |
| Trapping: no license, bear, game birds, fur bearing mammals   | 38                                | 219 50      | 10     | 35                                | 253 00      |        |
| Tree squirrels: killing, possession, grey squirrel skins  | 9                                 | 145 00      |        | 7                                 | 90 00       | 3½     |
| Trespass  | 13                                | 132 50      |        | 12                                | 205 00      |        |
| Using cane gun  |                                   |             |        | 1                                 | 25 00       |        |
| Waterfowl: take between 4 p.m. and 7 a.m.   |                                   |             |        | 7                                 | 155 00      |        |
| Totals  | 1,480                             | \$40,121 56 | 5,933½ | 1,476                             | \$39,148 00 | 5,622¾ |

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| Counties          | Total     |
|-------------------|-----------|
| ALAMEDA.....      | 30,000    |
| ALPINE.....       | -----     |
|                   | 731,220   |
| AMADOR.....       | 222,000   |
| BUTTE.....        | 574,000   |
| CALAVERAS.....    | 469,445   |
| DEL NORTE.....    | 252,100   |
| EL DORADO.....    | -----     |
|                   | 2,137,382 |
| FRESNO.....       | -----     |
|                   | 934,121   |
| HUMBOLDT.....     | 985,231   |
| INYO.....         | 006,327   |
| KERN.....         | 408,046   |
| LAKE.....         | 91,000    |
| LASSEN.....       | 485,270   |
| LOS ANGELES.....  | 660,400   |
| MADERA.....       | -----     |
|                   | 03,790    |
| MARIN.....        | 74,660    |
| MARIPOSA.....     | 75,900    |
| MENDOCINO.....    | 75,800    |
| MODOC.....        | 45,000    |
| MONO.....         | -----     |
|                   | 21,324    |
| MONTEREY.....     | 1,000     |
| NAPA.....         | 0,000     |
| NEVADA.....       | -----     |
|                   | 4,092     |
| NEVADA STATE..... | 2,590     |
| ORANGE.....       | 7,500     |







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## ELEVEN-YEAR RECORD OF DEER KILL

| COUNTY                      | 1927    | 1928    | 1929    | 1930    | 1931    | 1932   | 1933   | 1934    | 1935    | 1936    | 1937    |
|-----------------------------|---------|---------|---------|---------|---------|--------|--------|---------|---------|---------|---------|
|                             | Total   | Total   | Total   | Total   | Total   | Total  | Total  | Total   | Total   | Total   | Total   |
| Alameda.....                | 220     | 263     | 275     | 252     | 248     | 164    | 148    | 204     | 268     | 266     | 398     |
| Alpine.....                 | 67      | 66      | 89      | 124     | 129     | 191    | 137    | 102     | 144     | 153     | 275     |
| Amador.....                 | 59      | 78      | 87      | 101     | 104     | 69     | 66     | 76      | 100     | 108     | 183     |
| Butte.....                  | 228     | 212     | 234     | 314     | 494     | 287    | 205    | 235     | 221     | 206     | 335     |
| Calaveras.....              | 149     | 191     | 175     | 283     | 227     | 148    | 114    | 148     | 119     | 149     | 235     |
| Colusa.....                 | 263     | 272     | 297     | 343     | 304     | 198    | 220    | 168     | 177     | 211     | 316     |
| Contra Costa.....           | 5       | 6       | 14      | 6       | 11      | 8      | 9      | 19      | 27      | 32      | 30      |
| Del Norte.....              | 42      | 48      | 55      | 40      | 38      | 13     | 17     | 32      | 39      | 23      | 23      |
| El Dorado.....              | 535     | 548     | 597     | 685     | 699     | 462    | 368    | 417     | 478     | 428     | 678     |
| Fresno.....                 | 592     | 763     | 764     | 893     | 952     | 882    | 888    | 1,359   | 1,259   | 1,522   | 1,658   |
| Glenn.....                  | 623     | 592     | 586     | 601     | 430     | 348    | 253    | 260     | 353     | 548     | 829     |
| Humboldt.....               | 821     | 777     | 689     | 917     | 1,069   | 807    | 842    | 877     | 921     | 796     | 940     |
| Imperial.....               | 1       | 4       | 4       | 1       | 1       | 4      | 5      | 1       | 1       | 1       | 3       |
| Inyo.....                   | 173     | 239     | 253     | 251     | 211     | 180    | 297    | 285     | 301     | 356     | 316     |
| Kern.....                   | 218     | 295     | 297     | 324     | 354     | 196    | 266    | 251     | 203     | 249     | 278     |
| Kings.....                  | 3       | 3       | 3       | 12      | 10      | 13     | 5      | 6       | 8       | 9       | 7       |
| Lake.....                   | 901     | 1,038   | 841     | 885     | 726     | 524    | 481    | 419     | 570     | 757     | 1,418   |
| Lassen.....                 | 296     | 393     | 511     | 585     | 607     | 508    | 551    | 632     | 781     | 1,037   | 986     |
| Los Angeles.....            | 435     | 369     | 691     | 637     | 949     | 819    | 572    | 750     | 800     | 772     | 1,192   |
| Madera.....                 | 260     | 300     | 313     | 379     | 442     | 316    | 268    | 310     | 360     | 314     | 421     |
| Marin.....                  | 367     | 444     | 394     | 403     | 449     | 376    | 301    | 341     | 328     | 411     | 482     |
| Mariposa.....               | 95      | 134     | 144     | 235     | 190     | 134    | 100    | 160     | 121     | 139     | 181     |
| Mendocino.....              | 1,475   | 1,468   | 1,355   | 1,483   | 1,706   | 1,273  | 1,234  | 1,185   | 1,207   | 1,372   | 2,072   |
| Merced.....                 | 67      | 68      | 48      | 68      | 60      | 45     | 45     | 60      | 26      | 53      | 67      |
| Modoc.....                  | 510     | 729     | 835     | 1,129   | 1,486   | 916    | 955    | 1,533   | 1,871   | 2,296   | 1,710   |
| Mono.....                   | 36      | 55      | 76      | 73      | 110     | 94     | 125    | 103     | 134     | 216     | 205     |
| Monterey.....               | 757     | 830     | 734     | 864     | 900     | 484    | 631    | 736     | 702     | 759     | 821     |
| Napa.....                   | 442     | 569     | 523     | 536     | 488     | 304    | 285    | 288     | 278     | 415     | 544     |
| Nevada.....                 | 125     | 140     | 169     | 236     | 229     | 144    | 154    | 182     | 202     | 230     | 465     |
| Orange.....                 | 56      | 69      | 81      | 90      | 114     | 87     | 36     | 55      | 40      | 54      | 99      |
| Placer.....                 | 341     | 346     | 335     | 340     | 361     | 271    | 196    | 175     | 194     | 205     | 319     |
| Plumas.....                 | 551     | 586     | 695     | 764     | 968     | 829    | 917    | 1,128   | 1,144   | 1,270   | 1,718   |
| Riverside.....              | 323     | 249     | 404     | 629     | 663     | 488    | 354    | 307     | 351     | 290     | 356     |
| Sacramento.....             | 2       | 2       | 2       | 2       | 4       | 2      | 2      | 1       | 1       | 3       | 5       |
| San Benito.....             | 217     | 320     | 269     | 313     | 275     | 152    | 172    | 214     | 160     | 285     | 408     |
| San Bernardino.....         | 74      | 122     | 120     | 188     | 237     | 187    | 153    | 180     | 196     | 176     | 225     |
| San Diego.....              | 169     | 232     | 233     | 250     | 334     | 263    | 173    | 259     | 237     | 263     | 363     |
| San Francisco.....          | 21      | 14      | 22      | 22      | 24      | 15     | 14     | 17      | 11      | 14      | 21      |
| San Joaquin.....            | 394     | 450     | 455     | 568     | 552     | 377    | 436    | 497     | 630     | 718     | 778     |
| San Luis Obispo.....        | 77      | 89      | 102     | 100     | 103     | 85     | 105    | 133     | 99      | 106     | 153     |
| San Mateo.....              | 669     | 851     | 717     | 777     | 755     | 532    | 547    | 608     | 748     | 807     | 957     |
| Santa Barbara.....          | 397     | 536     | 577     | 650     | 697     | 415    | 393    | 421     | 463     | 595     | 754     |
| Santa Clara.....            | 78      | 92      | 102     | 115     | 127     | 85     | 108    | 108     | 81      | 92      | 118     |
| Santa Cruz.....             | 612     | 603     | 702     | 655     | 773     | 527    | 517    | 630     | 653     | 689     | 1,065   |
| Shasta.....                 | 101     | 102     | 132     | 137     | 190     | 151    | 158    | 179     | 210     | 302     | 531     |
| Sierra.....                 | 1,665   | 1,654   | 1,211   | 1,372   | 1,516   | 896    | 823    | 1,043   | 1,092   | 1,227   | 1,186   |
| Siskiyou.....               | 45      | 52      | 54      | 58      | 45      | 31     | 19     | 20      | 23      | 32      | 39      |
| Solano.....                 | 751     | 753     | 732     | 865     | 903     | 709    | 748    | 704     | 554     | 536     | 744     |
| Sonoma.....                 | 91      | 115     | 119     | 111     | 94      | 37     | 37     | 39      | 39      | 77      | 107     |
| Stanislaus.....             | 1       | 3       | 2       | 1       | 1       | 1      | 1      | 1       | 1       | 1       | 1       |
| Sutter.....                 | 799     | 846     | 758     | 845     | 715     | 487    | 569    | 866     | 813     | 647     | 1,391   |
| Tehama.....                 | 921     | 800     | 751     | 760     | 841     | 418    | 340    | 464     | 459     | 650     | 865     |
| Trinity.....                | 744     | 939     | 807     | 965     | 890     | 725    | 625    | 836     | 924     | 1,108   | 1,206   |
| Tulare.....                 | 213     | 213     | 212     | 280     | 329     | 215    | 175    | 218     | 223     | 257     | 451     |
| Tuolumne.....               | 274     | 362     | 346     | 308     | 390     | 317    | 408    | 398     | 465     | 554     | 972     |
| Ventura.....                | 115     | 169     | 176     | 214     | 191     | 138    | 88     | 91      | 106     | 151     | 209     |
| Yolo.....                   | 53      | 52      | 55      | 93      | 91      | 34     | 31     | 56      | 40      | 42      | 102     |
| Yuba.....                   | 53      | 52      | 55      | 93      | 91      | 34     | 31     | 56      | 40      | 42      | 102     |
| Totals.....                 | 19,507  | 21,515  | 21,222  | 24,132  | 25,805  | 18,380 | 17,686 | 20,805  | 21,955  | 25,008  | 32,241  |
| Deer Tag License Sales..... | 110,760 | 105,638 | 115,472 | 123,999 | 129,005 | 96,702 | 95,776 | 108,913 | 110,808 | 126,855 | 128,436 |

CALIFORNIA FRESH FISHERY PRODUCTS FOR YEAR 1936  
Compiled by Division of Fish and Game, Bureau of Commercial Fisheries

| Species of fish    | Del Norte,<br>Humboldt | Mendocino,<br>Sonoma, Lake | Marin   | Solano, Yolo | Sacramento,<br>San Joaquin | Alameda,<br>Contra Costa | San Francisco,<br>San Mateo | Santa Cruz | Monterey    |
|--------------------|------------------------|----------------------------|---------|--------------|----------------------------|--------------------------|-----------------------------|------------|-------------|
| Albacore           |                        |                            |         |              |                            |                          |                             | 6,413      | 36,128      |
| Anchovy            | 2,020                  |                            |         |              |                            |                          |                             | 16,250     | 13,950      |
| Barracuda          |                        |                            |         |              |                            |                          |                             | 32         | 410         |
| Bonito             |                        |                            |         |              |                            |                          |                             |            |             |
| Cabrilla           |                        |                            |         | 4,815        | 32,120                     | 10,173                   |                             |            |             |
| Carp               |                        | 61,625                     |         |              | 172,631                    | 119,668                  |                             |            |             |
| Catfish            |                        | 12,031                     |         |              |                            |                          |                             | 52,997     | 108,326     |
| Cultus             | 217,696                | 123,566                    | 24      |              |                            | 728                      | 247,419                     | 9,238      | 1,078       |
| Flounder           | 111,742                | 26,856                     |         |              |                            |                          | 471,520                     |            |             |
| Flying Fish        |                        |                            |         |              |                            |                          |                             | 7,250      |             |
| Hake               |                        | 6,250                      |         |              |                            |                          | 33,241                      |            |             |
| Halibut—California |                        | 1,477                      | 85      |              |                            |                          | 8,139                       |            | 19,522      |
| Halibut—Northern   | 500,027                | 98,400                     |         |              | 38,270                     | 4,310                    | 444,370                     |            | 1,315       |
| Herring            | 5,849                  |                            | 382,848 |              |                            |                          | 12,847                      | 35,559     | 174,295     |
| Kingfish           |                        |                            |         |              |                            |                          |                             | 335        | 30,802      |
| Mackerel—Horse     |                        |                            |         |              |                            |                          |                             | 2,067      | 5,416,029   |
| Mackerel—Pacific   | 13                     | 451                        |         |              |                            |                          | 44,535                      |            |             |
| Mackerel—Spanish   |                        |                            |         |              |                            |                          |                             |            |             |
| Mullet             |                        |                            |         |              |                            |                          |                             |            |             |
| Perch              | 13,353                 | 31                         | 66,236  | 105          | 307                        | 18                       | 26,369                      | 4,881      | 40,466      |
| Pike               |                        |                            |         |              |                            | 85                       |                             |            |             |
| Pompano            |                        |                            |         |              |                            |                          |                             | 1          | 297         |
| Rock Bass          |                        |                            |         |              |                            |                          |                             |            | 8           |
| Rockfish           | 234,318                | 170,396                    | 5       |              |                            | 43                       | 547,813                     | 666,000    | 2,046,863   |
| Sablefish          | 476,079                | 130,020                    |         |              |                            |                          | 15,603                      | 199,455    | 25,510      |
| Salmon             | 2,347,116              | 4,405,849                  |         | 301,766      | 252,012                    | 400,181                  | 266,440                     | 58,664     | 86,260      |
| Sand Dab           | 147,047                | 63,209                     |         |              |                            | 250                      | 322,732                     | 56,180     | 21,758      |
| Sardine            |                        |                            |         |              |                            |                          | 283,789,475                 | 1,000      | 402,941,948 |
| Sculpin            |                        |                            |         |              |                            |                          |                             | 80         |             |
| Sea Bass—Black     |                        |                            |         |              |                            |                          |                             |            | 25          |
| Sea Bass—White     |                        |                            | 3,295   |              |                            |                          | 1,147                       | 6,574      | 475         |
| Shad               |                        |                            |         | 306,399      | 35,904                     | 1,907,088                | 24,487                      | 11         |             |
| Shark              | 210                    | 13,996                     |         |              |                            |                          | 141,422                     | 16,763     | 1,465       |

|                             |           |           |           |         |         |           |             |           |             |
|-----------------------------|-----------|-----------|-----------|---------|---------|-----------|-------------|-----------|-------------|
| Sheepshead                  | 3,948     | 36,275    |           |         |         |           | 247,165     | 31,554    | 21,420      |
| Skate                       |           |           |           |         |         |           |             |           |             |
| Skipjack                    |           | 9,513     | 9,167     |         |         |           | 41,639      | 21,202    | 102,885     |
| Smelt                       | 15,116    | 53,986    |           |         |         |           | 5,353       | 11,115    |             |
| Smelt—Jack                  |           |           |           |         |         |           |             |           |             |
| Sole                        | 1,885,845 | 1,193,685 |           |         |         |           | 3,919,675   | 829,465   | 114,731     |
| Spittail                    |           | 22,125    |           |         |         |           |             |           |             |
| Sucker                      |           | 41,925    |           |         |         |           | 3,495       |           |             |
| Swordfish—Broadbill         |           |           |           |         |         |           | 6,126       |           |             |
| Swordfish—Marlin            |           |           |           |         |         |           |             |           |             |
| Tom Cod                     |           | 70        |           |         |         |           | 4,083       |           | 22          |
| Tuna—Bluefin                |           |           |           |         |         |           |             |           |             |
| Tuna—Yellowfin              |           |           |           |         |         |           |             |           |             |
| Turbot                      | 825       | 1,010     | 984       |         |         |           | 95,042      | 8,621     | 9,866       |
| Whitebait                   | 77,333    | 111,054   | 24        |         |         |           | 2,271       | 19        | 7,037       |
| Whitefish                   |           |           |           |         |         |           |             |           |             |
| Yellowtail                  |           |           |           |         |         |           |             |           |             |
| Miscellaneous               | 44,571    | 26,848    |           | 10      | 10      | 97        | 91,405      | 24,498    | 1,121       |
| Total fish                  | 6,084,624 | 3,550,583 | 516,654   | 613,095 | 540,502 | 2,451,569 | 291,199,017 | 2,063,792 | 411,293,712 |
| Crustaceans:                |           |           |           |         |         |           |             |           |             |
| Crab                        |           |           |           |         |         |           |             |           |             |
| Shrimp                      | 229,684   | 3,010     |           |         |         |           |             | 5,484     | 724         |
| Spiny Lobster               |           |           | 280,366   |         |         |           |             | 1,771,474 | 1,861       |
| Mollusks:                   |           |           |           |         |         |           |             |           |             |
| Abalone                     |           |           |           |         |         |           |             |           |             |
| Clam—Hardshell              | 231       | 23,067    | 119       |         |         |           | 10,600      |           | 1,575,675   |
| Clam—Mixed                  | 34,065    | 5,286     | 411       |         |         |           |             | 2,245     | 18,014      |
| Clam—Pismo                  |           |           |           |         |         |           |             |           |             |
| Clam—Softshell              |           | 977       | 78,604    |         |         |           | 11,390      |           |             |
| Mussel                      |           |           |           |         |         |           |             | 750       |             |
| Octopus                     | 111       | 830       |           |         |         |           | 12,140      | 3,549     | 45,172      |
| Oyster—Eastern and Japanese |           |           | 108,131   |         |         |           | 422,094     |           | 9,266       |
| Oyster—Native               |           |           | 37,350    |         |         |           |             | 149       | 933,082     |
| Squid                       |           | 315       |           |         |         |           | 2,438       |           |             |
| Miscellaneous mollusks      |           |           |           |         |         |           |             |           |             |
| Miscellaneous:              |           |           |           |         |         |           |             |           |             |
| Turtle                      |           |           |           |         |         |           |             |           |             |
| Totals                      | 6,348,715 | 3,585,091 | 1,111,635 | 613,095 | 540,502 | 2,639,232 | 295,500,211 | 2,105,989 | 413,807,356 |

All amounts shown in pounds unless otherwise specified. Skipjack and Albacore cleaned.

## CALIFORNIA FRESH FISHERY PRODUCTS FOR YEAR 1936—Continued

| Species of fish    | San Luis Obispo,<br>Santa Barbara,<br>Ventura | Los Angeles | Orange    | San Diego  | Total taken in state<br>waters and off coast of<br>California | From west coast south of<br>the International<br>Boundary brought into<br>San Pedro | From west coast south of<br>the International<br>Boundary brought into<br>San Diego | Total landings in Cali-<br>fornia, including fish<br>from west coast south<br>of the International<br>Boundary |
|--------------------|---|-------------|-----------|------------|---|---|---|--|
| Albacore           | 1,780   | 870,230     | 39,817    | 2,403      | 956,771   |   |   | 956,771  |
| Anchovy            |   | 21,832      |           | 221,643    | 103,122   |   |   | 103,122  |
| Barracuda          | 47,950  | 1,824,536   | 159,777   | 935,789    | 9,253,566   |   | 494,659   | 2,977,154  |
| Bonito             | 4,176   | 820,402     | 453,870   |            | 2,216,679   |   | 1,314,506   | 7,115,916  |
| Cabrilla           |   |             |           | 142        |   |   | 124,011   | 106,823  |
| Carp               |   |             |           |            | 108,875   |   |   | 108,875  |
| Catfish            |   |             |           |            | 304,630   |   |   | 304,630  |
| Cutbush            | 143   | 118         | 9         | 2,051      | 734,325   |   | 3,634   | 738,234  |
| Flounder           |   | 55,627      |           |            | 621,186   |   |   | 621,186  |
| Flying Fish        |   | 4,080       |           |            | 38,027  |   |   | 38,027   |
| Hake               |   | 398,539     | 21,208    | 95,315     | 50,791  |   |   | 307,191  |
| Halibut—California | 263,500                                       |             |           |            | 783,243   |   |   | 1,583,324  |
| Halibut—Northern   |   |             |           |            | 522,848   |   |   | 522,848  |
| Hardhead           |   |             |           |            | 108,670   |   |   | 108,670  |
| Herring            | 225   | 419,538     |           | 1,533      | 840,530   |   |   | 840,580  |
| Koestfish          | 699   | 4,506,669   | 7,716     | 1,273      | 651,927   |   | 166   | 652,093  |
| Maackerel—Horse    |   |             |           | 60,771     | 4,338,517   |   | 1,200   | 4,399,717  |
| Maackerel—Pacific  | 24,316  | 78,150,993  | 6,162,780 | 9,026,646  | 98,827,800  |   | 1,714,079   | 100,541,879  |
| Maackerel—Spanish  |   | 4,833       | 1,847     | 3,891      | 10,571  |   | 1,425   | 17,542   |
| Mullet             |   | 91,587      | 281       | 331        | 251,622   |   |   | 10,571   |
| Perch              | 5,069   |             |           |            | 497   |   | 120   | 251,742  |
| Pike               |   | 7,016       | 115       | 95         | 7,524   |   | 402   | 7,926  |
| Pompano            | 16,129  | 142,179     | 48,619    | 117,379    | 324,314   |   | 82,037  | 416,054  |
| Roek Bass          | 400,981                                       | 244,299     | 26,434    | 153,699    | 4,490,851   |   | 11,397  | 4,600,313  |
| Rockfish           |   |             |           | 1,605      | 1,021,082   |   | 544   | 1,025,580  |
| Sablefish          |   | 95,007      | 77,057    |            | 5,113,308   |   |   | 5,119,308  |
| Salmon             | 270   | 750         |           |            | 621,675   |   |   | 621,675  |
| Sand Dab           |   | 6,056       | 2,443     |            | 955,524,778   |   | 547   | 955,525,325  |
| Sardine            | 1,657   | 252,667,215 | 268,080   | 15,855,463 | 104,751   |   | 746   | 110,497  |
| Sculpin            | 216   | 97,699      | 8,099     | 3,657      | 10,751  |   |   | 110,497  |
| Sea Bass—Black     |   |             |           | 3,657      | 19,854  |   | 96,609  | 397,691  |
| Sea Bass—White     | 61,599  | 10,562      | 2,917     |            | 564,944   |   | 18,360  | 807,767  |
| Shad               |   | 416,677     | 5,335     | 69,242     | 2,272,989   |   | 224,463   | 2,272,989  |

|                                  |           |             |           |            |               |            |            |               |
|----------------------------------|-----------|-------------|-----------|------------|---------------|------------|------------|---------------|
| Skink.....                       | 22,211    | 157,580     | 58,200    | 45,884     | 457,530       | 8,212      | 6,119      | 471,861       |
| Sheepshead.....                  | 19,568    | 86,660      | 3,058     | 6,830      | 115,586       | 1,568      | 10,623     | 128,577       |
| Skate.....                       | 13,752    | 59,433      | 2,610     | 9,067      | 378,200       | 1,741      | 2,003      | 381,044       |
| Skipjack.....                    | 7         | 5,177,253   | 288,020   | 3,392,410  | 8,787,292     | 3,443,705  | 14,236,086 | 26,497,493    |
| Smelt.....                       | 20,933    | 253,822     | 24,377    | 7,675      | 511,752       | 2,011      | 2,011      | 513,763       |
| Smelt—Jaek.....                  | 374,279   | 4,205       | 2,790     | 52         | 327,755       | 23         | 23         | 327,778       |
| Sole.....                        | 44,228    | 357,776     | 57,782    | 90,232     | 832,478       | 147        | 29,342     | 832,822       |
| Spittail.....                    | 7,147     | 13,623,047  | 507       | 177,855    | 13,808,578    | 4,021,330  | 1,004,975  | 18,924,883    |
| Swordfish—Broadbill.....         | 65        | 603,241     | 30,850    | 126,975    | 707,291       | 17,626,807 | 57,924,714 | 76,318,752    |
| Swordfish—Marlin.....            | 4,312     | 10,713      | 1,487     | 10,327     | 197,738       | 5,726      | 14,038     | 197,738       |
| Tom Cod.....                     | 46        | 162,556     | 21,418    | 69,663     | 258,723       | 1,063,662  | 7,875,055  | 10,072,470    |
| Tuna—Bluefin.....                | 5,041     | 2,278       | 728       | 386        | 196,993       | 20,851     | 40,621     | 258,465       |
| Tuna—Yellowfin.....              | 1,340,776 | 361,269,113 | 7,798,001 | 30,427,959 | 1,119,100,987 | 31,606,080 | 86,020,943 | 1,236,737,020 |
| Turbot.....                      | 76        | 16,126      | .....     | .....      | 2,327,716     | .....      | .....      | 2,327,716     |
| Whitebait.....                   | 141,783   | 160,993     | 30,524    | 80,053     | 2,233,104     | 35,044     | 4,489      | 2,244,333     |
| Yellowtail.....                  | 1,692,143 | 21,429      | .....     | .....      | 413,358       | .....      | 855,679    | 1,394,081     |
| Miscellaneous.....               | .....     | .....       | .....     | .....      | .....         | .....      | .....      | .....         |
| <b>Total fish.....</b>           | .....     | .....       | .....     | .....      | .....         | .....      | .....      | .....         |
| Crustaceans:                     | .....     | .....       | .....     | .....      | .....         | .....      | .....      | .....         |
| Crab.....                        | .....     | .....       | .....     | .....      | .....         | .....      | .....      | .....         |
| Shrimp.....                      | .....     | .....       | .....     | .....      | .....         | .....      | .....      | .....         |
| Spiny Lobster.....               | .....     | .....       | .....     | .....      | .....         | .....      | .....      | .....         |
| Mollusks:                        | .....     | .....       | .....     | .....      | .....         | .....      | .....      | .....         |
| Abalone.....                     | .....     | .....       | .....     | .....      | .....         | .....      | .....      | .....         |
| Clam—Hardshell.....              | .....     | .....       | .....     | .....      | .....         | .....      | .....      | .....         |
| Clam—Mixed.....                  | .....     | .....       | .....     | .....      | .....         | .....      | .....      | .....         |
| Clam—Pismo.....                  | .....     | .....       | .....     | .....      | .....         | .....      | .....      | .....         |
| Clam—Softshell.....              | .....     | .....       | .....     | .....      | .....         | .....      | .....      | .....         |
| Mussel.....                      | .....     | .....       | .....     | .....      | .....         | .....      | .....      | .....         |
| Geopus.....                      | .....     | .....       | .....     | .....      | .....         | .....      | .....      | .....         |
| Oyster—Eastern and Japanese..... | .....     | .....       | .....     | .....      | .....         | .....      | .....      | .....         |
| Oyster—Native.....               | .....     | .....       | .....     | .....      | .....         | .....      | .....      | .....         |
| Squid.....                       | .....     | .....       | .....     | .....      | .....         | .....      | .....      | .....         |
| Miscellaneous Mollusks.....      | .....     | .....       | .....     | .....      | .....         | .....      | .....      | .....         |
| Miscellaneous:                   | .....     | .....       | .....     | .....      | .....         | .....      | .....      | .....         |
| Turtle.....                      | .....     | .....       | .....     | .....      | .....         | .....      | .....      | .....         |
| <b>Totals.....</b>               | 3,364,318 | 361,478,367 | 7,830,027 | 30,508,036 | 1,120,432,734 | 31,641,124 | 86,913,274 | 1,247,987,132 |

All amounts shown in pounds unless otherwise specified. Skipjack and Allacore cleaned.

**CANNED, CURED AND MANUFACTURED FISHERY PRODUCTS OF CALIFORNIA FOR THE YEAR 1936  
SHORE PLANTS**

| Canned                          |                 |                                     |                          |                           |                           |             |        |
|---------------------------------|-----------------|-------------------------------------|--------------------------|---------------------------|---------------------------|-------------|--------|
| Kind of fish or fishery product | Size of cans    | Northern California district, cases | Monterey district, cases | San Pedro district, cases | San Diego district, cases | Total cases |        |
| Albacore                        | 4-lb., 12's     |                                     |                          | 838                       |                           | 838         |        |
|                                 | 1-lb.           |                                     |                          | 8,585                     |                           | 8,585       |        |
|                                 | 1/2-lb.         |                                     |                          | 43,525                    | 35                        | 43,560      |        |
| Bonito                          | 1/4-lb.         |                                     |                          | 901                       |                           | 901         |        |
|                                 | 1-lb.           |                                     |                          | 7,749                     | 6,580                     | 14,329      |        |
|                                 | 1/2-lb.         |                                     |                          | 55,747                    | 29,657                    | 85,404      |        |
| Mackerel                        | 1/4-lb.         |                                     |                          | 1,464                     | 506                       | 1,970       |        |
|                                 | 1/4-lb., 100's  |                                     |                          | 3,375                     |                           | 3,375       |        |
|                                 | 1-lb.           |                                     | 54,138                   | 990,360                   | 113,075                   | 1,157,573   |        |
| Roe                             | 1/2-lb.         |                                     |                          | 7,640                     | 9,669                     | 17,309      |        |
|                                 | 1/2-lb., 96's   |                                     | 1,001                    | 56,430                    | 4,680                     | 62,111      |        |
|                                 | 1/4-lb.         |                                     |                          |                           | 75                        | 75          |        |
| Sardine                         | 1-lb.           |                                     |                          |                           | 43                        | 43          |        |
| Sardine                         | No. 10, 6's     |                                     | 4,492                    | 749                       |                           | 5,241       |        |
|                                 | 1-lb. oval      |                                     | 1,089,683                | 586,038                   |                           | 1,675,721   |        |
|                                 | 1-lb. tall      |                                     | 202,148                  | 259,793                   | 9,728                     | 471,669     |        |
|                                 | 1/2-lb.         |                                     |                          | 25,260                    |                           | 25,260      |        |
|                                 | 1/2-lb. oval    |                                     | 728                      |                           |                           | 728         |        |
|                                 | 1/2-lb., 72's   |                                     | 1,031                    |                           |                           | 1,031       |        |
|                                 | 1/2-lb., 96's   |                                     | 86,506                   | 107,228                   | 2,755                     | 196,489     |        |
|                                 | 1/2-lb. B. & P. |                                     | 432                      |                           |                           | 432         |        |
|                                 | 1/2-lb. fillet  |                                     | 113,516                  |                           |                           | 113,516     |        |
|                                 | 10 1/2 oz.      |                                     | 37,454                   |                           |                           | 37,454      |        |
|                                 | 5-oz., 100's    |                                     | 124,490                  |                           | 156,649                   | 281,139     |        |
|                                 | 1/4-lb.         |                                     |                          |                           |                           | 10,380      | 10,380 |
|                                 | 1/4-lb. B. & P. |                                     |                          |                           |                           | 583         | 583    |
| 100's                           |                 |                                     | 583                      |                           |                           | 583         |        |
| Sardine paste                   | 4-oz.           |                                     | 906                      |                           |                           | 906         |        |
| Shad                            | 1-lb.           | 13,214                              |                          |                           |                           | 13,214      |        |
| Shad roe                        | 1-lb. oval      | 75                                  |                          |                           |                           | 75          |        |
| Squid                           | 1/2-lb. oval    | 5,028                               |                          |                           |                           | 5,028       |        |
|                                 | 9-oz.           |                                     | 12,091                   |                           |                           | 12,091      |        |
| Tuna, bluefin                   | 7-oz.           |                                     | 181                      |                           |                           | 181         |        |
|                                 | 1-lb.           |                                     |                          | 13,843                    | 1,506                     | 15,349      |        |
|                                 | 1/2-lb.         |                                     |                          | 247,752                   | 18,235                    | 265,987     |        |
|                                 | 1/2-lb.         |                                     |                          | 24,546                    | 2,649                     | 27,195      |        |
|                                 | 1/4-lb., 100's  |                                     |                          | 24,638                    |                           | 24,638      |        |
| Tuna, striped                   | 12-oz.          |                                     |                          | 1,208                     |                           | 1,208       |        |
|                                 | 1-lb.           |                                     |                          | 7,016                     | 12,802                    | 19,818      |        |
|                                 | 1/2-lb.         |                                     |                          | 138,739                   | 235,577                   | 374,316     |        |
|                                 | 1/4-lb.         |                                     |                          | 9,044                     | 24,125                    | 33,169      |        |
|                                 | 1/4-lb., 100's  |                                     |                          | 29,557                    | 22,826                    | 52,383      |        |
| Tuna, yellowfin                 | 12-oz.          |                                     |                          | 574                       |                           | 574         |        |
|                                 | 4-lb., 12's     |                                     |                          | 811                       | 841                       | 1,652       |        |
|                                 | 1-lb.           |                                     |                          | 33,243                    | 68,294                    | 101,537     |        |
|                                 | 1/2-lb.         |                                     |                          | 279,409                   | 864,796                   | 1,144,205   |        |
|                                 | 1/4-lb.         |                                     |                          | 24,626                    | 123,192                   | 147,818     |        |
| Tuna flakes                     | 1/4-lb., 100's  |                                     |                          | 4,284                     | 17,688                    | 21,972      |        |
|                                 | 12-oz.          |                                     |                          | 861                       |                           | 861         |        |
|                                 | 1-lb.           |                                     |                          | 814                       | 2,300                     | 3,114       |        |
|                                 | 1/2-lb.         |                                     |                          | 9,092                     | 12,431                    | 21,523      |        |
|                                 | 1/4-lb.         |                                     |                          |                           | 236                       | 236         |        |
| Tuna, "tonno" style             | 1/2-lb.         |                                     |                          | 6,450                     |                           | 6,450       |        |
| Yellowtail                      | 1/4-lb., 100's  |                                     |                          | 51,347                    | 740                       | 52,087      |        |
|                                 | 1-lb.           |                                     |                          | 6,157                     | 12,471                    | 18,628      |        |
|                                 | 1/2-lb.         |                                     |                          | 10,912                    | 82,208                    | 93,120      |        |
| Pet food                        | 1/4-lb.         |                                     |                          |                           | 380                       | 380         |        |
|                                 | Misc. sizes     |                                     |                          | 128,384                   |                           | 128,384     |        |
| Totals                          |                 | 18,317                              | 1,729,380                | 3,365,638                 | 1,690,480                 | 6,803,815   |        |

NOTE—Forty-eight cans to the case unless otherwise specified. Sardines packed in Northern California included with Monterey.

**CANNED, CURED AND MANUFACTURED FISHERY PRODUCTS OF CALIFORNIA FOR THE YEAR 1936**  
**SHORE PLANTS—Continued**

**Cured and Manufactured**

| Fishery product         | Size or quantity | Northern California district | Monterey district | San Pedro district | San Diego district | Total      |
|-------------------------|------------------|------------------------------|-------------------|--------------------|--------------------|------------|
| Herring, pickled.....   | Pounds.....      | 40,000                       |                   |                    |                    | 40,000     |
| Mixed fish, dried.....  | Pounds.....      | 71,514                       |                   |                    | 17,975             | 89,489     |
| Mixed fish, salted..... | Pounds.....      |                              |                   |                    | 86,526             | 86,526     |
| Sablefish, smoked.....  | Pounds.....      | 226,471                      |                   |                    |                    | 226,471    |
| Salmon, mild cure.....  | Tierces.....     | 2,239                        |                   |                    |                    | 2,239      |
| Salmon, smoked.....     | Pounds.....      | 77,349                       |                   |                    |                    | 77,349     |
| Sardines, salted.....   | Pounds.....      |                              | 47,750            | 12,600             |                    | 60,350     |
| Shad, salted.....       | Tierces.....     | 10                           |                   |                    |                    | 10         |
| Shrimp, dried.....      | Pounds.....      | 178,656                      |                   |                    |                    | 178,656    |
| Shrimp meal.....        | Pounds.....      | 384,762                      |                   |                    |                    | 384,762    |
| Fish meal.....          | Tons.....        | 24,593                       | 30,431            | 23,588             | 7,655              | 86,267     |
| Fish oil.....           | Gallons.....     | 5,626,422                    | 6,756,541         | 2,834,887          | 260,059            | 15,477,909 |

**Miscellaneous Data**

|                              |             |             |              |             |              |
|------------------------------|-------------|-------------|--------------|-------------|--------------|
| Estimated value of pack..... | \$3,402,517 | \$8,227,865 | \$14,296,022 | \$9,024,907 | \$34,951,311 |
| Number of employees.....     | 1,134       | 2,706       | 4,041        | 1,946       | 9,827        |
| Value of plants.....         | \$1,986,095 | \$3,351,831 | \$3,110,721  | \$998,656   | \$9,447,303  |

## REPORT OF SARDINE PLANTS, SEASON 1936-37

While the season in Monterey and northern California opened on August 1st, no fishing was done until the 10th at Monterey and the 17th in the San Francisco Bay area, when a few light loads were brought in. Fishing was held up during the first of the month by the full-moon which occurred on August 2d, and by negotiations between plant operators and fishermen on prices and labor regulations. In southern California the season opened on November 1st but no fishing was done in November on account of a fishermen's strike. Permits for use of sardines by a reduction process were issued during the entire open season and amounted to 637,500 tons. None of the plants received tonnage to cover the quota granted, and during the season 363,242 tons of permit-tonnage was canceled on account of lack of fish. This report covers operations of the shore plants only and does not include sardines taken for fresh fish markets, bait or "quarter oil" pack.

During the season nine floating reduction ships operated off the coast of California, outside the jurisdiction of the State. It is estimated these floating plants took 239,257 tons of sardines, and produced 39,876 tons of meal and 9,034,041 gallons of oil. Adding the estimated tonnage of the floating plants to the tonnage of the shore plants would make a total of 727,398 tons of sardines taken in State waters and off the California coast. The floating reduction plants which operated off the California coast during the season, with names of the owners, were: *Lansing*, Fishermen's Products Co.; *Manatawny*, Deep Sea Fisheries; *Lake Miraflores*, Santa Cruz Oil Co.; *American Fisher*, Santa Cruz Oil Co.; *Brookdale*, Gardenia Packing Co.; *Monitor*, Interstate Fish Reduction Co.; *Polarine*, Polarine Fisheries, Inc.; *Santa Inez*, Pacific Ocean Products Co.; *Currier*, American Marine Products Co.

The following shore plants operated during the season:

### MONTEREY AND NORTHERN CALIFORNIA DISTRICT

Benicia Fisheries, Benicia.  
 F. E. Booth Co., Inc., Monterey.  
 F. E. Booth Co., Inc., Pittsburg.  
 California Packing Corporation, Monterey.  
 Carmel Canning Company, Monterey.  
 Carquinez Fishery, Ltd., Port Chicago.  
 Custom House Packing Corporation, Monterey.  
 Cypress Fisheries, Inc., Monterey.<sup>1</sup>  
 Del Mar Canning Corporation, Monterey.<sup>1</sup>  
 East Bay Fisheries, Inc., Richmond.  
 Edible Fish Meals & Oils, Inc., Richmond.  
 Farallone Packing Company, San Francisco.  
 Fish-Dee-Lish-Corporation, Benicia.



Fish Packers, Inc., Benicia.  
 E. B. Gross Canning Company, Monterey.  
 Hofmann Packing Corporation, Benicia.  
 Hovden Food Products Corporation, Monterey.  
 Hovden Food Products Corporation, Moss Landing.  
 Mazama Fisheries Corporation (Barge *Mazama*), Richmond.  
 Monterey Canning Company, Monterey.  
 Old Capitol Land Company, Monterey.<sup>1</sup>  
 Old Capitol Packers, Inc., Benicia.  
 Ozol Packing Company, Martinez.  
 Pittsburg Cannery, Inc., Pittsburg.  
 Point Edith Fisheries, Ltd., Port Chicago.  
 Redondo Fish Products Co. (Barge *Redondo*), Richmond.  
 Richmond Fisheries, Inc., Richmond.  
 San Carlos Canning Company, Monterey.  
 San Xavier Fish Packing Company, Monterey.  
 Sea Pride Packing Corporation, Ltd., Monterey.  
 Union Fish Company (Barge *Peralta*), San Francisco.

## SAN PEDRO DISTRICT

Ambrose-Steele Canning Co., Long Beach.  
 California Marine Curing & Packing Company, Terminal Island.  
 California Packing Corporation, Terminal Island.  
 Coast Fishing Company, Wilmington.  
 Franco-Italian Packing Company, Inc., Terminal Island.  
 French Sardine Company, Inc., Terminal Island.  
 Italian Food Products Company, Inc., Long Beach.  
 K & M Fisheries, Inc., Terminal Island.  
 San Carlos Canning Company, Long Beach.  
 Sea Pride Packing Corporation, Ltd., Terminal Island.  
 Sea Pride Packing Corporation, Ltd., Wilmington.  
 South Coast Fisheries, Terminal Island.  
 Southern California Fish Corporation, Terminal Island.  
 Terminal Island Packing Co., Newport Beach (Sardines processed at Benicia).  
 Van Camp Sea Food Co., Inc., Terminal Island.

## SAN DIEGO DISTRICT

American Fisheries Company, San Diego.  
 Point Loma Tuna Packers, Inc., Point Loma.  
 Sun Harbor Packing Company, San Diego.  
 Westgate Sea Products Company, San Diego.

<sup>1</sup> Plant destroyed by fire November 25, 1936.

## PRODUCTION OF SARDINE PLANTS

August 1, 1936, to April 5, 1937

| District  | Sardines received, tons | Used for canning, tons | Used for meal and oil, tons | Offal, tons |
|---|-------------------------|------------------------|-----------------------------|-------------|
| Monterey and Northern California .....                    | 345,658                 | 76,482                 | 269,062                     | 38,245      |
| San Pedro .....   | 137,914                 | 72,340                 | 64,097                      | 36,165      |
| San Diego .....   | 4,569                   | 463                    | 4,106                       | 231         |
| Totals.....   | 488,141                 | 149,285                | 337,265                     | 74,641      |
| Deduct fish received for purposes other than canning..... | 275,863                 |                        |                             |             |
| Received for canning.....                                 | 212,278                 |                        |                             |             |

<sup>1</sup> The law requires that 13½ cases of 1-lb. oval cans be canned from each ton of sardines received for canning, but in figuring amount actually used in canning, a basis of 20 cases per ton is used.

| District                               | 1-lb. ovals packed, cases | Other size cans packed, cases | Other size cans reduced to equivalent of 1-lb. ovals, cases | Cases per ton |
|--|---------------------------|-------------------------------|---|---------------|
| Monterey and Northern California ..... | 1,017,530                 | 541,081                       | 512,282   | 13.5          |
| San Pedro .....                        | 629,802                   | 801,534                       | 819,859   | 14.6          |
| San Diego .....                        |                           | 9,375                         | 9,573   | 19.7          |
| Totals.....                            | 1,647,332                 | 1,351,990                     | 1,341,714   |               |

| District                              | Sardine meal, tons | Ratio per ton of meal | Sardine oil, gallons | Gallons of oil per ton of fish and offal | Fish used for purposes other than canning, tons |
|---------------------------------------|--------------------|-----------------------|----------------------|--|---|
| Monterey and Northern California..... | 55,553             | 5.5                   | 12,324,089           | 40.1                                     | 232,750   |
| San Pedro .....                       | 18,735             | 5.3                   | 1,898,134            | 18.9                                     | 39,028  |
| San Diego .....                       | 827                | 5.2                   | 77,700               | 17.9                                     | 4,085   |
| Totals.....                           | 75,115             |                       | 14,299,923           |  | 275,863   |

<sup>2</sup> 232,636 tons for meal and oil under permit, 114 tons for salting and smoking.

<sup>3</sup> 37,551 tons for meal and oil under permit, 1,477 tons for pet food.

<sup>4</sup> 4,085 tons for meal and oil under permit.

<sup>5</sup> 274,272 tons for meal and oil under permit, 114 tons for salting and smoking, 1,477 tons for pet food.

## SARDINE CATCH BY MONTHS, SEASON 1936-37

|                        | Monterey and Northern California, tons | San Pedro, tons | San Diego, tons |
|------------------------|--|-----------------|-----------------|
| August, 1936.....      | 10,620                                 |                 |                 |
| September.....         | 73,112                                 |                 |                 |
| October.....           | 65,282                                 |                 |                 |
| November.....          | 69,755                                 | 3               |                 |
| December.....          | 68,647                                 | 18,311          |                 |
| January, 1937.....     | 30,096                                 | 17,734          | 22              |
| February.....          | 27,385                                 | 41,435          | 2,410           |
| March.....             | 761                                    | 56,250          | 2,137           |
| April 1st to 5th ..... |  | 4,181           |                 |
| Totals.....            | 345,658                                | 137,914         | 4,569           |

## PACK OF 1-LB. OVALS BY MONTHS, SEASON 1936-37

|                       | Monterey<br>and Northern<br>California,<br>cases | San Pedro,<br>cases | San Diego,<br>cases |
|-----------------------|--|---------------------|---------------------|
| August, 1936.....     | 44,146   | -----               | -----               |
| September.....        | 256,464  | -----               | -----               |
| October.....          | 204,874  | -----               | -----               |
| November.....         | 179,262  | -----               | -----               |
| December.....         | 167,637  | 67,188              | -----               |
| January, 1937.....    | 87,773   | 117,333             | -----               |
| February.....         | 77,344   | 192,581             | -----               |
| March.....            | -----  | 234,217             | -----               |
| April 1st to 5th..... | -----  | 18,483              | -----               |
| Totals.....           | 1,017,530  | 629,802             | -----               |

PACK OF OTHER SIZE CANS REDUCED TO EQUIVALENTS OF 1-LB. OVALS BY MONTHS,  
SEASON 1936-37

|                       | Monterey<br>and Northern<br>California,<br>cases | San Pedro,<br>cases | San Diego,<br>cases |
|-----------------------|--|---------------------|---------------------|
| August, 1936.....     | 27,830   | -----               | -----               |
| September.....        | 118,168  | -----               | -----               |
| October.....          | 94,887   | -----               | -----               |
| November.....         | 104,585  | -----               | -----               |
| December.....         | 68,998   | 77,017              | -----               |
| January, 1937.....    | 48,891   | 102,813             | -----               |
| February.....         | 38,015   | 233,398             | 4,753               |
| March.....            | 10,908   | 358,429             | 4,820               |
| April 1st to 5th..... | -----  | 48,202              | -----               |
| Totals.....           | 512,282  | 819,859             | 9,573               |

## SARDINE MEAL PRODUCTION BY MONTHS, SEASON 1936-37

|                       | Monterey<br>and Northern<br>California,<br>tons | San Pedro,<br>tons | San Diego,<br>tons |
|-----------------------|---|--------------------|--------------------|
| August, 1936.....     | 1,499   | -----              | -----              |
| September.....        | 11,188  | -----              | -----              |
| October.....          | 10,209  | -----              | -----              |
| November.....         | 11,574  | -----              | -----              |
| December.....         | 11,350  | 1                  | -----              |
| January, 1937.....    | 5,000   | 2,838              | -----              |
| February.....         | 4,638   | 2,347              | 4                  |
| March.....            | 95  | 5,575              | 456                |
| April 1st to 5th..... | -----   | 7,539              | 367                |
| Totals.....           | 55,553  | 18,735             | 827                |

## SARDINE OIL PRODUCTION BY MONTHS, SEASON 1936-37

|                       | Monterey<br>and Northern<br>California,<br>gallons | San Pedro,<br>gallons | San Diego,<br>gallons |
|-----------------------|--|-----------------------|-----------------------|
| August, 1936.....     | 375,664  | -----                 | -----                 |
| September.....        | 2,691,879  | -----                 | -----                 |
| October.....          | 2,501,662  | -----                 | -----                 |
| November.....         | 2,485,241  | -----                 | -----                 |
| December.....         | 2,498,381  | 312,708               | -----                 |
| January, 1937.....    | 1,062,752  | 261,187               | 101                   |
| February.....         | 698,493  | 674,194               | 54,476                |
| March.....            | 10,017   | 637,719               | 23,123                |
| April 1st to 5th..... | -----  | 12,326                | -----                 |
| Totals.....           | 12,324,089   | 1,898,134             | 77,700                |

## COMPARATIVE STATEMENT OF SARDINE PLANT OPERATIONS, SEASONS 1935-36 AND 1936-37

## Monterey and Northern California District

|   | Season<br>1935-36 | Season<br>1936-37 | Increase  |
|---|-------------------|-------------------|-----------|
| Tons of sardines received for canning.....                      | 140,152           | 112,908           | *27,244   |
| Tons of sardines received under permit for meal and oil.....    | 118,086           | 232,636           | 114,550   |
| Tons of sardines received for salting, etc.....                 | 106               | 114               | 8         |
| Total tons of sardines received for all purposes.....           | 258,344           | 345,658           | 87,314    |
| Cases of 1-lb. oval cans packed.....                            | 1,256,051         | 1,017,530         | *238,521  |
| Cases of other size cans packed.....                            | 599,725           | 541,081           | *58,644   |
| Other size cans reduced to equivalent cases of 1-lb. ovals..... | 633,788           | 512,282           | *121,506  |
| Meal, tons.....   | 38,537            | 55,553            | 17,016    |
| Oil, gallons.....   | 10,050,658        | 12,324,089        | 2,273,431 |

\*Decrease.

## San Pedro District

|   | Season<br>1935-36 | Season<br>1936-37 | Increase   |
|---|-------------------|-------------------|------------|
| Tons of sardines received for canning.....                      | 95,949            | 98,886            | 2,937      |
| Tons of sardines received under permit for meal and oil.....    | 41,783            | 37,551            | *4,232     |
| Tons of sardines received for salting, pet food, etc.....       | 601               | 1,477             | 876        |
| Total tons of sardines received for all purposes.....           | 138,333           | 137,914           | *419       |
| Cases of 1-lb. oval cans packed.....                            | 680,103           | 629,802           | *50,301    |
| Cases of other size cans packed.....                            | 588,570           | 801,534           | 212,964    |
| Other size cans reduced to equivalent cases of 1-lb. ovals..... | 627,117           | 819,859           | 192,742    |
| Meal, tons.....   | 19,422            | 18,735            | *687       |
| Oil, gallons.....   | 2,939,863         | 1,898,134         | *1,041,729 |

\*Decrease.

## San Diego District

|   | Season<br>1935-36 | Season<br>1936-37 | Increase |
|---|-------------------|-------------------|----------|
| Tons of sardines received for canning.....                      | 1,436             | 484               | *952     |
| Tons of sardines received under permit for meal and oil.....    | 9,053             | 4,085             | *4,968   |
| Total tons of sardines received for all purposes.....           | 10,489            | 4,569             | *5,920   |
| Cases of 1-lb. oval cans packed.....                            | 17,047            | 9,375             | *7,672   |
| Cases of other size cans packed.....                            | 19,856            | 9,573             | *10,283  |
| Other size cans reduced to equivalent cases of 1-lb. ovals..... | 1,945             | 827               | *1,118   |
| Meal, tons.....   | 210,171           | 77,700            | *132,471 |

\*Decrease.

## All Districts Combined (Shore Plants)

|   | Season<br>1935-36 | Season<br>1936-37 | Increase  |
|---|-------------------|-------------------|-----------|
| Tons of sardines received for canning.....                      | 237,537           | 212,278           | *25,259   |
| Tons of sardines received under permit for meal and oil.....    | 168,922           | 274,272           | 105,350   |
| Tons of sardines received for salting, pet food, etc.....       | 707               | 1,591             | 884       |
| Total tons of sardines received for all purposes.....           | 407,166           | 488,141           | 80,975    |
| Cases of 1-lb. oval cans packed.....                            | 1,936,154         | 1,647,332         | *288,822  |
| Cases of other size cans packed.....                            | 1,205,342         | 1,351,990         | 146,648   |
| Other size cans reduced to equivalent cases of 1-lb. ovals..... | 1,280,761         | 1,341,714         | 60,953    |
| Meal, tons.....   | 59,904            | 75,115            | 15,211    |
| Oil, gallons.....   | 13,200,692        | 14,299,923        | 1,099,231 |

\*Decrease.

CALIFORNIA FRESH FISHERY PRODUCTS FOR YEAR 1937  
Compiled by Division of Fish and Game, Bureau of Marine Fisheries

| Species of fish     | Del Norte,<br>Humboldt | Mendocino,<br>Sonoma, Lake | Marin   | Solano, Yolo | Sacramento,<br>San Joaquin | Alameda,<br>Contra Costa | San Francisco,<br>San Mateo | Santa Cruz | Monterey    |
|---------------------|------------------------|----------------------------|---------|--------------|----------------------------|--------------------------|-----------------------------|------------|-------------|
| Albacore            | 2,526                  |                            |         |              |                            |                          | 680                         | 50,462     | 532,202     |
| Anchovy             |                        |                            |         |              |                            |                          | 102,100                     |            | 44,205      |
| Barredouta          |                        |                            |         |              |                            |                          |                             |            |             |
| Bonito              |                        |                            |         |              |                            |                          |                             | 43         | 221         |
| Cabrilla            |                        |                            |         | 1,842        |                            |                          |                             |            |             |
| Carp                |                        | 7,600                      |         |              | 10,329                     |                          |                             |            |             |
| Crabfish            |                        | 26,208                     |         |              | 160,930                    |                          |                             |            |             |
| Cutrus, Pacific     | 336,574                | 207,355                    |         |              |                            |                          | 304,731                     | 22,839     | 94,650      |
| Flounder, Slarry    | 185,511                | 70,088                     | 34      |              |                            |                          | 680,424                     | 9,889      | 5,608       |
| Flying Fish         |                        |                            |         |              |                            |                          |                             |            |             |
| Grouper             |                        |                            |         |              |                            |                          |                             |            |             |
| Hake                | 768                    | 17,663                     |         |              |                            |                          | 41,506                      | 1,170      |             |
| Halibut, California |                        |                            |         |              |                            |                          | 8,604                       | 6,704      | 12,255      |
| Halibut, Northern   | 308,510                | 8,406                      | 64      |              |                            |                          |                             |            |             |
| Hardhead            |                        | 20,739                     |         |              | 33,223                     |                          |                             |            |             |
| Herring, Pacific    | 6,495                  | 53                         | 298,433 |              |                            |                          | 302,825                     |            | 4,335       |
| Kelp Bass           |                        |                            |         |              |                            |                          |                             |            |             |
| Kingfish            |                        |                            |         |              |                            |                          | 5,280                       | 27,077     | 107,740     |
| Mackerel, Horse     |                        |                            |         |              |                            |                          |                             |            | 42,163      |
| Mackerel, Pacific   |                        |                            |         |              |                            |                          | 11,502                      | 592        | 2,013,957   |
| Mackerel, Spanish   |                        |                            |         |              |                            |                          |                             |            |             |
| Mullet              |                        |                            |         |              |                            |                          |                             |            |             |
| Percch              | 10,963                 | 32                         | 70,897  | 13           | 351                        |                          | 27,727                      | 1,228      | 38,660      |
| Pike                |                        |                            |         |              |                            |                          |                             |            |             |
| Pompano             |                        |                            |         |              |                            |                          |                             | 70         | 31          |
| Rock Bass           |                        |                            |         |              |                            |                          |                             |            |             |
| Rockfish            | 412,837                | 54,607                     |         |              |                            |                          | 680,329                     | 611,002    | 1,516,885   |
| Sablefish           | 507,702                | 64,371                     |         |              |                            |                          | 20,697                      | 848        | 3,330       |
| Salmon              | 3,375,560              | 558,705                    |         | 24,250       | 700,825                    |                          | 1,108,402                   | 292,002    | 599,081     |
| Sand Dab            | 177,598                | 61,787                     |         |              |                            |                          | 245,443                     | 10,535     | 12,747      |
| Sardine             |                        | 16                         |         |              |                            |                          | 255,367,357                 | 35         | 279,194,254 |
| Sculpin             |                        |                            |         |              |                            |                          |                             |            |             |
| Sea-bass, Black     |                        |                            | 8,476   |              |                            |                          |                             | 88         |             |
| Sea-bass, White     |                        |                            |         |              |                            |                          | 3,158                       | 24,568     | 3,682       |

|                                   |           |           |           |         |         |           |             |           |             |
|-----------------------------------|-----------|-----------|-----------|---------|---------|-----------|-------------|-----------|-------------|
| Shad.....                         | 6,010     | 29,076    | 200       | 140,157 | 33,993  | 476,601   | 275         | 37        | 112,634     |
| Shark.....                        |           |           |           |         |         | 19,508    | 347,920     | 15,129    |             |
| Sheepshead.....                   | 37,040    | 44,225    |           |         |         |           | 286,393     | 10,120    | 11,165      |
| Skate.....                        | 13,662    | 3,397     | 3,923     |         |         | 9,139     | 30,403      | 10,408    | 76,348      |
| Snail.....                        | 3,285,304 | 1,221,003 | 69,796    |         |         |           | 206,095     | 5,141     |             |
| Snelt, Jack.....                  |           | 4,885     |           |         |         | 1,847     | 3,269,670   | 101,472   | 123,508     |
| Split-tail.....                   |           | 2,775     |           |         |         |           | 4,004       |           |             |
| Sticklefish.....                  |           |           |           |         |         |           | 5,107       |           |             |
| Swordfish, Broadbill.....         |           |           |           |         |         |           |             |           |             |
| Swordfish, Marlin.....            |           |           |           |         |         |           |             |           |             |
| Toncod.....                       |           | 150       |           |         |         | 563       | 343         |           | 10          |
| Tuna, Bluefin.....                |           |           |           |         |         |           |             |           |             |
| Tuna, Yellowfin.....              | 1,480     | 875       | 415       |         |         |           | 59,247      | 7,777     | 6,139       |
| Turbot.....                       | 43,882    | 32,725    | 25        |         |         |           | 7,904       |           | 1,641       |
| Whitebait.....                    |           |           |           |         |         |           |             |           |             |
| Whitefish.....                    |           |           |           |         |         |           |             |           |             |
| Yellowtail.....                   | 55,864    | 29,292    |           |         |         | 11        | 70,781      | 6,567     | 474         |
| Miscellaneous.....                |           |           |           |         |         |           |             |           |             |
| Total fish.....                   | 8,768,385 | 2,467,367 | 452,263   | 165,762 | 957,854 | 906,276   | 263,198,766 | 1,215,003 | 284,562,925 |
| Crustaceans:                      |           |           |           |         |         |           |             |           |             |
| Crab.....                         | 191,792   | 5,580     | 224       |         |         |           | 1,412,595   | 8,970     | 3,438       |
| Shrimp.....                       |           |           | 218,801   |         |         | 194,570   | 665,376     |           | 3,041       |
| Spiny Lobster.....                |           |           |           |         |         |           |             |           |             |
| Mollusks:                         |           |           |           |         |         |           |             |           |             |
| Abalone.....                      |           |           |           |         |         |           |             |           | 1,433,200   |
| Clam, Hard-shell.....             |           | 500       | 150       |         |         |           |             |           |             |
| Clam, Mixed.....                  |           | 5,882     | 166       |         |         |           |             | 582       | 13,505      |
| Clam, Pismo.....                  | 18,977    |           |           |         |         |           |             |           |             |
| Clam, Soft-shell.....             | 79        | 406       | 91,813    |         |         | 617       |             |           |             |
| Mussel.....                       |           |           |           |         |         |           |             |           |             |
| Octopus.....                      |           | 603       |           |         |         |           |             | 1,400     |             |
| Oyster, Eastern and Japanese..... | 12        |           |           |         |         |           | 3,673       | 516       | 18,644      |
| Oyster, Native.....               | 6,657     |           | 546,911   |         |         |           | 491,162     |           |             |
| Squid.....                        |           |           | 44,211    |         |         |           | 500         |           | 464,739     |
| Miscellaneous mollusks.....       | 100       |           |           |         |         |           |             |           |             |
| Totals.....                       | 8,936,002 | 2,480,398 | 1,354,339 | 165,762 | 957,854 | 1,101,463 | 265,802,072 | 1,227,161 | 286,490,432 |

All amounts shown in pounds.

NOTE: This record does not include albacore shipped in from Oregon and Washington or fish imported from Japan or Gulf of Mexico.

This report is, as far as practicable, the catch made in or off the districts shown in the table. In most cases the catch was landed in the district to which it was credited, but there are a few exceptions to this. For example: 1. The sardine catch taken by the San Francisco fleet is landed at plants in San Francisco, Contra Costa, Marin and Solano counties but is all credited to the San Francisco district. 2. The Monterey sardine fleet comes as far north as San Mateo and San Francisco counties but delivers to Monterey plants and this catch is credited to the Monterey district. The thought in making these exceptions is to keep the two fisheries separate, rather than combine part of the catch delivered to Monterey plants with the San Francisco catch.





|                                   |           |             |           |            |               |            |            |               |
|-----------------------------------|-----------|-------------|-----------|------------|---------------|------------|------------|---------------|
| Shad.....                         | 123,477   | 106,969     | 75,085    | 70,306     | 651,063       | 4,771      | 2,020      | 651,063       |
| Shark.....                        | 14,054    | 54,682      | 1,474     | 2,939      | 906,314       | 6,985      | 1,332      | 913,105       |
| Sheepshead.....                   | 44,128    | 10,541      | 2,304     | 1,386      | 73,149        | 15,005,669 | 30,211,275 | 81,466        |
| Skate.....                        | 21        | 415,975     | 159,417   | 1,308,735  | 447,392       | 2,100      | 2,100      | 447,392       |
| Skipjack.....                     | 22,554    | 220,344     | 1,596     | 2,407      | 1,884,148     | 88         | 88         | 47,104,092    |
| Snail.....                        | 832       | 3,796       | 1,994     | 141        | 394,081       | 285,880    | 285,880    | 396,181       |
| Sand, Jack.....                   | 206,331   | 1,849       | 1,994     | 24         | 8,302,195     | 10,826     | 10,826     | 8,302,222     |
| Sole.....                         | 101,933   | 177,776     | 118,570   | 191,598    | 589,877       | 7,882      | 7,882      | 625,307       |
| Sucker.....                       | 157       | 2,534       | 868       | 868        | 3,559         | 400        | 400        | 4,049         |
| Swordfish, Broadbill.....         | 3,144     | 9,962,919   | 7,686     | 544,012    | 10,822,071    | 1,056      | 1,056      | 12,693,922    |
| Swordfish, Marlin.....            | 195       | 140,473     | 14,801    | 32,257     | 157,732       | 1,316,712  | 1,316,712  | 91,522,458    |
| Tuna, Bluefin.....                | 36        | 4           | 17        | 6,217      | 78,907        | 87,177     | 87,177     | 75,900        |
| Tuna, Yellowfin.....              | 13,235    | 12,545      | 330       | 98,439     | 32,347        | 3,906      | 3,906      | 86,177        |
| Turbot.....                       | 11        | 122,237     | 3,246     | 1,660      | 223,983       | 419,190    | 419,190    | 577,198       |
| Whitebait.....                    | 2,340     | 5,651       | 2,028     | 1,660      | 174,610       | 1,357      | 1,357      | 5,371,230     |
| Yellowtail.....                   |           |             |           |            |               |            |            | 173,967       |
| Miscellaneous.....                |           |             |           |            |               |            |            |               |
| Total fish.....                   | 1,554,086 | 420,589,542 | 8,961,803 | 17,968,109 | 1,011,768,741 | 44,632,651 | 44,632,651 | 1,160,662,443 |
| Crustaceans:                      |           |             |           |            |               |            |            |               |
| Crab.....                         | 49        | 1,362       | 151       |            | 1,624,161     |            |            | 1,624,161     |
| Shrimp.....                       | 113,986   | 147,537     | 48,121    | 76,281     | 1,111,892     | 1,530      | 1,530      | 1,111,892     |
| Spiny Lobster.....                |           |             |           |            | 385,925       |            |            | 1,322,426     |
| Mollusks:                         |           |             |           |            |               |            |            |               |
| Abalone.....                      | 1,428,247 | 1,728       | 61        |            | 2,803,175     |            |            | 2,863,175     |
| Clam, Hard-shell.....             |           | 27,781      |           |            | 28,552        |            |            | 28,552        |
| Clam, Mixed.....                  | 208,868   |             |           |            | 25,025        |            |            | 25,025        |
| Clam, Pismo.....                  |           |             |           |            | 223,955       |            |            | 223,955       |
| Clam, Soft-shell.....             |           |             |           |            | 92,915        |            |            | 92,915        |
| Mussel.....                       | 278       | 89          | 69        |            | 1,400         |            |            | 1,490         |
| Octopus.....                      |           |             |           |            | 23,884        |            |            | 23,884        |
| Oyster, Eastern and Japanese..... | 6         |             |           |            | 1,044,730     |            |            | 1,044,730     |
| Oyster, Native.....               | 13        | 36,250      | 160       |            | 44,217        |            |            | 44,217        |
| Squid.....                        |           |             |           |            | 501,662       |            |            | 501,662       |
| Miscellaneous mollusks.....       |           |             |           |            | 100           |            |            | 100           |
| Totals.....                       | 3,306,533 | 420,804,289 | 9,010,379 | 18,044,390 | 1,019,740,334 | 44,634,181 | 44,634,181 | 1,169,570,537 |

All amounts shown in pounds.

**CANNED, CURED AND MANUFACTURED FISHERY PRODUCTS OF CALIFORNIA FOR THE YEAR 1937—  
SHORE PLANTS**

**Canned**

| Kind of fish or fishery product | Size of cans       | Northern California district, cases | Monterey district, cases | San Pedro district, cases | San Diego district, cases | Total cases |
|---------------------------------|--------------------|-------------------------------------|--------------------------|---------------------------|---------------------------|-------------|
| Albacore                        | 1-lb.              |                                     |                          | 11,642                    | 102                       | 11,744      |
|                                 | 1½-lb.             |                                     |                          | 71,268                    | 7,934                     | 79,202      |
|                                 | ¼-lb.              |                                     |                          | 147                       |                           | 147         |
|                                 | ¼-lb., 100's       |                                     |                          | 66                        |                           | 66          |
| Bonito                          | 1-lb.              |                                     |                          | 16,856                    | 6,757                     | 23,613      |
|                                 | 1½-lb.             |                                     |                          | 64,979                    | 35,551                    | 100,530     |
|                                 | ¼-lb.              |                                     |                          |                           | 1,430                     | 1,430       |
|                                 | ¼-lb., 100's       |                                     |                          | 3,683                     | 316                       | 3,999       |
| Mackerel                        | 1-lb.              |                                     | 13,415                   | 727,656                   | 30,482                    | 771,553     |
|                                 | 1½-lb., 96's       |                                     | 441                      | 12,529                    | 429                       | 13,399      |
|                                 | 1½-lb.             |                                     |                          | 3,561                     | 5,063                     | 8,624       |
|                                 | ¼-lb.              |                                     |                          |                           | 163                       | 163         |
|                                 | ¼-lb., 100's       |                                     |                          |                           | 41                        | 41          |
| Oyster                          | 1-lb.              | 33                                  |                          |                           |                           | 33          |
|                                 | 10½ oz.            | 16                                  |                          |                           |                           | 16          |
| Salmon                          | 1-lb.              | 147                                 |                          |                           |                           | 147         |
| Sardine                         | No. 10 cans, 6's   |                                     | 3,291                    | 1,509                     |                           | 4,800       |
|                                 | 1-lb. oval         |                                     | 679,317                  | 761,776                   |                           | 1,441,093   |
|                                 | 1-lb. tall         |                                     | 227,806                  | 634,215                   | 7,823                     | 869,844     |
|                                 | ¼-lb.              |                                     |                          | 25,364                    |                           | 25,364      |
|                                 | ¼-lb. oval         |                                     | 1,528                    |                           |                           | 1,528       |
|                                 | ¼-lb., 96's        |                                     | 48,957                   | 238,365                   | 2,565                     | 289,887     |
|                                 | ¼-lb. B. & P.      |                                     | 583                      |                           |                           | 583         |
|                                 | ¼-lb. fillet       |                                     | 73,785                   |                           |                           | 73,785      |
|                                 | 10½-oz.            |                                     | 5,098                    |                           |                           | 5,098       |
|                                 | 6-oz. B. & P.      |                                     |                          |                           |                           |             |
|                                 | 100's              |                                     | 2                        |                           |                           | 2           |
|                                 | 5-oz., 100's       |                                     | 68,164                   | 200,060                   |                           | 268,224     |
|                                 | ¼-lb. B. & P.      |                                     |                          |                           |                           |             |
|                                 | 100's              |                                     | 876                      |                           |                           | 876         |
|                                 | ¼-lb.              |                                     |                          |                           | 2,103                     | 2,103       |
|                                 | ¼-lb. fillet 100's |                                     | 17                       |                           |                           | 17          |
| Shad                            | 1-lb.              | 4,677                               |                          |                           |                           | 4,677       |
| Shad roe                        | 1½-lb.             | 1,684                               |                          |                           |                           | 1,684       |
| Squid                           | 9-oz.              |                                     | 3,052                    |                           |                           | 3,052       |
|                                 | 7-oz.              |                                     | 2,479                    |                           |                           | 2,479       |
| Tuna, bluefin                   | 1-lb.              |                                     |                          | 16,542                    | 1,611                     | 18,153      |
|                                 | 1½-lb.             |                                     |                          | 140,412                   | 20,853                    | 161,265     |
|                                 | 12-oz.             |                                     |                          | 629                       |                           | 629         |
|                                 | ¼-lb.              |                                     |                          | 19,926                    | 3,091                     | 23,017      |
|                                 | ¼-lb., 100's       |                                     |                          | 10,843                    | 1,548                     | 12,391      |
| Tuna, striped                   | 1-lb.              |                                     |                          | 13,748                    | 17,414                    | 31,162      |
|                                 | 1½-lb.             |                                     |                          | 198,964                   | 408,960                   | 607,924     |
|                                 | ¼-lb.              |                                     |                          | 14,316                    | 24,636                    | 38,952      |
|                                 | ¼-lb., 100's       |                                     |                          | 49,137                    | 36,741                    | 85,878      |
| Tuna, yellowfin                 | 4-lb. 12's         |                                     |                          | 962                       | 450                       | 1,412       |
|                                 | 1-lb.              |                                     |                          | 42,757                    | 89,866                    | 132,653     |
|                                 | 12-oz.             |                                     |                          | 1,290                     |                           | 1,290       |
|                                 | 1½-lb.             |                                     |                          | 333,422                   | 916,287                   | 1,249,709   |
|                                 | ¼-lb.              |                                     |                          | 29,995                    | 157,169                   | 187,164     |
|                                 | ¼-lb., 100's       |                                     |                          | 8,155                     | 2,094                     | 10,249      |
| Tuna flakes                     | 1-lb.              |                                     |                          | 8,716                     | 2,563                     | 11,279      |
|                                 | 1½-lb.             |                                     |                          | 25,818                    | 12,947                    | 38,765      |
|                                 | ¼-lb.              |                                     |                          |                           | 394                       | 394         |
| Tuna, "tonno" style             | 1½-lb.             |                                     |                          | 11,404                    |                           | 11,404      |
|                                 | ¼-lb., 100's       |                                     |                          | 125,208                   | 1,125                     | 126,333     |
| Yellowtail                      | 1-lb.              |                                     |                          | 1,545                     | 14,968                    | 16,513      |
|                                 | 1½-lb.             |                                     |                          | 1,807                     | 29,131                    | 30,938      |
|                                 | ¼-lb.              |                                     |                          |                           | 29                        | 29          |
| Pet food                        | Misc. sizes        | 7,049                               |                          | 172,181                   |                           | 179,230     |
| Totals                          |                    | 13,606                              | 1,128,811                | 4,001,563                 | 1,842,636                 | 6,986,616   |

NOTE.—Forty-eight cans to the case unless otherwise specified. Sardines packed in Northern California included with Monterey.

CANNED, CURED AND MANUFACTURED FISHERY PRODUCTS OF CALIFORNIA FOR THE YEAR 1937—  
SHORE PLANTS—Continued

## Cured and Manufactured

| Fishery product         | Size or quantity | Northern California district | Monterey district | San Pedro district | San Diego district | Total      |
|-------------------------|------------------|------------------------------|-------------------|--------------------|--------------------|------------|
| Herring, smoked.....    | Pounds.....      | 3,650                        |                   |                    |                    | 3,650      |
| Mixed fish, dried.....  | Pounds.....      | 57,152                       |                   |                    |                    | 57,152     |
| Mixed fish, salted..... | Pounds.....      |                              |                   |                    | 151,369            | 151,369    |
| Sablefish, smoked.....  | Pounds.....      | 206,016                      |                   |                    |                    | 206,016    |
| Salmon, mild cure.....  | Tierces.....     | 1,012                        | 9                 |                    |                    | 1,021      |
| Salmon, salted.....     | Pounds.....      | 8                            |                   |                    |                    | 8          |
| Salmon, smoked.....     | Pounds.....      | 78,834                       |                   |                    |                    | 78,834     |
| Sardine, salted.....    | Pounds.....      |                              | 18,000            |                    |                    | 18,000     |
| Shrimp, dried.....      | Pounds.....      | 63,880                       |                   |                    |                    | 63,880     |
| Shrimp meal.....        | Pounds.....      | 126,813                      |                   |                    |                    | 126,813    |
| Fish meal.....          | Tons.....        | 22,916                       | 21,118            | 29,184             | 8,300              | 81,518     |
| Fish oil.....           | Gallons.....     | 4,431,668                    | 4,122,817         | 2,578,600          | 191,757            | 11,324,842 |

## Miscellaneous Data

|                              |             |             |              |              |              |
|------------------------------|-------------|-------------|--------------|--------------|--------------|
| Estimated value of pack..... | \$2,867,396 | \$5,487,565 | \$18,646,700 | \$11,474,841 | \$38,476,502 |
| Number of employees.....     | 1,301       | 2,691       | 4,520        | 2,186        | 10,698       |
| Value of plants.....         | \$2,932,041 | \$3,091,433 | \$3,147,279  | \$1,011,429  | \$10,182,182 |

## REPORT OF SARDINE PLANTS, SEASON 1937-38

Sardine fishing started in the Monterey Bay area on August 9th and in the San Francisco Bay area on August 11th. In southern California fishing started on November 1st.

Permits to take and use sardines by a reduction process for the manufacture of meal and oil were issued for 12,500 tons to all plants with a reduction plant capacity per hour of one to twenty tons; and permits for 16,500 tons were issued to plants having an hourly capacity of twenty-one to forty tons. In Monterey and northern California a monthly limit was placed on the amount that could be taken in each plant. However, if the tonnage allotted for any month was not taken, it could be carried over and taken at any time during the season up to February 15th. No plant during any month took the full monthly allotment. For the entire State permits to take 765,500 tons for use by a reduction process were issued, and the plants received and used 183,858 tons of sardines by a reduction process; and at the close of the season there were 581,642 tons of unused permit tonnage canceled.

This report covers operations of the shore plants only and does not include sardines taken for fresh fish markets, bait or quarter-oil pack.

During the season six floating reduction ships operated off the coast of California outside the jurisdiction of the State. These floating plants started to operate in September and came in and ceased operations early in December. It is estimated that these floating plants took 74,334 tons of sardines, and produced 12,389 tons of meal and 2,479,731 gallons of oil. Adding the estimated tonnage taken by the floating plants to the tonnage taken by the shore plants would make a total of 420,168 tons of sardines taken in State waters and off the coast of California. This is 307,230 tons less than was taken during the previous season, a decrease of forty-two per cent. There was a greater fishing effort on account of the increase in the number of fishing boats and at no time were any limits put on catch of the boats, all plants taking all fish brought in.

The floating plants which operated off the California coast with names of the owners were: *American Fisher*, Santa Cruz Oil Co., *Currier*, American Marine Products Co., *Lake Miraflores*, Santa Cruz Oil Co., *Lansing*, Fishermen's Produce Co., Inc., *Manatawny*, Deep Sea Fisheries, Inc., *Santa Inez*, Pacific Ocean Products Co. The *Polarine* did not operate and the *Brookdale* and *Monitor* came inside and operated as shore plants in State waters under permit from the Commission. These three plants were operated outside of State jurisdiction during the previous season.

The following shore plants operated during the season :

MONTEREY AND NORTHERN CALIFORNIA DISTRICT

Benicia Fisheries, Benicia  
 F. E. Booth Co., Inc., Monterey  
 F. E. Booth Co., Inc., Pittsburg  
 California Packing Corp., Monterey  
 Carmel Canning Co., Monterey  
 Carquinez Fisheries, Ltd., Richmond  
 Custom House Packing Corp., Monterey  
 Cypress Fisheries, Inc., San Francisco  
 Del Mar Canning Co., Monterey  
 East Bay Fisheries, Inc., Richmond  
 Edible Fish Meals & Oils, Inc., Richmond  
 Farallone Packing Co., San Francisco  
 Fish-Dee-Lish Corp., Richmond  
 Fish Packers, Inc., McNears Point  
 Gardenia Packing Co., Sausalito  
 E. B. Gross Canning Co., Monterey  
 Hofmann Packing Co., McNears Point  
 Hovden Food Products Corp., Monterey  
 Hovden Food Products Corp., Moss Landing  
 Interstate Fish Reduction Corp., Richmond  
 Mazama Fisheries Corp., Richmond  
 Monterey Canning Co., Monterey  
 Monterey Fish Products, Seaside  
 Northern Packing Co., San Francisco  
 Old Capitol Packers, Inc., McNears Point  
 Ozol Packing Co., Martinez  
 Pittsburg Cannery, Inc., Richmond  
 Point Edith Fisheries, Ltd., Port Chicago  
 Redondo Fish Products Co., Richmond  
 Richmond Fisheries, Inc., Richmond  
 San Carlos Canning Co., Monterey  
 San Pablo Fisheries, Richmond  
 San Xavier Fish Packing Co., Monterey  
 Sea Pride Packing Corp., Ltd., Monterey  
 Union Fish Company, Richmond

SAN PEDRO DISTRICT

Ambrose Steele Canning Company, Long Beach  
 California Marine Curing & Packing Company, Terminal Island  
 California Packing Corp., Terminal Island  
 Coast Fishing Company, Wilmington  
 Franco-Italian Packing Company, Terminal Island  
 French Sardine Company, Inc., Terminal Island  
 Italian Food Products Company, Long Beach  
 Italian Food Products Company, Newport Beach  
 Point Loma Tuna Packers, Inc., Newport Beach  
 San Carlos Canning Company, Long Beach  
 Sea Pride Packing Corp., Ltd., Terminal Island  
 Sea Pride Packing Corp., Ltd., Wilmington

South Coast Fisheries, Inc., Terminal Island  
 Southern California Fish Corp., Terminal Island  
 Van Camp Sea Food Company, Inc., Terminal Island

## SAN DIEGO DISTRICT

Sun Harbor Packing Corp., San Diego  
 Westgate Sea Products Company, San Diego

## PRODUCTION OF SARDINE PLANTS

August 1, 1937, to March 31, 1938

| District  | Sardines received, tons | Tons used for canning | Cannery fish overage used for meal and oil, tons | Used for meal and oil under permit, tons |
|---|-------------------------|-----------------------|--|--|
| Monterey and Northern California .....          | 236,712                 | 49,516                | 23,235   | 163,935                                  |
| San Pedro .....                                 | 109,015                 | 65,416                | 22,704   | 19,873                                   |
| San Diego .....                                 | 107                     | 49                    | 8  | 50                                       |
| Totals .....                                    | 345,834                 | 114,981               | 45,947   | 183,858                                  |
| Add cannery overage used for meal and oil ..... |                         | 45,947                |  |  |
| Total tons received for canning purposes .....  |                         | 160,928               |  |  |

| District                               | Offal, tons | 1-lb. ovals packed, cases | Other size cans packed, cases | Other size cans reduced to equivalent of 1-lb. ovals, cases | Cases per ton |
|--|-------------|---------------------------|-------------------------------|---|---------------|
| Monterey and Northern California ..... | 24,757      | 629,408                   | 383,566                       | 360,306   | 13.6          |
| San Pedro .....                        | 32,708      | 553,306                   | 747,482                       | 756,369   | 14.8          |
| San Diego .....                        | 24          |                           | 1,013                         | 1,040   | 18.1          |
| Totals .....                           | 57,489      | 1,182,714                 | 1,132,061                     | 1,117,715   |               |

| District                               | Sardine meal, tons | Ratio per ton of meal | Sardine oil, gallons | Gallons of oil per ton of fish and offal |
|--|--------------------|-----------------------|----------------------|--|
| Monterey and Northern California ..... | 38,441             | 5.5                   | 7,726,734            | 36.4                                     |
| San Pedro .....                        | 14,525             | 5.2                   | 1,447,631            | 19.3                                     |
| San Diego .....                        | 15                 | 5.4                   | 912                  | 11.1                                     |
| Totals .....                           | 52,981             |                       | 9,175,277            |  |

| District                               | Permits issued, tons | Unused permit tonnage cancelled, tons | Used for other purposes, tons |
|--|----------------------|---------------------------------------|-------------------------------|
| Monterey and Northern California ..... | 499,000              | 335,065                               | 26                            |
| San Pedro .....                        | 216,500              | 196,627                               | 1,022                         |
| San Diego .....                        | 50,000               | 49,950                                |                               |
| Totals .....                           | 765,500              | 581,642                               | 1,048                         |

<sup>1</sup> The law requires that 13½ cases of 1-lb. oval cans be canned from each ton of sardines received for canning purposes, but in figuring amount actually used in canning, a basis of 20 cases per ton is used.

<sup>2</sup> 26 tons for salting.

<sup>3</sup> 1,022 tons for pet food.

## SARDINE CATCH BY MONTHS, SEASON 1937-38

| Month              | Monterey and Northern California |           | San Pedro |           | San Diego |           |
|--------------------|----------------------------------|-----------|-----------|-----------|-----------|-----------|
|                    | Canning                          | Reduction | Canning   | Reduction | Canning   | Reduction |
| August, 1937.....  | 75                               | 4,810     |           |           |           |           |
| September.....     | 5,268                            | 30,072    |           |           |           |           |
| October.....       | 19,167                           | 48,293    |           |           |           |           |
| November.....      | 14,421                           | 30,905    | 16,798    | 8,572     | 26        | 47        |
| December.....      | 22,067                           | 31,886    | 21,277    | 46,679    | 31        | 3         |
| January, 1938..... | 10,732                           | 17,977    | 19,188    | 43,355    |           |           |
| February.....      | 1,021                            | 18        | 24,398    | 11,751    |           |           |
| March.....         |                                  |           | 6,459     | 538       |           |           |
| Totals.....        | 72,751                           | 163,961   | 88,120    | 20,895    | 57        | 50        |

<sup>4</sup> Includes 26 tons for salting.

<sup>5</sup> Includes 284 tons for pet food.

<sup>6</sup> Includes 352 tons for pet food.

<sup>7</sup> Includes 327 tons for pet food.

<sup>8</sup> Includes 59 tons for pet food.

## PACK OF 1-LB. OVALS BY MONTHS, SEASON 1937-38

| Month              | Monterey and Northern California, cases | San Pedro, cases | San Diego, cases |
|--------------------|---|------------------|------------------|
| August, 1937.....  | 165                                     |                  |                  |
| September.....     | 38,374                                  |                  |                  |
| October.....       | 156,895                                 |                  |                  |
| November.....      | 118,502                                 | 87,403           |                  |
| December.....      | 202,508                                 | 114,663          |                  |
| January, 1938..... | 105,080                                 | 113,787          |                  |
| February.....      | 7,884                                   | 168,447          |                  |
| March.....         |   | 69,006           |                  |
| Totals.....        | 629,408                                 | 553,306          |                  |

## PACK OF OTHER SIZE CANS REDUCED TO EQUIVALENTS OF 1-LB. OVALS, BY MONTHS, SEASON 1937-38

| Month              | Monterey and Northern California, cases | San Pedro, cases | San Diego, cases |
|--------------------|---|------------------|------------------|
| August, 1937.....  | 868                                     |                  |                  |
| September.....     | 32,786                                  |                  |                  |
| October.....       | 101,916                                 |                  |                  |
| November.....      | 76,915                                  | 145,618          | 574              |
| December.....      | 96,997                                  | 183,638          | 466              |
| January, 1938..... | 42,443                                  | 172,643          |                  |
| February.....      | 8,381                                   | 214,378          |                  |
| March.....         |   | 40,092           |                  |
| Totals.....        | 360,306                                 | 756,369          | 1,040            |

## SARDINE MEAL PRODUCTION BY MONTHS, SEASON 1937-38

| Month              | Monterey and Northern California, tons | San Pedro, tons | San Diego, tons |
|--------------------|--|-----------------|-----------------|
| August, 1937.....  | 832                                    |                 |                 |
| September.....     | 5,821                                  |                 |                 |
| October.....       | 10,979                                 |                 |                 |
| November.....      | 7,334                                  | 3,643           | 11              |
| December.....      | 8,669                                  | 3,832           | 4               |
| January, 1938..... | 4,688                                  | 3,000           |                 |
| February.....      | 118                                    | 3,212           |                 |
| March.....         |  | 838             |                 |
| Totals.....        | 38,441                                 | 14,525          | 15              |

## SARDINE OIL PRODUCTION BY MONTHS, SEASON 1937-38

|                    | Monterey and Northern California, gallons | San Pedro, gallons | San Diego, gallons |
|--------------------|---|--------------------|--------------------|
| August, 1937.....  | 174,165                                   |                    |                    |
| September.....     | 1,186,497                                 |                    |                    |
| October.....       | 2,382,564                                 |                    |                    |
| November.....      | 1,484,380                                 | 463,187            | 902                |
| December.....      | 1,619,492                                 | 418,475            | 10                 |
| January, 1938..... | 860,356                                   | 264,850            |                    |
| February.....      | 19,280                                    | 258,504            |                    |
| March.....         |   | 42,615             |                    |
| Totals.....        | 7,726,734                                 | 1,447,631          | 912                |

## COMPARATIVE STATEMENT OF SARDINE PLANT OPERATIONS, SEASONS 1936-37 AND 1937-38

## Monterey and Northern California District

|   | Season 1936-37 | Season 1937-38 | Decrease  |
|---|----------------|----------------|-----------|
| Tons of sardines received for canning.....                      | 112,908        | 72,751         | 40,157    |
| Tons of sardines received under permit for meal and oil.....    | 232,636        | 163,935        | 68,701    |
| Tons of sardines received for salting, etc.....                 | 114            | 26             | 88        |
| Total tons of sardines received.....                            | 345,658        | 236,712        | 108,946   |
| Cases of 1-lb. oval cans packed.....                            | 1,017,530      | 629,408        | 388,122   |
| Cases of other size cans packed.....                            | 541,081        | 383,566        | 157,515   |
| Other size cans reduced to equivalent cases of 1-lb. ovals..... | 512,282        | 360,306        | 151,976   |
| Meal, tons.....   | 55,553         | 38,441         | 17,112    |
| Oil, gallons.....   | 12,324,089     | 7,726,734      | 4,597,355 |

## San Pedro District

|   | Season 1936-37 | Season 1937-38 | Decrease |
|---|----------------|----------------|----------|
| Tons of sardines received for canning.....                      | 98,886         | 88,120         | 10,766   |
| Tons of sardines received under permit for meal and oil.....    | 37,551         | 19,873         | 17,678   |
| Tons of sardines received for salting, pet food, etc.....       | 1,477          | 1,022          | 455      |
| Total tons of sardines received for all purposes.....           | 137,914        | 109,015        | 28,899   |
| Cases of 1-lb. oval cans packed.....                            | 629,802        | 553,306        | 76,496   |
| Cases of other size cans packed.....                            | 801,534        | 747,482        | 54,052   |
| Other size cans reduced to equivalent cases of 1-lb. ovals..... | 819,859        | 756,369        | 63,490   |
| Meal, tons.....   | 18,735         | 14,525         | 4,210    |
| Oil, gallons.....   | 1,898,134      | 1,447,631      | 450,503  |



## San Diego District

|   | Season<br>1936-37 | Season<br>1937-38 | Decrease |
|---|-------------------|-------------------|----------|
| Tons of sardines received for canning.....                      | 484               | 57                | 427      |
| Tons of sardines received under permit for meal and oil.....    | 4,085             | 50                | 4,035    |
| Total tons of sardines received for all purposes.....           | 4,569             | 107               | 4,462    |
| Cases of 1-lb. oval cans packed.....                            | 9,375             | 1,013             | 8,362    |
| Cases of other size cans packed.....                            | 9,573             | 1,040             | 8,533    |
| Other size cans reduced to equivalent cases of 1-lb. ovals..... | 27                | 15                | 12       |
| Meal, tons.....   | 77,700            | 912               | 76,788   |
| Oil, gallons.....   |                   |                   |          |

## All Districts Combined (Shore Plants)

|   | Season<br>1936-37 | Season<br>1937-38 | Decrease  |
|---|-------------------|-------------------|-----------|
| Tons of sardines received for canning.....                      | 212,278           | 160,928           | 51,350    |
| Tons of sardines received under permit for meal and oil.....    | 274,272           | 183,858           | 90,414    |
| Tons of sardines received for salting, pet food, etc.....       | 1,591             | 1,048             | 543       |
| Total tons of sardines received for all purposes.....           | 488,141           | 345,834           | 142,307   |
| Cases of 1-lb. oval cans packed.....                            | 1,647,332         | 1,182,714         | 464,618   |
| Cases of other size cans packed.....                            | 1,351,990         | 1,132,061         | 219,929   |
| Other size cans reduced to equivalent cases of 1-lb. ovals..... | 1,341,714         | 1,117,715         | 223,999   |
| Meal, tons.....   | 75,115            | 52,981            | 22,134    |
| Oil, gallons.....   | 14,299,923        | 9,175,277         | 5,124,646 |

## SARDINE CATCH, CASE PACK, MEAL AND OIL PRODUCTION

For Sardine Packing Seasons

## Sardine Catch, Tons

| Season    | Monterey and Northern California | San Pedro district | San Diego district | Total   |
|-----------|----------------------------------|--------------------|--------------------|---------|
| 1925-1926 | 69,259                           | 61,992             | 5,214              | 136,465 |
| 1926-1927 | 79,343                           | 64,216             | -----              | 143,559 |
| 1927-1928 | 109,744                          | 67,459             | 3,973              | 181,176 |
| 1928-1929 | 131,859                          | 119,180            | 1,394              | 252,433 |
| 1929-1930 | 180,089                          | 140,432            | 2,079              | 322,600 |
| 1930-1931 | 133,421                          | 38,580             | -----              | 172,001 |
| 1931-1932 | 88,763                           | 42,557             | -----              | 131,320 |
| 1932-1933 | 106,674                          | 83,492             | -----              | 190,166 |
| 1933-1934 | 187,404                          | 124,950            | 1,488              | 313,842 |
| 1934-1935 | 297,132                          | 178,755            | 4,859              | 480,746 |
| 1935-1936 | 258,344                          | 138,333            | 10,480             | 407,166 |
| 1936-1937 | 345,658                          | 137,914            | 4,569              | 488,141 |
| 1937-1938 | 236,712                          | 109,015            | 107                | 345,834 |

## Sardines, 1-Lb. Ovals, Cases

| Season    | Monterey and Northern California | San Pedro district | San Diego district | Total     |
|-----------|----------------------------------|--------------------|--------------------|-----------|
| 1925-1926 | 940,906                          | 968,495            | 66,074             | 1,975,475 |
| 1926-1927 | 1,202,516                        | 986,858            | -----              | 2,189,374 |
| 1927-1928 | 1,474,162                        | 878,175            | 39,380             | 2,391,717 |
| 1928-1929 | 1,520,192                        | 1,140,488          | 12,383             | 2,673,063 |
| 1929-1930 | 2,004,044                        | 1,483,615          | 16,551             | 3,514,210 |
| 1930-1931 | 1,336,225                        | 403,041            | -----              | 1,739,266 |
| 1931-1932 | 990,104                          | 470,786            | -----              | 1,460,900 |
| 1932-1933 | 410,469                          | 321,794            | -----              | 732,263   |
| 1933-1934 | 970,504                          | 526,540            | -----              | 1,497,044 |
| 1934-1935 | 894,584                          | 591,759            | -----              | 1,486,343 |
| 1935-1936 | 1,256,051                        | 680,103            | -----              | 1,936,154 |
| 1936-1937 | 1,017,530                        | 629,802            | -----              | 1,647,332 |
| 1937-1938 | 629,408                          | 553,306            | -----              | 1,182,714 |

## Other Size Cans Reduced to Equivalents of 1-Lb. Ovals, Cases

| Season    | Monterey and Northern California | San Pedro district | San Diego district | Total     |
|-----------|----------------------------------|--------------------|--------------------|-----------|
| 1925-1926 | 35,956                           | 16,361             | 13,065             | 65,382    |
| 1926-1927 | 21,673                           | 63,264             | -----              | 84,937    |
| 1927-1928 | 54,985                           | 145,143            | 31,995             | 232,123   |
| 1928-1929 | 115,664                          | 173,540            | 10,368             | 299,572   |
| 1929-1930 | 169,462                          | 458,416            | 12,552             | 640,430   |
| 1930-1931 | 246,316                          | 170,388            | -----              | 416,704   |
| 1931-1932 | 52,197                           | 159,066            | -----              | 211,263   |
| 1932-1933 | 15,944                           | 75,775             | -----              | 91,719    |
| 1933-1934 | 123,688                          | 331,631            | 5,396              | 460,715   |
| 1934-1935 | 154,560                          | 222,661            | 13,058             | 390,279   |
| 1935-1936 | 633,788                          | 627,117            | 19,856             | 1,280,761 |
| 1936-1937 | 512,282                          | 819,859            | 9,573              | 1,341,714 |
| 1937-1938 | 360,306                          | 756,369            | 1,040              | 1,117,715 |

## Sardine Meal, Tons

| Season    | Monterey and Northern California | San Pedro district | San Diego district | Total  |
|-----------|----------------------------------|--------------------|--------------------|--------|
| 1925-1926 | 6,413                            | 5,962              | 467                | 12,842 |
| 1926-1927 | 6,675                            | 5,962              | -----              | 12,637 |
| 1927-1928 | 10,538                           | 7,128              | 184                | 17,850 |
| 1928-1929 | 13,782                           | 14,802             | 140                | 28,724 |
| 1929-1930 | 18,953                           | 16,258             | 251                | 35,462 |
| 1930-1931 | 14,206                           | 4,317              | -----              | 18,523 |
| 1931-1932 | 10,128                           | 4,911              | -----              | 15,039 |
| 1932-1933 | 16,667                           | 14,060             | -----              | 30,727 |
| 1933-1934 | 27,279                           | 19,166             | 262                | 46,707 |
| 1934-1935 | 46,967                           | 29,836             | 848                | 77,651 |
| 1935-1936 | 38,537                           | 19,422             | 1,945              | 59,904 |
| 1936-1937 | 55,553                           | 18,735             | 827                | 75,115 |
| 1937-1938 | 38,441                           | 14,525             | 15                 | 52,981 |

## Sardine Oil, Gallons

| Season    | Monterey and Northern California | San Pedro district | San Diego district | Total      |
|-----------|----------------------------------|--------------------|--------------------|------------|
| 1925-1926 | 1,113,612                        | 658,817            | 43,995             | 1,816,424  |
| 1926-1927 | 1,562,351                        | 682,796            |                    | 2,245,147  |
| 1927-1928 | 1,859,982                        | 711,579            | 10,253             | 2,581,814  |
| 1928-1929 | 2,939,579                        | 2,178,815          | 6,857              | 5,125,251  |
| 1929-1930 | 4,362,002                        | 1,986,704          | 11,071             | 6,359,777  |
| 1930-1931 | 4,127,555                        | 630,011            |                    | 4,757,566  |
| 1931-1932 | 2,755,282                        | 762,701            |                    | 3,517,983  |
| 1932-1933 | 4,336,345                        | 2,161,476          |                    | 6,497,821  |
| 1933-1934 | 5,995,301                        | 3,242,899          | 24,303             | 9,262,503  |
| 1934-1935 | 11,893,827                       | 4,865,486          | 111,252            | 16,870,565 |
| 1935-1936 | 10,050,658                       | 2,939,863          | 210,171            | 13,200,692 |
| 1936-1937 | 12,324,089                       | 1,898,134          | 77,700             | 14,299,923 |
| 1937-1938 | 7,726,734                        | 1,447,631          | 912                | 9,175,277  |

## Sardine Oil Production, Gallons Per Ton

| Season    | Monterey and Northern California | San Pedro district | San Diego district |
|-----------|----------------------------------|--------------------|--------------------|
| 1930-1931 | 43.4                             | 26.3               |                    |
| 1931-1932 | 43.9                             | 28.5               |                    |
| 1932-1933 | 45.3                             | 29.1               |                    |
| 1933-1934 | 37.5                             | 31.3               | 17.7               |
| 1934-1935 | 43.9                             | 30.7               | 24.7               |
| 1935-1936 | 47.5                             | 27.9               | 21.0               |
| 1936-1937 | 40.1                             | 18.9               | 17.9               |
| 1937-1938 | 36.4                             | 19.3               | 11.1               |

## CASE PACK, MEAL AND OIL PRODUCTION FOR CALENDAR YEARS 1916-1937

## Sardines, 1-Lb. Ovals, Cases

| Year | Monterey and Northern California | San Pedro district | San Diego district | Total     |
|------|----------------------------------|--------------------|--------------------|-----------|
| 1916 | 97,100                           | 2,512              | 7,133              | 106,745   |
| 1917 | 331,065                          | 43,221             | 34,380             | 408,666   |
| 1918 | 593,315                          | 136,632            | 17,790             | 747,737   |
| 1919 | 798,566                          | 113,909            | 33,594             | 946,069   |
| 1920 | 687,777                          | 213,714            | 50,302             | 951,793   |
| 1921 | 287,954                          | 77,048             | 1,189              | 366,191   |
| 1922 | 353,188                          | 340,860            | 3,595              | 697,643   |
| 1923 | 580,464                          | 488,885            | 19,215             | 1,088,564 |
| 1924 | 631,286                          | 693,133            | 12,175             | 1,336,554 |
| 1925 | 737,743                          | 929,191            | 29,846             | 1,687,780 |
| 1926 | 1,158,133                        | 861,088            | 63,410             | 2,082,631 |
| 1927 | 1,341,872                        | 1,046,453          | 14,947             | 2,403,272 |
| 1928 | 1,511,535                        | 945,676            | 39,755             | 2,496,966 |
| 1929 | 2,039,526                        | 1,438,159          | 12,225             | 3,489,910 |
| 1930 | 1,579,408                        | 863,254            | 15,500             | 2,458,162 |
| 1931 | 1,004,215                        | 498,096            |                    | 1,503,211 |
| 1932 | 459,756                          | 415,874            |                    | 875,630   |
| 1933 | 838,533                          | 365,750            |                    | 1,204,283 |
| 1934 | 1,091,158                        | 531,619            |                    | 1,622,777 |
| 1935 | 1,126,466                        | 615,808            |                    | 1,742,274 |
| 1936 | 1,089,683                        | 586,038            |                    | 1,675,721 |
| 1937 | 679,317                          | 761,776            |                    | 1,441,093 |

## Fish Meal, Tons

| Year | Monterey and Northern California | San Pedro district | San Diego district | Total  |
|------|----------------------------------|--------------------|--------------------|--------|
| 1916 | 249                              | 261                | 25                 | 535    |
| 1917 | 875                              | 2,606              |                    | 3,481  |
| 1918 | 2,874                            | 4,737              | 1,123              | 8,734  |
| 1919 | 3,812                            | 5,667              | 1,674              | 11,153 |
| 1920 | 3,969                            | 3,328              | 1,559              | 8,856  |
| 1921 | 2,115                            | 3,566              | 636                | 6,317  |
| 1922 | 2,695                            | 5,373              | 959                | 9,027  |
| 1923 | 3,806                            | 4,216              | 1,216              | 9,238  |
| 1924 | 6,601                            | 7,726              | 1,001              | 15,328 |
| 1925 | 7,105                            | 13,023             | 2,808              | 22,936 |
| 1926 | 7,807                            | 7,066              | 1,394              | 15,767 |
| 1927 | 9,347                            | 9,746              | 2,018              | 21,111 |
| 1928 | 12,575                           | 12,923             | 2,367              | 27,865 |
| 1929 | 19,216                           | 20,040             | 3,565              | 42,821 |
| 1930 | 17,127                           | 13,653             | 4,859              | 35,639 |
| 1931 | 12,013                           | 7,600              | 2,827              | 22,440 |
| 1932 | 14,995                           | 9,846              | 2,659              | 27,500 |
| 1933 | 23,810                           | 18,249             | 4,310              | 46,369 |
| 1934 | 45,630                           | 27,236             | 4,858              | 77,724 |
| 1935 | 40,960                           | 31,163             | 6,572              | 78,695 |
| 1936 | 55,024                           | 23,588             | 7,655              | 86,267 |
| 1937 | 44,034                           | 29,184             | 8,300              | 81,518 |

Includes meal produced from sardines and other species of fish.

## Fish Oil, Gallons

| Year | Monterey and Northern California | San Pedro district | San Diego district | Total      |
|------|----------------------------------|--------------------|--------------------|------------|
| 1916 | 25,563                           |                    | 500                | 26,063     |
| 1917 | 92,393                           | 83,900             |                    | 176,293    |
| 1918 | 261,466                          | 67,858             | 17,400             | 346,724    |
| 1919 | 341,173                          | 146,298            | 26,791             | 514,262    |
| 1920 | 419,474                          | 152,937            | 39,174             | 611,585    |
| 1921 | 226,826                          | 93,305             | 16,607             | 336,738    |
| 1922 | 295,858                          | 244,310            | 6,882              | 547,050    |
| 1923 | 576,553                          | 346,883            | 28,452             | 951,888    |
| 1924 | 1,240,296                        | 1,059,001          | 51,425             | 2,350,722  |
| 1925 | 1,246,561                        | 1,715,633          | 187,847            | 3,150,041  |
| 1926 | 1,418,512                        | 651,006            | 54,410             | 2,123,928  |
| 1927 | 1,759,480                        | 763,905            | 95,105             | 2,618,490  |
| 1928 | 2,456,716                        | 1,268,518          | 24,068             | 3,749,302  |
| 1929 | 4,205,118                        | 2,280,991          | 62,017             | 6,548,126  |
| 1930 | 4,517,881                        | 1,282,893          | 41,989             | 5,842,763  |
| 1931 | 3,098,817                        | 818,364            | 7,511              | 3,924,692  |
| 1932 | 3,805,760                        | 1,293,961          | 25,678             | 5,125,399  |
| 1933 | 5,143,062                        | 2,585,784          | 58,948             | 7,787,794  |
| 1934 | 11,812,236                       | 4,221,447          | 94,525             | 16,128,208 |
| 1935 | 9,841,090                        | 3,821,566          | 261,482            | 13,924,138 |
| 1936 | 12,382,963                       | 2,834,887          | 260,059            | 15,477,909 |
| 1937 | 8,554,485                        | 2,578,600          | 191,757            | 11,324,842 |

Includes oil produced from sardines and other species of fish.

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not to be circulated

