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STATE OF CALIFORNIA

DEPARTMENT OF NATURAL RESOURCES

Division of Fish and Game

THIRTY-THIRD BIENNIAL REPORT

For the Years 1932-1934

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HARRY HAMMOND, STATE PRINTER
SACRAMENTO, 1934

**DEPARTMENT OF NATURAL RESOURCES
DIVISION OF FISH AND GAME
San Francisco, California**

Fish and Game Commissioners appointed by the Governor. Term at pleasure of Governor. No compensation

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EARL B. GILMORE, Commissioner.....	Los Angeles
I. ZELLERBACH, Commissioner.....	San Francisco
JOHN L. FARLEY, Executive Officer.....	San Francisco
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E. V. Cassell, Superintendent of Mt. Shasta Hatchery.....	Mt. Shasta
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Archie Thompson, Foreman Yosemite Hatchery.....	Yosemite
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Geo. E. West, Foreman Cold Creek Hatchery.....	Ukiah
J. L. Stinnett, Foreman Feather River Hatchery.....	Clio
R. A. McCloud, Foreman Kaweah Hatchery.....	Three Rivers
J. C. Lewis, Superintendent Tahoe Hatchery.....	Tahoe
Wm. Berrian, Foreman Lake Almanor Hatchery.....	Westwood
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John Marshall, Foreman Brookdale Hatchery.....	Brookdale
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W. L. Scofield, Supervisor, State Fisheries Laboratory.....	Terminal Island
Arthur A. Alstrom, Supervisor, Fresh Fish Marketing.....	San Francisco

BUREAU OF LICENSES

H. R. DUNBAR, Chief.....	Sacramento
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BUREAU OF EDUCATION AND RESEARCH

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GEORGE NEALE, Chief.....	Sacramento
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STATE OF CALIFORNIA

DEPARTMENT OF NATURAL RESOURCES

Division of Fish and Game

THIRTY-THIRD BIENNIAL REPORT

For the Years 1932-1934



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J. DALE GENTRY, President, State
Fish and Game Commission.



EARL B. GILMORE, Fish and Game
Commissioner.



I. ZELLERBACH, Fish and Game Com-
missioner.



JOHN L. FARLEY, Executive Officer.

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LETTER OF TRANSMITTAL

SAN FRANCISCO, August 1, 1934.

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

SIR: In compliance with the provisions of the Fish and Game Code, we submit herewith the Thirty-third Biennial Report of the activities and accomplishments of the Fish and Game Commission for the period July 1, 1932, to June 30, 1934.

We are particularly pleased to render this report because it records distinct progress in fish and game management, and marks new attainments in the production of both fish and game during a period of diminishing income.

The report consists of a brief summary by the Executive Officer, followed by more detailed reports of the Chiefs of the several bureaus of the Division, and complete statistical reports including all receipts and disbursements.

We wish to take this opportunity of expressing our appreciation of the assistance which has been given to this work by His Excellency, the Governor, his staff, the members of the Legislature, and the officials of the different departments of the State government, all of whom have helped to make our work both effective and pleasant.

Respectfully submitted.

J. DALE GENTRY,
I. ZELLERBACH,
E. B. GILMORE,
Fish and Game Commission.

IN MEMORY

It is with much regret the Division reports the following deaths 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>
A. J. Stanley-----	July 14, 1919	November 4, 1932
Ross W. Markley-----	October 11, 1926	July 7, 1933

THIRTY-THIRD BIENNIAL REPORT

REPORT OF THE EXECUTIVE OFFICER, JOHN L. FARLEY

The personnel and organization of the Fish and Game Commission, with J. Dale Gentry, San Bernardino, President; I. Zellerbach, San Francisco, and E. B. Gilmore, Los Angeles, as members, has continued unchanged during the period covered by this report. As thus organized, the Commission has continued its policy to hold meetings at frequent intervals in all parts of the State to permit sportsmen and commercial fishermen to meet with the members of the Commission, and to consider with them the problems of fish and game management.

Eugene D. Bennett, former Executive Officer and for nearly six years attorney for the Commission, terminated his connection on August 20, 1933, when the legal work was transferred to the Attorney General.

Most of the changes which have been made in the administrative personnel of the Division have been the result of necessary economies, and have involved the consolidation of some of the activities which have previously been carried on under separate heads.

On July 1, 1933, the position of Chief of the Bureau of Hydraulics was discontinued, and the remaining work of this Bureau was continued in the Bureau of Fish Culture.

On October 10, 1933, Leo K. Wilson resigned as Chief of the Bureau of Education and Research, which position has remained vacant and the supervision of the work of this Bureau was transferred to Dr. J. O. Snyder, in addition to his other duties.

Mr. E. Lingenfelder served as Assistant Executive Officer in charge of the Los Angeles office from September 26, 1932, to July 1, 1933, when Captain A. E. Burghduff took over this work in addition to his duties with the Bureau of Fish Culture.

It has been the policy of the Commission to simplify the organization of the Division, and to maintain at a maximum the production of fish and game by discontinuing during the period of low income, educational work, and scientific studies which could be deferred without too serious losses; and to use these savings for hatcheries and game farms, and to purchase game birds.

OUTSTANDING ACCOMPLISHMENTS

Increased fish hatchery facilities and efficient management resulted in the planting of seventy million trout, twenty-four million salmon and forty-seven thousand small mouth black bass. While these imposing numerical records are encouraging, the real progress is in the number of pounds of game fish reared in our hatcheries. Of last year's plantings, nearly 400,000 trout were from six to ten inches in length.

For the first time in California, small mouth black bass were reared in quantity for distribution, and towards the close of the biennial

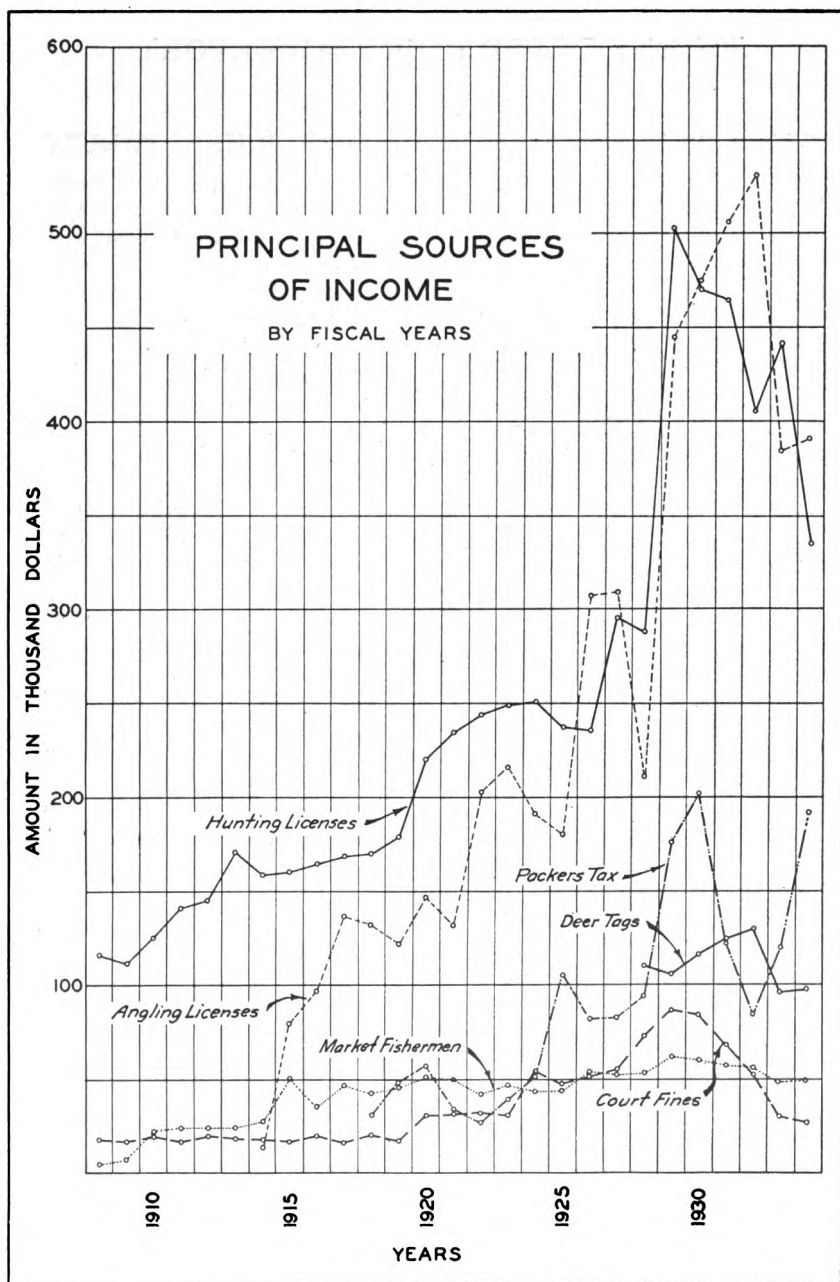


FIG. 1.

period, Kentucky black bass were imported by airplane to add to the game fishes to be reared and released by the Bureau of Fish Culture.

The Southern California Game Farm was turned over exclusively to the production of valley quail, arrangements were made with the Mexican Government for the importation of quail from Lower California, and quail refuge and natural production areas were leased and developed in the southern counties. Twenty thousand quail were thus added to the wild breeding stock in the southern areas where depletion was most marked. The Commission still holds a permit to import 85,000 more quail, and the work of restocking will proceed as rapidly as climatic conditions will permit.

The sportsmen of the State enjoyed their first open season on pheasants during a portion of November, 1933. The results were very satisfactory. Over 37,000 ringnecks were distributed from the game farms and in addition 33,000 eggs which were turned over to sportsmen to hatch and rear for releasing. This distribution establishes a new record for California.

The Klamath River was closed to commercial fishing, thus making more effective the expressed wish of the citizens of the State to have that district set aside as a recreational area.

Striped bass were set aside by legislative enactment as essentially a game fish for sportsmen, by prohibiting their sale except when taken in restricted areas during three months of the shad season. Increased interest and apparent abundance in striped bass was reflected in larger angling license sales in the bass areas.

The Commission adopted the visible angling and hunting license buttons commencing with January 1, 1934. This action was taken to stimulate the purchase of licenses and to enable sportsmen to know those who try to get their sport without paying for it. These buttons have been well received, and have increased the angling license sales.

The Commission endeavored to assist the commercial fishermen and operators during the depression by granting increased permits for the reduction of sardines. The 1932-33 catch was 190,000 tons, and the 1933-34 catch exceeded 313,000 tons, an increase of 53 per cent and 117 per cent respectively over the previous seasons.

The mackerel catch of California for 1933 reached a new high total of 30,000 tons. This figure is particularly interesting when it is compared with the 25,000 maximum take of the Atlantic mackerel fishery.

LICENSE SALES

In the chart shown in Figure 1 is an interesting record of the income of the Division. Our last report recorded the falling off of hunting license sales. This chart records an increase in the hunting license revenue for the period ending June 30, 1933, but this was due to a change in hunting license years which made necessary an eighteen-month period for which a fee of \$3 was charged. The number of hunting licenses sold dropped from 214,000 to 154,000 and then up to 169,000 as shown in Figure 2.

Equally startling is the decrease in the sale of deer tags during 1932 and 1933, these sales dropping from nearly 130,000 as noted in the last report, down to 96,702 and 95,776 for the two years covered by this report.

Angling licenses, too, have followed the downward trend of the times. In our last report a total annual sale of over 242,000 angling licenses was recorded. In 1932, this dropped off to 212,662, and in 1933 to 175,936.

In the face of these drastic reductions in income, increased production was accomplished, partly by economies, and partly through the use of a surplus in the Fish and Game Preservation Fund which has been kept for such situations.

Revenues from commercial fishing license sales fell off about 16 per cent but the increased landings of sardines and mackerel have

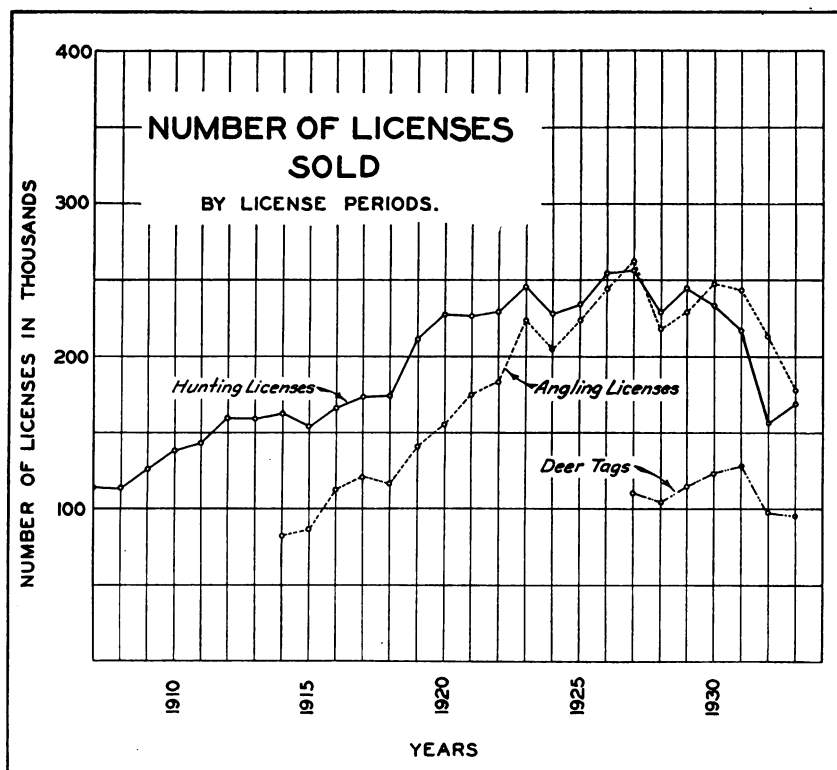


FIG. 2.

resulted in a sharp increase in revenues from commercial sources, offsetting in part the losses sustained from other sources.

The total revenue for the two years covered in this report amounted to \$2,311,942.99, including \$45,000 from the State Fish Exchange. The total expenditures amounted to \$2,302,982.87. For the previous biennium, the corresponding figures were: Revenue, \$2,637,260.27, Expenditures \$2,758,770.77.

FISH CULTURE

This bureau has functioned in a most satisfactory manner and has produced both more, and larger fish. The production has been 69,-650,000 trout of all kinds, 20,669,000 king salmon, 3,402,367 silver

salmon and 47,000 small mouth black bass. Through the use of an increased number of tanks and ponds, and added equipment for distribution, the bureau has materially increased the size of the fish planted, and has made more effective its work.

A complete new 96 trough hatchery with 10 tanks was completed and ponds are to be added near Lake Almanor. The salmon racks on the Klamath were completely rebuilt and many other repairs and improvements made at the State's twenty-five hatcheries, considerable assistance being received from the Federal Government through its various relief agencies.

Improvements in hatchery methods have been developed, all employees have been placed under civil service, and the bureau is better equipped, and in better position to continue to improve its work than at any time in the past.

The cooperative trout study with the U. S. Bureau of Fisheries has continued and useful information is beginning to be available from this source. A report of this activity is included in the pages following.

PATROL

Due to a diminishing income, it was necessary in 1933 to reduce the number of wardens materially. This reduction, together with hard times, resulted in a marked falling off in the number of convictions for game law violations, and a reduction in revenue from fines. This is clearly shown in Figure 1.

The entire force is now equipped with State-owned cars with a resulting saving in expense. The small pick-up type of truck has been adopted as the standard equipment for wardens, and its value in fish planting, fish rescue, and other work has been thoroughly demonstrated.

An excellent, specially equipped fish planting truck has been added to the equipment for that work, and increased emphasis on careful fish planting has given improved results.

The number of volunteer wardens increased to such an extent, and the number who were actually doing law enforcement work was so small, that the Commission canceled all the appointments, and provided for two classifications of volunteer workers. Volunteer wardens are sponsored by the Chief of Patrol upon recommendation of his assistants, and are only men who actually engage in making arrests and serving papers in game cases. Fish and Game Protectors are appointed by the Commission in recognition of the assistance given by sportsmen and prominent citizens in the work of game conservation. This latter group is not bonded and are no expense to the Commission.

After a year's trial, the use of metal seals for deer tags was discontinued. The good features of the seal were not of sufficient value to justify the added expense.

While law enforcement is the primary function of our wardens, they have many other duties including fish planting, fish rescue, predator control, winter feeding of birds and animals, and in fact all of the duties involved in proper fish and game management. The work calls for a high type of man and we believe that most of our wardens are measuring up to high standards and increased responsibilities.

GAME FARMS

Continued study and improvement in equipment and methods have resulted in larger production and stronger birds from our game farms, without a corresponding increase in cost. As noted above, over 37,000 pheasants, 19,000 quail and more than 1000 partridges were distributed; and an additional 37,000 game bird eggs were placed with sportsmen for hatching. The pheasant production was about double that of the preceding biennium.

Sportsmen, both as individuals and as organizations, have continued to take an increasing interest in game bird production. This has been particularly noticeable in the operation of holding pens where young birds are fed and reared near the areas where they are to be released. Last year, 8000 birds were taken care of in this manner by sportsmen.

Mention has been made of the importation of Mexican quail, and our last report outlined plans for the development of areas in the south for the natural propagation of quail. This work has continued to expand, and it is probable that the natural production on these areas last year exceeded the quail production of our game farms. Unfortunately, the present dry season has been disastrous for quail in these same areas, and drastic curtailment in the legal quail kill should be effected in these areas.

GAME REFUGES

The work of this bureau has been largely confined to the development and management of the State-owned refuges, and the management of game on refuges created by legislative act, but not owned by the State. When economies necessitated a reduction in the number of trappers in 1933, two of the best men were assigned to the mule deer territory to protect and manage these animals which have suffered severely from hunting, drought, severe winters and disease.

COMMERCIAL FISHERIES

The commercial fisheries of California have done their part to break the depression. The total landings of fish and shellfish amounted to 440,889,986 pounds in 1932, and 699,778,667 pounds in 1933. This latter amount is a sharp increase over the two previous years, and is about equal to the 1930 catch. The total for the two years is about 2 per cent greater than for the biennial period just preceding.

With the complete installation of mechanical equipment for the recording and tabulation of statistical data, the laboratory has been able to compile reports with less delay, and to furnish the industry and governmental agencies with data which would otherwise be almost impossible.

Continued studies of the State's important fishery resources constantly add to the fund of information by which the Commission must be guided in its program of permitting maximum catches and maintaining a perpetual fishery. The limitations as to season and sizes, which knowledge of the fishery indicates are necessary, often bring conflicting and discrediting comments from those who are interested in exploiting our fisheries, but the fact remains that the bureau is in possession of

more accurate and complete data than any other agency. The bureau is naturally inclined to a maximum usage which in turn would yield larger revenues for increased equipment and activity.

The problem of the floating reduction plant remains unsolved. At the last Legislature, the Commission endeavored to secure the passage of a law which would deny the right to fish in State waters to those who draw upon the State's fisheries by operating beyond the State's jurisdiction, and who do not comply with the laws observed by the majority of fishermen and operators. Passage of the two bills designed to accomplish this was refused.

Much favorable comment has come from the help given to those interested in developing a native oyster industry in Humboldt Bay, and a renewed interest has been taken in growing eastern and Japanese oysters in Monterey, San Francisco and Drake's bays.

The 1933 Legislature abolished the State Fish Exchange which had been a part of the Department of Agriculture, and transferred the balance of \$45,000 to the Division to be used in publicity and demonstrations designed to increase the use of fresh fish. This work has been carried on as a phase of the Bureau of Commercial Fisheries.

EDUCATION AND RESEARCH

This bureau, with reduced personnel, has continued to be responsible for the Division's publications, and to arrange through the proper outside laboratories for the prompt identification of game bird and animal diseases.

The taking of motion pictures has been discontinued, and lecture work has been reduced to a minimum. As now functioning, the name of the bureau is rather a misnomer.

The library has been maintained on a part time basis with fairly satisfactory results. Greater interest on the part of many employees in reports on fish and game work elsewhere have made it difficult to properly meet the demands for material.

FISH RESCUE

This little bureau has been one of the best producers of the Division. With a small annual investment of about \$6,000, over 4,000,000 game fishes annually have been saved from destruction and placed in waters where they may mature and find their way into the sportsman's creel.

LEGAL

The 1933 Legislature transferred to the Attorney General the legal work of the Commission which for nearly six years had been satisfactorily handled by Eugene D. Bennett, whose experience as Executive Officer and whose ability as an attorney made his services of unusual value to the Commission. A summary of the cases handled is to be found elsewhere in this report.

FISH SCREENS AND LADDERS

One of the most severe blows ever received by sportsmen and commercial fishermen was given by the last Legislature in changing the screen law to require the Commission to pay one-half the cost

of the installation of all screens on irrigation diversions. Those who dry up the natural streams of the State to produce agricultural crops, and who pay nothing to the State for the use of this water, should protect the State from the additional loss of game and commercial fishes which follow these diversions to become stranded in field and orchard. Few sportsmen wish to stand in the way of necessary agricultural and industrial development, but sportsmen believe that those who benefit from water diversions should pay the cost of proper screening. The losses of fish through unscreened diversions probably exceeds the production of all the State hatcheries. The cost of screening is a relatively small item in the total cost of an irrigation system; but the cost from the sportsmen's contribution to fish and game work is prohibitive.

Because of this action of the Legislature, all work on fish screens was discontinued last year, and the remaining activities covering

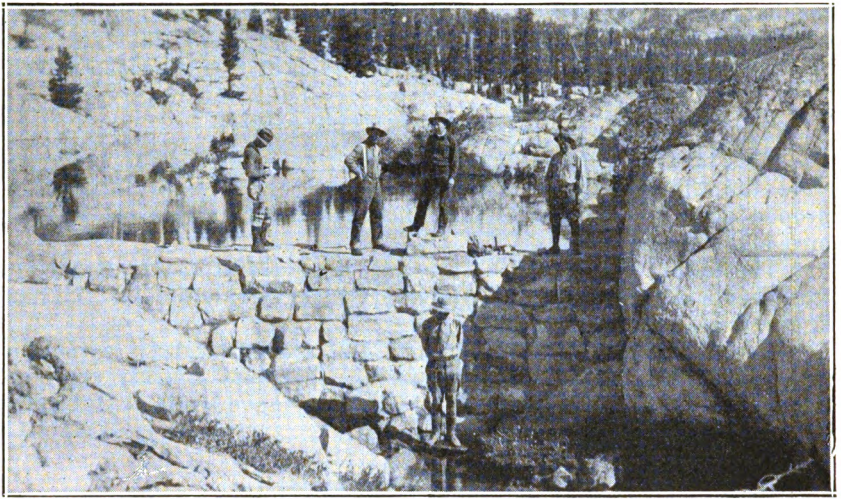


FIG. 3. Main check dam on Long Lake, Cherry Creek project, Tuolumne County. This dam is eight feet high and stores 520 acre-feet of water. Photo by Louis Jensen.

fish ladders and stream pollution were transferred to the Bureau of Fish Culture.

STREAM AND LAKE IMPROVEMENTS

Through the energy and vision of F. W. Leighton of Sonora, a cooperative stream improvement program for the Cherry Creek area in Tuolumne County was developed and made possible by contributions from the City of San Francisco, the Board of Supervisors of Tuolumne County, and the Fish and Game Commission. The construction consisted of check dams at the outlet of suitable lakes which would create storage sufficient to maintain a small flow of water in the natural streams throughout the period when these streams naturally dry up with a consequent loss of young fish as well as spawners. The work was highly successful and has been continued with the

aid of the U. S. Forest Service and Federal unemployment relief organizations.

SPORTSMEN'S ORGANIZATIONS

During the past two years, there has developed a marked increase and interest among the organized sportsmen. It has been very gratifying to the Commission to find these organizations unselfishly interested in fish and game problems, and anxious to engage in constructive work for the improvement of hunting and fishing in the State. There seems to be a better understanding of the problems involved, and with the help of these organizations, it is probable that the Commission will soon be vested with adequate authority to really manage the State's wild life.

FEDERAL CONTROL OF HUNTING AND FISHING

Sportsmen of the State and game officials have been much concerned over the assumption of authority by the Secretary of Agriculture to regulate the season, bags, conditions and fees for hunting and fishing in the National Forests. While the Secretary explains that this will only be done where State cooperation is lacking, still the threats to take away from the State its control of its resident fish and game is most disturbing, and attempts to exercise any such assumed rights will be resisted by the Commission.

GENERAL

The California Code Commission completed its work on the Fish and Game Code which was adopted by the 1933 Legislature. This code is a great improvement over the old set of laws, and the Fish and Game Commission wishes to express its thanks to the Code Commission for the excellence of its work.

A forward step was taken by the last Legislature in granting the Commission, through the Director of the Department of Natural Resources, and subject to the approval of the Governor, the right to close to hunting newly stocked areas, or areas where added protection to game birds or animals is needed.

After fifty years of loyal and active service to the State, and for sixteen years Chief of the Bureau of Fish Culture, W. H. Shebley retired from active service on May 16, 1933, with the best wishes of associates and many other friends.

ACKNOWLEDGMENTS

Many individuals and organizations contribute to the work of this Division. Sportsmen's clubs rear fish and birds and plant them; City, County, State and Federal agencies contribute largely in funds, equipment and personnel to help in our work, this being particularly true of the United States Forest Service, Biological Survey, Bureau of Fisheries and Park Service. Service clubs and many commercial organizations give material assistance.

The Division in behalf of the sportsmen of the State wishes to acknowledge with gratitude the generosity of M. E. Lombardi, vice

president of the Standard Oil Company, in making it possible to introduce twenty-one sand grouse to the Anaverde Valley, northwest of Palmdale, Los Angeles County.

The University of California and Stanford University have made available their laboratories. For many years, railroads and transportation companies of the State have handled our fish cars and fish cans and the hatchery personnel without cost to the Commission. George D. Nordenholt and Dan H. Blood, as Directors of the Department of Natural Resources, have consistently aided us in our work. To all these, the members of the Fish and Game Commission are grateful.

The employees of this Division join me in also expressing appreciation to the members of the Fish and Game Commission for their sympathetic interest and for the maintenance of standards of accomplishment which make California's fish and game work stand out among those States which lead in conservation.

Respectfully submitted.

JOHN L. FARLEY, Executive Officer.

BIENNIAL REPORT OF THE BUREAU OF LICENSES

By H. R. DUNBAR, Chief

The activities of the Bureau of Licenses during the biennium just past have been carried on in practically the same manner as explained in my previous report. There is maintained at Sacramento the office of the cashier, who supervises the printing and distribution of all licenses and the accounting of all moneys accruing to the Division. Branch license offices are maintained at Sacramento, San Francisco and Los Angeles, for the purpose of selling licenses to agents who pay cash in advance. These offices account for approximately one-half the total license sales. Branches for selling market fishermen's licenses are also maintained at Monterey, Terminal Island and San Diego. County clerks in many of the counties of the State continue to handle and distribute licenses, accounting for all sales at the close of each month. Licenses are also distributed from the Sacramento office to agents who handle them on a credit basis. This latter plan has been in practice for about three years and has proven to be one of the most satisfactory methods of distribution, principally for the reason that it insures a wider field of distribution and the opportunity of maintaining an adequate supply in the hands of the agents during the rush periods.

Due to the centralization of all financial accounts in the office of the cashier, it was necessary to employ an additional clerk on July 1, 1932. This clerk proved very satisfactory and a valuable asset to the office, but on account of the decrease in revenue, it was found necessary to reduce our expenditures as much as possible; consequently on June 30, 1933, this clerk was placed on the lay off list and a clerk from the San Francisco office was transferred to Sacramento.

On August 21, 1933, several laws, passed at the 1933 session of the Legislature and amending the hunting and angling license act, became effective. These measures were:

That a hunting or sporting fishing license shall be issued to replace one lost or destroyed upon the payment of a fee of fifty cents and the furnishing of an affidavit that the original license had been lost or destroyed. (The old law provided that in the case of a lost or destroyed license, that the fee for the duplicate would be the same as the one lost.)

That angling licenses were to be issued free of charge to Indians who were financially unable to pay the fee provided and who had not been previously convicted of the violation of a fish and game law of this State.

That county clerks shall deposit all moneys collected for hunting and angling license to the county treasury to the credit of a special fund, and at the close of each month the county clerk shall remit all moneys in this special fund to the Division of Fish and Game on warrants drawn by the county auditor. (This measure was brought about because of the many bank failures during 1932 and the early

part of 1933. In many of these closed banks, county clerks had fish and game license money on deposit.)

On January 1, 1934, the Commission adopted the identification button to be issued with the angling licenses for 1934. The buttons are $1\frac{1}{4}$ inch in diameter with celluloid front and with a heavy safety pin attached for fastening the button to the clothing. On the back of the button is a pocket or container in which the license is to be carried. The buttons are made up in five different series, each series in a different color. The series are: citizen-resident, Indian, nonresident, alien and duplicate. Each series is numbered consecutively and the button issued to the applicant must bear the same number as appears on the license.

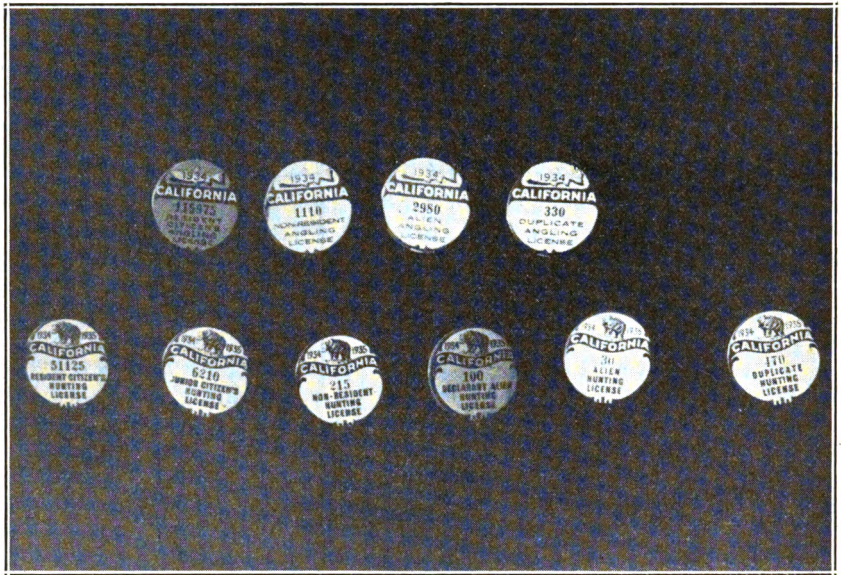


FIG. 4. The new hunting and fishing license buttons showing the various denominations. Photo by Tod Powell.

The buttons met with such favorable reaction from the sportsmen and their value from a conservation standpoint was so well demonstrated that the Commission decided to use a similar button to accompany the hunting licenses, effective July 1, 1934.

During the present biennium, the revenue of the Division has shown a marked decrease as compared to the income for the previous years. This decrease has occurred principally in the sale of hunting and angling licenses and deer tags. The total income for the fiscal year ending June 30, 1934, is almost equal to the income for the preceding fiscal year, but the income from privilege taxes for the year ending June 30, 1934, is approximately 60 per cent greater than that of the preceding year. This increase in the revenue for privilege taxes, consequently, reflects a corresponding decrease in the income from license sales.

Following is a statement showing the value and number of hunting, angling and deer tag license sales for each particular license year since 1929:

	1929	1930	1931	* 1932-33	1933-34
Hunting—					
Value -----	\$488,638 00	\$464,157 00	\$424,188 88	\$453,159 15	\$334,746 50
Number -----	241,709	231,970	214,517	154,031	171,139
Angling—					
Value -----	\$471,826 00	\$508,875 00	\$497,317 00	\$436,373 00	\$358,568 00
Number -----	225,774	248,319	242,857	212,662	175,936
Deer Tag—					
Value -----	\$115,472 00	\$123,999 00	\$129,005 00	\$96,702 00	\$95,776 00
Number -----	115,472	123,999	129,005	96,702	95,776

* Hunting licenses for an eighteen months period, January 1, 1932, to June 30, 1933. Fee increased fifty per cent during this period.

Figures for some of the license years listed above may not agree with figures for the same year appearing in previous publications. This apparent difference is caused by moneys being received subsequent to the previous publications and applying to that particular license account.

In November, 1933, there was a six-day open season on pheasants and was the first time in the history of California that pheasants could be legally killed throughout the State. Generally, the sportsmen found them to be an excellent game bird and quite difficult to hit. It is estimated that the six-day open season netted between \$30,000 and \$40,000 additional income on the hunting license sales.

The income from court fines as compared to former years has continued to fall off. This is due principally to the economic and unemployment condition that has prevailed the last few years. Violations of the fish and game laws have not lessened during this time, but the judges have been disposed to be more lenient in imposing penalties.

The income from fish packers' tax for the biennium has shown an increase of 51 per cent as compared with the previous biennium. The income for the fiscal year ending June 30, 1934, is the second largest ever having been received.

In the appendix may be found statements showing the sales of the different kinds of licenses for the years 1932 and 1933.

REPORT OF THE BUREAU OF FISH CULTURE

By J. O. SNYDER, Chief

The results of bureau activities are reflected in a large measure by the appended statistical tables which have been prepared by Assistant Chief J. H. Vogt. The account presents the record of an output of 69,650,272 trout of several species, 20,669,690 king salmon, 3,402,367 silver salmon and over 47,000 small mouth black bass.

The entire plant concerned with trout propagation consists of 25 hatcheries with upwards of 1720 standard troughs and 67 large tanks. There are also a considerable number of brood and rearing ponds of various types and construction. Egg-taking stations to the number of

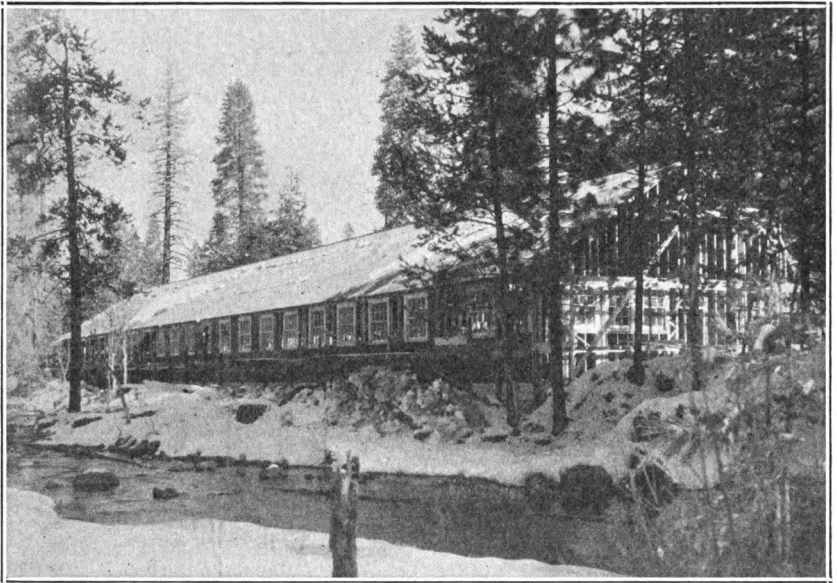


FIG. 5. New Lake Almanor Hatchery. Photo by Wm. Berrian, December, 1933.

32 were in operation. Some of these stations are regarded as temporary in character and because of changing conditions they are apt to be shifted.

Plans for the gradual expansion of pond systems as hatchery accessories and holding stations and for the accommodation of brood stocks are well under way. Actual construction is in progress as funds will permit, and the work carries with it a degree of experimentation so as to test in a measure the adaptability of certain types of structure. Where the water supply is insufficient or of poor quality, a situation is presented which is difficult to handle to the best advantage.

Among the outstanding items of new construction and general betterment, the following may be mentioned: A complete plant consisting

of a 96 trough, 10 tank hatchery with four cottages and two garages, with the necessary office, feed rooms, etc., near Lake Almanor. Excellent spring water is available here and rearing ponds of a suitable type will soon be added. The plant at Brookdale has been remodeled, a foreman's cottage added, and an excellent pond system installed. New racks and traps with a substantial concrete foundation have been

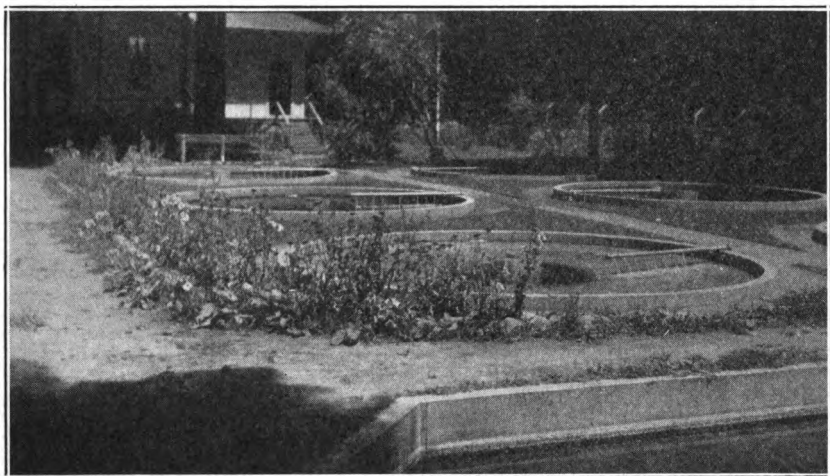


FIG. 6. Circular pools constructed by CWA labor at Brookdale Hatchery. Photo by J. O. Snyder.

built on Klamath River near Hornbrook, and the hatchery at Fall Creek has been overhauled, a garage and feed room added, while the ponds have been reconstructed and greatly extended. Small hatcheries at Snow Creek, Bear Lake, San Gabriel River and Santa Ana River in the San Bernardino mountain region have been abandoned and

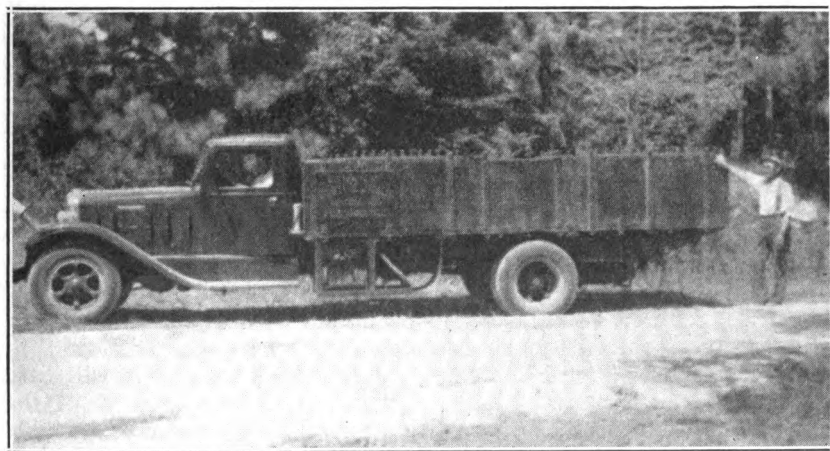


FIG. 7. One of the lately acquired fish planting trucks equipped with aeration and temperature regulation apparatus for long distance transportation of small fish. Photo by E. V. Cassell.

their activities centered at Forest Home where better water conditions prevail. An increased output with reduced expenses will result. An extensive brood and rearing pond system is nearing completion at Hot Creek in Mono County. Where government relief work was available, notable improvements involving actual construction were successfully accomplished. General improvement of living quarters is under way

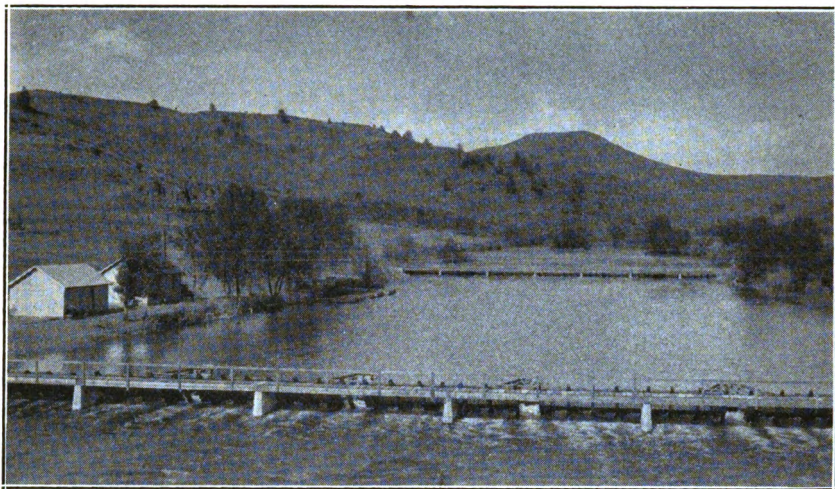


Fig. 8. Klamathon Egg Taking Station, Klamath River. Photo by Earl Leitritz, 1934.

and in many places the men in charge have added a very creditable touch of landscape gardening.

As a matter of hatchery routine, a method of enumeration has been introduced which is intended to record a fairly accurate determination of production in terms of number, size and weight of the fish which are distributed for planting. Accurate weighing apparatus and various accessories have been provided each hatchery and definite reports relating to the results of enumeration are required. An operating test of one year was in most cases entirely satisfactory. The work will be so systematized in the future that records of quantity production and growth will be available for comparison with costs of food and other items.

The work of the bureau in king salmon propagation centers on Klamath River. With a background furnished by careful investigation, what is believed to be a safe and profitable procedure in artificial propagation has become fairly well established. The release of young fish is made to coincide with the early and late emigrations in the river. Eggs are taken at a location where profitable natural spawning is not possible. Improvements just completed warrant the collecting of about 5,000,000 eggs and contemplated future development will care for more than twice that number. The same plant is used in the propagation of trout and any expansion for salmon thus serves a double purpose. A station for the observation of migrating salmon and trout is maintained on Shasta River and its findings have materially contributed toward a mass of facts useful in artificial propagation. Silver

salmon are being experimentally dealt with in large measure with promising results. Aged fish planted in the neighborhood of Santa Cruz have already produced satisfactory returns. Introductions are being made in Eagle Lake and some of the waters of the San Bernardino region.

The United States Bureau of Fisheries maintains three stations which are largely devoted to salmon propagation on Sacramento River, located at Baird, Battle Creek and Mill Creek.

Nothing of a positive nature has been learned relating to the result of recent introductions of Atlantic salmon in Klamath and Smith rivers. In the few cases where fish purported to be of that species were submitted for examination, they proved to be rainbow steelhead, cut-throat steelhead and humpback salmon.

The propagation of small mouth black bass is in its second year of operation. Difficulties peculiar to this region have been successfully met by the foreman in charge. Last year, 8676 fish measuring 2½ to 3 inches were planted where they may be kept under observation during their growth in open waters. Some were carried upwards of 500 miles without loss to test the possibility of long distance transportation. During the present season, more than 47,000 have been distributed. The plant is more or less temporary in construction and experimental in operation. It has about reached its production

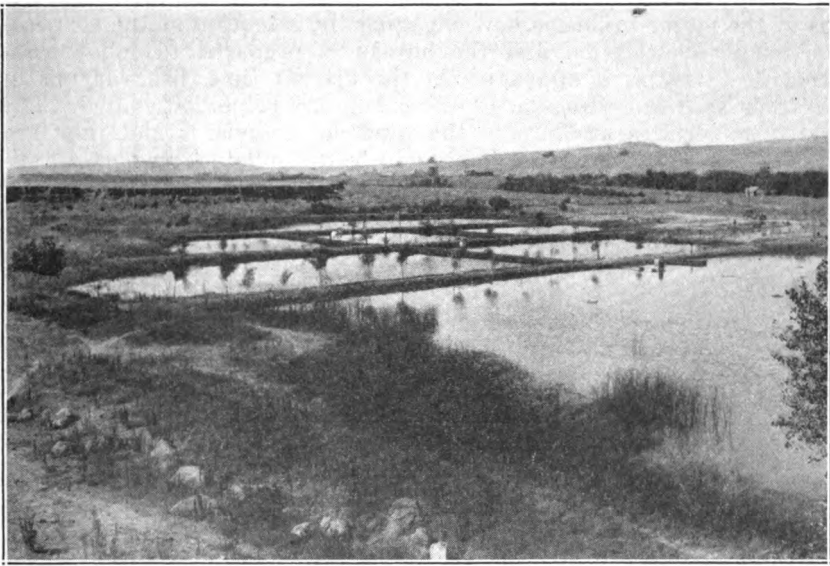


FIG. 9. Bass Ponds at Friant, near Fresno. Photo by J. O. Snyder, 1934.

capacity. The possibility of successful operation has been demonstrated and now the results of planting under various conditions are awaited.

The egg supply in the case of trout comes from wild and semiwild fish, brood stocks and purchase. The purchase and importation of eggs is not looked upon with favor principally because of the danger from disease. The supply of Loch Leven and brook trout is ample for the present. Golden trout thrive well only in a restricted region, and

while their propagation is difficult, progress with them seems satisfactory. The critical situation is with the rainbow trout. Great efforts are being made to build up and provide an ample source of supply for the future, so that there shall be no interference with natural propagation. Effort is being made to increase the black-spotted trout (the coast and Tahoe cutthroats) and insure their perpetuation in native waters.

Attempts at maintaining a brood stock of rainbow trout at the Mt. Shasta station have been discontinued because of an infestation of parasitic copepods which can not be prevented under present water conditions. Two other sites where an abundant supply of pure spring water is available are being experimentally developed for the maintenance of a number of strains of trout which have been selected because of certain traits which they possess. Vigorous, rapid growing and highly colored fish and also a rainbow trout which will spawn in the fall are wanted.

Discussions relating to the best adapted size of fish for artificial stocking and general planting still occupy much space on the sportsmen's stage. The question can not be settled offhand. The waters of this State, the general terrain and climate present such extremes of varied conditions that no general pronouncement relating to the best size of young fish to be planted is worth considering. Each peculiar situation will have to be met in a particular way. This is one of the major problems now engaging the attention of the cooperative trout investigation and the bureau is prepared to follow constructive advice as it appears. At the present time, fish varying in size from No. 1 fingerlings to 10 inches long are being distributed. The smaller fingerlings are largely the result of easements and they are generally placed where large fish would be difficult to transport. Failing water and high temperatures are frequent causes of easements. An extension of pond systems of proper design is expected to considerably improve the present condition. Due to some confusion and misunderstanding concerning the lately introduced system of counting and measuring fish, the statistics for 1933 are not complete. However, such as we have are interesting. 32,748,000 trout were reported as planted. Of these we have reliable data relating to 29,331,000. Their length measurements run as follows:

1 to 2 inches-----	27,314,000
2 to 3 inches-----	1,396,000
3 to 4 inches-----	150,000
4 to 6 inches-----	75,000
6 to 8 inches-----	380,000
8 to 10 inches-----	16,000

Progress in the solution of the various problems relating to distribution and planting will depend largely on our knowledge of the waters of the State.

A stream and lake survey, which in effect is a thorough preliminary reconnaissance, is well under way. It is being accomplished through the cooperation of members of the Division patrol, officials of the U. S. Forests, interested sportsmen and members of the trout investigation. An activity of this type is continuous as it must take into

account among other things such matters as weather cycles, changes in the biota resulting from unstable physical conditions and the attending effects of the increase and spread of human population. Sufficient data are already at hand to well demonstrate the value of the ultimate results of the survey in the establishment of a sound conservation and stocking policy.

There is a growing interest among sportsmen's clubs and other organizations in the construction and operation of holding ponds. It has been the policy of the bureau to not commit itself beyond its means in cooperations. The building of ponds is relatively simple. Their maintenance and the necessary care and expense of rearing the fish is another matter. It is suggested that before construction starts, the interested parties carefully consider the necessities of future operation. The bureau will gladly offer advice as to the location, plans and possible cooperation.

The future location of hatcheries and pond sites is a matter of great concern. Water supply, climate, transportation and the general requirements of the region to be served should be taken into account. Each propagation plant should be considered as an integral part of the entire system and its location and service should be determined accordingly. Observations and studies are being made of the probable future demand of artificial propagation in various parts of the State and of the opportunities offered for its successful pursuit.

Losses directly traceable to disease are not often carefully measured, but are acknowledged on all sides. In this State where the operations of many hatcheries are carried on under adverse physical conditions and where disease may and often does become rampant, its control is of major importance. A procedure intended to combat fish diseases has been inaugurated following the generally accepted axiom that our ability to control disease is proportional to our knowledge of it. An experimental hatchery and a small laboratory have been equipped and these together with hatchery inspection, and studies relating to diagnosis, prevention and treatment have been placed in competent hands. The matter of disease control and the healthy and rapid growth of small fish depends in a large measure upon a proper diet. Carefully planned experimentation of foods and feeding is being carried on in a small way and under careful direction. Results of value are already at hand.

Opportunities for the general advancement of the staff engaged in fish propagation are being provided. The library is being enriched with works of interest to fish culturists, a group of specialists engaged in various investigations is at hand for consultation, the younger men are being shifted about so as to broaden their experience, and a general convention will provide for discussions and exchanges of ideas. It is hoped that as a result each individual will be helped and that more perfect cooperation will result, also that the efforts of the bureau will be systematized and consolidated.

The activities of the Bureau of Hydraulics were transferred to this bureau following the resignation of John Spencer early in July, 1933, and the assistant hydraulic engineer was given direct responsibility for the necessary duties. Besides much work of a routine

nature, many fishways and screens have been installed, notably on Eel River, Tuolumne River and Salt Springs reservoir. Investigations, inspections and conferences have consumed much time and effort. As occasion requires, accurate surveys and topographical maps of present hatchery holdings are being prepared, these being found necessary in planning future improvements and extensions.

The bureau has tried at all times to maintain cordial and mutually helpful relations with persons and groups who are interested in its operations. Constructive criticism, suggestions and advice are received and thoughtfully considered. Its members are directly interested in not only conserving what we have, but in materially adding with the least necessary expense to the supply of game fish available to the angler.

REPORT OF THE COOPERATIVE TROUT INVESTIGATIONS

By P. R. NEEDHAM

Work on trout problems of California has been actively conducted by the members of these investigations during the past two years under the direction of Dr. P. R. Needham and A. C. Taft of the U. S. Bureau of Fisheries. Expenses are shared jointly by the Division and the Federal bureau. Dr. G. C. Embury, Dr. H. S. Davis and other outstanding fish cultural experts have been consulted and have given much assistance in the development of a sound research program.

The two major problems now being attacked are: (1) Problems relating to the conservation of coastal steelhead trout, and (2) Development of select strains of brood stock for egg supplies and restocking purposes. Other problems are concerned with planting experiments to determine the mortality under natural conditions from plantings of given numbers of trout of certain size, and also to determine the migratory characteristics of various species after planting. The data as obtained are to be used in the development of well-balanced stocking policies for the streams of California.

Last year a counting weir was installed at Waddell Creek in Santa Cruz County for use in steelhead studies. During the winter and spring some 3200 silver salmon and 2400 steelhead were marked and handled here, and the weir is proving to be of great value in the steelhead work.

Several marking experiments are in progress. Over 40,000 marked rainbows were planted in the Truckee River in 1932 and again in 1933. This experiment will be of importance in determining not only the survival rates for given numbers planted, but also their migratory habits. Likewise over 40,000 rainbow trout of several strains were marked and planted this spring in the Upper Klamath River and its tributaries near the Fall Creek Hatchery. One lake marking experiment has also been started in Upper Angora Lake near Lake Tahoe. Last year 5000 eastern brook trout were marked and planted there. This year half as many fish, twice as long, will be planted to determine the results of each plant as shown by anglers' catches. It is hoped that actual production in pounds of fish produced per acre of water may also be determined here in addition to survival rates from given numbers planted.

Now being completed at Hot Creek in Mono County are a series of brood ponds and raceways which will be used in experiments toward development of a domestic supply of rainbow trout eggs. It is planned to develop a source of rainbow eggs from select strains of trout that will relieve somewhat the present drain on wild egg supplies through hatchery activities. Other practical fish-cultural experiments will be carried on here, such as feeding experiments to determine cheap but efficient diets; selective breeding for rapid growth; high egg yields; disease resistance; etc. The selective breeding of trout is a new field and rich in possibilities for improvement along many fish-cultural lines.

Studies of natural foods have continued. Aside from merely determining the abundance of food found in various waters, correlations of amounts present with amounts actually eaten by trout have been made and much useful data obtained. Seasonal food studies likewise have been made and show, among other things, and contrary to the usual belief, that in the wintertime foods in trout waters are as abundant as in the warm summer months. This spring the water sow bug, a crustacean, was introduced into California from the east in an attempt to improve the food supply of high Sierra lakes. It is too early to predict the outcome of this experiment.

Another item of interest is that the Federal Bureau of Fisheries received an appropriation from the Public Works Administration for stream survey work and at present operating in California are three four-man stream survey parties. One has been assigned to the Klamath-Trinity National forests, one to the Sierra forest, and one to the Mono-Inyo forests. Each of these parties is amply supplied with scientific field equipment for investigation of both lakes and streams. The work is being conducted as an integral part of the program of these investigations, and the data obtained will form the basis for definite stocking recommendations for the lakes and streams studied. Transportation is supplied in the form of Ford trucks. Pack stock is being hired as needed for studies of back country lakes and streams. Active cooperation is being supplied the Division of Fish and Game and the U. S. Forest Service on stream and lake improvement projects.

REPORT OF THE BUREAU OF PATROL AND LAW ENFORCEMENT

By E. L. MACAULAY, Chief

A reduced budget made it necessary to lay off 14 wardens on June 30, 1933. These layoffs were made in accordance with civil service rules and regulations, but all of the men who so desired were given temporary employment as sardine cannery inspectors for several months. On May 1, 1934, half of the laid off force was brought back into active service on a temporary six-month program, and it is hoped that economies in the patrol operation will be sufficient to continue their employment on a permanent basis, as well as to return the balance of the layoff men to duty.

Effective July 1, 1932, the Commercial Fisheries Patrol, formerly operated by the Bureau of Commercial Fisheries, was transferred to this bureau and at the close of the biennium the Bureau of Patrol and Law Enforcement consisted of one chief at San Francisco, two assistant chiefs (one at San Francisco and one at Los Angeles), one supervisor of fisheries patrol at Terminal Island, 16 captains, 95 wardens and two stenographers, as well as 7 miscellaneous ratings.

Fines imposed for fish and game violations continue to show a decrease and the courts in many cases are reluctant to impose severe penalties, which are warranted in many instances, on account of existing economic conditions. A recapitulation of the arrests and convictions, together with the fines and jail sentences imposed will be found in the appendix on page 83.

During the past biennium, Captain Walter R. Welch and Warden J. L. Bundock retired from active service under the provisions of the State Employees Retirement Act. Warden A. J. Stanley passed away on November 3, 1932, after a short illness, and Warden R. W. Markley passed away suddenly on July 7, 1933.

Over a period of several years, the number of volunteer wardens had gradually increased to a point where many were rendering no service of value to the Fish and Game Commission, and at a Commission meeting held in October, 1933, all volunteer appointments were canceled except those of regular paid Federal, State or county employees engaged in related conservation activities. To provide interested parties in the protection and management of fish and game with an identification, the designation of Fish and Game Protector was created. These protectors are authorized to make arrests for violations of the fish and game laws committed in their presence, and are provided with a suitable badge.

In April, 1934, a conference of wardens was held in Los Angeles where all the field men had an opportunity to ask questions on their work and to receive the benefit of the experiences of their fellow workers in different portions of the State. The meeting closed with a competitive pistol shoot on the splendid range of the Los Angeles Police Department, furnished through the courtesy of the chief of police.

Practically the entire personnel of the department is now equipped with State automobiles and the standard equipment of closed cab pickups has given, on the whole, satisfactory service considering the extremely hard working conditions under which they operate. Including depreciation the cost per mile is approximately $3\frac{1}{2}$ cents and all vehicles are traded in when they are no longer economical to operate, in general after two years service.



FIG. 10. Loading tule elk at Buttonwillow to be transported to Owens Valley.

The patrol boat *Bluefin* has been equipped with an excellent wireless set and a new set of batteries, while the *Albacore* has recently been recaulked and overhauled. The question of installing a new engine on the *Albacore* is under consideration as this vessel is a little too slow to overhaul outside fishing boats.

The United States Bureau of Biological Survey waterfowl regulations were enforced by all State wardens during the waterfowl season, and in the San Joaquin area, where local jury trials were in general very unsatisfactory, it is interesting to note that Federal courts awarded substantial fines and imprisonments.



FIG. 11. Deputies rescuing small trout on Soda Creek in Lake County. About 3000 young steelhead from 2 to 5 inches long were taken from this drying pool. Photo by J. D. Dondero.

The last Legislature provided that judges, upon conviction, in their discretion might order the forfeiture of firearms and fishing gear used in committing a violation of the fish and game laws. This provision has been of material assistance as courts have not hesitated in many instances to order such confiscation, and the loss of a favorite rifle or fishing rod is often a more severe punishment to the violator than a monetary fine.

The Buttonwillow Elk Refuge, now known as the Tupman Zoological Park, was transferred to the Patrol Department for administration on March 15, 1933, and an SERA camp has been established in this vicinity. The project calls for the establishment of adequate water supply and many other beneficial improvements. During October and November, 1933, wardens transferred 56 tule elk to Owens Valley, 14 of which were taken from Yosemite National Park. All of these animals survived the trip without injury and seem to be doing well in their new home, where they have an area of 60 miles in length and 5 miles in width in which to roam along the Owens River bottoms.

REPORT OF THE BUREAU OF GAME FARMS

By AUGUST BADE, Chief

During the past two years further progress was made with the development of artificial methods of propagating game birds, and as this program develops the domestic hen as a factor in game bird propagation is passing out of the picture.

With the elimination of the hen the disease hazard has been lessened and the difference it makes in general conditions around our game farms is quite noticeable. During this period we have had no outbreak of disease that is common to domestic poultry. It is our opinion that when the hen is eliminated from game bird propagation programs the source of many disease hazards will have been eliminated.

Several years ago it was decided to begin a program for the restoration of the quail in southern California. Some thought had been given to this problem but no definite idea had been developed that seemed at all feasible. Several programs had been suggested but when put to the test some glaring weakness appeared. Finally the closed area idea seemed the best and the program was launched with the Antelope Valley and the San Bernardino and Riverside localities as the scene of action. Since the last report this project has progressed and results are now in evidence on these closed areas and surrounding territory.

In the Antelope Valley about 20,000 acres of original quail habitat were secured and divided into sixteen units. These areas are located in various parts of the valley and are under the personal supervision of a caretaker with headquarters at Palmdale. The land used in these areas is privately owned but leased to the Division of Fish and Game for a period of three years.

It is the duty of the caretaker in charge not only to develop water when necessary, but to trap vermin and also interest the landowner in vermin control, and in other ways look after the interests of the birds. Stock birds for the planting of these areas are furnished by the Bureau of Game Farms.

With the work established in the Antelope Valley, about the same acreage and about the same number of closed areas were secured in the San Bernardino and Riverside localities and placed under the personal supervision of a caretaker with headquarters at Highgrove. After this area had been well organized and the different units stocked with quail, the work was extended to San Diego county with a caretaker in charge. It is planned to continue this work in other localities as fast as funds and personnel are available to handle the projects.

According to the results of checkups so far made it would seem that the closed area idea is the most logical way of repopulating depleted covers. In the establishment of these areas the interests of the sportsmen are always considered in that these sanctuaries are so arranged that open shooting will be permitted, in season, on the adjacent property. These areas are merely the breeding and reproducing ground that will supply birds for all nearby areas.

In the past two years considerable attention has been given to the propagation of the chukor partridge as a further means of increasing the value of the more rocky and desert areas to the sportsmen. The chukor partridge is a bird that naturally occupies the higher and more rocky-barren sections, and for that reason there is a great deal of available space for them. This partridge is not only a wonderful field bird but is considered by those who know to be the best table bird of all. Over 1000 of these birds have already been planted in areas ranging from a few hundred feet in elevation to 5000 feet.

In order to secure the best results from the available birds, plantings have been made during the early spring with birds that have been held on our game farms over the winter months. A check on these plants shows that the birds have remained in the immediate vicinity where liberated and in many instances have nested. From the experi-

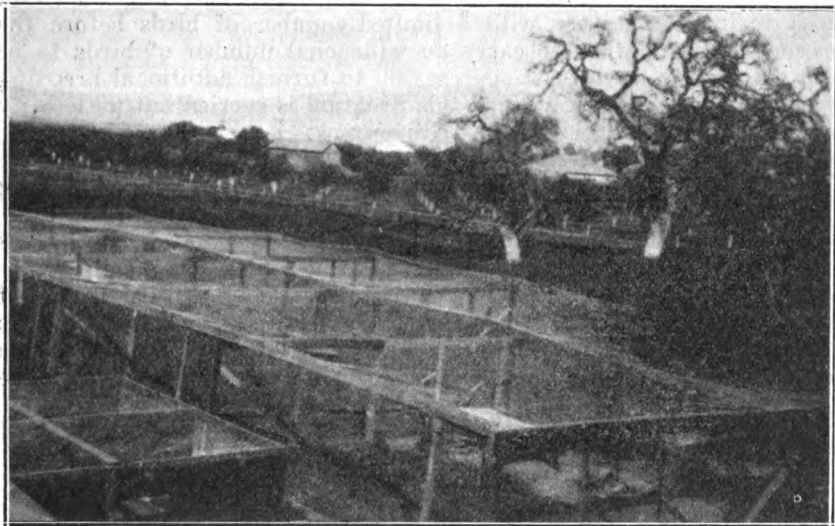


FIG. 12. Pheasant rearing pens erected at Cotati by the sportsmen of Sonoma County. Photo by August Bade.

ence and information gained during these two years it looks as though this bird is going to prove valuable in our general scheme of restocking.

Public interest in the ring-necked pheasant as a game bird was greatly increased by the open season during the month of November. Many sportsmen who had considered the pheasant more as a barnyard fowl are now convinced that he will not only take care of himself, but will survive the pressure of an open season.

What is probably the most outstanding development of the past two years is the rapid growth of the holding pen idea. From a small start of 20 pens at Bakersfield and 10 at Cotati in Sonoma County the idea has grown until now the sportsmen of the northern part of the State have provided 350 of these pens. This rearing pen idea is a natural outgrowth and development of the interest that has been created by the distribution of pheasant eggs for farmers and sportsmen's organizations to hatch and rear from. The immediate result so

far as the Bureau of Game Farms is concerned is the fact that these pens provide an outlet for about 8000 more birds than would otherwise be possible.

While we have the incubating and brooding facilities at our game farms for a large number of birds we do not have sufficient holding pens to care for them.

If this program continues to grow as it has in the past year or so, more than 1000 pens will be available within two years. These pens are built entirely from money raised by sportsmen and private individuals and the pens are constructed according to blueprints furnished by this bureau. This makes possible a standard type of construction and the carrying out of a well defined and regulated program of handling.

These rearing pens will be especially valuable in the face of future open seasons. It will be possible for any organization to rear and stock their own locality with a limited number of birds before the season opens and then to carry an additional number of birds to be released at the close of the open season to furnish additional breeding stock for the next year. When this program is carried out no locality will ever be entirely without breeding stock.

In northern Mendocino, Humboldt and southern Monterey counties the Mexican bronze wild turkey has established itself and is making very satisfactory progress.

A considerable number of quail have been trapped from areas where they had become a nuisance and transported to other localities for stocking purposes. In many cases the local deputy had charge of the work. A permit was secured from the Mexican government to trap and transport 100,000 California valley quail into southern California for restocking purposes. Some 12,000 or 15,000 of these birds have already been received.

The following figures show the detailed records of the Bureau of Game Farms for the past two years:

Eggs Laid

Pheasants—			
Ring-necked	93,518	Partridges	8,325
Silver and Golden	1,382	Quail	51,323
Reeves	3,717	Turkey	889

Eggs Distributed

Pheasants—			
Ring-necked	33,390	Partridges	51
Silver and Golden	216	Quail	3,480
Reeves	446	Turkey	78

Birds Distributed

Pheasants—			
Ring-necked	37,691	Partridges	1,060
Silver and Golden	162	Quail	19,344
Reeves	807	Turkey	351

REPORT OF THE BUREAU OF GAME REFUGES

By J. S. HUNTER, Chief

We now have in California 9,216.96 acres of State-owned waterfowl refuges located advantageously in the great duck grounds of the Pacific coast. In the fall of the year when the first migrants arrive and find the valleys unusually dry, these thousands of acres of well watered areas must be a welcome sight to tired birds. In recent years they have been practically the only wet spots in what was formerly an extensive ideal duck marsh. Water surface is maintained the year round. Breeding ducks have increased not only on the property but also in adjacent favorable localities. Thousands of birds are practically resident during the fall and winter leaving the refuge daily in search of food; others stop for a few days, then go on their way farther south, stopping again on the way north to the great breeding grounds. On account of the fact that we have ideally located refuges, it is believed that the number of birds remaining in the State during the winter have increased; that the birds have not been subjected to the continual harassing of former years and that we have sent north every spring a considerably increasing number of nesting birds.

LOS BANOS REFUGE

The development of a satisfactory waterfowl refuge in a country where water conditions are all artificial for the greater part of the year is no small task. When the Division of Fish and Game took ownership to 3000 acres near Los Banos, we had to start at the beginning. There were a few small ponds that had been used by duck hunters, formed behind temporary levees. Fortunately, the land was more rolling than in other parts of the San Joaquin Valley. The surface sloped towards a meandering slough that crossed the property from south to north for about three miles. This surface is interrupted by lesser drainage ways that gave opportunity of creating many individual lakes with a total surface area of approximately one-third the entire property. In the creation of these lakes more than 100,000 yards of soil have been moved. Practically all impounding levees have been made full road width. All dams and levees have been constructed with the idea of permanency.

Water is delivered to us through irrigation ditches at four points. From these points it is carried step by step through our pond and lake system, at various levels, to the lower edge of the property. Continually flowing water is healthy water and does away with the possible creation of conditions that would promote duck disease and cause the loss of thousands of ducks.

GRAY LODGE REFUGE

Somewhat similar conditions prevail on the refuge in Butte County. The soil is richer and permits a heavier growth of vegetation including cat-tails which cause additional work in keeping open surface water.

The contour of the land is much more regular making it necessary to create artificial lakes, but we have the same system of constantly flowing water from level to level. As at Los Banos we have moved thousands of yards of dirt in levee and dam construction.

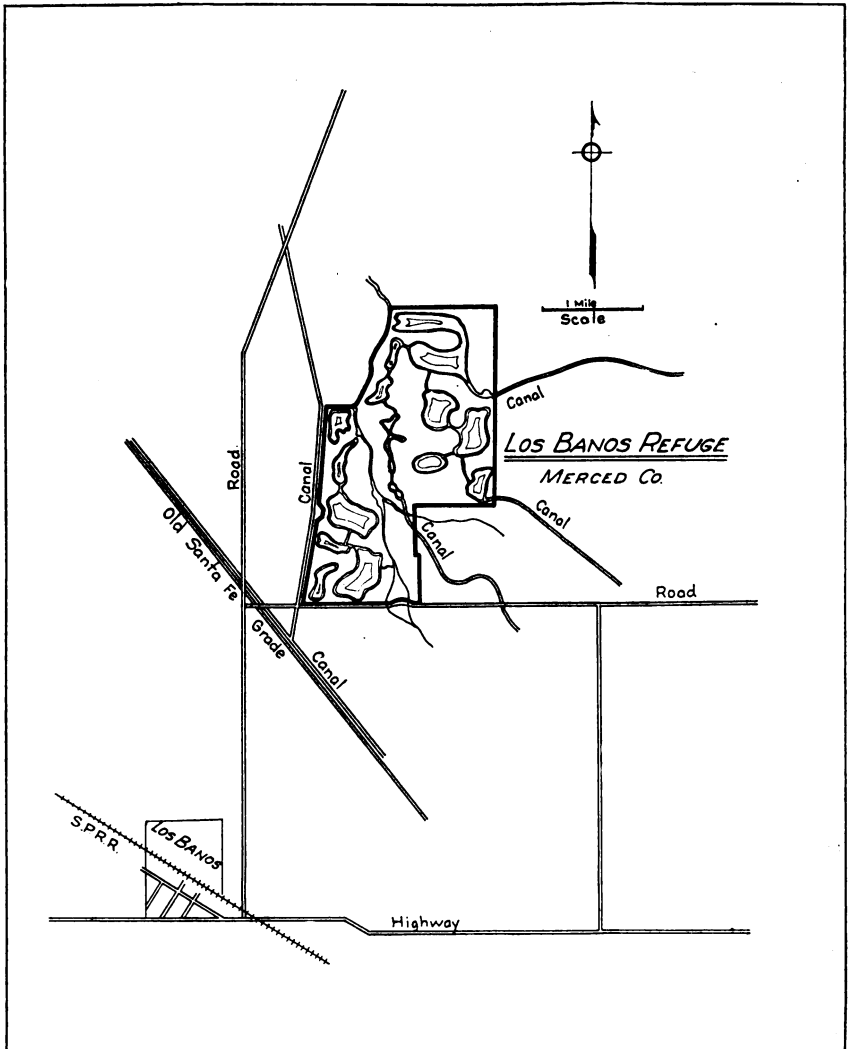


FIG. 13. Los Banos refuge, 3000 acres, located $3\frac{1}{4}$ miles northeast of Los Banos, Merced County. Purchased in 1929.

This refuge is particularly well located for pheasants. During the breeding season it is not unusual to see brood after brood of young. As many as 15 or more broods of not less than 12 birds each have been counted in a mile. During the fall of last year when the open pheasant season was on, excellent shooting prevailed in adjoining open lands.

JOICE ISLAND REFUGE

On the Joice Island refuge we have different conditions. There our property is on an island bounded by tidal sloughs. If it were not

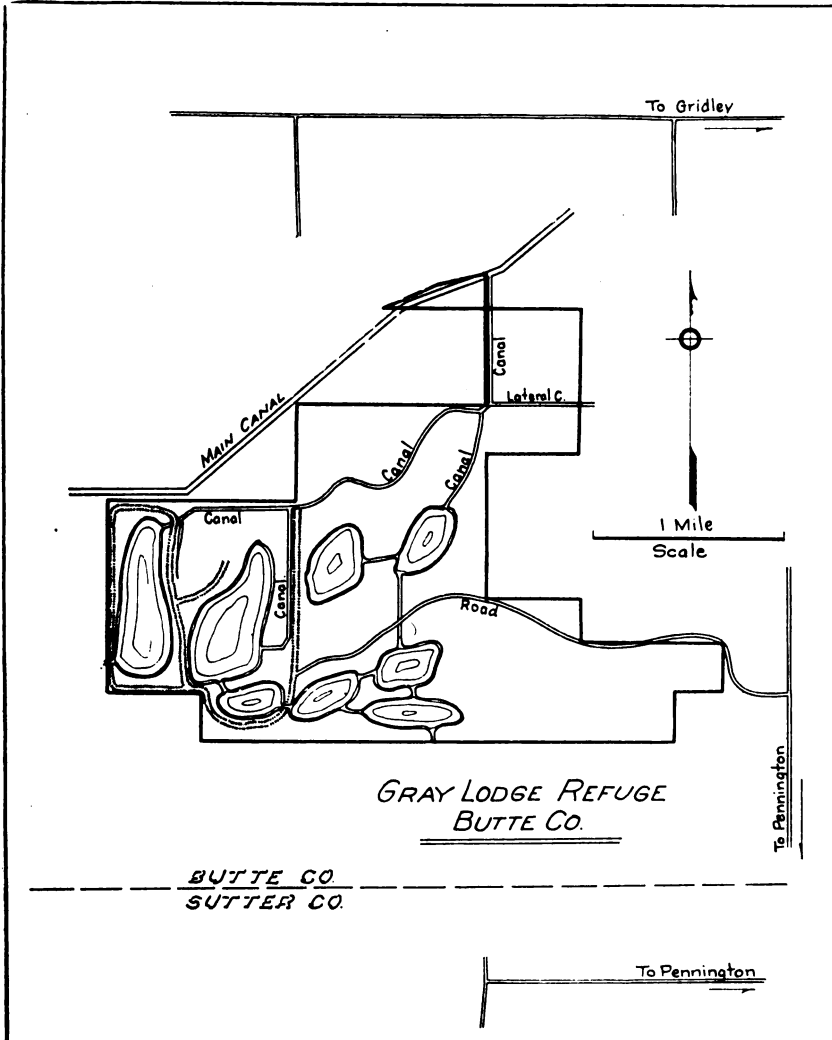


FIG. 14. Gray Lodge refuge, 2541.51 acres, located 5 miles southwest of Gridley, Butte County. Purchased in 1931.

for a high levee surrounding the entire property it would be flooded at every high tide. For water we are dependent on the flow in the boundary tidal creeks. During the greater part of the year, in fact during the entire year in years of normal rainfall, fresh water is available, but unfortunately during the past few years of short rainfall we

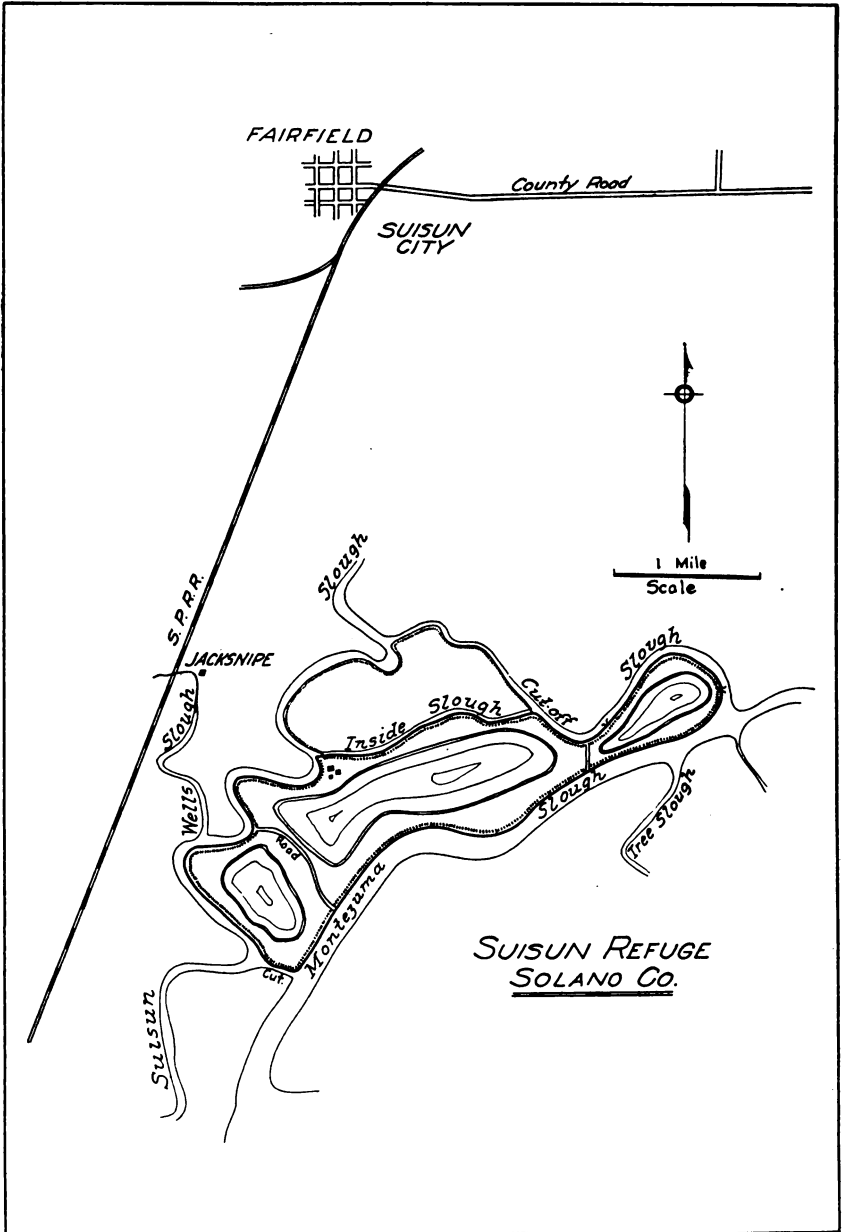


FIG. 15. Joice Island (Suisun) refuge, 1711 acres, located 4½ miles south of Suisun, Solano County. Purchased in 1931.

have been forced to use brackish water for flooding during the late summer. Water is taken in through headgates at the upper end of the island and carried through a system of ponds and ditches and finally discharged at the lower end.

One of the problems on this refuge has been the control of mosquitoes. In this work it is necessary to maintain a constant water level. So well has this been done that on a recent inspection of the 1711 acres by the superintendent of the mosquito abatement district, only a few mosquito larvae were found while at the same time on adjoining property there were untold millions.

On this refuge and in fact throughout the entire Suisun marsh, there has been a very encouraging increase in the number of breeding ducks since we have owned the property.

IMPERIAL REFUGE

The Imperial Refuge is located in the county of the same name and is of somewhat different character from any of the others. It is located near the town of Calipatria on the Alamo River. Past floods have eroded a wide river course so that the stream now flows in a meandering channel through a valley a mile or more wide and approximately 25 feet below the floor of the main valley. In this secondary valley the river has built its own confining levee, each successive rise carrying more sediment and increasing the height of the levee. Between these levees and the high banks are extensive flats that we can flood from waste water flowing through the various drainage ditches. By means of gates, we are able to control the water levels in various lakes.

One of the difficult problems on this refuge is the control of tules. In the warm climate of the valley, the growth of these plants is very rapid; you can fairly see them grow. It is not exaggeration to say that the average height of a tule patch on the refuge will be upwards of 20 feet. Tules if not controlled will soon fill up the open water areas leaving no water for ducks. Fortunately, by increasing the depth of the water, we are able to float out extensive islands of tule and plant growth. The height to which the water can be raised is limited by the height of the natural confining levee of the Alamo.

On this refuge during the winter of 1933, we were fortunate in securing through the Civil Works Administration a crew of laborers. In all they put in 2490 man hours and did good work in cutting tules, digging ditches and building levees.

NATURAL DUCK FOOD

The problem of increasing the growth of wild duck food plants in California is not the introduction of new species, but it is providing places for native species to grow. Much of our native marsh has been destroyed. Heavy grazing and concentration of waterfowl on what is left and on the artificial marsh maintained by duck clubs has all but exterminated many species of duck food plants. Most of the best of such plants are native to our State and although greatly reduced there is enough seed stock left to restore the former abundance so far as conditions will permit, providing grazing and other destructive influences can be controlled. We have found it difficult, if not impossible, to get a start of certain introduced plants. What is considered a good

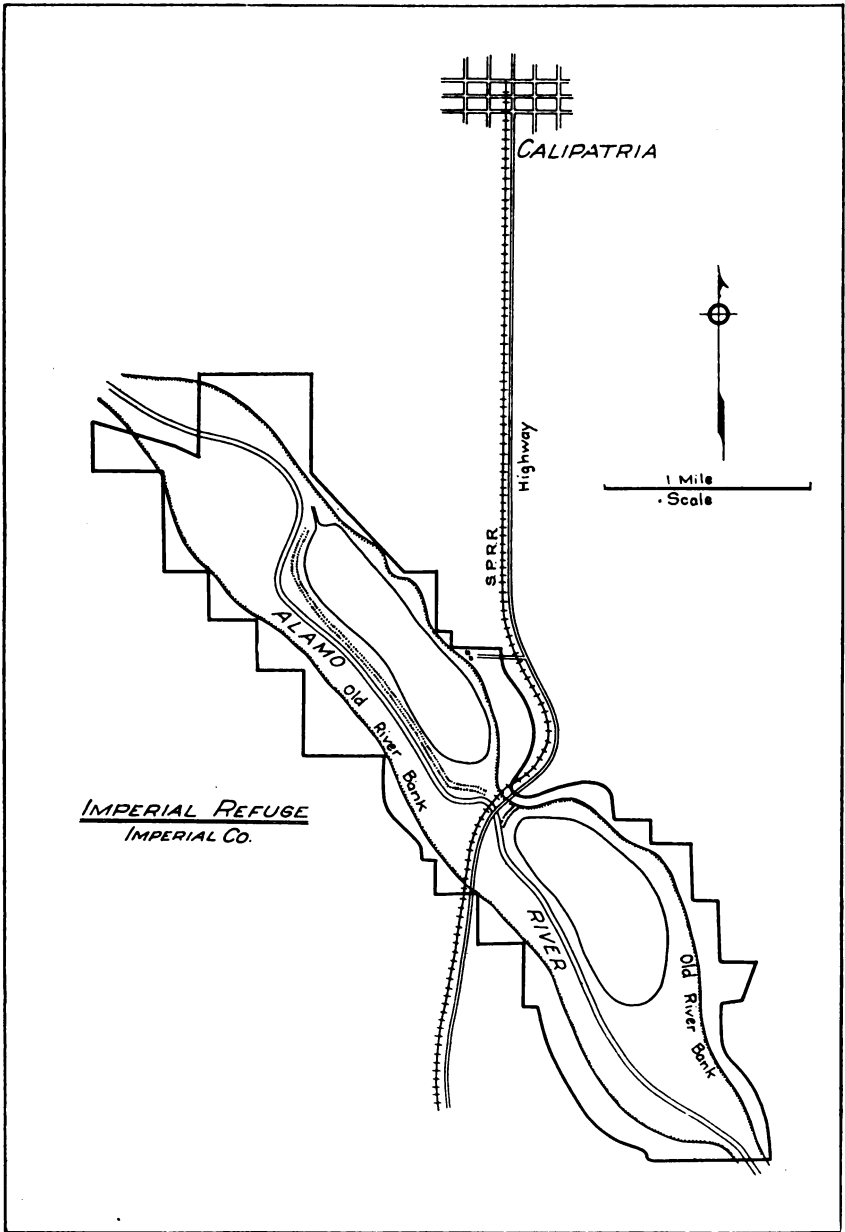


Fig. 16. Imperial refuge, 2064.43 acres, located 2 miles south of Calipatria, Imperial County. Purchased in 1931 and 1932.

start will be cleaned up in a single night by thousands of hungry ducks.

Of six species of plants that have been considered the best duck food, we have three species native to California; two of cosmopolitan distribution, the other abundant but restricted to salt water areas. Wild rice and wild celery have both been tried in our State; the former with slight success, the latter unsuccessfully. There is a small patch of wild rice in a particularly favorable locality in the Sonoma marsh. Rice requires pure, sweet water with a sluggish current. We are trying to get it established on our Gray Lodge Refuge. Mature plants have been transplanted. So far they seem to be growing well. Experimental seed plants have also been made, but it will be next spring before results will be known.

The pond weeds, good food plants, include sago pond weed, widgeon grass and eel grass are represented in the State by 24 species; duck weeds by 8 species; chufa, commonly called nut grass, by 13 species; *Sagittaria* or tule potato, by 5 species. In addition to these there are numerous other species considered from fair to good as duck food, that are well distributed throughout the State.

With a limited water and marsh surface it is impossible to provide enough natural feed to take care of the ducks that concentrate in California during the fall months. Heavy flights in the early fall clean up the natural feed and as food becomes scarce, they are forced farther south. New birds coming in from the north find conditions bad and keep on traveling. It is not exaggeration to say that at times we will have on the Los Banos Refuge not less than 500,000 ducks. This number of birds will consume in one day at least 100,000 pounds of food. There are 3000 acres on the refuge with approximately 1200 acres of water and marsh conditions. If it were possible to produce a ton of natural food to the acre, this number of birds could only be taken care of for 24 days. Heavy concentration begins in September, two months ahead of the open season. It is seldom we have rainfall before December sufficient to start any amount of green feed so that the birds must live upon what they find, starve or move on south. The greater part move on. Ducks will go where there is food. In the old days when there was abundant feed and loafing waters in the San Joaquin Valley, the vast majority of ducks shipped to the San Francisco markets came from that district. With the development of the rice industry in the Sacramento Valley conditions changed. About that time the drying up of the San Joaquin marsh began. The early plantings of rice did not ripen until late in the fall. Much of it was put in on spotty land that left open water favorable for ducks. By the time the birds arrived, there had been storms, lodging many acres of rice. Water had not been drained from the fields. There was water and feed in abundance. Naturally the birds remained.

Now this has again been changed. Early ripening rice is planted. Practically all fields have been drained by September. Domestic animals are turned into the cut fields and feed on the waste grain. There is little water and little feed for ducks. Naturally the great flocks must go where there is feed.

PREDATORY ANIMAL CONTROL

The predatory animal control program that was started during January, 1932, was carried through as planned until July, 1933, when it was necessary to reduce our force of trappers. At that time three well qualified trappers were transferred to the mule deer country in northeastern California. Through them we are endeavoring to get additional information that will lead to a better understanding of the mule deer situation in that region.

The nine trappers working on refuges and adjoining areas in various parts of the State caught 563 coyotes and 369 wildcats, as well as other animals including skunks, foxes, coons, etc., a total of 1680 animals. In coyote and wildcat work a total of 71,693 miles of trap line were run with a total of 90,922 trap sets or an average of 166.5 miles of trap line for each coyote and 229.7 miles for each wildcat. Eliminating all other animals except wildcats and coyotes, the cost per animal was \$14.05 and the total cost per animal including everything taken was \$7.79. The stomachs of all animals were carefully examined and a record kept of the contents. The contents were preserved so that should there at any time be any doubt as to identification made, the work can be checked. One of the interesting facts brought out was in the San Francisco refuge in San Mateo County, formerly the Spring Valley Water Company property. The introduced opossum is so firmly established that it totaled one-eighth of all animals taken.

MOUNTAIN LION CONTROL

We have been paying bounty on mountain lions since September, 1907. During the 27 years ending December 31, 1933, we have paid on 6990 lions, a total of \$162,070. In July, 1917, the bounty on female lions was increased from \$20 to \$30. Since that date we have an accurate record of the number of both sexes turned in. During the 16-year period there has been a gradual increase in the number of females killed. During the first 4 years of the 16-year period, the percentage of females was 46.8; during the last, 54.3 per cent, an increase of 7.5 per cent which indicates that we have reduced the annual kitten crop, thereby reducing the number of lions. This increase in kill has been brought about by additional interest in hunting and the welcome money received when work was scarce.

This activity of the Commission has probably been more favorably commented on than almost any other and the results obtained have paid many times over. It has been estimated by those who should know that a lion in the sheep country will kill on the average of \$1,000 worth of sheep annually. At this rate 6990 lions with their natural increase would destroy during a period of years millions of dollars worth of sheep.

The bounty is paid from hunting license funds. Since the hunting license act was put on the statutes, the total amount collected has been \$6,377,618. It is reasonable to say that more than that value in sheep has been saved, to say nothing of other domestic animals and deer that are preyed upon by lions.

That we are getting the best of the lion is shown by the additional facts that in Humboldt County during the early days of bounty pay-

ment, it only required 70 square miles of country to produce a lion; now it requires 121 square miles. Doubtless the lion population in the best lion country in California was comparable with the best lion country in the State of Oregon in the early days. We have been paying a bounty since 1907; Oregon did not commence regular payments until 1923. Comparing the lion kill in the two best lion counties in Oregon with the kill in the two best lion counties in California for a ten-year period from 1923 to 1933, we find that in the four counties there were killed 1333 lions; 961, or 72 per cent, were killed in Oregon and 372 or 28 per cent in California. On the average it required, over the ten-year period, in Oregon only 7 square miles to produce a lion while in California it required 18 square miles, or nearly three times as much.

There is really no lion competitor. While their numbers have been reduced, the animals on which they feed have increased and as the food supply is the normal factor in the abundance of any species, if we should stop lion control there would be a rapid increase in the number of lions until the saturation point had been reached with a resulting disastrous affect upon our deer. When the payment of bounty is once started it must be kept up until the species has been so reduced that it can not come back. The stopping of the bounty systems on account of excessive cost has been the reason for the failure of practically every bounty law that has been adopted from time to time in the various States of the union.

STATE GAME REFUGES

Legislative

Designation	Location, county	Area (acres)	Created	Species of game
Distr. 1A.....	Siskiyou.....	32,640	1917	Deer, quail, grouse
1B.....	Modoc.....	77,440	1917	Deer
1C.....	Modoc.....	35,840	1917	Deer, quail, grouse
1D.....	Trinity.....	66,000	1915	Deer, quail, grouse, bear
1E.....	Shasta.....	31,360	1917	Deer, quail, grouse, bear
1F.....	Lassen.....	47,360	1917	Deer, quail
1G.....	Tehama.....	111,760	1917	Deer, quail, grouse
1H.....	Plumas.....	39,680	1917	Deer, quail, grouse, bear
1I.....	Placer.....	89,600	1917	Deer, quail, grouse, bear
1J.....	Amador-Alpine.....	56,640	1917	Deer, quail, grouse, bear
1K.....	Fresno.....	34,560	1917	Deer, quail, grouse, bear
1M.....	Kern.....	73,200	1919	Deer, quail, grouse, bear
1N.....	Modoc-Siskiyou.....	33,920	1927	Deer, quail, grouse, bear
1O.....	El Dorado.....	74,880	1927	Deer, quail, grouse, bear
1P.....	Plumas.....	56,320	1927	Deer, quail, grouse, bear
1Q.....	Lassen.....	275,200	1927	Antelope, sagehen, deer
1R.....	Tuolumne.....	96,640	1929	Deer
1S.....	Lassen.....	15,360	1929	Deer
1T.....	Humboldt.....	1,920	1929	Deer
2A.....	Mendocino, Glenn, Lake.....	39,040	1917	Deer, quail, grouse
2B.....	Marin.....	28,000	1927	Deer, quail, waterfowl
3A.....	Santa Cruz.....	4,300	1915	Deer, quail
3B.....	San Benito.....	14,000	1909	Deer, quail
3C.....	Santa Barbara.....	42,600	1917	Deer, quail
3D.....	Ventura.....	118,400	1917	Deer, quail
3E.....	Santa Clara.....	3,840	1919	Deer, quail
3F.....	Contra Costa.....	10,240	1921	Deer, quail
3G.....	San Mateo, Santa Clara.....	8,500	1927	Quail
3H.....	Santa Barbara.....	17,280	1929	Deer, quail
4A.....	San Bernardino.....	272,680	1915	Deer, quail
4B.....	San Bernardino, Los Angeles.....	280,960	1915	Deer, quail
4C.....	Orange, Riverside.....	33,440	1913	Deer, quail
4D.....	Riverside.....	69,120	1917	Mountain sheep
4E.....	San Diego.....	39,680	1917	Mountain sheep
4F.....	Los Angeles, Kern.....	39,040	1919	Deer, quail, grouse
4G.....	Riverside.....	50,000	1927	Deer, quail
General Grant Refuge.....	Fresno.....	16,000	1929	Deer, quail, grouse, bear
Bolinas Quail Refuge.....	Marin.....	800	1929	Quail
San Leandro Bay.....	Alameda.....	-----	1931	Water birds
Huntington Lake.....	Fresno.....	37,120	1931	Deer, grouse
San Francisco Refuge.....	San Mateo.....	18,000	1931	Deer, quail, waterfowl
Silver Lake.....	El Dorado.....	21,760	1931	Deer, quail, bear

State Owned Game Refuges

Los Banos.....	Merced.....	3,000	1929	Waterfowl
Gray Lodge.....	Butte.....	2,541.51	1931	Waterfowl, pheasants
Imperial Valley.....	Imperial.....	2,064.43	1931	Waterfowl
Joise Island.....	Solano.....	1,711	1931	Waterfowl

REPORT OF THE BUREAU OF COMMERCIAL FISHERIES

By N. B. SCOFIELD, Chief

In our last report on the condition of the fisheries of California we pointed out that the commercial fish catch in the State follows very closely the prosperity curve. The peak year of 1919 was followed by two years of decline in production. Then a fairly steady advance took place until the record high peak of 1929 was reached. Following the banner year of 1929 the production of the fisheries declined rapidly during the financial and business depression until in 1931 it reached about the level of the years 1925 and 1926.

If the volume of the fish landings in California is a true index of the prosperity of the country, then prosperity must have reached its

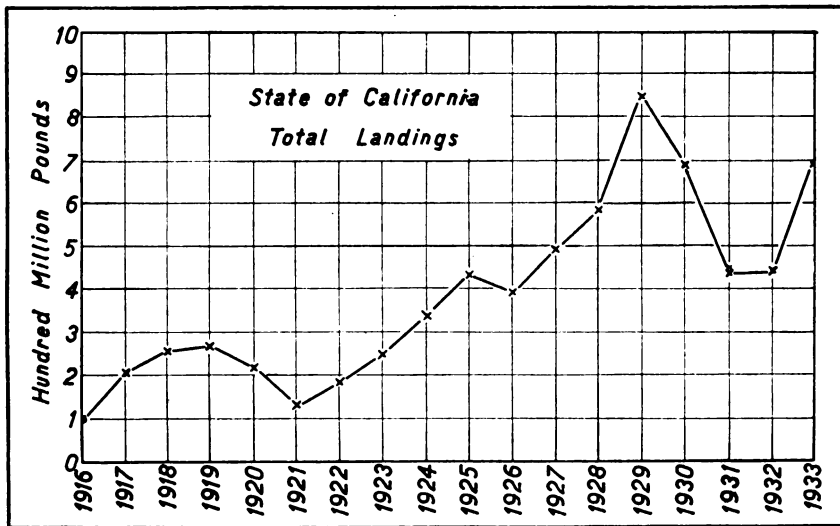


FIG. 18. Total landings for the State from 1916-1933, including all fish, mollusks and crustaceans.

lowest level in 1931, for since that year the production of California's fisheries has rapidly increased. These fluctuations in the production of the fisheries are shown graphically in Fig. 18.

The statistics of the commercial fish catch and the fish pack are compiled by calendar years, and in addition a full report of the sardine catch and production is compiled on a seasonal basis which is from August 1 to March 31 of the year following. These reports for 1932 and sardine season 1932-33 are covered by Statistical Circular No. 7 issued in April, 1933, and for 1933 and sardine season 1933-34, Statistical Circular No. 8 issued in April, 1934.

In the year of 1932, there were taken in State waters and off the coast of California 364,974,096 pounds of fish and 13,356,107 pounds

of shellfish. In addition to this, 61,894,041 pounds of fish were caught off the coast of Mexico in territorial and extraterritorial waters by California fishermen and 705,742 pounds of shellfish were taken by California and Mexican fishermen in the same waters and brought into California. The total amount of fish and shellfish landed in California, which were taken in or off California and from the west coast south to the international boundary, was 440,889,986 pounds.

In 1933, 617,124,210 pounds of fish were taken in State waters and off the coast of California, and 10,111,201 pounds of shellfish were taken in the same waters. In addition to this, 71,870,925 pounds of fish were caught south of the international boundary between California and Mexico in territorial and extraterritorial waters by California fishermen, and 672,331 pounds of shellfish were taken in the same waters by California and Mexican fishermen and brought into California. The total amount of fish and shellfish caught in the State or brought into the State by California fishermen was 699,778,667 pounds; and for the two years of 1932 and 1933, 1,140,668,653 pounds. This figure is comparable with the catch for the years of 1930 and 1931 which was 1,117,014,113 pounds, or an increase of a little over 2 per cent.

In the year 1932, there were 2,323,052 cases of canned fish packed, 27,500 tons of fish meal and 5,125,399 gallons of fish oil produced and other miscellaneous packs, valued at \$10,387,106. In addition to this, the fish and shellfish consumed in a fresh state had an estimated value of between three and four million dollars.

In 1933 a healthy increase over the previous year was shown in the canned and manufactured fishery products with a pack of 3,698,293 cases of canned fish, 46,369 tons of fish meal, 7,787,794 gallons of fish oil and other miscellaneous pack with an estimated value of \$16,406,964, to which should be added the value of the fish used in a fresh condition estimated at about \$4,000,000.

In 1932, there were 5664 persons employed in the fish packing industry and in 1933 there were 5534 persons employed.

During the license year 1932-33, 4955 licenses were issued to commercial fishermen; and for the license year 1933-34, 4991 licenses were issued.

Detailed statistics of the fishery products for the years 1932 and 1933 will be found in the Appendix.

ADMINISTRATION OF THE FISHERIES

The commercial fisheries of California are worth to the State at least \$25,000,000 a year. Considerably less than one per cent of this amount is being spent on administration, commercial fisheries law enforcement and necessary research to guard this great natural resource against exhaustion. The funds to carry on this work are derived entirely from the industry itself, the principal sources being the commercial fishing license of \$10 for each man fishing for profit and a privilege tax of 50 cents per ton on fish used for packing. The fresh fish industry proper does not pay this tax and therefore contributes little or nothing toward the support of this work. It is occasionally stated that this tax of 50 cents a ton is too high, but a comparison with any State which has commercial fisheries of importance will disclose the fact that the California fisheries tax is ridiculously small. A fur-

ther comparison of the use being made of the revenues collected in the various States will, we are sure, convince almost anyone that the California industry should not complain.

SARDINES

By referring to Fig. 19 it will be seen that the increased catch of sardines accounted for most of the gain in the take of fish in the State in the years 1932 and 1933. This revival, during what was considered

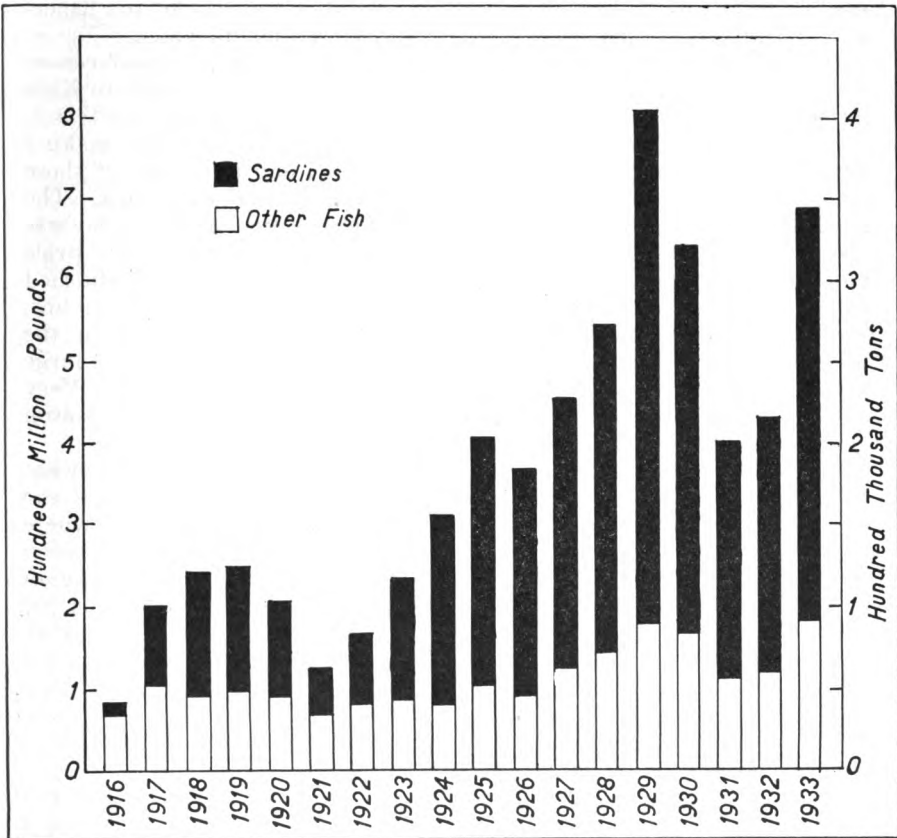


FIG. 19. Total landings of fish (exclusive of mollusks and crustaceans) in California. Importations from Japan and Hawaii have been omitted. Catches south of the international boundary have been included. "Other fish" consists of the combined species of fish except sardines. The top of the black bar represents the total of our so-called local catch.

the worst period of the depression, was due very largely to the action of the Fish and Game Commission in granting liberal reduction permits.*

At the opening of the 1932-1933 sardine season, California sardines were unable to compete successfully in foreign markets due to the

* As the sardine season starts on August 1st of one year and ends on March 31st of the year following, it is customary in discussing the sardine industry to follow the seasons rather than calendar years.

depreciated currency in other countries. As the principal outlet for California sardines had been in foreign countries, there was no hope that the domestic market would absorb more than a small part of an average season's pack. To add to the bad situation, there was a large carryover of canned sardines in the hands of packers and prices for canned sardines were below the cost of production. The market for the by-products (sardine oil and meal) was the lowest for many years, being only a quarter of what it was three years before. The previous season had been a bad one and the industry was facing disaster. It seemed certain that most of the plants would not open and the fishermen, already in distress, were facing a year of unemployment.

At this juncture the Fish and Game Commission held conferences with the canners and fishermen with the result it was decided to issue permits to the plants to use sardines for reduction. During the season permits amounting to 7500 tons were granted to each plant making application. A few of the plants did not open and a number of those which did open used only a portion of their reduction allotments. The market for sardine oil was very low and the price of sardine meal was about as bad. To operate at all it was necessary to reduce the price paid the fishermen for the fish. A price of \$4 per ton was established after considerable trouble, as the fishermen considered this price too low. The net result was a season of no profit for either the packer or the fisherman but it relieved the distress among the fishermen to a large extent and enabled most of the packers to pull through the crisis. Very little canning was done, goods on hand were cleaned up and the season ended with a brisk demand for canned sardines.

The 1933-1934 sardine season opened with the market somewhat improved. The price for canned sardines had not gone above the cost of packing but the prices for oil and meal had advanced to where there was a profit in these products. The Fish and Game Commission recognized that an emergency still existed in the industry and again issued reduction permits, but cut down the amount to 6000 tons for each plant. The permits were issued for the purpose of relieving actual want among sardine fishermen and to enable the canners to put up a larger pack and thus give more employment to cannery workers. The profits from the oil and meal enabled the packers to can and dispose of a larger pack than would otherwise have been the case, thus giving employment to several thousand cannery employees.

The fishermen started the season with \$6 a ton for their fish but soon struck for a higher price. After being out on strike a month a compromise was reached at \$7 per ton. The season was considered a fairly prosperous one for both the fishermen and the canners. The canners, most of them, took the full amount of their permits for reduction and as all plants operated, and in addition to this more sardines were canned than expected, the total catch of sardines for the season was surprisingly large.

As a matter of policy the Commission decided in 1929 that, if the sardine supply is to be guarded against depletion through overfishing, the total catch per season should not exceed 200,000 tons. For three seasons the total catch had not exceeded this figure, but during the past season (1933-1934) the catch of sardines reached the huge figure of 313,842 tons, to say nothing of some 77,000 tons taken by floating reduction plants operating in waters off shore beyond the control of

the State. The Commission expected, in the existing emergency, to sanction a temporary increase in the amount decided upon as safe to take a few years ago. Also it did not seem wise to withhold permits while the floating plants operated without restriction, and received their fish from California fishermen, just outside the three-mile limit; but it was not anticipated so large a catch would be made in the season of 1933-1934. The following table gives the sardine production during the past two seasons:

Sardine Season 1932-1933

Amount of catch, 381,348,000 lbs.	Increase over previous season	53%
Pack of pound oval cans, 732,263 cases	Decline from previous season	99%
Pack of other size cans, 85,116 cases	Decline from previous season	147%
Sardine meal, 30,727 tons	Increase over previous season	104%
Sardine oil, 6,497,821 gallons	Increase over previous season	84%

Sardine Season 1933-1934

Amount of catch, 627,684,000 lbs.	Increase over previous season	117%
Pack of pound oval cans, 1,497,044 cases	Increase over previous season	104%
Pack of other size cans, 452,356 cases	Increase over previous season	431%
Sardine meal, 46,707 tons	Increase over previous season	52%
Sardine oil, 9,262,503 gallons	Increase over previous season	42%

Floating Reduction Plants

In spite of the low price of sardine oil and meal, floating reduction plants have worked off the northern California coast during the past two seasons.

The *Lake Miraflores*, a 4500 ton motorship which began to operate in November, 1930, operated throughout the past two seasons, taking an estimated amount of 27,090 tons of sardines during the season 1932-1933 and 27,612 tons during the season 1933-1934.

The *Lansing*, a motorship of 8000 tons, financed by a group of purse seine boat owners, began to operate in October 1932 off the northern California coast and continued through the rest of that season and through the 1933-1934 season. She took an estimated amount of 31,182 tons of sardines during the 1932-1933 season and 46,832 tons during the 1933-1934 season.

During the past season two more of these plants were added to the list, the concrete barge *Peralta* and the motorship *Santa Inez*. These plants have been fitted out with the latest improved reduction machinery, but due to financial troubles and other difficulties they took very few fish. With the experience gained and with an improved market for the products (oil and meal) indicated for next season, it is expected that these vessels will be taking large quantities of sardines and that other plants will be added to the list. These floating plants, operating as they do without any control or regulation, constitute a dire menace to the supply of sardines and to the sardine canning industry.

Sardine Conservation

An intensive study of the sardine has been carried on for more than 12 years by the staff of the State Fisheries Laboratory and the main facts bearing on the conservation of this fish have been determined. As early as five years ago the strain of the heavy fishing on the sardine supply was apparent and it was recommended at that time

that, if it were possible for the Division of Fish and Game to get the authority, the seasonal catch of sardines in California should be limited to 200,000 tons. This amount was some 50,000 tons less than the average of the three previous seasons. The limit thus recommended was more or less an arbitrary one, to be lowered or raised as the condition of the sardine supply might warrant. Such authority has not been given to the Division by the Legislature, due principally to the opposition of the reduction interests. That there should be a limiting of the take of sardines to prevent exhausting the supply on which the canning industry depends, there can be no doubt. Serious depletion can not be proven until some time after it has occurred. It is therefore necessary to determine the evidences of depletion as early as possible and to heed their warning before the supply is too seriously exhausted.

The present evidences of depletion are:

Fishermen have found it necessary to go farther for their catches, to procure more efficient boats and fishing gear and to adopt cheaper power to cover the distances they now go for the fish which formerly could be caught close at hand. The investigations show that the length of time it takes to locate schools of sardines after the boat reaches the fishing ground has steadily increased during the past several years. The schools which are found are smaller than formerly. The period of scarcity at Monterey, extending from the time the local fall sardines are fished out to the time the southward spawning migration brings in a fresh supply, has been increasing in length each season. The only explanation for this is decreasing abundance.

The number of the very largest sardines have shown a general decrease, which is one of the evidences of overfishing.

For six or seven years there has been a decrease in the number of young sardines which are used for bait and canned as quarter-oils in southern California. This will produce a still greater decrease in the number of larger and older sardines.

Intensity of the Fishing

The great fisheries of the world are confined to coastal waters or waters less than 100 fathoms in depth, because it is in such waters that the basic food supply on which fishes depend is produced in abundance sufficient to maintain an abundant fish population. The area along the California coast within the 100-fathom line is very small as compared with those areas where great fisheries are located. For this reason we should guard our fisheries with greater care than those fisheries which are more favorably located.

If we compare the catch of California sardines per square mile of area within the 100-fathom line with the sardine fishery of Japan, the herring fishery of the North Sea or the menhaden fishery of our Atlantic coast, we find that the California area is being fished far more intensively. As many fisheries have been badly depleted by less intensive fishing than that in California, it should be evident that some method should be adopted to curb the rapid development of the sardine reduction industry now rapidly expanding through the operation of floating reduction plants.

There is plenty of evidence that the supply of sardines is decreasing and to add to this, the sardine spawning seasons have been com-

paratively unsuccessful for several years, which will still more accelerate the decline in abundance. To prevent virtual commercial extermination of the sardine it is necessary that reduction be curbed and that the floating reduction plants be controlled. The seasons for taking sardines should now be changed so as to relieve the strain on the younger fish of the fall fishery. The fishery can best be administered by giving the Division of Fish and Game full regulatory powers.

MACKEREL

One of the principal features of the fisheries of California during the past biennium was the spectacular revival of the mackerel fishery in 1933. About ten years ago California canners began putting out small packs of canned mackerel in an endeavor to create a demand for this fish, found in considerable abundance in our waters. The pack at first competed in the markets with the cheaper grades of salmon, especially chum salmon, and could be sold at a profit only when the price of canned salmon was high. Recently, however, canned mackerel has come to be recognized as a very fine food product and the demand for it is increasing.

In the year 1929 the California mackerel catch amounted to 60,000,000 pounds as a result of very favorable markets. Following that year the catch dropped with each year of the depression until the low point was reached in the year 1932 with a catch of 12,473,556 pounds. In 1933 the mackerel industry entered a period of expansion as a result of better prices and a strong demand for the canned product in the Philippine Islands and in the southern United States. When the records for 1933 were compiled it was found the mackerel catch had reached the unprecedented figure of 69,613,951 pounds. The magnitude of this new fishery is the more striking when compared with the mackerel fishery of the Atlantic coast. The mackerel catch of the entire eastern coast of the United States has not equalled 50,000,000 pounds in any year during the last twenty years.

Naturally, we have asked ourselves: How long can our mackerel supply stand this heavy fishing? In order that we might be possessed with sufficient information to determine when the fishermen are drawing too heavily on the supply and to propose methods of conserving that supply, members of the State Fisheries Laboratory were three years ago detailed to make a special study of the mackerel fishery and of the life history of this fish. A preliminary report has already resulted from this investigation, issued in 1933 by the Division of Fish and Game as Fish Bulletin No. 40, entitled "The California Mackerel Fishery," by Richard S. Croker. This bulletin, consisting of 150 pages, covers all phases of the industry, including a history of the fishery in this State; methods of fishing with descriptions of fishing boats and gear; the methods of handling, packing and marketing. It has a chapter on mackerel sport fishing and another on the mackerel fisheries of the world.

OYSTERS

We fully expected to be able to report, at this time, that the oyster industry in California has progressed beyond the experimental stage and is well on the road to becoming one of our most important fisheries. We must admit that we are yet in the experimental stage

and that we have a lot yet to learn, not only as to how to grow oysters, but what is even more important, how to market them. Japanese (Pacific) oysters have been grown with great success in Elkhorn Slough on Monterey Bay, in San Francisco Bay and Drake's Bay, but the marketing conditions of the past two years have been such as to discourage the companies from expanding. Just recently marketing conditions have improved somewhat and one new company has made a very large plant of Japanese oyster seed on the old Millbrae oyster beds in south San Francisco Bay. It is confidently believed that with even slightly improved markets the Japanese oyster can be profitably grown from imported seed in the three localities here mentioned. This oyster lends itself well to canning on account of its large size and rapid growth, and in this it has a decided advantage over either the eastern or native oyster in this State. No canning has yet been attempted, however.

Experiments with eastern oysters indicate that the growing of these oysters from imported seed, once a large industry in the state, may be built up again.

Attempts to cultivate the native oyster have centered in Humboldt Bay where several companies have invested close to \$50,000 on dikes and equipment. In 1933 these companies failed to get a commercial set of oysters, due it is believed to the abnormally cold water. This failure naturally had a very depressing effect. The companies have not been entirely discouraged, but are taking advantage of these past experiences and are at this writing prepared to place great numbers of the most modern spat collectors in more favorable localities near the natural oyster beds, as soon as the young oysters show signs of setting. This event is expected to take place early in July.

The U. S. Bureau of Fisheries, due to drastic reductions in its budget, was compelled to discontinue the cooperative arrangement with the Division of Fish and Game whereby H. C. McMillin, an experienced oyster expert, was detailed to work in California. Mr. McMillin, who had been located on Humboldt Bay, discontinued his work with the U. S. Bureau at the end of June, 1933. Since that time he has been employed in the same work by the supervisors of Humboldt County.

A good set of oysters in Humboldt Bay this summer will no doubt revive the hopes of those who have spent their time and money, to such an extent that the industry will get going on a commercial basis.

One of the greatest hindrances to the cultivation of oysters as well as other shellfish in California is the contamination of our bays and estuaries by city sewage.

SPINY LOBSTERS

The closed season is for the purpose of protecting the lobsters during the time they are shedding their shells and mating and while the females are carrying their eggs attached to the under side of their bodies. This closed season was changed at the last session of the Legislature, but it is now recognized by all that this was a mistake. The month and a half earlier opening of the season finds the female lobsters, many of them, still carrying their eggs. It is recommended that the closed season be again established from March 1 to October 15. It would be even better to extend the closed time to November 1 so as to

discourage the "fair weather fishermen" who do not follow fishing as a regular vocation, but work a short time in the fall while the weather is good and the lobsters easy to catch. They disturb the market and are almost entirely responsible for the bootlegging of short lobsters. The minimum size limit of $10\frac{1}{2}$ inches is about right to protect the lobsters until they have passed through several spawning seasons. The maximum limit of 16 inches is too high, and we recommend that it be reduced to 14 inches.

There has been a great deal of complaint by lobster dealers over the provisions which permit the importation of lobsters from Mexico to be sold during the closed season. Most of the dealers propose, and we recommend, that the law be changed so as to permit no lobsters to come into the State during the closed season and that during the open season lobsters from Mexico may be held and marketed during the closed season, provided they be inspected by the Fish and Game Commission and marked by identification symbols so as to guard against illegal fishing during the closed season.

REPORT OF THE CALIFORNIA STATE FISHERIES LABORATORY

The program of the Laboratory is concerned with the most important species of marine commercial fishes in order that changes in abundance may be discovered and the proper degree of utilization determined. Life histories of species and the characteristics of each important fishery are studied in order that effectiveness of present legislation may be gauged and suitable protective measures recommended. Fisheries statistics are gathered as a basis for the administration of the fisheries and for studies of depletion and life history.

Effort is concentrated upon four major fisheries: sardines, tuna, mackerel and the trawl fishery for flatfishes, but in addition, several miscellaneous studies are carried along as incidental to the major projects.

SARDINES

The work of past years has been coordinated so that we now have a good working knowledge of the facts necessary for the proper administration of this fishery. Spawning habits as to time, place and density are now well known. Seasonal movements of sardines along our coast have been demonstrated. The essentials of growth rate and age are now understood so that we have ventured to predict the sizes of fish and relative abundance of sardines to be expected in succeeding fall and winter fisheries. Depletion studies indicate that the supply is now subjected to a heavy strain and that increased utilization probably would result in serious depletion of the stock.

TUNA

The difficult study of the tunas is complicated by the fact that we are dealing with five species of wide range and fishing localities off the coasts of foreign countries. Certain obtainable information is needed however and we are therefore attempting to learn through racial studies whether or not we are drawing from one uniform population. Observations are being made as to age, growth, spawning time and locality, and size at first sexual maturity. Much information is obtained

by having instituted special shiplogs kept for us by the cooperation of interested boat captains. A survey of the causes for spoilage and loss of fish is being made. Aid to the industry has been rendered by the several scouting trips made for the purpose of locating schools of fish and favorable fishing banks. Within the last few months, tagging experiments were begun in the hope of learning the seasonal movements of the several species included in this fishery.

MACKEREL

The study of our mackerel fishery, although recently undertaken, is making satisfactory progress toward an understanding of the characteristics of this fishery, age and rate of growth, spawning time and locality and the proportion of size classes making up the catch by the several fishing methods. Little has been learned, as yet, as to the movements of mackerel and depletion studies in this new fishery can not possibly yield results until the growing stock has been submitted to the strain of fishing over a period of years. We are in the favorable position of having launched our study of mackerel practically at the beginning of the period of quantity production in this fishery.

TRAWL FISHERY

There was recently undertaken a survey of the trawl fishery for flatfishes out of San Francisco, Eureka and Santa Barbara. The study includes such questions as the percentage of loss due to use of drag nets, effects on crab, rock cod and sablefish, proportion and size of each of the many species in the catches for different fishing areas and observations as to growth rate, spawning and size at maturity. The benefits to both the stock of fish and to the fishermen by the use of larger meshed fishing gear is now being demonstrated.

SECONDARY STUDIES

We are collecting needed information on a number of questions such as spawning seasons, size at maturity and cleaning loss in various market species, statistical estimates of amounts caught by the various types of marine sport fishing enterprises, shiplogs in those fisheries where logs are kept, striped bass tagging, and destructiveness of certain types of gear. Improvements have been made in our fish catch statistical system and the reporting by means of punched cards tabulated mechanically has been perfected. The registration of boats and fishing gear has been greatly improved during the past two years. The library has not been enlarged because of shortage of funds, but this gave an opportunity for a more thorough cataloging of the material on hand by subject and author.

PUBLICATIONS

Detailed results of work accomplished are printed in a series of fish bulletins. Less formal results appear as articles in the quarterly magazine CALIFORNIA FISH AND GAME, and occasional issues of one of the fisheries trade journals carrying an account of our work written by one of our staff members. Summaries of findings are sometimes mimeographed and mailed to interested men of the fish trades. In

addition, reports in typewritten form are submitted in order that results may be quickly available to administrative officers of the Division.

During the biennium, three fish bulletins were issued and seven others are now awaiting printing. The bulletins issued were:

- No. 37. The California barracuda (*Sphyraena argentea*). By Lionel A. Walford.
 No. 39. Fluctuations in the abundance of striped bass (*Morone saxatilis*) in California. By G. H. Clark.
 No. 40. The California mackerel fishery. By Richard S. Croker.

The seven bulletins awaiting printing are:

1. Early life history of the California sardine (*Sardina caerulea*), with special reference to the distribution of the eggs and larvae. By Eugene C. Scofield.
2. Maturity of the California sardine (*Sardina caerulea*) determined by ova diameter measurements. By Frances N. Clark.
3. The sizes of California sardines caught by the different fishing gear, and in the different localities of the Monterey and San Pedro regions. By G. H. Clark and J. B. Phillips.
4. The sharks and rays of California. By Lionel A. Walford.
5. The development of the ova of the California sardine (*Sardina caerulea*). By C. B. Andrews.
6. A bibliography of the mackerels. By Genevieve C. Wheeler.
7. The commercial fish catch of California for the years 1930-1933.

REPORT OF THE FRESH FISH MARKETING

The Fish Exchange, up to and including August 21, 1933, was a self-supporting agency which received its funds from license fees paid annually by every person, individual, partnership, association or corporation other than a market fisherman engaged in the buying or selling of fresh fish for human consumption.

For the license period of July 1, 1932, to June 30, 1933, inclusive, the following fresh fish dealers paid the amount set up in their classification:

4,675 Sideline dealers-----	\$21,781 71
311 Peddlers -----	1,405 96
230 Exclusive dealers-----	2,185 03
71 Wholesale dealers-----	4,925 00
28 Wholesale branch dealers-----	140 00
13 Brokers -----	650 00
5,328	\$31,087 70

The personnel of the Fish Exchange was superintendent, one supervisor, fish marketing specialist, two inspectors, one part-time inspector, one typist-clerk and one stenographer-clerk.

In addition to the license collection activities, the exchange maintained sanitary inspection service of markets and peddler vehicles; also did publicity work to bring about increased consumption of fresh fish through:

- (1) Newspaper cooperation.
- (2) Exhibit and display.
- (3) Radio.
- (4) Public relations.

(5) Dealers help material:

- (a) Cook books.
- (b) Pamphlets.
- (c) Window stickers.
- (d) Landing reports.

TRANSFER OF STATE FISH EXCHANGE

On August 21, 1933, the Exchange activities were transferred from the Department of Agriculture to the Bureau of Commercial Fisheries, Division of Fish and Game, as provided by section 33, Chapter 825, of the General Laws of the State of California. This act repealed sections 1120 to 1140, inclusive, of the Fish and Game Code, relating to Fish Exchange and provides for the disposing of equipment and \$45,131.65 held in the Fish Exchange reserve fund.

PERSONNEL

The personnel, under the present setup, is Supervisor of Fresh Fish Marketing, a typist-clerk and a part-time publicist.

DUTIES OF THE SUPERVISOR, ETC.

The duties of the Supervisor of Fresh Fish Marketing are to plan and direct the work of the staff of the Fish Exchange, supervise and direct the keeping of records connected with statistical and promotional work and prepare reports as requested by the Chief of the Bureau of Commercial Fisheries, personally contacting and meeting with leaders in the fishing industry with relation to marketing problems of the industry, contact and gain cooperation in the interest of the fishing industry of those who represent news publicity and promotional outlets; and to do such other work as required by the Chief of the Bureau of Commercial Fisheries.

DUTIES OF PUBLICIST

The duties of the publicist are disseminating information and managing publicity designed to extend the market of fresh fish, contact and gain cooperation in the interest of the fishing industry of those who represent news publicity and do such other work as required.

FISH EXCHANGE ACTIVITIES

The newspapers maintaining home economic departments and household editorial pages cooperating with the Fish Exchange in publishing fish recipes and holding fresh fish cooking demonstrations are *San Francisco Chronicle*, *Oakland Tribune*, *Hollywood Citizen News*, *Sacramento Union*, and *San Francisco Daily News*.

A news item regarding fresh fish consumption was mailed to all California papers and several thousand requests for our recipe book were received as a result of this news release.

EXHIBIT AND DISPLAYS

The Fish Exchange participated with its animated exhibit at the following fairs and food shows:

State Fair, Sacramento, September 2-9, 1933.
 Los Angeles County Fair, Pomona, September 15-24, 1933.
 Los Angeles County Food Show, Los Angeles, November 11-18, 1933.
 Cloverdale Citrus Fair, Cloverdale, February 22-25, 1934.
 Alameda County Food Show, Oakland, April 7-14, 1934.
 Emporium, San Francisco, March 5-17, 1934.
 Sportsmen's Carnival, Oakland, April 26, 1934.
 Attendance—1,045,626.

The following newspapers maintaining home economic departments broadcasted over their radio stations, at the request of the Fish Exchange, the food value of sea foods and also suggested to their radio listeners to send for our sea foods recipe book:

Los Angeles *Examiner*, Prudence Penny.
 Los Angeles *Times*, Marion Manners.
 Hollywood *Citizen News*, Annabelle Lee.
 Los Angeles *Herald Express*, Kate Vaughn.
 Los Angeles Light and Power Co., Ann Martin.
 Oakland *Tribune*, Martha Lee.
 San Francisco *Chronicle*, Jane Friendly.
 San Francisco *Daily News*, Martha Lane.
 Sacramento *Bee*, Katherine Kitchen.
 San Francisco *Call-Bulletin*, Ann Welcome.

During the past eight months we have distributed 40,000 "Reasons Why You Should Make Tuesday Fish Day Too" pamphlets while making contacts with fresh fish dealers. A liberal supply of these pamphlets were given to each dealer for distribution to his customers. On the back of these pamphlets is a coupon and when properly completed by the housewife and sent to this office, we mail her our cookery book. Return of these coupons have been in gratifying numbers. In all cases where coupons received gave the name of the fresh fish dealer, we have mailed a post card to such dealer, informing him that our recipe book has been mailed to his customer. This contact work and distribution of dealers' help material has proven very effective in stimulating sales and good will.

Dealer help material distributed:

Northern District

Recipe books			
State Fair, Sacramento	1,500	Sportsmen's Carnival, Oakland	100
San Francisco <i>Chronicle</i>	450	Miscellaneous	6,567
Oakland school department	800	U. S. home demonstration agent	100
Fresh fish dealers—1933	465		
Emporium food show	1,754		14,735
Sacramento school department	75	Pamphlets	
Oakland school department	200	State Fair, Sacramento	3,200
Jane Friendly, Oakland	264	Dealers in 1933	23,100
Jane Friendly, San Francisco	300	Emporium Show, San Francisco	375
Martha Lane, San Francisco <i>News</i>	25	Dealers	10,000
Berkeley dealers	43	Oakland Food Show	4,750
Newspapers	100	Miscellaneous	19,666
Oakland Food Show	1,050		
San Jose dealers	42		61,091
		Post cards to dealers	1,018

FISH AND GAME COMMISSION

Southern District

Recipe books		Pamphlets	
Prudence Penny, Los Angeles-----	25	L. A. County Fair, Pomona-----	7,000
L. A. Food Show, Los Angeles-----	2,250	L. A. Food Show, Los Angeles--	11,500
L. A. County Fair, Pomona-----	3,000	Dealers -----	6,770
Newspapers -----	50	Miscellaneous-----	12,790
Miscellaneous-----	3,160		
San Diego School Department-----	50		38,060
	8,535	Post cards to dealers-----	424

REPORT OF THE BUREAU OF EDUCATION AND RESEARCH

By J. O. SNYDER, Chief

The activities of this bureau were considerably restricted during the past biennium for lack of funds. It was found necessary to discontinue all motion picture production, educational work in connection with the public schools, and to greatly curtail the program of general lectures offered to groups or clubs. Moreover, the personnel has been subject to change and reduction in number.

Publication has been limited, but the quarterly, *CALIFORNIA FISH AND GAME*, has regularly appeared and several bulletins, some of which have originated in other bureaus, have come from the press.

The *Service Bulletin*, which reflects the varied activities of the Division, is issued each month under the editorship of Opie L. Warner. It is replete with timely items of interest to members of the service and to the sportsmen and commercial fishermen of the State. The editor is also responsible for releases of important news items and general information relating to fish and game.

The educational activities of the bureau in so far as concerns its immediate contacts with the public have ceased. The program of special lectures, the production of motion pictures, educational activities in the schools, the installation of exhibits, and the like have mostly been discontinued. The entire collection of motion picture films has been placed with the Department of Visual Instruction of the State University where they are available as before. Exhibits at the California State Fair pertaining to the fish and game resources of the State were made as usual.

Among particular researches made during the biennium may be mentioned the annual brant census and the mule deer study by James Moffitt, the life history studies of California quail by E. Lowell Sumner, Jr., and investigations relating to thallium as a control poison by Paul A. Shaw.

Much routine work pertaining to game refuges, transfer of elk, duck disease, pollution of streams, field observations relating to game birds and various mammals, particularly predators, etc., has been accomplished.

Decreased water flows and a multiplicity of diversions in the face of a cycle of dry years has added much to the necessary duties of the toxicologist. A definite program is now being followed in the location of polluted waters and their improvement where their condition is injurious to fish and other aquatic life. Attention is also being given in a systematic manner to the water supply of the State hatcheries as a direct aid in determining the losses which often occur among the young fish. This work is carried on in cooperation with the biologist engaged in an investigation of fish diseases. Many cases of pollution have been carefully studied and dealt with in the most feasible way.

The main purpose of the library, which falls under the supervision of the bureau, is to meet the demands of members of the Division, both technical and general. In a measure, it serves a part of the

public in answering questions relating to wild life and its conservation. It consists of some 1425 bound volumes and 6000 separate pamphlets. Most of these are catalogued and easily available. Of late, its growth has been slow and great care has been taken in the selection of additions. The better class of periodicals, over 150 in number, have been kept complete. The space allotted to it is convenient although somewhat crowded. The library has reached a size where consideration of expansion, cataloguing and the like deserves serious attention.

Notwithstanding the distinctive title of this bureau, much work of the nature of research has been carried on under other direction and it is the opinion of the writer that no real centralization of research in the Division is possible, or even desirable. Of late, there has been a tendency to stress the desire that research which is pursued in the Division shall give promise of results directly connected with conservation or production, and it appears likely that such work will be better accomplished under the immediate supervision of the bureau which is directly concerned.

REPORT OF THE BUREAU OF FISH RESCUE

By GEORGE NEALE, Chief

This biennium marks the sixth year since the creation of the Bureau of Fish Rescue. In addition to the report for the biennial period, it may be of interest to tell what has been accomplished toward the conservation of one of our most important natural resources.

There are twelve species of valuable food and game fishes, not native to the State, but which have been introduced into our waters and which can not be artificially propagated in our hatcheries as are trout and salmon. These are the species principally rescued, in addition to trout and salmon, which represent a very small per cent of the number of fish reclaimed.

These twelve species are known as the spiny-rayed or spinous tribe of fresh water species. They are the large and small mouth black bass, striped bass, crappie, calico bass, catfish of two kinds, and different kinds of sun-fish and perch. Catfish are not classed as game fish, nevertheless they are one of the most valuable food fishes, and of commercial importance.

The climatic conditions, together with great abundance of feed upon which these species of fish exist, the immense acreage of natural wild spawning areas and the low cost of fish reclamation, make it unnecessary to attempt semiartificial propagation ponds as practiced in the Eastern and Middle Western States, which is most difficult and prohibitive in cost and maintenance.

In California, the wild outdoor hatcheries are caused by the overflow of streams and lakes into the low lands where the fish go to spawn. In normal years of rainfall, these areas cover as much as seventy or eighty thousand acres; in flood conditions, as much as 150,000 acres. They are located in those counties adjacent to the San Joaquin, Sacramento, American, Cosumnes and Mokelumne rivers, contained in thousands of ponds miles apart. It is from these ponds our rescue work



FIG. 20. Some of the large-mouthed black bass that were transplanted in Merced Lake in San Francisco.

is done and these valuable fish are distributed throughout the State. In such waters, there is no problem of food or disease. The fish obtain both food and shelter for themselves and their young at no cost.

DISTRIBUTION OF SMALL MOUTH BLACK BASS

The demand that the small mouth bass be planted in our State waters still continues. They need clear, cold water with gravel bottom, deep water with rocks and boulders, very different from the requirements of the large mouth. Nearly all of the State waters of such character are populated with trout and these two species never have mingled and thrived together in the same streams and lakes. It is my belief that the small mouth bass in the lagoon at the south end of Lake Tahoe are a great detriment to the young trout entering the lake from the streams near there.



FIG. 21. Seining 36,000 fingerling black bass.

I would recommend the plantings of the small mouth bass be made from the Salt Spring reservoir, Calaveras County, which has an elevation of 1092 feet, watershed is 30 square miles, length of the dam is 2600 feet, depth of 32 feet, and capacity of the dam is 16,000 acre-feet of water. The temperature of the water on May 30, 1930, at five feet in depth was 68 degrees; at 12 feet, 65 degrees; 18 feet, 62 degrees.

ROUGH FISH ERADICATION

During the biennial period, the bureau eliminated large numbers of worthless fish which mainly furnish a food supply to the predatory game fishes and are of little market value. Carp eat the bulbs and roots of fresh water aquatic growth so necessary in fresh water in which the young bass and other sunfish find food and shelter. The young of these fish furnish a valuable food supply for predatory game fish that would consume their own kind otherwise. The worthless fish

which were taken were given to the farmers upon whose lands we worked and to the poor who desired them.

In our netting of stranded fish, we frequently catch many top minnows or mosquito fish, *Gambusia affinis*. These little viviparous fellows serve a double purpose. They eat the larvae of the mosquito and they in turn serve as food for black and calico bass and some of the sunfishes. We distribute many of them to applicants who have small or large ornamental home ponds.

MEANS OF FUTURE PRODUCTION

During the period the bureau has been operating, a system of natural propagation has been devised. When the wild fish have spawned and the young fish have hatched and reached the swimming stage, instead of confining the parent wild fish, they are returned to the river or lake from which they came during the flood period thus preventing them from eating their young. The young fish are allowed to remain until necessary to remove them to stock other waters and make replacements.

Fish Rescued Fiscal Year 1932-1933

Black bass, large mouth	1,881,268
Catfish	698,528
Green sunfish	697,871
Bluegill sunfish	643,558
Calico bass, crappie	51,413
Striped bass	36,977
Black bass, small mouth	6,992
Mottled perch	2,589
Salmon, adult	1,091
Trout, steelhead	37
Sacramento perch	34
Yellow perch	1
	4,020,359

Fish Rescued Fiscal Year 1933-1934

Black bass, large mouth	1,989,363
Bluegill sunfish	911,593
Catfish	811,641
Green sunfish, perch	559,804
Calico bass, crappie	323,679
Striped bass	8,757
	4,604,837
Total for biennium	8,625,196

The game wardens were instrumental in rescuing a large number of these fish.

From the above table, you will note that many sunfish were rescued. These fish are rapidly gaining favor with the light fly rod fisherman. When taken with a fly or small spinner there is no better sport fish for their size, and they are excellent for the table.

The U. S. Bureau of Fisheries sent a carload of four species of sunfishes, calico bass and crappies for distribution in our valley waters, the latter part of the nineteenth century. By continued rescue and

reclamation work, years of flood waters which aided in their distribution, they may be now found in every body of fresh water in the valley and foothills. They are now as widely known to our people as trout and salmon.

As a reclamation of these fish is the only means of their continuance, it should be maintained and increased. Perhaps the writer will not take part in the continuation of this great conservation activity in which he has been engaged for more than 32 years, but he will always feel proud of having been active in the building of this splendid organization.

APPENDIX

STATISTICAL REPORTS

STATEMENT OF INCOME

For the Period July 1, 1932, to June 30, 1933, of the Eighty-fourth Fiscal Year

Departmental income	Detail	Total
License sales:		
Angling licenses, 1931.....	\$927 00	
Angling licenses, 1932.....	323,930 00	
Angling licenses, 1933.....	58,398 00	
Commercial Hunting Club licenses, 1932-33.....	2,075 00	
Commercial Hunting Club Operators licenses, 1932-33.....	565 00	
Deer tags, 1932.....	95,557 75	
Fish Breeders licenses, 1932.....	40 00	
Fish Breeders licenses, 1933.....	370 00	
Fish Importers licenses, 1932.....	10 00	
Fish Importers licenses, 1933.....	70 00	
Game Breeders licenses, 1932.....	95 00	
Game Breeders licenses, 1933.....	957 50	
Hunting licenses, 1931.....	208 20	
Hunting licenses, 1932-33.....	439,694 47	
Hunting licenses, 1933-34.....	36 00	
Kelp licenses, 1932.....	30 00	
Kelp licenses, 1933.....	30 00	
Market Fishermen's licenses, 1932-33.....	23,600 00	
Market Fishermen's licenses, 1933-34.....	24,870 00	
Trapping licenses, 1932-33.....	1,660 00	
Wholesale Fish Packers and Shell Fish Dealers licenses, 1932-33.....	945 00	
Total license sales.....		\$974,068 92
Other income:		
Contributions from importers.....	\$190 00	
Court fines.....	30,784 13	
Fish Packers tax.....	120,156 07	
Fish tag sales.....	1,791 24	
Game tag sales.....	142 17	
Interest on bank balances.....	6,258 41	
Kelp tax.....	3 02	
License of kelp beds.....	1,309 20	
Miscellaneous sales.....	29 28	
Publication sales.....	622 50	
Total other income.....		161,286 02
Total departmental income—current year.....		\$1,135,354 94

STATEMENT OF INCOME

For the Period July 1, 1933, to June 30, 1934, of the Eighty-fifth Fiscal Year

Departmental Income, Current Year—

License sales:

Angling licenses, 1932	\$5,475 00
Angling licenses, 1933	300,170 00
Angling licenses, 1934	83,719 00
Commercial hunting club licenses, 1933-34	1,750 00
Commercial hunting club operators' licenses, 1933-34	395 00
Deer tags, 1932	1,143 25
Deer tags, 1933	95,776 00
Deer tags, 1934	4 00
Fish breeders' licenses, 1933	20 00
Fish breeders' licenses, 1934	365 00
Fish importers' licenses, 1933	5 00
Fish importers' licenses, 1934	60 00
Game breeders' licenses, 1933	130 00
Game breeders' licenses, 1934	970 00
Hunting licenses, 1931	261 30
Hunting licenses, 1932-33	8,387 18
Hunting licenses, 1933-34	330,779 00
Hunting licenses, 1934-35	79 00
Kelp licenses, 1934	50 00
Market fishermen's licenses, 1933-34	25,040 00
Market fishermen's licenses, 1934-35	24,440 00
Trapping licenses, 1933-34	1,413 00
Wholesale fish packers' and shell fish dealers' licenses, 1933-34	990 00

Total license sales	\$881,421 73
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Other income:

Contributions from importers	\$324 15
Court fines	27,107 56
Fish packers' tax	192,637 06
Fish tag sales	1,576 10
Game tag sales	106 32
Interest on bank balances	5,332 57
Income from Department of Agriculture Fund—Chap. 825-33	45,131 65
Kelp tax	116 76
Lease of kelp beds	1,309 20
Miscellaneous sales	1,248 07
Publication sales	553 30
Dividends California National Bank (50%)	18,545 08
Dividends Trinity County Bank at Weaverville	178 50

Total other income	294,166 32
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Total departmental income, current year	\$1,175,588 05
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STATEMENT OF EXPENDITURES

For the Period July 1, 1932, to June 30, 1933, of the Eighty-fourth Fiscal Year

Function	Salaries and wages	Materials and supplies	Service and expense	Property and equipment	Total
Bureau administration:					
Executive.....	\$9,500 01				\$9,500 01
Clerical and office.....	21,682 41	\$1,044 45	\$402 46	\$259 50	23,388 82
Printing.....		8,422 64			8,422 64
Automobiles.....		681 62		1,029 00	2,287 42
Traveling.....			576 80		4,272 34
Postage.....			4,272 34		5,593 34
Telephone and telegraph.....			5,593 34		3,824 29
Freight, cartage and express.....			3,824 29		2,431 37
Rent.....			2,431 37		13,354 72
Accident and death claims.....			13,354 72		4,719 74
Accounting pro rata.....	4,500 00		4,719 74		4,500 00
Legal.....	3,600 00		213 30	265 55	4,078 85
Premiums on bonds.....			1,351 32		1,351 32
Publicity.....			249 45		249 45
Total bureau administration.....	\$39,282 42	\$10,148 71	\$36,989 13	\$1,554 05	\$87,974 31
Bureau education and research:					
Chief and assistant.....	\$3,900 00				\$3,900 00
Clerical and office.....	1,920 00	\$55 59	\$132 18		2,107 77
Automobiles.....		6 72		\$591 28	598 00
Traveling.....			3,671 29		3,671 29
Telephone and telegraph.....			2 64		2 64
Photographer.....			159 33	382 63	541 96
Librarian.....	2,040 00	24 88	113 79	125 89	2,304 56
Research.....	6,600 00	35 83		11 80	6,647 63
Publicity.....	3,600 00		43 36		3,643 36
Lecturer.....	2,100 00				2,100 00
Total bureau education and research.....	\$20,160 00	\$123 02	\$4,122 59	\$1,111 60	\$25,517 21
Bureau patrol and law enforcement:					
Chief and assistants.....	\$11,100 00				\$11,100 00
Clerical and office.....	3,180 00	\$91 46	\$2 78	\$5 97	3,280 21
Automobiles.....		17,461 38	7,086 66	15,612 09	40,160 13
Traveling.....			88,081 87		88,081 87
Postage.....			623 59		623 59
Telephone and telegraph.....			1,674 12		1,674 12
Freight, cartage and express.....			23 98		23 98
Rent.....			472 52		472 52
Heat, light and power.....			10 00		10 00
Captains and deputies.....	199,555 22	841 43	609 95	92 01	201,098 61
Launches.....		1,836 60	1,702 56	809 50	4,348 66
Fish planting.....	4,620 00	349 62	1,108 31	917 50	6,995 43
Laboratory.....				10 00	10 00
Premiums on bonds.....			1,787 56		1,787 56
Temporary help.....	164 34				164 34
Cooks.....	1,500 00				1,500 00
Game refuge guard.....	90 00				90 00
Commercial fisheries patrol:					
Chief and assistants.....	2,760 00				2,760 00
Captains and wardens.....	16,560 00	5 13	72 50		16,637 63
Launches.....	12,002 24	3,590 32	1,734 56	141 57	17,468 69
Fish cannery inspectors—seasonal.....	14,950 02				14,950 02
Travel.....			7,865 74		7,865 74
Rent.....			788 96		788 96
Automobiles.....		189 13	90 15		279 28
Temporary help.....	253 34				253 34
Total bureau patrol and law enforcement.....	\$266,735 16	\$24,365 07	\$113,735 81	\$17,588 64	\$422,424 68
Bureau commercial fisheries:					
Chief and assistants.....	\$13,620 00				\$13,620 00
Clerical and office.....	9,600 00	\$129 82	\$69 90	\$74 49	9,874 21
Automobiles.....		398 75	201 88		600 63
Traveling.....			6,461 28		6,461 28
Telephone and telegraph.....			541 19		541 19
Freight, cartage and express.....			264 97		264 97
Rent.....			341 04		341 04
Heat, light and power.....			429 46		429 46
Research.....	3,185 95	128 99		18 51	3,333 45
Launches.....				1,386 00	1,386 00
Laboratory.....	25,499 74	636 42	1,119 60	256 78	27,512 54
Fish tags.....		237 00			237 00
Hydrobiological survey, Monterey Bay.....			1,500 00		1,500 00
Statistics.....		1,709 96	1,974 66	1,039 81	4,724 43
Fish cannery research.....			5,000 00		5,000 00
Total bureau commercial fisheries.....	\$51,905 69	\$3,240 94	\$17,903 98	\$2,775 59	\$75,826 20

STATEMENT OF EXPENDITURES—Continued

For the Period July 1, 1932, to June 30, 1933, of the Eighty-fourth Fiscal Year

Function	Salaries and wages	Materials and supplies	Service and expense	Property and equipment	Total
Bureau fish culture:					
Chief and assistants	\$10,810 00	\$4 80			\$10,814 80
Clerical and office	4,080 00	29 17	\$42 83	\$5 97	4,157 97
Automobiles		6,158 60	3,071 16	3,810 30	13,040 06
Traveling			11,227 40		11,227 40
Postage			174 36		174 36
Telephone and telegraph			1,310 99		1,310 99
Freight, cartage and express			1,048 59		1,048 59
Rent			2,176 85		2,176 85
Heat, light and power			1,566 55		1,566 55
Hatcheries	118,237 44	76,892 35	1,979 14	3,458 85	200,567 78
Special field investigations	7,270 00	62 45	10 25	132 70	7,475 40
Fish cars	3,540 00	373 55	725 80		4,639 35
Blue printing		2 59	19 89		22 48
Cooperative research	3,240 00	430 32	2,033 90	911 97	6,616 19
Temporary help	2,017 75				2,017 75
Fish hatchery assistant—seasonal	26,439 57				26,439 57
Total bureau fish culture	\$175,634 76	\$83,953 83	\$25,387 71	\$8,319 79	\$293,296 09
Bureau hydraulics:					
Chief and assistants	\$8,340 00				\$8,340 00
Clerical and office		\$29 38	\$52 02	\$46 07	127 47
Automobiles		548 64	230 81	563 88	1,343 33
Traveling			1,443 41		1,443 41
Postage			3 00		3 00
Telephone and telegraph			3 00		3 00
Total bureau hydraulics	\$8,340 00	\$578 02	\$1,732 24	\$609 95	\$11,260 21
Bureau game propagation:					
Superintendents	\$3,300 00				\$3,300 00
Automobiles		\$979 55	\$230 39		1,209 94
Traveling			4,368 71		4,368 71
Postage			28 12		28 12
Telephone and telegraph			217 68		217 68
Freight, cartage and express			35 07		35 07
Heat, light and power			1,635 22		1,635 22
Maintenance	12,676 00	10,249 16	909 92	\$53 00	23,888 08
Temporary help	3,351 60				3,351 60
Quail trapping and expansion of quail program	5,501 39	718 05	146 22	43 68	6,409 34
Total bureau game propagation	\$24,828 99	\$11,946 76	\$7,571 33	\$96 68	\$44,443 76
Bureau fish rescue:					
Chief and assistants	\$4,800 00	\$38 84	\$21 75		\$4,860 59
Traveling			1,763 16		1,763 16
Rent			160 00		160 00
Temporary help	109 50				109 50
Total bureau fish rescue	\$4,909 50	\$38 84	\$1,944 91		\$6,893 25
Bureau game refuge:					
Chief and assistants	\$8,500 00				\$8,500 00
Clerical and office	2,119 74	\$55 08	\$61 32		2,236 14
Automobiles		654 39	301 23	\$600 00	1,555 62
Traveling			4,217 51		4,217 51
Telephone and telegraph			3 62		3 62
Lion hunters and trappers	8,221 29				8,221 29
Refuge posting	720 00	7 84			727 84
Predatory animal control			7,450 00		7,450 00
Temporary help—seasonal	7,788 56				7,788 56
Refuge maintenance	6,197 50	1,964 52	2,084 90		10,246 92
Predatory animal hunters and trappers—seasonal	10,255 00				10,255 00
Fences				6,901 62	6,901 62
Total bureau game refuge	\$43,802 09	\$2,681 83	\$14,118 58	\$7,501 62	\$68,104 12
Total eighty-fourth fiscal year expense	\$635,598 61	\$137,077 02	\$223,506 28	\$39,557 92	\$1,035,739 83
Prior year expense—eighty-third fiscal year					9,562 63
Total paid from support—eighty-third and eighty-fourth fiscal years					\$1,045,302 46

STATEMENT OF EXPENDITURES—Continued

For the Period July 1, 1932, to June 30, 1933, of the Eighty-fourth Fiscal Year

Special items	Property and equipment	Total
Construction, improvements and equipment:		
Bass ponds.....	\$832 91	
General repairs, improvements and construction of cottage at the Brookdale Hatchery.....	1,814 12	
Construction on Cherry Creek dams.....	223 33	
Lake Elinor Egg Collecting Station.....	231 12	
Tank and Egg Collecting Station at Huntington Lake.....	77 74	
Kaweah Garage project.....	187 33	
Klamathon Station—Station House and Dry Room Project.....	310 64	
Klamathon Station—Warehouse Project.....	156 00	
Kosk Creek Egg Collecting Station Project.....	236 30	
Repairs and improvements at Mt. Shasta Hatchery.....	368 64	
Maintenance and improvements—Navarro River Jetty.....	33 79	
Opening Salinas River Channel.....	54 36	
Sebastopol Bass Rearing Ponds.....	351 88	
Construction of a Diversion Dam on Waddell Creek.....	322 50	
Construction of equipment for experimental trout investigation on Waddell Creek.....	67 87	
Construction of fish trap and tank on Waddell Creek.....	298 44	
Total construction, improvements and equipment.....		\$5,566 97
Construction Russian River jetties—Chapter 60, 1931, or executive order 605, 84th fiscal year.....		2,671 15
Deer tight fences—Chapter 872, 31:		
From January 1, 1933, to June 30, 1933.....	\$3,644 01	
From July 1, 1932, to December 31, 1932.....	2,422 80	
Total deer tight fences, Chapter 872-31.....		6,066 81
Electro Metals Company's claim—Chapter 599, 1931.....		18,750 00
License commissions.....		43,719 81
Purchase of game refuges.....		34,804 94
Expenditure for reimbursing bank account on account of failure of California National Bank—Department of Finance, Chapter 141, 1933.....		37,090 19
State Fair and other exhibits.....		1,291 97
Total special items.....		\$149,961 84
Prior year expense—82d fiscal year.....		6 60
Grand total, proprietary group.....		\$1,195,270 90
In addition to the above expenditures the following amount was transferred from the Fish and Game Preservation Fund only to the State Employees' Retirement Fund.....		18,911 31

STATEMENT OF EXPENDITURES

For the Period July 1, 1933, to June 30, 1934, of the Eighty-fifth Fiscal Year

Function	Salaries and wages	Materials and supplies	Service and expense	Property and equipment	Total
Administration:					
Executive.....	\$8,360 00				\$8,360 00
Clerical and office.....	5,520 00	\$1,090 37	\$230 01		6,840 38
Printing, Fish and Game Magazine.....		2,175 52			2,175 52
Printing, general.....		3,469 94			3,469 94
Automobile.....		635 26	389 57		1,024 83
Traveling.....			3,232 79		3,232 79
Postage.....			4,392 22		4,392 22
Telephone and telegraph.....			3,966 12		3,966 12
Freight, cartage and express.....			631 95		631 95
Rent.....			13,354 66		13,354 66
Accident and death claims.....			4,491 92		4,491 92
Accounting pro rata.....	4,500 00				4,500 00
Legal.....	493 56		3,582 05	\$81 32	4,156 93
Premiums on bonds.....			42 50		42 50
Publicity.....			438 25		438 25
Pro rata General Fund expense, Chap. 923-33.....			2,670 68		2,670 68
Total Administration.....	\$18,873 56	\$7,371 09	\$37,422 72	\$81 32	\$63,748 69
Bureau Education and Research:					
Chief.....	\$1,079 85				\$1,079 85
Clerical and office.....	1,920 00	\$35 91	\$65 06	\$3 07	2,024 04
Automobiles.....		491 83	258 63		750 46
Traveling.....			2,348 17		2,348 17
Postage.....			14 80		14 80
Telephone and telegraph.....			2 42		2 42
Photography.....		8 30	104 37	45 10	157 77
Freight, cartage and express.....			3 47		3 47
Library.....	1,080 00	27 86	73 17	197 87	1,378 90
Research.....	5,140 00	136 80	53 10	10 50	5,340 40
Publicity.....	2,450 00	41 50	34 29		2,525 79
Total Bureau Education and Research.....	\$11,669 85	\$742 20	\$2,957 48	\$256 54	\$15,626 07
Bureau Patrol and Law Enforcement:					
Chief and assistants.....	\$11,100 00				\$11,100 00
Clerical and office.....	3,180 00	\$53 50	\$12 70	\$56 86	3,303 06
Automobiles.....		27,780 04	10,858 88	9,699 29	48,338 21
Traveling.....			45,916 23		45,916 23
Postage.....			603 83		603 83
Telephone and telegraph.....			1,620 05		1,620 05
Freight, cartage and express.....			27 40		27 40
Rent.....			618 78		618 78
Captains and wardens.....	176,146 67	1,506 07	1,105 12	76 54	178,834 40
Launches.....		2,366 17	1,551 12	14 06	3,931 35
Fish planting.....	4,620 00	629 58	1,257 75	49 59	6,556 92
Volunteer deputies.....		102 50			102 50
Premiums on bonds.....			229 50		229 50
Temporary help.....	2,237 77				2,237 77
Cooks.....	1,500 00				1,500 00
Game refuge guard.....	720 00				720 00
Commercial fisheries patrol:					
Chief and assistants.....	2,760 00				2,760 00
Captains and wardens.....	14,355 50	13 83	17 66		14,386 99
Launches.....	11,291 29	5,373 21	2,766 31	293 95	19,724 76
Fish cannery inspectors, seasonal.....	9,333 18				9,333 18
Traveling.....			5,256 02		5,256 02
Rent.....			841 50		841 50
Automobiles.....		678 61	359 07		1,037 68
Temporary help.....	350 64				350 64
Total Bureau Patrol and Law Enforcement.....	\$237,595 05	\$38,503 51	\$73,041 92	\$10,190 29	\$359,330 77
Bureau Commercial Fisheries:					
Chief and assistants.....	\$13,620 00				\$13,620 00
Clerical and office.....	9,596 34	\$84 94	\$23 96		9,704 24
Automobiles.....		347 29	254 51	\$976 12	1,577 92
Traveling.....			5,694 22		5,694 22
Postage.....			60		60
Telephone and telegraph.....			585 77		585 77
Freight, cartage and express.....			129 73		129 73
Rent.....			146 92		146 92
Heat, light, water and power.....			361 37		361 37
Research.....	2,280 00	33 24		100 92	2,414 16
Laboratory.....	22,687 58	1,154 57	907 24	500 18	25,249 57
Fish tags.....		580 00			580 00
Statistics.....		855 45	2,016 00	143 30	3,014 75
Temporary help.....	88 39				88 39
Total Bureau Commercial Fisheries.....	\$48,272 31	\$3,055 49	\$10,120 32	\$1,720 52	\$63,168 64

STATEMENT OF EXPENDITURES

For the Period July 1, 1933, to June 30, 1934, of the Eighty-fifth Fiscal Year—Continued

Function	Salaries and wages	Materials and supplies	Service and expense	Property and equipment	Total
Bureau Fish Culture:					
Chief and assistants	\$7,185 00	\$13 20	\$160 50		\$7,358 70
Clerical and office	4,080 00	23 94	12 75	\$165 28	4,281 97
Automobiles		6,953 11	3,091 37	2,913 68	12,958 16
Traveling			7,867 58		7,867 58
Postage			219 53		219 53
Telephone and telegraph			1,198 29		1,198 29
Freight, cartage and express			896 25		896 25
Rent			2,774 04		2,774 04
Heat, light and power			1,640 01		1,640 01
Hatcheries	108,536 67	62,139 24	1,076 80	1,068 65	172,821 36
Fish cars	3,540 00	415 47	725 63		4,681 10
Blue printing		1 62	16 46		18 08
Cooperative research	3,110 71	637 58	1,762 81	22 67	5,533 77
Temporary help	1,520 35				1,520 35
Fish hatchery assistant, seasonal	21,646 04				21,646 04
Hydraulic engineering	2,400 00	50 26	957 72	225 28	3,633 26
Special field	7,340 00	99 76	5 50	94 79	7,540 05
Total Bureau Fish Culture	\$159,358 77	\$70,334 18	\$22,405 24	\$4,490 35	\$256,588 54
Bureau Game Propagation:					
Chief and assistants	\$5,460 00				\$5,460 00
Automobiles		\$630 88	\$270 04		900 92
Traveling			2,250 61		2,250 61
Postage			72 79		72 79
Telephone and telegraph			174 10		174 10
Freight, cartage and express			40 59		40 59
Heat, light and power			1,300 07		1,300 07
Maintenance	13,005 71	10,039 86	448 63	\$64 70	23,558 90
Temporary help	744 95				744 95
Quail trapping and expansion of quail program	4,726 07	1,641 77	2,493 59	492 18	9,353 61
Purchase of quail and pheasants		2,135 67			2,135 67
Total Bureau Game Propagation	\$23,936 73	\$14,448 18	\$7,050 42	\$556 88	\$45,992 21
Bureau Fish Rescue:					
Chief and assistants	\$4,800 00	\$4 27	\$42 24		\$4,846 51
Traveling			107 56		107 56
Rent			109 00		109 00
Temporary help	117 00				117 00
Heavy truck service			1,187 20		1,187 20
Total Bureau Fish Rescue	\$4,917 00	\$4 27	\$1,446 00		\$6,367 27
Bureau Game Refuges:					
Chief and assistants	\$8,500 00				\$8,500 00
Clerical and office	1,920 00	\$11 16	\$12 50		1,943 66
Automobiles		557 97	182 96		740 93
Traveling			4,752 46		4,752 46
Telephone and telegraph			95		95
Lion hunters	5,479 00				5,479 00
Refuge posting	450 00				450 00
Predatory animal control			5,530 00		5,530 00
Refuge maintenance	8,145 50	3,282 35	2,199 81	\$328 20	13,955 86
Predatory animal hunters and trappers, seasonal	5,600 00				5,600 00
Temporary help, seasonal	3,982 00				3,982 00
Total Bureau Game Refuges	\$34,076 50	\$3,851 48	\$12,678 68	\$328 20	\$50,934 86
Bureau Licenses:					
Clerical and office	\$13,140 00	\$111 77	\$22 04		\$13,273 81
Printing, licenses and applications		15,776 06			15,776 06
Traveling			340 62		340 62
Postage			1,838 14		1,838 14
Freight, cartage and express			1,071 29		1,071 29
Premiums on bonds			1,177 50		1,177 50
Total Bureau Licenses	\$13,140 00	\$15,887 83	\$4,449 59		\$33,477 42
Total eighty-fifth fiscal year expense paid from support appropriations	\$551,839 77	\$154,198 23	\$171,572 37	\$17,624 10	\$895,234 47

STATEMENT OF EXPENDITURES

For the Period July 1, 1933, to June 30, 1934, of the Eighty-fifth Fiscal Year—Continued

Function	Salaries and wages	Materials and supplies	Service and expense	Property and equipment	Total
Special items:					
Claim of Chief Accounting Officer of Department of Finance—Chapter 991-33				\$2,259 11	
Construction of Russian River Jetties—Chapter 989-33				7,325 76	
Deer-tight fences—Chapter 872-31:					
From January 1, 1934, to June 30, 1934			\$73 80		
From July 1, 1933, to December 31, 1933			1,498 05		
Total deer-tight fences—Chapter 872-31				\$1,571 85	
Electro Metals Company's Claim—Chapter 599-31				18,750 00	
License commissions				38,313 71	
State Fair and other exhibits				538 32	
Total special items					\$68,758 75
Permanent improvements:					
Construction, improvements and equipment					\$67,496 43
Prior year expense:					
83d fiscal year				\$82 35	
84th fiscal year				26,043 69	
Total prior year expense					\$26,126 04
Bureau Commercial Fisheries—Chapter 825-33					
Fresh fish marketing:					
Chief and assistants	\$4,490 47				\$4,490 47
Clerical and office	1,139 03	\$123 40	\$11 55		1,273 98
Automobiles		6 50	19 42		25 92
Traveling			1,155 63		1,155 63
Postage			260 00		260 00
Telephone and telegraph			2 61		2 61
Freight, cartage and express			180 68		180 68
Rent			40 57		40 57
Exhibits		205 47	3,545 95		3,751 42
Temporary help	351 00				351 00
Printing		1,852 02			1,852 02
Pro rata administration			696 21	\$103 79	800 00
Total Bureau Commercial Fisheries—Chapter 825-33—Fresh fish marketing	\$5,980 50	\$2,187 39	\$5,912 62	\$103 79	\$14,184 30
Grand total proprietary group					\$1,071,799 99

In addition to the above expenditures the following amount was transferred from the Fish and Game Preservation Fund into the State Employees' Retirement Fund..... \$17,000 67

HUNTING LICENSE ACCOUNT

License Year, January 1, 1932, to June 30, 1933

County	Total	Citizen	Citizen (Junior)	Non- resident	Alien	Declarant alien
Alameda.....	\$20,760 00	\$19,812 00	\$768 00		\$75 00	\$105 00
Alpine.....	211 50	102 00	4 50	\$105 00		
Amador.....	1,702 50	1,629 00	58 50			15 00
Butte.....	8,230 50	7,845 00	385 50			
Calaveras.....	1,594 50	1,542 00	52 50			
Colusa.....	3,865 50	3,579 00	271 50	15 00		
Contra Costa.....	6,268 50	5,901 00	292 50			75 00
Del Norte.....	1,351 50	1,281 00	55 50			15 00
El Dorado.....	2,413 50	2,319 00	94 50			
Fresno.....	15,777 00	14,808 00	341 50		37 50	90 00
Glenn.....	3,117 00	2,814 00	250 50	15 00	37 50	
Humboldt.....	10,609 50	9,921 00	486 00	15 00	37 50	150 00
Imperial.....	3,892 50	3,705 00	157 50			30 00
Inyo.....	2,395 50	2,253 00	105 00		37 50	
Kern.....	11,770 50	11,331 00	364 50		75 00	
Kings.....	2,283 00	2,145 00	138 00			
Lake.....	3,364 50	3,186 00	163 50	15 00		
Lassen.....	4,470 00	4,059 00	201 00	75 00		135 00
Los Angeles.....	89,095 50	87,423 00	1,365 00	105 00	112 50	90 00
Madera.....	1,797 00	1,707 00	90 00			
Marin.....	3,924 00	3,675 00	249 00			
Mariposa.....	552 00	534 00	18 00			
Mendocino.....	5,947 50	5,586 00	286 50			75 00
Merced.....	5,446 50	4,968 00	296 00		37 50	45 00
Modoc.....	6,609 00	3,744 00	240 00	2,565 00		60 00
Mono.....	*1,164 15	1,054 65	34 50	75 00		
Monterey.....	8,415 00	7,749 00	403 50		37 50	225 00
Napa.....	5,301 00	4,749 00	319 50	15 00	37 50	180 00
Nevada.....	3,159 00	2,934 00	97 50	60 00	37 50	30 00
Orange.....	8,644 50	7,617 00	277 50	750 00		
Placer.....	4,950 00	4,578 00	327 00			45 00
Plumas.....	3,205 50	3,033 00	127 50	15 00		30 00
Riverside.....	7,447 50	7,149 00	298 50			
Sacramento.....	14,154 00	13,254 00	577 50	105 00	112 50	105 00
San Benito.....	2,320 50	2,112 00	178 50			30 00
San Bernardino.....	8,863 50	8,598 00	265 50			
San Diego.....	16,113 00	15,435 00	663 00	15 00		
San Francisco.....	31,152 00	28,551 00	786 00	105 00	675 00	1,035 00
San Joaquin.....	11,265 00	10,437 00	603 00		75 00	150 00
San Luis Obispo.....	6,297 00	5,883 00	399 00			15 00
San Mateo.....	5,299 50	4,869 00	243 00		37 50	150 00
Santa Barbara.....	6,060 00	5,718 00	244 50		37 50	60 00
Santa Clara.....	12,199 50	11,148 00	691 50	15 00	150 00	195 00
Santa Cruz.....	6,000 00	5,274 00	463 50		37 50	225 00
Shasta.....	4,881 00	4,629 00	184 50		37-50	30 00
Sierra.....	765 00	735 00	30 00			
Siskiyou.....	10,579 50	8,871 00	463 50	1,065 00		180 00
Solano.....	5,779 50	5,490 00	289 50			
Sonoma.....	18,784 50	11,709 00	760 50	30 00	150 00	135 00
Stanislaus.....	6,621 00	6,222 00	309 00		75 00	15 00
Sutter.....	1,191 00	1,116 00	75 00			
Tehama.....	3,931 50	3,699 00	187 50	30 00		15 00
Trinity.....	472 50	456 00	16 50			
Tulare.....	8,547 00	8,217 00	292 50		37 50	
Tuolumne.....	1,716 00	1,650 00	66 00			
Ventura.....	8,217 00	7,623 00	534 00	30 00		30 00
Yolo.....	4,332 00	3,975 00	282 00		75 00	
Yuba.....	3,882 00	3,636 00	216 00			30 00
Totals.....	\$453,159 15	\$424,039 65	\$18,042 00	\$5,220 00	\$2,062 50	\$3,795 00
Number.....	154,031	141,347	12,028	348	55	253

*Incomplete.

HUNTING LICENSE ACCOUNT

Period Ending June 30, 1934

Counties	Total	Citizen	Duplicate	Citizen (Junior)	Non- resident	Alien	Declarant alien
Alameda	\$14,514 00	\$13,856 00		\$478 00		\$100 00	\$80 00
Alpine	129 00	64 00		5 00	\$60 00		
Amador	1,355 00	1,290 00		65 00			
Butte	6,864 00	6,572 00		392 00			
Calaveras	1,016 00	972 00		44 00			
Colusa	2,798 50	2,606 00	\$4 50	188 00			
Contra Costa	5,196 50	4,836 00	2 50	203 00		25 00	30 00
Del Norte	949 00	888 00	1 00	50 00			10 00
El Dorado	1,780 00	1,722 00		58 00			
Fresno	12,415 00	11,726 00	5 00	614 00			70 00
Glenn	2,514 50	2,318 00	2 50	184 00	10 00		
Humboldt	7,828 50	7,342 00	5 50	336 00	10 00	25 00	110 00
Imperial	2,863 50	2,724 00	50	129 00			10 00
Inyo	1,768 50	1,696 00	50	72 00			
Kern	8,970 00	8,568 00		402 00			
Kings	1,885 50	1,770 00	1 50	114 00			
Lake	2,241 00	2,120 00		121 00			
Lassen	3,333 50	3,044 00	1 50	158 00	90 00		40 00
Los Angeles	61,986 50	59,860 00	18 50	1,818 00	90 00	100 00	100 00
Madera	1,439 00	1,352 00	2 00	85 00			
Marin	2,625 00	2,454 00		171 00			
Mariposa	379 00	348 00		21 00	10 00		
Mendocino	4,427 50	4,174 00	1 50	222 00			30 00
Merced	4,210 50	3,848 00	1 50	316 00		25 00	20 00
Modoc	2,544 00	2,318 00		126 00	100 00		
Mono	893 00	620 00		13 00	60 00		
Monterey	6,342 50	5,836 00	5 50	291 00		50 00	160 00
Napa	3,995 00	3,576 00	1 00	243 00	10 00	25 00	140 00
Nevada	3,102 00	2,406 00		81 00	540 00	25 00	50 00
Orange	5,183 00	4,946 00	3 00	234 00			
Placer	3,810 50	3,498 00	50	262 00			50 00
Plumas	2,659 50	2,486 00	50	98 00	40 00	25 00	10 00
Riverside	5,630 00	5,406 00	3 00	221 00			
Sacramento	12,013 00	10,918 00	22 00	528 00	200 00	75 00	270 00
San Benito	1,798 50	1,600 00	2 50	156 00			40 00
San Bernardino	5,860 50	5,588 00	50	262 00			10 00
San Diego	11,254 00	10,564 00	2 00	643 00	10 00	25 00	10 00
San Francisco	20,618 50	19,112 00	12 50	439 00	80 00	475 00	500 00
San Joaquin	9,816 00	9,162 00	1 00	548 00		25 00	80 00
San Luis Obispo	3,760 00	3,472 00	2 00	241 00	10 00	25 00	10 00
San Mateo	3,723 00	3,378 00		240 00		25 00	80 00
Santa Barbara	5,571 00	5,120 00	1 00	360 00		50 00	40 00
Santa Clara	10,098 50	9,468 00	2 50	548 00	10 00	50 00	20 00
Santa Cruz	4,630 50	4,116 00	1 50	338 00		25 00	150 00
Shasta	4,081 00	3,844 00	4 00	153 00	60 00		20 00
Sierra	538 50	512 00	50	16 00	10 00		
Siskiyou	11,855 50	7,252 00	1 50	347 00	4,060 00	25 00	170 00
Solano	4,325 00	4,142 00		183 00			
Sonoma	9,185 50	8,446 00	3 50	481 00		125 00	130 00
Stanislaus	5,649 50	5,288 00	2 50	299 00		50 00	10 00
Sutter	1,119 00	1,058 00		61 00			
Tehama	2,925 50	2,772 00	1 50	142 00	10 00		
Trinity	446 00	440 00		6 00			
Tulare	6,587 50	6,206 00	2 50	379 00			
Tuolumne	1,183 00	1,150 00		33 00			
Ventura	3,604 50	3,400 00	50	204 00			
Yolo	3,388 50	3,110 00	50	218 00		50 00	10 00
Yuba	3,165 00	2,908 00		207 00	30 00		20 00
Totals	\$334,746 50	\$310,368 00	\$126 50	\$14,847 00	\$5,500 00	\$1,425 00	\$2,480 00
Number	171,139	155,184	253	14,847	550	57	248

ANGLING LICENSE SALES

Year 1932

County	Total	Citizen	Non-resident	Alien
Alameda.....	\$39,805 00	\$37,376 00	\$21 00	\$2,408 00
Alpine.....	490 00	240 00	240 00	10 00
Amador.....	1,757 00	1,712 00		45 00
Butte.....	6,470 00	6,420 00		50 00
Calaveras.....	1,386 00	1,386 00		
Colusa.....	1,086 00	1,086 00		
Contra Costa.....	11,344 00	10,682 00	12 00	650 00
Del Norte.....	2,584 00	2,440 00	129 00	15 00
El Dorado.....	3,293 00	3,280 00	3 00	10 00
Fresno.....	13,124 00	12,698 00	21 00	405 00
Glenn.....	938 00	928 00		10 00
Humboldt.....	9,507 00	9,316 00	51 00	140 00
Imperial.....	1,231 00	1,206 00		25 00
Inyo.....	7,131 00	7,014 00	57 00	60 00
Kern.....	5,241 00	5,238 00	3 00	
Kings.....	1,028 00	1,008 00		20 00
Lake.....	1,583 00	1,578 00		5 00
Lassen.....	2,814 00	2,666 00	78 00	70 00
Los Angeles.....	79,813 00	78,686 00	87 00	1,040 00
Madera.....	1,536 00	1,536 00		
Marin.....	5,598 00	5,598 00		
Mariposa.....	2,547 00	2,426 00	81 00	40 00
Mendocino.....	4,907 00	4,852 00		55 00
Merced.....	2,162 00	2,162 00		
Modoc.....	1,729 00	1,572 00	132 00	25 00
Mono.....	5,811 00	5,248 00	528 00	35 00
Monterey.....	4,868 00	4,620 00	3 00	245 00
Napa.....	4,160 00	4,078 00	12 00	70 00
Nevada.....	4,209 00	3,808 00	276 00	125 00
Orange.....	4,605 00	4,592 00	3 00	10 00
Placer.....	4,807 00	4,658 00	12 00	137 00
Plumas.....	4,876 00	4,620 00	126 00	130 00
Riverside.....	4,012 00	3,954 00	3 00	55 00
Sacramento.....	18,291 00	15,654 00	57 00	2,580 00
San Benito.....	633 00	588 00		45 00
San Bernardino.....	11,132 00	11,066 00	36 00	30 00
San Diego.....	10,603 00	10,444 00	69 00	90 00
San Francisco.....	45,725 00	42,764 00	81 00	2,880 00
San Joaquin.....	12,365 00	11,800 00		565 00
San Luis Obispo.....	3,402 00	3,292 00		110 00
San Mateo.....	4,596 00	4,316 00		280 00
Santa Barbara.....	3,313 00	3,268 00		45 00
Santa Clara.....	11,295 00	11,002 00	3 00	290 00
Santa Cruz.....	6,447 00	5,956 00	6 00	485 00
Shasta.....	4,325 00	4,216 00	24 00	85 00
Sierra.....	1,182 00	1,142 00		40 00
Siskiyou.....	7,418 00	6,820 00	243 00	355 00
Solano.....	7,220 00	6,700 00		520 00
Sonoma.....	11,541 00	11,188 00	3 00	350 00
Stanislaus.....	5,493 00	5,438 00		55 00
Sutter.....	725 00	710 00		15 00
Tehama.....	2,335 00	2,306 00	9 00	20 00
Trinity.....	584 00	584 00		
Tulare.....	6,620 00	6,504 00	36 00	80 00
Tuolumne.....	2,755 00	2,724 00	6 00	25 00
Ventura.....	4,399 00	4,342 00	12 00	45 00
Yolo.....	1,875 00	1,812 00	3 00	60 00
Yuba.....	2,026 00	1,930 00	6 00	90 00
Nevada, State of.....	3,621 00		3,621 00	
Totals.....	\$436,373 00	\$415,250 00	\$6,093 00	\$15,030 00
Number.....	212,662	207,625	2,031	3,006

ANGLING LICENSE SALES

Year 1933

County	Total	Citizen	Duplicate	Non-resident	Alien
Alameda.....	\$31,202 00	\$30,472 00			\$730 00
Alpine.....	420 00	204 00		\$216 00	
Amador.....	1,444 00	1,424 00			20 00
Butte.....	5,333 00	5,208 00		30 00	95 00
Calaveras.....	1,036 00	1,036 00			
Colusa.....	940 00	938 00	\$2 00		
Contra Costa.....	8,710 00	8,364 00	9 00	12 00	325 00
Del Norte.....	2,096 50	1,942 00	50	144 00	10 00
El Dorado.....	2,825 00	2,788 00		12 00	25 00
Fresno.....	11,748 00	11,370 00		18 00	360 00
Glenn.....	815 50	806 00	50	9 00	
Humboldt.....	7,853 00	7,716 00	4 00	33 00	100 00
Imperial.....	709 00	694 00			15 00
Inyo.....	6,684 00	6,612 00		27 00	45 00
Kern.....	4,939 00	4,930 00		9 00	
Kings.....	1,001 00	970 00	1 00		30 00
Lake.....	1,174 00	1,164 00			10 00
Lassen.....	1,887 00	1,806 00		36 00	45 00
Los Angeles.....	69,691 00	68,766 00	9 00	66 00	850 00
Madera.....	1,462 00	1,462 00			
Marin.....	4,802 00	4,802 00			
Mariposa.....	2,289 00	2,226 00		48 00	15 00
Mendocino.....	3,693 00	3,678 00			15 00
Merced.....	1,796 50	1,788 00	50	3 00	5 00
Modoc.....	1,112 00	1,094 00		18 00	
Mono.....	4,857 00	4,416 00		426 00	18 00
Monterey.....	3,973 50	3,764 00	1 50	3 00	208 00
Napa.....	3,480 00	3,428 00	2 00		50 00
Nevada.....	5,696 00	3,392 00		2,139 00	165 00
Orange.....	3,815 00	3,778 00	2 00		35 00
Placer.....	3,969 50	3,856 00	50	33 00	80 00
Plumas.....	4,125 50	3,826 00	50	219 00	80 00
Riverside.....	3,410 00	3,346 00	1 00	3 00	60 00
Sacramento.....	15,274 00	13,596 00	10 00	48 00	1,620 00
San Benito.....	630 00	610 00			20 00
San Bernardino.....	9,336 00	9,314 00		12 00	10 00
San Diego.....	10,038 00	9,968 00		60 00	10 00
San Francisco.....	34,413 00	32,700 00	12 00	36 00	1,665 00
San Joaquin.....	9,778 50	9,278 00	50		500 00
San Luis Obispo.....	2,498 00	2,438 00			60 00
San Mateo.....	3,264 50	3,138 00	50	6 00	120 00
Santa Barbara.....	3,521 00	3,366 00			155 00
Santa Clara.....	8,504 00	8,330 00	1 00	3 00	170 00
Santa Cruz.....	5,507 50	5,188 00	4 50		315 00
Shasta.....	3,812 50	3,730 00	1 50	21 00	60 00
Sierra.....	856 50	842 00	50	9 00	5 00
Siskiyou.....	5,987 00	5,538 00	2 00	237 00	210 00
Solano.....	5,723 00	5,288 00			435 00
Sonoma.....	9,731 50	9,444 00	4 50	3 00	280 00
Stanislaus.....	4,401 00	4,350 00	6 00		45 00
Sutter.....	546 50	506 00	50		40 00
Tehama.....	2,042 50	2,028 00	50	9 00	5 00
Trinity.....	310 00	304 00		6 00	
Tulare.....	5,328 00	5,220 00	1 00	12 00	95 00
Tuolumne.....	2,204 00	2,204 00			
Ventura.....	2,502 00	2,482 00			20 00
Yolo.....	1,694 00	1,610 00	1 00	3 00	80 00
Yuba.....	1,676 00	1,626 00			50 00
Totals.....	\$358,568 00	\$345,164 00	\$80 00	\$3,969 00	\$9,355 00
Number.....	175,936	172,582	160	1,323	1,871

DEER TAG LICENSE SALES, BY COUNTIES

Years 1927, 1928, 1929, 1930, 1931, 1932, 1933

County	1927	1928	1929	1930	1931	1932	1933
Alameda.....	\$5,101 00	\$4,947 00	\$5,263 00	\$5,483 00	\$5,686 00	\$4,292 00	\$3,899 00
Alpine.....	32 00	34 00	52 00	76 00	72 00	43 00	42 00
Amador.....	452 00	446 00	433 00	551 00	605 00	429 00	470 00
Butte.....	2,902 00	2,643 00	2,770 00	3,026 00	3,207 00	2,234 00	2,379 00
Calaveras.....	591 00	585 00	606 00	659 00	648 00	476 00	413 00
Colusa.....	1,184 00	1,149 00	1,263 00	1,285 00	1,406 00	1,002 00	991 00
Contra Costa.....	1,253 00	1,248 00	1,395 00	1,530 00	1,573 00	1,149 00	1,178 00
Del Norte.....	414 00	445 00	426 00	464 00	462 00	283 00	294 00
El Dorado.....	1,180 00	1,098 00	1,195 00	1,299 00	1,209 00	765 00	830 00
Fresno.....	3,324 00	3,153 00	3,616 00	3,789 00	4,173 00	3,035 00	3,073 00
Glenn.....	1,117 00	1,160 00	1,178 00	1,289 00	1,221 00	866 00	865 00
Humboldt.....	3,792 00	3,809 00	3,756 00	4,004 00	4,030 00	2,832 00	3,060 00
Imperial.....	129 00	128 00	179 00	265 00	267 00	307 00	237 00
Inyo.....	852 00	865 00	796 00	890 00	929 00	686 00	738 00
Kern.....	3,128 00	3,248 00	3,584 00	3,607 00	3,333 00	2,628 00	2,708 00
Kings.....	334 00	409 00	434 00	468 00	490 00	382 00	407 00
Lake.....	1,652 00	1,611 00	1,681 00	1,741 00	1,595 00	1,097 00	1,062 00
Lassen.....	1,443 00	1,384 00	1,618 00	1,749 00	1,810 00	1,382 00	1,483 00
Los Angeles.....	13,879 00	11,606 00	15,087 00	16,026 00	17,081 00	14,404 00	13,117 00
Madera.....	711 00	658 00	674 00	847 00	808 00	415 00	454 00
Marin.....	1,088 00	1,157 00	1,183 00	1,230 00	1,211 00	1,095 00	919 00
Mariposa.....	216 00	206 00	160 00	200 00	189 00	169 00	148 00
Mendocino.....	3,032 00	2,908 00	3,073 00	3,242 00	3,366 00	1,951 00	2,040 00
Merced.....	893 00	769 00	917 00	1,026 00	1,123 00	812 00	807 00
Modoc.....	1,137 00	1,326 00	1,659 00	1,894 00	1,766 00	1,307 00	1,295 00
Mono.....	124 00	153 00	227 00	295 00	320 00	348 00	251 00
Monterey.....	2,412 00	2,482 00	2,674 00	2,846 00	2,747 00	2,031 00	2,046 00
Napa.....	1,769 00	1,845 00	1,952 00	2,105 00	2,108 00	1,469 00	1,616 00
Nevada.....	848 00	691 00	687 00	1,153 00	1,196 00	745 00	1,148 00
Orange.....	1,224 00	1,116 00	1,522 00	1,678 00	1,673 00	1,447 00	1,283 00
Placer.....	1,675 00	1,864 00	1,930 00	1,771 00	1,935 00	1,560 00	1,421 00
Plumas.....	1,307 00	1,247 00	1,401 00	1,371 00	1,444 00	1,003 00	1,270 00
Riverside.....	1,458 00	921 00	1,372 00	1,910 00	1,938 00	1,668 00	1,402 00
Sacramento.....	3,367 00	3,344 00	3,032 00	3,541 00	4,077 00	3,095 00	2,963 00
San Benito.....	828 00	781 00	846 00	842 00	924 00	677 00	641 00
San Bernardino.....	1,483 00	1,237 00	1,756 00	1,908 00	2,247 00	1,831 00	1,545 00
San Diego.....	2,078 00	1,948 00	2,006 00	2,205 00	2,291 00	1,960 00	1,709 00
San Francisco.....	5,963 00	5,803 00	5,971 00	6,347 00	6,868 00	5,443 00	5,118 00
San Joaquin.....	2,009 00	2,099 00	1,952 00	2,198 00	2,251 00	1,864 00	1,919 00
San Luis Obispo.....	1,887 00	1,793 00	2,044 00	2,271 00	2,337 00	1,514 00	1,642 00
San Mateo.....	979 00	1,078 00	1,179 00	1,157 00	1,223 00	931 00	885 00
Santa Barbara.....	2,353 00	1,861 00	2,005 00	2,149 00	2,077 00	1,628 00	2,210 00
Santa Clara.....	3,722 00	3,608 00	3,733 00	3,871 00	4,415 00	3,009 00	2,998 00
Santa Cruz.....	1,351 00	1,354 00	1,442 00	1,722 00	2,035 00	1,355 00	1,551 00
Shasta.....	1,990 00	1,894 00	1,962 00	1,979 00	2,125 00	1,478 00	1,742 00
Sierra.....	269 00	214 00	229 00	250 00	322 00	261 00	264 00
Siskiyou.....	4,234 00	3,969 00	3,731 00	4,183 00	4,110 00	2,865 00	3,197 00
Solano.....	1,374 00	1,448 00	1,605 00	1,678 00	1,640 00	1,263 00	1,317 00
Sonoma.....	4,612 00	4,402 00	4,261 00	4,445 00	4,610 00	3,547 00	3,659 00
Stanislaus.....	1,431 00	1,549 00	1,574 00	1,836 00	1,712 00	1,277 00	1,358 00
Sutter.....	346 00	355 00	344 00	350 00	389 00	265 00	313 00
Tehama.....	1,490 00	1,399 00	1,429 00	1,679 00	1,642 00	1,182 00	1,267 00
Trinity.....	482 00	418 00	429 00	407 00	432 00	239 00	227 00
Tulare.....	2,475 00	2,282 00	2,677 00	2,683 00	2,806 00	1,968 00	1,955 00
Tuolumne.....	976 00	915 00	948 00	951 00	936 00	468 00	497 00
Ventura.....	1,741 00	2,245 00	2,470 00	2,714 00	2,798 00	2,006 00	1,261 00
Yolo.....	1,433 00	1,165 00	1,412 00	1,536 00	1,495 00	1,207 00	1,107 00
Yuba.....	1,079 00	956 00	1,125 00	1,318 00	1,199 00	921 00	927 00
State of Nevada.....	33 00	60 00	80 00	10 00	149 00	51 00	-----
State of Oregon.....	122 00	150 00	467 00	-----	277 00	85 00	-----
Total sales.....	\$110,760 00	\$105,638 00	\$115,472 00	\$123,999 00	\$129,005 00	\$96,702 00	\$95,776 00

MARKET FISHERMEN'S LICENSE SALES

Total sales, license year April 1, 1932, to March 31, 1933.....	\$49,550 00
Total sales, license year April 1, 1933, to March 31, 1934.....	49,910 00
License fee: All persons, \$10.	

TRAPPING LICENSE SALES

Total sales, license year July 1, 1932, to June 30, 1933.....	\$1,660 00
Total sales, license year July 1, 1933, to June 30, 1934.....	1,413 00
License fee: Citizens, \$1; aliens, \$2.	

FISH PACKERS' AND WHOLESALE SHELL-FISH DEALERS' LICENSE SALES

Total sales, license year July 1, 1932, to June 30, 1933.....	\$945 00
Total sales, license year July 1, 1933, to June 30, 1934.....	990 00
License fee: Citizens, \$5; aliens, \$20.	

GAME BREEDERS' LICENSE SALES

Total sales, license year January 1, 1932, to December 31, 1932.....	\$972 50
Total sales, license year January 1, 1933, to December 31, 1933.....	1,087 50
License fee: All persons, \$2.50.	

FISH BREEDERS' LICENSE SALES

Total sales, license year January 1, 1932, to December 31, 1932.....	\$485 00
Total sales, license year January 1, 1933, to December 31, 1933.....	390 00
License fee: All persons, \$5.	

DOMESTICATED FISH IMPORTERS' LICENSE SALES

Total sales, license year January 1, 1932, to December 31, 1932.....	\$105 00
Total sales, license year January 1, 1933, to December 31, 1933.....	75 00
License fee: All persons, \$5.	

KELP LICENSE SALES

Total sales, year 1932.....	\$30 00
Total sales, year 1933.....	30 00
License for term of one year from date of issuance. Fee, \$10.	

COMMERCIAL HUNTING GUN CLUB LICENSE SALES

Total sales, year July 1, 1932, to June 30, 1933.....	\$2,075 00
Total sales, year July 1, 1933, to June 30, 1934.....	1,750 00
License fee: Citizens, \$25; aliens, \$100.	

COMMERCIAL HUNTING CLUB OPERATORS' LICENSE SALES

Total sales, July 1, 1932, to June 30, 1933.....	\$565 00
Total sales, July 1, 1933, to June 30, 1934.....	395 00
License fee: Citizens, \$5; aliens, \$25.	

SUMMARY OF GAME BREEDERS' REPORTS

1932-1933

	Sold in		On hand December 31	
	1932	1933	1932	1933
Pheasants—				
Ringnecks.....	3,870	6,022	5,985	4,672
Quail—				
Valley.....	3,295	10,143	8,345	7,718
Mountain.....	119	233	637	743
Gambel.....	139	447	417	655
Bobwhite.....	77	301	393	432
Partridges.....	48	234	388	443
Doves.....	102	64	649	640
Mallard Ducks.....	1,256	399	686	362

389 Game Breeders' licenses sold in 1932

435 Game Breeders' licenses sold in 1933

ARRESTS AND CONVICTIONS

RECAPITULATION

	Number of arrests	Fines imposed	Jail sentences (days)
Fish cases, 1932-1933.....	1,094	\$16,164 50	3,191
Game cases, 1932-1933.....	943	20,605 50	5,333
Totals, 1932-1933.....	2,037	\$36,670 00	8,524
Fish cases, 1933-1934.....	943	\$15,195 00	1,697½
Game cases, 1933-1934.....	815	18,526 00	4,936½
Totals, 1933-1934.....	1,758	\$33,721 00	6,634
Recapitulation—			
1932-1933.....	2,037	\$36,670 00	8,524
1933-1934.....	1,758	33,721 00	6,634
Totals.....	3,795	\$70,391 00	15,158

TOTAL ARRESTS FOR A PERIOD OF THIRTY-TWO YEARS

1902-1904.....	550
1904-1906.....	774
1906-1908.....	1,192
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.....	4,390
1928-1930.....	5,388
1930-1932.....	5,237
1932-1934.....	3,795

SEIZURES OF FISH AND GAME

	July 1, 1932, to June 30, 1933	July 1, 1933, to June 30, 1934	Total
Abalones.....	2,815	1,822	4,637
Abalone, pounds.....	849	4,778	5,627
Albacore, pounds.....	50		50
Barracuda, pounds.....	4,427	289	4,716
Bass—			
Black.....	228	349	577
Calico.....	34	45	79
Rock, pounds.....		33	33
Striped.....	419	400	819
Striped, pounds.....	785	3,621	4,406
White sea.....	1,132	500	1,632
Clams.....	4,339	9,210	13,549
Crabs.....	1,504	299	1,803
Crappie, perch, sunfish.....	306	539	845
Catfish, pounds.....	497	27	524
Cockles.....	134	1,327	1,461
Croaker, spotfin; oorbina, pounds.....	6	2,206	2,212
Carp.....	6		6
Herring, pounds.....	50		50
Halibut, pounds.....	555	1,220	1,775
Lobsters, pounds.....	5,257	4,213	9,470
Mussels, pounds.....	552	283	835
Salmon, pounds.....	8,434	4,279	12,713
Sturgeon.....		20	20
Skipjack, pounds.....	57,524		57,524
Saltwater perch, pounds.....	195	75	270
Scallops, pounds.....	80	434	514
Smelt, pounds.....		781	781
Sheepshead, pounds.....	51		51
Trout (all kinds).....	1,240	1,546	2,786
Trout, steelhead, pounds.....	2,816	1,802	4,618
Traps, fish; spears.....	145	95	240
Tuna—			
Yellowfin, pounds.....	119,855	11,048	130,903
Bluefin, pounds.....	150		150
Miscellaneous fish, pounds.....	52	17	69
Antelope.....		1	1
Deer.....	80	100	180
Deer meat, pounds.....	3,080	2,463	5,543
Doves.....	149	162	311
Ducks.....	1,266	751	2,017
Mountain sheep.....	1		1
Non-game birds.....	116	35	151
Pigeons.....	48	49	97
Pheasants.....	30	38	68
Quail.....	562	103	665
Rabbits.....	16	49	65
Shorebirds.....	22	152	174
Sage hen.....	1		1
Seagull.....	1		1
Swan.....		1	1
Squirrel, tree.....	4	2	6
Bird nets and traps.....		3	3
Bear.....	1	1	2
Bear meat, pounds.....		100	100
Caviar, pint jars.....	14		14

Alame
Alpine
Amado
Butte
Calave

Colusa
Contra
Del No
El Dor
Fresno

Glenn
Humb
Imper
Inyo
Kern

Kings
Lake
Lassen
Los An
Madera

Marina
Marip
Mendoc
Merced
Modoc

Mono
Monte
Napa
Nevada
Orange

Placer
Plumas
Rivers
Sacramento
San Bernardino

San Bernardino
San Diego
San Francisco
San Jose
San Luis

San Mateo
Santa Clara
Santa Cruz
Shasta

Sierra
Siskiyou
Solano
Sonoma
Stanislaus

Sutter
Tehama
Trinity
Tulare
Tuolumne

Ventura
Yolo
Yuba

T

Deer

GAME CASES

Offense	July 1, 1932, to June 30, 1933			July 1, 1933, to June 30, 1934		
	Arrests	Fines	Jail days	Arrests	Fines	Jail days
Antelope, closed season.....				1	\$100 00	
Bear, closed season.....	2	\$20 00		6	85 00	50
Deer, closed season; overlimit; failure to tag; killing does; fawns; spike buck; selling deer meat.....	334	8,615 50	2,808	283	8,220 00	2,697
Ducks, geese; closed season; overlimit; selling of.....	75	1,137 00	842	51	1,445 00	335
Doves, closed season; overlimit.....	19	330 00	27	26	462 00	75
Commercial Gun Club License Act, violations of.....	14	138 00				
Hunting License Act, violations of.....	157	2,752 00	197	154	2,232 50	174½
Hunting in refuge.....	49	847 00	91	43	380 00	
Bird nets, illegal possession of.....	1	25 00				
Night hunting and spotlight hunting.....	56	2,090 00	263½	56	1,862 00	490
Non-game birds, killing of.....	29	695 00	25	29	545 00	30
Pheasants; closed season.....	38	835 00	317½	44	890 00	675
Quail, closed season; overlimit.....	44	1,265 00	100	27	695 00	130
Rabbits, closed season.....	20	280 00	49½	19	245 00	100
Shorebirds, killing of.....	11	170 00		11	260 00	
Tree squirrels, killing of.....	7	75 00	15	2		
Sage hens, closed season.....	2	75 00				
Swan, killing.....	1		90	6	75 00	
Shooting from auto and power boat.....	17	365 00		25	314 50	
Trespassing on enclosed property.....	36	273 50	95	16	240 00	
Mountain sheep, killing of.....	2	100 00	50			
Pigeons, closed season.....	12	232 50		10	425 00	
Trapping License Act, violations of.....	7	45 00	2½	1		
Miscellaneous game cases.....	10	140 00	360	5	50 00	180
	943	\$20,505 50	5,333	815	\$18,526 00	4,936½

FISH CASES

Offense	July 1, 1932, to June 30, 1933			July 1, 1933, to June 30, 1934		
	Arrests	Fines	Jail days	Arrests	Fines	Jail days
Angling License Act, violations of.....	266	\$3,365 50	536	142	\$1,765 00	75
Abalones, overlimit; undersized; closed season.....	107	2,495 00	285	147	2,734 00	126½
Barracuda, small.....	11	60 00	17	6	55 00	
Bass—						
Black, closed season; overlimit.....	11	225 00		15	325 00	
Calico, closed season.....				1	25 00	
Striped, closed season; undersized.....	83	1,305 00	65	48	780 00	185
White sea, closed season.....	4	400 00	2	2	50 00	
Clams, closed season; small; overlimit.....	127	1,694 00	553	139	2,210 00	518½
Crabs, closed season; small; females.....	29	370 00	5	20	290 00	20
Catfish, small.....				1	20 00	
Crappie, perch, sunfish; closed season.....	15	80 00	25	32	530 00	
Cockles, small.....	2	25 00	6	6	150 00	
Commercial Fishing License Act, violations of.....	87	370 00	70½	103	306 00	47
Fishing in closed waters.....	14	295 00		26	450 00	
Illegal fishing apparatus.....	28	560 00	147½	26	505 00	30
Lobsters, closed season; overlimit; small.....	61	925 00	91½	45	700 00	470
Mussels, closed season.....	11	35 00	51	3		
Nets; set lines, illegal use of.....	47	575 00	656	54	1,525 00	75
Night fishing.....	10	210 00	60	2		
Pollution of streams.....	1	200 00				
Salmon, closed season; overlimit.....	12	235 00	275	14	285 00	50
Trout (all kinds), closed season; overlimit.....	132	2,050 00	295½	89	2,160 00	97½
Tuna, yellowfin; small.....	18	475 00		3	25 00	
Halibut, small; overlimit.....	3	125 00		2	100 00	
Miscellaneous fish cases.....	15	90 00	50	17	205 00	3
	1,094	\$16,164 50	3,191	943	\$15,195 00	1,697½

CALIFORNIA FRESH FISHERY PRODUCTS FOR THE YEAR 1932

(Compiled by the Division of Fish and Game, Bureau of Commercial Fisheries)

Species of fish	Del Norte, Humboldt	Mendocino, Sonoma, Lake	Marin	Solano, Yolo	Sacramento, San Joaquin	Alameda, Contra Costa	San Francisco, San Mateo	Santa Cruz	Monterey
Albacore	21							46,856	559,457
Anchovy			82				147,545	2,800	119,712
Barracuda								2,938	30
Bonito								21	10
Cabrilla									
Carp		35,558	153	688	3,891	5,125			
Catfish				2,059	154,292	97,676			
Cultus	417,611	49,525	75				287,882	45,534	84,869
Flounder	139,215	5,090	33				367,170	30,832	970
Flying fish									
Hake	7,838	2,420					13,291	5,028	
Halfmoon									
Hailbut—California			78				311	20,913	25,968
Hailbut—Northern	636,492	8,572	198		4,190		15,381	3,526	
Hardhead		427,092				64,130	272,680	413	17,723
Herring	8,699	700	387,240						
Kelp Bass							4,867	39,410	102,045
Kingfish	695	297							120,544
Mackerel—Horse							3,021	5,577	660,342
Mackerel—Pacific		35							
Mackerel—Spanish									
Mullet									
Perch	18,613	461	36,858				37,547	8,584	50,951
Pike				90	967	947		62	178
Pompano									
Ray									
Rock Bass		59,232					646,775	983,793	1,067,789
Rockfish	346,522	34,032	102				45,223	216,436	13,390
Sablefish	586,260						122,009	42,161	38,733
Salmon	2,336,859	1,023,919	2,001	143,113	219,934	902,003	307,116	44,088	17,790
Sandab	261,725	28,013					29,367,768	36,169	168,261,023
Sardine	140						3,561	824	83
Saxdine		46						23	53
Sculpin									
See Bass—Black									
See Bass—White			5,200				3,912	20,300	6,332

	80,282	47,253	962,302	83,518	29
Shad				216,104	8,100
Shark					703
Sheepshead	1,806			203,709	17,475
Slate	5,098				12,511
Slipjack					
Snail	10,133		9,474	199,983	49,809
Snake	195			2,874	2,874
Snout—Jack	378,459			2,996,471	303,576
Sole	14,225				60,720
Splittail					
Striped Bass	112				
Sucker	16,260			2,519	
Swordfish—Broadbill					
Swordfish—Marlin					
Tomcod	63		50	1,602	
Tuna—Bluefin					38
Tuna—Yellowfin					
Turbot	636			19,060	33
Whitebait	24,659			22,662	854
Whitefish					
Yellowtail					
Miscellaneous	4,303	178	226	17,120	2,032
Total fish	2,130,958	508,428	2,441,081	35,409,012	1,993,003
Crustaceans:					
Crab	4,332			2,284,767	25,356
Shrimp		732,846	609,905	1,539,006	2,042
Spiny Lobster					982
Mollusks:					
Abalone	123				2,135,375
Clam—Hardshell	309				54
Clam—Mixed	1,613			430	16
Clam—Pismo	2,940				21,538
Clam—Softshell	690		19,516	18,331	3,619
Mussel	180				
Octopus	15				633
Oyster—Eastern	1,717			1,649	16,921
Oyster—Native	5,389	99,615		190,957	9,142
Squid		7,009		76,080	8,105
Miscellaneous:					
Turtle					
Totals	9,980,717	1,593,321	3,070,502	39,322,232	2,030,770
					177,658,946

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

FISH AND GAME COMMISSION

CALIFORNIA FRESH FISHERY PRODUCTS FOR THE YEAR 1932—Continued

Species of fish	San Luis Obispo, Santa Barbara, Ventura.....	Los Angeles.....	Orange.....	San Diego, Imperial.....	Total.....	Fish from south of the International Boundary brought into California via San Pedro.....	Fish from south of the International Boundary brought into California via San Diego.....	Total fish from south of the International Boundary brought into California..
Albacore.....		13,260			619,684			
Anchovy.....		31,547			301,686			
Barracuda.....		1,971,905	44,338	468,358	2,500,989	371,684	49,669	421,353
Bonito.....	872	845,773	4,082	743,537	1,596,385	1,251,605	11,056	1,265,661
Cabrilla.....		10,550		786	786	102,989	237,019	340,008
Carp.....					55,965			
Catfish.....					254,027			
Cutlass.....	267	821	883	12	897,479			
Flounder.....	237	1,738	147	13	545,445			
Flying fish.....		40,335			40,555			
Hake.....		424			29,001			
Halibut.....		20,315	17	1,215	21,547			
Halibut—California.....	311,749	429,863	61,229	69,589	919,700	1,528	9,173	10,701
Halibut—Northern.....					664,109			
Hardhead.....					431,334			
Herring.....	103			11,861	763,449			
Kelp bass.....	2,116	4,606		2,304	6,722			
Kingfish.....	1,190	296,735	1,878		448,481			
Mackerel—Horse.....	1,064	416,077			537,685			
Mackerel—Pacific.....	4,996	11,513,067	108,503	178,415	12,473,596			
Mackerel—Spanish.....								
Mullet.....		2,218		16,278	19,955	3,209	7,613	10,822
Pacch.....		48,878	1,439	867	206,477		2,755	2,755
Pike.....	3,565		203		2,004			
Pompano.....		5,267	50		5,557	3,728	348	4,076
Race.....		1,399	721	60	2,180			
Rock Bass.....	5,161	214,307	21,412	182,960	423,840		1,274	4,796
Rockfish.....	85,406	1,711,961	45,661	656,947	5,624,188	3,522	10,769	10,769
Sablefish.....	94	75,731	5,987		977,153			
Salmon.....		16			4,830,738			
Sardine.....	2	6,384	277		665,345			
Sardine.....	423	113,983,741	200	544,997	312,176,406		66	66
Scupin.....	150	67,741	4,176	13,561	90,147			
Sea Bass—Black.....	8,997	44,793	17,609	160,004	231,084	150,257	92,053	242,310
Sea Bass—White.....	50,401	489,245	2,852	88,534	606,076	79,401	58,032	137,433

THIRTY-THIRD BIENNIAL REPORT

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Shad.....	87	283,701	215,192	138,357	1,173,471	118	118
Shark.....		54,864	4,156	9,391	850,770	206	246
Sheepshead.....		25,350	2,821	319	89,345	41	
Skate.....		27,278	181	347,583	290,232		
Skipjack.....		247,396	36,737	30,526	375,042	12,904,141	21,261,533
Smelt.....		6,035		42	862,421	8,267,392	
Smelt—Jack.....		11,042	1,680	1,617	29,378		
Sole.....		242,430			8,888,942		
Spittail.....					27,913		
Striped Bass.....					523,551		
Sucker.....					16,375		
Swordfish—Broadbill.....		972	28,695	205,481	651,851	2,202	10,687
Swordfish—Marlin.....		170	951	4,507	24,578	285	285
Tomcod.....					4,271		
Tuna—Bluefin.....		33		22,719	400,044	608,170	
Tuna—Yellowfin.....				160,829	165,323	10,072,041	2,992
Turbot.....			9		23,416	20,686,046	36,755,087
Whitebait.....					133,486		
Whitefish.....		1,808	59,884	87,794	149,491	2,274	12,530
Yellowtail.....		567	756,323	261,305	1,024,700	524,620	771,533
Miscellaneous.....		520	29,101	3,577	179,071	14,915	17,384
Total fish.....		800,038	134,639,899	4,417,345	364,974,096	27,456,415	61,894,041
Crustaceans:							
Crab.....			145		2,435,678		
Shrimp.....					2,682,759		
Spiny Lobster.....		95,477	141,592	64,648	318,513	25,740	700,014
Mollusks:							
Abalone.....		681,805	42		2,817,345		
Clam—Hardshell.....			29,060		152,395		
Clam—Mixed.....		28	4,021		31,723		
Clam—Pismo.....		84,810			109,967		
Clam—Softshell.....					104,921		
Mussel.....			50		21,230		
Octopus.....			70	69	21,187		
Oyster—Eastern.....			113		290,572		
Oyster—Native.....					100,220		
Squid.....			141,983	115	4,230,617		
Miscellaneous:							
Turtle.....						5,728	5,728
Totals.....		1,662,158	637,260	4,482,177	378,330,203	27,482,155	62,599,783

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

CANNED, CURED AND MANUFACTURED FISHERY PRODUCTS OF CALIFORNIA FOR THE YEAR 1932

(Compiled by the Division of Fish and Game, Bureau of Commercial Fisheries)

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.....	10-lb. (6 to case).....		115			115
	4-lb. (12 to case).....			448		448
	1-lb.		202	8,255		8,457
	1/2-lb.		12,691	41,990		54,681
	1/4-lb.		131	1,013		1,144
	1/4-lb. (96 to case).....			252		252
	1/4-lb. (100 to case).....		23	257		280
Bonito.....	1-lb.			6,072	1,739	7,811
	1/2-lb.			17,536	7,577	25,113
	1/4-lb.			4,632		4,632
	1/4-lb. (100 to case).....			3,661	897	4,558
Mackerel.....	1-lb.			84,385	184	84,569
	8-oz. (72 to case).....			1,649		1,649
	8-oz. (96 to case).....			2,958		2,958
Salmon.....	1-lb.	446				446
	1/2-lb.	1,559				1,559
Sardine.....	10-lb. (6 to case).....		1,486			1,486
	1-lb. oval.....		459,756	415,874		875,630
	1-lb. tall.....		4,467	36,292		40,759
	1/2-lb. oval.....		3,276			3,276
	1/2-lb. sq.		88			88
	6-oz. sq.		721		281	1,002
	5-oz. tall.....		17,726	54,197		71,923
	1/2-lb. sq.		321		7,360	7,681
Shad.....	1-lb. tall.....	201				201
Shad roe.....	1-lb. oval.....	50				50
	1/2-lb. oval.....	1,368				1,368
Tuna, bluefin.....	1-lb.			1,005		1,005
	1/2-lb.			6,204	177	6,381
	1/4-lb.			682		682
	1/4-lb. (100 to case).....			619		619
Tuna, striped.....	1-lb.		4,808		10,642	15,450
	1/2-lb.		62,118		159,417	221,535
	1/4-lb.		24,030		13,604	37,634
	1/4-lb. (96 to case).....			52		52
	1/4-lb. (100 to case).....			10,618	19,718	30,336
Tuna, yellowfin.....	4-lb. (12 to case).....			524		524
	1-lb.			34,492	18,292	52,784
	1/2-lb.			200,110	326,247	526,357
	1/2-lb. (50 to case).....			320		320
	1/2-lb.			27,891	57,294	85,185
	1/4-lb. (96 to case).....			259		259
	1/4-lb. (100 to case).....			11,462	1,217	12,679
	1/2-lb. (96 to case).....			205		205
Tuna flakes.....	1-lb.			1,343	745	2,088
	1/2-lb.			10,174	3,965	14,139
	1/4-lb.				64	64
Tuna, "Tonno" style.....	1/2-lb.			2,074		2,074
	1/4-lb. (100 to case).....			40,173		40,173
Yellowtail.....	1-lb.			814	98	912
	1/2-lb.			1,453	570	2,023
	1/4-lb.			180		180
Dog and cat food.....	10-lb.			4,749		4,749
	1-lb.			57,836		57,836
	1/2-lb.			1,570		1,570
	1/4-lb. (100 to case).....			53		53
	6-oz.			3,048		3,048
Totals.....		3,624	501,003	1,188,337	630,088	2,323,052

NOTE.—Forty-eight cans to the case unless otherwise specified.

**CANNED, CURED AND MANUFACTURED FISHERY PRODUCTS OF CALIFORNIA FOR THE
YEAR 1932—Continued**

Salted, Smoked and Dried

Fishery product	Size or quantity	Northern California district	Monterey district	San Pedro district	San Diego district	Total
Mackerel, salted.....	Pounds.....			3,400		3,400
Mackerel, salted.....	25-lb. kits.....		40			40
Mackerel, salted.....	50-lb. kits.....		34			34
Mackerel, salted.....	100-lb. bbls.....		1			1
Mixed fish, dried.....	Pounds.....	49,439				49,439
Mixed fish, salted.....	Pounds.....				25,026	25,026
Sablefish, smoked.....	Pounds.....	276,963				276,963
Salmon, mild cure.....	Tierces.....	832				832
Salmon, kippered.....	Pounds.....	5,281				5,281
Salmon, salted.....	Pounds.....	2,300				2,300
Salmon, smoked.....	Pounds.....	106,642				106,642
Sardines (salacchini).....	Pounds.....		3,344			3,344
Sardines, salted.....	Pounds.....		241,751			241,751
Sardines, salted.....	25-lb. kits.....		353			353
Sardines, salted.....	100-lb. bbls.....		20			20
Sardines, salted.....	280-lb. bbls.....		28			28
Sardines, smoked.....	Pounds.....	8,550	1,067			9,617
Shrimp, dried.....	Pounds.....	166,021				166,021
Shrimp meal.....	Pounds.....	343,162				343,162
Squid, dried.....	Pounds.....		916,000			916,000
Fish meal, edible.....	Tons.....		1,796			1,796
Fish meal, by-product.....	Tons.....	852	12,347	9,846	2,659	25,704
Fish oil, edible.....	Gallons.....		1,274,811	721,048		1,995,859
Fish oil, by-product.....	Gallons.....	5,853	2,525,096	572,913	25,678	3,129,540

Miscellaneous Data

Estimated value of pack.....		\$642,979	\$1,642,774	\$4,932,692	\$3,168,661	\$10,387,106
Number of employees.....		656	1,743	1,710	1,555	5,664
Value of plants.....		\$772,210	\$2,933,750	\$3,057,000	\$1,079,648	\$7,842,608

Norm.—Sardines packed and fish meal and oil produced at Pittsburg included with Monterey.

REPORT OF SARDINE PLANTS, SEASON 1932-33

The season of 1932-33 opened in Monterey and northern California on August 1st; the first delivery of fish was made at Monterey on August 13th and at Pittsburg on September 6th. In the San Pedro district the season opened on November 1st, with delivery of 748 tons on the opening day. Prior to the opening of the season, reduction permits to manufacture edible products from sardines were issued to sardine packers, most of whom started the season by manufacturing edible meal or edible oil. The production of canned goods, meal and oil of the Pittsburg plant of F. E. Booth Co., Inc., is grouped with the Monterey production. No pack of 1-lb. oval cans of sardines was made at San Diego.

CANNERY, FISH MEAL AND OIL PRODUCTION

August 1, 1932, to March 31, 1933

District	Sardines received, tons	Used for canning, tons	Used for meal, tons	Offal, tons
Monterey and Northern California.....	106,674	21,320	84,885	10,825
San Pedro.....	83,492	19,877	63,615	9,940
Totals.....	190,166	41,197	148,500	20,765
Deduct fish used for other purposes.....	129,473			
Fish used by canning plants.....	60,693			

District	1-lb. ovals packed, cases	Other size cans packed, cases	Other size cans equivalent to 1-lb. ovals, cases	Cases per ton
Monterey and Northern California.....	410,469	15,273	15,944	13.6
San Pedro.....	321,794	69,843	75,775	13.5
Totals.....	732,263	85,116	91,719	

District	Edible meal, tons	Meal (by-products), tons	Ratio per ton of meal
Monterey and Northern California.....	2,412	14,255	5.7
San Pedro.....		14,060	5.2
Totals.....	2,412	28,315	

CANNERY, FISH MEAL AND OIL PRODUCTION—Continued

August 1, 1932, to March 31, 1933

District	Edible oil, gallons	Oil (by-products), gallons	Gallons oil per ton of fish and offal	Fish used for other purposes, tons
Monterey and Northern California.....	1,594,049	2,742,296	45.3	175,352
San Pedro.....	1,625,256	536,220	29.1	54,121
Totals.....	3,219,305	3,278,516	-----	129,473

¹ 34,462 tons used for edible oil; 40,350 tons used for edible meal; 540 tons used for salting and smoking.

² 54,121 tons used for edible oil.

SARDINE CATCH IN TONS BY MONTHS, SEASON 1932-33

	Monterey and Northern California	San Pedro
August, 1932.....	1,145	-----
September.....	16,177	-----
October.....	24,027	-----
November.....	14,928	16,076
December.....	18,497	16,695
January, 1933.....	22,433	17,144
February.....	9,467	18,636
March.....	-----	14,941
Totals.....	106,674	83,492

CASE PACK OF 1-Lb. OVALS BY MONTHS, SEASON 1932-33

	Monterey and Northern California	San Pedro
August, 1932.....	-----	-----
September.....	34,934	-----
October.....	46,394	-----
November.....	55,350	75,251
December.....	96,506	48,036
January, 1933.....	106,518	39,811
February.....	70,767	84,810
March.....	-----	73,886
Totals.....	410,469	321,794

SARDINE MEAL PRODUCTION IN TONS BY MONTHS, SEASON 1932-33

	Monterey and Northern California	San Pedro
August, 1932.....	199	-----
September.....	2,452	-----
October.....	4,040	-----
November.....	2,304	2,720
December.....	2,879	2,875
January, 1933.....	3,433	3,043
February.....	1,360	3,099
March.....	-----	2,323
Totals.....	16,667	14,060

SARDINE OIL PRODUCTION IN GALLONS BY MONTHS, SEASON 1932-33

	Monterey and Northern California	San Pedro
August, 1932.....	53,418	
September.....	694,964	
October.....	1,079,879	
November.....	650,405	476,777
December.....	735,882	449,910
January, 1933.....	842,097	494,721
February.....	279,700	440,689
March.....		299,379
Totals.....	4,336,345	2,161,476

COMPARATIVE STATEMENT OF SARDINE PLANT PRODUCTION, SEASONS 1931-32 AND 1932-33

Monterey and Northern California District

	Season 1931-32	Season 1932-33	Increase 1932-33	Percentage increase
Tons of sardines received.....	88,763	106,674	17,911	20
Tons of sardines used for canning.....	52,117	21,320	*30,797	*59
Tons of sardines used for meal and oil.....	36,608	84,885	48,277	131
Tons offal.....	26,067	10,825	*15,242	*58
Cases 1-lb. ovals packed.....	990,104	410,469	*579,635	*58
Cases other size cans packed.....	50,892	15,273	*35,619	*70
Cases other size cans equivalent to cases 1-lb. ovals.....	52,197	15,944	*36,253	*68
Meal, tons.....	10,128	16,667	6,539	64
Oil, gallons.....	2,755,282	4,336,345	1,581,063	57
Tons received for edible oil and meal, and other purposes.....	15,888	75,352	59,464	374

*Decrease.

San Pedro District

	Season 1931-32	Season 1932-33	Increase 1932-33	Percentage increase
Tons of sardines received.....	42,557	83,492	40,935	96
Tons of sardines used for canning.....	31,485	19,877	*11,608	*37
Tons of sardines used for meal and oil.....	10,981	63,615	52,634	479
Tons offal.....	15,742	9,940	*5,802	*36
Cases 1-lb. ovals packed.....	470,796	321,794	*149,002	*31
Cases other size cans packed.....	159,593	69,843	*89,750	*56
Cases other size cans equivalent to cases 1-lb. ovals.....	159,066	75,775	*83,291	*52
Meal, tons.....	4,911	14,060	9,149	186
Oil, gallons.....	762,701	2,161,476	1,398,775	183
Tons received for edible oil and meal, and other purposes.....	91	54,121	54,030	

*Decrease.

SARDINE PLANTS OPERATED, SEASON 1932-33

F. E. Booth Company, Inc.	Pittsburg
Bayside Fish Flour Company	Monterey
F. E. Booth Company, Inc.	Monterey
Carmel Canning Company	Monterey
Custom House Packing Corporation	Monterey
Del Mar Canning Corporation	Monterey
E. B. Gross Canning Company	Monterey
Hovden Food Products Corporation	Monterey
Monterey Canning Company	Monterey
Old Capitol Land Company	Monterey
San Carlos Canning Company	Monterey
San Xavier Fish Packing Company	Monterey
Sea Pride Packing Corporation, Ltd.	Monterey
Coast Fishing Company	Wilmington
French Sardine Company	Terminal Island
Italian Food Products Company, Inc.	Long Beach
Sea Pride Packing Corporation, Ltd.	Terminal Island
Sea Pride Packing Corporation, Ltd.	Wilmington
Southern California Fish Corporation	Terminal Island
Van Camp Sea Food Company, Inc.	Terminal Island

FISH AND GAME COMMISSION

CALIFORNIA FRESH FISHERY PRODUCTS FOR THE YEAR 1933
 (Compiled by the Division of Fish and Game, Bureau of Commercial Fisheries)

Species of fish	Del Norte, Humboldt	Mendocino, Sonoma, Lake	Marin	Solano, Yolo	Sacramento, San Joaquin	Alameda, Contra Costa	San Francisco, San Mateo	Santa Cruz	Monterey
Albacore	70						185,095		407
Anchovy								24	90,758
Barracuda								10	5
Bonito									
Cabrilla				1,352	6,351	4,716			
Carp		46,633		454	88,757	77,109			
Catfish		2,582							
Cultus	390,436	109,378					386,900	65,201	123,626
Flounder	278,294	10,040				35	150,989	17,947	679
Flying fish									
Hake	1,715	1,725					25,991	2,629	13
Halibut									
Halibut—California									
Halibut—Northern	297,838	24,746			17,897		22,592	13,192	8,873
Hardhead		134,590							
Herring									
Kelp Bass							187,623		51,595
Kingfish						2,250			
Mackerel—Horse							13,483	26,552	162,733
Mackerel—Pacific								33,479	
Mackerel—Spanish							239	2,427	1,350,327
Mullet									
Perch	4,261	5,267					54,653	7,837	47,432
Pike				113	255	181			
Pompano						289		27	68
Ray							59		
Rock Bass									
Rockfish	435,854	81,689					5	10	
Sablefish	464,521	23,938					623,255	553,540	1,090,716
Salmon	2,793,018	597,464					117,287	202,143	36,372
Sardine	158,255	27,200	1,321	88,590	197,507	161,549	157,485	153,687	416,172
Sardine—Spanish							305,070	42,304	20,474
Sculpin							62,214,750	1,851	254,471,362
							1,324	45	

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

Original from
UNIVERSITY OF CALIFORNIA

CALIFORNIA FRESH FISHERY PRODUCTS FOR THE YEAR 1933—Continued
(Compiled by the Division of Fish and Game, Bureau of Commercial Fisheries)

Species of fish	San Luis Obispo, Santa Barbara, Ventura.....	Los Angeles.....	Orange.....	San Diego, Imperial.....	Total.....	From west coast south of the International Boundary brought into San Pedro.....	From west coast south of the International Boundary brought into San Diego.....	Total from west coast south of the Inter- national Boundary brought into California
Albacore.....		80			487			
Anchovy.....		40,783	586		317,292			160,810
Barbacuda.....	87,024	2,223,766	61,109	478,199	2,850,117		34,547	284,055
Bonito.....	1,221	970,812	6,553	1,047,235	2,025,831	126,263	96,136	84,612
Cabrilla.....				42	42	186,819	76,337	
Carp.....					59,052	8,275		
Catfish.....					168,902			
Cultus.....	393	548	11,320		1,087,802			
Flounder.....	14	2,598	1,511	22	462,129			
Flying fish.....		16,396			16,396			
Hake.....		155	5,311		37,539			
Halibut.....	276	7,786	485	339	8,866			
Halibut—California.....	322,017	392,901	65,603	78,431	903,809	91	84,305	84,396
Halibut—Northern.....					322,584			
Hardhead.....					152,487			
Herring.....	182			4,665	601,445			
Kelp Bass.....		8			1,529			
Kingsfish.....	620	1,529	11,823	1,643	564,307			
Mackerel—Horse.....	3,357	347,453	634	600	1,010,200			
Mackerel—Pacific.....	26,025	58,265,175	631,397	9,338,381	69,613,951			
Mackerel—Spanish.....						3,662	969	969
Mullet.....		1,759	38	19,990	21,787		1,185	4,847
Perch.....	6,588	35,472	1,215	349	213,801	112	2,227	2,227
Pike.....					657			112
Pompano.....	2	3,691		32	3,879		710	710
Ray.....		1,375			2,740			
Rock Bass.....	9,564	138,792	51,065	128,829	239,265			
Rockfish.....	104,722	1,211,020	92,774	558,704	4,749,274	12,647	4,646	17,293
Sablefish.....	176	221,770	265,562	1,604	1,333,373	240	36,813	87,053
Salmon.....	35				4,568,841			
Sandsh.....	32	5,578	13		1,622,994			
Sardine.....	1,239	192,737,537	50	532,591	509,959,370			
Sculpin.....	338	52,459	3,561	8,088	65,763			

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Sea Bass—Black.....	1,490	40,540	4,017	73,505	119,582	172,116	157,596	329,712
Sea Bass—White.....	85,046	538,821	7,918	185,681	824,286	39,390	295,405	334,795
Shad.....					1,132,532	61		61
Shark.....	22,303	180,302	115,789	56,289	470,969			
Sheepshead.....	8,592	40,518	1,814	7,685	58,609			
Skate.....	4	15,750	5,030	700	190,971			
Skipjack.....			10		10	5,364,639	11,312,004	16,676,633
Smelt.....	19,891	185,729	16,043	22,377	691,964		260	260
Smelt—Jack.....	14,933	4,235		349	37,311			
Sole.....	616,135	51,962	1,117	3,916	8,306,874			
Spittail.....					17,509			
Striped Bass.....					476,461			
Sucker.....					13,837			
Swordfish—Broadbill.....	13,560	505,963	56,326	234,787	810,636		40,063	40,063
Swordfish—Marlin.....		4,802	1,451	606	6,859			
Tom Cod.....					729			
Tuna—Bluefin.....		316,914		7,302	324,216	236,276		236,276
Tuna—Yellowfin.....				6,867	6,867	15,855,279	35,039,278	50,894,557
Turbot.....			4		49,615			
Whitebait.....					95,361			
Whitesh.....	249	38,396	475	42,108	81,228	5,228	8,597	13,825
Yellowtail.....		238,506	7,384	987,396	1,233,286	430,875	2,234,727	2,663,602
Miscellaneous.....	351	12,827	2,258	4,817	160,167	138	1,019	1,157
Total fish.....	1,346,377	259,826,828	1,435,692	13,832,049	617,124,210	22,442,101	49,428,824	71,870,925
Crustaceans:								
Crab.....		14,818			3,223,312			
Shrimp.....					2,088,260			
Spiny Lobster.....	129,510	156,918	20,135	73,788	380,351	21,298	648,132	669,430
Mollusks:								
Abalone.....	525,822				2,747,322			
Clam—Hardshell.....					87,897			
Clam—Mixed.....		18,505	80		23,316			
Clam—Pismo.....					105,674			
Clam—Softshell.....	79,654				173,139			
Mussel.....			465		173,139			
Octopus.....			51		31,529			
Oyster—Eastern and Japanese.....		8			415,205			
Oyster—Native.....					10,149			
Squid.....		54,634	214		824,590			
Miscellaneous:								
Turtle.....							2,901	2,901
Totals.....	2,081,363	260,071,711	1,456,637	13,905,837	627,235,411	22,463,399	50,079,857	72,543,256

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

CANNED, CURED AND MANUFACTURED FISHERY PRODUCTS OF CALIFORNIA FOR THE YEAR 1933

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 to case).....			128		128
	1-lb.....			4,948		4,948
	$\frac{1}{2}$ -lb.....			42,952		42,952
	$\frac{1}{4}$ -lb.....			1,363		1,363
Anchovy.....	$\frac{1}{2}$ -lb.....			2,076		2,076
Bonito.....	1-lb.....			2,174	2,446	4,620
	$\frac{1}{2}$ -lb.....			13,120	15,590	28,710
	$\frac{1}{4}$ -lb.....			2,598	93	2,691
	$\frac{1}{4}$ -lb. (100 to case).....				539	539
Mackerel.....	1-lb. oval.....		50			50
	1-lb. tail.....		7,672	578,004	100,801	686,477
	1-lb. rd.....			898	82	980
	$\frac{1}{2}$ -lb.....			36,082	9,210	45,292
	12-oz.....			26,830		26,830
	$\frac{1}{4}$ -lb.....				497	497
Salmon.....	1-lb. flat.....	927				927
	$\frac{1}{2}$ -lb. flat.....	4,297				4,297
Sardine.....	1-lb. oval.....		838,533	365,750		1,204,283
	1-lb. tail.....		47,575	57,969		105,544
	$\frac{1}{2}$ -lb. oval.....		4,604			4,604
	5-oz. tall.....		38,013	53,996		92,009
	10-lb. (6 to case).....		1,336			1,336
	12-oz.....			4,336		4,336
	9-oz. (100 to case).....		40			40
	$\frac{1}{4}$ -lb. sq.....		116		10,592	10,708
Shad roe.....	1-lb.....	53				53
	$\frac{1}{2}$ -lb. oval.....	1,316				1,316
Squid.....	9-oz.....		1,740			1,740
Tuna, Bluefin.....	1-lb.....			245		245
	$\frac{1}{2}$ -lb.....			3,217	1	3,218
	$\frac{1}{4}$ -lb.....			1,725		1,725
	$\frac{1}{4}$ -lb. (100 to case).....			2,393		2,393
Tuna, striped.....	1-lb.....			5,050	5,831	10,881
	$\frac{1}{2}$ -lb.....			42,622	152,804	195,426
	$\frac{1}{4}$ -lb.....			23,047	12,887	35,934
	$\frac{1}{4}$ -lb. (100 to case).....			4,009	26,791	30,800
Tuna, yellowfin.....	4-lb. (12 to case).....					
	1-lb.....			528		528
	1-lb.....			25,382	53,429	78,811
	1-lb. tall.....			1,580		1,580
	$\frac{1}{2}$ -lb.....			188,543	510,449	704,992
	$\frac{1}{4}$ -lb.....			27,407	94,990	122,397
	$\frac{1}{4}$ -lb. (100 to case).....			10,183	13,942	24,125
	12-oz.....			5,359		5,359
Tuna flakes.....	1-lb.....			1,540	133	1,673
	$\frac{1}{2}$ -lb.....			9,367	1,960	11,327
	$\frac{1}{4}$ -lb.....				90	90
Tuna, "Tonno" style.....	$\frac{1}{2}$ -lb.....			3,442		3,442
	$\frac{1}{4}$ -lb. (100 to case).....			37,758		37,758
Yellowtail.....	1-lb.....			860	9,558	10,418
	$\frac{1}{2}$ -lb.....			529	22,571	23,100
Dog and cat food.....	10-lb.....			5,074		5,074
	1-lb.....			102,324		102,324
	6-oz.....			5,282		5,282
	$\frac{1}{4}$ -lb. (100 to case).....			45		45
Totals.....		6,593	939,679	1,700,735	1,051,286	3,698,293

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 1933—Continued**

Salted, Smoked and Dried

Fishery product	Size or quantity	Northern California district	Monterey district	San Pedro district	San Diego district	Total
Anchovy, salted.....	Pounds.....		420			420
Mackerel, salted.....	Pounds.....		1,225			1,225
Mixed fish, dried.....	Pounds.....	41,606				41,606
Mixed fish, salted.....	Pounds.....			4,189	184,502	188,691
Mixed fish, smoked.....	Pounds.....			2,390		2,390
Sablefish, smoked.....	Pounds.....	164,460				164,460
Salmon, mild cured.....	Tierces.....	1,157	121			1,278
Salmon, smoked.....	Pounds.....	90,295				90,295
Sardines, salted.....	Pounds.....	3,200	67,768			70,968
Shad, mild cured.....	Tierces.....	267				267
Shrimp, dried.....	Pounds.....	121,684				121,684
Shrimp meal.....	Pounds.....	239,093				239,093
Fish meal.....	Tons.....	4,941	18,869	18,249	4,310	46,369
Fish oil.....	Gallons.....	933,696	4,209,366	2,585,784	58,948	7,787,794

Miscellaneous Data

Estimated value of pack.....		\$1,393,629	\$3,214,332	\$6,402,092	\$5,306,911	\$16,406,964
Number of employees.....		564	1,648	1,751	1,571	5,534
Value of plants.....		\$1,311,418	\$2,925,908	\$2,041,522	\$893,927	\$7,172,775

REPORT OF SARDINE PLANTS, SEASON 1933-34

The season of 1933-34 opened on August 1st in Monterey and northern California, but as the full moon occurred on August 5th no fish were brought into Monterey until the 10th or in northern California until the 16th. There was a strike of fishermen between September 20th and October 15th. In the San Pedro district the season opened on November 1st, but as this was during a full moon period, the first fish were delivered on the 8th. There was a change in the law pertaining to issuance of permits by the Division of Fish and Game for the use of sardines by reduction process for the manufacture of fishery products, which became effective August 21st. No permits were issued until August 21st, and all fish delivered between August 1st and 20th were used for canning purposes.

This report covers operations of shore plants only. However, during the season four floating reduction plants operated off the California coast and it is estimated that these floating plants took approximately 77,132 tons of sardines, and produced 12,861 tons of meal and 2,647,466 gallons of oil. Adding the amount of their take to that of the shore plants as shown below would make a total catch of 390,974 tons of sardines taken off the coast of California during the season. The tables shown below do not include sardines taken for fresh fish markets, bait, quarter oil pack and a small quantity used with other ingredients in the manufacture of pet food. The following plants operated during the season:

MONTEREY AND NORTHERN CALIFORNIA DISTRICT

Bayside Fish Flour Co., Monterey
Bayside Fish Flour Co., Richmond
Benicia Fisheries, Inc., Benicia
F. E. Booth Co., Inc., Monterey
F. E. Booth Co., Inc., Pittsburg
California Packing Corporation, Monterey
Carmel Canning Company, Monterey
Custom House Packing Corporation, Monterey
Del Mar Canning Corporation, Monterey
E. B. Gross Canning Co., Monterey
Hovden Food Products Corporation, Monterey
Monterey Canning Company, Monterey
Old Capitol Land Company, Monterey
Pittsburg Cannery, Inc., Pittsburg
San Carlos Canning Co., Monterey
San Xavier Fish Packing Co., Monterey
Sea Pride Packing Corporation, Ltd., Monterey

SAN PEDRO DISTRICT

California Packing Corporation, Terminal Island
Coast Fishing Co., Wilmington
Franco-Italian Packing Co., Terminal Island

French Sardine Co., Inc., Terminal Island
 Italian Food Products Co., Inc., Long Beach
 George F. Klampe, Long Beach
 Sea Pride Packing Corporation, Ltd., Terminal Island
 Sea Pride Packing Corporation, Ltd., Wilmington
 Southern California Fish Corporation, Terminal Island
 Van Camp Sea Food Co., Inc., Terminal Island

SAN DIEGO DISTRICT

Westgate Sea Products Co., San Diego

PRODUCTION OF SARDINE PLANTS

August 1, 1933 to March 31, 1934

District	Sardines received, tons	Used for canning, tons	Used for meal and oil, tons	Offal, tons
Monterey and Northern California.....	187,404	54,707	132,610	27,351
San Pedro.....	124,950	42,908	82,042	21,452
San Diego.....	1,488	239	1,249	120
Totals.....	313,842	97,854	215,901	48,923
Deduct fish received for purposes other than canning.....	170,155			
Received by canning plants.....	143,687			

¹ The law requires that 13½ cases of 1-lb. oval cans or the equivalent be canned from each ton of sardines received for canning, but in figuring the 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 equivalents of 1-lb. ovals cases	Cases per ton
Monterey and Northern California.....	970,504	120,138	123,688	13.5
San Pedro.....	526,540	327,361	331,631	13.8
San Diego.....		4,857	5,396	22.5
Totals.....	1,497,044	452,356	460,715	

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.....	27,279	5.8	5,995,301	37.5	*106,185
San Pedro.....	19,166	5.4	3,242,899	31.3	*62,721
San Diego.....	262	5.2	24,303	17.7	*1,249
Totals.....	46,707		9,262,503		170,155

* 106,044 tons used for manufacture of meal and oil; 141 tons for salting and pickling.

* 62,721 tons used for manufacture of meal and oil.

* 1,249 tons used for manufacture of meal and oil.

SARDINE CATCH BY MONTHS, SEASON 1933-34

	Monterey and Northern California, tons	San Pedro, tons	San Diego, tons
August, 1933.....	19,976	-----	-----
September.....	14,764	-----	-----
October.....	17,635	-----	-----
November.....	41,175	17,920	-----
December.....	31,402	27,616	-----
January, 1934.....	35,081	21,626	585
February.....	27,371	43,789	680
March.....	-----	13,999	223
Totals.....	187,404	124,950	1,488

PACK OF 1-LB. OVALS BY MONTHS, SEASON 1933-34

	Monterey and Northern California, cases	San Pedro, cases	San Diego, cases
August, 1933.....	95,019	-----	-----
September.....	58,218	-----	-----
October.....	74,413	-----	-----
November.....	212,808	51,619	-----
December.....	220,767	112,580	-----
January, 1934.....	186,968	81,667	-----
February.....	122,311	247,152	-----
March.....	-----	33,522	-----
Totals.....	970,504	526,540	-----

PACK OF OTHER SIZE CANS REDUCED TO EQUIVALENTS OF 1-LB. OVALS BY MONTHS, SEASON 1933-34

	Monterey and Northern California, cases	San Pedro, cases	San Diego, cases
August, 1933.....	12,370	-----	-----
September.....	9,890	-----	-----
October.....	17,678	-----	-----
November.....	25,453	24,212	-----
December.....	19,389	59,011	-----
January, 1934.....	23,646	77,023	1,322
February.....	15,262	134,285	-----
March.....	-----	37,100	4,074
Totals.....	123,688	331,631	5,396

SARDINE MEAL PRODUCTION BY MONTHS, SEASON 1933-34

	Monterey and Northern California, tons	San Pedro, tons	San Diego, tons
August, 1933.....	2,840	-----	-----
September.....	2,281	-----	-----
October.....	2,623	-----	-----
November.....	5,994	2,953	-----
December.....	4,364	4,351	-----
January, 1934.....	5,099	3,375	106
February.....	4,078	6,175	148
March.....	-----	2,312	8
Totals.....	27,279	19,166	262

SARDINE OIL PRODUCTION BY MONTHS, SEASON 1933-34

	Monterey and Northern California, gallons	San Pedro, gallons	San Diego, gallons
August, 1933.....	539,117	-----	-----
September.....	510,303	-----	-----
October.....	581,466	-----	-----
November.....	1,368,269	470,969	-----
December.....	1,031,064	787,230	-----
January, 1934.....	1,172,333	503,317	8,312
February.....	792,749	1,168,132	15,437
March.....	-----	313,251	554
Totals.....	5,995,301	3,242,899	24,303

COMPARATIVE STATEMENT OF SARDINE PLANT PRODUCTION, SEASONS 1932-33 AND 1933-34

Monterey and Northern California District

	Season 1932-33	Season 1933-34	Increase 1933-34	Percentage increase
Tons of sardines received.....	106,674	187,404	80,730	75
Tons of sardines used for canning.....	21,320	54,707	33,387	156
Tons of sardines used for meal and oil.....	84,885	132,610	47,725	56
Tons of offal.....	10,825	27,351	16,526	152
Cases of 1-lb. ovals packed.....	410,469	970,504	560,035	136
Cases of other size cans packed.....	15,273	120,138	104,865	686
Cases of other size cans reduced to equivalents of 1-lb. ovals.....	15,944	123,688	107,744	675
Meal, tons.....	16,667	27,279	10,612	63
Oil, gallons.....	4,336,345	5,995,301	1,658,956	38
Tons of sardines received for purposes other than canning.....	75,352	106,185	30,833	41

San Pedro District

	Season 1932-33	Season 1933-34	Increase 1933-34	Percentage increase
Tons of sardines received.....	83,492	124,950	41,458	49
Tons of sardines used for canning.....	19,877	42,908	23,031	116
Tons of sardines used for meal and oil.....	63,615	82,042	18,427	29
Tons of offal.....	9,940	21,452	11,512	116
Cases of 1-lb. ovals packed.....	321,794	526,540	204,746	63
Cases of other size cans packed.....	69,843	327,361	257,518	368
Cases of other size cans reduced to equivalents of 1-lb. ovals.....	75,775	331,631	255,856	337
Meal, tons.....	14,060	19,166	5,106	36
Oil, gallons.....	2,161,476	3,242,899	1,081,423	50
Tons of sardines received for purposes other than canning.....	54,121	62,721	8,600	16

CASE PACK, MEAL AND OIL PRODUCTION

For Sardine Packing Seasons

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	908,858	-----	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	1,493,615	16,551	3,514,210
1930-1931.....	1,336,225	403,041	-----	1,739,266
1931-1932.....	990,104	470,796	-----	1,460,900
1932-1933.....	410,469	321,794	-----	732,263
1933-1934.....	970,504	526,540	-----	1,497,044

FISH AND GAME COMMISSION

Other Size Cans Reduced to Equivalents of 1-lb. Ovals

Season	Monterey and Northern California, cases	San Pedro, cases	San Diego, cases	Total, cases
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	10,388	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

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

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

CASE PACK, MEAL AND OIL PRODUCTION FOR CALENDAR YEARS 1916-1933

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	12,135	1,336,554
1925.....	737,743	920,191	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	498,996	-----	1,503,211
1932.....	459,756	415,874	-----	875,630
1933.....	838,533	365,750	-----	1,204,283

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

Includes meal produced from sardines and other species of fish.

THE FISH AND GAME COMMISSION

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	16,507	336,738
1922.....	295,858	244,310	6,882	547,050
1923.....	576,553	346,883	29,452	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

Includes oil produced from sardines and other species of fish.

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