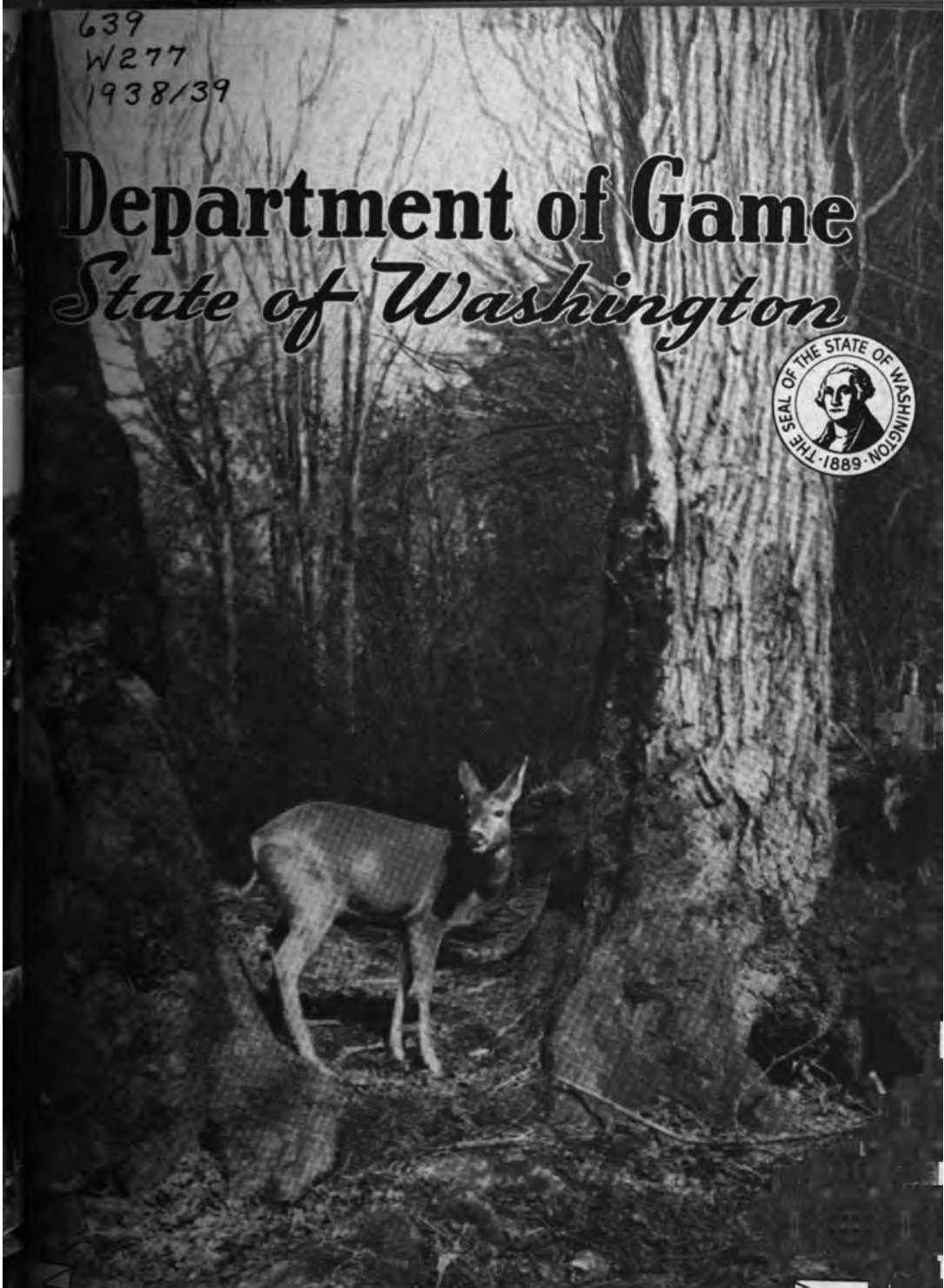
Department of Game
State of Washington



FOURTH BIENNIAL REPORT

of the Washington State Game Commission

1933-1939

FOURTH BIENNIAL REPORT

OF THE

WASHINGTON STATE GAME COMMISSION

April 1, 1938, to March 31, 1940

WASHINGTON STATE GAME COMMISSION

Department of Game

Virgil B. Bennington, Chairman.....Walla Walla
Thomas A. E. Lally.....Spokane
Claude C. Snider.....Vancouver
Dr. H. C. Nickelsen.....Tacoma
Lou Ovenden .....Wenatchee
Harry G. LeGear.....Port Angeles

Bernard T. McCauley.....Director of Game

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LETTER OF TRANSMITTAL

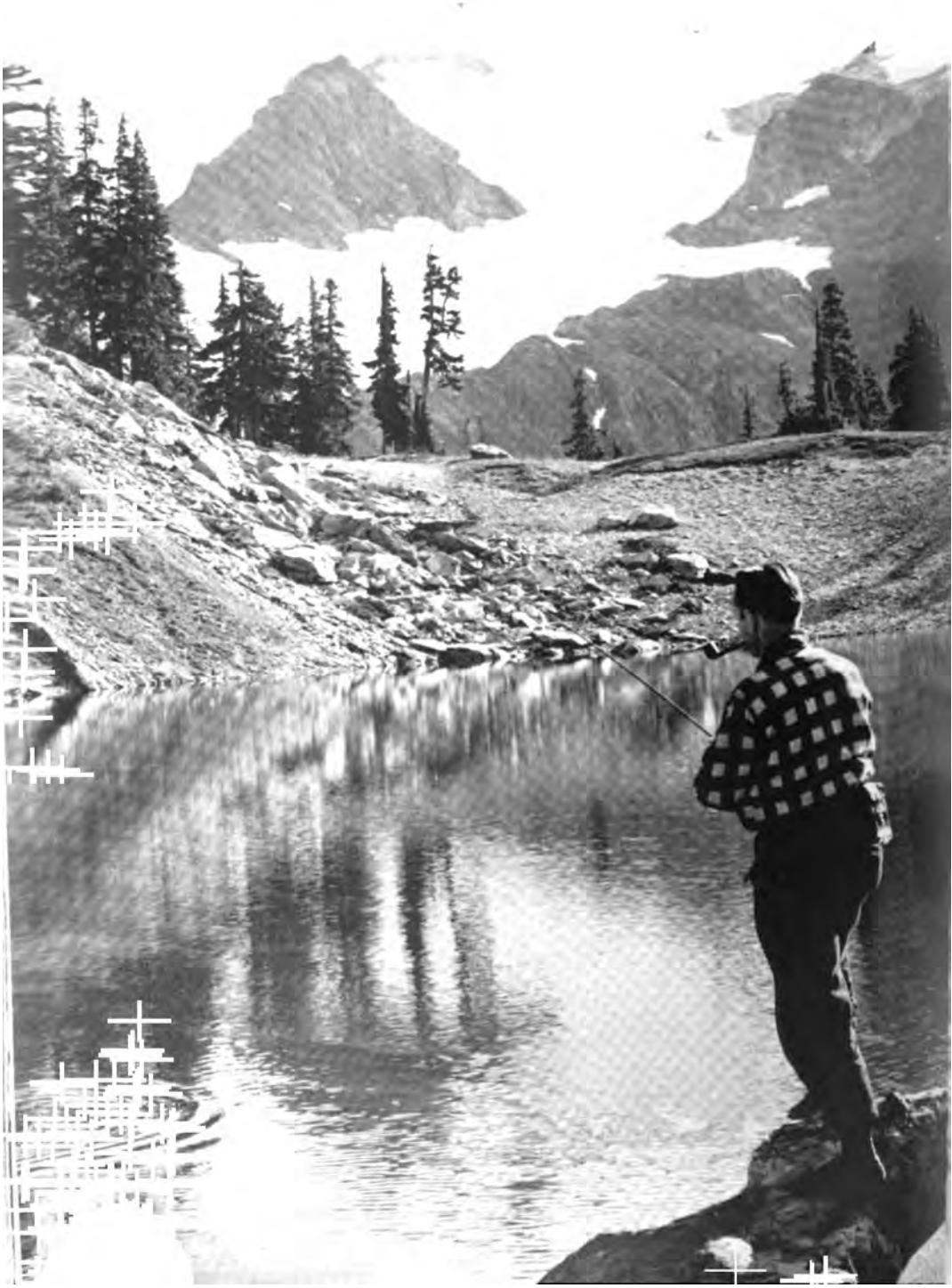
To His Excellency,
Clarence D. Martin,
Governor of the State of Washington,
Olympia, Washington.

Dear Sir:

Herewith is submitted in accordance with law, the fourth report of the Washington State Game Commission for the biennial period beginning April 1, 1938, and ending March 31, 1940, inclusive.

Respectfully submitted,

WASHINGTON STATE GAME COMMISSION
Virgil B. Bennington, Chairman,
Thos. A. E. Lally,
Claude C. Snider,
Dr. H. C. Nickelsen,
Lou Ovenden,
Harry G. LeGear.



FOREWORD

Modern trends in wildlife conservation today lean more to the scientific treatment of game problems and management of game projects. Application of biology to the solution of range, disease, predators and other problems affecting the survival of game is of comparatively recent development. In the 18th and 19th centuries little was done to aid wildlife while in the 20th century the teaching of college courses in science and subjects related to wildlife management has opened the way for a new and constructive era in American game conservation.

In the preparation of the Fourth Biennial Report of the Washington State Game Commission, it is the desire of the Commission to report the progress and activities of the Washington State Department of Game for the last biennial period, April 1, 1938, to March 31, 1940. It will be noted by the nature of the report that the past two years comprise a "biological era" in the eight year growth of the Department. By the statement of facts an effort will be made to show the influence biological science and research methods have played in the carrying out of such important phases of the Department's program as winter game surveys, lake and stream surveys, range problems, and disease conditions affecting upland birds and big game. The Commission has been careful to select biologists who have specialized in each of the several scientific problems confronting wildlife in Washington. It is important to place trained men to study and investigate the biological conditions under which wildlife lives. Obtaining accurate data from biologists on habits and habitat of state game life is essential in the establishment of policies and administration of work dealing with game management.

The increase in fishing and hunting licenses sold since 1933 indicates the growing popularity of sport fishing and hunting and this increase in license holders is being met by the construction of new modern hatcheries and game farms, by game surveys and the general expansion of the departmental program. In 1933 there were 129,622 license holders in Washington, while for the calendar year 1939 the records show a total of 219,278 licenses issued. Fishing attracted more than 12,000,000 people in the United States to lakes and streams for the year 1939.

It is the express desire of the Washington Game Commission to present this report of fact-finding material in a manner which will be readily understandable to readers and sportsmen, giving a clear concept of the administration and progress of the Department of Game.

The growing realization of the recreational values of state game life has made the conservation of wildlife one of the most vital functions of state government. More and more the public is enjoying the outings afforded in the Evergreen State. Through a broadening of the scope of departmental work, it is believed that greater outdoor recreation will be afforded sportsmen in the future.

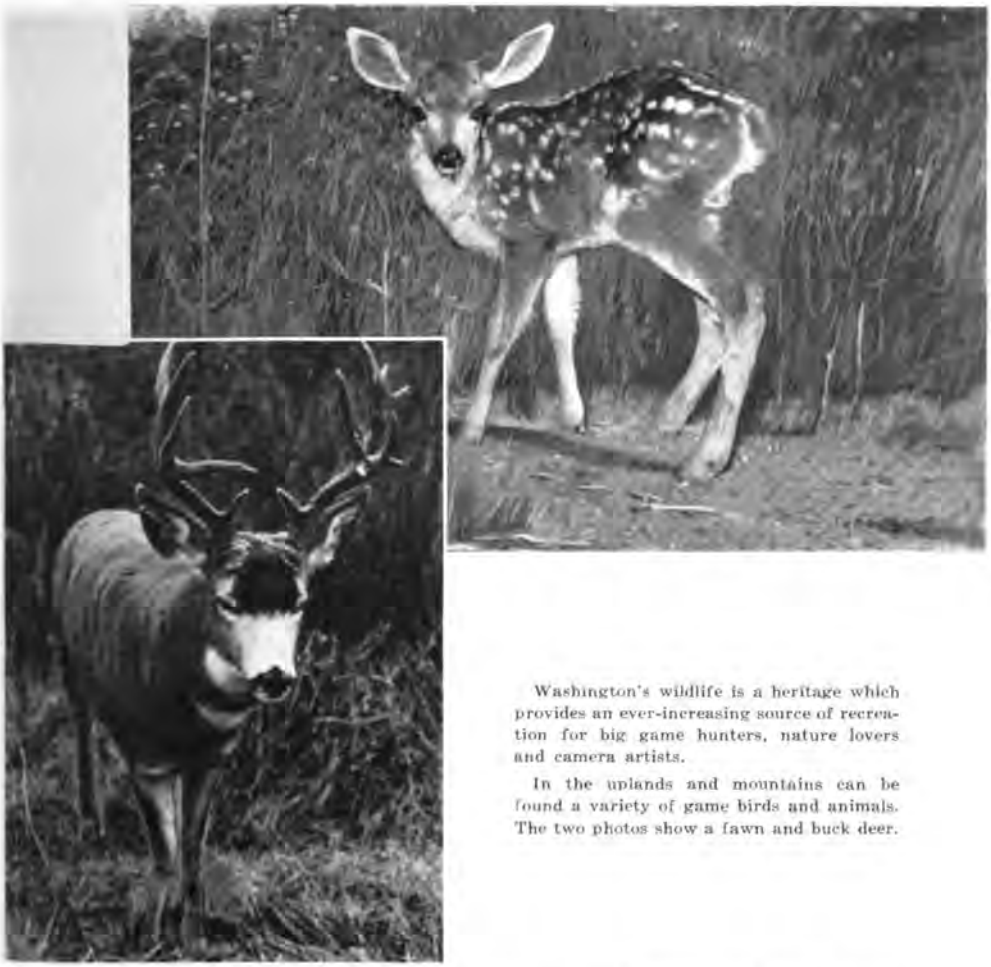
Under the guidance of the State Game Commission several noteworthy developments have been achieved during the last biennium. New construction includes rehabilitation of the South Tacoma hatchery, completion of the modern Vancouver and Goldendale hatcheries and improvements to the Bellingham and Aberdeen plants. Further description of these improvements will be given later in this report. The new hatchery under construction at Arlington, Snohomish County, will be in operation by autumn, 1940. Purchase of the Kennewick game farm and building of the Chukar partridge farm at Yakima are biennial achievements in game farm expansion, while plans are under way to electrify the Kennewick game farm. These points of expansion are part of the planned development program laid down at the beginning of the biennium.

Conservation may be briefly summarized as meaning the "wise use and preservation of our natural resources." In the light of current biological studies in game management, wildlife may be likened to a crop which is sowed, propagated and harvested. Never since the entrance of Washington to statehood has the need of a correlated and comprehensive plan for state fish and game become more apparent. The ratio of persons owning a hunting and fishing license in Washington now represents about one-eighth of the total population of the commonwealth. Seven years ago the ratio of license holders in relation to the total population was one license holder to sixteen Washington residents.

With the expanding program designed to meet the problems of the day, the Commission has endeavored to advise and inform sportsmen of its plans for future development. The Commission is delegated to administer the affairs of the Department of Game and the program outlined by them is carried out by the Director of Game. Each commissioner is appointed by the Governor for a six-year term.

As public interest continues in wildlife conservation, thousands of state sportsmen are joining in fostering wildlife projects, lending their united support in departmental expansion and in a number of ways giving their cooperation to the Commission. This support is most vital to the successful culmination of a progressive and adequate wildlife program in Washington.

Administering the affairs of a large conservation agency, such as the Washington State Department of Game, continues to become increasingly complex as license holders increase and propagation, biological and departmental functions are expanded. Appreciation is expressed by the Game Commission for wholehearted cooperation given by the State Game Director, supervisors and employees for efficiently and enthusiastically carrying out the program and policies of the Commission. This tribute is due the personnel of the Department of Game for working together with a unity of purpose and advancing the Department to a high standard of progress the past two years. The scope of this progress embraces all phases of operations of the



Washington's wildlife is a heritage which provides an ever-increasing source of recreation for big game hunters, nature lovers and camera artists.

In the uplands and mountains can be found a variety of game birds and animals. The two photos show a fawn and buck deer.

Department as are pictured in the ensuing Fourth Biennial Report. The Commission and entire departmental staff can feel a sense of pride in this record of service.

Sportsmen of Washington, collectively and individually, have aided the cause of wildlife conservation in a number of helpful ways. Some of the more general activities of sportsmen include assisting the Department in bird and fish planting and sponsorship of junior sportmen's clubs which are aimed to create a broader understanding and appreciation of state game resources. Sportsmen's organizations have consistently worked to procure needed legislation benefiting fish and game resources, while their work in the field of predatory control is well known and has yearly increased in value to the Department of Game. With many sportsmen's clubs, predatory drives, crow shoots and vermin hunts are annual events with a varied assortment of prizes as rewards. Many clubs today foster predatory hunts among junior sportsmen and there were many outstanding examples of work accomplished in this field that were reported to the Department during the last biennium.

The State Game Commission cites the various conservation and sportsmen's organizations in the state and commends their work in conservation service as praiseworthy and worthwhile aids to Washington wildlife.

Snow-capped peaks towering over Lake Chelan are the home of the mountain goat.

State, Federal Cooperation

In the final consummation of conservation objectives, it is well known that a great number of questions demand the cooperation and joint consideration of several agencies, state and federal. It is also clear that in the broadened scope of wildlife conservation today wildlife agencies are dependent upon each other and their united support is vital to the successful carrying out of important projects. Such wholehearted aid was received from both federal and state agencies and the Washington press during the expansion era just past. Much valuable assistance was rendered the Department of Game by these agencies and the Commission wishes to cite this worthwhile support.

Aid Received From State and Federal Agencies

Among federal agencies, the aid received from the Works Progress Administration, the Fish and Wildlife Service and the U. S. Forest Service was outstanding. In the State of Washington, the Commission has found the cooperation of the following departments most helpful in the completion of many plans and projects: State Attorney General's office, Department of Fisheries, Department of Health, Department of Conservation and Development and the State Progress Commission.

In its interpretation of game matters, and use of Department of Game news material, the state press has been most fair and impartial. Throughout the biennium there were many instances where specific information and data should be presented to the general public and the response received from daily and weekly newspapers was most gratifying. Many newspapers are

keeping pace with the increased interest of their readers in game conservation and are devoting more space to wildlife features and topics.

Scientific Assistance Given Department of Game

During the early development of a biological division within the Department of Game, the support and assistance of the University of Washington School of Fisheries and Dr. Lauren Donaldson, have served to guide the Department over many problems in the preliminary work of planning. Assistance has also been given by the International Fisheries Commission. This cooperation has continued in the form of constructive aid during the last biennium. Technical and scientific facilities of the agencies' laboratories have been made available to Department of Game biologists. The Commission is appreciative of this assistance. Likewise, the Western Washington Experimental Station, Puyallup, has been of help in the solving of pheasant disease and feeding problems. Staff members of the Division of Game Management, Department of Zoology, Washington State College, have afforded the Department of Game access to laboratories and, in addition, assisted in big game and upland bird surveys. They have extended the Department their services in the solution of biological questions pertaining to state game life.

A band of native Washington elk browses on an Olympic Peninsula river-bottom, near Lake Quinault.

Game protectors' annual conference. Upper, class study in ballistics; lower, luncheon at Beaver Lake Resort. Meetings are planned to school protectors in modern conservation methods. Program includes discussions on game problems, talks by wildlife specialists and demonstrations.

Game Protection Division

GUARDIAN of fish and game life throughout the 66,836 square miles comprising the State of Washington, is the game protector. Each of the 62 regular protectors is charged with the management and protection of game in his district. His routine duties are numerous and varied. In recent years the protector's work has dealt mainly with conservation practices incidental to the care and welfare of wildlife. Much of his time is spent in field service and management. Education and practical experience in game conservation are required of applicants for posts as game protectors in order to cope with the constantly changing nature of wildlife conservation methods.

A Bond of Friendship and Understanding

There is a closer bond of friendship and understanding between game protectors and sportsmen in the state today than, perhaps, ever before. Consideration and utmost courtesy toward license holders and the public are expected of game protectors. In many ways their suggestions to sportsmen in the field have made outings more enjoyable. These suggestions have included information relative to likely hunting and fishing areas and data pertaining to general field conditions, weather, accommodations and the answering of queries. In the apprehension of game violators, cases are handled with the least inconvenience to arrested persons, and they are accorded fair treatment.

Cooperation of Sportsmen Aids Wildlife

Much valuable assistance has been received by protectors in the course of the year that has proved helpful in game matters. This spirit of service demonstrated by game protectors in their districts has reacted favorably with sportsmen and sportsmen's clubs, and the intimate understanding and cooperation now existent between protectors and sportsmen are providing wildlife with greater all-round conservation. The protectors' dealings with the general public have been most friendly and conducive to a mutual, common-ground relationship for the betterment of wildlife.

Protectors Seek Only Bona Fide Cases

While patrolling his district and carrying on the duties of game management in the field, the protector is on the lookout for poachers, fur bootleggers and violators of all descriptions. The protector seeks only bona fide cases with established evidence. The public is given the benefit of the doubt in all fish and game cases. This fact is borne out by a comparison of arrests, convictions and acquittals for the past six years. For example, during the fiscal year 1939, arrests totalled 1,637, and convictions, 1,580. There were 57

acquittals. A comparatively small percentage of suspended sentences or fines is recorded. If there were wide latitude in the number of arrests and convictions, it could be contended that many arrests were made on insufficient evidence. Game laws are made to curb those individuals who violate the rights of others by poaching game and failure to abide by measures enacted to safeguard wildlife. (See table on page 18.)

Field Routine of the Game Patrol Force

The belief is general that game protectors devote a considerable amount of their time to police work. It has been explained that arrests are made in the course of their duties in many varied fields of conservation. A short enumeration of some of the most important phases of their routine will further emphasize this fact. The field work of the protector is thus summarized:

Fish Salvage

When flood waters rise in the early spring it is necessary to carry on fish salvage work and this is largely the job of the game protector. Many thousands of fish are removed from lakes and streams after waters overflow their banks. During summer dry periods the protector salvages fish from drying pools and ponds and transports them to lakes. This form of fish control work has proved very beneficial. Many thousands of scavenger fish, such as squawfish, carp and other rough fish, are seined from trout lakes giving greater freedom of growth to trout and game fish.

Predatory Control

A large number of predatory birds and predatory animals were again taken by the patrol force during the fiscal year of 1939. By devoting considerable of his time in the field to this work, the protector is able to cope with preda-

Left, a game protector examines a predatory beaver skin. Beaver are dead trapped only when it is found impracticable to transfer the animals from damage areas. Lower, bountying coyote and bobcat skins in Okanogan county.

Checking stations are located in game areas. Here hunting data is compiled along with the take of big game and birds.

tors. It is a task which demands year-round vigilance, but which, in turn, reaps a heavy harvest of the natural enemies of fish and game. The number of game birds and animals which are saved for the sportsmen's bags by predatory control is incalculable, but it is known that it represents a sizable figure.

Predatory Bounties

Funds obtained from the sale of big game seals at fifty cents each, to pay predatory bounty hunters, are disbursed from the main office, but actual bountying of pelts is assigned to game protectors. For the fiscal year 1938, a total of 9,752 predators was bountied and payments made aggregating $35,-274.00. Figures for the fiscal year 1939 show 9,881 animals bountied and payments made totalling $47,501.50.

Fish and Bird Plantings

A large share of the more than 100,000 Chinese pheasants and 42,000,000 trout distributed during the last fiscal year were planted with the assistance of the game protectors in their districts, as they assist planting crews through the routine of loading, hauling and release. Many loads of trout are carried on the protectors' half-ton pickup trucks and planted in the high lakes. The pro-

The Washington Big Game Hunters Protective Association holds its annual predatory animal drive, Spring, 1940. The photo shows the sportsmen with a part of their kill. Twenty-one wildcats and one cougar were bagged during the drive. Scene of the contest was Grays Harbor county and the Olympic Peninsula. This is an example of the many helpful conservation services rendered wildlife by sportsmen's clubs throughout the state.

tector's intimate knowledge of game conditions in his district is of definite value in the efficient stocking of fields and streams.

Damage Areas

Through cooperation with property owners, protectors have been able to remedy many cases of bird and animal damage. Use of flares, electric fences and other devices has worked to advantage in some cases. Seasons have been changed to conform with local conditions and every effort has been made to aid the property owner and farmer. The damage situation is an acute problem in some regions and it appears that a legislative enactment will be required to solve this problem.

Beaver Control

Beaver live-trapped out of damage areas by the patrol force for the fiscal year 1939, numbered 346 which were transplanted in areas where there could be no possibility of damage to private property. Beaver in Washington are increasing each year and it will undoubtedly be necessary to live-trap more beaver in the ensuing biennium. Transplanted from damage areas, beaver are valuable to stockmen and farmers because their dams are an aid to irrigation. Beaver and predatory animal trapping are being done by the protectors rather than being assigned to a few trained men as heretofore. They are becoming well grounded and experienced in trapping and the protector's value in predatory control has reached a high standard of efficiency. Additional live traps have been purchased for beaver control work and every effort is being made to control beaver damage. Beaver will then be stocked in areas where the animals have been depleted, thus increasing the supply in the more primitive regions of the state.

Left, western red tail hawk. Right, the bobcat is one of three predatory animals upon which the state pays bounties.

Live-trapped beaver are tagged or marked for the purpose of checking migratory tendencies. A further discussion of beaver will be found under "Raw Furs and the Fur Industry."

Checking Stations

To assist in enumerating the birds and big game taken by hunters during the seasons, the Department of Game has maintained checking stations at a number of the highway junctions throughout the state. Hunters are checked in and out of game areas and data is gathered pertaining to the take of game, its condition and general factual statistics which aid biologists in the management of wildlife, and it is due largely to the cooperation of the sportsmen that checking station information has been obtained in complete form.

Training School Helps Game Protectors

Efficiency and training in game management methods are taught game protectors at an annual meeting of the force. The program deals with discussions of game surveys and biological research, the game code, wildlife management and the general routine work of protectors.

The training school has been found to be of definite assistance to protectors in preparing them to better cope with the problems of game management in their districts and broadening their knowledge of conservation.

Protectors Equipped for Field Service

Protectors are now being supplied with half-ton pickup trucks for patrolling. This general utility vehicle is preferred in a number of ways to the coach model patrol car as it can be used to advantage in carrying out bird and fish plantings as well as for other duties. Many protectors have their trucks equipped for sleeping and cooking in the field.

Three boats are operated for patrolling public waters. One is stationed at Friday Harbor for use in patrolling the San Juan Islands. A fast speedboat is used in King County for patrolling Lake Washington and Lake Union, and Puget Sound waters, while the large sea-going boat at Lake Chelan is used for patrol work and also for fish planting in the upper tributaries of Lake Chelan.

PROTECTION DIVISION

ADMINISTRATION AND GENERAL EXPENDITURES

April 1, 1938, to March 31, 1939—April 1, 1939, to March 31, 1940

	Fiscal Year April 1, 1938, to March 31, 1939		Fiscal Year April 1, 1939, to March 31, 1940	
Salaries and wages	$89,584 23		$91,811 59	
State car expense	15,988 19		13,473 81	
New state cars	5,984 67		3,808 15	
Private mileage	20,835 45		19,858 08	
Fares	358 22		268 38	
Meals and rooms	8,581 99		6,904 32	
Telephone and telegraph	606 98		531 06	
Postage, freight and express	337 62		96 40	
Boat expense	1,041 17		2,475 95	
Medical aid	1,189 77		531 39	
New equipment	1,714 81		653 26	
Miscellaneous	2,274 24		1,780 21	
Totals		$148,497 34		$142,192 60
TEMPORARY PROTECTORS				
Salaries and wages	$12,021 78		$13,927 77	
State car expense			387 11	
Private mileage	128 25		1,954 48	
Fares	9 99		30 90	
Meals and rooms	430 58		1,054 05	
Boat expense			13 56	
Medical aid	99 53		34 88	
Miscellaneous	11 02		173 41	
Totals		$12,701 15		$17,576 16
Grand totals		$161,198 49		$159,768 76
Feed in the open		$99 88		$232 95

Protectors gather information from a hunting party on a mountain trail in big game country.

LIVE TRAPPING

April 1, 1938, to March 31, 1939—April 1, 1939, to March 31, 1940

	Fiscal Year April 1, 1938, to March 31, 1939	Fiscal Year April 1, 1939, to March 31, 1940		
	Birds	Birds	Deer	Elk
Salaries and wages	$589 08	$1,440 36	$371 03	$364 71
State car expense	47 88	96 26	37 23	13 81
Private mileage	89 76	298 08	.....	11 08
Meals, rooms and berths	.....	66 75	169 55	50 74
Freight and express	122 64	213 37	.....	.....
Feed	.....	28 08	31 13	12 24
Miscellaneous	22 85	45 98	16 75	18 76
Totals	$872 21	$2,188 88	$625 69	$471 34

SPECIAL PREDATORY ANIMAL HUNTERS

April 1, 1938, to March 31, 1939—April 1, 1939, to March 31, 1940

	Fiscal Year April 1, 1938, to March 31, 1939		Fiscal Year April 1, 1939, to March 31, 1940	
Salaries and wages	$4,052 10		$4,449 88	
State car expense	520 26		.....	
Private mileage	1,508 02		1,657 44	
Fares	.....		19 25	
Meals, rooms and berths	376 24		296 56	
Postage, freight and express	3 68		16 93	
Boat expense	24 49		.....	
Miscellaneous	91 09		155 32	
Totals	.....	$6,065 88	.....	$6,595 38

Hunting deer with bow and arrow is a popular sport of Washington archers.

SPECIAL FUR BEARING AND BEAVER TRAPPING

April 1, 1938, to March 31, 1939—April 1, 1939, to March 31, 1940

	Fiscal Year April 1, 1938, to March 31, 1939		Fiscal Year April 1, 1939, to March 31, 1940	
Salaries and wages	$8,409 64		$6,993 28	
State car expense	9 57		446 23	
Private mileage	1,174 86		1,006 04	
Meals, rooms and berths	280 87		63 96	
Freight and express	59 56		74 35	
Miscellaneous	12 66		658 75	
Totals		$9,956 16		$9,242 61

REPORT OF THE PROTECTION DIVISION

Fines, Arrests, Convictions, Etc.

	April 1, 1936, to March 31, 1937	April 1, 1937, to March 31, 1938	April 1, 1938, to March 31, 1939	April 1, 1939, to March 31, 1940
Total number of arrests	1,460	1,775	1,695	1,637
Total number of acquittals	65	60	77	57
Total number of convictions	1,395	1,715	1,618	1,580
Total number of appeals	11	14	15	8
Food fish cases included	35	20	21	37
Big game cases included	144	237	272	184
Jail sentences imposed	5,776 days	6,203 days	5,869 days	10,704 days
Jail sentences suspended	3,809 days	4,997 days	3,837 days	9,233 days
Fines assessed	$43,639 00	$65,202 00	$74,944 40	$62,482 80
Fines suspended	5,620 00	16,521 50	20,727 00	18,857 00
Fines collected	15,001 00	21,479 75*	16,740 65*	13,977 30*
Fines served out in jail	11,785 00	12,889 75	22,968 00	13,897 50
Fines unpaid	10,333 00	14,331 00	14,508 75	15,751 00
Bail forfeitures	229 00	589 50	685 50	819 75

* NOTE—One-half of the fines collected go to the State Game Fund and one-half to the county in which the arrest is made.

Ducks in flight over Lake Washington game reserve. Thousands of migratory waterfowl winter in this sanctuary

FUR RESOURCES AND RAW FUR TRAPPING

TRAPPING fur-bearing animals was a thriving enterprise in the Puget Sound area as early as 1880 and fur resources have played an important role in the development of the Pacific Northwest. Lewis and Clark reporting on their expedition to the far west, recounted the apparent abundance of fur animals.

Purpose of Tabulating Raw Fur Records

Through the period of settlement and into modern times very little was known of the annual fur take by trappers until the 1938-1939 trapping season when the first successful effort was made to tabulate the annual raw fur crop. Since 1938 trapping licenses have been issued from the main office of the Department of Game and it is now possible through contact with the trappers to check their activities. This was accomplished by issuance of a postcard with each trapper's license requesting a listing of species of fur-bearers taken and recommended seasons or administrative changes.

For a number of years the Department of Game was dependent upon the quarterly reports of licensed fur dealers which revealed the source of pelts handled. However, not all raw fur pelts were disposed of through Washington dealers and, therefore, the information gathered did not provide a complete picture of the industry.

Gain or Loss Shown in Biennial Fur Take

A total of 1,888 trappers was licensed during the 1938-1939 season and 1,871 trapping licenses issued for the 1939-1940 season. In the accompanying table is shown the per cent of increase or decrease of certain species of fur animals over the two years with the number of pelts taken by species. This percentage is based on returns from 92% of trappers and is conclusive for the period specified. The increased take of muskrat, mink and otter in the 1939-1940 season may be partly due to the more favorable weather conditions encountered during that trapping season.

Predatory Beaver Removed From Trouble Areas

The ban on beaver trapping has been in force for twenty-five years, but has not been adequately enforced until the last six years. Bootleg trafficking of beaver from without the state has been controlled through efforts of the Department of Game, assisted by cooperative Federal Agencies. As a result of Washington's beaver management plan, beaver in Washington are increasing. Through live-trapping beaver from overstocked and damage areas, the Department has been able to restock regions where beaver had become

extinct. There were 4,833 beaver removed or dead-trapped from trouble or damage areas by state game protectors and special trappers the last two years. A total of 2,266 pelts was taken in 1938 and 2,567 pelts taken in 1939. Beaver pelts thus taken by the Department are sold at public auction at the Seattle Fur Exchange and the money received is credited to the State Game Fund. Beaver are dead-trapped only when it would not be practicable to live-trap the animals and transplant them to higher country away from private property.

Future Outlook of Washington Fur Industry

The Washington State Game Commission regards the state fur industry as a resource which can be greatly developed in the ensuing years by promotion of biological studies and practical management methods. The future aims are briefly, to determine the productivity of the natural supply of fur-bearing animals and, through game management methods, increase production to as near the carrying capacity as the natural habitat will warrant.

Facts About State Fur-Bearing Animals

A brief resume on the present status of the twelve principal Washington fur-bearing animals follows:

Muskrat

Regarded as one of the most staple of all fur-bearers and the mainstay of the trapper's take. More than 150,000 muskrats were taken by trappers during the last biennium. This animal is largely a stream dweller, living in burrows in the banks of streams, but in some instances they may be found in marshes and lakes. Their habit is to build houses where burrowing sites are not available.

The muskrat has a rapid rate of reproduction. Usually four to eight young per litter and two or three litters a year is the rule and this factor is the reason the animal has been able to maintain its numbers in the face of heavy trapping activities.

Muskrat feeding. This animal is one of the most staple of all fur bearers.

Raccoon have shown a favorable increase in the State of Washington in the last few years.

Raccoon

The season on raccoon was closed for several years and then opened in western Washington only. In 1939 Whitman county was added to the list of open counties. This closure was rewarded by a favorable increase in raccoon throughout Washington. A total of 4,154 raccoon was trapped during the last two seasons.

Mink

A total of 13,897 mink was taken during the past two legal trapping seasons. The pelt price of mink dropped for animals taken during the 1939-1940 season. Dealers paid an average of $9.00 per mink pelt in 1938-1939 as against $6.00 per pelt on mink for the 1939-1940 season. Mink is one fur-bearer which has decreased markedly due to heavy trapping and some trappers are now recommending a closed season on mink for a limited time.

Otter

The bulk of otter pelts are taken west of the Cascades with Clallam county supplying the heaviest county take of this fur-bearer. The otter is a difficult animal to trap and for this reason is holding its numbers fairly well. It ranges over a large area and its habit is to revisit familiar haunts on an average of once a month.

Fox

Whatcom county is the best fox producing area in the state. However, only 69 foxes were taken in the state during 1938-1939 and 59 were trapped during the 1939-1940 season. Most of the animals taken were red fox with a few silvers and cross fox intermixed in the take. The Cascade red fox is known to be a native of the state. It ranges over most of the Cascade mountain region from the Canadian border down to the Columbia River in Washington.

Skunk

The low prevailing price of $1.10 for skunk pelts has discouraged many trappers from working for a bigger take of this animal. A total of 5,754 was trapped during the biennium.

Civet Cat (Little Spotted Skunk)

The extremely low quotation marked up for this fur-bearer has reacted in bringing about a heavy rate of increase, especially in Clallam county. In many districts the rate of growth has attained a point where this animal is becoming a pest.

Badger

This animal is found only in eastern Washington and is becoming rather scarce in many districts. The market value is low and few have been taken in recent years. Whitman county affords the largest take of badger.

Weasel

Weasels are trapped throughout the state, but in most cases only a few are taken by trappers. Weasels in the mountainous and eastern part of the state turn white in winter, but west of the Cascades they retain their brown coat throughout the year.

Marten

This little animal was trapped so heavily up to 1937 that the State Game Commission moved to close the trapping season on marten until further notice. They are reported to be increasing at a good rate since the closure. The range of marten extends over all of the mountainous regions of Washington.

Fisher

Trappers and conservationists will be interested to learn that the fisher is reported showing some increase since closure several years ago. The northern Cascade mountain region and the primitive areas of the Olympic Peninsula are its habitat.

PER CENT OF INCREASE OR DECREASE AND NUMBER OF PELTS TAKEN FOR LAST TWO YEARS

SPECIES	Number Pelts Taken		Per Cent of Increase	Per Cent of Decrease
	1938-1939	1939-1940		
Muskrat	63,010	87,386	38.6	.....
Mink	6,764	7,133	5.45	.....
Raccoon	1,943	2,211	13.8	.....
Otter	247	307	24.3	.....
Fox	69	59	.....	14.5
Skunk	2,981	2,773	.....	6.98
Weasel	983	568	.....	42.3
Civet Cat	699	350	.....	49.3
Badger	63	45	.....	28.6

The determined valuation in dollars and cents of the trappers' raw fur take for each of the past two trapping seasons may be quoted as follows: 1938-1939 season, $121,881.65; 1939-1940 season, $135,403.34. These figures were arrived at from prevailing market prices on raw fur pelts for the different fur species.

LICENSE DIVISION

WASHINGTON state, ranking thirtieth in population and nineteenth in size among the United States, is seventh in total revenue received during the year 1938, from fish and game license sales. Office activity and the growing duties embracing the handling of licenses in this division is best illustrated by citing a comparison of gains in sales over a seven year period. License sales for 1933 were 129,622, while for the last year of this biennium, 1939, sales increased to 219,278, or an increase of 69.25%. The greatest individual unit sales' increase was the number of state licenses sold over county resident hunting and fishing licenses issued. In 1933 there were 55,925 county and 69,587 state resident hunting and fishing licenses sold. For the calendar year 1939, there were 84,674 county and 122,034 state hunting and fishing licenses issued.

Reasons for the Annual Gain in License Sales

This trend is explained by pointing out the small additional cost of a state license and the wider distribution of game, birds and fish in the state of Washington. Traveling conditions are improving each year and short-cuts to game areas are attracting sportsmen from so-called "custom hunting and fishing grounds" to more distant hunting regions.

Improve License Sales Promotion Methods

The license division has constantly improved its methods of operation to cope with the yearly increase in sales. The shortcomings of previous methods, which placed sales in the hands of county auditors, and later, in the hands of state game protectors for distribution, have been offset in the office-to-dealer plan. This direct-mail distribution was put in operation January 1, 1938, and has continued to function efficiently. Through approximately 700 bonded and cash dealers, the Department is able to service sportsmen with licenses of all kinds in metropolitan as well as urban communities of the state. The license division handled $589,895.00 in license revenue from the main office in Seattle through dealers, yet not one penny was lost or unaccounted for by using this method of administration.

The Upturn in State Hunting and Fishing Sales

While total license sales for 1939 show a marked gain over any previous year of state control, the bulk of the increase may be credited to state hunting and fishing sales. However, a breakdown of individual classes of licenses for the year 1939, as against 1933, makes possible some interesting comparisons. The following recapitulation illustrates the gains made in license sales in a few of the brackets:

LICENSE COMPARISON OF UNIT SALES FOR YEARS 1933 AND 1939

LICENSE	1933	1939
State Resident Hunting and Fishing	69,587	122,034
County Resident Hunting and Fishing	55,925	84,674
State Resident Supplemental Elk	1,114	5,425
State Resident or Non-Resident Fishing	998	2,061
County Resident Trapping	839	1,871
State Fur Dealer	69	116
State Taxidermist	25	32
County Professional Guide	3	16

RATE OF INCREASE OF LICENSE SALES

Fiscal Years 1933 to 1939

YEAR	Total Sales	Per Cent Of Increase
1939	219,278	3.06
1938	212,770	2.39
1937	207,807	10.66
1936	187,814	14.26
1935	164,385	4.07
1934	157,951	21.85
1933	129,622	.....

Average yearly rate of increase in license sales, 9.37 per cent. Sales increase, 1939 over 1933, 69.25 per cent.

Increases Shown in Big Game Seal Sales

Another jump in the sales of big game seals is noted. Following is an accounting of big game seals sold since 1935, the first year of issuance. Revenue from big game seals is not credited to the Game Fund, but instead is set apart for payment of predatory animal bounties.

NUMBER OF BIG GAME SEALS SOLD, 1935 TO 1939

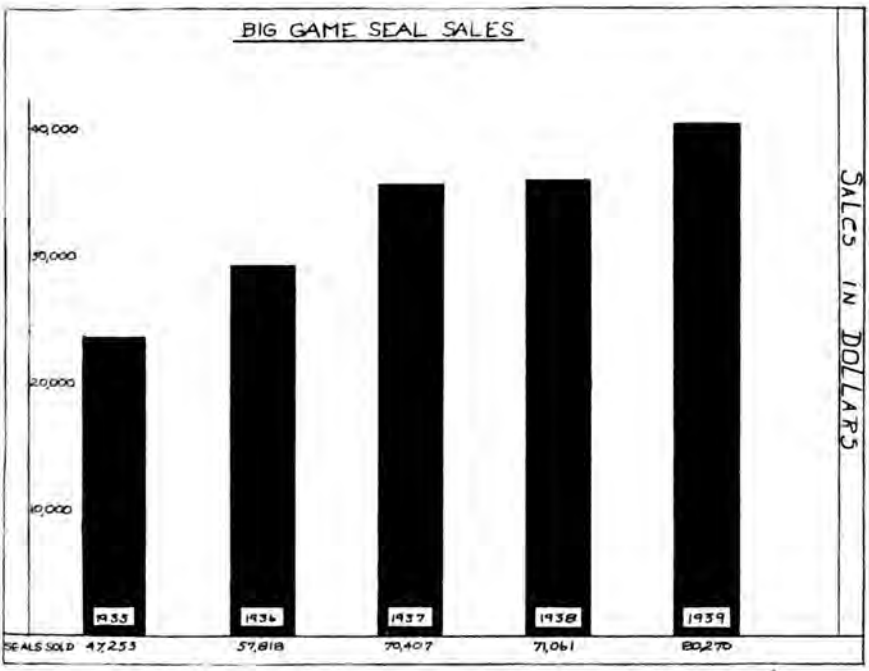
YEAR	NUMBER SOLD	REVENUE
*1935	47,253	$23,626 50
1936	57,818	28,909 00
1937	70,407	35,203 50
1938	71,061	35,530 50
1939	80,270	40,135 00

* A separate seal was required for each unit of game, elk, deer, bear, in 1935, and tags were not interchangeable.

Time-Saving Devices Expedite Sales Service

Dealers are better able to take charge of sales and record the business side of the service after two years' experience. Although they receive no remuneration for servicing sales, the Department has many applications from sporting goods and hardware dealers and merchants for the privilege to handle state fishing and hunting licenses.

The license division has introduced a number of time-saving methods for the quick handling and dispatch of licenses and bounty permits. The system of bookkeeping and filing of records has been simplified. Use of addressograph plates has speeded up correspondence to dealers, at the same time insuring accuracy. Dealers have been placed on the Department mailing list to receive news releases and other general information of interest to them and to license holders. The number of field-auditing trips which were made by the license division during the previous biennium has been reduced to a minimum and practically all business has been consummated by correspondence.



GENERAL EXPENSE—LICENSE DIVISION

April 1, 1938, to March 31, 1939—April 1, 1939, to March 31, 1940

	Fiscal Year April 1, 1938, to March 31, 1939		Fiscal Year April 1, 1939, to March 31, 1940	
Salaries	$5,679 01		$6,450 82	
State car expense	.....		248 27	
Private mileage	31 90		.....	
Meals and rooms	4 85		.....	
General office supplies	156 52		493 18	
Telephone and telegraph	.....		95	
Postage and envelopes	2,284 04		2,713 30	
Freight and express	101 32		94 40	
Printing	1,873 73		1,889 79	
Surety bonds	1,951 50		2,088 50	
Publications	.....		1,774 05	
Repairs—furniture and equipment	20 03		185 59	
New equipment	126 09		120 25	
Miscellaneous	.....		3 28	
Totals		$12,228 99		$16,062 38

RECAPITULATION OF BIG GAME SEALS

For Calendar Years 1936, 1937, 1938, 1939

COUNTY SOLD	1936		1937		1938		1939	
	Number of Big Game Seals Sold	Total Amount of Revenue	Number of Big Game Seals Sold	Total Amount of Revenue	Number of Big Game Seals Sold	Total Amount of Revenue	Number of Big Game Seals Sold	Total Amount of Revenue
Adams	102	$51 00	99	$49 50	124	$62 00	163	$81 50
Asotin	443	221 50	478	239 00	525	262 50	602	301 00
Benton	60	30 00	85	42 50	166	83 00	216	108 00
Chelan	4,177	2,088 50	4,960	2,480 00	4,961	2,480 50	5,976	2,988 00
Clallam	1,791	895 50	1,963	981 50	1,819	909 50	2,051	1,025 50
Clark	1,563	781 50	1,771	885 50	1,733	866 50	1,923	961 50
Columbia	480	240 00	546	273 00	584	292 00	658	329 00
Cowlitz	1,630	815 00	1,902	951 00	1,952	976 00	2,215	1,107 50
Douglas	165	82 50	222	111 00	232	116 00	526	263 00
Ferry	504	252 00	759	379 50	827	413 50	934	467 00
Franklin	125	62 50	157	78 50	82	41 00	104	52 00
Garfield	533	266 50	532	266 00	503	251 50	563	281 50
Grant	479	239 50	938	469 00	945	472 50	1,400	700 00
Grays Harbor	2,409	1,204 50	3,010	1,505 00	2,694	1,347 00	2,984	1,492 00
Island	431	215 50	643	321 50	735	367 50	722	361 00
Jefferson	629	314 50	710	355 00	723	361 50	776	388 00
King	6,483	3,241 50	7,419	3,709 50	7,579	3,789 50	8,664	4,332 00
Kitsap	1,907	953 50	1,904	952 00	2,186	1,093 00	2,519	1,259 50
Kittitas	1,923	961 50	2,300	1,150 00	2,531	1,265 50	2,724	1,362 00
Klickitat	801	400 50	920	460 00	963	481 50	1,034	517 00
Lewis	2,143	1,071 50	2,668	1,334 00	2,708	1,354 00	2,915	1,457 50
Lincoln	408	204 00	530	265 00	612	306 00	726	363 00
Mason	882	441 00	1,139	569 50	1,249	624 50	1,504	752 00
Okanogan	4,212	2,106 00	4,725	2,362 50	4,681	2,340 50	5,308	2,654 00
Pacific	1,327	663 50	1,425	712 50	1,205	602 50	1,567	783 50
Pend Oreille	1,019	509 50	1,236	618 00	1,301	650 50	1,267	633 50
Pierce	3,559	1,779 50	4,018	2,009 00	4,396	2,198 00	5,013	2,506 50
San Juan	289	144 50	379	189 50	309	154 50	401	200 50
Skagit	1,378	689 00	1,760	880 00	1,780	894 50	1,971	985 50
Skamania	567	283 50	467	233 50	457	228 50	517	258 50
Snohomish	2,079	1,039 50	2,574	1,287 00	2,667	1,333 50	2,873	1,436 50
Spokane	3,932	1,966 00	5,804	2,902 00	5,825	2,912 50	6,044	3,022 00
Stevens	1,939	905 00	2,561	1,280 50	2,690	1,345 00	2,748	1,374 00
Thurston	1,746	873 00	2,029	1,014 50	2,165	1,082 50	2,850	1,425 00
Wahkiakum	285	142 50	336	168 00	411	205 50	440	220 00
Walla Walla	824	412 00	806	403 00	805	402 50	924	462 00
Whatcom	1,966	983 00	2,369	1,184 50	2,602	1,301 00	2,766	1,383 00
Whitman	421	210 50	523	261 50	548	274 00	678	339 00
Yakima	2,216	1,108 00	3,740	1,870 00	2,777	1,388 50	3,004	1,502 00
Totals	57,818	$28,909 00	70,407	$35,203 50	71,061	$35,530 50	80,270	$40,135 00

FOUR-YEAR RECAPITULATION OF GAME LICENSES

For the Calendar Years 1936, 1937, 1938, 1939

TYPE OF GAME LICENSE SOLD	Price	1936		1937		1938		1939	
		Number Licenses Sold	Total Amount of Revenue	Number Licenses Sold	Total Amount of Revenue	Number Licenses Sold	Total Amount of Revenue	Number Licenses Sold	Total Amount of Revenue
State resident citizen hunting and fishing	$3 00	97,035	$291,105 00	112,193	$336,579 00	114,717	$344,151 00	122,034	$366,102 00
State non-resident citizen hunting and fishing	25 00	12	286 00*	11	268 00*	8	200 00	11	275 00
State alien hunting and fishing	25 00	17	425 00	18	450 00	17	425 00	13	325 00
State non-resident citizen (game birds only)	15 00	39	585 00	50	750 00	57	855 00	75	1,125 00
State resident or non-resident fishing	5 00	1,502	7,960 00	1,798	8,990 00	1,863	9,315 00	2,061	10,305 00
State fur dealer	10 00	135	1,350 00	123	1,230 00	118	1,180 00	116	1,160 00
State taxidermist	5 00	39	195 00	40	200 00	42	210 00	32	160 00
State resident supplemental elk	5 00	2,364	11,820 00	4,097	20,485 00	4,040	20,200 00	5,425	27,125 00
State alien supplemental elk	50 00	.....	.....	.....	.....	.....	.....	.....	.....
State non-resident elk	25 00	1	25 00	9	225 00	4	100 00	5	125 00
Game farm (new)	20 00	8	160 00	10	200 00	4	80 00	16	320 00
Game farm (renewals)	10 00	59	590 00	56	560 00	52	520 00	45	450 00
Game preserve license (migratory)	10 00	.....	.....	.....	.....	.....	.....	2	20 00
County resident citizen hunting and fishing	1 50	81,626	122,439 00	83,309	124,963 50	87,080	130,620 00	84,674	127,011 00
County non-resident fishing	3 00	1,382	4,146 00	1,642	4,926 00	1,640	4,920 00	1,517	4,551 00
County alien fishing	5 00	121	605 00	134	670 00	122	610 00	113	565 00
County resident citizen trapping	5 00	2,392	11,960 00	3,368	16,840 00	1,888	9,440 00	1,871	9,355 00
County professional guide	10 00	8	80 00	7	70 00	8	80 00	16	160 00
Duplicate licenses	50	1,051	525 50	1,008	504 00	1,110	555 00	1,252	626 00
Miscellaneous	.....	.....	53	.....	.....	.....	.....	.....	.....
Totals	.....	187,881	$454,257 03	207,873	$517,910 50	212,770	$523,461 00	219,278	$549,760 00

* See reciprocity agreement.

PREDATORY ANIMAL BOUNTIES—APRIL 1, 1938, TO MARCH 31, 1939

COUNTY	Coyotes at $1.00	Amount	Coyotes at $2.50	Amount	Total Coyotes	Total Amount	Bobcats at $5.00	Amount	Cougar at $50.00	Amount	Grand Total	
											Animals	Bounty
Adams	105	$105 00	216	$540 00	321	$645 00	.....	.....	.....	.....	321	$645 00
Asotin	.....	.....	36	90 00	36	90 00	8	$40 00	.....	.....	44	130 00
Benton	199	199 00	323	807 50	522	1,006 50	.....	.....	.....	.....	522	1,006 50
Chelan	13	13 00	155	387 50	168	400 50	31	155 00	1	$50 00	200	605 50
Clallam	.....	.....	12	30 00	12	30 00	193	965 00	12	600 00	217	1,595 00
Clark	4	4 00	67	167 50	71	171 50	24	120 00	1	50 00	96	341 50
Columbia	39	39 00	105	262 50	144	301 50	15	75 00	.....	.....	159	376 50
Cowlitz	.....	.....	73	182 50	73	182 50	128	640 00	10	500 00	211	1,322 50
Douglas	46	46 00	494	1,235 00	540	1,281 00	16	80 00	.....	.....	556	1,361 00
Ferry	24	24 00	323	807 50	347	831 50	29	145 00	5	250 00	381	1,226 50
Franklin	35	35 00	110	275 00	145	310 00	.....	.....	.....	.....	145	310 00
Garfield	42	42 00	53	132 50	95	174 50	1	5 00	.....	.....	96	179 50
Grant	105	105 00	891	2,227 50	996	2,332 50	7	35 00	.....	.....	1,003	2,367 50
Grays Harbor	.....	.....	21	52 50	21	52 50	144	720 00	2	100 00	167	872 50
Jefferson	.....	.....	4	10 00	4	10 00	77	385 00	17	850 00	98	1,245 00
King	3	3 00	186	465 00	189	468 00	180	900 00	5	250 00	374	1,618 00
Kitsap	.....	.....	.....	.....	.....	.....	1	5 00	.....	.....	1	5 00
Kittitas	7	7 00	220	550 00	227	557 00	55	275 00	.....	.....	282	832 00
Klickitat	10	10 00	434	1,085 00	444	1,095 00	48	240 00	2	100 00	494	1,435 00
Lewis	.....	.....	123	307 50	123	307 50	186	930 00	8	400 00	317	1,637 50
Lincoln	66	66 00	408	1,020 00	474	1,086 00	14	70 00	.....	.....	488	1,156 00
Mason	7	7 00	10	25 00	17	32 00	34	170 00	2	100 00	53	302 00
Okanogan	20	20 00	773	1,932 50	793	1,952 50	64	320 00	9	450 00	866	2,722 50
Pacific	.....	.....	34	85 00	34	85 00	91	455 00	.....	.....	125	540 00
Pend Oreille	1	1 00	120	300 00	121	301 00	8	40 00	2	100 00	131	441 00
Pierce	1	1 00	49	122 50	50	123 50	73	365 00	9	450 00	132	938 50
Skagit	1	1 00	31	77 50	32	78 50	70	350 00	15	750 00	117	1,178 50
Skamania	.....	.....	37	92 50	37	92 50	68	340 00	18	900 00	123	1,332 50
Snohomish	.....	.....	111	277 50	111	277 50	109	545 00	3	150 00	223	972 50
Spokane	42	42 00	244	610 00	286	652 00	5	25 00	.....	.....	291	677 00
Stevens	1	1 00	528	1,320 00	529	1,321 00	34	170 00	.....	.....	563	1,491 00
Thurston	.....	.....	37	92 50	37	92 50	26	130 00	.....	.....	63	222 50
Wahkiakum	2	2 00	4	10 00	6	12 00	23	115 00	1	50 00	30	177 00
Walla Walla	13	13 00	41	102 50	54	115 50	.....	.....	.....	.....	54	115 50
Whatcom	.....	.....	18	45 00	18	45 00	49	245 00	40	2,000 00	107	2,290 00
Whitman	103	103 00	136	340 00	239	443 00	.....	.....	.....	.....	239	443 00
Yakima	45	45 00	389	972 50	434	1,017 50	29	145 00	.....	.....	463	1,162 50
Totals	934	$934 00	6,816	$17,040 00	7,750	$17,974 00	1,840	$9,200 00	162	$8,100 00	9,752	$35,274 00

PREDATORY ANIMAL BOUNTIES—APRIL 1, 1939, TO MARCH 31, 1940

COUNTY	Coyotes @ $1.00	Amount	Coyotes @ $2.50	Amount	Coyotes @ $5.00	Amount	Total Coyotes	Total Amount	Bobcats @ $5.00	Amount	Cougar @ $50.00	Amount	Grand Total Animals	Grand Total Bounty
Adams	60	$60 00	3	$7 50	185	$925 00	248	$992 50	.....	.....	.....	.....	248	$992 50
Asotin	7	7 00	7	17 50	149	745 00	163	769 50	18	$90 00	.....	.....	181	859 50
Benton	197	197 00	2	5 00	200	1,000 00	399	1,202 00	.....	.....	.....	.....	399	1,202 00
Chelan	.....	.....	13	32 50	261	1,305 00	274	1,337 50	16	80 00	.....	.....	290	1,417 50
Clallam	.....	.....	.....	.....	4	20 00	4	20 00	71	355 00	4	$200 00	79	575 00
Clark	1	1 00	2	5 00	40	200 00	43	206 00	18	90 00	.....	.....	61	296 00
Columbia	56	56 00	14	35 00	122	610 00	192	701 00	15	75 00	.....	.....	207	776 00
Cowlitz	6	6 00	4	10 00	59	295 00	69	311 00	48	240 00	3	150 00	120	701 00
Douglas	16	16 00	6	15 00	401	2,005 00	423	2,036 00	8	40 00	.....	.....	431	2,076 00
Ferry	.....	.....	10	25 00	237	1,185 00	247	1,210 00	21	105 00	3	150 00	271	1,465 00
Franklin	.....	.....	.....	.....	313	1,565 00	313	1,565 00	.....	.....	.....	.....	313	1,565 00
Garfield	54	54 00	1	2 50	87	435 00	142	491 50	1	5 00	.....	.....	143	496 50
Grant	100	100 00	3	7 50	840	4,200 00	943	4,307 50	9	45 00	.....	.....	952	4,352 50
Grays Harbor	.....	.....	.....	.....	39	195 00	39	195 00	110	550 00	4	200 00	153	945 00
Jefferson	.....	.....	5	12 50	2	10 00	7	22 50	48	240 00	6	300 00	61	562 50
King	5	5 00	12	30 00	162	810 00	179	845 00	124	620 00	1	50 00	304	1,515 00
Kitsap	.....	.....	.....	.....	2	10 00	2	10 00	.....	.....	.....	.....	2	10 00
Kittitas	27	27 00	11	27 50	235	1,175 00	273	1,229 50	26	130 00	.....	.....	299	1,359 50
Klickitat	22	22 00	11	27 50	442	2,210 00	475	2,259 50	49	245 00	.....	.....	524	2,504 50
Lewis	.....	.....	13	32 50	124	620 00	137	652 50	160	800 00	4	200 00	301	1,652 50
Lincoln	84	84 00	13	32 50	376	1,880 00	473	1,996 50	2	10 00	.....	.....	475	2,006 50
Mason	.....	.....	2	5 00	17	85 00	19	90 00	15	75 00	1	50 00	35	215 00
Okanogan	36	36 00	33	82 50	995	4,975 00	1,064	5,093 50	43	215 00	5	250 00	1,112	5,558 50
Pacific	.....	.....	5	12 50	28	140 00	33	152 50	84	420 00	.....	.....	117	572 50
Pend Oreille	.....	.....	9	22 50	193	965 00	202	987 50	13	65 00	.....	.....	215	1,052 50
Pierce	.....	.....	2	5 00	59	295 00	61	300 00	53	265 00	3	150 00	117	715 00
Skagit	.....	.....	7	17 50	47	235 00	54	252 50	48	240 00	4	200 00	106	692 50
Skamania	.....	.....	.....	.....	36	180 00	36	180 00	10	50 00	3	150 00	49	380 00
Snohomish	.....	.....	5	12 50	59	295 00	64	307 50	58	290 00	.....	.....	122	597 50
Spokane	18	18 00	10	25 00	279	1,395 00	307	1,438 00	3	15 00	.....	.....	310	1,453 00
Stevens	.....	.....	6	15 00	539	2,695 00	545	2,710 00	15	75 00	.....	.....	560	2,785 00
Thurston	9	9 00	6	15 00	20	100 00	35	124 00	21	105 00	.....	.....	56	229 00
Wahkiakum	.....	.....	1	2 50	10	50 00	11	52 50	36	180 00	.....	.....	47	232 50
Walla Walla	7	7 00	.....	.....	23	115 00	30	122 00	.....	.....	.....	.....	30	122 00
Whatcom	.....	.....	.....	.....	11	55 00	11	55 00	16	80 00	7	350 00	34	485 00
Whitman	132	132 00	5	12 50	237	1,185 00	374	1,329 50	.....	.....	.....	.....	374	1,329 50
Yakima	117	117 00	4	10 00	639	3,195 00	760	3,322 00	16	80 00	7	350 00	783	3,752 00
Totals	954	$954 00	225	$562 50	7,472	$37,360 00	8,651	$38,876 50	1,175	$5,875 00	55	$2,750 00	9,881	$47,501 50

Note—By act of 1939 Legislature bounty on adult coyote changed from $2.50 to $5.00, effective June 8, 1939.

Air photo of the Yakima State Trout hatchery, Yakima county. The ten circular ponds are used for rearing game fish. The three rectangular pools at right are for broodstock where fish are held for egg taking.

Trout broodstock.

TROUT HATCHERY DIVISION

THE sport of fishing has been a favorite form of recreation from earliest times, but its greatest gain in popularity has come in the Twentieth Century. In recent years, or from 1933 to 1939, license holders have increased in number in this state, 69.25%. Many streams and lakes which were once frequented by ten fishermen are now fished by hundreds. Improvement to fishing tackle and quick access to all parts of the state over good roads and highways are largely responsible for the gain in sport fishermen. Many lakes and streams that were at one time well stocked with trout have dropped below their optimum peak. Building up game fishing in the state by preservation of spawning beds, elimination of man-made barriers which impede upstream migration, and construction of large, modern hatchery plants to bolster the native stocks of fish have been the Department's plan for meeting the intensity of present day fishing.

The problem of renewing and maintaining the supply of fish in state lakes and streams is one which must be managed with modern methods. A long period program of expansion of hatchery propagation facilities, and gathering of scientific data pertaining to fish productivity, and other factors, will comprise the basis for future activity in the hatchery and fish planting units.

New Construction and Hatchery Improvements

Two new hatcheries of modern pattern were completed during the period April 1, 1938, to March 31, 1940. Construction of a third hatchery was started late in the biennium, while a fourth hatchery was enlarged and modernized. Additional fish rearing and hatching units will be built as funds permit, giving the Department of Game a trout propagation system which will annually produce an increase in fish output.

The following is a summary of new construction in the hatchery division:

Vancouver Hatchery

This plant was started in the previous biennium, but completed in the period covering this report. The unit includes a 96 trough hatchery, two broodstock ponds, twelve forty-foot diameter rearing ponds, a superintendent's house and assistant's quarters and a three-car garage. The plant is installed with full refrigeration units, mixing and feed rooms. This hatchery is located on the Evergreen highway along the Columbia River, approximately six miles east of Vancouver.

Tokul Creek Hatchery

A pumphouse and concrete tank were built to collect outlet waters as well as the construction of two broodstock ponds, one fifty feet long and the other sixty feet long.

Bellingham Hatchery

Construction of a 14' x 24' concrete settling tank, together with general improvements to grounds.

South Tacoma Hatchery

New work at this hatchery was a major improvement. The old hatchery building was enlarged and doubled in rearing capacity. Construction of concrete intermediate rearing troughs, a new development, was part of the hatchery building expansion. The number of fish troughs has been increased from 56 to 102, and the outdoor rearing system was enlarged with the addition of two 125' x 12' fish raceways.

A full account of the above construction and other improvements which were manned by W. P. A. labor and jointly financed by Works Progress Administration and Department of Game funds, will be found under listing of Works Progress Administration projects.

Goldendale Hatchery

This plant was completed and ready for operation in December, 1939. Modern throughout, its facilities are in line with new rearing developments introduced in recent years. It has a 48-trough hatchery building with 24 intermediate troughs, full refrigeration, feed room, six raceway rearing and broodstock ponds and a superintendent's residence. A large dam was built at the spring and a complete set of pipelines installed to supply hatchery and ponds. Along with the regular hatchery work, this plant will be developed as a broodstock station for rainbows.

Snohomish Hatchery

Breaking of ground and preliminary work on construction of the big Snohomish Hatchery located in Snohomish county, began late in the biennium and will be completed during the fall of 1940. Plans call for a hatchery building of 96 troughs with 10 intermediate, concrete troughs, and a battery of twelve 40' diameter rearing ponds and six concrete raceways. Refrigeration and other facilities will be installed.

Right, State Trout Hatcheries and rearing units. At top, new Snohomish hatchery, Arlington, under construction. Second row photos show, left, Aberdeen hatchery, right, Spokane hatchery. The new Goldendale hatchery, Klickitat county, is pictured in the lower three views. Note that raceways are installed at Goldendale instead of the conventional rearing ponds. The box construction shows hatchery intermediate troughs.

At the annual hatcherymen's and game farmers' meetings. Left, game farm superintendents receive instruction in bird dissection. Right, hatcherymen use microscopes to study fish scale samples.

Seward Park Ponds

Ten additional 40′ diameter rearing ponds, garage and superintendent's house and helper's quarters have been turned over to the Department of Game by the City of Seattle for use in fish propagation work.

Summary of Hatchery Propagation Facilities

Seventeen hatcheries were operated up to the close of the biennium. Rearing facilities include: 1,114 hatchery troughs, 110 rearing ponds, all but three of which are of the 40′ diameter type, and 27 fish raceways of various sizes. Seven hatcheries have broodstock ponds.

By the propagation of broodstock, it is the aim of the Department of Game to build up a strain of fish more adaptable for the waters of this state. This will also insure an adequate supply and in some ways hold prices steady or on a lower level than in the past for trout spawn. Present prices are being quoted at $1.25 a thousand for good Rainbow eggs whereas a few years ago they were as high as $2.50 per thousand.

The refrigeration units installed as standard equipment in the new hatcheries are insurance against fish food spoilage and enable the Department to take advantage of reduced market prices on quantity food purchases, and a substantial saving has already been made in buying large stocks of fish foods. Salmon offal and viscera can be purchased economically in large quantities during the summer and held in storage at the largest hatcheries for use in winter.

State trout hatcheries operating broodstock ponds and the species of trout eggs taken are listed as follows:

Hatchery	Eggs Spawned
Goldendale, Klickitat County	Rainbow
Yakima, Yakima County	Rainbow and Cutthroat
Spokane, Spokane County	Rainbow
Pend Oreille, Pend Oreille County	Cutthroat
Tokul Creek, King County	Rainbow
South Tacoma, Pierce County	Rainbow
Vancouver, Clark County	Cutthroat

The broodstock egg output for 1939 from most stations was considerably higher than 1938. For example:

YEAR		EGG SPECIES	Hatchery Broodstock Unit
1938	1939		
12,160	344,423	Cutthroat	Vancouver
214,524	435,000	Rainbow	South Tacoma
95,256	1,284,557	Rainbow	Yakima
844,920	365,480	Rainbow	Spokane

RECAPITULATION OF EGGS TAKEN BY SPECIES

Fiscal Years 1938-1939

Year	Crescentil	Black-spotted	Cutthroat	Eastern Brook	Rainbow	Silver Trout	Steelhead	White Fish
1938....	25,820	394,060	1,732,200	12,292,630	3,016,334	32,906,034	1,386,693	.....
1939....	22,900	40,890	1,744,010	13,016,997	3,817,235	18,134,643	2,005,380	15,570

Note—The year 1938 was the peak year in state history for taking of silver trout spawn.

Developments in Fish Disease Remedies

Definite strides have been made to remedy and eradicate the common fish diseases with which hatcherymen the country over are confronted from time to time. Biologists and hatcherymen have given disease and the causes for its presence a course of intensive study. Important among research discoveries in this field has been the additional knowledge obtained of the value of well rounded diets in maintaining healthy fish. Through study of dietary factors affecting fish growth and mortality, biologists and hatcherymen have been able to reduce losses to a minimum.

Balanced Ration Insures Maximum Efficiency

By using body weight percentages as an index, fish are now fed proper amounts of balanced rations to insure maximum efficiency. Overfeeding, which causes the liver cells to be broken down and replaced with fat cells, has been minimized. Overfeeding is not only harmful to fish, as well as wasteful, but it may set up a very unsanitary condition. Foodstuffs lying in ponds are subject to bacterial action and may result in a perfect condition for fostering disease. Under-nourishment is also avoided by knowledge of the food value of the different types of diets.

Sanitation Is Stressed at all Hatcheries

Selective breeding and rigid culling have resulted in healthier strains of broodstock fish eggs. To avoid possible transmission of disease through shipments from one station to another, various laboratory tested disinfectants are used. Diluted solutions of acriflavine have been found extremely successful in preventing both fungus and "soft egg" diseases in trout eggs. Salt, calomel, copper sulphate and acetic acid have been used to good advantage in treating both fry and fingerlings.

Four steps in the rearing of trout. Upper left, weighing fish for planting; upper right, grinding beef liver, one of the items in the diet of fish; lower left, salting fish, a remedy for a parasitic infection; lower right, sorting or sizing trout.

Ponds, troughs and equipment are treated with disinfectants to avoid the possibility of carry-over of disease. Improved pond and trough construction makes it possible to treat groups of fish with greater ease.

The carrying capacity of ponds and troughs has been carefully checked with a result of better growth and reduced mortalities which might be caused by over-crowding.

Game protectors plant many thousands of trout annually in their districts using their light pickup trucks. Top left, signed testimonials are obtained from sportsmen verifying the planting of fish. Waters are checked for temperatures preparatory to planting fish. Biologists often go along with protectors on fish planting trips to collect scientific data.

Fish Distribution Zones Expedite Planting

The Department's new fish planting methods and the establishment of fish distribution zones have reduced transportation losses of trout, facilitated plantings, and cut fish planting costs. With construction of the Goldendale and Vancouver hatcheries during the biennium it was possible to route plantings out of these stations to serve waters in the areas encompassing these hatcheries. Completion of the Snohomish hatchery, Snohomish county, during the ensuing biennium and others under consideration will further extend the possibilities of low cost and minimum mortality fish plantings.

Fish plantings in each region of the state are handled by the supervisor of plantings with the assistance of the biological division and the game protectors. The biological division studies catch reports and other reports of take to determine the different species of fish adapted to the waters. The output of the hatchery is then pro-rated according to trout on hand and is measured out to meet the needs as far as possible.

Fish distribution today is largely mechanized. Fleet tank trucks fully aerated provide greater insurance against mortalities from plantings. A total of 91,780,831 trout was planted throughout the state the past two years. The present truck planting system includes five of the 400-gallon capacity type, and one of 800-gallon capacity. A large percentage of planted fish are transported to waters by state game protectors, biologists and hatchery personnel in small pickup trucks. This equipment is supplemented by the mule pack string used for planting the high country.

Many Factors Govern Planting of Reared Fish

Between twenty and thirty per cent of the fish are reared for one year and are planted at an average size of five inches by the use of tank trucks. Catch records have shown that early spring plantings produce the best returns in lowland lakes. The fish are given an opportunity for environmental adaptation before the waters warm up and predacious fish become active. Food conditions are excellent at this time, assuring a rapid growth. Later fish plantings are made in the higher waters after streams have passed their flood point, and conditions are more suitable for trout releases. By planting fish at different times the Department is able to acquire maximum pond production as thinning and sorting of fish result in a more rapid growth and in reduction of losses through cannabalism.

The importance of planned planting schedules is clearly indicated in the case of the silver trout, a cycle fish, which is largely dependent upon artificial propagation. Sportsmen would probably have little of this fishing if natural reproduction were relied upon entirely.

Overcome Conditions in "Problem" Units

Undesirable conditions have been overcome at two of the hatcheries that were formerly considered "problem" units. A settling tank was installed at the Bellingham Hatchery, which eliminated the problem of organic debris. Before installing the basin, the mechanical and chemical action of this debris was very toxic.

Aberdeen's mortalities caused by high summer temperatures, were overcome by sending this station the earliest broodstock eggs available. The fish had thus developed sufficiently in their life cycle to be able to withstand the otherwise unfavorable temperature conditions. This hatchery now produces fish equal to any trout hatchery in the state.

Upper right, typical steelhead trap, Neuwaukum Creek, King county; other views are of spawning operations at the Headworks trap, King county.

Rearing facilities at the South Tacoma hatchery. Upper left, shows refrigeration equipment. These units are installed at all modern hatcheries built by the Department of Game. Right, the enlarged hatchery building with a close-up of hatchery troughs in the lower views. Lower right, are pictured the concrete intermediate troughs which are constructed under the standard wood troughs.

A pack string of twelve mules was put into service during the spring of 1940 for transporting thousands of trout to high mountain lakes. Many wilderness lakes are inaccessible to Department planting trucks and can be reached only via pack string.

Stocking the High Mountain Lakes With Trout

Planting of the high mountain lakes is often an arduous task requiring miles of back-packing of fish planting cans by game protectors and sportsmen. During the winter of 1940, a string of twelve young mules was purchased and broken for fish planting work. Actual planting began in the late spring with distribution of fish to lakes in the higher mountain areas.

Biologists Work to Introduce New, Low-Cost Feeds

One of the most encouraging developments in the propagation of fish has been the research work carried on to introduce new, low-cost feeds. With more than 750,000 pounds of varied food units fed during the biennium, the cost of fish food has received close study in the face of an ever-increasing and expanding production. The study of growth and mortality from feeding different foods has enabled biologists to select an assortment of diets suitable for artificial propagation. It has been possible to cut food costs per pound the past two years while at the same time a comparable output of fish was maintained. In 1934, 119,467 pounds of food cost $10,700.00 or 10½ cents per pound. In 1939, the hatcheries used 328,000 pounds of food, costing $12,200.00, thus reducing the pound price to 4 cents.

Hatcherymen are feeding a greater quantity of meal each year. The cost of meal and liver is approximately the same, although liver contains better than 75% water while meal's water content is approximately 5%. This represents a tremendous saving in the quantity of food necessary to feed. Due to the presence of certain factors found in meat, meals cannot be used exclusively as dietary troubles soon develop.

REPORT OF GAME FISH LIBERATED BY DEPARTMENT OF GAME

April 1, 1938, to March 31, 1939

COUNTY	Black-spotted	Crescentii	Cutthroat	Eastern Brook	Mackinaw	Rainbow	Silver	Steelhead	Total
Adams				25,000					25,000
Asotin						10,000		4,392	14,392
Chelan	20,526		66,645	280,000		352,573	3,748,765		4,468,509
Clallam		11,004	65,345	119,173		123,641	950,000	560,861	1,830,024
Clark	21,500		39,800	15,000		77,059	380,403		533,762
Columbia						22,724		14,392	37,116
Cowlitz						27,075	783,200	124,644	934,919
Ferry	15,454			709,680		105,814	497,245		1,408,193
Garfield						73,100			73,100
Grant	114,240			225,000		12,000	862,000		1,213,240
Grays Harbor	4,000					58,860	54,500	665,250	782,610
Island							125,000		125,000
Jefferson				89,605		8,440	100,000	66,000	264,045
King			29,732	125,552		315,647	4,225,569	762,405	5,458,905
Kittitas	91,500		103,100	557,120		226,387	984,100		1,962,207
Kitsap	2,000			2,000		4,000	350,000	12,000	370,000
Klickitat	75,000			33,000		78,500	261,200		448,000
Lewis				13,400		139,272	32,000	167,400	358,712
						eggs 6,640			
Lincoln				10,000		40,773			50,773
Mason	32,130			22,000		123,286	1,857,190	873,970	3,008,576
Okanogan			11,992	682,106		148,051	1,290,949	40,500	2,173,598
Pacific						12,500		460,865	473,365
Pend Oreille	305,550		20,170	688,123	57,004	46,650	905,220	20,514	2,104,140
Pierce	65,758		394	42,800		94,752	3,393,422	882,355	4,389,301
San Juan				35,000			300,000		335,000
Skagit				107,180		15,200	899,250	1,043,000	2,064,630
Skamania			2,000	95,263		184,985			282,188
Snohomish			22,516	10,350		249,119	718,322	518,515	1,518,822
Spokane						95,700	708,125	11,460	815,285
Stevens	224,564			701,200	122,494	115,534	1,108,000	13,212	2,285,004
Thurston	8,000					25,188	850,000	8,300	891,488
Wahkiakum								120,000	120,000
Walla Walla						19,000		5,000	24,000
Whatcom	32,620		672	169,065		15,500	5,575,000	312,260	6,105,117
Whitman						3,131			3,131
Yakima				460,000		285,575	1,606,500		2,352,075
Totals	1,152,842	11,004	362,276*	5,218,457	180,398	3,116,805	32,035,960	6,637,835	49,315,577

* Includes 102 Cutthroat and Steelhead.

REPORT OF GAME FISH LIBERATED BY DEPARTMENT OF GAME

April 1, 1939, to March 31, 1940

COUNTY	Black-spotted	Crescentii	Cutthroat	Eastern Brook	Rainbow	Silver	Steelhead	Steelhead and Cutthroat	Total
Adams					2,036				2,036
Asotin					134,235				134,235
Chelan	4,500		187,974	67,028	552,723	1,472,077			2,284,302
Clallam		12,570	28,472		230,198	927,600	884,215		2,183,055
Clark			43,174		305,031		36,982		385,187
Columbia					166,103				166,103
Cowlitz			26,950		147,855		122,165		296,970
Douglas					5,905				5,905
Ferry			810	464,787	417,928	474,864			1,358,389
Garfield					95,247				95,247
Grant				56,250	23,909	1,029,645			1,109,804
Grays Harbor					125,791		524,143		649,084
Island					3,300	125,000			128,300
Jefferson					35,349	144,000			179,349
King	11,098		123,452	22,000	382,288	3,170,363	1,312,169		5,021,370
Kitsap	49,943				36,529				86,472
Kittitas			1,993	48,400	313,106	1,229,682			1,593,181
Klickitat				248,430	68,930				317,360
Lewis	35,538				312,054		29,428		377,020
Lincoln					19,342				19,342
Mason			35,602	84,300	124,017	709,600	464,506		1,418,025
Okanogan				703,889	333,483	971,134			2,008,456
Pacific					62,899		373,266		436,165
Pend Oreille	132,390		89,550	417,873	461,611	1,098,695			2,200,029
Pierce	43,473		140		123,370	720,000	870,988		1,757,971
San Juan					18,830	149,450			168,280
Skagit	8,750			19,683	478,509	819,300	732,080	2,997	2,061,619
Skamania			30,313		568,205		25,900		624,418
Snohomish			1,500	96,801	446,515	949,791	75,272		1,569,989
Spokane				45,000	88,151	1,999,625			2,132,776
Stevens				264,040	341,396	1,751,324			2,356,760
Thurston					58,216	1,035,447	17,225		1,110,888
Wahkiakum			3,994		54,476		9,978		68,448
Walla Walla					50,321				50,321
Whatcom	18,000		31,325	80,000	287,703	6,556,510	143,832	5,228	7,122,598
Whitman					26,448				26,448
Yakima			48,229	81,080	624,098	204,965			958,372
Totals	303,692	12,570	653,478	2,099,901	7,626,257	25,538,982	5,622,149	8,225	42,465,254

The Diversified Diets of Hatchery Reared Fish

The experimentation with various mixed diets is constantly reducing the pound price of fish foods. The diet of fish reared in Department hatcheries is diversified to provide needed vitamins. It includes: Fish meals and kelp meals, beef liver, beef spleen, salmon viscera, salmon egg meals, sole trimmings, dogfish and ratfish. The latter are obtained from trawlers at an extremely low cost and have been added to the feeding program of late years. Ordinarily these scrapfish would be discarded as they have little domestic food value, but can be utilized to good advantage by hatcherymen.

Here is a list of poundage fed, cost per pound and the yearly cost of fish foods for the years 1933 to 1939:

YEAR	Poundage Fed	Cost of Feed	Cost Per Pound
1939	328,000	$12,200 00	4¢
1938	422,083	15,600 00	3.8¢
1937	297,250	13,800 00	4½¢
1936	417,741	20,000 00	5¢
1935	206,172	14,200 00	7¢
1934	119,467	10,700 00	10½¢
1933	100,000	9,330 00	9.3¢

Egg-Taking and Eyeing Stations, Traps

Sport fishing for certain trout species today is largely dependent upon a combination of two reproductive forces—natural spawning and artificial rearing. The increase in license holders the last four years has made the work of fish management and production a matter of paramount consideration. Natural propagation is very desirable and every effort is being put forth to encourage natural spawning. This is being done by elimination of natural and man-made barriers such as dams, stream diversions, pollution, and illegal catches.

Artificial propagation is supplementary to natural spawning and fishermen cannot depend upon wild stock alone for their recreation. They must look to fish hatcheries and plantings to maintain the supply in the face of the intensive fishing by the many thousand license holders.

There are three main sources for obtaining trout eggs—wild stock, brood-stock ponds and commercial fish breeders.

New Traps Built for Spawn Taking

Eight new traps have been constructed throughout the state in the past two years to facilitate the taking of trout eggs, and are used in addition to the older traps and egg-taking stations.

The following is a list of the new stations:

1. Trout Creek, tributary of Curlew Lake, Ferry county, rainbow.
2. Unnamed Creek, tributary of Packwood Lake, Lewis county, rainbow.
3. Schumacher Creek, tributary to Mason Lake, Mason county, cutthroat.
4. South Skookum Lake, upstream trap, located between North and South Skookum lakes, Pend Oreille county, eastern brook.
5. Skookum Lake outlet, downstream trap, Pend Oreille county, eastern brook.
6. Cedar River, King county, silver trout.
7. Newaukum Creek, tributary of Green River, King county, steelhead.
8. South Fork Tieton River, tributary to Rimrock Lake, Yakima county, silvers.

Traps in operation during the biennium showed an egg-take of 51,753,771 eggs in 1938 and 38,797,625 eggs taken for the fiscal year, 1939.

Importance of Screening Water Diversions

This little known operation is becoming of increasing importance as the state expands. Screening of outlets from lakes and diversions from streams tie in directly with the planting and propagation of fish. For a number of

years past, countless thousands of fish—resident and migratory—have been diverted from their regular courses and forced down man-made canals and flumes. Here they were either left high and dry in fields or passed through the turbines of various power houses. This condition can be remedied only by keeping fish out of such diversions.

The past biennium has seen joint cooperation between the State Department of Fisheries and the Department of Game in a move to correct by screening some of the conditions existing in the state. The State Game Commission apportioned the sum of $13,000.00 to be spent jointly by the Department of Fisheries and Department of Game on a comprehensive screening program during the past year. The Department of Fisheries has apportioned a like sum and together with W. P. A. grants, it has been possible to screen a large number of diversions.

Crews on screening operation projects have already worked in Chelan, Okanogan, Kittitas, Yakima, Benton, Walla Walla and Columbia counties. Work is now under way for screening diversions in Clallam county. The Department is continuing its vigilance in working to establish needed fishways on dams and in the abolition of unused dams.

Legislature Moves to Control Diversions

Diversion of public waters is regarded as one of the chief limiting factors relative to the return of planted fish. Many streams had their flow dangerously reduced or entirely dried up during the summer months under a plan which permitted anyone to acquire any desired amount of water upon application for water rights. At the last session of the State Legislature the Department of Game and Department of Fisheries were empowered to make recommedations on all future water permits. Applications for water rights are now closely scrutinized by this Department before such requests are granted, thus assuring fish life proper consideration.

Fish rearing facilities at the Vancouver hatchery, Clark county, are illustrated in this air photo.

STATE HATCHERIES

HATCHERY	Troughs	Intermediate Troughs	Ponds 40' Circular	Ponds Race-Ways	Ponds Brood	Supt's House	Assist. House	Garage	Store-Room	Refrig-eration
Aberdeen	48	.....	10	.....	.....	1	1	1	1	.....
Bellingham	48	.....	10	.....	.....	1	.....	1	1	.....
Chelan	48	.....	10	.....	.....	1	.....	1	1	1
Colville	68	.....	.....	2 4'×30'	.....	1	.....	1	1	.....
Chiwaukum	93	12 2'×16' Wood	1	.....	.....	1	.....	1	.....	.....
Goldendale	48	24 2'×16' Wood	.....	6 15'×240'	.....	1	.....	.....	.....	1
Lake Crescent	45	.....	2	.....	.....	1	.....	1	1	.....
Lake Whatcom	80	.....	.....	.....	.....	1	.....	1	1	.....
Pend Oreille	54	.....	.....	4 4'×60'	1 Dirt	1	1	1	1	1
San Poil	48	.....	.....	1 6'×20' 2 6'×10'	.....	1	.....	1	1	.....
Seward Park	.....	.....	20	.....	.....	1	1	2	1	.....
Spokane	96	.....	16	.....	1 Dirt	1	2	1	1	1
South Tacoma	102	12 4'×32' Concrete	12	6 6'×40' 2 12'×125'	1 Dirt	1	1	1	1	1
Tokul Creek	96	2 2'×16' Wood	2	5 Concrete	1 16'×50' 1 14'×60' 2 Rock	1	2	1	1	1 Sm. Box
Vancouver	96	2 2'×16' Wood	12	.....	2 Dirt	1	1	1	1	1
Walla Walla	48	4 4'×45' Concrete	3 28' Circular	1 30'×135'	.....	1	.....	1	1	.....
Yakima	96	.....	12	.....	3 Dirt 40'×200'	1	1	1	1	1
* Snohomish	96	11 4'×32' Concrete	12	6 15'×240'	.....	1	1	1	1	1

* Under construction.

STATE TROUT HATCHERIES

ADMINISTRATION AND GENERAL EXPENDITURES

April 1, 1938, to March 31, 1939—April 1, 1939, to March 31, 1940

	Fiscal Year April 1, 1938, to March 31, 1939		Fiscal Year April 1, 1939, to March 31, 1940	
Salaries and wages	$46,483 72		$51,872 14	
State car expense	2,079 85		2,097 10	
Purchase new cars	1,763 65		1,016 09	
Private mileage	1,056 54		819 26	
Fares—Railroad, boat and stage	.....		115 03	
Meals and rooms	880 47		1,209 17	
Telephone and telegraph	511 04		519 86	
Freight and express	1,626 86		217 92	
Light, heat and water	3,881 94		2,380 21	
Medical aid	145 83		464 67	
Slicker coats, boots and pants	186 46		231 84	
Small tools and equipment	631 57		510 13	
Repairs—Hatcheries	628 74		2,142 78	
Feed—Including feed in storage	15,679 87		12,280 77	
Purchase trout eggs	13,810 95		23,129 75	
Seeds and lawn expense	30 64		199 41	
New equipment	218 26		3,148 24	
Purchase horses and mules	.....		1,839 70	
Horses and mules—Miscellaneous expense	.....		732 56	
Miscellaneous	537 50		506 20	
Totals	.....	$90,100 89	.....	$106,062 83

CONSTRUCTION EXPENSES—STATE TROUT HATCHERIES

April 1, 1938, to March 31, 1939—April 1, 1939, to March 31, 1940

	Fiscal Year April 1, 1938, to March 31, 1939		Fiscal Year April 1, 1939, to March 31, 1940	
Salaries	$6,710 24		$6,234 68	
Salaries—Auburn warehouse	109 93		541 50	
Materials	1,128 89		2,508 88	
State car expense	974 30		633 03	
Private mileage	51 20		86 48	
Fares	30 60		52 03	
Meals and rooms	766 90		810 91	
Auburn warehouse	67 44		888 00	
Miscellaneous	133 22		200 05	
Totals	.....	$10,032 72	.....	$11,955 56

TROUT PLANTING EXPENSES—STATE TROUT HATCHERIES

April 1, 1938, to March 31, 1939—April 1, 1939, to March 31, 1940

	Fiscal Year April 1, 1938, to March 31, 1939		Fiscal Year April 1, 1939, to March 31, 1940	
Salaries	$5,962 61		$5,350 34	
State car expense	4,175 64		3,385 69	
Purchase new cars, trucks	3,395 60		.....	
Private mileage	228 96		63 32	
Fares	57 17		45 90	
Meals and rooms	1,222 22		652 33	
Telephone and telegraph	21 15		10 18	
Boat expense	18 46		.....	
Small tools and equipment	309 43		1,554 08	
Miscellaneous	42 78		115 59	
Totals	.....	$15,434 02	.....	$11,177 43

EXPENSES—EYEING STATIONS AND TRAPS

April 1, 1938, to March 31, 1939—April 1, 1939, to March 31, 1940

	Fiscal Year April 1, 1938, to March 31, 1939		Fiscal Year April 1, 1939, to March 31, 1940	
Salaries	$8,249 56		$7,326 59	
State car expense	798 27		556 71	
Purchase new car	.....		394 74	
Private mileage	138 66		39 40	
Fares	27 95		8 10	
Meals and rooms	579 18		399 41	
Freight, express and packing	164 92		81 88	
Rent of land	60 00		180 00	
Light, heat and water	20 36		14 94	
Small tools and equipment	30 60		78 07	
Materials	303 23		264 64	
Boat expense	38 66		19 48	
Feed	216 42		.....	
Miscellaneous	50 61		28 63	
Totals	.....	$10,777 42	.....	$9,392 59

State Pollution Laboratory

In the previous biennial report, announcement was made of the formation of the Washington State Pollution Commission, composed of the directors of the following state departments: Department of Fisheries, Department of Game, Department of Conservation and Development and Department of Health. This Commission was formed in the fall of 1937 for the purpose of studying problems relative to various types of pollution in the State of Washington. Three technically trained men work in the field and at the Pollution Laboratory on Henderson Bay at Purdy, near Gig Harbor.

The principal project of the Commission during the last two years has been concerned with the serious fish mortality noted in the upper region of Grays Harbor and much valuable and comprehensive data has already been gathered dealing with this situation.

Here is a brief summary of the conclusions set forth by pollution biologists in a recently published report:

(a) Dead and distressed fish, shrimp, crabs, and other aquatic animals were observed in large numbers in upper Grays Harbor in 1937, 1938 and 1939.

(b) Dissolved oxygen concentrations found were in many cases less than the minimum quantities that fish can withstand, even for short periods. Dissolved oxygen concentrations were always extremely low where fish were observed in distress.

(c) Known habits of fish indicate that cutthroat and steelhead trout and chinook and silver salmon all have their runs endangered by the pollution of Grays Harbor. Of these fish, the chinook salmon is probably the most seriously endangered, as both seaward and streamward migrants normally would be passing through the Harbor during the time of acute pollution. Chum salmon are affected little, if any, by this pollution, the survey showed.

(d) Low dissolved oxygen concentrations in the water of upper Grays Harbor occurred only when the pulp mill operated during the period of low river flows.

State Pollution laboratory, Gig Harbor, on Puget Sound.

The pollution report recommended that the discharge of waste sulphite liquor in Grays Harbor be controlled in such a way that the dissolved oxygen concentration of Harbor water never falls below 5 p. p. m.

In addition to the work covered by the printed report, other valuable work has been done and findings made which will materially benefit the fisheries of the State of Washington, both game and food.

Right, more than 100,000 Chinese pheasants were produced by the Department of Game in 193 using methods illustrated on this page. Reading from top to bottom, left row: 1, Walla Wall game farm; 2, pheasants ranging over an open pen farm; 3, Yakima farm showing cultivate fields; 4, Auburn farm. Right row, top to bottom: 1, day-old chicks in hover; 2, thousands birds are hatched on electrified farms; 3, domestic hen with pheasant chicks in field brooder 4, looking through a battery of brooder houses, Walla Walla farm.

Pollution of Lake Washington caused by the logging operations of a timber company over a period of twenty years

GAME FARM DIVISION

THE Chinese pheasant reared by the Department of Game has become a favorite of Washington upland bird hunters. Cleared farming land and irrigated districts are exceptionally good for pheasants. Thus, Washington state has certain regions where the ringneck thrives better than others. For instance, eastern Washington, as a whole is regarded as range which yearly produces a higher productivity than western Washington. Yet, taking the state at large, 66,836 square miles or 42,775,040 acres, the total area suitable for pheasant range is slightly more than 11 per cent.

Output for Biennium Reaches 187,164 Pheasants

The State Game Department now operates nine Chinese pheasant farms and one Chukar partridge farm. Bird production from these ten state game farms for the last biennium reached 187,164 birds, as against 135,006 birds for the previous biennium. This is a gain of 52,158 birds.

Bird Fertility, Vitality Increase on Farms

Planned feeding and study of high vitamin, low cost feeds, have enabled the game farm division to cut its bird feeding expenditures from $56,319.83 for the biennial period, April 1, 1936, to March 31, 1938, to $49,207.13 for the last biennium. This is a reduction in feeding costs of $7,112.70, although production for this period was increased by 52,158 birds including 1,650 Chukar partridges. Feed used during the last biennium totalled 2,690,839 pounds. Fertility and vitality have steadily increased in the rearing of birds due to proper feeding.

Setting and hatching operations for the fiscal rearing seasons of 1938 and 1939 were accomplished much earlier than in former seasons and greater efficiency is being experienced from use of artificial brooders, hovers and incubators.

Game Farm Construction and New Improvements

A considerable amount of new construction on game farms was completed during the previous two years, the outstanding project being the Auburn game farm. This work, however, was started during the previous biennium, but was completed during the period, April 1, 1938, to March 31, 1940. With W. P. A. aid, seven acres were cleared and grubbed; eighteen acres were levelled and seeded; six new rearing fields of about four acres each were fenced; two covered pens 100′ x 100′ constructed; and other improvements completed.

Building of the Chukar partridge farm within the confines of the Yakima pheasant farm, was a major expansion project completed after April 1, 1938. This farm consists of approximately thirteen acres of irrigated land. The first equipment included fifteen 5′ x 5′ brooder houses with runs 6′ x 12′ x 2′ high. Later fifteen additional 5′ x 5′ brooder houses of an improved design were added, as well as fifteen covered brooder runs 10′ x 30′.

Chinese pheasant cock with hens.

Work for Continued Pheasant Increases

An improvement has been made in bird shipments by using better ventilated crates. This step has worked to minimize losses from transportation of birds. Planting schedules are arranged and county allotments are made according to the production of game farms.

BIENNIAL REPORT OF BIRDS LIBERATED BY DEPARTMENT OF GAME

April 1, 1938, to March 31, 1940

April 1, 1938, to March 31, 1939			April 1, 1939, to March 31, 1940			
Chinese Pheasants	Chukar Partridges	Totals	Chinese Pheasants	Chukar Partridges	Hungarian Partridges	Totals
84,195	641	84,836	101,252	1,009	67	102,328
Note—In addition the following were planted direct to counties:			Note—In addition the following were planted direct to counties:			
Raised by sportsmen		415	Raised by sportsmen			243
Hungarian Partridges purchased		948	Bobwhite Quail purchased			200
Purchased from 4-H Clubs		3,705	Purchased from 4-H Clubs			6,650
Quail trapped		3,809	Quail trapped			6,968
Chinese trapped		116	Hungarian Partridges trapped			232
Grand total for state		93,829	Grand total for state			116,621

Pheasant Feeding and Breeding Experiments

The Department assigned to a graduate biologist in 1939 the task of studying nutrition and pheasant broodstock improvement. The nutritional studies are being carried out on the Walla Walla game farm and are designed to determine what commercial foods or mixture of foods are most economical for raising pheasants, at the same time developing birds best able to care for themselves when released in the wild.

Groups of birds are being fed on different rations and weighed at regular intervals to compare their rates of growth. They are also compared from the standpoint of susceptibility to disease and mortality. This work is most important to the economical and efficient administration of this Department's extensive rearing program.

Nature of Pheasant Breeding Studies

The breeding work consists of a comparison of different strains and varieties of Chinese and Mongolian pheasants, including various crosses, to determine which make the best hunting birds and are best adapted to Washington game bird habitat. The Walla Walla game farm is one of the sources of breeders for the other game farms of the state and selective breeding will go on there continuously. To supplement this program eggs are purchased from eastern states to maintain the high standard of quality that hunters appreciate.

Results of this program will not be available until the end of the pheasant rearing season, so definite conclusions and recommendations cannot be entered in this biennial report.

Bird Planting Procedure Explained

A total of 185,447 Chinese pheasants was released from the nine farms by the Department of Game during the last biennium. In addition to these, 10,355 Chinese pheasants were purchased from 4-H Club members and released in their counties by state game protectors. Liberations of reared birds are made in centers of greatest natural productivity in order to achieve the best possible returns from planted birds. Cover, food and water, weather, temperature levels and farming operations all contribute to the normal reproduction of planted pheasants. As above stated, when it is considered that a comparatively small percentage of the total acreage of the state of Washington is adaptable as pheasant habitat, it is quite clear that steps must be taken to obtain a maximum of returns from released game farm birds.

Where pheasants are reared on the Okanogan game farm. Note row of 42 brooder houses.

Production of the Chukar Partridge

Rearing of the Chukar partridge under practically the same system as pheasant rearing has proved very satisfactory in comparison to methods utilized in former years. Chukars receive about four times as much space ratio as previously which has tended to nearly eliminate disease. The disease known as Blackhead formerly caused heavy losses at six weeks of age and prevented large scale output. Chukars now are placed in large fields of wheat at eight weeks of age where they thrive. Close attention is given to the brailing of reared birds, pheasants and Chukars. Care is taken to insure birds being rebrailed at regular intervals to prevent the cramping of wings.

Adapting the Chukar to Washington Habitat

The Chukar partridge is an uplander imported from the steppes and high plateaus of India and the Far East. It is a hardy, durable bird whose natural habitat parallels that of the semi-arid uplands of eastern Washington. Thirteen experimental liberation points were selected throughout the state in 1938 for the release of several hundred Chukars. The plantings ranged from the San Juan Islands to Whitman county and from Clark county to Douglas county. Game protectors have reported favorably on the nesting and reproduction of planted Chukars during the 1939 and 1940 nesting seasons. Propagation of the Chukar is being gradually increased and plantings are being made in larger numbers each year. Factors which restrict or hamper growth in the wild are being studied and the survey continued to determine the best all-purpose state habitat for the Chukar.

Chukar partridge releases during the last two fiscal years were as follows: 1938, 641; 1939, 1,009 birds.

Rearing India's Chukar partridge in Washington. Top left, Hovers and brooder runs on the Yakima Chukar farm; top right, Chukars held for liberation; lower left, day-old Chukar chicks; lower right, Chukars ready for shipment.

Extensive quail and Hungarian partridge trapping operations carried on in Okanogan county during the winter months were successful in trapping thousands of birds which were distributed to game protectors throughout the state for restocking. Top, baiting trap; center, removing trapped quail; lower, release of Huns, Whitman county.

Trapped Quail and Huns Used for Restocking

Although upland bird propagation by the Department of Game consists mainly of the Chinese pheasants and Chukar partridges, the trapping of quail and Hungarian partridges has reached an outstanding figure in recent years.

Using the fertile quail country of Okanogan county as the base of activities, trapping crews caught a total of 10,777 Valley quail in small traps the past two winters. Trapped quail are crated and shipped to game protectors for restocking suitable quail areas. These plantings have proved beneficial to bird areas by introducing new blood to flocks and in bolstering depleted quail coveys.

A total of 232 Hungarian partridges was trapped from the vicinity of Bridgeport, Douglas county, during the winter of 1940 and these birds were distributed to other counties to introduce new blood and restock depleted areas.

The "Zone Plan" of Pheasant Liberation

To eliminate long hauls and carrying of pheasants over extended cross-state planting schedules, a plan is being perfected which will zone the planting areas within a certain radius of each of the ten game farms.

Sportsmen Assist in Bird Planting Work

The aid of sportsmen in various communities in the state has been called for by game protectors during bird plantings and this assistance has proved very helpful. Usually sportsmen's clubs designate members of their organization to meet the bird planting crews and cooperate in liberation work. This cooperation is much appreciated and is regarded as a worthwhile conservation service.

As in recent years, all bird plantings made were verified by a sportsman or recognized individuals of the community where liberation of birds was made. This Department regulation accredits all bird releases, as planting witnesses are persons not connected with the Department of Game.

This air view shows the South Tacoma game farm and hatchery. The hatchery and ponds can be seen at extreme left while the game farm acreage takes up most of the remaining portion of the photograph.

STATE GAME FARMS—ADMINISTRATION AND GENERAL EXPENDITURES

April 1, 1938, to March 31, 1939—April 1, 1939, to March 31, 1940

	Fiscal Year April 1, 1938, to March 31, 1939		Fiscal Year April 1, 1939, to March 31, 1940	
Salaries and wages	$85,011 13		$33,979 31	
State car expense	3,113 54		2,599 88	
Purchase new cars	1,207 04		947 75	
Private mileage	664 35		338 08	
Fares—Railroad, boat and stage	.....		51 22	
Meals and rooms	1,268 56		865 51	
Telephone and telegraph	445 58		381 80	
Postage, freight and express	604 87		190 43	
Rent of land	2,175 00		1,275 00	
Medical aid	1,468 51		1,353 24	
Light, heat and water	2,501 87		2,584 05	
Groceries and kitchen supplies	1,331 77		1,332 75	
Repairs—Pens and buildings	270 91		1,870 23	
Ammunition for vermin control	121 03		144 74	
Feed for birds	20,534 75		28,672 38	
Feed for animals	424 19		342 91	
Purchase game birds	3,243 50		648 71	
Purchase birds 4-H Club	2,778 75		4,987 50	
Purchase game bird eggs	153 00		118 34	
Purchase hens	7,346 05		7,940 25	
Seeds and plowing	931 26		1,333 02	
Drugs and chemicals	340 38		480 12	
Small tools and equipment	448 90		529 45	
Brails	622 84		544 12	
Purchase equipment and livestock	601 09		1,942 17	
Miscellaneous	237 98		374 27	
Totals	.....	$87,936 85	.....	$94,927 83
Less credit for broody hens sold at close of rearing season	.....	$4,652 06	.....	$4,143 19
Less credit for sale of sacks	.....	$65 88	.....	$150 94
Less credit for sale of calf	.....	.....	.....	$1 50

CONSTRUCTION EXPENSES—STATE GAME FARMS

April 1, 1938, to March 31, 1939—April 1, 1939, to March 31, 1940

	Fiscal Year April 1, 1938, to March 31, 1939		Fiscal Year April 1, 1939, to March 31, 1940	
Salaries	$3,213 56		$1,189 06	
Salaries Auburn warehouse	169 93		541 49	
Materials	1,974 55		2,591 71	
State car expense	25 45		63 56	
Private mileage	17 08		.....	
Meals and rooms	82 18		30 30	
Auburn warehouse	67 43		888 01	
Miscellaneous	6 25		15 96	
Totals	.....	$5,556 43	.....	$5,620 09

BIRD PLANTING EXPENSES—STATE GAME FARMS

April 1, 1938, to March 31, 1939—April 1, 1939, to March 31, 1940

	Fiscal Year April 1, 1938, to March 31, 1939		Fiscal Year April 1, 1939, to March 31, 1940	
Salaries	$3,848 37		$2,079 58	
State car expense	1,539 94		874 40	
Purchase new car	205 20		.....	
Private mileage	321 76		25 88	
Fares	15 18		23 25	
Meals and rooms	513 55		98 47	
Telephone and telegraph	17 50		.....	
Freight and express	.....		39 17	
Boat expense	18 46		.....	
Miscellaneous	8 53		1 25	
Totals	.....	$6,482 49	.....	$3,142 00

BIOLOGICAL DIVISION

A BIOLOGICAL staff has been at work since 1935 studying fish and game problems. These surveys have included surveys of elk, deer and mountain goat conditions, steelhead migration, factors dealing with nutrition, survival of planted fish, handling of broodstock fish, the management of furbearers, upland bird habits and habitat and other problems confronting wildlife conservation. It is well to point out here, that artificial reproduction is only supplementary to natural reproduction and, by every practical means, wildlife in Washington is encouraged to carry out its own salvation and system of propagation and welfare. The position of the biologists is to expedite this natural reproduction by removing all possible obstacles which impede nature's plan. These limiting factors are isolated through the medium of surveys, research and scientific studies.

The Sum Total of the Sportsman's Bag

The true gauge of the successful operation of a conservation program is not the numbers of fish and game planted in the state, but rather the sum total of the sportsman's bag. Therefore, the propagation phase of the Department of Game is but the beginning. The follow-through studies and operations which supplement this work largely measure the returns and determine the results of artificial reproduction.

Steelhead Survey and Tagging Experiment

The migratory tendencies of the steelhead have long been a source of conjecture. To learn something of its habits and the effect of planting, the Department of Game started a series of experiments in 1937 which form the basis for a current release by the biological division. Sportsmen have long accorded the steelhead, or sea-run rainbow, the title of "King of Washington game fish." Sports fishermen may fish for steelhead at two extreme cycles in its life, the special winter steelhead season of December, January, February and March when the steelhead ascend the rivers to spawn, and the regular fishing season running from April to October, when they are taken as immature fish.

Methods Used to Check Steelhead Migration

Concrete facts on the migration time and extent of steelhead fishing were needed in order to better manage this important game fish. Such an experiment was started in August, 1937. Five thousand fourteen-months-old steelhead were tagged internally with a small red celluloid tag, 3/16" x 3/4" x 51/1000" lettered "Return to Wn. Game Dept.". A slit was made in the body wall just posteriorly and dorsally to one of the ventral fins through which the tag was entirely inserted into the body cavity. In order to reduce the chance of injuring the intestines, the fish were starved at least 72 hours before mark-

Tagging steelhead. Left, cutting the incision for the marked tag; upper right, inserting the red monel tag; lower right, clipping adipose fin is an exterior mark of identification.

ing. The adipose fin was also clipped as an external mark of identification. Tagged steelhead were held in rearing ponds three months to observe tagging losses and mortalities.

The steelhead were starved for three days prior to planting and then were released as follows: One-half below the Headworks Dam on the Green River, King county, and the other half in Burns Creek, tributary of the Green River.

Sportsmen's Cooperation Aid Study

Although no attempt was made to obtain a complete check on trout fishermen, a total of 121 tags was received from sportsmen during the 1938 trout season. More than 5,000 fishermen were checked on the Green River during the 1940 winter steelhead season. Scale samples, temperatures, weights and lengths and other biological data were gathered and compiled. The study was expedited by the friendly cooperation of fishermen.

Summary of Steelhead Tagging Results

Results of this experiment based upon returns from tagged steelhead are summed up as follows:

(1) Scale samples taken from anglers' catches of immature fish indicated that the major portion of their catches consisted of fish two years of age. From a study of scale samples it is assumed that the month of May is the peak of downstream migration. The bulk of spring trout caught, consisted of fish either in the process of migration or nearly ready to migrate.

(2) Scale samples of mature fish studies indicate that 73 per cent of the fish had migrated to salt water as two year old fish. Other deductions were: That 61 per cent of the fish matured after two years in salt water, and 28 per cent matured after three years in salt water; 52 per cent of the steelhead were found to have spent a combination of two years in fresh water and two years in salt water before maturing.

(3) Comparison of the 1940 sports catch of steelhead with the 1940 trap collections shows 885 for the sports catch and 1,160 for the trap take. Much natural spawning undoubtedly takes place in the main river. It is believed that winter sports fishermen take about 40 per cent of the total winter run. The biggest reduction in the numbers of steelhead is due to the catch during the spring when the fish are on their way to salt water for the first time.

Development of Fish Catch Records

Creel censuses, or fish catch records, have developed during the last three years to the point where they are accepted as the foundation of the fish planting program of the Department of Game. Establishment of a system of catch records was introduced on the theory that a mere physical, chemical and biological study of lakes and streams is quite inadequate to satisfactorily forecast the productivity of public waters.

Record Returns from 106,293 Fishermen in 1939

The taking of fish catch records has been state-wide in scope. Biologists completed tabulating the returns from 106,293 fishermen in 1939, who averaged 6.1 fish apiece. From these statistics future fish liberations will be based upon the actual productivity of the waters. Already a good return has been passed along to sportsmen from plantings guided by this actual catch record data.

The present day fish management program of this department places particular stress on catch records as a permanent part of its work. Continued cooperation from sportsmen and resort owners will directly benefit them by increased catch per person.

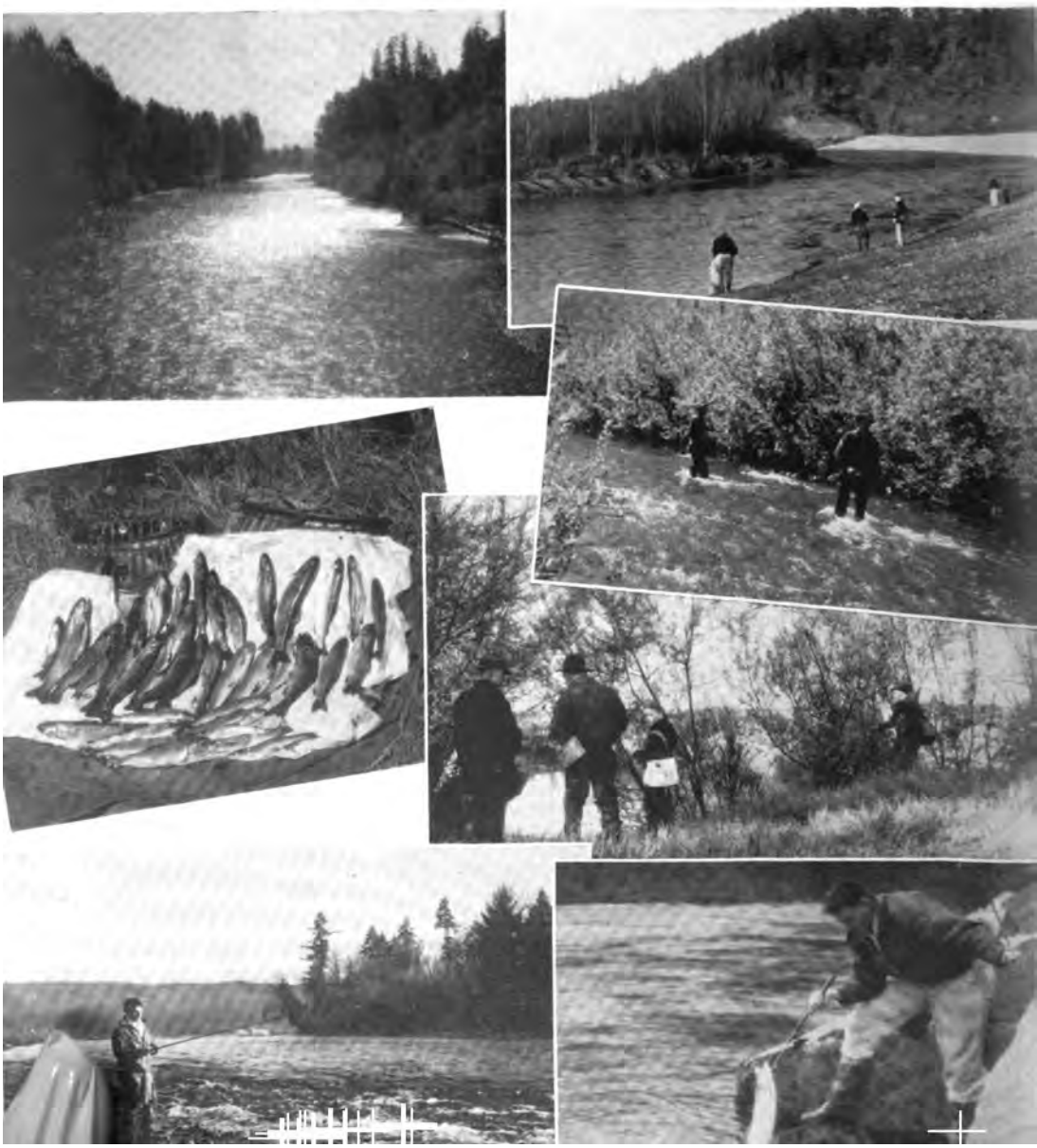
Sources Utilized in Tabulating Creel Data

Three sources of information are utilized in the assembling of catch record information: Resort owners who check the fishermen's score at the end of the day; game protectors whose records cannot be as complete as resort owners inasmuch as they tally the fish-catch at the time the patrol is made; voluntary reports submitted by fishermen on the department's catch record forms.

How Fish Creel Censuses Are Compiled

From catch record forms varied data is compiled. The number and species of fish caught and relative productivity of the lake or stream, are each vital points and this data is tabulated directly from catch records. No effort is made to check all fishermen throughout the season in the state, but from a comparatively high average of creels checked, it is possible to draw conclusions on fishing conditions as a whole. It is pointed out that there has been a sizable increase in voluntary fishermen's checks thus providing data on a greater number of lakes and streams.

Washington sport fishing. Washington lakes and streams are intensely fished during the season. Fish catch records for 1939 show that 106,293 fishermen checked had taken 648,098 fish. Average fish per man 6.1 per cent.



CATCH RECORD 1939

NAME OF LAKE Chapman SIZE 350 acres COUNTY Spokane

TYPE OF LAKE

MAX. TEMP 72° DATE 8/11 FOOD CONDITIONS Good

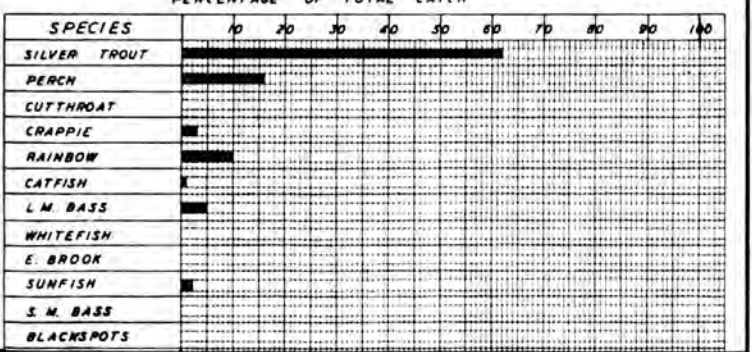
MIN. TEMP 32° DATE 2/12 BOTTOM CONDITION Rock--Silt

MAX. DEPTH 150' FISH PER ACRE 27.9

ALTITUDE PRODUCTIVITY

NO. FISHERMEN 2077 NO. FISH CAUGHT 9,748 CATCH PER MAN 4.7

PERCENTAGE OF TOTAL CATCH



PLANTING RECORD

NUMBER	SPECIES	SIZE	DATE
350,000	Silver Trout	1"	1937
5,000	Rainbow	5-7"	1937
1,000,000	Silver Trout	1"	1938
5,500	Rainbow	5-10"	1938
5,346	Rainbow	6-14"	1939
2,000	Rainbow	3"	1939
5,000	Rainbow	5"	1939
5,300	Rainbow	4"	1940

INLETS

Pine Creek

OUTLET

Rock Creek

TIMES CHECKED

DATE	PLACE	BY

PLANTING RECOMMENDATIONS

Not less than 500,000 Silver 1"
25,000 Rainbow 4" or better

REMARKS

The production of this lake slacked off materially on the silver trout catch. This is the result of a smaller than average plant of this fish. Rainbow are increasing steadily in spite of only three year stocking with comparatively small plants.

Type of chart used by Department of Game to tabulate fish catch record data. Reports received from resort owners, protectors and voluntary information given by fishermen are combined and compiled according to lakes and streams, as illustrated in this chart.

COMBINED TOTAL OF RESORT CHECKS, GAME PROTECTORS' CHECKS, AND VOLUNTARY REPORTS FOR 1939 AS COMPARED WITH 1938 TAKE

1939 results as tabulated, 106,293 fishermen were checked with 648,098 fish averaging 6.1 fish per man per trip. The catch statistics listed below for 1938 season, 62,334 fishermen with an average of 5.44 fish per man per trip.

SPECIES OF FISH CAUGHT	1939 Per Cent	1938 Per Cent
Silver trout	33.9	35.0
Perch	22.5	22.5
Rainbow	14.1	11.5
Eastern brook	11.2	8.0
Cutthroat	6.8	11.5
Crappie	4.4	4.0
Catfish	2.3	2.5
Large mouth bass	1.9	2.0
Sunfish	0.8	0.7
Blackspotted	0.7	0.3
Small mouth bass	0.5	0.4
Miscellaneous	0.4	.....
Whitefish	0.3	1.5
Dolly Varden	0.2	0.1

Merrill Lake, Cowlitz county, is a typical example of Catch Record data. The figures clearly show the ratio between the number of fishermen and the average catch per person. When the number of fishermen increases past a certain level, the catch of fish per person decreases.

CATCH REPORT RECORDS—MERRILL LAKE, COWLITZ COUNTY

	Cutthroat	Rainbow	Eastern Brook	Total Number Fish	Total Fishermen	Fish Per Person
1938	1,882 54.5%	154 4.4%	1,430 41.4%	3,466	604	5.74
1939	3,288 54.6%	943 15.7%	1,793 29.7%	6,024	941	6.41
1940	3,309 46.3%	2,859 40.1%	974 13.6%	7,142	1,271	5.61

GENERAL EXPENSES—FISH AND GAME SURVEYS

April 1, 1938, to March 31, 1939—April 1, 1939, to March 31, 1940

	April 1, 1938, to March 31, 1939		April 1, 1939, to March 31, 1940	
	Game Surveys	Lake and Stream Surveys	Game Surveys	Lake and Stream Surveys
Salaries	$3,543 07	$5,852 67	$5,750 60	$6,232 94
State car expense	308 00	349 77	824 22	411 97
Purchase new cars	.....	425 40	467 74	486 96
Private mileage	105 91	912 35	327 24	753 80
Fares—Railroad, boat and stage	18 75	43 15	32 43	39 51
Meals, rooms and berths	859 76	449 80	1,170 02	398 09
Freight and express	.....	.....	56 15	.....
New equipment and small tools	.....	177 45	216 90	196 23
Pictures and films	81 41	.....	102 88	.....
Scientific supplies	.....	26 63	.....	42 75
Stream improvement and construction	.....	.....	.....	26 56
Feed—Experimentals	.....	42 82	.....	42 48
Miscellaneous	116 42	395 75	113 11	312 40
Totals	$5,033 32	$8,675 79	$9,061 35	$8,943 69

GAME MANAGEMENT

IT is sometimes difficult for sportsmen and the public in general to understand the scientific terminology used in describing game management operations and the steps taken to solve wildlife problems. In a broad sense the management may be compared to the supervision of production of farm produce, crops, livestock, etc. The wildlife crop must be harvested in season, game shortages must be built up and surpluses over and above the carrying capacity of the range controlled. The farmer undertakes to manage the sowing, propagating and harvesting of his farm produce. The game management biologist seeks to study and survey all natural factors which bear on the habits, habitat and conditions affecting game on the range. In a word, the term "game conservation" is becoming to mean more and more the wise use and preservation of wildlife resources.

Surveys Vital to Game Management

The biological surveys, research studies and the gathering of scientific data are an integral part of the state's game management program. Such information compiled from summer and winter big game surveys has proved of inestimable worth to the Commission in its establishment of game seasons. It can be said that the present policy of the Commission envelops the recommendations of game biologists, the counsel of sportsmen and records of past seasons on matters of hunting dates. To the sportsman and hunter, the Commission wishes to assure a maximum yield of big game, taking the harvest crop each year from the range, while at the same time regulating the season so as not to endanger the productivity of the herds.

Factors Guiding Elk, Deer Conservation

Deer and elk management in Washington are based on four main factors:

(1) The annual seasonal kill of elk and deer. This information is collected from big game cards mailed to the Department following the hunting season and from checking station reports.

(2) The sex ratio and fawn ratio of deer. This data is gathered from surveys made through the winter in the principal wintering areas of the state.

(3) By frequent field trips during the year, biologists check on the condition of deer, parasites and disease affecting animals and other factors which contribute to their decrease. Deer losses other than hunting kills are considered.

(4) Range conditions. Biologists and game protectors observe the food supply on the range. An adequate supply is essential if large winter losses are to be avoided.

What Game Survey Men Aim to Accomplish

Biologists do not claim to be able to count or observe all of the deer in any region nor do they claim to know how many there actually are. However, they do attempt to observe as many deer as possible as a representative sample of the entire population. From these they are able to arrive at conclusions which

can be used to gauge the conditions of the entire herd. If the survey shows the fawn crop to be good, the supply of bucks adequate, range conditions satisfactory and there are no excessive losses, it is safe to say that the deer herds in a given region are being well managed. However, should the biologists find one of these factors unsatisfactory, deer in this area must be studied intensively and a remedy found.

From time to time as ranges reach population peaks it becomes necessary to harvest some female animals. In eastern Washington deer areas this plan could be accomplished best by a system of controlled hunting, but this first requires legalization by action of the State Legislature. The dense cover of western Washington makes it possible to open seasons on both sexes in limited over-populated areas without jeopardizing the breeding stock.

Deer Surveys Start in December

Department winter survey men begin their deer sex ratio counts early in December while bucks are still in possession of their antlers. Each biologist is supplied with field glasses and mapping material to chart the area to which he is assigned. This area may include canyons, mountains or other areas inhabited by deer in winter. In notebooks they record the number of bucks, does, fawns and the point classes of the bucks. Information pertaining to range conditions, listing of food utilized, nature of deer kills found on the range and similar data, form the basis of the survey. The highest single day's count by three observers recorded 913 deer. Sex ratio counts end about January 15 when antler shedding by bucks becomes general and positive identification of sex is no longer possible.

Accuracy Stressed in Winter Deer Counts

The surveys are continued later in the winter and early spring when biologists are able to ascertain winter deer losses, study range conditions, food consumption, migrations and concentrations. In all instances, only deer actually observed are recorded and no estimates are permitted. Estimates, it has been found, are too variable and misleading to lend value to scientific understanding of deer conditions.

Comparison of Deer Sex Ratio Figures

For purposes of illustration, a three-year recapitulation of deer sex ratio count data is given. These sex ratio figures indicate a comparison of bucks to does and does to fawns. The average deer ratios of 1 buck to 3 does in 1937, 1 buck to 2.5 does in 1938 and 1 buck to 2.5 does again in 1939 are viewed as very good since they were secured after the hunting season kill. The 12,526 deer upon which these figures are based represent a good sample. The lowest buck ratio found anywhere was 1 buck to 4 does and this is still considered very satisfactory. The average ratio of slightly better than one fawn to one doe positively removes the possibility of any problem of barren does. This is a very good ratio when it is considered that the counts were made in December when most of the fawn losses had taken place and also since non-productive yearlings were classified with the does. It has been computed that this ratio actually averages two fawns each for one-half of the mature does and single fawns for the other half.

These ratios of bucks to does and does to fawns constitute the basis upon which a large part of the management of deer is founded. (See Sex Ratio table on page 67.)

Finding the Productivity of a Mule Deer Herd

The buck law has been the hunting order in Washington for many years. This means that the yearly harvestable crop of branched-antlered bucks will provide good hunting commensurate with the number of antlered bucks produced each year.

Consider the following life equation which illustrates the productivity of a herd of mule deer:

CHANGES IN A DEER HERD THROUGHOUT ONE YEAR

(Starting with 233 Deer)

Ratio	Bucks	Does	Fawns	Time of Year
1 buck to 3 does.....	33	100	100	December—as counted in winter survey.
		Estimated 10% winter loss		
	30	90	90	March—loss deducted
	30 + 45	90 + 45		
	75	135		May—Fawns matured
	75	135	135+	June—New fawns born
	40% kill—30 bucks			October—Buck kill.
1 buck to 3 does.....	45	135 (35% increase)	135	December—as counted in next winter survey.

Conditions Influencing Deer Sex Ratios

Many people assume that once the sex ratio of a deer herd is over-balanced, or heavy on the doe side, a long period of time must elapse to correct that condition and bring the bucks back. This is not true for the ratio will correct itself very rapidly if the kill is reduced. As an example, assume that 1 buck to 10 does will leave no animals unbred.

Bucks		*Does*		*Fawns*
10	to	100 produce		100 (50 males, 50 females)
Season closed one year and no kill				
50	matured from fawns	50		
60	to	150	=	1 buck to 2.5 does
60	to	150 produce		150 (75 males, 75 females)
Season closed another year				
75	matured from fawns	75		
135	to	225	=	1 buck to 1.6 does

The above equation illustrates that a single closed season on deer will return any herd to a safe sex ratio. It is pointed out that if deer were killed after the breeding season, it would be possible to kill all antlered bucks and still have one spike or two-point buck to every three does for the following breeding season. However, such a season is not recommended because of the questionable value of using all young animals for breeding. Since the average hunting kill is about 45% two-points, approximately 40% of the 1940 kill is from the fawn crop of 1939.

Deer range conditions. Left row, top to bottom, 1, excellent deer winter range, Teanaway River, Kittitas county; 2, over-browsed range, fir and pine limbs stripped by deer; 3, winter deer survey, Yakima county, 1940. Right row, top to bottom, 1, Bitterbrush, important as a source of winter food for deer; 2, typical deer winter range, Chelan county; 3, over-browsed elk range, Yakima county; 4, Black-tailed deer.

SEX RATIO AND PRODUCTIVITY TABLE

Totals for State, 1937, 1938, 1939

Year	Total Deer Seen	Does	Fawns	Bucks	Ratio Bucks to Does	Ratio Does to Fawns
1937	2,928	1,215	1,324	389	1 buck to 3.1 does	1 doe to 1.09 fawns
1938	4,583	1,877	1,975	731	1 buck to 2.54 does	1 doe to 1.06 fawns
1939	5,015	2,064	2,152	799	1 buck to 2.58 does	1 doe to 1.04 fawns

Deer trapping operations, Chelan county, 1940. Upper left, preparing the trap; upper right, drop gate type trap used; lower left, deer loaded and ready for release in less congested game areas; lower right, release. One hundred and twenty-four mule deer were trapped using these methods.

DEER KILL

COUNTIES	1936	1937	1938	1939
Asotin	41	70	67	107
Chelan	875	743	831	1,461
Clallam	65	80	111	193
Clark	34	51	50	70
Columbia	96	77	119	181
Cowlitz	66	107	110	172
Douglas	Closed	Closed	Closed	153
Ferry	308	414	356	511
Garfield	73	80	74	143
Grays Harbor	65	143	181	208
Island	53	305	286	429
Jefferson	65	99	139	160
King	77	75	127	155
Kitsap	56	103	99	119
Kittitas	197	181	240	378
Klickitat	92	42	56	70
Lewis	106	156	189	252
Mason	60	133	214	371
Okanogan	1,522	1,213	1,336	2,281
Pacific	84	142	178	251
Pend Oreille	207	274	245	391
Pierce	73	161	154	221
San Juan	11	132	29	149
Skagit	27	44	59	64
Skamania	80	82	101	110
Snohomish	30	46	66	74
Spokane	49	57	73	96
Stevens	319	306	304	480
Thurston	71	127	174	342
Wahkiakum	26	44	42	79
Walla Walla	10	17	19	32
Whatcom	46	64	105	113
Yakima	129	81	Closed	Closed
Undetermined counties	38	4	14	12
Totals	5,114	5,653	6,148	9,833
The above figures represent the total number of cards returned out of the total Big Game Seals sold	57,818	70,407	71,061	80,270

The cards returned probably represent 70% of the kill. This is arrived at by absolute checks we have had of areas of kill and returns we have had from those areas.

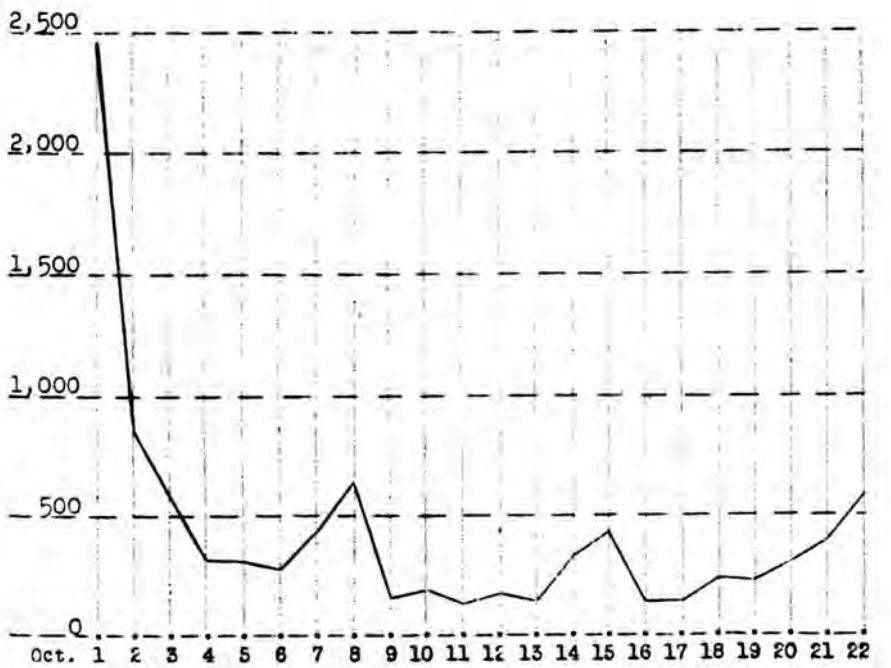
Deer-Trapping Operations in Chelan County

An experiment in trapping deer in the Twenty-Five Mile Creek region of Chelan county was carried to a successful conclusion during the winter of 1939-1940. Using a type of "drop-gate box trap," a crew of two department men was able to capture 124 deer in a twenty-nine day period. Trapped deer were tagged and removed to deer areas away from the over-populated region.

Two illustrated deer reports were prepared by the biological division and released by the Department of Game during the past two years. These reports summarize the findings of biologists on winter surveys and present a factual picture of deer conditions generally throughout Washington.

Distribution of Kill Throughout the Season

Distribution of kill according to date of kill was taken from the Big Game Seal cards returned and is shown in the following graph.



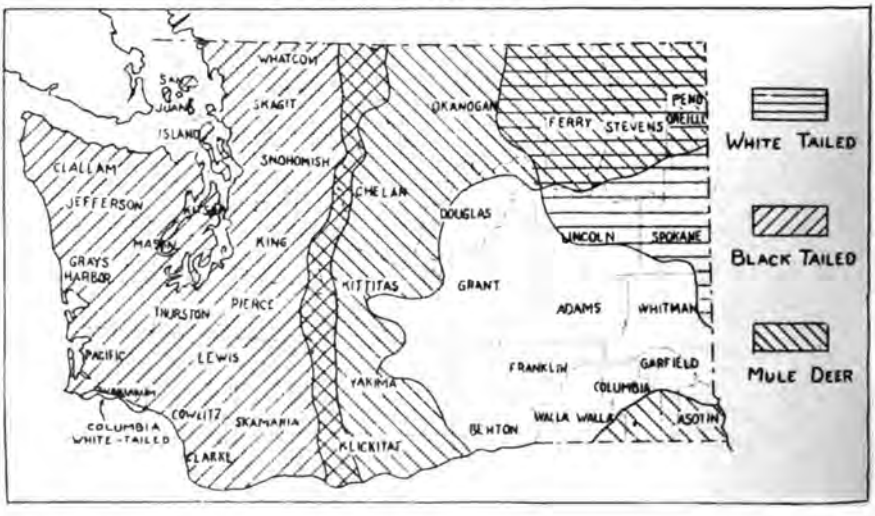
It will be noted that the kill drops off rapidly after the first day of the season. This decline is followed by a slight rise for each week-end and a similar rise at the end of the season. The latter is due to the combined effect of increased hunting near the end of the season and reduced caution of bucks, since the breeding season of mule deer started at about that time.

DEER LOSSES, CALENDAR YEAR 1939

Taken from Game Protectors' Monthly Reports

HOW KILLED	Total	Fawn		Adults		Undetermined
		Male	Female	Buck	Doe	
Car	397	30	31	127	203	6
Poacher	155	2	11	57	63	22
Illegal hunting season kills	89	8	2	23	55	1
Drowned	47	.....	.....	24	22	1
Unknown	37	3	4	14	11	5
Train	35	3	4	7	21	.....
Killed for property protection	33	1	4	13	15	.....
Dog	31	5	4	4	17	1
Coyote	20	4	5	2	6	3
Wire fence	20	.....	.....	8	12	.....
Natural death	14	4	2	3	5	.....
Cougar	11	.....	.....	5	6	.....
Hunting wounds	10	.....	.....	5	4	1
Disease	5	2	1	.....	2	.....
Bots and ticks	5	.....	.....	.....	3	2
Fell off cliff	4	.....	.....	.....	4	.....
Bear	3	.....	.....	.....	3	.....
Falling limbs	3	.....	1	1	1	.....
Poisoned	3	.....	.....	1	2	.....
Fell in well	3	.....	.....	1	2	.....
Fighting	3	.....	.....	3	.....	.....
Malnutrition	2	2	.....	.....	.....	.....
Bobcat	1	.....	.....	.....	1	.....
Frozen in ice	1	1	.....	.....	.....	.....
Broken leg	1	1	.....	.....	.....	.....
Exposure	1	.....	1	.....	.....	.....
Caught in trap	1	.....	.....	.....	1	.....
Hung in bridge	1	1	.....	.....	.....	.....
Totals	936	67	70	298	459	42

DEER DISTRIBUTION



The following table lists eastern Washington deer food plants:

WINTER BROWSE UTILIZATION EASTERN WASHINGTON DEER

1938-1939

COMMON NAME		Per Cent in Deer Diet
Mountain Laurel	Ceanothus velutinus	22 %
Bitterbrush	Purshia tridentata	21
Mountain Mahogany	Cercocarpus ledifolius	10
Buckbrush	Ceanothus sanguineus	7.3
Kinnikinnick	Arctostaphylos uva-ursi	4.8
Black moss	Unsea sp.	3.2
Pine	Pinus sp.	3.1
Willow	Salix sp.	3.0
Service berry	Amelanchier sp.	2.8
Choke cherry	Prunus sp.	2.6
Sage	Artemisia sp.	2.6
Oregon grape	Odestemon aquifolium	2.3
Douglas fir	Pseudotsuga taxifolia	2.3
Rose	Rosa sp.	2.0
Pentstemon	Pentstemon sp.	1.7
False Box	Pachistima myrsinites	1.7
Maple	Acer sp.	1.5
Elderberry	Sambucus glauca	1.1
Oak	Quercus sp.	1.1
Syringa	Philadelphus Lewisii	1.1
Sumac	Rhus glabra	.7
Rabbit brush	Chrysothamnus sp.	.5
Hazelnut	Corylus californica	.4
Cedar	Thuja plicata	.3
Alder	Alnus sp.	.3
Snowberry	Symphoricarpus albus	.2
Ninebark	Opulaster opulifolius	.2
Red-osier	Cornus stolonifera	.1
True fir	Abies sp.	.1

The percentages were computed from daily browse utilization records of winter survey workers.

Feeding time for forest orphans, cub bear, deer fawn and young raccoon.

Mountain goat, old and young. Washington has one of the largest populations of goat in the United States. Their habitat is high, rugged mountain cliffs and they can be found in good numbers in the northern Cascades.

Comments on the Mountain Goat Study

Mountain Goat Study: A study of the mountain goat of Washington was conducted during the biennium by a department biologist. Previously the Department had little conclusive data available on the habits, habitat and rate of reproduction of this animal. The season on mountain goat has been closed since 1915. As one of the major big game animals, the Commission was desirous of obtaining first-hand observations on all facts pertaining to the goat. Washington is classed as having one of the largest goat populations in the United States and future management of this population was the object of the goat study.

Survey Covers Habits and Habitat of Goat

The Department of Game has recently released the results of the year-round study of the mountain goat and the following conclusions were set forth:

(a) Population counts made in the survey just completed show increases over the last few years and over estimated figures. While increasing in numbers, the goat, it is observed, has also expanded its range.

(b) Goats have a potential capacity for a fairly fast rate of increase, although they are not as prolific as deer. The survival of the 1939 kid crop indicates about a 35% increase in the total of those herds studied. The yearling count shows that the 1938 kid crop survival amounted to less than a 5% increase in the total herds. An answer to this great variation of kid losses will come with a longer and more detailed study of goat problems.

(c) Eagles and coyotes do account for some losses, but were not viewed as serious during the period studied.

(d) It is thought that severe winter conditions have an appreciable effect on the reproduction. Additional study over a period of several years will be necessary before this supposition can be established as fact.

(e) Forage for goats is abundant and apparently domestic grazing has not curtailed the range supply of the goat population. This is true as long as the heavy winter snows do not restrict the feeding of the animals.

It is planned to continue the mountain goat survey to a definite conclusion.

Elk Management and Life History

Elk in Washington may be classified in two groups: The native Olympic elk of western Washington; and those elk introduced into Washington from Montana during the period 1912 to 1932. So far as is known, elk are native only west of the Cascades, there being no historical records available of elk having ranged in eastern Washington in recent times.

The elk population throughout the state has shown rapid increase in late years. This is due to efficient game protection and control of predators through application of the bounty law. Yet with the increase of elk on the range has come over-utilization of the food supply in some areas.

The rate of reproduction of elk is somewhat slower than that of deer since they very rarely have twin calves while twin fawns are the general rule. In counts made in Washington, it has been determined that six-tenths of a calf per cow is average for an elk herd including unproductive yearlings. Studies of some herds planted in eastern Washington indicate that the average yearly herd increase is between 20% and 25%.

Male elk all develop the spike antler the first, or yearling year, usually followed by three or four-point antlers the next spring. After the third year there are generally five or six points on each antler and they do not indicate the true age of the elk. These antlers are shed late in February and March and are replaced by new ones grown in the spring and summer. Breeding takes place in September and is completely over by the time the hunting season starts.

Roosevelt elk. This species is native to the State of Washington and is found in greatest numbers on the Olympic Peninsula.

Methods Used to Regulate Elk Population

In several areas where elk herds exceed the carrying capacity of their ranges it has been necessary to limit their numbers by declaring a "cow season" as no reduction in productivity is accomplished by the elimination of bulls only. The total elk kills of Washington for the last four years have been as follows: 1936, 605; 1937, 1,099; 1938, 1,449 and 1939, 1,438 animals.

Two experimental projects to determine the feasibility of transferring elk from one range to another were tried on over-populated ranges of the Olympic Peninsula. Twenty-seven young elk calves were captured from over-browsed regions of the Hoh and Quinault river bottoms and transplanted to new elk range. The animals were removed from wild habitat when only a few days old, reared on a farm at Lake Quinault and when about six months old, transferred to good elk country in south Grays Harbor county. Summarizing this project, the Department found that calves could be obtained in the wild and raised domestically, but that the cost of such an enterprise was too great to warrant consideration as a means of reducing elk herds in over-populated areas. The young calves released in Grays Harbor county in 1938 are now fully grown and doing well in the region of the North River game preserve.

During 1938 and 1939 efforts were made to trap mature elk from the Elwha watershed where a small herd had been doing damage to farms in that vicinity. A large corral built by the U. S. Forest Service was operated by the Department of Game in cooperation with this Federal agency during the winter of 1938-1939. Twenty-six elk were trapped and removed by truck

Release of elk calves, taken from the Hoh and Quinault River regions of the Olympic Peninsula, to the vicinity of the North River region of Pacific county. These animals are doing well in their new habitat.

to other elk range, but the remainder of the herd eluded capture. There are still a few elk which should be removed from this region.

A State-Wide Review of Elk Conditions

Considering the elk situation from a state-wide viewpoint, the following is a brief discussion of elk by regions:

(a) **Olympic Peninsula Elk:** This area is populated entirely with native Roosevelt elk. The range on the western slope of the peninsula is overstocked as the winter forage on the Hoh and Quinault rivers is inadequate and some losses of elk can be expected during winters of considerable increases in elk herds. Liver flukes and other parasites also affect the elk of the over-populated ranges.

The new Olympic National Park includes most of the summer elk range and part of the winter range. Predatory animals, chiefly cougar, can be expected to use the Park as a base of operations for forays into the elk herds staying outside of the Park boundaries. The state has no jurisdiction over predatory animals within the limits of National Parks.

Hunting in this region has been limited to western Jefferson county and parts of Clallam and Grays Harbor counties where elk are most abundant. Two seasons allowed the killing of elk of either sex, but reductions have hardly equalled reproduction.

(b) **Southwest Washington Elk:** This region is also inhabited by native Roosevelt elk and they have become fairly abundant in Pacific county south of the Willapa River. Range here is ample and the elk are said to be increasing steadily. The first open elk season in this area was established in 1939. The Cowlitz, Lewis and Wahkiakum county elk herds have shown an increase in recent years.

(c) **Yakima County Elk:** The entire elk population of this county is the result of one planting of fifty Rocky Mountain elk that was released along the Naches River in 1913. They now range from the Indian reservation, north into Kittitas county with the bulk of the herd remaining between the Naches and Tieton Rivers. Their summer range includes the entire Rattlesnake Game Reserve and extends west to the summit of the Cascade Mountains. The high summer range of this herd is still in excellent condition, but some of the low summer range and most of the winter range has been over-grazed. A reduction of the herd by the opening of a season allowing the killing of elk of either sex in 1938 greatly lessened this elk problem.

(d) **Manastash-Taneum Elk Herd, Kittitas County:** These elk comprise the overflow from the Yakima herd and range north of the Naches River to Cle Elum. This includes the Wenas, Untanum, Manastash and Taneum watersheds. Winter range in this region is somewhat limited with the result that they cause some conflict with agriculture.

(e) **Colockum Elk Herd, Kittitas County:** This herd was started with the release of 45 elk introduced from Montana in 1915. The present population is estimated at between four and five hundred animals which range throughout the summer in the Wenatchee Range east of Blewett Pass and winter on the breaks of the Columbia River north of Vantage. Range of this herd is adequate to support continued large increases.

(f) **Blue Mountains Elk:** Asotin, Garfield, Columbia and Walla Walla counties embrace the range of the so-called Blue Mountains elk herd. A total of about 145 animals was planted in this area from 1913 to 1930. They have made large increases and have even served to populate considerable territory in Oregon.

(g) **Cowlitz County Elk:** Near Mount St. Helens in the headwaters of the Toutle and Kalama Rivers range about 450 elk of the native variety. These were almost exterminated at one time, but they appear to be coming back well now. However, there has been no open season on these animals.

(h) **King County Elk:** A small herd of elk still remains in the Enumclaw district as the result of a planting made in that area in 1913. This herd is still too small to allow any hunting.

Biologists have carried sex ratio counts and elk population censuses over the entire elk range, following a plan of survey and study similar in scope to that applied in making deer surveys.

A thorough summary of the state elk situation, covering range, hunting, disease, and biological developments affecting elk in the state, was made by the Department of Game during 1939.

Nevada Antelope Introduced Into Washington

Widespread interest was evidenced among sportsmen of the state by the Department's introduction of antelope during the summers of 1938 and 1939. It was the wish of the Game Commission that the fleet antelope of the western plains be brought to Washington to add a new big game animal which at some future time would afford hunting variety for sportsmen. It now appears that this may be accomplished if rearing problems can be overcome.

Antelope on the Squaw Creek Refuge.

It's nip and tuck at feeding time when the young pronghorns line up for their bottles of corn syrup, lime water, condensed milk and cod liver oil. Pictures taken on the Squaw Creek Refuge.

Results of the First Pronghorn Experiment

The first antelope, a band of 25 fawns, were captured in northeastern Nevada in the early summer of 1938 with the assistance of the United States Bureau of Biological Survey. Returned to Washington, they were established on the Squaw Creek Refuge, a Pittman-Robertson project, located approximately twenty miles south of Ellensburg. Washington state is said to be one of the first states to transplant antelope and carry them long distances to new habitats. Very little was known about the care of fawn antelope and a number died during the summer of 1938 from dietary causes.

Good Results From 1939 Antelope Importation

Another attempt to introduce antelope was made the following summer, when a second band of 25 fawns was brought in. These animals fared better and responded well to the formula of condensed milk, corn syrup, cod liver oil and lime water. Of the 25 original antelope imported in 1939, 21 remain and are in good health. The third antelope expedition was planned for the summer of 1940 and a crew is to be selected to head into the Hart Mountain region of Oregon to bring back the latest group of pronghorns.

Animals Benefit From Improved Formulas

Squaw Creek Antelope Refuge is a 10,099.74 acre area partially fenced in, providing ideal range for the animals. Antelope held here are being closely observed to check general habits in their life history. As this antelope restocking project continues to progress through the years, it is felt that the animals will benefit from improved feeding formulas and that they will show an increasing rate of productivity.

Summary of Pittman-Robertson Objectives

A Federal Act which attracted widespread interest among sportsmen is the Federal Aid in Wildlife Restoration Act, known as the Pittman-Robertson Act. For many years there have been active efforts by conservationists, sportsmen's organizations and wildlife groups in the United States to provide a program which would restore the natural habitat of game life so as to increase wild mammals and birds.

Some of the chief reasons for wildlife deficits in certain regions in America may be listed as: drought, floods, overgrazing of game winter range by domestic stock, and use of game habitat for agricultural purposes. Each of these limiting factors has played a definite role in causing shortages in game supplies to endanger the future existence of many wildlife species.

Federal Aid in Wildlife Restoration Act

Provisions of the Federal Aid in Wildlife Restoration Act are designed to improve environmental conditions for game, giving birds and mammals better opportunity to reproduce under normal conditions. This gain in supply would, in turn, be harvested by sportsmen.

The Act authorizes expenditures in amounts not exceeding the annual revenue from the tax on arms and ammunition tax income which is largely contributed by hunters. This revenue is matched in the ratio of 75% Federal and 25% state moneys. The money is to be used by the states to purchase and develop lands, to restore natural environment, and for the development of research projects which will serve to solve the common problems of wildlife. The Pittman-Robertson Act became effective September 2, 1937.

Three Projects Established Under Act

Three projects have been approved in the state of Washington under regulation of the Act. These are: Sinlahekin game refuge, Okanogan county, approximately 17,232.23 acres used as a wintering area for mule deer; 10,099.74 acres have been purchased for the Squaw Creek Antelope Refuge, Kittitas county; Oak Creek game refuge, Yakima county, 27,884.59 acres, of which 240 acres have been acquired by purchase. This latter project is set aside as a wintering range for elk.

Upper left, Sinlahekin Wildlife Refuge, Pittman-Robertson project, Okanogan county; upper right, view across the south end of the refuge; lower left, typical deer winter range in this section; lower right, mule deer, the principal game species benefited by this refuge.

The yearly allocations of Federal Pittman-Robertson funds to the Washington Department of Game are as follows: 1938, $23,439.58; 1939, $36,871.25; 1940, $56,525.42.

Purposes and developments of each project may be outlined briefly in this way:

Sinlahekin Project

It is expected that through range management and control of land use, the Department of Game will, in time, be able to increase the carrying capacity of this wintering range three to five times and the range will winter a corresponding increase in mule deer. During the winter months, there are from 1,000 to 3,500 deer on the Sinlahekin project. The area also has possibilities for nesting grounds for upland birds and migratory birds and waterfowl. The appraised value of the 17,232.23 acre project is $59,266.08. Options have been taken up for $29,667.48 of this figure and negotiations are in progress for the purchase of the rest of this land.

Squaw Creek Project

Antelope which have been brought in from Nevada and Oregon have been taken to the 10,099.74 acre Squaw Creek Antelope refuge in Kittitas county. This area is located about midway between Ellensburg and Yakima and is semi-arid desert range land. The habitat which antelope will find here is very much the same as the home range of Nevada and Oregon. The entire area has been fenced to give the department control over the range and grazing. It is planned to install study plots on the project for both grasses and

browse to determine the suitability and palatableness of feed for antelope. The appraised valuation of the 10,099.74 acre project was $21,447.35; the total option price, $16,365.68.

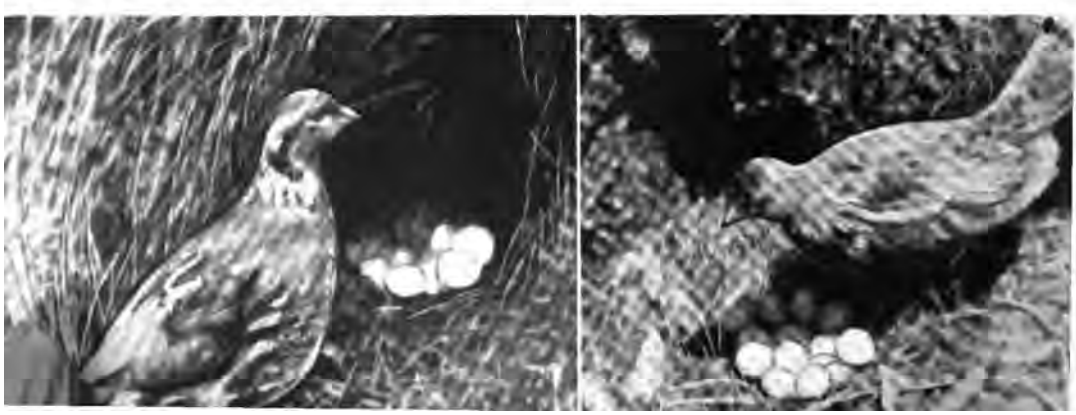
Oak Creek Project

This project consists of 27,884.59 acres and is set apart as an elk wintering ground. Plans are being perfected for developing this project along the lines of the Sinlahekin project for mule deer. Approximately 1,006 elk were taken on or adjacent to this area during the 1938 hunting season. Of the 27,884.59 acres embracing this project, the department has acquired 240 acres at a cost of $3,504.00, and purchase of the remaining acreage is pending negotiations with land owners.

Aims of Pullman Research Laboratory

With an annual pheasant planting of more than 100,000 birds, the Department of Game is desirous to obtain the greatest possible value from this plant in the wild. Liberated birds serve as broodstock and are supplementary to the wild stock. Limiting factors which impede their reproduction are being closely surveyed by department biologists, and through this study it is hoped to arrive at practical conclusions. Such experiments are now being conducted by biologists stationed at a research laboratory on the Washington State College campus. Two biologists are assigned there primarily for the study of the Chinese pheasant and Hungarian partridge.

Left, bobwhite quail hen and nest; right, ruffed grouse or Native pheasant hen.



Upland Bird Studies and Experiments

Rearing pheasants on a large scale has brought out the question of survival in the wild. What happens to released birds, their rate of reproduction and what can be done to make conditions more favorable for them, are problems the biologists are investigating.

Two representative plots of pheasant range of four square miles each located in the Colton and Rosalia districts in Whitman county were minutely mapped and assigned for intensive study. On these areas a census of winter bird populations was made. Studies of survival of liberated birds were also conducted there. In the spring an intensive study of nests was made to determine the percentage of successful nests and causes of losses. This is followed by a study of covey or chick survival throughout the summer. At the conclusion of a year of work the observers will have a complete picture of pheasant problems and they will be able to report on what factors limit the bird increase and how these factors can be counterbalanced or eliminated.

Laboratory of the Department of Game, Scientific Research Unit, Washington State College.

Varied Scope of Biological Research Studies

The department laboratory staff is also working on three other projects. These include: Study of food habits of Washington game birds; the development of a collection of skeletons of game birds and mammals to assist the protection force in game identification; and a study of parasites and diseases of game birds and animals of the state.

Cooperative Aid of Washington State College

Much valuable assistance has been given the Department of Game in the operation and administration of the laboratory by the Washington State College. The College has supplied student help and has used Department of Game problems for class study. Several graduate students have been employed as workers in the laboratory and field.

EDUCATION AND PUBLIC RELATIONS

IT has been said that wildlife conservation is guided by three major factors of development, protection, propagation and education. Protection to guard the existent fish and game; propagation to increase the supply; and education to acquaint the public with the wildlife resources and apprise them of the necessity of conserving the supply. Nearly every state and several federal wildlife agencies are placing increasing emphasis on a comprehensive, far-reaching educational program to run hand in hand with the other functions of game management.

Methods Used in Wildlife Education

For the past five years, the Department of Game has provided means to instruct school children in game conservation methods and to familiarize them with the natural features of state wildlife. Likewise, considerable time has been given to bring the Department of Game program before sportsmen's clubs, civic groups, service organizations and similar gatherings. From comments made by sportsmen and license holders, such a program of conservation education has two definite advantages: (a) The use of visual education has a tendency to create an urge among many laymen and individuals who do not hunt and fish to take up the sports; (b) sportsmen are kept informed on the progress and development of the Department of Game with the result that they have become in many instances, more game conscious.

Schedule More than 250 Movie-Lectures

The method of education employed by the Department is a schedule of movie-lectures presented for the most part before sportsmen's clubs and schools. The number of such showings presented during the past biennium was close to 250 with attendance totalling more than 50,000 persons. The average length of each movie-lecture was one hour. The Department now has on hand four 800-foot reels in natural color. There are also reels depicting state wildlife, the system of fish propagation, methods used in the propagation of more than 100,000 Chinese pheasants and a reel on game protection and related subjects.

Requests for the pictures have increased to the point that certain regulations covering the release of the films have become necessary. The Department has endeavored to comply with as many requests for showings as possible. Whenever practicable, additional showings of the movies have been arranged for two or more groups in a community, including schools. This plan has saved time and expense.

Game Exhibits and Conservation Displays

Wild game exhibits and movies have been displayed at district, state and county fairs. These exhibits never fail to attract widespread interest among children, sportsmen and the general public. Exhibits were displayed at the following: Yakima State Fair, Clallam County Fair, Southwest Washington Fair, Ellensburg Rodeo and Kittitas County Fair, and the Western Washington Fair, Puyallup.

Black bear. Washington is reported to have one of the largest populations of this species.

State Cooperation of Press and Radio

News releases to the state press and bulletins to sportsmen's clubs have served to keep the public informed as to the program and activities of the Department of Game during the biennium. The past two years have seen an increasing number of inquiries from publications, newspapers, radio stations and magazines for wildlife and conservation material. This is largely due to the mounting interest being demonstrated by school children and adults in wildlife resources. These requests have been promptly complied with.

Here are a few safety-first hints for hunters. The photo illustrates some of the every-day causes of gun accidents in the field. In most cases the "right" and "wrong" ways to handle firearms are clearly pictured. For example, the center photo in the top row, depicts a game protector crossing a wire fence. Note that he first places the rifle on the other side and then proceeds to climb over the barrier. The gun can then be picked up. This is a safe plan. Pulling a gun over or through a fence or leaning a gun against a fence while crossing is dangerous. It is always best to remove your gun from a car with the stock toward you. These are only a few hints on safe handling of firearms. Forethought and careful use of guns generally will meet most hunting season eventualities.

Public Seeks More Wildlife Information

Washington state will before many years become a mecca for tourists and vacation travelers judging from the heavy influx of queries coming from all parts of the United States and Canada. Queries range from requests for material dealing with hunting, fishing and trapping, to inquiries for biological data on Washington wildlife. The number of requests from school children within the state, sportsmen and the general public has shown a noticeable gain over the previous biennium.

Biological Bulletins Tell of Conservation

As a means of instruction and education, the Department's biological division has prepared several scientific bulletins. These include: "Studies on the Life History of the Puget Sound Steelhead," "Mountain Goat Study," and two yearly reports on Washington deer.

During the biennium members of the Department of Game staff have appeared before numerous sportsmen's organizations and clubs throughout the state, speaking on matters of general wildlife interest. These talks explained new developments and progress of the Department of Game and opened the way for discussion of pressing game matters.

What Sportsmen Are Doing About Conservation

Conservation education has played an important role in the year-round program of a number of sportsmen's organizations. Many clubs have well organized sportsmen-sponsored plans designed for bringing wildlife conservation before the school children in their districts. Often the plans have dealt with fostership of junior sportsmen's clubs, supervision of predatory drives, fishing derbies and regular meetings planned to emphasize conservation and to teach the technique of firearms and angling equipment. In a number of cases, sportsmen's clubs have sponsored open meetings for which the Department of Game was asked to supply the program. The sportsmen's cooperation with the state in game conservation has been most helpful.

The best possible safeguard for the future is the sportsmen's creed, that "Children of today are the sportsmen of tomorrow."

GENERAL OFFICE

The multiple phases of departmental administration, which have increased steadily since 1933, have added many additional duties to the office staff. Statistical data, records and correspondence, bookkeeping and secretarial work require considerably more time and consideration today than in the early stages of state game control. The office personnel has been organized to keep pace with the rapidly expanding scope of activities of the Department of Game.

The Statistical Side of Office Routine

In the keeping of public records the time element, accuracy and thoroughness are integral points. Careful compilation of all department records is emphasized and these are made available for public inspection. As an example of the magnitude of varied business transacted through the main office of the Department of Game, it is significant that more than 11,000 warrants are handled yearly and upwards of 1,000 vouchers issued monthly.

Records are compiled showing cost and distribution of fish and bird feeds, fish plantings and bird liberations. Monthly reports are available indicating the status of production and distribution ends of the bird and fish rearing program. Questions dealing with the biological treatment of fish and birds are reported to the office by field workers and these are compiled for prompt reference. Such office details as recording of fish catch records, big game card returns, live beaver trapping and listing the fur take of licensed trappers are examples of the broader scope of office detail.

Expenditures Ready for Daily Check

Every item of cost and expenditure is available for daily check if necessary and a report of disbursements is tabulated and released regularly to the Commission, the Director of Game and office staff. This is important, as such reports acquaint department heads with the specific cost of the program and with expenditures made by each unit of the Department. During the last biennium, additional time has been given to the administration of the Federal Aid to Wildlife Restoration Act, commonly known as the Pittman-Robertson Act.

Many Duties Added to Office Detail

The routine work requirements of state game protectors now include many details which were not included in their activities several years ago. Department biologists constantly contact protectors through letter and the departmental personnel bulletin requesting scientific information. These letters range from requests for specimens of plant and mammal life to fish catch records, but in each instance, these requests and the replies are properly filed or dispatched. The volume of protectors' reports and correspondence has increased and methods now have been perfected for the prompt handling of reports by field workers. Records are condensed and prepared in bulletin form for the attention of the administrative staff.

Correspondence Gains in Volume

The growth of the departmental functions has prompted many license holders, sportsmen and conservationists to write the Commission, the Director of

Thousands of fish catch record cards are compiled during the fishing season. This is an example of the many statistical records compiled by the Department of Game.

Game and members of the staff on game matters. Correspondence from this source, which passes through the office staff, has gained in volume and now requires more time from staff men, and every effort is made to answer such requests from the public promptly.

Biological Records and Papers

The biological staff has its own functions and these encompass the field of research study and surveys dealing with big game, upland birds and fish. Work in this division has been fact-finding and has brought out a number of scientific reports of progress in this branch of the service. Such reports and papers are prepared by biologists with the assistance of the secretarial staff. Scientific papers released from the biological division have increased twofold over the previous biennium.

Predatory animal bounty payments have increased threefold since April 1, 1935, while transactions pertaining to capital outlay is up one-third over 1935.

Widening of the scope of office detail has been accomplished with little additional help. Every effort has been put forth to insure the availability of statistical data which will aid the Commission and administrative heads to effectively manage the Department of Game. Records have also been prepared with the thought to make them accessible to sportsmen and license holders for such use as they see fit.

Close check on Department of Game properties is provided through a system of year-round inventory of equipment whereby all pieces of public property owned and used by departmental divisions is available at a moment's notice. Full utilization of all equipment is, therefore, possible under the plan now in operation.

SUMMARY OF RECEIPTS, CALENDAR YEARS 1938-1939

		Number Licenses Issued		Total Amount Collected	
		1938	1939	1938	1939
COLLECTIONS BY DEPARTMENT OF GAME—LICENSE DEPARTMENT—					
State resident hunting and fishing licenses	@ $3 00	114,717	122,034	$344,151 00	$366,102 00
State non-resident hunting and fishing licenses	@ 25 00	8	11	200 00	275 00
State alien hunting and fishing licenses	@ 25 00	17	13	425 00	325 00
State non-resident game bird hunting licenses	@ 15 00	57	75	855 00	1,125 00
State resident or non-resident fishing licenses	@ 5 00	1,863	2,061	9,315 00	10,305 00
State fur dealers licenses	@ 10 00	118	116	1,180 00	1,160 00
State taxidermist licenses	@ 5 00	42	32	210 00	160 00
State resident supplemental elk licenses	@ 5 00	4,040	5,425	20,200 00	27,125 00
State alien supplemental elk licenses	@ 50 00	.....	.....	.....	.....
State non-resident elk licenses	@ 25 00	4	5	100 00	125 00
County resident hunting and fishing licenses	@ 1 50	87,680	84,674	130,620 00	127,011 00
County non-resident fishing licenses	@ 3 00	1,640	1,517	4,920 00	4,551 00
County alien fishing licenses	@ 5 00	122	113	610 00	565 00
County resident trapping licenses	@ 5 00	1,888	1,871	9,440 00	9,355 00
County professional guide licenses	@ 10 00	8	16	80 00	160 00
Duplicate licenses	@ 50	1,110	1,252	555 00	626 00
		212,714	219,215	$522,861 00	$548,970 00①
Private game farm licenses (new)	@ 20 00	4	16	$80 00	$320 00
Renewal game farm licenses	@ 10 00	52	45	520 00	450 00
Private migratory game preserve licenses	@ 10 00	.....	2	.....	$20 00
		212,770	219,278	$523,461 00	$549,760 00
Total receipts from sale of big game seal licenses	@ 50	71,061	80,270	35,530 50	40,135 00
Total receipts from licenses		283,831	299,548	$558,991 50	$589,895 00①
Fines collected for violations of state game laws		.....	.....	②	②
Receipts from other sources and transfers		.....	.....	②	②
MISCELLANEOUS COLLECTIONS IN DEPARTMENT OF GAME OFFICE—					
Sale of poultry		.....	.....	$4,052 06	$4,037 40
Sale of sacks or other miscellaneous items		.....	.....	20 28	109 54
Aluminum bands		.....	.....	28 00	62 60
Tagging		.....	.....	1,279 05	1,345 75
Game fish tags		.....	.....	119 11	116 10
Sale of pelts		.....	.....	12,140 78	47,206 32
Miscellaneous		.....	.....	2,069 72	2,371 50
		283,831	299,548	$579,302 00	$645,234 21①

① Total receipts from licenses include some sales reported after January 1, 1938, and 1939, respectively, which accounts for the difference between these totals and those shown by the state treasurer.

② As collections of fines are not reported to the Department of Game office, and this segregated information is not available from the state treasurer's office, this item is left blank. It is included in the state treasurer's reports under "county fines."

SUMMARY OF RECEIPTS—Continued

	Calendar Year 1938	Calendar Year 1939
STATEMENT OF AMOUNT CREDITED TO STATE GAME FUND—(From Report of State Treasurer)		
Department of Game (miscellaneous collections)	$13,981 16	$51,050 82
Department of Game (hunting and fishing, etc.) licenses	548,288 00	550,544 56
Department of Game (big game seal licenses)	①	39,774 00
County fines	10,603 14	11,936 05
Sale of State property	4,849 99	4,199 34
Deposit interest	1,065 02	2,370 42
Refund	50 00	.....
Transfers into	1,683 56	87 50
	$580,520 86	$659,962 69
Balance on hand December 31, 1937	341,043 73	.....
Balance on hand December 31, 1938	.....	380,470 62
	$921,564 59	$1,040,433 31
Warrants paid	540,963 97	615,434 21
Transfers	130 00	670 06
Balance on hand December 31, 1938	$380,470 62	.....
Balance on hand December 31, 1939	.....	$424,329 04

	Fiscal Year 1938	Fiscal Year 1939
STATEMENT OF AMOUNT CREDITED TO STATE GAME FUND—(From Report of State Treasurer)		
Department of Game (miscellaneous collections)	$28,438 27	$36,741 08
Department of Game (hunting and fishing, etc.) licenses	510,849 50	555,025 06
Department of Game (big game seal licenses)	34,876 00	40,451 50
County fines	10,655 48	11,646 02
Sale of State property	4,817 94	4,239 84
Deposit interest	2,370 42	5,249 64
Transfers into	1,738 55	32 50
	$593,746 16	$653,385 64
Balance on hand March 31, 1938	260,369 78	.....
Balance on hand March 31, 1939	.....	339,243 89
	$854,115 94	$992,629 53
Warrants paid	514,727 05	679,818 88
Transfers	145 00	650 06
Balance on hand March 31, 1939	$339,243 89	.....
Balance on hand March 31, 1940	.....	$312,160 59

① This amount not segregated by State Treasurer.

STATE GAME COMMISSION

April 1, 1938, to March 31, 1939—April 1, 1939, to March 31, 1940

	Fiscal Year April 1, 1938, to March 31, 1939		Fiscal Year April 1, 1939, to March 31, 1940	
Per diem	$2,080 00		$1,871 50	
Stenographers	682 06		663 55	
Private autos—Mileage	647 21		383 02	
Fares—Railroad, boat and stage	512 58		383 45	
Meals, rooms and berths	729 24		644 40	
Telephone and telegraph	131 00		143 67	
Miscellaneous	15 00		142 70	
Totals	.....	$4,809 09	.....	$4,232 29

GENERAL ADMINISTRATION AND OFFICE EXPENDITURES

April 1, 1938, to March 31, 1939—April 1, 1939, to March 31, 1940

	Fiscal Year April 1, 1938, to March 31, 1939		Fiscal Year April 1, 1939, to March 31, 1940
	General Office	Biennial Report	General Office
Salaries and wages—Office	$23,428 76	$76 06	$23,805 94
Salaries and wages—State Examiners	36 78	.....	2,824 84
Total, office salaries and wages	$23,465 54	$76 06	$26,630 78
State car expense	$827 94	.....	$808 56
Private mileage	.....	$21 25	18 00
Fares—railroad, boat, stage	357 01	.....	45 74
Fares—state audit books	2 50	.....	.....
Meals and rooms	681 61	2 10	541 15
Meals and rooms—state audit books	.....	.....	1,209 99
General office supplies	694 31	.....	863 51
Telephone and telegraph	1,883 89	.....	1,806 54①
Postage and envelopes	2,690 91	.....	3,525 99
Freight and express	46 84	8 10	42 05
Printing	1,102 23	1,302 79	924 42
Rent	4,005 80	.....	5,133 54
Surety bonds—office employees	97 25	.....	104 25
Purchase books, subscriptions, etc.	31 50	.....	32 46
Towel service	71 40	.....	72 72
Repairs—office furniture and equipment	120 70	.....	230 76
New equipment	1,026 97	.....	785 30
Press clippings	358 55	.....	325 40
Legal advertising	2,424 07	.....	2,568 51
Pictures and films	.....	21 81	.....
New state car for director	569 70	.....	.....
Miscellaneous	55 87	.....	127 34
Total office operations	$17,150 06	$1,446 05	$19,316 23②
Grand total	$40,624 59	$1,522 11	$45,947 01

① All general telephone service charged to office.
② $4,000.00 Revolving Fund not included in total.

CAPITAL OUTLAY

April 1, 1938, to March 31, 1939—April 1, 1939, to March 31, 1940

	Fiscal Year April 1, 1938, to March 31, 1939		Fiscal Year April 1, 1939, to March 31, 1940	
Supervision	$602 43		.....	
Draftsman	148 00		.....	
Auburn game farm	38 25		.....	
Bellingham hatchery	.....		$1,200 00	
Colville game farm	21 26		.....	
Colville hatchery	41 83		.....	
Goldendale hatchery	3,588 36		18,436 38	
Goldendale hatchery—Refrigeration plant	.....		950 55	
Kennewick game farm	.....		3,000 00	
Snohomish hatchery	.....		5,555 60	
South Tacoma hatchery	.....		6,620 54	
Spokane hatchery	92 67		.....	
Tokul Creek hatchery	226 97		.....	
New Vancouver hatchery	8,404 77		.....	
Vancouver hatchery—Refrigeration plant	.....		912 63	
Vancouver hatchery—Pipe line	.....		582 00	
Yakima hatchery	629 36		.....	
Stream improvement and screens	.....		6,555 18	
Miscellaneous	184 34		.....	
Totals	.....	$13,988 24	.....	$43,813 48

RECAPITULATION OF DISBURSEMENTS

April 1, 1938, to March 31, 1939—April 1, 1939, to March 31, 1940

	Fiscal Year April 1, 1938, to March 31, 1939			Fiscal Year April 1, 1939, to March 31, 1940		
	Salaries	Operations	Total	Salaries	Operations	Total
Game Commission	$2,762 00	$2,047 03	$4,809 03	$2,535 05	$1,697 24	$4,232 29
General administration and office	23,465 54	17,159 05	40,624 59	26,630 78	19,316 23	45,947 01
Biennial report	76 06	1,446 05	1,522 11			
Education and public relations	2,281 66	1,210 59	3,492 25	1,786 33	1,069 16	2,855 49
License Department	5,679 01	6,549 98	12,228 99	6,450 82	9,611 56	16,062 38
Game survey	3,543 07	1,490 25	5,033 32	5,750 60	3,310 75	9,061 35
Lake and stream survey	5,852 67	2,823 12	8,675 79	6,232 94	2,710 75	8,943 69
Pittman-Robertson (incidental expenses of administration only)				1,179 75	875 55	2,055 30
Washington State College Research Laboratory				1,073 17	1,037 12	2,110 29
Special antelope	721 72	381 40	1,103 12	2,104 54	2,005 49	4,110 03
Live trapping birds	589 08	283 13	872 21	1,440 36	748 52	2,188 88
Trapping deer				371 03	254 66	625 69
Trapping elk				364 71	106 63	471 34
Seining and salvaging	909 77	731 68	1,701 45	466 40	267 92	734 32
Signs and tags		903 51	903 51		903 72	903 72
Protection Division—Regular	89,584 23	58,913 11	148,497 34	91,811 59	50,381 01	142,192 60
Protection Division—Temporary	12,021 78	679 37	12,701 15	13,927 77	3,648 39	17,576 16
Special fur-bearing and beaver trapping	8,409 64	1,546 52	9,956 16	6,993 28	* 2,249 33	9,242 61
Special predatory animal hunters	4,052 10	2,613 78	6,665 88	4,449 88	2,145 50	6,595 38
Feed in the open		99 88	99 88		232 95	232 95
Pollution Commission	5,916 20	50 04	5,966 24	1,039 10	732 56	1,771 66
State Game Farms—						
General	35,011 13	52,925 72	87,936 85	33,979 31	60,948 52	94,927 83
Construction	3,383 49	2,172 94	5,556 43	2,030 55	3,589 54	5,620 09
Planting	3,848 37	2,634 12	6,482 49	2,079 58	1,062 42	3,142 00
State Trout Hatcheries—						
General	46,483 72	43,677 17	90,160 89	51,872 14	54,190 69	106,062 83
Construction	6,880 17	3,152 55	10,032 72	6,776 18	5,179 38	11,955 56
Planting	5,962 61	9,471 41	15,434 02	5,350 34	5,827 09	11,177 43
Eyeing stations	8,249 56	2,527 86	10,777 42	7,326 59	2,066 00	9,392 59
Totals	$275,743 58	$215,490 20	$491,233 84	$284,022 79	$236,168 68	$520,191 47*

* $1,000.00 Revolving fund not included in total.

WORKS PROGRESS ADMINISTRATION PROJECTS COMPLETED

Listed in Order of Starting Date of Work on Project—April 1, 1938, to March 31, 1940

	Federal Funds	Department of Game Funds	Total
1. *AUBURN GAME FARM—(December 6, 1937) Clearing and grubbing 7 acres; leveling and seeding 18 acres; building of 6 new setting pens and two 150'x200' covered rearing pens. Erection of 1,792 lineal feet of 6' fence; remodeling garage; renovating house and construction of one septic tank.....	$11,895 00	$3,617 05	$15,512 05
2. *VANCOUVER HATCHERY—(February 19, 1938) Construction of fish hatchery consisting of 12 concrete 40' diameter rearing ponds, two broodstock ponds, all necessary supply and discharge lines, dams and intake boxes. Clearing and landscaping of grounds, approximately 5½ acres.....	17,290 00	6,933 22	24,223 22
3. TOKUL CREEK HATCHERY—(April 6, 1938) General improvement of park area by clearing, grubbing and landscaping; construction of a log shelter, rock walls, trails, roads, etc. Construction of pump house and concrete tank to collect outlet waters.....	15,290 00	933 00	16,223 00
4. FIELD SURVEY—(August 8, 1938) To prepare a new or revised set of records, maps, etc. as they pertain to fish and game preservation and propagation, to supply more complete information regarding stream, lake and field conditions throughout the State of Washington.....	7,980 00	2,567 00	10,547 00
5. VANCOUVER HATCHERY—(September 4, 1938) Construction of one superintendent's residence; one two-car garage with office and living quarters; two septic tanks for sewage disposal from above houses; complete existing new hatchery building. Gravel roads and around buildings.....	7,864 00	4,308 00	12,172 00
6. BELLINGHAM HATCHERY—(October 11, 1938) Including such works as: Covering of main water line, 400 cu. yds.; leveling and grading parking area, 3,000 sq. ft.; clearing and grubbing 5 acres; landscaping 1½ acres; building 820 lineal feet rock retaining walls; 300 sq. ft. display pond; one 14'x24' concrete settling tank; building 1,600 lineal feet of paths; graveling paths and walks, 510 cu. yds.; painting and staining all buildings, 750 sq. yds.....	10,303 00	2,828 00	13,361 00
7. SOUTH TACOMA HATCHERY—(October, 1938) Clearing and brushing 20 acres, 2,329 cu. yds. excavations; installing sprinkling system; grading, leveling and seeding 3,000 sq. yds. lawn area. Placing 1,000 lineal feet curbs and 2,500 lineal feet concrete sidewalks; painting all buildings, 472 squares; rebuilding feed room; enlarging and reconstructing hatchery building; construction of concrete intermediate troughs and concrete raceway ponds. Grading and surfacing roadways, 4,800 sq. yds.; painting hatchery exterior and interior, 130 squares.....	20,033 00	7,652 00	27,685 00
8. ABERDEEN HATCHERY—(December 4, 1939) Works to include clearing, grubbing one acre; excavation by hand and machine 5,000 cu. yds.; surface leveling 4,500 sq. yds.; lawn rolling and seeding 1,500 sq. yds. Landscaping 3,650 sq. yds.; gravel surfacing driveways, 170 cu. yds. Laying of 280 feet drain tile; installation of lawn sprinkling system; construction of concrete curbs and walks.....	8,152 00	3,951 00	12,103 00
Totals.....	$99,037 00	$32,789 27	$131,826 27

Note—* Indicates projects listed and started in last biennial report but finished in this biennium.

EMPLOYEES

March 31, 1940

Office	Address	Occupation
McCauley, B. T.	7720 E. Green Lake Way, Seattle	Director
Shields, C. H.	1933 W. 96th, Seattle	Asst. Director
Brewer, Grace C.	3718 11th Ave. N. E., Seattle	Chief Clerk
Martens, Bertha M.	2021 4th Ave., Seattle	Stenographer & File Clerk
Arthur, Laura	6212 5th Ave. N. W., Seattle	Secretary to Director & Commission
Hammond, May P.	723 35th Ave., Seattle	Stenographer
Phillips, Gwenn	409 10th Ave. N., Seattle	Stenographer
Tippie, Ardis	409 10th Ave. N., Seattle	Stenographer
Clark, Hazel D.	6708 1st Ave. N. W., Seattle	Bookkeeper
Franich, Cora	3241 15th Ave. W., Seattle	Bookkeeper
Brown, L. May	763 Belmont Place, Seattle	Bookkeeper
Derks, Margaret	418 Loretta Place, Seattle	Bookkeeper
Lee, Andree J.	Box 17869 Lake Forest Park, Seattle	Typist & Mimeographer
Eklund, Lillian	900 Queen Anne Ave., Seattle	Typist & Telephone Operator
Condon, H. T.	7531 Taft St., Seattle	Purchasing
Mitchell, G. E.	9226 26th Ave. N. W., Seattle	License Clerk
Glennon, J. A.	317 W. 80th, Seattle	License Division Clerk
Crowley, Lucille	Senator Hotel, Seattle	License Division Bookkeeper
Lumijarvi, Janet	633 12th Ave. N., Seattle	License Division Typist
Boddy, Herbert R. N.	3928 Bagley Ave., Seattle	Education & Public Relations
Springer, Leonard M.	9728 Phinney Ave., Seattle	Federal Aid Administrator
Fruit, M. M.	Lake Forest Park, Seattle	Planting
Dow, Lorenzo	8635 So. Park, Tacoma	Mechanical Engineer
Dettmer, Herbert	4137 23rd Ave. S. W., Seattle	Statistician
Pautzke, C. F.	2124 W. 99th St., Seattle	Chief Biologist
Lauckhart, Burton	1810 E. Republican, Seattle	Game Biologist
Ball, Chester	217 New Science Hall, Pullman	Game Biologist
Knott, Norman P.	205 So. Grand St., Pullman	Game Biologist
Larsen, Marvin	Walla Walla Game Farm, Walla Walla	Game Biologist
Meigs, Robert C.	7550 22nd Ave. N. E., Seattle	Fisheries Biologist
Earnest, Don	E. 1608 Garland, Spokane	Fisheries Biologist
Protection		
Loughary, H. E.	9756 Wallingford Ave., Seattle	Chief Patrol Officer
Allen, Dale K.	Okanogan	Protector
Allen, J. J.	1902 Park Ave., Raymond	Protector
Anderson, Niilo	601 So. Mission, Wenatchee	Protector
Banta, Floyd	6716 Phinney, Seattle	Protector
Bercot, Henry F.	Freeland	Protector
Beringer, R. E.	Box No. 21, Ritzville	Protector
Biggs, John A.	215 W. 11th Ave., Vancouver	Protector
Boone, M. E.	1603 N. Puget St., Olympia	Protector
Burnham, Guy	Rte. 1, Box 1076-J, Bremerton	Protector
Douglas, John W.	1754 Marion St., Enumclaw	Protector
Drain, H. D.	Kirkland	Protector
Dray, Edw.	Box No. 36, Cle Elum	Protector
Drolet, Jos. O.	N. 810 Clay St., Colfax	Protector
Duggan, H. J.	Box No. 208, Davenport	Protector
Eide, Ole	P. O. Box No. 102, Stanwood	Protector
Erickson, A. R.	R. F. D. No. 4, Box 309, Olympia	Protector
Farquhar, Geo. R.	Box No. 271, Quilcene	Protector
Fennimore, Gene	E. 110 Canyon, Colfax	Protector
Goodman, Herman O.	Box No. 545, Blaine	Protector
Haley, C. H.	811 So. 25th St., Tacoma	Protector
Hall, Wm. O.	508 Clark St., Kelso	Protector
Hammer, Joe., Jr.	Hoyt Hotel, Everett	Protector

Protection	Address	Occupation
Handron, S. J.	702 Spruce St., Hoquiam	Protector
Hoggatt, Carl	Eatonville	Protector
Holcomb, R. C.	Box No. 37, White Salmon	Protector
Hughey, Paul	918 E. Elinor, Shelton	Protector
Hull, Marvin	Box No. 133, Stevenson	Protector
Huntley, Dennis H.	506 Avenue "A," Kennewick	Protector
Hynes, J. M.	4002 N. 36th St., Tacoma	Protector
Johnson, Ralph	R. F. D. No. 3, Newport	Protector
Kanz, John R.	Pomeroy	Protector
Little, Wm. J.	Morton	Protector
Long, Chas. B.	1601 Lakeway Drive, Bellingham	Protector
Louden, J. M.	Riverview Apartments, Cathlamet	Protector
Lundgren, A. H.	710 N. Wooding Ave., Aberdeen	Protector
Mattson, Norman	c/o Tokul Creek Hatchery, North Bend	Protector
Neil, Lloyd J.	1301 N. Walnut, Ellensburg	Protector
Neubrech, Walter	548 Methow St., Wenatchee	Protector
Norton, Clyde	Wilson Hotel, Centralia	Protector
Palmer, N. E.	Prosser	Protector
Resner, O. L.	413 So. Maple, Colville	Protector
Rice, Fred	R. F. D. No. 2, Port Angeles	Protector
Roberson, Roy E.	Okanogan	Protector
Robins, Edw. J.	E. 1427 Nebraska St., Spokane	Protector
Roundy, Fred L.	1717 E. Heroy St., Spokane	Protector
Schwindel, Ralph	Box 415, Waterville	Protector
Seabury, Laurence	11th & Section, Mt. Vernon	Protector
Shaw, Clarence	Box 185, Republic	Protector
Snider, Donald E.	600 12th St., Clarkston	Protector
Splane, Maurice E.	821 Ferry, Sedro Woolley	Protector
Stark, Harry E.	Friday Harbor	Protector
Stevens, J. L.	405 So. 18th Ave., Yakima	Protector
Van Arsdol, Fred W.	607 So. 17th Ave., Yakima	Protector
Walsh, Thos.	Rte. No. 5, Box 32, Vancouver	Protector
Webster, Jack O.	Box 24, Soap Lake	Protector
Winters, C. L.	616 Washington St., Walla Walla	Protector
Wooten, W. T.	205 Spring St., Dayton	Protector
Game Farms		
Faudree, J. W.	Broadmoor Apts., Seattle	Supervisor Game Farms
Morrell, Wm.	R. F. D. No. 3, Auburn	Auburn Supt.
Wadkins, Wm. W.	R. F. D. No. 3, Auburn	Auburn Asst.
Hunter, Wesley A.	R. F. D. No. 3, Auburn	Auburn Asst.
Harper, Ross	Colville	Colville Supt.
Leslie, R. D.	Colville	Colville Asst.
Ford, Thos. D.	R. F. D. No. 3, Ellensburg	Ellensburg Supt.
McDaniel, Geo. A.	R. F. D. No. 3, Ellensburg	Ellensburg Asst.
Rollinger, Mike	R. F. D. No. 3, Ellensburg	Ellensburg Asst.
Witham, Harold	R. F. D. No. 1, Kennewick	Kennewick Supt.
Johnson, Ernest	R. F. D. No. 1, Kennewick	Kennewick Asst.
Ditlevsen, B. E.	Riverside	Okanogan Supt.
Wood, Frank E.	Riverside	Okanogan Asst.
Morrell, Chas.	Rte. No. 1, Box 618, So. Tacoma	So. Tacoma Supt.
Bean, Cyril	Rte. No. 1, Box 618, So. Tacoma	So. Tacoma Asst.
Nichols, Jack	Rte. No. 1, Box 618, So. Tacoma	So. Tacoma Asst.
Ford, Dave	Mead	Spokane Asst.
Hedstrom, E.	P. O. Box No. 520, Walla Walla	Walla Walla Supt.
Palmer, Quincy	P. O. Box No. 520, Walla Walla	Walla Walla Asst.
Johnson, J. A.	Star Route, Wapato	Yakima Supt.
Boatman, John	Star Route, Wapato	Yakima Asst.
Ford, Bill G.	Star Route, Wapato	Chukar Supt.
Keightley, T. E.	212 11th Ave. N., Seattle	Special Antelope
Kirkendall, Jack	Yakima	Special Antelope
Scrupps, Fred A.	c/o Seward Park Ponds, Seattle	Truck Driver

Hatcheries	Address	Occupation
Hancock, Wm. R.	905 E. 65th St., Seattle	Supervisor Hatcheries
Dunstan, Wm.	Bothell	Supervisor Eyeing Stations
Lytle, Geo.	Rte. No. 1, Montesano	Aberdeen Supt.
Moore, Howard D.	Rte. No. 1, Montesano	Aberdeen Asst.
Loveridge, G. W.	Whatcom Falls Park, Bellingham	Bellingham Supt.
Hilsinger, L. E.	Whatcom Falls Park, Bellingham	Bellingham Asst.
Underwood, Wm.	Chelan	Chelan Supt.
Jahn, Bert J.	Chelan	Chelan Asst.
Inions, Thos. G.	Chelan	Chelan Asst.
Johansen, John	Winton	Chelan Twin Lakes Eyeing Station Supt.
Chitwood, E. A.	Winton	Chelan Twin Lakes Eyeing Station Asst.
Johnston, Virgil	Winton	Chiwaukum Supt.
Krick, H. F.	Colville	Colville Supt.
Yorke, R. H.	Goldendale	Goldendale Supt.
Pratt, Dick	Goldendale	Goldendale Asst.
Immenroth, A. F.	Port Angeles	Lake Crescent Supt.
MacKenzie, Daniel	R. F. D. No. 2, Sedro Woolley	Lake Whatcom Supt.
Jones, C. A.	Packwood	Packwood Lake Eyeing Station Supt.
DeHart, Wm. Byron	Usk	Pend Oreille Supt.
Walters, L. W.	Seattle	Seward Park Ponds Supt.
Foster, C. R.	Rte. No. 1, Box 141, So. Tacoma	So. Tacoma Supt.
Luzader, G. P.	Rte. No. 1, Box 141, So. Tacoma	So. Tacoma Asst.
West, B. J.	Rte. No. 1, Box 141, So. Tacoma	So. Tacoma Asst.
Youmans, F. A.	R. F. D. No. 7, Spokane	Spokane Supt.
Mertl, Paul E.	R. F. D. No. 7, Spokane	Spokane Asst.
Lattish, Wm.	R. F. D. No. 7, Spokane	Spokane Asst.
Vanhook, M. F.	R. F. D. No. 7, Spokane	Spokane Asst.
Hodgeboom, K. D.	Rte. No. 1, North Bend	Tokul Creek Supt.
Partee, L. R.	Rte. No. 1, North Bend	Tokul Creek Asst.
Ryan, Thos. E.	R. F. D. No. 5, Box 28-A, Vancouver	Vancouver Supt.
Ashby, W. H.	R. F. D. No. 5, Box 28-A, Vancouver	Vancouver Asst.
Henrichsen, James	R. F. D. No. 5, Box 23-A, Vancouver	Vancouver Asst.
Woodward, A. N.	R. F. D. No. 5, Box 28-A, Vancouver	Vancouver Asst.
Dunstan, W. E.	R. F. D. No. 3, Walla Walla	Walla Walla Supt.
Welshons, C. A.	R. F. D. No. 7, Yakima	Yakima Supt.
Wardall, S. L.	R. F. D. No. 7, Yakima	Yakima Asst.
Rice, Lawrence H.	R. F. D. No. 7, Yakima	Yakima Asst.
Knutsen, Arthur	R. F. D. No. 7, Yakima	Yakima Asst.
Lee, Robert E.	Loomis	Pack String
Nixon, C. J.	Monroe	Miscellaneous Planting

Construction

Dederick, F. H.	Bothell	Supervisor of Construction
Noel, Aubrey	600 Queen Anne Ave., Seattle	Draftsman
Kurth, Wm.	Bothell	Job Foreman
Westrom, S. M.	Rte. No. 1, So. Tacoma	Job Foreman
McDaniel, Joe	Bellingham	Construction Asst.
Heindselman, W. R.	Auburn	Construction Asst.