TEN YEARS OF PITTMAN-ROBERTSON WILDLIFE RESTORATION

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by

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INTRODUCTION

Every time an American hunter buys a gun or ammunition he chips in to improve his sport. This has been going on since July 1, 1938, when the excise tax on sporting arms and ammunition, first levied in 1932, was channeled over by the Congress to pay for work performed under the Pittman-Robertson Federal Aid to Wildlife Restoration Act.

The millions of Americans who go afield each year in pursuit of their favorite game finance wildlife restoration action by buying arms and ammunition and by purchasing hunting licenses that provide State matching money. But why is this necessary? Have these investments in the wildlife factory improved management and stepped up production? The multitude of stockholders in this restoration business are entitled to an accounting. This report covers the first decade of operations.

Double-fronted assaults on a fast-rising scale of intensity squeezed wildlife during these ten years. State hunting license sales soared from 6,898,847 in 1938, to 12,066,763 in 1947. (See Table I in appendix, for annual sales.) At the same time, an unprecedented expansion in crop production erased much wildlife food and cover, so essential to continued high populations of game birds and mammals.

Skyrocketing hunting license sales and shrinking living quarters for game species made it imperative that the State game departments reverse the tide of habitat loss by financing replacement work. Farm lands, which produce more than 75 percent of the annual game harvest, had to be made more productive by habitat improvements compatible with good farm management. There was a pressing need for public lands, particularly those controlled by the State game and fish departments, being brought into maximum wildlife production. Critical winter ranges for big game, fast dwindling waterfowl marshes, and other important game areas had to be acquired for these purposes. Collecting accurate information on wildlife populations and trends became a necessity. The margin of allowable error on what the proper harvest should be had declined in proportion to the vast expansion of the hunting army. Administrators were compelled to expand or contract hunting pressure according to the size of the game population and the ability of the lands to support them. But the management that any sensible cattle rancher would apply to his herds was not enough. Wildlife seed stock had to be brought into suitable but vacant ranges to spread game species and help cushion the impact of greater gun pressure.

Funds coming to the States from Pittman-Robertson appropriations have been a potent aid in financing performance of varying

restoration work, to insure large-scale population increases. This income also paid for the brains and brawn to gather facts for setting sound seasons and bag limits.

THE STORY BEHIND THE ACT

The drought of the early thirties brought home the stark reality that waterfowl were in a bad way. Buying and developing several million acres of land for duck and goose refuges by the Federal Government helped ease their plight. This demonstrated what could be done through proper financing. The States had an important stake in perpetuating an abundant supply of waterfowl, and sole responsibility for upland wildlife. Unfortunately, they lacked funds to finance the kind of wildlife restoration job that was needed.

Additional attention was focused on the problem when President Roosevelt called the first North American Wildlife Conference to meet in February, 1936 at Washington, D. C. The large attendance at the conference and the topics discussed disclosed a deep-rooted realization of the pressing need for action to conserve and restore habitat and preserve dwindling wildlife numbers. At the same time, the Congress was in the process of abolishing certain excise taxes, including the one on sporting arms and ammunition.

Far-sighted conservationists in and out of the Congress conceived the idea of having the excise tax on sporting arms and ammunition continued, with proceeds going to the States to pay for needed wildlife restoration. Such a proposal was presented to the International Association of Game, Fish and Conservation Commissioners, which represents all the State game departments, at their annual meeting in 1936. The Association gave hearty endorsement to the proposal. With that backing, a bill was drafted and sponsored in the Congress by former Senator Key Pittman of Nevada, and Senator (then Representative) A. Willis Robertson of Virginia. So ably presented and supported was the bill that it passed the Congress without opposition, and was approved by the President on September 2, 1937. The new act was to take effect July 1, 1938. Its administration was placed in the Department of Agriculture's Bureau of Biological Survey where it remained until June 30, 1940, when the Bureau of Biological Survey and the Bureau of Fisheries were merged to form the Fish and Wildlife Service, the agency which now administers the act. Under the terms of the act, project costs are borne initially by the State game departments, after which reimbursement is made from Federal funds for the Federal pro-rata share, which cannot exceed 75 percent of the cost of the project. Each State, therefore, is required to contribute 25 percent or more of project costs from its own funds.

To handle the Federal Government's administrative end of the program, a new Division of Federal Aid in Wildlife Restoration was set up in the old Bureau of Biological Survey. The first chief of this Division, appointed on July 2, 1938, was Albert M. Day, now Director of the Fish and Wildlife Service.

WORKING OUT PROGRAM STANDARDS AND PROCEDURES

Like other laws, the Pittman-Robertson Act had numerous features that required interpretation. This was particularly true of such a far-reaching program involving the Federal Government and 48 States. To avoid confusion, it was essential to have mutual understanding of what activities were and were not approvable.

To accomplish this, representatives of the Federal agency first met with heads of the State game departments in regional meetings throughout the country, shortly after the passage of the act in 1937. Out of these meetings came understanding on some points and questions on others that had to be referred to Federal legal and fiscal authorities for decision. Following the first round of meetings, a tentative policy and procedure manual and required rules and regulations were drafted. This tentative set-up was reviewed by the State officials during the course of the North American Wildlife Conference at Baltimore, early in 1938. That review brought to light the need for changes in coverage. The finishing touches on what would constitute approvable activities and sound operational procedures was agreed to when the State representatives met at Asheville, North Carolina, in June, 1938, for the annual meeting of the International Association of Game, Fish and Conservation Commissioners.

The preliminary study and action by State and Federal officials has been outlined here to show that this cooperative wildlife restoration program, from the beginning, has been founded on mutual understanding and agreement. The democratic rather than bureaucratic approach has been used. In consequence, when the first money became available for program operations on July 1, 1938, there was a meeting of minds about the character of the work that could be conducted.

In the intervening years, modifications in work emphasis have necessitated some changes in original concepts. In spite of this, however, the contents of the originally adopted Federal Aid Policy and Procedure Manual remain essentially the same. The few changes made from time to time have been worked out in concert with the Pittman-Robertson Committee of the International Association of Game, Fish and Conservation Commissioners, representing all of the State game departments. Procedural problems are discussed and ironed out promptly, so disagreements never get the chance to grow to proportions where they can stimulate acrimonious debate, or stifle progress.

ASSENTING TO BECOME ELIGIBLE TO SHARE IN P.-R. BENEFITS

The Pittman-Robertson Act requires the States to assent to its provisions. It also calls for passage of laws by the States, for the conservation of wildlife, which shall include a prohibition against diversion of receipts from sales of hunting licenses for any other purposes than the operation of the State fish and game departments. In a few instances, State legislatures were reluctant to pass assenting legislation promptly because they were misinformed about the true purpose of this cooperative program. Then, too, diverting hunting license receipts to non-wildlife activities had been a profitable pastime in some States. Nevertheless, the growing number of States that met

conditions of the law and were sharing in its advantages to their entire satisfaction encouraged the slow-acting States to make themselves eligible.

Kansas was the first State to pass legislation assenting to the terms of the Act. This was done on March 4, 1938. Similar action was soon taken by several other States so that by July 1, 1938, when the program started, seven more States were eligible to participate.

In the first year of the program, an additional 32 States joined the original eight. By 1943, 47 of the States were active participants. Ironically, Nevada, whose senior Senator co-authored the legislation, was the last State to become eligible. Until 1947, that State lacked centralized wildlife control, as required by the Pittman-Robertson Act. Each county had a separate wildlife agency. On March 20, 1947, the State Legislature established a single game and fish department, and Nevada began sharing in benefits of the Act on July 1, of that year. (See Table II in appendix for dates of State assent acts to the Pittman-Robertson Act.)

On August 18, 1941, the Pittman-Robertson Act was amended to permit Alaska, Hawaii, Puerto Rico, and the Virgin Islands to receive annual allotments of funds. This amendment leaves determination of the amounts to be granted to the Secretary of the Interior, but limits Alaska to $25,000 and the other three to $10,000 each.

EXCISE TAX: APPROPRIATIONS AND APPORTIONMENTS

Between July 1, 1938, and June 30, 1948, a total of $48,175,431 was realized from the excise tax on sporting arms and ammunition. The Congress appropriated $23,431,274 to finance the 75-percent Federal share of the cost of this work, during the first ten years of program operations. Collections made during the tenth year ($11,276,687) were appropriated in their entirety, to defray program costs during the eleventh year, beginning July 1, 1948. (See Table III for apportionment of funds, State contributions, and the grand total available for projects, through June 30, 1948, and Table IV for summary of excise tax receipts, appropriations and apportionments for the ten-year period.)

Due to appropriations under-running collections, especially during the war years, a reserve accumulated in the special fund, amounting to $13,467,469. This is available for appropriation at a later date, when the Congress decides it is needed by the States.

Annual appropriations are divided among the States, using the ratio of land area and the number of paid hunting license holders in each, to determine their shares. In addition, no State may receive more than five percent, nor less than one-half of one percent, of the total apportioned to all States.

HOW THE ACT OPERATES

When the shares of annual appropriations are credited to the States in the United States Treasury, the game and fish departments may proceed to obligate these funds. They select the work and submit project proposals to the Fish and Wildlife Service for approval. The

Service, acting for the Secretary of the Interior, reviews the objectives and plans of the projects to see that they conform with requirements of the Act, and are sound in character and design.

When approved, the State game and fish departments proceed with the work. All project personnel are employed by the States. All equipment and lands bought with the help of these funds become the property of the States. The initial expenditures are paid with State funds. Periodic and final reimbursement claims are paid by the Federal Government on the basis of 75 percent of the actual costs. Thus, when completed, the projects cost the States 25 percent from their departmental funds. The remaining 75 percent is paid from Pittman-Robertson funds.

The Act provides for wildlife restoration by the acquisition of lands and waters, their development, and the conduct of investigations into problems of wildlife management. Projects designed to benefit fish are not approvable. On July 24, 1946, an amendment was passed which permits expenditure of as much as 25 percent of each State's share for maintenance of completed projects.

The States are allowed two years in which to obligate their annual apportionments. If they fail to do this the sums of money left over revert to the Fish and Wildlife Service and are expended in financing Service operations under provisions of the Migratory Bird Conservation Act. (See Table V for tabulation of apportionments, reversions, project obligations and unobligated balances by States.)

WORK SELECTION AND EMPHASIS

There are no restrictions on State investment of this money as long as the work selected comes within the framework of the Act. Each State has its own peculiar problems to solve. Some have devoted most of their allotments to the acquisition of lands to be used for refuges, public shooting grounds, and management units. Others are stressing the development of lands by planting food and cover, fencing, posting, and construction of water impounding structures. Still others emphasize surveys and investigations of their wildlife management problems, such as determining the current status of game populations. Such information is basic to the setting of sound seasons and bag limits. Since the amendment of July 24, 1946, was passed permitting States to use this money for maintenance of completed projects, needed reconditioning of structures and other improvements on previously developed project areas has been financed. (See Table VI for a listing of net obligations by types of projects, and the percentage of funds devoted to them.)

Ten years ago, most State wildlife programs consisted almost entirely of law enforcement, game bird stocking, and predator control. The majority of sportsmen had been sold on these activities as producers of the highest returns for them. But there were questions in the minds of many State game administrators and more observing nimrods, about the real dividends from investments in large-scale bird stocking and high-powered predator control campaigns (particularly those featuring bounty payments). Technically trained wildlife workers were hired, with the help of Pittman-Robertson funds, to

get the facts. They soon proved that widespread and indiscriminate plantings of game birds were not paying their way. This led to a decline in pen-reared bird releases and increased emphasis on habitat improvement. It is universally agreed now that the only excuse for this kind of stocking is to introduce new species or restore birds to suitable habitats from which they have been cleaned out. High production costs and low survivals would bankrupt a game department if it tried to stock sufficient birds on a large enough scale to meet hunting demands.

Studies have shown that State-wide predator control programs rarely can be justified. The needs for this kind of work usually are local. With farm game in particular, predation does not make serious inroads if wildlife is well established and has properly located food and cover. On the other hand, coyote control is often necessary to permit antelope remnants to build up or to pave the way for the safe reintroduction of these animals into presently vacant but suitable ranges. The point is that the real need for this kind of work should be determined by field studies.

Investigations have disclosed the futility of trying to maintain excess populations of big-game animals by artificial feeding. This has led to population counts and forage utilization studies as a routine preliminary to the setting of seasons and bag limits. The objective is a very sensible one: keep these animals in balance with carrying capacities of the ranges they occupy. In the West, particularly, biological studies have pointed to the need for acquiring winter ranges, especially for deer and elk. Much land of this character has been bought to date.

Instead of laying out their Pittman-Robertson cash to build bigger and better game farms, the States have swung over to improving wildlife living quarters on the land. The establishment of field borders featuring perennial legumes such as sericea and bicolor lespedezas; creation of living fences through plantings of multiflora rose; planting of coverts of conifers, hardwoods, and food bearing shrubs; and the fencing of parts of farms or strips of uplands bordering farm ponds, are providing food, nesting and escape cover for farmland wildlife. This work is not spectacular but it strengthens nature's physical condition so she will produce more abundantly. It is a heartening improvement over those earlier feathered shots in the arm, which at best afforded only temporary relief.

RESTORATION ACCOMPLISHMENTS

During the 10 years covered by this report, 38 States acquired nearly 900,000 acres of land. The average purchase price was $7.28 an acre. (See Table VII for acreages acquired and being acquired by the States and Table VIII for a summary of acquisitions by fiscal years.)

Developmental measures have been extremely varied. Many dams, dikes, and water diversion structures, as well as service roads and buildings, were constructed. Millions of trees and shrub seedlings were planted. Several thousand acres of food and nesting cover were seeded. Refuge boundary fencing and posting totaled thousands of

miles. Live trapping and transplanting of birds and mammals included 29 species. Restocking suitable but vacant ranges has been given high priority in many States. Included in this splendid work has been the designing of traps and devising of successful trapping methods. (See Tables IX and X for numbers of mammals and birds trapped and transplanted by the States.)

The availability of Pittman-Robertson funds has enabled the States to expand their activities to include improvements to benefit waterfowl. Many excellent areas have been bought and developed. During the first ten years of this program, 23 percent of the money allotted to the States was invested in the purchase and development of lands, and in surveys and investigations to help ducks and geese.

Land acquisition and developmental work have one feature in common: although primary benefits for individual species are emphasized, important secondary advantages accrue to other species. Quail developmental work, for example, can not be carried out without helping cottontail rabbits. Waterfowl improvement usually creates fine muskrat habitat, with substantial dividends coming from the harvest of these fur animals. Game birds and mammals also flourish in the included uplands bordering such marshy spreads.

While all Pittman-Robertson projects must aid wildlife primarily, improving conditions for ducks and geese frequently create excellent fishing opportunities. Lands retired for wildlife purposes contribute to moisture conservation and stop soil erosion. Recommended soil conservation practices go hand-in-hand with good wildlife management. The aims of both are so closely interwoven that 27 States now have wildlife habitat improvement projects operating in cooperation with soil conservation districts.

Prominently woven into the cloth of Pittman-Robertson achievements are the study threads. These surveys and investigations have been undertaken to answer the multitude of management problems confronting State game administrators. These include such things as the devising and testing of new management methods, the objective weighing of accomplishments on the ground, and the gathering of facts and figures so that sound recommendations for open seasons and bag limits can be made. Nearly all game species and many furbearers have been the subjects of these studies. (See Table XI for a listing of the species investigated by the States.)

The 1946 amendment to the Act permits the States to use part of their annual apportionments for the maintenance of completed projects. This financial assistance was badly needed to insure that acquired and developed refuges and management areas would produce to the limit of their potentialities. Maintenance projects have been undertaken to repair structures, replace signs, reseed food patches and replant trees and shrubs. (See Table XII for a listing by States of all projects approved during the 10-year period.)

FEDERAL RESPONSIBILITIES — STATE COORDINATION

The Fish and Wildlife Service is responsible for administering the Federal portion of this cooperative wildlife restoration program. This calls for determining whether projects selected and submitted by the States are approvable under the law, whether costs of such projects are reasonable, and whether reimbursement claims for completed work conform with Federal-State project contracts. Unfortunately, the substantiality of projects dealing with the purchase of lands, their development, and the conduct of research into the problems of wildlife management can not be determined merely by reviewing paper submissions. Satisfying the requirements of law calls for field investigations by men who are competent to perform such work.

When this cooperative program began, very few States had engaged in buying lands, in performing improvement work on such lands, or in conducting wildlife management research. Over the years the Fish and Wildlife Service had assembled a staff of skilled land appraisers. Depending upon the problem at hand, these men could cruise timber, appraise the worth of buildings, translate crop production into real worth per acre for agricultural lands, determine the livestock carrying capacity of grazing lands and from that figure their cash value, and evaluate marshlands from the fur crops or other income produced. To help the many States in need of land-valuation assistance, a substantial part of the administrative funds available to the Fish and Wildlife Service has been expended in making detailed land appraisals in proposed project areas.

Proposals for the impoundment of water to benefit ducks and geese involve biological and engineering problems in addition to the buying of necessary lands. Through the development of millions of acres of waterfowl habitat, the Service trained a group of highly skilled marsh biologists. These men have been made available to the States for the investigation of potential restoration sites. The Service performed the pilot work on designing and installing earthen dikes and dams for impounding water on the national system of waterfowl refuges it administers. There is a scarcity of engineers who are experienced in this economical type of water impoundment and who are fully aware of the dangers inherent in inaccurate water availability conclusions and faulty construction. To assist the States needing help on such developmental work, the Service has supplied engineering assistance whenever requested, which has been frequent.

The States have invested a substantial part of their Pittman-Robertson funds on wildlife surveys and investigations. As a service to them, the Fish and Wildlife Service abstracts significant information contained in quarterly progress reports and publishes it in the Pittman-Robertson Quarterly. This information is highly valuable to project workers stationed at field points where reference library facilities are not available. It also tends to prevent duplication of effort and encourages project workers in various States to correspond with each other. This exchange of information is a quick way of spreading knowledge of improved wildlife management technics.

Fiscal requirements of the Federal Government call for approval of State reimbursement requests by bonded certifying officers. This

in turn requires that claims for the Federal share of expenditures made by the States on approved projects be audited. It also makes it necessary to audit project accounts and records in the State capitals. A group of qualified auditors has been employed to perform these necessary accounting tasks in cooperation with the fiscal branches of the States.

The law provides that as much as eight percent of each annual appropriation may be deducted to finance the work responsibilities of the Fish and Wildlife Service on the Pittman-Robertson program. The major part of the expenditures at the Federal end have been devoted to serving the States beyond the strict requirements of the law. The States wanted the help, and by providing it the Service has promoted economy, efficiency, and progress along all lines of action.

After the Pittman-Robertson program got under way, it became obvious that the weak link in the operational chain in many of the States was the lack of someone to plan new work and to supervise that in progress. State game administrators in most States could not devote enough time to program activities and there was no one in their organizations to whom that responsibility could be assigned. This unsatisfactory state of affairs led to the designing of the coordination project.

The duties of program coordinators in the States include planning, directing, and supervising all restoration work financed through Pittman-Robertson projects. This employee administers the program and is responsible for its integration with the over-all programs of the State game department. Contributions from coordination projects are extremely important in the smooth and effective operation of this wildlife restoration work. Coordinators relieve game department heads of responsibility for program details. They insure a well-balanced and productive program operated on a current fiscal basis. In many instances these employees conduct land-purchase negotiations and perform some developmental or research work as part of their normal responsibilities. Then too, this project is used at times to finance the cost of employing engineers to make reconnaissance surveys of areas that appear to have biological promise for waterfowl restoration. Such studies disclose whether adequate water supplies are available and whether ground conditions favor desired development at reasonable costs. Where lands are being purchased in numerous places and from many owners, it often has been found expedient to attach personnel who conduct the negotiations to coordination projects. This gets away from maintaining involved cost-distribution records for each project on which office or field work is performed, and enables these State workers to spend full time on the land-buying work for which they were hired.

Coordination projects were in operation in 31 States on June 30, 1948. This post in the State departments has provided a fertile training ground for advancement to higher administrative responsibilities. Of the seven former Pittman-Robertson workers who were filling the top positions in State fish and game department organizations on June 30, 1948, five were Federal Aid coordinators when the promotions occurred.

SPECIES BENEFITTED BY P.-R. PROJECTS

Practically every game and fur species has received attention under one or more phases of the program. Typical examples of State actions have been selected and are contained in the following coverage, by species.

Deer

The three species of deer — white-tails, black-tails, and mule — comprise the most important big-game group in the country. As such, they have been accorded major attention under the Pittman-Robertson program.

These animals received primary benefits from 70 land acquisition projects, covering 64 areas in 19 states. These have involved the purchasing or long-term leasing of 636,000 acres of land. These deer areas vary in nature and use, but fall into two general categories. Those in the East usually comprise year-round habitat for white-tailed deer and are set up as refuges, or as in Pennsylvania, as additions to the State Game Lands, open to hunting except on specified refuges. Much of the land acquired in the West has been purchased to provide wintering range for mule and black-tailed deer.

A good example of an eastern project is the Catoosa Game Management Area acquired by Tennessee, comprising 60,000 acres in Cumberland and Morgan Counties. The Tehama Winter Deer Range in Tehama County, California, is a good illustration of the western type. This eventually will contain over 114,000 acres, and will benefit Columbian black-tailed deer. A total of 33,972 acres has been bought or is in process of acquisition in this purchase unit. Cattle grazing was reduced to 50 percent of prior usage on State-owned lands, and sheep grazing has been discontinued. Required fencing was constructed under a developmental project.

Texas has been most active in live-trapping and transplanting white-tails, having moved 9,186 head. Additional animals have

Figure 1. During the 1947-48 trapping season, the Texas Game, Fish, and Oyster Comission furnished Georgia with 150 white-tails. This truck load has just completed a 1,000-mile trip and the deer are about to be released on suitable but vacant Georgia deer range. The animals were trapped on the Fish and Wildlife Service's Aransas National Wildlife Refuge. Photo by Georgia Game and Fish Commission.

been made available to Oklahoma and certain eastern states, for seed stock purposes (Figure 1). This out-of-state aid in helping solve deer deficiency problems has included the shipping of 25 Texas white-tails to the Virgin Islands. They were trucked to Miami, Florida, and then transported by airplane the remaining 1,100 miles to the Virgin Islands. Arkansas has caught and moved 1,909 white-tails. Montana has live-trapped and transplanted 1,333 deer, of which 262 were white-tails and 1,071 mule deer. Restocking unoccupied but suitable range by purchase and release of white-tailed deer had been emphasized in certain eastern and southern States. Virginia procured and released a total of 1,373 deer, between 1939 and 1944. This stocking program was very successful. Some of the counties where these deer were released have already been opened to hunting for short periods to permit the harvesting of surplus bucks.

Opening up dense stands of timber to stimulate growth of food plants on the forest floor is a recent addition to program activities. Outstanding is Pennsylvania's project involving a cutting program in second-growth timber on its extensive game land holdings. With intensive fire protection, large scopes of cut-over timber land have recovered, and now support dense stands of second growth which no longer provide food for deer. Such forests must be opened if the carrying capacity for more than a remnant of recent herds is to be maintained. Cutting operations underway in Pennsylvania are aimed at removing inferior trees. The deer benefit, and the timber removed is in accordance with sound woodland management.

Several of the southeastern states have set aside large blocks of woodlands as deer refuges in which the animals will be allowed to increase for restocking purposes or the surplus will be permitted to spread out into adjacent open areas. To make these as productive as possible for deer, the boundaries have been posted and food patches established on old clearings and trails.

Methods of censusing deer have been greatly improved through the efforts of Pittman-Robertson workers. In Texas, a successful cruise census and quadrant count has been developed on the Edwards Plateau. This has made it possible for one man to sample representative areas and come out with a reliable estimate of total population. Similar types of cruise census were devised and applied on Pittman-Robertson projects in Oklahoma and Minnesota. The greatest improvement in counting deer and many other species has been made possible by using airplanes. This was pioneered in North Dakota, but has since been adopted by about half of the States for deer population studies.

Browse studies in a number of states have provided yardsticks for quickly appraising deer concentration areas by examining key browse species as indicators of intensity of deer use. These surveys, plus nutritional and preference studies assembled through Pittman-Robertson projects, enable the game departments to establish season and bag limits, so as to keep numbers within the carrying capacities of the ranges. Starvation losses can be predicted in time to avoid them (Figure 2). Experiments have been conducted in Wisconsin and Michigan to determine carrying capacity of deer yards, and Wiscon-

Figure 2. Deer browse line in Itasca State Park, Minnesota. Field investigations and timely herd reduction can prevent forage being depleted to this starvation stage. Photo by Minnesota Department of Conservation.

sin has made appraisals of deer damage to forest reproduction. Palatability ratings of plant species were determined in South Dakota by comparing percentages available as determined by range surveys with percentages found in stomach analyses. Bone marrow analyses to determine degree of malnutrition in deer, have been made in New York, Wisconsin, and South Dakota. North Carolina has used environmental studies as a basis for deer management. Moreover, effects of weather on deer kill have been studied in New York, Vermont, and Maine. Oregon, Texas, Alabama, New York, Maine, and Vermont have studied deer-damage control by use of electric fences, repellents, and buffer crops. Body and antler measurements in Vermont showed age to be the most important factor governing size and weight and Colorado has devised a method of converting body measurements of mule deer into weight figures, thus eliminating the necessity of removing carcasses from cars. This type of data is important in determining physical condition of the herd. Winter mortality surveys have been conducted annually in the Adirondack region of New York, and food habits studies have been made in North Carolina, Wisconsin, South Dakota, and many other States.

Studies of supplemental feeding of mule deer in winter concentration areas in Utah and Colorado disclosed that such programs were detrimental rather than beneficial. It was concluded that heavier hunting pressure to remove surplus deer threatened by malnutrition was the only practical method of avoiding over-populations. The abandonment of artificial feeding in Colorado has saved that State almost $50,000 per year. Annual population inventories and range utilization studies have been substituted. Deer now are managed on a herd-basis, with hunting pressure being expanded or contracted to keep the animals within the carrying capacities of their winter ranges. Bitter and inconclusive wrangles as to whether deer herds should be increased or reduced are now being solved over the entire range of these animals by Pittman-Robertson field studies, and subsequent management recommendations. Facts have replaced opinions. Actions are in keeping with the basic principles of good livestock management, particularly in the West. In some of the midwestern and eastern

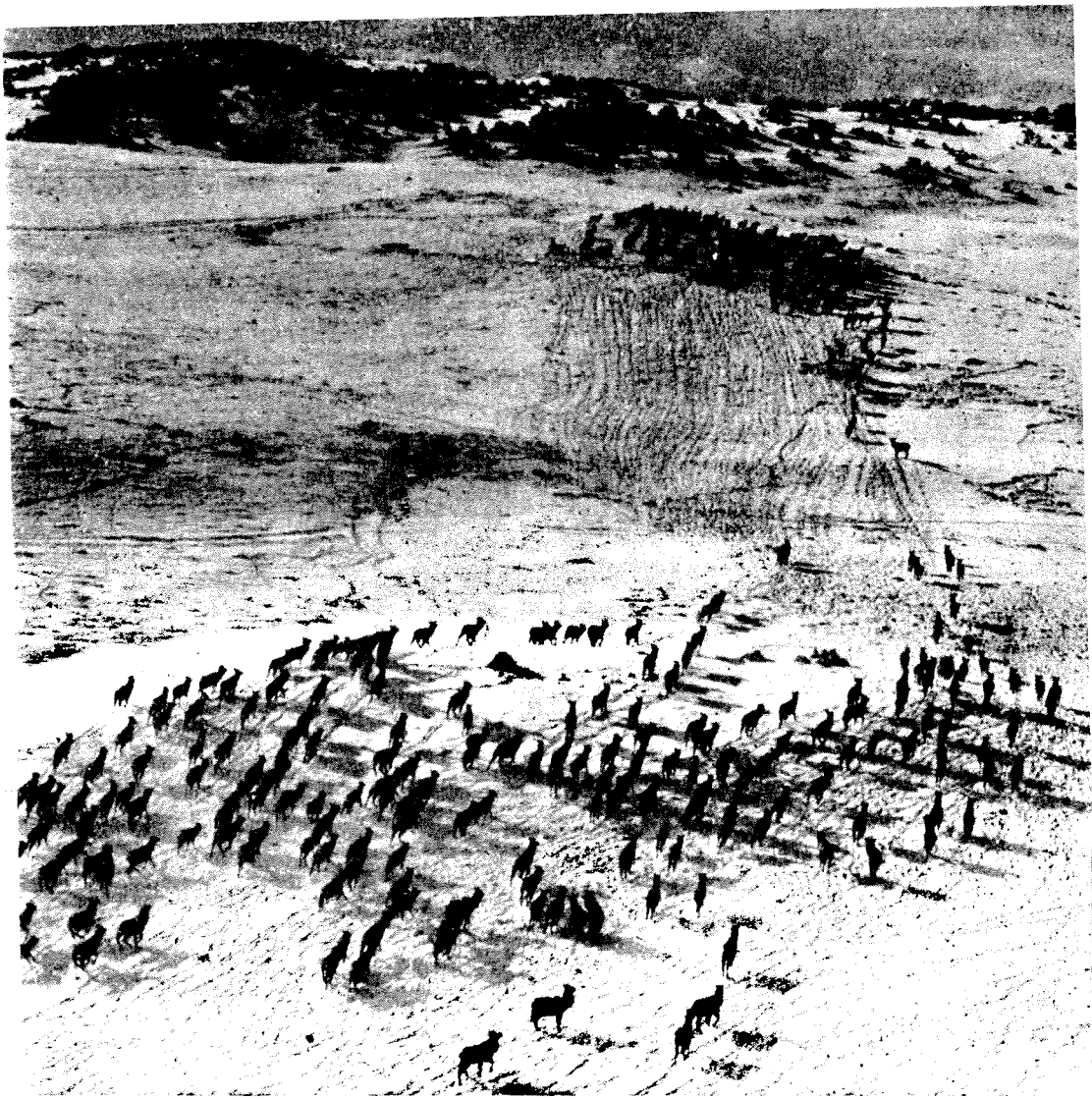


Figure 3. Some of Montana's Sun River elk herd on the winter range being acquired for them. Photo by R. F. Cooney, Montana Fish and Game Commission.

states, however, public education has not progressed to the stage where intelligent management can be applied to deer. Deer winter yard forage conditions continue to deteriorate and periodic heavy starvation losses occur. Nevertheless, Pittman-Robertson technicians have developed practical and inexpensive methods for getting the facts. The prescription can be written and treatment started whenever public acceptance permits action.

Elk

The major problem in elk management is the shortage of winter range. To relieve this condition six of the Western States have undertaken the purchase of 19 wintering areas. Montana's elk winter range

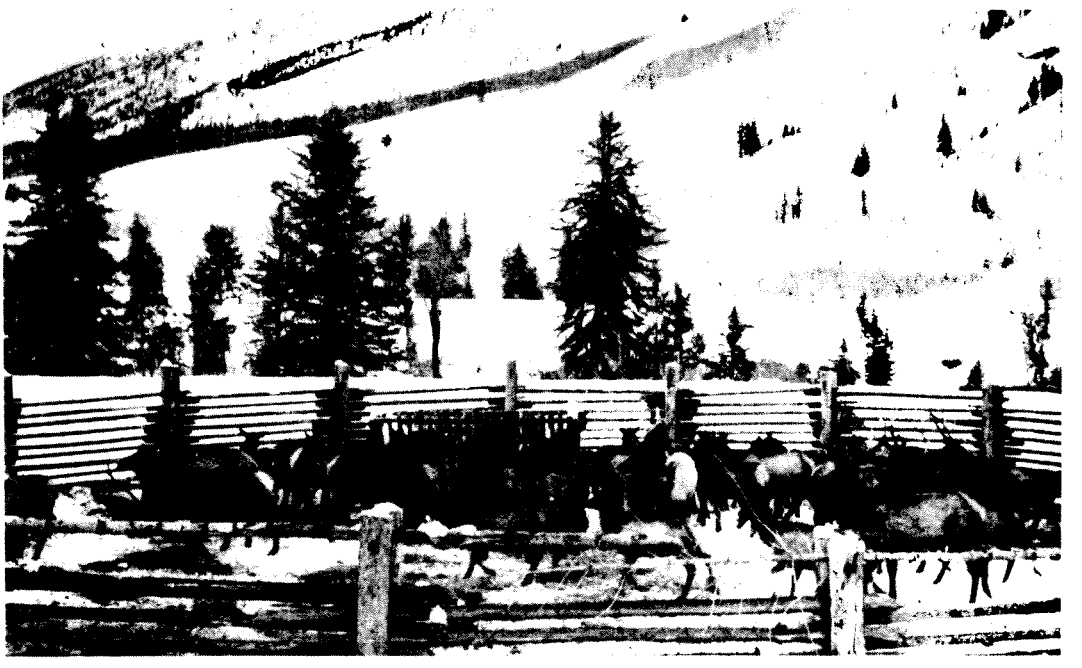


Figure 4. All big-game animals transplanted on Pittman-Robertson projects are ear-tagged. Additional Wyoming elk are lured into corrals and livestock tags are attached to their ears. Hunter and other kills then furnish information on extent of migrations and life spans. Montana also tags new-born elk on calving grounds. Photo by James E. Grasse, Wyoming Game and Fish Commission.

purchase program at the headwaters of the Sun River is typical. By careful management, the State has built up the Sun River herd to 3,000. This is the second largest concentration in the State, being exceeded only by the Gallatin herd which summers in Yellowstone National Park. The Sun River elk were causing severe damage to ranches. The Montana Fish and Game Commission had two choices: the winter range could be expanded or the elk population reduced. The State chose to buy the ranches. The purchase area contains 65,280 acres of privately-owned lands, of which 11,775 acres have been acquired. (Figure 3.)

Wyoming has live-trapped and transplanted 929 elk, and leads in this activity (Figure 4). Idaho obtained 50 elk from Wyoming, to get these animals back onto vacant but hereditary range. Elk refuges have been established by several States, and developments consist of posting, fencing out domestic stock, and range revegetation where necessary.

Salting summer ranges, as conducted by Idaho and Montana, has proved effective in prolonging their use by elk. Animals are thus encouraged to delay their fall migrations to winter ranges, and go back to the summer ranges earlier in the spring. Since winter range is the population bottleneck, successful enticements to keep elk at higher elevations until they are actually forced out by winter snows, and to get them to return as quickly as possible, is first-class management. In the roadless back country, airplanes are used for dropping the 50-pound blocks of livestock salt. This is cheaper and makes for better distribution than would be the case if pack animals were used.

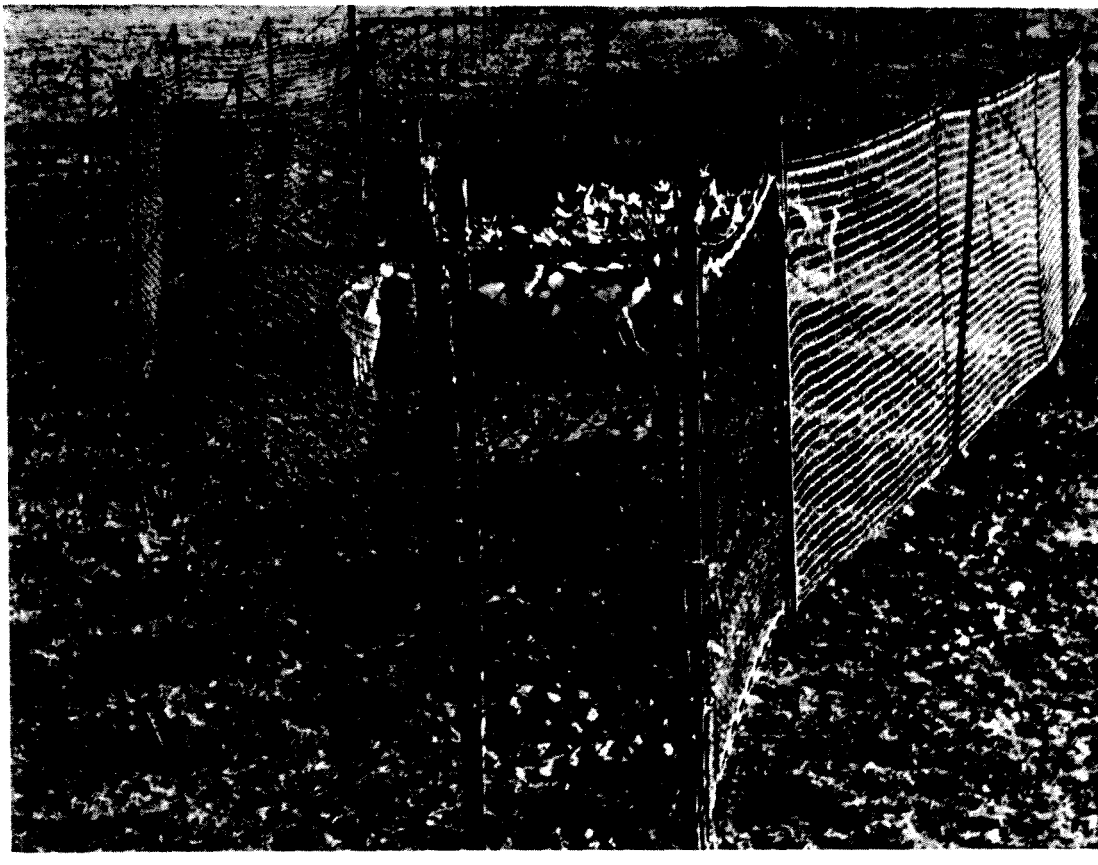
Sex-and-age classifications of elk have been made in South Dakota, Wyoming, Montana, Colorado, Arizona, and Utah. Such information is gathered to learn the reproductive success of individual herds and whether the ratio of cows to bulls is in proper balance. This data, along with population counts and the degree of forage utilization on the ranges, makes it possible for the game departments to intelligently build up, maintain, or reduce the herds. When ranges become overstocked, western States do not hesitate to permit the harvesting of surplus cow elk.

Treating each herd and the range it occupies as a separate problem, is in striking contrast with former State-wide management. The change-over in operating procedure was made possible by the availability of Pittman-Robertson funds to employ trained men to go out and gather the facts. That these workers had to devise new methods and procedures to do the job is more to their credit. The task of taking inventory, for example, has been simplified and speeded up by using airplanes.

Antelope

One of the outstanding accomplishments of the Pittman-Robertson

Figure 5. Metal post and rope-netting antelope trap. Stakes and cables provide needed support and eliminate time-consuming post setting in rocky or frozen ground. Narrow lane in background extends 100 yards and widens into V-shaped wings. Loading chute and catching pen is in the foreground. Photo by R. F. Cooney, Montana Fish and Game Commission.



program has been the spectacular increases in numbers of antelope, due to restoration and management activities by the States. Once ranging from Iowa to California and from Canada to Mexico, and counted in the millions, occupied ranges and antelope numbers were whittled to nubbins. Changed land use, overgrazing by sheep, overshooting and predation were responsible.

To spread these speedsters onto lands that are still suitable for them, trapping and transplanting have been conducted. More than 7,000 antelope in eight western States have been liberated in new homes. Texas leads, that State having trapped and moved 2,675 of them. Through experimentation, traps have been designed that can be erected quickly and where the corralled pronghorns can do themselves the minimum of injury. Bands selected for trapping are spotted and herded into the traps by airplanes. Truck bodies have been designed to permit loose loading, getting away from awkward, individual crating. Transportation losses are negligible under this system (Figure 5).

The airplane also is a major tool of management. Open seasons are based upon ability of the populations to stand hunting pressure. In order to get the facts about numbers, sex ratios, and the fawn crop, the States have used the airplane to do the job quickly, cheaply, and accurately.

In some cases, predation by coyotes has proved to be a limiting factor. Their killing is confined principally to the kids. Where necessary, some predator control has been done to take pressure off remnant populations, or to prepare the range for seed-stock releases. Arizona studies have shown an excellent increase in fawn survival where coyote control has been undertaken. Fawn survival was in direct ratio to the degree of control, being as high as 95 percent where intensive control campaigns were conducted, and as low as 21 percent where control was lacking.

Complaints by Texas cattle ranchers about competition between antelope and cattle for available forage, resulted in a study being made to get the facts. It was found that a range steer would eat as much cattle forage as 38 antelope. The reason is that in addition to the great difference in consumption due to the disparity in weight, antelope are essentially browsers while cattle confine themselves almost entirely to grass. Spreading the results of this study in Texas and elsewhere has helped allay past misapprehensions and clear the way for expansion of antelope rehabilitation work.

The non-competitive nature of antelope, and the fact that there are millions of acres of public land in the West over which these animals can range freely, have made it generally unnecessary to buy land for their use. The major exception was the purchase of the 9,000-acre Raymond Ranch in Coconino County, Arizona, by the Arizona Game and Fish Commission, to provide the nucleus for the Anderson Mesa antelope range. Control over 5,000 acres of State-owned lands was obtained by lease and exclusive grazing rights were assigned to wildlife on 5,000 acres in the adjacent Coconino National Forest. This State-owned and controlled unit provides essential winter range for Arizona's largest antelope herd and it ensures the does coming

through the winter and into the critical fawning period in good condition. This State antelope establishment has been fenced to prevent trespass by domestic livestock. Water sources have been developed to insure an ample supply of good drinking water. Previously-erected ranch headquarters buildings have been remodelled to provide suitable quarters for the State employee who is responsible for management and maintenance of the land and improvements.

Mountain Sheep

Ten years ago the fear was prevalent that the bighorn sheep was a vanishing species. Pittman-Robertson investigations verified the low state of populations, but not the vanishing predictions, if protection and sensible management were applied. Recommendations came out of those studies for trapping and transplanting wherever a surplusage permitted. Traps were devised and successful corralling methods developed. Montana moved 25 out of its small Sun River herd to the Gates of the Mountains country on the Missouri River, near Helena, where Lewis and Clark reported large numbers in 1804. Montana also obtained 16 bighorns from Colorado, in exchange for mountain goats. These have been released in a half-section woven wire enclosure in hereditary sheep country in the Missouri River breaks, bordering the Fort Peck Reservoir. Surplus animals will be permitted to leave the enclosure. By that time the sheep should be sufficiently accustomed to the new country so that long-range wandering in search of accustomed Rocky Mountain terrain need not be feared.

With its famous Tarryall herd to draw from, Colorado is in the best position to get seed stock onto vacant but suitable ranges. To date, that State has trapped and moved 152 sheep, not including those traded to Montana. New Mexico has performed some water impounding work to provide a permanent source of water for bighorns in the Big Hatchet Mountains. Previously, these sheep had to travel a long distance down into cattle country for water.

Texas' Sierra Diablo mountain sheep project is the only acquisition undertaken primarily to aid bighorns. The project proposes the purchase of a block of very rugged land, containing almost 20,000 acres, in Hudspeth and Culberson Counties, to protect the Texas remnants of this species. To date, 5,325 acres of the proposed purchase area have been acquired.

Mountain Goat

Surveys of mountain goat range were made in Montana to determine approximate numbers, sex ratio, extent of range, life history and migratory habits. This information was badly needed to insure the best possible management of these animals.

Montana devised suitable traps and succeeded in catching 54 mountain goats. Colorado obtained eight of them in exchange for mountain sheep. The remainder was released by Montana in mountain ranges lying east of the Rockies. There had never been any goats in the places the releases were made, but conditions there were comparable to those found in occupied ranges in the Rockies. Very satisfactory results are coming from Montana's efforts to spread the range of this interesting and valuable big game species.

Colorado never had any Rocky Mountain goats, at least during historic times. There is no good reason, however, why these animals should not prosper in the places they were released in that State.

Moose

Pittman-Robertson investigations in Montana in 1945 showed the population to be around 3,600 head. These were scattered in three localities in the western part of the State. These surveys revealed over-populations in certain parts of the winter range, and unbalanced sex ratios in others. Based on these findings, the first open season on a special-permit system was allowed in 1945. Moderate kills of bulls both in 1945 and 1946 were made. The part hunting plays in scattering these animals has not been determined, but recent increases have been noted in several places adjacent to hunted areas. Moose also were found to have very definite migration habits which are closely related to palatability changes in forage.

In Minnesota pressure was put on the game department to open the moose season in the Northwest Angle — the most northerly point in the United States. Aerial surveys by Pittman-Robertson personnel over that area and other places in northern Minnesota occupied by this largest member of the deer family showed that the moose population was not high enough to justify an open season. These findings were accepted by the game department and no hunting has been permitted (Figure 6). A similar investigation in Wyoming showed that a hunting season could be justified in 1946, and 200 animals were subsequently harvested. This was an increase in kill over any previous year between 1940 and 1945.

Wyoming experimented with trapping and transplanting and in the winter of 1947-1948 was successful in moving eight moose to new locations.

Buffalo

Arizona has a free-ranging herd of buffalo in House Rock Valley, close to the Colorado River in Coconino County. These animals range on public domain along with domestic livestock. Under agreement with the local grazing district, the herd is limited to 200 animals. Numbers above that rate are harvested by hunting, through the medium of special permits. To supply an assured source of water, a pipeline several miles in length was laid to tap permanent water on the adjoining Kaibab National Forest. Water troughs were installed along the pipeline. This

Figure 6. Moose being counted from the air. Photo by W. W. Wettschreck, Minnesota Department of Conservation.

Pittman-Robertson development has enabled the buffalo to utilize fully the range they occupy.

Buffalo and antelope complement one another in their feeding habits — the buffalo being primarily grass eaters and the antelope browsers. Mindful of that, 42 buffalo were trapped in House Rock Valley and released on the 20,000-acre Anderson Mesa antelope range. An additional 17 were obtained from the Wichita National Wildlife Refuge of the Fish and Wildlife Service, and released on the Mesa. Through these actions, the Arizona Fish and Game Commission now has two thriving herds.

Kansas is the only other State that has done anything for buffalo, under the Pittman-Robertson program. In that State a 520-acre area was purchased and fenced, to expand the Finney County Game Preserve as a refuge for buffalo and other game species.

Javelina

The javelina, or peccary, has received developmental attention by one State. Texas live-trapped and transplanted six of these animals, under one project. Arizona is making a study of these animals in the southern part of that State to ascertain their present distribution and numbers. These findings will be the basis for further studies and management recommendations.

Bear

Black bear have received secondary attention in many woodland acquisitions. Being secretive and difficult to hunt, they are not classed as a major big-game species. Kentucky has imported and released 10 of these animals on big-game refuges in an attempt to extend their range in that State.

In Virginia, bear damage complaints were investigated by Pittman-Robertson personnel. It was found that the damage was not serious. As a result of this study the Commission was able to reject a petition to extend the open season on black bear or remove it entirely from the protected list.

Workers in Colorado and Montana have reported that there is a definite correlation between bear damage and the scarcity of natural foods during certain seasons of the year.

While no specific projects have been set up for bear studies, many of the States have gathered data on them incidental to other work.

Waterfowl

With the help of Pittman-Robertson funds, many States for the first time were able to finance waterfowl restoration work. It was fortunate indeed that they could move in to take up some of the slack. Duck stamp sales more than doubled during the ten years, bringing a spectacular increase in hunting pressure; high crop prices stimulated the drainage of marshes; and well-financed hunting clubs bid high for control of the fast shrinking waterfowl habitat.

Work to aid waterfowl has been performed by 38 States. This has included the purchase and development of lands, the conduct of field studies to locate and appraise likely restoration sites, and the gathering of facts needed for better management of the resource. Almost

126,000 acres of land have been bought in 70 areas. Typical examples of such purchases are New Jersey's 4,436-acre Egg Island Marsh; Oak Orchard, totaling 2,243 acres in New York; the Cheyenne Bottoms in Kansas, containing 18,711 acres; Colorado's South Platte River acquisition calling for the eventual control of 14,000 acres; and Oregon's Sauvies Island, which will total over 12,500 acres. Iowa has dipped into its Pittman-Robertson income to step up action on its 25-year waterfowl restoration program. In the heart of the high-priced land of the corn belt, that State acquired 15 fine waterfowl areas totaling 6,600 acres during the 10-year period.

Effective management of lands for ducks and geese calls for control of water levels. This is accomplished through construction of dams, dikes, spillways, canals, and other features peculiar to first-class marsh management. Such improvements have been made on 34 areas in 22 States. An outstanding example of this work was the development of the Ogden Bay Unit on the gently sloping mud flats bordering Great Salt Lake. Formerly a skim of water would cover those salty flats from time to time. In late summer and early fall the ducks would concentrate there and periodically thousands would be killed by botulism.

Utah built a series of dikes enclosing 6,500 acres of these mud flats and interior dikes to permit shifting of water levels within the main impoundments. Spillways to let the water in and out were built into the dikes. Ample water was available for diversion from the Weber River which flows into Great Salt Lake at this point. Raising or lowering water levels helps check botulism when sick ducks appear. Shallow flooding of the fertile delta lands produce an abundance of waterfowl food plants. An additional 6,000 acres of unimproved marshes and mud flats lie between the dikes and the Lake. This development is not only an attractive stopping place for migrating birds, it also is a top-notch waterfowl factory. In 1947, a one-mile stretch along the banks of an interior channel revealed over 200 waterfowl nests. Canada geese owned 17 of them (Figures 7 and 8).

The Ogden Bay project is managed as a refuge and public shooting grounds — half of the developed lands being devoted to each use. During the 1946-47 open seasons, more than 10,000 hunters bagged almost 16,000 birds here.

New Jersey owned a 13,000-acre tidal marsh near Atlantic City. The scarcity of open water and the rank profusion of salt marsh grasses offered little attraction to wildfowl. By constructing dikes now totaling over 27,000 lineal feet, the State has been able to trap fresh water along the margin of the marsh. Close to 3,000 acres of salt marsh has been transformed into a series of fresh water impoundments which provide ideal conditions for the birds (Figures 9 and 10). And the remaining salt marsh has not been neglected. Using dynamite, the thick vegetative mat has been blasted to create a pattern of quarter-acre ponds (Figure 11). The Tuckahoe development is managed as a combination waterfowl refuge and public shooting grounds. It is first-class both ways.

In the spring of 1946, the Missouri Conservation Commission started buying 3,000 acres of flood plain along the Grand River, in Linn and Livingston Counties, for the Fountain Grove Waterfowl Management

Figures 7 and 8. The above scene shows thousands of botulism-killed ducks on a four-mile stretch of mud flats at Ogden Bay prior to diking and restoration. Below is the healthy situation created by construction of dikes and spillways to impound and manage Weber River waters. Photos by Lee Kay, Utah Fish and Game Commission.

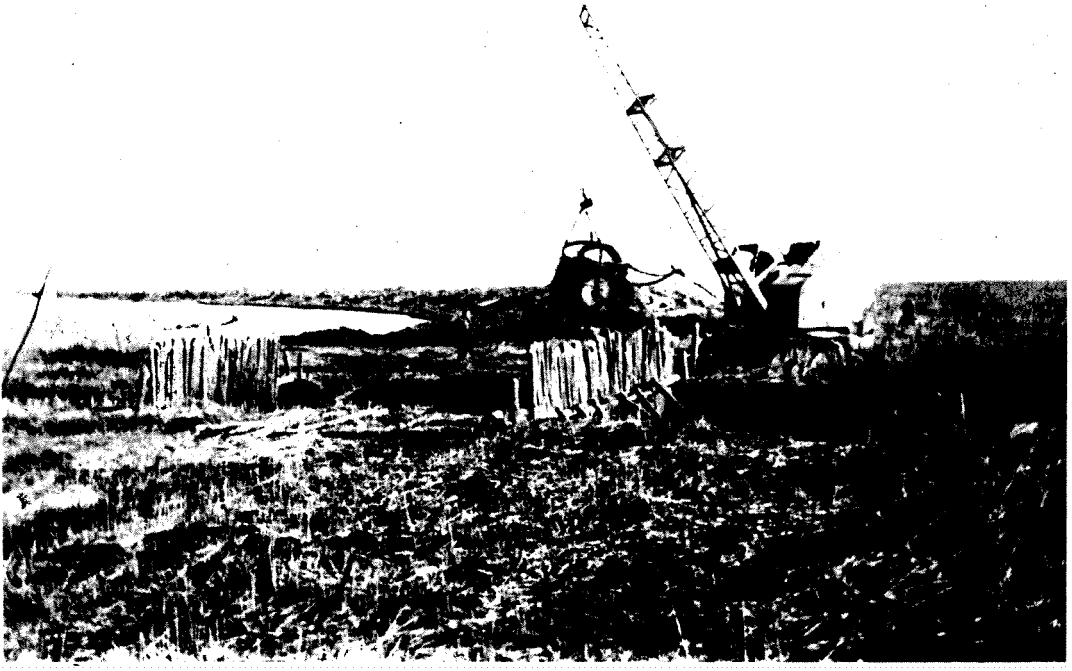


Figure 9. Ditch plug construction with a three-quarter yard dragline in diking work at Tuckahoe, New Jersey. Photo by L. G. MacNamara, New Jersey Department of Conservation.

Figure 10. One of the marshy lakes created by diking and trapping fresh water at Tuckahoe, New Jersey. Photo by L. G. MacNamara, New Jersey Department of Conservation.

Figure 11. Dynamiting a pond in the unimproved salt marsh on Tuckahoe project. Photo by L. G. MacNamara, New Jersey Department of Conservation.

Unit. That was followed by construction to divert flood waters into a series of pools formed by a system of cross dikes. By the fall of 1948, development was nearly completed. Part of the establishment was opened to public shooting and the hunters obtained good returns despite the fact the pools were only partially filled. Thus in two seasons the State was able to transform a large chunk of unproductive flood plain into an attractive waterfowl management unit.

The Oregon Game Commission is proud of its 13,650-acre Summer Lake Waterfowl Management Area. Alkali flats, exposed by the dwindling lake, made this opportunity. Oregon bought the privately-owned lands needed, then proceeded with improvement work. Water was available from the Anna River, which heads a few miles north in a cluster of profusely-flowing springs. Diversion dams were built, canals excavated and low dikes constructed to control and spread the water over the parched lands. The work is not completed, but close to 3,000 acres have already been converted into a highly-productive waterfowl marsh. Wheat and rye are planted on bordering uplands each year to provide additional nourishment for local and migrating ducks and geese. Hunting is permitted on half the area; the other half is a sanctuary. Information gathered during the first half of

Figure 12. Hunters returning from public shooting grounds at Summer Lake. Photo by A. V. Meyers, Oregon Game Commission.

the 1948 split hunting season disclosed a harvest of 8,669 ducks and geese from 3,367 man-days of shooting, or better than 2.6 birds per man-day (Figure 12). But Summer Lake is more than a combination refuge and public shooting grounds, it is also a splendid incubator. The production records show that this Pittman-Robertson project rears 6,000 ducks and 1,500 Canada geese each year.

Horicon Marsh, Wisconsin, is a fine example of unwise reclamation followed by a costly salvage job. In its original state this 30,000-acre marsh was a famous waterfowl nesting and concentration spot and a splendid producer of mink and muskrats. Unfortunately, the marsh was drained some 50 years ago to uncover more agricultural lands. After the lands were dehydrated and ruined for wildlife it was learned that the sour peaty soil would not grow crops.

In 1940, the Wisconsin Conservation Commission and the Fish and Wildlife Service entered into an agreement whereby the State would buy and restore the southern part of the former marsh, and the Service would take like action on the northern part. This two-pronged rehabilitation campaign was to be financed by the State, with the help of Pittman-Robertson funds, and by the Service with Duck Stamp money. Executing its part of the agreement, Wisconsin proceeded to buy nearly 10,000 acres of land in the southern part of the marsh. Restoration has followed, through required developmental projects. Half of the State's marshy spread is closed to hunting; the remainder is open. While fur animals were incidental to the main purpose of restoration, the Wisconsin Conservation Department's dividends from this source of cash income, are substantial. During the 1947-48 trapping season, for example, the State sold its half of the share-trapped mink and muskrats for $15,000. That money is helping pay for restoration and management work on the property.

Replacing low-quality plants with high-quality food producers has been undertaken by many States. Elimination of noxious vegetation is accomplished by cutting, discing, spraying with herbicides such as 2,4-D, and by controlled burning. New York is rapidly clearing water-chestnut from the Hudson and Mohawk Rivers. This worthless exotic threatened to choke all other vegetation in the quiet waters of those streams until it was successfully battled by underwater weed cutters and 2,4-D sprayed by airplanes, helicopters and hand pumps. Wiscon-

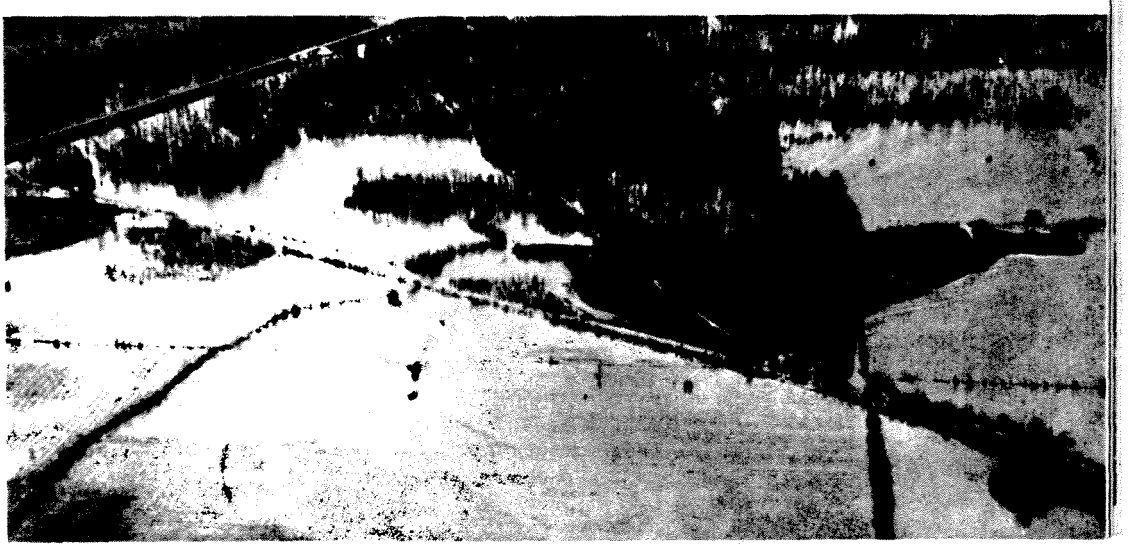
sin has used controlled burning to good effect on its Horicon Marsh, to check the growth of willow and aspen and thus provide goose pasturage. Maine has made extensive clearings on Swan Island, and has seeded them with rye, Ladino clover and other plants to supply green foods for geese during the spring migration.

Food plantings have been made on 34 projects in 20 States. Tennessee is performing a king-sized job on the 185-mile long Kentucky Reservoir under a cooperative agreement with the Tennessee Valley Authority. Certain shallow water areas at the reservoir margin have been diked and are pumped dry each spring to eliminate a prime setup for malarial mosquitos. Crops of corn, peas, soya beans, wheat and oats are produced on these dewatered lands. In the fall — after the mosquito-breeding season is over — the croplands are flooded (Figure 13). These recently installed cafeterias have been a spectacular success. In 1946-47, 14,000 ducks and 50 Canada geese wintered here. This jumped to 50,000 ducks and 500 honkers in the winter of 1947-48. The splendid results coming from its maiden efforts to do something for the birds and hunters have encouraged the Tennessee Conservation Department to expand operations. All sites suitable for waterfowl development in the other reservoirs created by the Tennesse Valley Authority within the State will be included in this habitat improvement program.

Surveys and investigations — biological, engineering and land acquisition are the foundation of land purchases and developments for waterfowl. Field studies also provide administrators with the facts about production, hunting pressure and kill, and many other features that bear upon the well-being and continued abundance of waterfowl. During the first ten years of Pittman-Robertson operations, about one-fifth of all money invested in investigative work was devoted to ducks and geese. New York, Minnesota, Connecticut, Massachusetts, and Oregon, lead the parade in locating and studying likely sites for future acquisition and development.

Kill records now are being obtained in large enough quantities so

Figure 13. Food plantings for waterfowl in Kentucky Reservoir dewatered areas are flooded in the fall when pumping operations for malaria mosquito control are discontinued. Photo by Tennessee Department of Conservation.



that the hunting drain on the available supply can be determined. During the 1947 open season, 15 States stressed this line of work. This information, when correlated with like data collected by the Fish and Wildlife Service, provides an important aid to effective management.

California and Minnesota have studied waterfowl food plants, their distribution, propagation and use by the birds. The New England States have made extensive surveys on eel grass. This aquatic — a very important waterfowl food plant along the North Atlantic Coast — was almost exterminated by a blight some years ago. Its comeback is slow but promising.

The growing problem of lead-shot poisoning has been investigated by Minnesota and Michigan. Field studies by both States have located heavy concentrations of such pellets in certain marshes and lakes. X-ray and fluoroscope examinations of wintering ducks showed that a high percentage have lead shot in their gizzards and are suffering from lead poisoning. Michigan fluoroscoped spring migrants during banding operations, and found as high as 25 percent of the puddle ducks carrying lead in their flesh (Figures 14 and 15).

With increased hunting pressure, crippling losses have mounted. On six Wisconsin marshes, it was found that 4,561 hunters bagged 3,949 birds and crippled an additional 1,010. Much of this waste could be averted by more careful shooting and the use of hunting dogs. Studies on Horicon Marsh, Wisconsin, disclosed that gunners using dogs failed to retrieve only 8.3 percent of the waterfowl shot down, while those without dogs lost 18.7 percent of the birds they knocked out of the air.

Many new techniques in waterfowl management have been developed. These range from inventorying methods, as illustrated by the State-wide aerial census in Colorado, to the chemical and mechanical control of undesirable aquatics such as waterchestnut in New York and water-hyacinth and alligator weed in Alabama. Population trends have been studied in many States through banding, inventorying, determining nesting success, analyzing hunter success and crippling losses, checking of sex and age ratios and gathering data on migrations.

Massachusetts technicians have devised a better way to encourage wood ducks to use nesting boxes. They experimented and learned that when these shelters were placed on poles set in the water, the occupancy increased to over 95 percent as compared to 40 percent use when the boxes were nailed to trees. Tree locations were too attractive to squirrels, raccoons, owls, and bees. The success attained in Massachusetts has encouraged New Hampshire and Pennsylvania to embark on extensive programs of construction and distribution of these artificial nesting sites to increase the numbers of this gaudy member of the duck family.

Bobwhite Quail

The various species of quail native to the United States comprise a group of outstandingly important game birds. Among them the bobwhite reigns as king over a large part of the nation.

Figure 14. Fluoroscopic examination of migrating black duck to determine number of shot in bird's body. Photo by Michigan Department of Conservation.

Figure 15. X-ray photo of same black duck showing it is carrying 10 lead pellets from past body wounds. Photo by Michigan Department of Conservation.

When the Pittman-Robertson program began, bobwhite restoration consisted almost entirely of stocking pen-reared birds. Sportsmen had been sold on the effectiveness of that approach. Improved game farm techniques enabled game breeders to turn out birds in large quantities. It was generally assumed that liberal dosages of artificially produced quail were the sure cure for ailing populations.

Field studies conducted since 1938 have proved that game farm products have been grossly over-rated as a means of increasing the supply of bobwhites. Such stockings have all too frequently been carried on with little or no attention to the adequacy of food and cover where liberations were made, or to the ability of released birds to survive under wild conditions. Chronic failures were inevitable. Even where stocking has been carried on to improve hunting conditions immediately, hunters' bags the first season have been found to contain only 4 to 33 percent of the birds released. Very few are bagged the second season. The great majority of stocked birds disappeared rapidly from release sites. Because they are abnormally tame, many are taken by predators. Some are lost to exposure and others simply wander away. Studies in Pennsylvania have shown that although popular with the hunters, the restocking program, for the money expended, has been the least effective of the Commission's quail management practices.

The success of restocking can only be measured by the number of birds that survive and reproduce. During the period from 1940 to 1942, Oklahoma banded 83,000 of its pen-raised quail to find out what happened to them after release. By July 1, 1942, 794 bands had been returned. That was less than one percent of the total number banded. And more to the point: two areas in eastern Oklahoma stocked with 108 birds in September 1941 were hunted intensively during the latter half of November of the same year. Seventy-seven birds were killed on one area and 42 on the other, making a total of 119 bobwhites bagged. But only 37, or 31 percent of the birds taken were hatchery birds; 82 or 69 percent were wild-reared.

Here is another illuminating example. Kentucky has been making intensive field studies on the effects of liberating pen-reared quail. Data concerning the survival of birds released during the fall of 1946 disclosed that only 28 percent of them were found on the stocked areas two months after they were liberated. Returns from live-trapping showed that by April 1947 only 8 percent of these game farm products were present.

The 1947 spring quail census of Fulton County, Pennsylvania, was of particular interest because it was conducted as a test to learn the real worth of the quail stocking program throughout the State. In the eastern one-third of Fulton County where 1,000 adult quail had been released in April 1946, the count remained at 18 coveys, exactly the same number found during the March 1946 census. Almost all of these coveys were at or within a short distance of the same places where they had wintered in 1945-46. This indicated a survival of native stock only. In the western section of the county, where 1,000 pen-reared birds had been released in September 1946, there was a gain of one covey over the number found the previous spring (18 to 19). It was believed that five of the 19 coveys could be surviving remnants

of the September release because these coveys were isolated from previously occupied ranges. In the middle division of the county which had received no pen-reared birds, the total number had increased by six coveys (30 to 36), but even here the mortality from fall to spring had been pronounced. The census showed, however, that wild birds — without any help from game farm additions — were able to maintain their numbers for a period of a year during which nearly all of the 2,000 pen-reared quail were lost.

The results of nearly 100 field studies in 29 States have proved to wildlife administrators that the dividends from quail stocking programs are low indeed. This has led to a shift in restoration emphasis: quail living quarters are either being created or improved on the land. Without required food and cover conditions, no amount of stocking — be it wild or artificially propagated birds — will put more bobwhites permanently in the coverts.

In the Southeast, where the bobwhite is game bird No. 1, habitat improvement emphasizes field border establishments which combine two shrubby exotic legumes, bicolor and sericea lespedezas. Bicolor contributes little in the way of cover but its seeds provide a much sought-after winter food; sericea grows low and dense and supplies nesting and escape cover. These plantings for quail not only increase birds numbers and make the hunters happy, but the farmer also benefits — and that is the key to enthusiastic acceptance. The field borders check woodlands from moving in on croplands, provide a convenient turnrow for the farmers and curb soil erosion. The Soil Conservation Service recommends such plantings to its cooperators. Observations and hunter experiences show that quail are almost certain to be found in or near these field borders. Landowners, sportsmen and game technicians are high in their praise of the splendid results coming from this type of habitat improvement work (Figure 16).

Georgia's farm game habitat restoration project is typical. Begun

Figure 16. Bicolor lespedeza field border provides excellent winter food for bobwhite quail. Photo by James W. Webb, South Carolina Game and Fish Department.

in 1943, the work is state-wide in scope. It operates through Soil Conservation Districts. Georgia's first trouble was in getting enough bicolor seed to distribute to the farmers for planting. Then too, many failures came from direct seeding and a shift was made to growing seedlings in nurseries for later transplanting. In 1948, the production of bicolor seedlings totaled nearly 3½ millions. During the last five years, almost 8,000 of these field borders have been established in Georgia. Similar projects are operating now in North Carolina, Louisiana, Alabama, Arkansas, South Carolina, Florida, Virginia, and Mississippi.

General farm game habitat improvement projects which utilize the lespedezas to a lesser extent are featured in Illinois, Ohio, Indiana, Oklahoma, Missouri, West Virginia, Delaware, Maryland, and Pennsylvania. Unfortunately, lespedeza bicolor will not produce seed in the northern part of the country.

Maryland's cooperative farm game program illustrates a somewhat different and more comprehensive approach to helping quail and other resident species of upland game. The Game Department furnishes technical guidance, seed, planting stock, fencing materials and signs for lands to be improved. The cooperators provide the labor. Improved areas range from five to 50 acres in size. The landowners agree to maintain not less than five acres in an inviolate sanctuary and to allow hunting on their lands as they have in the past. This Maryland habitat improvement work is conducted in cooperation with the Soil Conservation Districts, 4-H Clubs, Izaak Walton League Chapters, and other conservation clubs, the State Department of Forests and Parks, the University of Maryland Extension Service, farmers, and others. Such broad gauge cooperation expands support, speeds progress, and insures stability.

Providing badly needed living quarters for quail and other farmland wildlife is a whale of a big job. Illinois, for example, contains 32 million acres of farmland and 200,000 farms. Half of the farms need small refuges and field border establishments. To complete the task calls for 100,000 miles of fence-row plantings and 250,000 acres of developed seed stock refuges. During the spring of 1948, the State planted 125 miles of fence rows and 2,500 acres of seed stock refuges. This completed the work on 400,000 acres of the State's croplands. Multiflora rose is the principal planting stock. The progress is very satisfactory for the amount of money being invested, but action must be stepped up. Illinois is enlisting all possible help in accomplishing this (Figure 17).

Land purchases for bobwhites have been quite numerous in the eastern half of the country. Many of the areas purchased were abandoned or submarginal farms. The lands bought are multi-purpose units to increase production of cottontail rabbits and squirrels as well as quail. Such acquisitions are improved for game by cover plantings, seeding food patches, fencing, and posting.

Scaled, Mountain, Valley, and Gambel's Quail

The principal limiting factor on quail production, over millions of acres of arid land in the West, is lack of water. Food supplies, even in

Figure 17. Multiflora rose field borders provide tight living fence and excellent wildlife cover. Photo by Illinois Department of Conservation.

desert and near-desert situations, are ample to sustain large numbers of these birds. Because of this, California's quail-watering installations, known as the "gallinaceous guzzler," have been a spectacular success (Figure 18).

Current construction is the product of much painstaking experimentation. Designs progressed from combination metal storage tanks, calling for manual filling, and small watering basins with float valves subject to unpredictable failures, to the present extremely practical arrangement. This consists of a thin concrete water-collecting apron covered with an asphalt emulsion, to fill any cracks that may develop. Water, falling on the apron, flows by gravity into an underground storage tank made of poured concrete. The use of portable forms saves much time in construction, and results in tanks of a standard size and design. A narrow opening about eight inches high, in front of the storage tank, enables the quail to enter and obtain water. Small-diametered steel rods set upright in the concrete at the tank entrance, prevent predators such as coyotes, bobcats or foxes from gaining access. The tank interior slopes gradually downward from the entrance, so the birds can always gain access to the water as it recedes during dry weather, without danger of being drowned.

Figure 18. Gallinaceous guzzler showing part of water-collecting apron, entrance to underground storage tank and valley quail that have come in for water. Photo by Ben Glading, California Fish and Game Commission.

These concrete reservoirs are built to hold about 600 gallons of water. To assure a water supply of that volume, the size of the collecting apron is determined by local precipitation records. Average rainfall is halved, and the collecting slope is made large enough to fill the tank. For example, if the rainfall is conservatively figured at three inches per year, a surface of 320 square feet will fill the 600-gallon storage reservoir. Despite drought conditions in California during 1948, not a single gallinaceous guzzler went dry. The construction is simple and maintenance costs are inconsequential.

The presence of this water supply has resulted in peak quail populations of several hundred, in places where there were none previously. Not only are larger populations of these sought-after game birds being produced, but they no longer have to travel long distances to obtain water during dry periods.

The economics of these quail oases are on the pleasing side. California has reduced costs in some localities to as low as $200 per installation. Figuring the investment at 5 percent per year, and disregarding any little maintenance, the cash outlay would be worth $10 per year. That would pay for five game-farm birds of dubious ability to survive in the wild. Game men in California figure that a gallinaceous guzzler is far below par if it does not produce 50 quail per year. The imagination and persistence of California game technicians in perfecting this practical quail-population increase device is worthy of the highest commendation. This has been one of the better Pittman-Robertson achievements.

What has been done in starting a large-scale quail restoration program in California, is applicable all over the low-rainfall parts of the West. Arizona, Nevada, and Hawaii are now engaged on identical water-providing projects.

The purchases of western big-game ranges have, in numerous instances, helped the western quail. When these ranges are fenced and cattle grazing reduced, the habitat again becomes attractive to these birds. New Mexico has purchased 15 areas totaling 28,707 acres, primarily for prairie chickens. Welcomed scaled-quail increases have been noted in these newly-fenced areas.

Another outstanding accomplishment in western quail management was the trapping and transplanting of 3,790 wild Gambel's quail in Arizona. Four States have live-trapped and distributed nearly 8,500 of the various species of western quail. Many sites that lacked an effective breeding population were restocked by this program.

Through census studies, Arizona obtained indisputable evidence that the Gambel's quail population was too low to permit a harvest. Acting on this information, the hunting season was closed on this bird in 1946, for the first time in the history of the State, and remained closed during the following two seasons, based on subsequent field investigations.

In New Mexico, technicians have found that avian malaria affects Gambel's quail, but not the other species. The limits of infection in the State have been established through sampling studies. With this knowledge, plus blood examinations on transplant stock, the State now is able to avoid spreading this disease to malaria-free localities.

Ring-necked Pheasant

This exotic has succeeded so well in the northern agricultural regions that it now has surpassed native species in importance in wide sections of the country. The pheasant has received primary benefits from acquisition projects involving 69 areas in 17 States, totaling nearly 84,000 acres. These purchases represent additions to the game management units in Pennsylvania, combination refuges and public shooting grounds in Michigan, Minnesota, and Iowa, and seed stock refuges in Utah, Washington, and Idaho.

Habitat improvement projects ranging from those confined to specific State-owned areas to the cooperative State-wide type on privately-owned lands, have been undertaken from Massachusetts to Washington. A wildlife habitat restoration project covering the Illinois prairie region illustrates a cooperative program for the benefit of farm game species, principally the pheasant. Under this project, small areas on cooperating farms have been fenced, posted and planted to trees, shrubs, and herbaceous plants such as legumes, multiflora rose, grains, and grasses. Modifications of this program are being conducted in Indiana, Nebraska, Minnesota, North Dakota, South Dakota, Wisconsin, Michigan, Ohio, and Pennsylvania.

The Nebraska upland game restoration project, in operation since 1941, benefits pheasants, prairie grouse and quail, primarily, and incidentally aids Hungarian partridge and rabbits. This project, which is State-wide in scope, operates on farms in established soil conservation districts. Acreages improved for wildlife are those that have been designated for such attention by soil conservation planners. The work has included fencing, posting, and planting trees, shrubs, and herbaceous vegetation. Parts of developed farms are set aside as refuges.

An additional feature of the Pennsylvania and Ohio programs is the purchase of strips of hay for nesting cover, standing grain for winter food and the leasing of brushy or weedy patches for winter cover.

Realizing the importance of winter cover for pheasants, South Dakota is establishing windbreaks of sufficient widths to prevent the shelters from being snowed in. Studies of the shelter belts previously created in that State showed that because of the narrow widths, such plantations are veritable death traps for these birds (Figures 19 and 20).

Heavy stocking from game farms is still being done in some States, but studies have shown that most of this is time and money wasted, unless the birds are released immediately ahead of the gun. This latter practice is not restoration, and cannot be approved as a Pittman-Robertson activity. Since the pheasant has already taken hold in those parts of the country suitable for it, there remains only the problem of restocking small areas where birds have been eliminated or where suitable habitat conditions have been developed, but birds have not yet been established. Massachusetts, Maine, Idaho, Utah, Oregon, California, Montana, New York, Pennsylvania, and Michigan, by studying release and band recoveries, have found that most birds taken by hunters on restocked areas are wild-hatched, despite liberal stock-

Figures 19 and 20. Above is a narrow shelterbelt which became a death trap to pheasants seeking shelter from bitter winds and drifting snow. The wide dense windbreak below assures excellent protection to these birds when blizzards invade the northern plains States. Photos by Roy N. Bach, North Dakota Game and Fish Department.

ing of pen-reared birds. In Illinois, for example, only 5 percent of the released birds were later bagged by hunters.

Where there is a genuine need for restocking, the trapping and transplanting of wild birds is by far the best way to solve the problem. Each of these wildwise ringnecks is worth half-a-dozen pen-reared innocents. At the end of the droughty thirties, South Dakota had some blanks in its occupied range in the western part of that State. With normal precipitation, food and cover had returned. To hasten the come-back of the birds, almost 8,500 were trapped on the Sand Lake National Wildlife Refuge during the winter of 1940-41 and released in suitable sites needing such stock. Idaho and Montana have used the South Dakota method in accomplishing pheasant restoration. Each has trapped and transplanted almost 6,000 ringnecks.

Emphasis on the use of wild birds to repopulate vacant or badly depleted ranges is not intended as an indictment against game farms They have their place. Undisturbed grasslands were essential to prairie grouse reproduction. They could not adjust themselves to the closed agricultural pattern and were forced out. The pheasant thrived among crop lands in the old world. Our fine populations of these birds came from imports that were processed through game farms. The results speak for themselves. Nevertheless, wildlife restoration does not mean releasing such stock in the same places over and over again. If habitat is suitable and sound management is applied, repeated replacements of birds is unnecessary. It is significant that South Dakota's spectacular pheasant abundance came from an original stocking of 2,300 birds, purchased from an Illinois game farm. Live-trapping and transplanting of subsequent increases spread the bird over the State. *South Dakota has never owned a game farm.*

Several methods of inventorying pheasants have been developed under the Pittman-Robertson program. The roadside census was the first successful means of estimating populations. Initially, this job was done by technicians and game wardens, but coverage has been greatly expanded by cooperating rural mail carriers. These seasonal counts over representative samples of the pheasant range provide essential information on sex ratios, breeding success, and effect of hunting pressure.

A more recent development in censusing is based on crowing counts of cock pheasants during the breeding season. The population of cock birds can be quite accurately determined by this method. Having previously determined sex ratios from winter observations, the spring breeding population can then be figured by simple arithmetic. The next step is to find out the hatching and rearing success. Roadside brood counts furnish this information. That completes the annual job. The technician can then inform his superior as to whether pheasant populations have gone up or down and recommend hunting seasons and bag limits. These Pittman-Robertson devised inventorying methods are being used wholly or in part in all States where pheasants are being managed. In 1946, for example, the pheasant season in South Dakota was shortened when census data showed the population was too low to withstand the longer hunting period which had formerly been set.

When winters are severe and good cover scant, pheasants flock to protective vegetation to avoid bitter winds and drifting snow. This habit has enabled the game departments in the Dakotas to make aerial censuses. Concentrations of birds are photographed — counting ringnecks is then a routine office job.

Wild Turkey

During the first decade of Pittman-Robertson operations, the wild turkey has staged a good comeback over most of its range. The bird that appeared to be bound for the zoos and museums is now being harvested under carefully managed seasons in at least a dozen States. The concerted efforts to purchase and develop woodlands especially for turkeys have been major bolstering factors in the recovery.

Turkeys are receiving principal benefits from the purchases of 22 areas totaling 172,392 acres in nine States. An outstanding example is the 4,500-acre Salt Springs Sanctuary in Clark County, Alabama. The unit is managed as a refuge for a source of stock for live-trapping and removal to other areas.

Habitat-improvement work has been conducted by 15 States. Outstanding in this respect are Alabama, North Carolina, Texas, Virginia, and West Virginia. The Virginia project provides environmental improvement on national forests in the mountainous portions of the State. The work includes establishment of small clearings which are seeded to grasses, and plantings of supplemental foods. In addition, the forest trails are maintained in grass. Continuous use of these openings by turkeys, has been observed. Turkey habitat improvements have also greatly benefited ruffed grouse and deer. This same pattern of development has been employed by other southeastern States. Texas has entered into agreements with landowners to develop woodlands for deer and turkeys. Approximately 400,000 acres have been placed under management. Lands are improved by fencing, seeding food patches, establishment of clearings, and travel lanes, and supplemental feeding, to hold the transplanted birds at release points until they are acclimated.

With much desirable vacant range available, restocking has been undertaken by nine States. Texas leads in this, having live-trapped and transplanted almost 3,000 wild birds. Transplanting Merriam's turkey in Colorado and Arizona has extended the range of this fine sub-species in those States. Colorado has released 359 and Arizona 248 wild birds. Stocking of game-farm birds also has been undertaken. Virginia released 1,089, Arkansas 400, and Mississippi 156. Subsequent studies showed that trapping and stocking wild birds is by far the superior method. Pen-raised birds invariably have some domestic strain in them and are definitely inferior to wild stock. They are much more susceptible to predation and hunting. West Virginia and Virginia have programs on which game farm hens are placed in fenced enclosures to be mated with wild toms, a restoration system developed in Pennsylvania. This is expensive, but it has yielded very satisfactory results in Pennsylvania.

An Alabama study showed that a pattern of 5- to 10-acre forest clearings amounting to 5 percent of the area, materially increased and brought about wider distribution of the birds (Figure 21). Winter

Figure 21. Wild turkeys using opening that has been cleared and planted to sod producing grasses in Salt Springs Sanctuary. Photo by Robert J. Wheeler, Jr., Alabama Department of Conservation.

cover crops were found more effective in maintaining flocks than summer food plantings. Destruction of foxes and bobcats on Alabama turkey ranges was found undesirable when normal populations of rodents were present. Removing predators swells rodent populations and results in increased competition for turkey foods from rabbits, cotton rats, and other rodents. Grazing by domestic livestock was found to be detrimental on turkey management areas.

It was found that future wild turkey management in West Virginia and western Maryland should include more clearings. Removal of suppressive forest growth permitted the grasses and other herbaceous plants to become established. Predation in West Virginia was of secondary importance as a limiting factor, compared to poaching and overhunting. Man still takes a heavier toll of wild turkeys in Missouri than all natural enemies combined, in spite of a closed season. From 1925 to 1943, more than 14,000 artificially-propagated turkeys were released in Missouri in an effort to increase declining populations. Because results did not justify costs, artificial restocking was abandoned by the Conservation Commission in 1943 in favor of better protection and management of wild native stock.

Ruffed Grouse

Throughout the woodland areas of the northern States, especially where there is a predominance of second-growth hardwoods, the ruffed grouse is the most important game bird. The grouse has been benefited by the acquisition of more than 157,000 acres in 24 areas, by eight States, and by developmental projects conducted by 13 States.

Six States have carried out investigative projects on these birds. Studies have been directed toward determining what forest management practices are best for them. These practices are being carried out wherever practical, particularly in conjunction with measures to help other forest game. Because of their cyclic nature, low populations per acre and the high costs of forest manipulation, intensive management for grouse alone cannot be justified.

Habitat improvements in the form of timber management have been the most logical approach. New York, Connecticut, and New Hampshire have undertaken the establishment of small clearings, the release of food-bearing trees, and the thinning of dense timber stands to allow herbaceous ground cover to become reestablished. Planting clumps of conifers where such species are lacking has provided necessary winter cover. Timber management for deer and turkeys has, in many instances, benefited the ruffed grouse.

Michigan has been concentrating on census and adult-immature age ratios as a means of setting proper seasons and bag limits. Unlike other States, Michigan has an open season on ruffed grouse every year, regardless of the stage of the cycle. Information gathered by that State indicates that the length or time of the hunting season, and the number of hunters has very little effect on the ruffed grouse population.

Connecticut has approached the management of this bird in a different manner. They have been studying the effect of forest clearings on the abundance of ground insect life. Their findings show that the insect populations in cleared areas are about double that in natural forest cover. An ample supply of insects is essential to young grouse during the first few weeks after they are hatched since they require a high protein diet.

Maine has made a study of the forest types preferred for nesting. Now they are in a position to recommend forest management practices that will favor this bird.

Prairie Grouse

Sharp-tailed and pinnated grouse have been helped from acquisitions involving nearly 32,000 acres on 20 areas in four States, and 42 developmental projects in 11 States.

New Mexico has had 11 acquisition projects for prairie chickens under which 18,627 acres of land have been purchased. Twelve developmental projects for improving these lands have been in operation. The work included fencing, planting of trees and shrubs, and plowing fire-breaks. Population surveys were made after the 1948 breeding season. Favorable findings encouraged the State to declare the first open season since 1934. New Mexico sportsmen had a most satisfactory hunt with an ample supply of birds being left for future production. The results of the hunting are conclusive proof of the benefits of these restoration activities.

A study of old burns in relation to sharp-tailed grouse abundance in Michigan led technicians to try experimental burning to hold back forest invasion and encourage creation and retention of shrubby and open areas so necessary to this bird.

Studies in at least eight States have been conducted on these two

grouse species. Through these efforts much has been learned about the factors affecting them. Better census techniques have made it possible to measure the results of management practices.

Sage Grouse

Although the sage grouse is now a species of minor importance, restoration efforts by eight western States have been beneficial. Acquisitions for antelope and prairie chickens, as well as some purchases primarily for this species of grouse, have made more range available. Restoration measures include fencing, development of watering sites, range revegetation and restocking. Wyoming has trapped and transplanted nearly 2,100 of these birds, and Montana 245.

Colorado, Montana, Oregon, Wyoming, and the Dakotas have conducted studies to determine distribution and abundance of sage hens as first steps toward better management. Oregon found that ravens are the most important predators on grouse eggs. On two similar study areas, one with ravens controlled and the other with no control, the effect of raven predation was startling. On the raven-controlled area, the nesting success was 51.2 percent; on the one where ravens were uncontrolled, only 5.5 percent of the nests were successful.

Hungarian Partridge

The Hungarian partridge, an exotic of less importance and with a more restricted range than the ring-necked pheasant, is a valuable game bird in portions of the northern plains States and the Northwest. This species has shared in benefits from developments for other upland game within its range. Hungarian partridges are essentially birds of the open country. Lands supporting the highest population in North America can be generally described as open prairie type where small grain farming predominates. Where this type borders wooded areas, the birds are moderately successful in the outer fringe. Traveling east from the western prairies into the wooded sections of Minnesota, for example, one finds Hungarian partridge fairly common where woods occupy about 25 percent of the total area. The birds become scarce to absent when 50 percent or more of the land is timbered. The birds like well-sodded, natural grass for nesting, and few of the "Hun" nests are found in cultivated fields.

Heavy precipitation during the critical reproduction period is probably the principal factor limiting Hungarian partridge increases. Prolonged rains cause heavy nest losses. Chilling and mudballing on beaks and feet of young chicks are responsible for substantial brood losses during cold, wet weather. Parasitism by a nematode worm may result in tremendous die-offs among young birds under conditions caused by heavy rainfall.

In Minnesota it was found that the Hungarian partridge nesting season extends over an 8-weeks' period, with over 90 percent of the nests begun during a period of six weeks. Although the average clutch size was quite high (14.7 eggs), the Hungarian partridge is much less successful at renesting than is the ring-necked pheasant. The nesting season of the Hungarian partridge (eight weeks) as compared with the ring-necked pheasant (15 weeks) makes the former far more vulnerable to the effects of cold, wet nesting seasons.

Pheasants often lay eggs in Hungarian partridge nests in regions where both species are common and especially when nesting cover is scarce. In one such area in Minnesota, those antics caused the abandonment and subsequent loss of 60 percent of all Hungarian partridge nests under observation.

The American method of hunting discriminates against the young, slower-flying birds and allows a large proportion of old birds to escape. The result is vigorous fighting among adult males in an attempt to defend large nesting territories (which in Minnesota had an average radius of 300 yards) and the production of fewer birds per unit area. In England where high populations of this bird are maintained through intensive management, every effort is made to shoot old birds to reduce fighting among nesting pairs, thus increasing nesting density and production. The obvious solution to this situation would be to educate the hunters and establish game regulations which would concentrate hunting pressure on the older birds.

Through stocking programs, temporary population build-ups have been obtained in Pennsylvania, Ohio, Michigan, and Minnesota. In these cases the increases were of short duration and subsequent attempts to reestablish the birds have failed. For example, Pennsylvania found an 80 percent decrease in one year's time of a population formerly numerous enough to justify a hunting season. In Michigan the planted birds had a tendency to spread out over wide areas as though trying to find suitable living quarters — instances of movements of 5 to 9 miles within a few months were recorded.

Idaho leads in live-trapping and transplanting of this species, having moved 924 birds to suitable but vacant habitat in the southeastern and central parts of the State. The partridge has received important assistance from seven projects in four States.

Chukar Partridge

Nevada trapped and transplanted 926 wild Chukar partridges in 1947, on its first Pittman-Robertson project. Short hunting seasons were permitted in that State in 1947 and 1948. Both actions were outstanding, considering the many failures in the past 25 years to get this exotic established elsewhere in the United States. Spectacular increases in the population of these feathered Orientals have shown up in a 100-mile stretch of country running north from Yakima, Washington. Chukars are holding their own in the Owens Valley and Mojave Desert of southern California, and are showing encouraging signs of boosting reproduction into high gear 800 miles away, in northeastern California. Wild coveys, from prior plantings of pen-reared birds, have been located in Arizona and some other western States.

The Chukar partridge has finally scratched out a real toe-hold in America. But the variety we have here — one of 22 of a single species with a natural range extending from Mongolia to the Atlantic, in Asia, Europe and North Africa — is adapted to low-rainfall country with plenty of steep rocky slopes.

Doves

Mourning doves, white-winged doves, and band-tailed pigeons have all been subjects of Federal Aid projects.

Mourning doves have been studied in a number of the southeastern States where they are an important game species. Because of their migratory nature and more or less solitary habits, it is impractical to carry out development work primarily for them. However, they are benefiting from other developments, such as farm ponds, farm game habitat restoration, and refuge areas. In Missouri, for example, a decided increase of doves was observed around farm ponds.

White-winged doves have been studied extensively in the southern sections of Arizona and Texas. Land acquisitions and subsequent management in southwest Arizona are contributing to habitat stability by protecting the birds from fires and clearing operations. Texas' white-wings are suffering from land clearing activities and studies have shown that one of the best immediate management aids would be the acquisition of suitable nesting areas along the lower Rio Grande river bottoms.

Nest predation by grackles in Texas is very serious and it alone is cutting breeding success in half. Control techniques are being studied in the hopes of reducing these losses.

Band-tailed pigeons are being studied in Colorado where the populations have dropped sharply in recent years.

Clapper Rail

The clapper rail or marsh hen has received little attention in the past. Georgia is now making a detailed study of its habits and requirements. Indications are that considerable can be done for these birds through habitat improvement and proper protection. New Jersey has made some valuable observations on this species in the tidal marshes of that State.

Woodcock

The woodcock is another species that needs further management study. Massachusetts is the only State that has carried on Pittman-Robertson work with this species. However, it has received considerable study in other States independent of the Federal Aid program.

Acquisitions for waterfowl and deer have, in many instances, provided excellent nesting habitat for the "timber doodle."

Cottontail Rabbit

The cottontail, being a farm game species of outstanding importance in most of the eastern United States, has been helped by many habitat restoration projects. Almost without exception, this work has benefited pheasants or quail as well as rabbits. Such improvements as fencing, planting trees and shrubs, and seeding herbaceous plants on small isolated or eroded parts of farms have contributed food and housing for cottontails. The establishment of multiflora rose hedgerows and the seeding of lespedeza field borders have made habitable otherwise barren sites. Thirty-two states are engaged in habitat restoration in cooperation with soil conservation districts, landowners, and other conservation agencies. Indiana has established more than 1,200 wildlife production units which also provide badly needed seed stock refuges in that heavily hunted State. Recent investigations of these leased and improved game sanctuaries revealed that nearly 90

percent of them were getting heavy use from cottontails and other farm game species (Figures 22 a and b).

Maryland, Michigan, Ohio, and Pennsylvania have invested Pittman-Robertson funds in many land purchase projects for the creation of refuges and management areas. Frequently, these purchases consisted of abandoned or submarginal farms. Once in State ownership, the lands were given developmental and management treatment. Woody cover plantings, herbaceous seedlings and the application of good soil conservation farm plans have produced gratifying results. For example, the Oldaker Wildlife Management Area in Ohio was purchased and then developed by tree, shrub and lespedeza plantings. A soil building and conserving crop rotation, combined with liming and fertilizing, was applied to the croplands. Recent investigations revealed three cottontails per acre. On this same area, squirrels increased to five per acre, and the summer nesting population of bobwhites was one bird to five acres.

Ohio, New Jersey, New York, Missouri, Michigan, and Pennsylvania have conducted field investigations to find out how to better manage their cottontails. Through hunter checks, Ohio learned the relative importance of the cottontails in the State as a whole, and in which parts they were most important. From data obtained in 1946 compared with similar figures for 1932 and 1933, it was found that the hunter success ratio had taken a big drop—6.6 rabbits were bagged per hunter in 1946, as compared to 13.4 and 11.9 for 1932 and 1933 respectively. These figures reflected the dual influence of shrinking habitat and increased hunting pressure.

Missouri is annually supplying approximately one million cottontails to the meat trade and transplanting stock to eastern States. This does not include local sportsman kill which runs into the millions. To keep their fingers on the pulse of this valuable resource, Pittman-Robertson investigators are assigned the task of inventorying rabbit populations periodically and keeping records of the enormous harvest. With such information on tap, the State Conservation Department is in a position to properly manage this resource without endangering high productivity in the future.

Research findings disclosed that in the west-central and southwestern parts of Missouri, where great numbers of rabbits are killed by hunters for sport or handled commercially, the cottontail populations have been maintained at high levels only because the carrying capacity of the lands permitted it. This has been due largely to the efforts of landowners. Cottontails are one of their cash crops. Interviews with 512 farmer-trappers in Central Missouri disclosed that they were maintaining cover conditions to encourage the production of rabbits. The medium-fertile soils of the west-central and southwestern parts of the State provide the best rabbit range. Northern Missouri is generally low in cottontail density because land-use changes have eliminated much of the formerly abundant food and cover.

High populations of rabbits can be maintained by wise land management. In Missouri it has been found that large numbers of them serve as an important buffer, aiding materially in the reduction of predator damage to poultry. For this reason many farmers are in-

Figures 22a and b. The above pasture was virtually a wildlife desert in 1941, due to intensive grazing. It was fenced in 1941, protected from livestock and planted to trees, shrubs and herbaceous cover. Within a year quail, pheasants, rabbits, raccoons, and squirrels were observed utilizing the area. Below is a view of the same area taken in 1948. It is now a fine haven for wildlife. Photos by H. P. Cottingham, Indiana Conservation Department.

terested in the encouragement of the cottontail. Recommended rabbit management practices in Missouri, to produce sustained yields of cottontails, consist of piling brushy cover in eroding draws, preventing overgrazing, planting of food and cover in spots where it is needed, and refraining from cutting or burning cover where its presence does not interfere with farming.

New York is one of the customers for Missouri cottontails. These imports are being used to repopulate depleted ranges. Pittman-Robertson field men are studying some of these releases to learn whether they are actually producing results commensurate with the costs involved. The final results of this study will help mold future rabbit stocking policies in the Empire State.

The decline of introduced cottontails was studied on an island in New York. Lacking ground predators, the rabbit population skyrocketed. Attempts to reduce them by shooting and the payment of bounties were unsuccessful. Following moderate reduction by winter starvation, considerable mortality accompanied by tick infestation occurred. Technicians determined that losses resulted from tick-induced anemia or bacterial infections. Additional losses among juvenile rabbits occurred when they were abandoned by sick or dying parental females.

Restocking cottontails during a 30-year period in Pennsylvania did not produce larger shooting populations. The main reason for the failure was that habitat conditions in the State could not support larger numbers than were already present. To increase rabbit populations it is necessary to manipulate the land in much the same manner as a farmer does to produce greater yields of tillable crops. Stocking lands beyond their carrying capacity is a waste of time and money.

Mortality studies in Pennsylvania revealed that about 20 percent of each year's young survived until the fall hunting season. The lack of summer cover that could effectively protect juvenile cottontails from predators and inclement weather were the chief causes for this heavy loss. Lack of adequate supplies of winter foods were found to limit populations in some areas when snow was deep. The woodchuck, once considered a nuisance, is now welcomed in cottontail country because the rabbits use woodchuck burrows extensively for escape cover.

Squirrels

The gray and fox squirrels lure millions of hunters afield each fall. In fact, these arboreal mammals rank second only to the cottontail rabbit in total numbers harvested during the open seasons. While few Pittman-Robertson projects have been undertaken exclusively for squirrels, many have contributed major benefits.

The acquisition of woodlands in Michigan, Pennsylvania, Ohio, West Virginia, and Tennessee have assured living quarters for these scurrying woods dwellers. Maryland acquired the LeCompte Wildlife Demonstration area primarily for the Bryant fox squirrel. The 4,500-acre Gratiot-Saginaw purchase unit in Michigan aids fox squirrels as well as other farm game species. This project area is one of 15 being

acquired in southern Michigan for farm game. These wildlife units are managed as combination refuges and public hunting grounds. Also serving as demonstration areas, included croplands are farmed according to plans that incorporate wildlife benefits. Developmental activities include transplanting of trees and shrubs, establishment of herbaceous cover, erection of nest and den boxes, and removal of unnecessary fences.

Farm game habitat projects in Ohio, Indiana, Maryland, and Pennsylvania have benefited squirrels by closing woodlots to pasturing, erection of nesting boxes, planting of corn, and the establishment of refuges.

Arizona has done most of the trapping and transplanting, having moved 543 Abert squirrels to vacant but suitable forested lands.

Squirrel studies in several states have been very important in pointing the way to better management. For example, Michigan found that the mast supply is the key to squirrel productivity the following year and forecasts of future abundance can be made on this basis. Mixed stands of timber, especially the various mast producers, are much better than pure stands of one species because they act as an insurance against crop failures. Scabies mite, one of the worst squirrel killers, was found to be at its peak in late winter when food was in short supply or at any time when the animals are in low physical condition. It rarely became serious during years of food abundance. In making bag checks it was found that an excellent breeding season resulted in about two-thirds of the kill being young squirrels. Under poor breeding conditions young animals taken dropped to as low as 25 percent.

Studies in Indiana, Illinois, and Michigan have shown that squirrel hunting seasons during the late summer months are not good management. While the quality of the meat was excellent because of the high percentage of young animals taken, the number of pregnant and lactating females killed, together with the loss of nursing young in the nests, greatly reduced production the following year. Open seasons commencing not earlier than September have been recommended in these states.

Varying Hare

The varying hare, or snowshoe rabbit, furnishes considerable hunting in the northeastern and north central states. Although no restoration work has been undertaken primarily for this species, land purchases and timber stand improvements within their range have brought about better living conditions for the hare.

In Pennsylvania, surveys showed that varying hares were present in sufficient numbers to afford good hunting on State Game Lands. Although Federal Aid personnel have determined that the hare has been all but annihilated in one area in Vermont, the population for the State, as a whole, is at present sufficiently large to permit hunting. Studies in the propagation, habits, and cover preferences of the varying hare have been conducted in New Hampshire to learn what types of forest manipulation to recommend.

Reconnaissance surveys have been made in New York to determine

the relative abundance and extent of the hare population in that State, and 139 potential release areas have been located, surveyed, and classified according to known habitat requirements. Some investigations of the breeding habits of the hares have been carried on at New York's Delmar Game Farm. However, attempts by the State to raise these animals on their game farms in sufficient numbers for release purposes have not been successful. Areas to be supplied with hares with a view to re-establishing the animal in the various sections of the State must, at present, be stocked by live-trapping and releasing native wild animals.

Studies of various liberation techniques and how to identify released hares were made in New York. The most satisfactory method for learning the results of restocking has been the clipping or tying off of the end joint of one toe on the hind foot of these animals which results in a track clearly distinguishable from the normal. Studies made on Valcour Island, New York, during 1946 showed a marked decline in the hare population. Diseases and parasites of this species are being investigated. From previous field and pathological work conducted in 1943-44 it has been concluded that the range on Valcour Island was heavily seeded with hare lungworms and that juvenile hares were picking up infestations at an early age. Further studies are being made to determine the extent to which these lungworms may reduce hare populations.

Raccoon

The raccoon interests two groups: the dyed-in-the-wool 'coon hunters who enjoy the chase with hounds, and the trapper who is out to make some extra cash by pelting the animals. In recent years the demand for raccoon fur has not been sufficient to encourage any appreciable interest in trapping. In many cases this has resulted in population build-ups and growing complaints of crop damage and predation.

In marsh areas these sly ringtails often do considerable damage to muskrats. Louisiana, for example, reported raccoons following trap lines and damaging as many as 20 percent of the 'rats. Pelts on half the carcasses were so torn up as to make them worthless and the remainder brought only 15-20 cents each. Thus, a $1.00 raccoon may damage $4.00 to $6.00 worth of muskrats in one night. Similar losses were reported from Texas marshes adjoining levees or areas supporting heavy raccoon populations.

In Michigan it was found that the essentials of an optimum raccoon range were a permanent water supply, tree dens, and food. Artificial feeding was not advised, though corn might be of value when mast crops fail. Raccoons apparently prefer to den in flood-plain situations and it is there that the first management efforts should be stressed. Where tree cutting can be controlled, investigators recommended that at least one and possibly two den trees per 15 to 20 acres be left standing, plus about two or three times that many potential denning sites. Michigan also experimented with den boxes in places where tree dens were in short supply. During a 10-month period, 10 out of 25 of these den boxes were used by raccoons.

The closure of one study area in Michigan appeared responsible for

a 17 percent increase in raccoons in one year. However, sanctuaries were not considered generally necessary in the State, except to give low populations in depleted areas a chance to build up. Artificial propagation has been found to be an ineffective and economically unsound way to increase raccoon numbers. While released animals furnished local hunters more game the fall after liberation, they apparently contributed no increase in the following year. Complete protection of raccoons in Michigan for two years seemed to have little effect on the kill in subsequent years. It was concluded that closed seasons were neither necessary for maintaining raccoon numbers nor expedient if the best use is to be made of the fur resource. Track observations during the winter breeding season were found to be the most practical method of inventorying populations.

Destruction of habitat by lumbering and other causes have resulted in a decreased raccoon population in Missouri. A limited open season which included the use of tags for marking pelts when sold was recommended for raccoon management.

No land purchases have been made primarily for racooon. However, the purchase of woodlands and run-down farms in the eastern States has helped them. Food plots of corn and chufa, seeded for turkeys and deer, are also beneficial for raccoons.

To rehabilitate some of the depleted ranges, six States (Arkansas, Alabama, Georgia, Kentucky, Oklahoma, and Texas) have live-trapped and transplanted 1,213 of these animals. Texas leads in this activity with 420 and Oklahoma is a close second with 311. In addition, Texas has supplied trapped stock to other States.

Muskrat

The muskrat is our most valuable fur animal. American trappers harvest an average of 18 to 20 million pelts annually which they sell for 30 to 40 million dollars. Returns from no other fur species remotely approach that amount of cash.

Muskrats are a fine example of how investments for one kind of wildlife help another. The creation of marshlands for waterfowl provides first-class living quarters for these valuable rodents. Horicon Marsh, Wisconsin, is a good illustration. During the 1947-48 trapping season, the Wisconsin Conservation Department collected $15,000 from muskrat pelts. This represented the State's half of the season's catch. That incidental income is helping pay for the restoration and management of that splendid waterfowl marsh. More than 70 marshes in 25 States, purchased and developed for ducks, are helping swell muskrat production.

The muskrat is no duck-marsh parasite; on the contrary, it is often a prime asset. Cattails produce no food for waterfowl and thick-growing stands crowd out valuable food plants. But these otherwise undesirable marsh plants provide excellent muskrat food. Maintaining proper muskrat populations solves the problem because these potenial fur coats create openings and travel lanes. The market for the pelts is always high enough to attract trappers so the only problem is to maintain enough of these surly vegetarians to keep unwanted vegetation in check. Even the muskrat house lends a helping hand by providing a frequently-used waterfowl nesting site (Figure 23).

There has been some live-trapping and transplanting done with Pittman-Robertson funds. Arkansas and Mississippi have been the principal States performing this work. Each has stocked about 300 animals.

Illinois conducted a study in drainage districts to find out how grazing affected muskrat production along ditches. It was learned that returns from ditches with ungrazed banks totaled $143 per mile; where the banks were grazed, only $42 per mile was realized. These findings were then used to sell landowners on keeping livestock off these slopes. Well-vegetated ditch banks prevent soil erosion and provide top-notch nesting and escape cover as well as travel lanes for farmland wildlife on lands where these essentials are badly needed (Figure 24).

Louisiana's four million acres of coastal marshes produce from five to six million muskrat pelts per year. They also winter a large part of the continental supply of waterfowl. Pittman-Robertson studies have disclosed that the fur harvest is only about 50 percent of what it should be. Under-trapping results in excess numbers that consume all vegetation on large scopes of marshlands and greatly reduce the muskrat and waterfowl carrying capacity on those vital Gulf Coast marshes (Figure 25). By applying the management recommendations that have come out of the study, larger fur crops can be taken and the winter quarters of ducks and geese will house and feed greater numbers of birds.

Figure 23. Muskrat house in Ogden Bay project furnishes fine nesting site for Canada goose. Photo by Lee Kay, Utah Fish and Game Commission.

Figure 24. Ungrazed Illinois ditch banks bordered by intensively cultivated lands provide essential cover for upland game and boost production of fur animals. Photo by Illinois Department of Conservation.

Muskrat-population inventories are commonly made on Pittman-Robertson projects to provide the States with information to set sound trapping seasons. Airplanes are now being used to considerable extent in making house counts from which resident populations can be quickly and accurately figured.

Beaver

Work on this valuable fur animal has been performed by 27 States. While none of the land purchases and habitat developments have been undertaken primarily for beaver, many areas purchased include sites where they will thrive.

To spread populations, 17 States have live-trapped and transplanted 8,470 beaver. Idaho tops the list, having moved almost 3,000 of them back to streams where their forebearers were once abundant. In the West, planting stock usually comes from animals that have invaded agricultural country. They plug up irrigation ditches, cut down valuable fruit and shade trees and make a general nuisance of themselves.

In addition to the well-known value of their pelts, properly located and managed beaver are conservation assets of high value. Rechecks of previous transplants in Montana, for example, revealed that they are making major contributions to wildlife values and watershed sta-

Figure 25. Overpopulations of muskrats in Gulf Coast marshes cause "eatouts" and ruin lands for waterfowl and furbearers until vegetation is re-established by natural or artificial means. Photo by Ted O'Neil, Louisiana Department of Wildlife and Fisheries.

bility. Downstream residents of creeks on which beavers were planted report that the streams now flow the entire year, as compared to intermittent flows prior to reintroduction of these furry hydraulic engineers. Silt loads of the streams have been reduced; birds, fishes, big

game, and domestic livestock profit from the impounded waters and increased grass and browse growth (Figure 26).

Much of the potential beaver country in the West is inaccessible except by tedious pack-horse trips. Long, jolting and dusty rides in crates lashed onto pack animals is rough on these flattails. To solve the problem of getting them to selected release sites in the roadless back country, Idaho has devised a unique method of parachuting beaver. A cargo 'chute is used, with a carrying box attached. The box remains shut under the tension of the parachute but opens like a suitcase when the 'chute collapses on the ground. The landing gear is retrieved later. This distribution method has proved to be much less expensive and time consuming than packing in these dam builders, and the beavers arrive at their new homes in excellent condition.

Beaver-timber relationships were investigated in Minnesota. This led to a special trapping season to reduce populations and curb the flooding of valuable timber. Nebraska conducted a beaver survey on a tributary of the Loup River, and 75 percent of the landowners contacted reported damage from these king-sized rodents. State-wide inventories in Vermont and West Virginia disclosed that open seasons for harvesting beaver were needed in some places. Two trapping seasons on beaver in West Virgina have been permitted, based on Pittman-Robertson studies. The objective is to manage these valuable fur animals on a sustained yield basis.

North Dakota, Minnesota, and Maine have been inventorying their beaver by airplane to learn whether and to what extent trapping should be permitted. In Maine and Minnesota, ground and canoe cruises supplemented the aerial surveys.

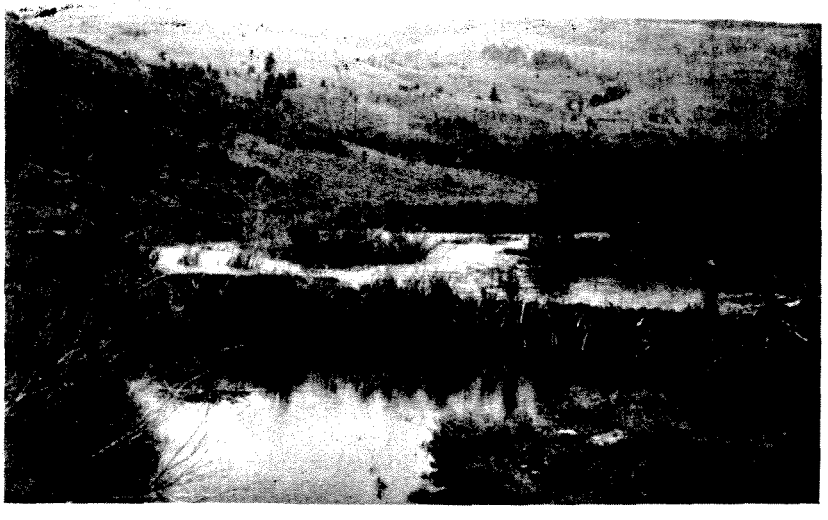


Figure 26. Water conservation is an important by-product of beaver management in low rainfall parts of the West. Photo by California Fish and Game Commission.

Marten

The marten, once abundant throughout the wooded sections of northern United States, has declined so that at present only a few of the northern Rocky Mountain and Pacific Coast States harbor trappable populations. The high value of their pelts, together with the ease with which they can be trapped, are the chief causes for the decline in numbers.

Montana live-trapped and moved 12 marten to suitable but vacant ranges. The animals handled well and wasted no time upon being released in starting on a hunt for food. Surveys of marten abundance in Idaho have shown that they are numerous enough in some sections so that live-trapping and transplanting can be undertaken. A project to accomplish this redistribution is in progress.

Data concerning habitat preferences, home range, cruising radii, and habits of the marten, were obtained by tracking them in Montana. Red squirrels, flying squirrels, mice and snowshoe hares were found to be the most important prey. Management, through the issuance of unit-trapping allotments, has been recommended.

Predators

Furred and feathered predators are often blamed for practically all of the ills that plague game birds and mammals. The destructive inroads by man on these wildlife species is less evident and all too frequently overlooked entirely.

Many sportsmen believe that they will enjoy game abundance if the winged and mammalian predators are exterminated. But predator control has all too often been ineffective in increasing favored wildlife in places where an adequate breeding stock is already present. Deficiencies in food, cover, or water were the main obstacles. Predation, however, can be a major limiting factor on ranges where numbers are low, even though living conditions are favorable. For example, fine increases in antelope followed coyote control in Texas, Oregon, and Arizona. Along the same line, field investigations show that released game farm birds are highly vulnerable to predation. Local control of their killers is often badly needed where game departments are investing heavily in attempts to restock vacant territories. On the other hand, North Dakota had a record high pheasant population in 1944 and the same applied to foxes. Farmers were clamoring for fox control because they were losing a lot of domestic poultry, but the wily ringnecks were quite capable of taking care of themselves.

Many Pittman-Robertson investigation projects have dealt in part with the problem of predation. This nation-wide digging has turned up much information of high value to game administrators. Typical examples of the many findings are related below.

Critical winter conditions characterized by unusual snow depths in the Blackfoot River watershed, Montana, forced big game animals to concentrate on small, restricted areas. Predation on white-tailed deer by coyotes was very heavy. During a 1942-43 survey in this area, 49 coyotes were seen and the remains of 143 white-tails, presumably killed by coyotes, were found. Deep snows in New York have been accompanied by heavy predation on white-tailed deer by free-ranging dogs.

Coyote predation has been a definite factor in impeding the increase of antelope in Arizona and Texas. Removing a large number of bobcats and coyotes was promptly followed by a higher fawn survival among mule deer on an area in southern Arizona. The contents of 120 coyote stomachs taken and analyzed in Nebraska contained cottontail rabbit, 39 percent; jackrabbit, 26 percent; and pheasant, 2 percent. The remaining 33 percent was made up of poultry and domestic livestock.

Experiments in the control of wolves in Alaska are being conducted. Poisoned fish meal and seal blubber are combined in 4-pound cellophane bags and dropped from airplanes onto frozen lakes. Baits distributed in this manner minimize the danger to valuable furbearers which might otherwise be accidentally killed. Dropped from 500 feet, the bags break, scattering the meal and baits in a circle. From 200 feet the drops scatter the meal in a narrow swath. These baits disappear with the break-up of ice in the spring. This control method promises to be a major aid in controlling wolves which have been levying so heavily on Alaska's big game animals.

Avian predators of valley quail were studied in California. Barn owls were not found to be a limiting element. Food habits of nesting marsh hawks presented quite a different picture, however, as 20 of 85 items taken by these birds were quail chicks. As might be expected, Cooper's hawks were worse offenders. To get the facts, California technicians enclosed nests of these hawks with mesh wire to prevent parent birds from feeding their young. Of 67 items abandoned outside the wire, 43 were birds and 21 of these were valley quail.

Observations to determine the degree of magpie predation on ringnecked pheasant nests were made in Montana. During the time when magpies are feeding their young, they were found to prey on pheasant nests located within a quarter mile radius of the magpie nesting sites. This depredation was considered serious enough to justify magpie control in pheasant nesting areas. It was found that the range where the magpie is most abundant corresponds almost exactly with the pheasant range in Montana. A survey of 38 counties showed 23 to be carrying out magpie control and six others planning such programs.

Investigations in Texas revealed that great-tailed grackles and green jays were the chief predators of white-winged dove eggs and young, with the grackle doing the most damage because of its abundance. Methods of control are being studied, but little success has been obtained to date. Red-tailed hawks, barred owls, and stray dogs were the most common predators on fox squirrels in a Michigan study area. Ravens were found to be the principal predators on sage grouse nests on two study areas in eastern Oregon. Seventy-five percent of the nests under observation were destroyed by ravens. From the number of broken eggs recovered in the vicinity of woodlots, it was learned that crows preyed heavily on pheasant nests near wooded areas in Michigan.

Failure of winter cover due to summer drought was responsible for heavy predation by hawks and owls on bobwhites in Texas. The quail lacked adequate vegetative protection. Losses to these winged predators were unusually large because rodents, particularly cotton rats,

went underground, thereby making them less available as a buffer prey species.

Oregon has made intensive studies of predation on released, pen-reared pheasants on several study areas. On McGuire Island in the Columbia River, 87 mortalities were found from a stocking of 238 birds. Indicated predators were: hawks, 59 percent; owls, 6 percent; house cats, 11 percent; dogs, 7 percent; and others, 4 percent. Total known losses of 36 percent occurred during a two-month period following release.

Mississippi studied quail-predator relationships on its Leaf River and Cole Refuges. A portion of each area was maintained as a check, and predator control was practiced on the second unit. A study of the stomach contents, droppings and den contents of gray and red foxes showed that no game birds had been taken by gray foxes and that but one quail had been taken by a red fox.

Studies of red and gray fox food habits in Massachusetts showed that these animals were not important as pheasant predators; rabbits and field mice were the important foods taken. Studies in Ohio disclosed that the gray fox does not prey heavily on ruffed grouse, but feeds primarily on cottontail rabbits and several species of mice. Foxes were found to feed largely on cottontails in a food habits survey in Maryland. The major predator on mature, nesting pheasants in New Hampshire was the fox, while feral house cats and automobiles played leading roles in the destruction of young birds.

A study of winter food habits in Indiana revealed that rabbits and mice are the staple food of the red fox in that State, and game birds occurred in only 21 of 211 stomachs examined. Increases in fox populations during 1943, 1944, and 1945 stimulated sportsmen's interest in fox drives. As a predator control method, driving was found to be inefficient and ineffective. A quail study in Tennessee showed predation on quail by foxes as exceptionally low. In Illinois it was found that mammalian predators can become highly destructive during spring floods. Heavy predation occurred on pheasants and rabbits as predators, principally red foxes, were forced to the high dikes. Buffer species, such as mice and shrews, were drowned by the high water and thus did not relieve the pressure on concentrations of game species caused by high water.

In Alabama, the wild cat, gray fox, opossum, skunks, and birds of prey were found to benefit wild turkeys indirectly by controlling densities of rabbits, squirrels, cotton rats, meadow mice, and other small mammals. All of these rodents compete to some extent with turkeys for food. Establishment of winter food patches for turkeys proved extremely difficult after predator removal because of increased rodent competition. In North Carolina, cotton rats destroyed 11 percent of the quail nests under observation.

A collection of 99 mink droppings in Iowa was analyzed. Muskrat remains were found in 20. Mink predation on muskrats increased with the advent of low temperatures and ice in December. Field observations in northeastern California and Ohio indicated that mink were important predators and a limiting factor on muskrat production.

Waterfowl nesting and management studies on three state refuges in Minnesota showed the skunk to be the most important predator.

This animal was responsible for one-fourth of all nests destroyed. Utah found it necessary to control skunks which were destroying duck nests on the highly productive Ogden Bay waterfowl project.

Stomach content examination of 46 wild ranging house cats in Missouri showed that 65 percent of their food consisted of table scraps; game and passerine birds comprised less than 20 percent of their diet.

Weighing the evidence collected by many wildlife trouble-shooters adds up to this: predators are neither all black nor all white. Sometimes the good they do in removing non-game competitors for available wildlife foods offsets the harm done in grabbing game species whenever the opportunity presents itself. Then, too, even though the evil is not outweighed by some compensating good, the high costs of liquidating predators may call for their being tolerated because the cash outlays for getting rid of them would be excessive. The real need for predator control should be based upon careful field investigations, followed by a weighing of costs of that action against probable game population increases.

Two methods are commonly used to control predators: paid hunters and trappers, or payment of bounties. Each has ardent supporters.

Minnesota conducted an investigation on the merits of bounty payments in fox control. A study of such claims for one year disclosed that nearly two-thirds of the red and four-fifths of the gray foxes were taken during the prime-fur period, and no doubt represented animals caught primarily for fur. Only 158 more foxes were presented for bounty payment than would have been trapped for fur.

Because much of the criticism levelled at foxes in Minnesota was based upon their supposed killing of pheasants, a study was made of the number of bounty payments on foxes taken from good ring-neck range. It was found in 1944 that only 36 percent of the red and 7 percent of the gray foxes bountied came from the better pheasant territory. Minnesota concluded that the bounty system as a means for reducing fox populations was both costly and ineffective. An educational program to encourage more hunting and trapping of foxes for sport and fur seemed to be a better way to solve the problem.

Further light on this controversial subject will come from studies now under way in Michigan, Pennsylvania, and Wisconsin. None of these has progressed to the point where conclusive findings are available. Bounty payments to swell interest in the reduction of predators have been tried in many States, generally with mediocre results. At an earlier date, Michigan investigators (non Pittman-Robertson) concluded that a low bounty payment did not offer enough incentive to reduce predatory species, while high rewards invited dishonesty and fraud.

CONTRIBUTIONS OF TECHNICALLY-TRAINED PERSONNEL

This is a specialized fast-moving age. Expert guidance is needed if the wildlife business is to produce fair dividends annually for more than 12,000,000 license-purchasing stockholders. When the Pittman-Robertson program was inaugurated, few States had a single technically-trained wildlife employee on their staffs. This was not due to

lack of desire but usually to the lack of money to finance such employment.

It was fortunate indeed that a few years prior to the launching of the Pittman-Robertson program, ten cooperative wildlife research units had been established at land-grant colleges. These units, financed jointly by the Fish and Wildlife Service, State game departments, the Wildlife Management Institute, and the colleges themselves, were designed to train men to manage wildlife, and to ferret out wildlife facts. Graduates from these educational institutions provided the States with a source of technically-trained wildlife workers. Similar teaching in numerous other colleges and universities over the country swelled the volume of trained men.

Employment of these college-trained men and the fine work done by them has resulted in an astounding improvement in the conduct of management and restoration work in the States. Declared seasons and bag limits are no longer guesswork. Such determinations are now based on the field studies and recommendations of technically-trained and experienced workers. Whether it be the merits of stocking pen-reared game birds; appraisal of wildlife increases resulting from various types of habitat improvement work; the carrying capacity of big-game ranges and what the shootable surplus of wildlife should be during the year in question, the wildlife technician can supply his superiors with the answers. The time has passed when it is necessary to sell State game administrators on the importance of hiring trained and experienced workers. In recent years there has been a marked shortage of them for the various lines of investigations and restoration operations. Seven former Pittman-Robertson workers have become heads of State game departments. Almost 400 technically-trained wildlife employees are working on State Pittman-Robertson operations. In addition, many others who started on this phase of State work have been transferred to responsible administrative positions where their technical training and demonstrated flair for administration makes them exceptionally valuable to their employers. These experienced career employees are a startling contrast to the former birds of passage who lit and left with each political shakeup.

PUBLICATIONS

More than 860 books, bulletins and articles have been published about the results of Pittman-Robertson investigations and other program activities. These publications are a vital part of the latest information on wildlife management. Wide dissemination of this material has acquainted game administrators, field workers and interested sportsmen with what can be done to improve management and how to go about it. The availability of these printed accounts helps the States to steer clear of faulty restoration actions and the wasteful duplication of studies previously made by other States.

In addition to these State publications, the Fish and Wildlife Service has issued eight volumes consisting of 32 issues of the Pittman-Robertson Quarterly. This periodical contains brief abstracts of current research, development and land acquisition reports. It is distributed to project personnel and other wildlife workers throughout the

country. This has provided a most effective means for keeping field workers, who are often far removed from library facilities, currently informed on what is being accomplished by other technicians.

COOPERATION BETWEEN THE STATES AND FEDERAL AGENCIES

The Pittman-Robertson program has been a major influence in generating a high degree of profitable cooperation among the States. Wildlife does not recognize State boundaries. The restoration and management problems of one State are common to others.

Waterfowl, for example, make seasonal flights up and down their respective flyways. The Pacific Coast States—Washington, Oregon, and California—have teamed up with British Columbia on a broad-scale waterfowl investigation. They want to know the amount of production within their borders, and how they can increase it. They need more information about season migrations and annual harvests. In short, the participants are working to assemble the facts of waterfowl life for their sportsmen and to help administrators do a better job of restoration and management.

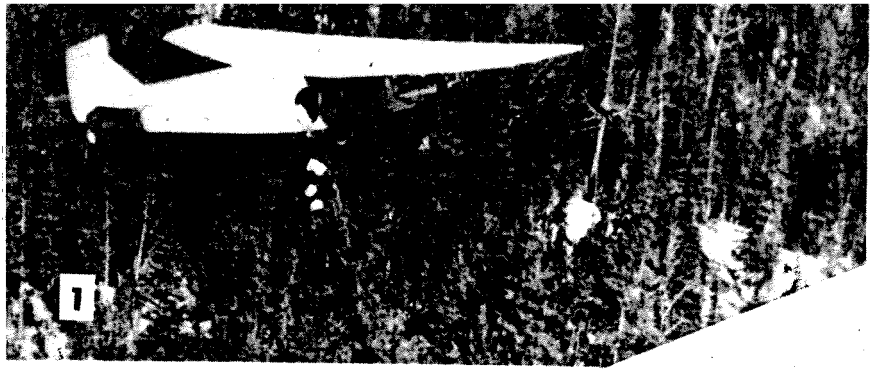
Waterfowl experts of the Fish and Wildlife Service are cooperating by making results of their field studies known to the States. The Service is also providing them with information on banding returns so that migration vagaries can be charted and interpreted. The Federal Aid Branch of the Service abstracts and disseminates individual State findings among all cooperators.

Study representatives from the States and British Columbia meet periodically to discuss their problems, advise on accomplishments, and lay plans for future action, to avoid any wasteful duplications. Alaska, the principal breeding ground for Pacific Flyway ducks and geese, is making the results of its Pittman-Robertson waterfowl investigations available for inclusion in the over-all study so that the picture will be complete.

The mourning dove is the subject of major hunting interest in the southeastern States. There is not enough factual information about the full extent of migrations, routes followed, and how early in the fall these popular game birds can be bagged without destroying fledglings in the nest. Getting the information in one State would help, but distributing the study over the principal breeding and wintering ranges is the only way conclusive data can be assembled. The southeastern states are setting up Pittman-Robertson dove studies, as qualified personnel to conduct field work can be found.

Northern States are being encouraged to cooperate. The Fish and Wildlife Service is furnishing information on returns of banded birds and abstracting data of general interest coming out of individual State reports, processing it, and supplying the States with these data. This interplay of work, with the included overlay of cooperation, is ferreting out dove facts that will lead to the most effective setting of seasons and bag limits, and widespread agreement that the conclusions that have led to that action are sound.

Fruitful cooperation between the State game and fish departments and the Soil Conservation Service has been worked into established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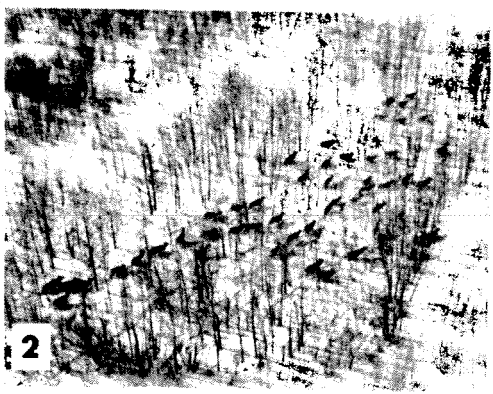
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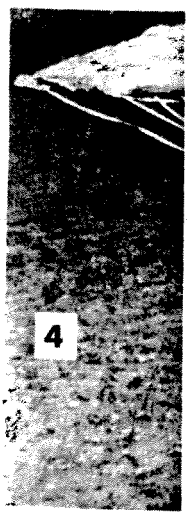
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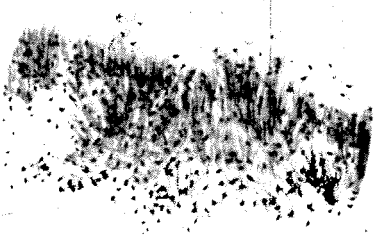
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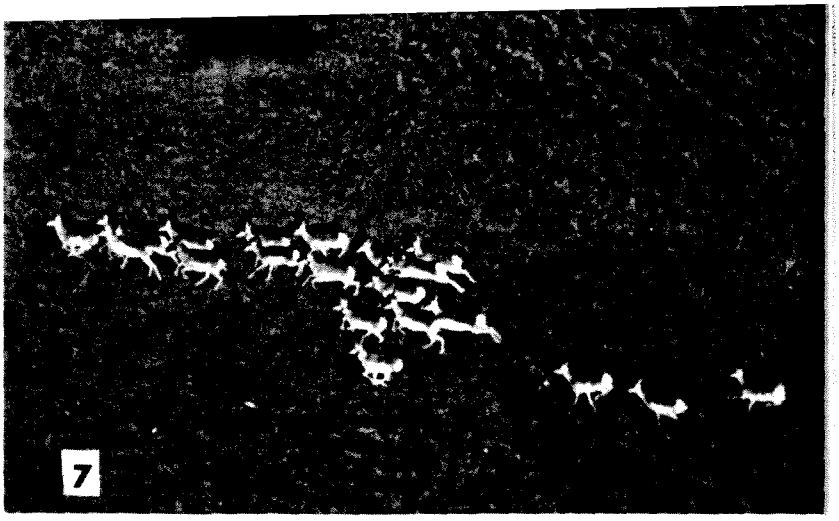

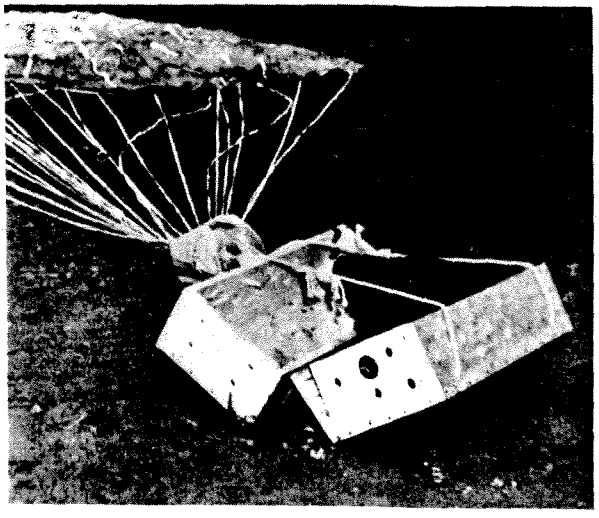

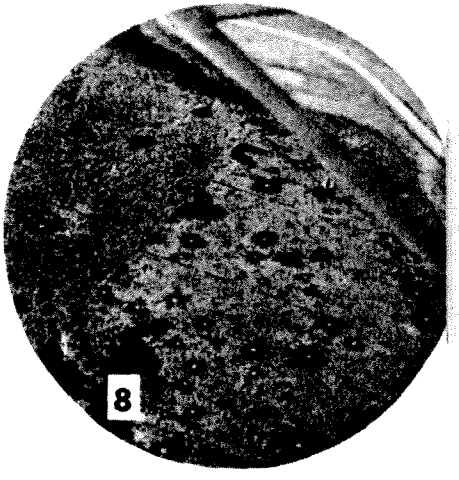

DLIFE MANAGEMENT TAKES TO THE AIR

ributing salt blocks on big game summer range. to by R. F. Cooney, Montana Fish and Game nmission.

inting wintering herds of elk. Photo by W. W. ltschreck, Minnesota Department of Conserva-

4. Stocking beaver in Idaho's roadless country. tos by Bill Bach.

6. Censusing winter concentrations of pheas- . Photos (5) by B. A. Nelson, and (6) Reuel ion, South Dakota Department of Game, Fish Parks.

nding up antelope for restocking. Photo by . Cooney, Montana Fish and Game Commis-

ring muskrat houses quickly and accurately. o by D. B. Vesall, Minnesota Department of servation.

ding sweet clover on strip mine spoil banks. o by Roy Bach, North Dakota Game and Fish artment.

Soil Conservation Districts in many States. Operational plans for farms include practices such as planting field borders next to woodlands with perennial legumes, developing living fences of multiflora rose, the retirement of erodable lands from tillage, and planting of trees and shrubs on them to hold the soil. The States, through Pittman-Robertson developmental projects, are providing planting stock and supervision. The farmer benefits, and larger wildlife crops are produced.

Wildlife improvements in the George Washington and Jefferson National Forests, in Virginia, are fine examples of Federal-State cooperation. Through Pittman-Robertson projects, the Virginia Commission of Game and Inland Fisheries is carrying on a large-scale program to create small forest openings to improve conditions for ruffed grouse and wild turkeys. White-tailed deer, reintroduced into that mountainous country with the help of these wildlife restoration funds, are profiting by the extra edge growth provided in the openings.

California has developed a top-notch wildlife food habits organization to handle its stomach analysis work. The State is servicing other western States on a cost-of-job basis. This avoids duplication of expenditures for skilled help and laboratory set-ups. Other western States have detailed men to California to get first-hand instruction on the construction of the ingenious gallinaceous guzzlers, the installation of which in arid locations has resulted in spectacular quail population increases.

In its outstanding Tuckahoe project, New Jersey has shown how a worthless tidal marsh can be developed, by diking and ponding fresh water, to create top quality waterfowl habitat. Other seaboard States have sent representatives to view the work and find out how they can develop similar marshes. Some have requested and obtained assistance from New Jersey, in appraising promising tidal marshes, to learn whether improvement is practical, and the course developmental work should follow.

Important wildlife findings flow quickly from State to State. Regional wildlife conferences of State game department personnel now prominently feature organized discussions by technicians about mutual wildlife problems and the progress made toward solving them. A fine spirit of cooperation has developed along these lines in the past 10 years. Technicians, engaged in species investigations, get together periodically to discuss their common problems and study progress. The most effective deer management, for instance, is a problem the northeastern States have in common. During the past several years, deer workers from several States have met late in the winter and traveled into the deer yards in other States to view different degrees of forage utilization and discuss on the ground what can best be done to improve the management of this king of American big game. General application of the most effective and up-to-date management measures has come from this exchange of ideas and experiences.

These few, of many fine examples, illustrate the broad and sensible approach to the goal of restoration and first-class management. Such pooling of information and unselfish cooperation form the foundation for prompt and effective action.

APPENDIX

TABLE No. I

HUNTING LICENSE SALES BY STATES
FISCAL YEARS 1938-47 INCLUSIVE

States	Land Area Sq. Miles	Fiscal Years 1938	1939	1940	1941	1942	1943	1944	1945	1946	1947	Total
Alabama	51,609	88,786	113,819	113,826	110,310	117,887	121,152	78,323	107,877	140,205	203,097	1,195,262
Arizona	113,909	28,815	30,355	34,070	28,972	35,729	37,154	36,214	40,095	46,807	49,673	367,884
Arkansas	53,102	36,419	49,662	54,532	55,164	66,832	64,680	60,491	64,545	143,127	193,196	788,648
California	158,693	215,435	250,734	270,095	285,123	329,643	266,909	282,693	319,410	380,634	483,176	3,083,852
Colorado	104,247	110,151	136,774	159,441	157,642	177,072	195,278	211,210	226,963	288,308	414,274	2,077,113
Connecticut	5,009	27,219	25,817	35,103	29,273	41,233	37,483	32,850	33,859	39,895	49,061	351,793
Delaware	2,057	15,537	14,053	15,233	14,353	16,761	15,626	14,218	15,256	17,156	21,408	159,601
Florida	58,560	55,635	57,925	57,072	60,533	66,405	65,096	51,113	68,366	76,317	101,411	659,873
Georgia	58,876	66,220	65,653	78,920	86,313	80,673	62,552	39,570	57,094	86,508	142,253	765,756
Idaho	83,557	84,875	109,359	104,742	103,050	109,931	121,497	119,892	126,809	169,942	166,357	1,216,454
Illinois	56,400	274,139	294,822	324,234	326,019	342,832	323,587	268,375	300,144	326,016	426,270	3,206,438
Indiana	36,291	432,041	389,092	358,386	386,164	400,896	376,949	341,818	398,903	381,295	369,125	3,834,669
Iowa	56,280	132,447	173,635	183,100	201,126	232,027	220,340	189,951	226,113	299,779	294,580	2,153,098
Kansas	82,276	74,358	74,742	84,703	84,257	103,072	97,673	86,163	101,852	138,732	176,538	1,022,090
Kentucky	40,395	95,239	107,079	95,967	120,595	97,570	77,051	71,260	76,785	105,910	181,670	1,029,126
Louisiana	48,523	73,487	92,432	96,379	116,653	152,597	131,009	101,750	124,485	163,072	170,396	1,222,260
Maine	33,215	95,209	95,411	98,039	97,679	105,541	105,781	113,821	115,821	119,365	133,321	1,079,988
Maryland	10,577	63,247	72,437	77,049	74,035	80,647	82,030	70,874	83,090	97,577	118,566	819,552
Massachusetts	8,257	71,102	63,836	85,834	77,876	99,914	83,717	83,395	85,075	115,869	135,788	902,406
Michigan	58,216	648,960	682,605	711,733	718,281	846,869	795,251	732,479	784,604	827,309	1,046,839	7,794,936
Minnesota	84,068	213,997	272,896	246,857	354,892	295,665	371,082	332,476	328,057	355,997	495,370	3,267,289
Mississippi	47,716	105,974	121,268	117,488	107,574	138,582	130,648	61,426	95,999	131,582	183,279	1,193,820
Missouri	69,674	154,583	190,055	194,880	206,476	215,393	208,978	201,258	229,096	314,833	332,480	2,248,032
Montana	147,138	113,370	123,622	132,420	133,450	99,332	104,305	107,277	100,294	141,629	149,119	1,204,818
Nebraska	77,237	139,022	159,440	129,915	132,452	134,876	128,122	121,818	141,088	168,879	220,688	1,476,300
Nevada	110,540	8,448	9,074	10,457	12,832	14,265	16,287	16,570	16,509	21,659	25,738	151,839
New Hampshire	9,304	50,210	46,320	54,046	57,601	61,488	57,634	64,867	65,146	98,924	109,175	665,411
New Jersey	7,836	128,068	128,772	129,238	128,018	138,404	123,121	118,843	125,866	157,088	183,107	1,360,525
New Mexico	121,666	23,633	25,145	28,257	28,365	25,654	25,508	32,103	35,170	40,525	53,041	317,401
New York	49,576	649,973	657,810	591,946	568,675	612,911	552,004	589,864	545,299	676,117	826,774	6,271,373
North Carolina	52,712	145,958	160,859	153,565	145,287	160,361	140,345	92,588	115,978	138,710	207,904	1,461,555
North Dakota	70,665	16,575	36,927	41,109	55,111	51,625	54,046	48,191	56,803	67,337	70,036	497,760
Ohio	41,222	507,732	565,104	521,963	542,674	614,106	553,072	490,533	523,040	579,326	702,510	5,600,060
Oklahoma	69,919	86,726	89,975	111,098	99,858	112,069	97,729	84,764	121,278	160,686	165,431	1,129,614
Oregon	96,981	77,478	82,842	111,706	106,082	113,221	108,270	126,354	138,964	159,192	199,020	1,223,129
Pennsylvania	45,333	606,371	661,443	661,330	678,688	687,153	648,620	582,242	607,096	678,228	843,040	6,654,211
Rhode Island	1,214	8,398	7,333	8,997	8,554	10,508	9,554	8,922	9,154	10,671	13,516	95,607
South Carolina	31,055	86,416	94,657	94,744	87,859	89,328	85,932	50,954	65,369	82,265	171,458	908,982
South Dakota	77,047	31,269	53,486	75,775	91,612	108,773	110,794	93,361	137,739	204,304	210,978	1,118,091
Tennessee	42,246	69,381	78,211	84,650	88,571	132,202	133,768	120,630	131,112	170,985	246,824	1,256,334
Texas	267,339	109,895	124,821	123,925	128,625	137,073	120,696	117,430	146,148	191,824	234,720	1,435,157
Utah	84,916	51,888	63,351	74,713	86,253	80,480	93,594	85,646	90,603	100,246	108,041	834,815
Vermont	9,609	44,969	43,170	45,084	45,124	48,201	47,021	44,766	47,797	56,852	72,248	495,232
Virginia	40,815	135,995	152,373	164,095	157,853	153,829	152,350	126,163	151,814	194,275	285,380	1,674,127
Washington	68,192	208,475	196,177	215,712	227,399	233,764	264,526	278,544	287,167	369,289	381,174	2,662,227
West Virginia	24,181	174,857	160,977	151,994	173,775	184,453	164,210	170,525	179,651	255,153	264,683	1,880,278
Wisconsin	56,154	238,538	271,351	294,100	299,534	327,740	256,720	291,832	298,478	305,787	378,941	2,963,021
Wyoming	97,914	21,321	21,849	27,013	26,350	35,245	40,947	44,735	43,040	58,127	55,089	373,716
Totals	3,022,318	6,898,847	7,499,550	7,635,535	7,912,962	8,520,882	8,080,678	7,491,142	8,190,901	9,854,319	12,066,762	84,151,598

TABLE No. II

DATE OF STATES' ASSENT ACTS TO PITTMAN-ROBERTSON ACT

State	*Date Enacted*	*State*	*Date Enacted*
Alabama	9-19-39	Nebraska	3-17-39
Arizona	3-10-39	Nevada	3-20-47
Arkansas	3-17-39	New Hampshire	6-7-39
California	5-29-39	New Jersey	5-7-38
Colorado	5-10-39	New Mexico	2-20-39
Connecticut	6-5-39	New York	4-12-38
Delaware	4-17-39	North Carolina	3-30-39
Florida	4-23-41 *	North Dakota	3-1-39
Georgia	2-8-43	Ohio	3-17-39
Idaho	3-4-39	Oklahoma	4-12-39
Illinois	7-1-39	Oregon	2-24-39
Indiana	3-9-39	Pennsylvania	5-26-39
Iowa	3-11-39	Rhode Island	3-29-38
Kansas	3-4-38	South Carolina	4-15-38
Kentucky	5-31-38	South Dakota	3-1-39 **
Louisiana	7-10-40	Tennessee	3-10-39
Maine	4-20-39	Texas	3-24-39
Maryland	5-3-39	Utah	2-1-39
Massachusetts	6-7-38	Vermont	3-15-39
Michigan	6-16-39	Virginia	3-31-38
Minnesota	3-7-39	Washington	3-15-39
Mississippi	8-18-38	West Virginia	6-7-39
Missouri	12-19-38	Wisconsin	7-14-39
Montana	3-17-41	Wyoming	2-16-39

*Governor vetoed measure June 9, 1939. Assembly passed over veto — House April 18, 1941, Senate April 21, 1941. Filed Secretary of State April 23, 1941.

**South Dakota became ineligible July 1, 1943, and was again eligible February 24, 1945, after repeal of tithing law.

TABLE No. IV

SUMMARY OF RECEIPTS, APPROPRIATIONS AND APPORTIONMENTS BY FISCAL YEARS 1939-1948, INCLUSIVE

Fiscal Year	*Receipts from Tax*	*Appropriated by Congress*	*Apportioned to States and Territories*	*Deductions for Administration of the Act*
1939	$ 2,976,019.80	$ 1,000,000.00	$ 890,000.00	$ 110,000.00
1940	3,707,843.68	1,500,000.00	1,400,000.00	100,000.00
1941	5,535,773.25	2,500,000.00	2,300,000.00	200,000.00
1942	5,072,587.60	2,750,000.00	2,570,600.00	179,400.00
1943	1,149,332.58	1,250,000.00	1,150,000.00	100,000.00
1944	1,061,044.95	1,000,000.00	920,000.00	80,000.00
1945	3,132,402.04	900,000.00	817,500.00	82,500.00
1946	5,232,464.71	1,000,000.00	900,000.00	100,000.00
1947	9,031,273.51	2,500,000.00	2,300,000.00	200,000.00
1948	11,276,687.37	9,031,273.51	8,308,771.63	722,501.88
TOTALS	$48,175,429.49*	$23,431,273.51	$21,556,871.63	$1,874,401.88

*The receipts from 1948, amounting to $11,276,687.37, were appropriated for the 1949 fiscal year. The balance in the Federal Aid in Wildlife Restoration Fund on July 1, 1948 was $13,467,468.71.

TABLE No. III

APPORTIONMENT OF FUNDS, STATES' CONTRIBUTIONS, AND GRAND TOTAL FOR FISCAL YEARS 1939-1948, INCLUSIVE

State or Territory	*Federal Apportionment*	*State Contribution*	*Grand Total for Projects*
Alabama	$ 331,837.54	$ 110,612.51	$ 442,450.05
Arizona	449,179.00	149,726.33	598,905.33
Arkansas	293,089.11	97,696.37	390,785.48
California	949,696.80	316,565.60	1,266,262.40
Colorado	627,752.39	209,250.80	837,003.19
Connecticut	80,541.09	30,180.35	110,721.44
Delaware	65,001.15	25,000.38	90,001.53
Florida	289,605.53	96,535.18	386,140.71
Georgia	302,086.50	100,695.50	402,782.00
Idaho	457,766.48	152,588.83	610,355.31
Illinois	595,793.37	198,597.79	794,391.16
Indiana	622,056.25	207,352.08	829,408.33
Iowa	483,148.27	161,049.42	644,197.69
Kansas	421,354.90	140,451.63	561,806.53
Kentucky	267,720.92	89,240.31	356,961.23
Louisiana	327,613.53	109,204.51	436,818.04
Maine	254,338.46	84,779.49	339,117.95
Maryland	143,224.10	47,741.37	190,965.47
Massachusetts	143,525.80	47,841.93	191.367.73
Michigan	1,160,188.93	386,729.64	1,546,918.57
Minnesota	689,110.13	229,703.38	918,813.51
Mississippi	317,030.08	105,676.69	422,706.77
Missouri	544,729.32	181,576.44	726,305.76
Montana	656,722.13	218,907.38	875,629.51
Nebraska	462,153.67	154,051.22	616,204.89
Nevada	408,822.10	136,274.03	545,096.13
New Hampshire	122,271.46	40,757.15	163,028.61
New Jersey	203,181.38	67,727.13	270,908.51
New Mexico	470,219.71	156,739.90	626,959.61
New York	977,149.64	325,716.55	1,302,866.19
North Carolina	366,406.83	122,135.61	488,542.44
North Dakota	312,594.38	104,198.13	416,792.51
Ohio	846,852.31	282,284.10	1,129,136.41
Oklahoma	399,178.44	133,059.48	532,237.92
Oregon	494,482.95	164,827.65	659,310.60
Pennsylvania	992,983.56	330,994.52	1,323,978.08
Rhode Island	51,375.68	17,125.23	68,500.91
South Carolina	216,032.76	72,010.92	288,043.68
South Dakota	425,705.24	141,901.75	567,606.99
Tennessee	303,166.65	101,055.55	404,222.20
Texas	1,098,996.87	366,332.29	1,465,329.16
Utah	403,419.72	134,473.24	537,892.96
Vermont	101,212.46	33,737.49	134,949.95
Virginia	348,799.53	116,266.51	465,066.04
Washington	592,807.10	197,602.37	790,409.47
West Virginia	336,600.52	112,200.17	448,800.69
Wisconsin	566,682.42	188,894.14	755,576.56
Wyoming	394,064.47	131,354.82	525,419.29
Alaska	107,600.00		107,600.00
Hawaii	25,000.00	5,743.32	30,743.32
Puerto Rico	28,000.00		28,000.00
Virgin Islands	28,000.00		28,000.00
TOTALS	$21,556,871.63	$7,135,167.18	$28,692,038.81

TABLE No. V

FINANCIAL SUMMARY OF OPERATIONS FOR FEDERAL AID IN WILDLIFE RESTORATION PROGRAM, JULY 1, 1938 TO JUNE 30, 1948, INCLUSIVE

State or Territory	*Apportionments*	*Reversions to M.B.C.F.*	*Net Project Obligations*	*Unobligated Balance 6-30-48*
Alabama	$ 331,837.54	$ 7,709.89	$ 250,291.60	$ 73,836.05
Arizona	449,179.00		407,234.03	41,944.97
Arkansas	293,089.11	6,510.94	251,353.72	35,224.45
California	949,696.80	33,869.66	826,461.55	89,365.59
Colorado	627,752.39	15,347.60	610,112.49	2,292.30
Connecticut	80,541.09		75,384.35	5,156.74
Delaware	65,001.15	5,000.00	28,682.29	31,318.86
Florida	289,605.53	18,887.47	264,640.66	6,077.40
Georgia	302,086.50	73,998.84	228,087.66	
Idaho	457,766.48	6,621.72	333,180.44	117,964.32
Illinois	595,793.37	1,888.43	490,417.25	103,487.69
Indiana	622,056.25	16,672.23	520,031.73	85,352.29
Iowa	483,148.27	2,412.37	338,600.00	142,135.90
Kansas	421,354.90	4,319.57	281,185.74	135,849.59
Kentucky	267,720.92	83,162.13	143,774.65	40,784.14
Louisiana	327,613.53	33,646.96	270,896.90	23,069.67
Maine	254,338.46	1,328.72	225,769.33	27,240.41
Maryland	143,224.10	5,610.53	137,363.40	250.17
Massachusetts	143,525.80	1,000.75	141,784.76	740.29
Michigan	1,160,188.93		909,075.66	251,113.27
Minnesota	689,110.13		557,355.85	131,754.28
Mississippi	317,030.08	19,643.14	209,202.38	88,184.56
Missouri	544,729.32		544,729.32	
Montana	656,722.13	36,203.67	611,170.34	9,348.12
Nebraska	462,153.67	45,748.05	383,573.84	32,831.78
Nevada	408,822.10	249,744.08	41,963.62	117,114.40
New Hampshire	122,271.46	23,059.14	99,186.84	25.48
New Jersey	203,181.38	4,336.24	196,234.71	2,610.43
New Mexico	470,219.71	4,630.25	426,473.47	39,115.99
New York	977,149.64	50,489.79	904,099.42	22,560.43
North Carolina	366,406.83		365,166.82	1,240.01
North Dakota	312,594.38	16,688.21	287,331.50	8,574.67
Ohio	846,852.31	20,856.08	750,359.74	75,636.49
Oklahoma	399,178.44	6,020.24	310,665.70	82,492.50
Oregon	494,482.95	8,748.67	450,971.65	34,762.63
Pennsylvania	992,983.56	2,386.84	989,198.97	1,397.75
Rhode Island	51,375.68	1,829.62	36,172.82	13,373.24
South Carolina	216,032.76	873.05	189,908.95	25,250.76
South Dakota	425,705.24	14,310.56	377,998.60	33,396.08
Tennessee	303,166.65	420.07	198,229.04	104,517.54
Texas	1,098,996.87		908,227.41	190,769.46
Utah	403,419.72	9,134.28	393,605.00	680.44
Vermont	101,212.46	12,929.33	88,283.13	
Virginia	348,799.53	4,900.71	336,381.81	7,517.01
Washington	592,807.10		484,276.37	108,530.73
West Virginia	336,600.52	23,522.11	305,526.95	7,551.46
Wisconsin	566,682.42	639.42	514,198.03	51,844.97
Wyoming	394,064.47	4,622.86	389,441.61	
Alaska	107,600.00		107,600.00	
Hawaii	25,000.00		23,098.78	1,901.22
Puerto Rico	28,000.00	6,986.66	21,013.34	
Virgin Islands	28,000.00	5,651.94	17,348.06	5,000.00
TOTALS	$21,556,871.63	$892,362.82	$18,253,322.28	$2,411,186.53

TABLE NO. VI

NET OBLIGATIONS BY TYPE OF PROJECTS
FISCAL YEARS 1939-1948, INCLUSIVE

Fiscal Year	Surveys and Investigations Amount	Surveys and Investigations Percentage	Land Acquisition Amount	Land Acquisition Percentage	Developmental Amount	Developmental Percentage	Maintenance Amount	Maintenance Percentage	Coordination Amount	Coordination Percentage	Totals
1939	$ 241,183.27	50.5	$ 130,419.37	27.3	$ 105,578.43	22.2	.....	....	.....	....	$ 477,181.07
1940	584,668.26	40.6	356.860.17	24.8	499,068.28	34.6	.....	....	.....	....	1,440,596.71
1941	817,011.04	38.3	544,372.08	25.5	704,217.81	33.0	.....	....	$ 69,508.60	3.2	2,135,109.53
1942	361,880.55	19.3	843,136.48	44.9	564,632.18	30.1	.....	....	106,453.58	5.7	1,876,102.79
1943	321,018.49	21.4	709,957.69	47.1	364,963.55	24.3	.....	....	108,402.90	7.2	1,504,342.63
1944	210,686.56	21.2	484,774.28	48.7	240,963.44	24.2	.....	....	59,695.61	5.9	995,119.89
1945	143,589.07	21.0	244,121.29	36.0	227,713.35	34.0	.....	....	54,005.45	9.0	669,429.16
1946	415,405.47	42.0	225,815.44	23.0	264,033.71	26.0	.....	....	87,918.13	9.0	993,172.75
1947	763,780.48	39.1	230,057.66	11.8	786,219.76	40.2	$ 24,596.16	1.2	149,992.05	7.7	1,954,646.11
1948	1,951,916.80	31.5	1,192,296.17	19.2	2,557,842.87	41.2	131,071.42	2.1	374,494.38	6.0	6,207,621.64
Totals and Percentages	$5,811,139.99	31.8	$4,961,810.63	27.2	$6,315,233.38	34.6	$155,667.58	0.9	$1,009,470.70	5.5	$18,253,322.28

TABLE No. VII

SUMMARY OF LANDS ACQUIRED AND BEING ACQUIRED BY STATES
FISCAL YEARS 1939-1948, INCLUSIVE

State	*Acres*	*Total Cost*[1]	*Average Price per Acre*
Alabama	10,683*	$ 60,630	$ 5.68
Arizona	11,681	37,192	3.18
California	54,571*	350,135	6.42
Colorado	44,406*	323,667	7.29
Florida	67,395	223,716	3.32
Idaho	17,492	169,533	9.69
Illinois	4,143	183,485	44.29
Indiana	3,486	93,033	26.69
Iowa	7,872*	297,135	37.75
Kansas	17,587*	311,118	17.69
Kentucky	3,225	21,938	6.80
Maine	1,316	19,255	14.63
Maryland	12,889*	73,468	5.70
Michigan	42,856*	744,692	17.38
Minnesota	14,772*	251,423	17.02
Missouri	11,778*	79,076	6.71
Montana	18,089*	117,161	6.48
Nebraska	6,057	48,757	8.05
New Jersey	12,618*	57,000	4.52
New Mexico	30,573*	230,234	7.53
New York	8,615*	114,374	13.28
North Carolina	16,007	22,643	1.41
North Dakota	7,444*	54,319	7.30
Ohio	10,690	155,414	14.54
Oklahoma	22,320*	140,855	6.31
Oregon	5,672*	308,530	54.40
Pennsylvania	150,114*	533,218	3.55
South Carolina	5,837	50,000	8.57
South Dakota	4,047*	49,701	12.28
Tennessee	81,014	132,056	1.63
Texas	5,335*	5,335	1.00
Utah	41,960*	218,989	5.22
Washington	50,369*	345,772	6.86
West Virginia	23,652	69,858	2.95
Wisconsin	9,978*	183,656	18.41
Wyoming	10,136*	104,502	10.31
TOTAL	846,679	$6,181,870	
AVERAGE			$ 7.30

*Actual acreage for completed projects or acquired tracts. Approved acreage for open projects or tracts in process of acquisition.

[1]Does not include land acquisition overhead costs.

TABLE No. VIII

SUMMARY OF LANDS APPROVED FOR PURCHASE
FISCAL YEARS 1939-1948, INCLUSIVE

Fiscal Year	*Approved Acreage*	*Land Cost*[1]	*Average Price per Acre*
1939	42,982	$ 220,892	$5.14
1940	75,667	423,052	5.59
1941	97,648	636,409	6.52
1942	167,915	1,030,212	6.14
1943	139,197	935,233	6.72
1944	91,016	555,896	6.11
1945	39,177	379,272	9.69
1946	49,887	298,515	5.99
1947	35,518	329,922	9.29
1948	134,761	1,548,130	11.49
TOTALS	873,768	$6,357,533	
AVERAGE			$7.28

[1]Does not include land acquisition overhead costs.

TABLE No. IX

MAMMALS TRAPPED AND TRANSPLANTED FISCAL YEARS 1939-1948 INCLUSIVE

State	Antelope	Bear	Beaver	Buffalo	Deer	Elk	Mt. Goat	Marten	Mink	Moose	Muskrat	Peccary	Raccoon	Sheep	Squirrel
Alabama			465		141						45		6		
Arizona	120		39	26											543A
Arkansas			52		1,909				13		332		283		
California			589								13				
Colorado	231						8							152	
Florida					113										
Georgia			72		344								53		
Idaho	284		2,955		9	125									
Illinois					100										
Indiana					181										
Kentucky		10	28		180								140		
Maine					51										
Mississippi			538		202						308				
Montana	1,732		865		1,333		46	12						41	
Nebraska			2												
New Mexico	1,793														
North Carolina					554										
Ohio					55										
Oklahoma					521								311		
Oregon			1,586												
South Dakota			157												
Tennessee					524										
Texas	2,675		122		9,186						55	6	420		110F
Utah	43		132												
Vermont			212												
Virginia			34		1,373										
West Virginia					506										
Wyoming	284		628		130	929				8					
Virgin Islands					22										
Total	7,162	10	8,476	26	17,434	1,054	54	12	13	8	753	6	1,213	193	653

A—Abert squirrel.
F—Fox squirrel.

TABLE NO. X

BIRDS TRANSPLANTED
FISCAL YEARS 1939-1948, INCLUSIVE

State	*Chachalaca*	*Chukar Partridge*	*Grouse*	*Hungarian Partridge*	*Pheasant*	*Quail*	*Turkey*
Alabama							63*
Arizona					1,374	4,022*B,G,M	248*
Arkansas						37*B	400
							11*
California						303*V	
Colorado					329*		359*
Idaho				924*	5,729*		
Kansas					30,360		
Kentucky						2,500 B	12*
Maryland						1,500 B	
Minnesota					5,460	6,059 B	
Mississippi						55*B	156
							14*
Montana			259*ST, SG	42*	5,683*		
Nebraska					34,130	1,204 B	
					707*		
Nevada		926*				530*V	
New Jersey					124		
New Mexico					1,750	1,011 B	
Ohio					6,596		
Oklahoma			157*P			45,520 B,S	
Rhode Island						30 B	
South Carolina						1,250 B	
South Dakota					8,440*		
Texas	11*		30*P			3,251*B,S	2,779*
						401 B	137
Virginia						8,877 B	1,089
Wyoming			2,076*SG				
Puerto Rico	12*					119*Ve	
Totals	23	926	2,522	966	100,682	76,669	5,268

*Wild birds.
Grouse: P—pinnated; ST—sharptailed; SG—sage grouse.
Quail: B—bobwhite; G—Gambel; M—mountain; S—scaled; V—valley; Ve—Venezuelan.

TABLE No. XI

WILDLIFE SPECIES INVESTIGATED BY STATES
(The symbol x indicates which species have received attention)

State	White-tailed Deer	Mule Deer	Elk	Antelope	Mt. Sheep	Mt. Goat	Moose	Javelina	Bear	Waterfowl	Bobwhite Quail	Scaled Quail	Mountain Quail	Valley Quail	Gambel's Quail	Ring-necked Pheasant	Turkey	Ruffed Grouse	Pinnated Grouse	Sharp-tailed Grouse	Sage Grouse	Hungarian Partridge	Mourning Dove	White-winged Dove	Band-tailed Pigeon	Clapper Rail	Woodcock	Cottontail Rabbit	Squirrels	Varying Hare	Raccoon	Muskrat	Beaver	Furbearers, General	Coyote	Magpie	Fox
Ala.	x									x	x						x						x					x	x		x	x	x	x			x
Ariz.	x	x	x	x	x			x		x		x		x	x	x	x							x					x				x		x		
Ark.	x		x							x	x						x						x					x	x		x	x	x	x	x		x
Calif.		x		x						x		x	x	x	x	x					x							x	x			x	x	x	x		
Colo.		x	x	x	x	x			x	x	x			x	x	x	x				x				x							x	x	x	x		
Conn.	x									x	x					x		x								x	x	x			x		x			x
Del.											x					x							x			x	x									
Fla.	x									x	x						x																			
Ga.	x									x	x						x						x		x		x	x		x		x	x			x
Idaho		x	x	x	x	x	x		x	x						x		x			x	x									x	x		x		
Ill.	x									x	x					x							x				x	x		x	x	x	x			x
Ind.	x									x	x					x			x			x					x	x		x	x					
Iowa																															x					
Kans.																																				
Ky.	x								x	x	x						x	x									x	x		x			x			x
La.	x									x	x						x						x				x	x		x	x		x			x
Maine	x						x			x						x		x								x	x			x		x	x			
Md.	x																x	x																		x
Mass.	x									x						x										x					x					

Mich.	x								x	x						x		x	x	x		x						x	x		x	x					x
Minn.	x		x				x			x	x					x		x	x	x		x										x	x	x			x
Miss.	x									x	x						x						x					x	x		x	x	x				x
Mo.	x									x	x						x	x	x				x					x	x		x	x	x	x	x		x
Mont.	x	x	x	x	x	x	x		x	x						x					x												x	x	x	x	
Nebr.		x								x	x					x			x	x		x	x					x	x			x	x	x	x		x
Nev.		x		x																																	
N. H.	x									x						x		x												x	x	x	x	x			x
N. J.	x									x	x					x										x	x	x	x			x		x			
N. M.	x			x							x	x			x		x		x																x		
N. Y.	x									x		x			x	x		x										x		x	x	x	x	x			x
N. C.	x									x	x						x	x					x					x	x		x	x	x	x			x
N. D.	x	x		x						x						x		x	x	x	x	x						x				x	x	x	x		
Ohio	x									x	x					x		x				x						x	x		x	x					x
Okla.	x										x					x	x		x				x				x	x	x					x			
Ore.		x	x	x	x					x						x					x	x			x								x		x		
Pa.	x									x	x							x										x	x		x	x	x	x			x
R. I.										x	x					x		x									x	x	x								x
S. C.																																					
S. D.	x	x	x							x						x	x		x	x	x	x												x	x		
Tenn.											x																										x
Tex.	x	x	x	x	x			x		x	x	x			x		x		x				x	x	x		x		x		x	x	x	x	x		
Utah		x	x	x						x	x			x		x				x	x	x										x	x		x		
Vt.	x									x						x		x									x	x	x	x	x	x	x	x			x
Va.	x									x	x						x	x										x	x		x	x	x				
Wash.		x	x																																		
W. Va.	x										x						x	x										x	x		x	x	x	x			x
Wisc.	x									x	x					x		x	x	x												x		x			x
Wyo.		x	x	x	x		x		x							x	x				x												x	x	x		
Alaska					x	x	x			x																						x	x	x	x		
Hawaii										x				x		x							x[1]														
P. R.										x														x[2]													
V. I.																																					

[1]Several exotic species.
[2]Cuban white-winged and Zenaida.

TABLE XII

FEDERAL AID IN WILDLIFE RESTORATION PROJECTS APPROVED DURING THE 1939-48 FISCAL YEARS AND THE FUNDS INVOLVED

	Numbers, Names, Descriptions, and Duration of Projects by States	*Federal Funds*
	ALABAMA	
1-R	Inventory of Wildlife Resources. 1940-49. To determine the range and status of game animals and furbearers	$ 32,826.83*
2-D	Beaver and Muskrat Stocking. 1941-45. Live trapping and transplanting the above species	7,456.91
3-D	Salt Springs Game Sanctuary. 1942-43. To construct improvements on this refuge in Clarke County	30,405.01
4-L	Clarke County Game Sanctuary and Managed Hunting Area. The acquisition of 798 acres as an addition to this refuge	6,748.08
5-D	Waterfowl Food Planting Project. 1942. To improve waterfowl habitat in Mobile Bay	1,686.38
6-D	Farm Game Habitat Restoration. 1942-49. To distribute lespedeza seeds and seedlings, and other food plants for the improvement of bobwhite quail habitat	25,538.70*
7-R	Mobile Bay Waterfowl and Muskrat Research. 1943-49. To investigate the status of waterfowl and muskrats in Mobile Bay and to prepare management recommendations	12,478.45*
8-C	Wildlife Management Coordination. 1943-49. To provide administration and coordination of restoration program	29,788.04*
9-R	Turkey Investigation and Management. 1943-48. To conduct investigations at the Salt Springs Game Sanctuary and to determine management procedures	10,413.49*
10-R	Farm Game Restoration. 1943-49. To determine habitat improvement measures for the benefit of farm game, principally bobwhite quail	7,270.13*
11-L	Addition to Salt Springs Game Sanctuary. The acquisition of 2,426 acres in Clarke County	11,881.75
12-D	Colbert County Game Sanctuary. 1945-48. To fence, post and construct necessary improvements	7,631.93*
13-D	Deer and Turkey Restocking Program. 1945-49. To live-trap and transplant the above species	14,797.17*
14-L	Colbert County Purchase Area. The acquisition of 7,459 acres	29,385.26*
16-D	State-wide Turkey Management. 1947-49. To improve turkey habitat on various public land areas	8,190.00*
17-M	Maintenance of Salt Spring Game Sanctuary. 1947-49. To maintain the improvements made under Project 3-D	5,376.97*
18-D	Fencing of the Upper State Land. 1947-48. To fence this refuge land in Clarke County	5,098.50*
20-M	Maintenance of Colbert County Game Area. 1949. To maintain improvements made under Project 12-D	3,318.00*
	State Total	$250,291.60

Types of projects are indicated by letter: C—Coordination; D—Developmental; L—Land Acquisition; M—Maintenance; and R—Surveys and Investigations.

Federal funds indicated are expenditures on completed projects or segments and obligated amounts on active projects or segments. An asterisk following the amount of Federal funds indicates a combination of expended funds on closed segments and obligated funds on active segments of the projects.

Missing numbers indicate projects approved subsequent to June 30, 1948, or projects on which no funds were expended or obligated. This latter group includes disapproved, cancelled, or withdrawn projects, and those on which only preliminary statements have been submitted.

TABLE XII—*Continued*

	Numbers, Names, Descriptions, and Duration of Projects by States	*Federal Funds*
	ARIZONA	
2–D	Catalina, Chiricahua and Pinalino Mountain Turkey Restocking Project. 1939. To live-trap and restock three areas with Merriam's turkey	$ 358.34
3–R	Investigation of Controlling Factors of Wild Turkey Population in Arizona. 1939-40. To determine the factors affecting the species	4,047.11
4–D	State-wide Quail Restocking Project. 1940-41. To live-trap and transplant Gambel's quail	1,962.68
5–D	State-wide Beaver Trapping and Transplanting. 1940-41. To redistribute beaver by live-trapping and transplanting	699.19
6–D	Pheasant Restoration. 1940. To reintroduce pheasants in certain areas of the State by the release of game farm birds	704.18
8–D	Catalina, Chiricahua, Pinalino and Bradshaw Mountain Turkey Restocking Project. 1940. To continue the restocking program begun under Project 2-D	1,424.33
9–R	State-wide Wildlife Management Research Project. 1940-47. To determine the proper management policies and sound restoration methods	87,005.63
10–D	Pheasant Restoration. 1941. To continue the program begun under project 6-D	918.76
11–D	State-wide Wildlife Restoration Project. 1941-49. To live-trap and transplant game birds and mammals and to release game farm pheasants and quail	74,876.31*
12–L	Lower Gila Refuge Acquisition Project. Acquisition of 2,720 acres in Yuma County	751.73
13–D	Cochise Quail Development, Part One. 1942. To improve quail habitat in Cochise County	7,873.25
14–L	Anderson Mesa Antelope Range Purchase. Acquisition of 8,961 acres in Coconino County	28,878.53
15–C	Wildlife Management Coordination. 1942-49. To provide administration and coordination of restoration program	54,744.99*
16–D	Buffalo Water Development. 1942. To develop adequate water for the buffalo herd in House Rock Valley	14,095.97
17–D	Clarence May Memorial Wildlife Area. 1942-43. To fence this area in Cochise County	1,508.50
18–D	Raymond Antelope Refuge Development Project. 1945-46. To fence and develop the area acquired under project 14-L	10,192.19
19–D	Texas Hill Refuge Development. 1947. To fence and develop water supplies on the area acquired under project 12-L	4,621.77
20–D	Desert Wildlife Water Development, Phase 1. 1948. To construct quail watering devices and fence same	3,798.68
22–R	State-wide Big Game Hunt Management Planning Project. 1948-49. To collect basic information necessary for the proper management of big game hunting	25,331.63*
23–R	Deer and Javelina Management Research Project, Zone 3. 1948-49. To study these species in the southeastern part of the State	13,295.81*
24–R	Quail, Dove, and Waterfowl Management Project, Zone 4. 1948-49. To study these species in the southwestern part of the State	9,843.94*
25–R	Elk, Deer, and Turkey Management Research Project Zone 1. 1948-49. To study these species in the northeastern part of the State	10,151.06*
26–R	Antelope, Deer and Turkey Management Research Project Zone 2. 1948-49. To study these species in the northwestern part of the State	13,853.06*

TABLE XII—*Continued*

	Numbers, Names, Descriptions, and Duration of Projects by States	*Federal Funds*
	ARIZONA—*Continued*	
27-R	Cooperative Kaibab (North) Livestock-Deer Forage Relationship Study. 1948-49. To cooperate with the Forest Service in conducting this joint investigation	12,101.44*
28-D	Development of the Anderson Mesa Antelope Range. 1948-49. To continue the development program begun under project 18-D on lands acquired under project 14-L	2,619.38*
29-D	Wildlife Water Development. 1948-49. To develop water supplies for quail by the improvement of existing sources. Installation of catchment and storage devices	12,763.07*
31-M	Raymond Range Maintenance Project. 1949. To maintain the developments constructed under Project 18-D	4,050.00*
32-R	Tonto National Forest Game Management Research Project. 1949. To conduct a general reconnaissance with special reference to deer and turkey	4,762.50*
	State Total	$407,234.03
	ARKANSAS	
1-D	Howard County Deer Restoration Project. 1940-42. To restock deer by purchase and release	$ 11,025.39
2-D	Turkey Restocking. 1940. To restock turkeys by purchase and release	2,250.00
3-D	Turkey Restocking. 1940-41. To restock turkeys by purchase and release	150.00
4-D	Marking Game Refuges. 1941-43. To mark and post State Game Refuge boundaries	7,643.97
5-D	State-wide Quail Restoration Project. 1941-46. To restore quail by habitat restoration and live-trapping and transplanting	25,955.00
6-D	Raccoon and Mink Trapping Project. 1942. To restore the above species by live-trapping and transplanting	2,532.79
7-D	Turkey Restocking. 1942. To restock turkeys by purchase and release	2,250.00
8-D	Purchase and Release of Virginia White-tailed Deer. 1942. To restock deer by purchase and release	5,634.63
9-D	Trapping and Release of Virginia White-tailed Deer. 1942. To restock deer by live-trapping and transplanting	560.15
10-C	Wildlife Management Coordination. 1942-49. To provide administration and coordination of restoration program	33,594.98*
11-R	State-wide Wildlife Survey Restoration and Management Project. 1943-48. To secure information as to wildlife distribution, populations, and limiting factors as a means to restoration	20,768.86*
12-D	Wildlife Trapping, Purchase, Transplanting, and Restocking Project. 1943. To restock game birds and mammals by purchase and release, and live-trapping and transplanting	7,042.06
13-D	Refuge Boundary Marking. 1944. To continue the marking program begun under project 4-D	2,524.28
14-D	State-wide Game Restoration Project. 1944-46. To restore deer, beaver, and turkey by live-trapping and transplanting	17,618.35
15-D	Quail Habitat Improvement Program. 1947-49. To continue quail habitat improvement program begun under project 5-D by the distribution of lespedeza seed and fertilizer	24,675.53*
16-D	Quail Demonstration Project. 1947. To provide for habitat improvement on selected areas	237.57

TABLE XII—*Continued*

	Numbers, Names, Descriptions, and Duration of Projects by States	*Federal Funds*
	ARKANSAS—*Continued*	
17–D	State-wide Game Development Project. 1947-49. To live-trap and transplant deer and furbearers	48,039.30*
18–R	State-wide Quail Status. 1947-49. To conduct studies of factors affecting quail population	22,077.68*
20–R	Study of Deer on National Forest Lands. 1948-49.	4,983.75*
21–D	Turkey Restoration Project. 1948-49. To restore turkey at Norfolk by habitat improvement and live-trapping and transplanting	6,654.41*
22–R	River Basin Studies. 1948. To conduuct surveys and prepare management plans for wildlife species found on flood control and power projects	5,135.02*
	State Total	$251,353.72
	CALIFORNIA	
1–D	Sage Grouse Habitat Improvement Project. 1941-43. To construct fenced water developments on sage grouse range in three northeastern counties	$ 14,606.31
2–R	A Survey to Determine the Present Status of the Three Kinds of Beaver in California. 1941-43. To conduct a state-wide survey and prepare the management plan	1,550.26
3–R	Management of Mule Deer in Southern California. 1940-42. To conduct an investigation with special reference to deer-coyote relationship	11,374.03
4–D	Desert Game Habitat Improvement. 1941-43. To improve game habitat in the southeastern counties by the construction of fenced water developments	9,482.92
5–R	Survey of Fur Resources of the State of California. 1940-45. To conduct a state-wide fur resource survey	23,314.62
6–R	Management of California Valley Quail in the South Coast Counties of California. 1941-45. To conduct an investigation and prepare management recommendations	28,510.75
7–D	Survey, Mark, and Post California Legislative Game Refuges. 1942-43. To survey, post, and mark refuge boundaries	11,172.71
9–D	Suisun Waterfowl Refuge Project. 1942-43. To raise the dikes and install water control structures on this refuge in Solano County	15,606.75
10–L	Tehama Winter Deer Range. Acquisition of 33,972 acres in Tehama County	106,698.71*
11–L	Honey Lake Waterfowl Management Area. Acquisition of 3,450 acres in Lassen County	63,912.11
12–R	Aerial Survey of Big Game in Southeastern California and in the Owens Valley. 1942-43. To conduct an aerial big game survey	1,930.61
13–D	Gray Lodge Waterfowl Reguge Project. 1943-44. To raise the dikes and install water control structures on this area in Butte County	41,987.76
14–D	Tehama Winter Deer Range Development. 1944-45. To fence boundaries of this area acquired under project 10-L	4,073.31
15–R	The Study of the Influence of Seasonal and Other Factors on the Food Value of the Meat of Game Animals. 1944-46. To study the varying palatability and food values of game meat for possible hunting season coordination	7,175.93
16–R	Desert Game Water Development Survey. 1944-46. To map water supplies capable of development and to locate sites for installation of watering devices	10,813.07

TABLE XII—*Continued*

	Numbers, Names, Descriptions, and Duration of Projects by States	*Federal Funds*
	CALIFORNIA—*Continued*	
17–L	Madeline Plains Waterfowl Management Area. Acquisition of 4,816 acres in Lassen County	32,934.91
18–D	Beaver Transplanting. 1946-49. To restock beaver by live-trapping and transplanting	16,270.99*
19–R	The Life History and Management of Mountain Quail in California. 1946-49. To study the life history and prepare management recommendations	28,322.97*
20–R	A Survey of the Waterfowl Food Plants of California. 1946-49. To determine kinds, sources, supplies, and growth	13,086.02
21–L	Doyle Winter Range. Acquisition of 11,707 acres in Lassen County	21,975.81*
22–R	The Life History and Management of the Ring-necked Pheasant in California. 1946-49. To study life history and prepare management recommendations	43,156.62*
24–R	Survey of the Critical Summer and Winter Deer Ranges of California. 1946-47. To determine the extent of critical summer and winter ranges	5,279.31
25–R	The Study of the Food Habits of the California Game Birds and Mammals and Species Affecting Their Welfare. 1947-49	20,387.04*
26–D	The Restoration of Quail in California. 1947-49. To restore quail by food, cover, and water developments, predator control, and live-trapping and transplanting in accordance with the findings of project 6-R	127,011.00*
27–D	Repair of Tule Lake Reservoir Dam and Tule Lake Reservoir Diversion Works. 1947. To repair water control structures for the purpose of assuring water supplies for the lands acquired under project 17-L	31,508.42
28–R	Study of Deer Population and Management Problems in California. 1948. To assemble data available from other agencies and recommend state-wide management policies	34,198.68*
29–C	Wildlife Management Coordination. 1948-49. To provide administration and coordination of restoration program	13,580.83
30–R	Study of Production, Migration, and Wintering Areas of Waterfowl. 1948-49. To participate in a cooperative waterfowl study	12,407.06*
31–R	Effects of Brush Removal on Game Ranges in California. 1948-49. To study the effects of brush removal on game ranges and to develop the most successful methods	22,591.01*
32–L	Headquarters Unit, Imperial Waterfowl Management Area. Acquisition of 535 acres in Imperial County	36,109.18*
33–R	Evaluation of Quail Development and Management Practices in California. 1948-49. To study practices followed in California in cooperation with Projects 25-R, 26-D, and 31-R	4,561.20*
35–R	A Study of the Diseases of Wildlife Species in California. 1949. To determine the extent and importance of diseases as a basis for control measures	10,870.65*
	State Total	$826,461.55
	COLORADO	
1–R	Deer-Elk Survey. 1939. To survey all big game ranges of the State	$ 4,893.83
2–R	Beaver Resources Survey. 1939. To survey the beaver resources of the State	1,741.86

TABLE XII—*Continued*

	Numbers, Names, Descriptions, and Duration of Projects by States	*Federal Funds*
	COLORADO—*Continued*	
3-L	Sapinero Deer and Elk Refuge. Acquisition of 7,531 acres in Gunnison County	21,330.11
4-R	Master Plan for Colorado Wildlife. 1939-47. To determine the factors affecting wildlife species and prepare management plans	157,315.19
5-L	Cathedral Creek Deer Refuge. Acquisition of 640 acres in Rio Blanco County	1,593.75
6-D	Wray Upland Bird Refuge. 1940. To construct a boundary fence	923.02
7-D	Hot Sulphur Refuge Range Development. 1940-41. To repair irrigation developments and to reseed the range	1,530.04
8-L	Hot Sulphur Deer, Elk Range. Acquisition of 570 acres and lease of 604 acres in Grand County	4,353.36
9-D	Cathedral Creek Refuge Rehabilitation. 1941-42. To repair dwelling and irrigation works, and to reseed range	2,015.34
10-D	Great Divide Sanctuaries. 1941-42. To fence areas on sage grouse refuges in Moffat County	1,679.87
11-L	Basalt Mountain. Acquisition of 527 acres in Eagle County	6,042.60
12-D	Hot Sulphur Residence Laboratory. 1941-42. To repair and remodel dwelling	1,939.27
13-L	Missouri Creek Refuge. Acquisition of 2,070 acres in Rio Blanco County	5,964.26
14-L	Butte Lake Refuge. Acquisition of 645 acres in Jackson County	835.57
17-R	Upland Bird Program. 1941-43. To survey upland game bird ranges and conduct experimental releases	11,289.80
18-D	Basalt Mountain Refuge Development. 1942-44. To repair dwelling, construct fences, and reseed range	234.24
19-C	Wildlife Management Coordination. 1940-49. To provide administration and coordination of restoration program	37,247.27*
20-L	Apishipa Canyon Refuge. Acquisition of 7,936 acres in Las Animas County	12,336.18
22-D	Antelope Restoration. 1942. To live-trap and transplant antelope	4,126.54
23-L	Devil Creek Turkey Refuge. Acquisition of 561 acres in Archuleta County	3,550.65
24-D	Hot Sulphur Refuge Rehabilitation. 1942-44. To remodel dwelling, repair irrigation structures, construct fences and reseed range	1,776.84
26-L	South Republican Game Production Unit. Acquisition of 599 acres in Yuma County	2,308.00
27-D	Devil Creek Development. 1942-44. To repair dwelling and irrigation works, construct bridge and telephone lines, and reseed range	1,223.30
28-L	La Porte Game Investigation Unit. Acquisition of 21 acres in Latimer County	306.75
29-D	Devil Creek Native Wildlife Turkey Improvement. 1943-44. To improve area as turkey habitat	1,359.16
32-D	Big Horn Sheep Restoration. 1945-49. To live-trap and transplant mountain sheep	9,038.03*
33-L	Piceance Creek Winter Deer Range. Acquisition of 14,872 acres in Rio Blanco County	61,125.00
34-D	Upland Game Bird Development. 1946-49. To restock by live-trapping and transplanting and release of game farm birds	12,292.30*
35-D	Antelope Restoration. 1948-49. To live-trap and transplant antelope	6,996.80*

	Numbers, Names, Descriptions, and Duration of Projects by States	*Federal Funds*
	COLORADO—*Continued*	
36–R	Interview Survey of Game Kill. 1948. To determine hunter success by conducting an interview survey	2,237.78*
37–R	Game Bird Survey Including Sage Grouse, Pheasants, Quail, Band-tailed Pigeons, and Migratory Waterfowl. 1948-49. To conduct surveys, censuses, and studies	34,310.64*
38–R	Deer-Elk-Bear Investigations. 1948-49. To conduct surveys, censuses, and studies	31,778.01*
39–R	Wild Turkey Investigations. 1948-49. To conduct surveys, censuses, and studies	4,566.87*
40–R	Antelope Investigations. 1948-49. To conduct surveys, censuses, and studies	6,961.15*
41–R	Big Horn Sheep Surveys. 1948. To conduct surveys, censuses, and studies	3,850.04*
43–L	South Platte River Management Area. Acquisition of 8,644 acres and lease of 321 acres in Logan and Sedgwick Counties	124,503.75*
44–L	Lamar Management Area. Lease of 3,062 acres in Lamar County	75.00
45–D	Little Hills Deer Range Development and Grazing Experiment. 1948. To fence deer range for study purposes	14,065.24*
46–M	Maintenance of Project 26-L, South Republican Game Production Unit. 1948-49. To repair and maintain exterior fences	2,476.77*
47–R	Fur Survey. 1948-49. To conduct an interview survey of fur resources	6,263.81*
48–L	Mt. Evans Elk Management Area. Acquisition of 195 acres in Clear Creek County	1,654.50*
	State Total	$610,112.49
	CONNECTICUT	
1–R	Ruffed Grouse Habitat Investigation. 1940. To study effects of habitat manipulations on ruffed grouse populations	$ 19,599.39
2–D	Scoville Sanctuary Development. 1940. To develop this area for the benefit of upland game	615.34
3–R	Pheasant Mortality Investigation. 1941-42. To determine the factors limiting pheasant populations	4,101.88
4–R	Seed Stock Refuge Investigation. 1942-47. To study the effect of seed stock refuges on hunting success and pheasant survival	10,458.67*
5–R	Estimate of Wildlife Populations. 1946-48. To determine game ranges and populations and to develop practical census methods	8,000.77
6–R	Connecticut River Survey. 1947. To survey wildlife conditions in the Connecticut River Valley	1,453.30
7–R	Wildlife Survey and Management Study. 1948-49. To estimate wildlife populations and study management problems	20,655.00*
9–D	Naugatuck State Forest, West Block. 1949. To make thinnings and clearings adjacent to plantations for the benefit of upland game	10,500.00*
	State Total	$ 75,384.35

TABLE XII—*Continued*

	Numbers, Names, Descriptions, and Duration of Projects by States	*Federal Funds*
	DELAWARE	
1–R	Establishment, Development, and Management of Seed Stock Refuges to Encourage Natural Game Increases. 1939-42. To devise practicable methods of increasing game supplies under natural conditions	$ 9,454.05
2–D	Federal-State Special Game Refuge Improvement Project. 1943. To establish and develop seed stock refuges for the benefit of upland game	886.73
4–D	Petersburg Refuge Development. 1944-47. To produce supplemental food supplies for upland game	3,341.51*
5–D	Cooperative Farm-Game Program. 1948-49. To cooperate with other conservation agencies and develop leased portions of farms as improved wildlife habitat	15,000.00*
	State Total	$ 28,682.29
	FLORIDA	
1–R	Management of Quail, Turkey and Deer in Florida. 1939. To determine the status of these species, limiting factors and management methods	$ 1,088.09
2–D	Habitat Restoration for Farm Game. 1942-44. To improve habitat for bobwhite quail in 8 northeastern counties	8,020.10
3–D	Habitat Restoration for Farm Game. 1942-44. To improve habitat of bobwhite quail in northwest Florida	6,891.96
4–L	South Lake County Quail Breeding Ground. Acquisition of 620 acres in Lake County	2,238.75
5–L	Marion County Quail Breeding Ground. Acquisition of 1,300 acres in Marion County	3,259.69
8–L	Charlotte County Game Management Area. Acquisition of 55,136 acres in Charlotte County	123,231.43
10–D	Deer Restocking Program. 1942-43. To restock deer by live-trapping and transplanting	1,273.13
11–R	Charlotte County Quail Investigation. 1947-49. To study quail on the Charlotte County unit	11,406.06*
12–D	Charlotte County Quail Project. To construct improvements and develop quail habitat on the Charlotte County Unit	11,013.41*
13–C	Wildlife Management Coordination. 1947-49. To provide administration and coordination of restoration program	9,312.75*
14–R	Florida Deer and Turkey Survey. 1947-49. To secure basic information necessary for state-wide restoration and management programs	18,248.04*
15–D	Habitat Restoration for Farm Game. 1948-49. To provide for cooperative bobwhite quail habitat improvement	7,693.61*
16–L	Palm Beach County Land Acquisition. Acquisition of 10,340 acres and lease of 39,893 acres in Palm Beach County	41,765.35
17–R	Gulf Hammock Deer and Turkey Survey. 1948-49. To determine the status of deer and turkey populations in Gulf Hammock and the effects of land use practices and environmental factors	3,196.50*
18–D	Palm Beach County Fencing Project. 1948-49. To fence lands acquired under Project 16–L	8,845.32*
19–R	Florida Waterfowl Survey. 1949. To investigate the status of waterfowl, study the effect of land use practices and to prepare management recommendations	7,156.47*
	State Total	$264,640.66

TABLE XII—*Continued*

	Numbers, Names, Descriptions, and Duration of Projects by States	*Federal Funds*
	GEORGIA	
1-R	State-wide Wildlife Survey and Game Management Project. 1944-49. To determine wildlife populations and ranges and prepare management recommendations	$ 31,697.05*
2-D	Piedmont Game Management Area. 1944-49. To develop this area for the benefit of deer, turkey, and quail	18,861.26*
3-D	Wildlife Trapping and Restocking Project. 1944-46. To live-trap and transplant deer, turkey, and beaver	5,181.53
4-D	Farm Game Habitat Restoration. 1944-49. To distribute lespedeza seed and seedlings for the improvement of quail habitat on farms	47,380.99*
5-D	Coastal Flatwoods Game Management Area. 1944-47. To develop this area for the benefit of deer, turkey, quail and furbearers	9,873.96
6-C	Wildlife Management Coordination. 1946-49. To provide administration and coordination of restoration program	25,373.09*
7-D	White-tailed Deer Restoration Project. 1945. To establish refuge areas and to restock with deer	1,050.00
8-D	Trapping and Restocking. 1947-49. To live-trap and transplant deer, turkey, and beaver	27,934.12*
9-R	Clapper Rail Survey and Management Study. 1947-49. To study the Clapper Rail and prepare management recommendations	20,208.38*
10-D	Restocking. 1948. To transport and release Texas white-tailed deer in Georgia	6,257.40*
11-D	Boundary Defining, Marking and Posting of State Game Refuges and Management Areas. 1948-49. To mark and post boundaries	8,126.25*
12-D	Reynolds Brothers Wildlife Refuge. 1948-49. To develop this refuge in southwest Georgia	7,367.25*
14-D	Refuge Management Project. 1948-49. To develop wildlife refuges in 7 counties	18,776.38*
	State Total	$228,087.66
	IDAHO	
1-D	Beaver Transplanting. 1941. To live-trap and transplant beaver	$ 2,705.59
2-D	Beaver Transplanting Project. 1940. To live-trap and transplant beaver	2,557.08
4-D	Posting State Game Preserves. 1940. To post refuge boundaries	1,658.28
5-D	Pheasant Redistribution Project. 1940. To live-trap and transplant pheasants	235.84
6-D	Hungarian Partridge Redistribution Project. 1940. To live-trap and transplant Hungarian Partridge	522.62
7-R	Wildlife Survey and Restoration Project. 1940-41. To determine game abundance and ranges, and prepare management recommendations	19,876.99
9-L	Hagerman Valley Refuge. Acquisition of 562 acres in Gooding County	14,934.53
10-L	Nez Perce Bird Refuge. Acquisition of 160 acres in Lewis County	750.90
11-L	Idaho County Bird Refuge. Acquisition of 40 acres in Idaho County	750.00
12-D	Nez Perce Bird Refuge. 1941. To fence and post the lands acquired under project 10-L	518.95

TABLE XII—*Continued*

	Numbers, Names, Descriptions, and Duration of Projects by States	*Federal Funds*
	IDAHO—*Continued*	
13–D	Idaho County Bird Refuge. 1940. To fence, post, and reseed lands acquired under project 11–L	293.60
14–D	Three Creek Cooperative Sagehen-Grouse Project. 1940. To develop and fence water supplies	497.45
15–D	Givens Springs Cooperative Sage-hen Grouse Project. 1941. To develop and fence water supplies	880.73
16–D	South Owyhee Cooperative Sagehen Project. 1941. To develop and fence water supplies	548.78
17–D	Kimama Cooperative Sagehen Restoration Project. 1941. To develop and fence water supplies	1,505.38
18–D	Hagerman Valley Refuge. 1941. To develop the lands acquired under project 9–L	3,137.44
19–L	Nez Perce Bird Refuge Addition. Acquisition of 160 acres as an addition to land acquired under 10–L	451.27
20–D	Nez Perce Addition. 1941. To develop the lands acquired under project 19–L	975.56
22–D	Hungarian Partridge Redistribution. 1941-42. To live-trap and transplant Hungarian partridge	371.55
23–D	Hagerman First Addition. 1941. To develop additional lands within the Hagerman Refuge	1,305.74
24–L	North Lake Migratory Waterfowl Refuge. Acquisition of 1,472 acres in Jefferson County	13,159.96
25–D	Electric Drift Fence. 1941-42. To construct an electric fence for the purpose of controlling elk movement and reducing crop damage	459.73
26–L	St. Marie's Winter Deer Range. Acquisition of 6,154 acres and lease of 4,504 acres in Benewah County	7,187.21*
27–L	Grangeville Refuge. Acquisition of 160 acres in Idaho County	2,628.75
29–L	Peterson Addition to Hagerman Project. Acquisition of 80 acres as an addition to lands acquired under project 9–L	2,026.80
30–D	Pheasant Redistribution Project. 1941-42. To live-trap and transplant pheasants	1,011.62
31–D	Peterson Addition to Hagerman Refuge. 1941. To develop the lands acquired under project 29–L	211.04
33–D	Birch Creek, U.S.F.S. Cooperative. 1941. To develop and fence game water supplies	546.89
34–D	Beaver Live-trapping and Transplanting. 1941-42. To live-trap and transplant beaver	2,072.56
35–D	Tree, Shrub, and Seed Planting. 1941-42. To improve wildlife habitat by seedings and plantings	1,112.69
36–D	Hagerman Refuge Development. 1941-48. To complete the development of the Hagerman Refuge	6,065.71*
37–L	Coeur d'Alene Bird Refuge. Acquisition of 101 acres in Kootenai County	2,470.16
38–D	Grangeville Refuge. 1941-42. To develop refuge by seeding and fencing	1,309.66
39–R	Beaver Survey. 1942. To conduct a beaver habitat survey and to determine the results of previous releases	1,316.67
40–C	Wildlife Management Coordination. 1942-49. To provide administration and coordination of restoration program	39,096.36*
41–D	Coeur d'Alene Bird Refuge Development. To develop the area acquired under project 37–L	777.81
42–R	Mountain Sheep Survey. 1942-43. To determine number and distribution, and prepare management recommendations	2,995.27

TABLE XII—*Continued*

	Numbers, Names, Descriptions, and Duration of Projects by States	*Federal Funds*
	IDAHO—*Continued*	
43–D	Latah County Cooperative. 1942. To develop game habitat by improvement and fencing of water supplies, seeding and planting	2,066.87
44–D	McCroskey Bird Refuge. 1942. To develop a small upland game bird refuge by spring improvement, seeding, and fencing	450.10
45–L	Clearwater Bird Refuge. Acquisition of 160 acres in Idaho County	675.75
47–D	Antelope Trapping and Transplanting. 1943-47. To live-trap and transplant antelope	2,388.37
48–D	Star Lake. 1942-44. To develop this area for the benefit of waterfowl and sage grouse	1,719.49
49–L	Boundary County Refuge. Acquisition of 801 acres in Boundary County	13,244.99
51–R	Gray's Lake Migratory Waterfowl and Muskrat Survey. 1942-43. To conduct investigations necessary for the determination of the optimum water level to be maintained in Gray's Lake	2,257.79
52–R	Idaho Big Game Aerial Survey. 1942-43. To conduct aerial big game censuses	1,706.14
55–D	North Lake Development. 1942-45. To develop the area acquired under Project 24–L	5,414.00
56–D	Beaver Live-trapping and Transplanting. 1942-43. To live-trap and transplant beaver	1,715.27
57–D	Clearwater Bird Refuge. 1942-47. To fence refuge boundaries and establish seedings	1,805.48
58–D	Pheasant Redistribution. 1943. To live-trap and transplant pheasants	330.24
59–D	Elk Planting. 1944-46. To release elk secured from Yellowstone National Park	2,298.73
60–D	Boundary County Refuge. 1942-47. To develop the area acquired under project 49–L	13,151.31
61–L	Boise River Elk and Deer Winter Range. Acquisition of 2,709 acres in Boise County	15,116.10
64–D	Boise County Winter Range. 1945-49. To develop the land acquired under project 61–L	6,738.85*
65–L	Pocatello Lake Refuge. Acquisition of 160 acres in Power County	2,345.32
67–R	Pheasant Research with Relation to Bird Refuges. 1947-48. To conduct studies necessary for pheasant management	14,857.45*
68–L	Middle Fork Winter Range. Acquisition of 160 acres in Valley County	4,500.90
69–M	State-wide Maintenance. 1947. To maintain refuges in 6 counties	1,337.54
70–M	Maintenance of Star Lake. 1947. To maintain developments made on Star Lake under project 48–D	491.79
71–L	Sand Creek Elk Refuge. Acquisition of 4,763 acres in Fremont County	48,750.00
72–D	State-wide Aerial Big Game Salting. 1947. To distribute salt on big game summer ranges	4,017.24
73–D	Star Lake. 1948-49. To construct fences, water control structures, and post refuge	11,833.57*
75–D	Trapping and transplanting. 1948. To live-trap and transplant game mammals and birds	19,052.22*
76–M	State-wide Aerial Big Game Salting Maintenance Project. 1948. To continue the salting program begun under project 72–D	4,683.33*

TABLE XII—*Continued*

	Numbers, Names, Descriptions, and Duration of Projects by States	*Federal Funds*
	IDAHO—*Continued*	
78-M	Maintenance of State Refuges. 1948-49. To maintain 9 refuge areas	5,358.81*
80-D	Habitat Improvement Adjacent to Farm Ponds and on Selected Areas. 1948-49. To improve areas adjacent to farm ponds for the benefit of upland game birds	5,945.62*
	State Total	$333,180.44
	ILLINOIS	
1-R	Illinois Fur Animal Resources Survey. 1939-40. To conduct a study of the fur resources and fur harvests	$ 2,719.54
2-R	Correlation of Food Supplies with Food Uses among Illinois Game Birds. 1940-41. The study of food habits of game birds, primarily waterfowl	3,251.17
3-D	Urbana Township Upland Game and Fur Animal Management and Demonstration Project. 1940-41. To develop upland game and furbearer management techniques adaptable to the Illinois Black Prairie	2,008.45
4-R	Urbana Township Upland Game and Fur Animal Research Project. 1940-49. To study upland game and fur animal management on an area in the Illinois Black Prairie	7,313.04*
8-L	Green River Waterfowl and Upland Game Area. Acquisition of 1,612 acres in Lee County	58,077.17
11-R	Survey of Potential Wildlife Habitat Restoration Areas on the Illinois Prairie. 1940. To conduct a survey within this geographic portion of the State	1,494.23
12-D	Wildlife Habitat Restoration of Illinois Prairie. 1941. To conduct a restoration program on the areas located under project 11-R	8,471.23
13-D	Horseshoe Lake Development Project. 1940-45. To develop and improve this area for the benefit of waterfowl	13,204.49
14-R	Squirrel-Raccoon Investigation and Management in Illinois. 1941-42. To conduct an investigation, and prepare management recommendations for these species	3,892.10
15-L	Horseshoe Lake Land Acquisition Project. Acquisition of 166 acres in Alexander County	11,198.85
16-D	Wildlife Habitat Restoration on the Illinois Black Prairie. 1942-49. To restore wildlife habitat on farms for the benefit of upland game	149,843.55*
17-R	Investigations and Methods for Restoring and Managing Aquatic Vegetation for Wildlife. 1942-43. To determine ecological relationship and requirements of the important species of aquatic vegetation and practical methods for restoring marshes	2,807.59
18-R	Evaluation of Federal Aid Habitat Restoration Measures on Illinois Black Prairie and a Survey of Quail and Deer Management Possibilities in Southern Illinois. 1942-44. To conduct studies as indicated	5,271.35
19-R	Management and Economic Relationship of Squirrels and Fur Animals on River Bottoms and Wooded Upland Areas. 1943. To continue the studies begun under Projects 1-R and 14-R	834.88
20-C	Wildlife Management Coordination. 1943-49. To provide administration and coordination of restoration program	28,165.39*
21-R	Wildlife Harvest Survey. 1943-44. To determine the state-wide hunter game harvest	1,688.12

TABLE XII—*Continued*

	Numbers, Names, Descriptions, and Duration of Projects by States	*Federal Funds*
	ILLINOIS—*Continued*	
22-D	Cook County Forest Preserve Wildlife Habitat Development Project. 1943-44. To improve wildlife habitat on the Forest Preserve areas	1,274.99
23-D	Horseshoe Lake Development Project. 1943. To continue the improvement program begun under Project 13-D	2,328.53
24-D	Green River Waterfowl and Upland Game Refuge Development Project. 1943-49. To develop the area acquired under project 8-L	27,338.45*
25-L	Rice Lake Acquisition Project. Acquisition of 2,366 acres in Fulton County	73,029.58
26 R	Wildlife Research on the Cook County Forest Preserve District. 1944-46. To continue studies begun by the Illinois Natural History Survey including the live-trapping and banding of waterfowl	4,260.16
28-R	Rice Lake Wildlife Research. 1945-46. To conduct studies of waterfowl and muskrats on the area acquired under Project 25-L	2,000.32
29 D	Rice Lake Development Project. 1945-46. To develop the area acquired under project 25-L	10,553.16
30-R	Illinois Pheasant Research. 1946-49. To conduct a comprehensive study of this species in the northern part of the State	30,454.45*
31-R	Illinois Upper Mississippi Wildlife Survey. 1947-49. To conduct wildlife surveys along the Mississippi River	11,174.51*
32 D	Illinois County Refuge and Public Shooting Grounds. (Segment of Kankakee Marsh Development Project.) 1947-49. To develop this area for the benefit of waterfowl and upland game	11,359.45*
33-R	Illinois White-tailed Deer and Beaver Research. 1947-49. To conduct a state-wide investigation of these species, with the exception of intensively farmed Black Prairie lands	16,402.50*
	State Total	$490,417.25
	INDIANA	
1 L	Hovey Lake. Acquisition of 885 acres in Posey County	$ 15,450.00
2-R	State-wide Wildlife Survey, Game Management, and Demonstration Project. 1941-49. To conduct state-wide game investigations and censuses and prepare management recommendations	162,658.51*
3-L	Jasper-Pulaski Game Preserve. Acquisition of 1,961 acres in Jasper, Pulaski, and Stark Counties	47,610.43
4 D	Hovey Lake Development. 1941. To develop the waterfowl area acquired under project 1-L	7,795.43
5 D	White-tailed Deer Restoration Project. 1941-42. To provide for the purchase and release of white-tailed deer	7,481.25
6 D	Cooperative Wildlife Habitat Restoration Program. 1941-49. To provide for a state-wide program of upland game habitat restoration on farms	266,086.20*
7 D	Kankakee Game Preserve Development Project. 1944-45. To provide for the construction of a spillway and bridge in this area	3,721.91
8-L	Beaver Lake Prairie Chicken Refuge. Acquisition of 640 acres in Newton County	7,214.62
9-D	Beaver Lake Prairie Chicken Refuge Development Project. 1946-48. To develop the area acquired under Project 8-L	1,263.38

TABLE XII—*Continued*

	Numbers, Names, Descriptions, and Duration of Projects by States	*Federal Funds*
	INDIANA—*Continued*	
11-M	Maintenance of Hovey Lake (Project 1-L and 4-D). 1949. To maintain improvements on waterfowl area acquired under Project 1-L and developed under Project 4-D	750.00*
	State Total	$520,031.73
	IOWA	
1-L	Rice Lake. Acquisition of 627 acres in Worth and Winnebago Counties	$ 22,270.78
2-D	Rice Lake Development. 1941-49. To develop the area acquired under Project 1-L	50,097.88*
3-L	Nishnabetna Wildlife Preserve. Acquisition of 721 acres in Fremont County	5,576.49
4-L-10	State-wide Wildlife Area Acquisition Program—Mud High. Acquisition of 132 acres in Emmet County	3,360.09
4-L-20	State-wide Wildlife Area Acquisition Program—Ventura Marsh. Acquisition of 466 acres in Cerro Gordo and Hancock Counties	12,196.49
4-L-30	State-wide Wildlife Area Acquisition Program — Goose Creek. Acquisition of 40 acres in Kossuth County	1,085.54
4-L-40	State-wide Wildlife Area Acquisition Program — Lake Ahquabi. Acquisition of 323 acres in Warren County	8,417.53
4-L-50	State-wide Wildlife Acquisition Program—Mt. Ayr. Acquisition of 970 acres in Ringgold County	20,045.29
4-L-60	State-wide Wildlife Area Acquisition Program — Klum Lake. Acquisition of 1,052 acres in Louisa County	17,810.22
4-L-70	State-wide Wildlife Area Acquisition Program—Barringer Slough. Acquisition of 554 acres in Clay County	22,021.94
4-L-80	State-wide Wildlife Area Acquisition Program — Dunbar Slough. Acquisition of 373 acres in Greene County	13,554.55
4-L-90	State-wide Wildlife Area Acquisition Program—Forney's Lake. Acquisition of 869 acres in Fremont County	30,600.61
4-L-100	State-wide Wildlife Area Acquisition Program — Muskrat Slough. Acquisition of 214 acres in Jones County	9,227.98
4-L-110	State-wide Wildlife Area Acquisition Program — Sunken Grove. Acquisition of 371 acres in Pocohantas County	18,113.91
4-L-120	State-wide Wildlife Area Acquisition Program — Lakin Slough. Acquisition of 300 acres in Guthrie County	9,370.90
4-L-130	State-wide Wildlife Area Acquisition Program — Goose Lake. Acquisition of 261 acres in Clinton County	10,365.00*
4-L-140	State-wide Wildlife Area Acquisition Program — Myre Slough. Acquisition of 218 acres in Winnebago County	12,262.95*
4-L-150	State-wide Wildlife Area Acquisition Program — Harmon Lake. Acquisition of 383 acres in Winnebago County	18,785.63*
5-D	Mt. Ayr Upland Game Area. 1946-49. To develop land acquired under Project 4-L-50	24,780.16*
6-R	Muskrat Investigation. 1946-49. To study populations and productivity through live-trapping and tagging	10,434.62*
7-D	Muskrat Slough. 1948-49. To develop area acquired under Project 4-L-100	7,051.72*
8-D	Sunken Grove Development Project. 1949. To develop area acquired under Project 4-L-110	3,752.51*
9-C	Wildlife Management Coordination. 1949. To provide administration and coordination of restoration program	7,417.21*
	State Total	$338,600.00

TABLE XII—*Continued*

	Numbers, Names, Descriptions, and Duration of Projects by States	*Federal Funds*
	KANSAS	
1–L	Finney County State Game Preserves. Acquisition of 520 acres in Finney County	$ 6,360.53
2–D	Finney County State Game Preserve. 1941. To fence the area acquired under Project 1-L	3,250.77
3–D	Game Bird Stocking Program. 1941. To restock game farm pheasants	7,067.32
5–D	Kingman County State Park. 1941-48. To fence, improve the habitat for upland game birds, and restock the area	3,425.06
6–D	Lyon County State Park. 1941. To fence and post the area	393.11
8–L	Miami County State Area. Acquisition of 270 acres in Miami County	4,803.98
9–D	Pheasant Stocking Project. 1942. To restock game farm pheasants	13,888.81
10–L	Cheyenne Bottoms. Acquisition of 18,711 acres in Barton County	231,120.48*
11–D	Pheasant Stocking Project. 1942-43. To restock game farm pheasants	10,875.68
	State Total	$281,185.74
	KENTUCKY	
1–L	Harlan Wildlife Restoration Unit. Acquisition of 1,242 acres in Harlan County	$ 7,722.97
2–L	Flatwoods Project. Acquisition of 1,984 acres in Pike County	8,730.16
3–D	Flatwoods Wildlife Restoration Unit. 1940. To provide for the drilling of wells on the area acquired under Project 2-L	675.00
4–D	Flatwoods Wildlife Restoration Unit. 1940-41. To provide for installing road culverts on the area acquired under Project 2-L	848.54
5–D	Harlan Wildlife Restoration Unit. 1940-41. To develop the area acquired under Project 1-L	1,219.77
6–R	Investigation of Quail Restoration Techniques. 1941-48. To study survival of pen-raised quail	19,057.71*
11–R	Southwestern Kentucky Wildlife Investigation and Management Plan. 1945-48. To determine the best management and development practices for waterfowl	7,452.10*
12–D	Beaver Creek Wildlife Management Area. 1946-48. To develop habitat for turkey and deer	7,904.19*
13–D	Wildlife Refuge Boundary Posting. 1946. To post and mark State refuge boundaries	2,797.49
14–D	Pennyrile Wildlife Development Area. 1946-48. To improve game habitat and restock deer	9,640.74*
15–C	Wildlife Management Coordination. 1946-49. To provide administration and coordination of restoration program	17,093.39*
16–D	Eastern Kentucky Big Game Refuge Establishment. 1947-48. To locate suitable refuge areas in eastern Kentucky, lease, post, map, and restock same	8,789.84
17–D	Live-trapping and Restocking. 1947-48. To restock game birds and mammals by live-trapping and transplanting, and purchase and release	13,626.25*
18–R	Beaver Creek Investigation. 1947-48. To determine the best management practices for deer, turkey and ruffed grouse on the Cumberland National Forest	4,297.75*
19–R	Effects of Quail Refuges as a Restoration Technique and Fox Food Habits Study. 1947-49. To study quail-fox relationships and importance of quail refuges	5,430.37*

TABLE XII—*Continued*

	Numbers, Names, Descriptions, and Duration of Projects by States	*Federal Funds*
	KENTUCKY—*Continued*	
20-D	State-wide Development of Big Game Refuges. 1948-49. To develop refuges established under Projects 12-D, 14-D, and 16-D, and to establish and develop others	14,876.25*
21-R	Western Kentucky Waterfowl Management Investigations. 1949. To expand and continue the studies begun under Project 11-R	4,343.25*
22-D	Western Kentucky Waterfowl Management. 1949. To develop waterfowl habitat based on the findings of Project 11-R	9,268.88*
	State Total	$143,774.65
	LOUISIANA	
1-R	Fur Resources Management Investigation. 1941-48. To investigate fur resources and prepare management recommendations	$ 24,812.27
2-R	Quail Release Investigation. 1941-46. To study quail populations and habitat factors, and to determine the success of releases	49,680.24
3-R	Wild Turkey Investigation. To determine turkey distribution and populations and prepare management recommendations	4,229.23
4-D	Waterfowl Food Planting. 1941. To restore duck food areas in Saint Bernard Parish	816.04
6-D	Farm Game Habitat Improvement. 1942-49. To distribute lespedeza seed and seedlings for the improvement of quail habitat by field border establishment	47,658.56*
7-R	Field Border Investigation. 1946-49. To investigate the value of field border plantings for quail	11,732.82*
8-R	Wildlife Inventory and Management Plan. 1946-49. To inventory the game resources of the State and evaluate factors affecting game distribution	59,289.34*
9-D	Coastal Marsh Development. 1947-48. To prepare plans for planting program and construction of water control structures on coastal refuges	15,435.43*
10-C	Wildlife Management Coordination. 1947-49. To provide administration and coordination of restoration program	23,120.30*
12-D	Red Dirt Wildlife Management Preserve. 1948-49. To develop and improve an area within the Kisatchie National Forest	34,122.67*
	State Total	$270,896.90
	MAINE	
1-R	Waterfowl Restoration Research Project. 1939-43. To determine the possibility and methods of improvement of water areas for waterfowl	$ 15,231.29
2-D	Wildlife Restoration Project. 1939-44. To plant aquatic foods for the benefit of waterfowl and furbearers	25,936.88
4-R	Plan for Wildlife Management in Baxter State Park and Game Refuge. 1941-42. To determine the status of game animals in the Park for game management and development, also the carrying capacity of the Park in relation to all species	6,717.67
5-D	Development—Baxter State Park and Katahdin Wildlife Sanctuary Area, State-owned. 1942. To post and mark the areas	3,305.60

TABLE XII—*Continued*

	Numbers, Names, Descriptions, and Duration of Projects by States	*Federal Funds*
	MAINE—*Continued*	
6-L	Swan Island Refuge and Game Management Area. Acquisition of 1,316 acres in Sagadahoc County	14,847.97
7-D	Swan Island Refuge and Game Management Area. 1943-47. To develop the area acquired under Project 6-L for the benefit of waterfowl and upland game	53,063.34
8-R	Swan Island Wildlife Restoration Research Project. 1943-49. To conduct wildlife research on the area acquired and developed under Projects 6-L and 7-D	17,310.67*
9-R	Maine Beaver Survey. 1946-49. To conduct a state-wide survey and prepare management recommendations	28,364.31*
10-R	Maine Grouse Census. 1946-47. To establish 20 grouse census areas	1,556.49
11-C	Wildlife Management Coordination. 1947-49. To provide administration and coordination of restoration program	16,344.79*
12-R	Maine Ruffed Grouse Investigation. 1947-48. To determine population trends, cover requirements, and nesting and brooding success	6,413.72*
13-M	Maintenance of Swan Island Refuge and Game Management Area No. 7-D. 1948-49. To maintain the area acquired under Project 6-L and developed under Project 7-D	13,029.61*
14-R	Game Management Investigation. 1948. To determine legal game kill by hunters through a random sample questionnaire	4,333.17*
15-R	Maine Pheasant Investigation. 1948-49. To determine the extent of pheasant range, survival, productivity, and success of released birds	11,466.46*
16-R	Burned Area Game Investigation. 1948. To determine game numbers and activity on burned areas, and woody plant regeneration	1,824.46*
18-R	Maine Waterfowl Investigation. 1949. To secure information necessary for developmental activities	6,022.90*
	State Total	$225,769.33
	MARYLAND	
1-L	Indian Springs Game Refuge. Acquisition of 1,225 acres in Washington County	8,335.17
2-D	Posting and Fencing Wildlife Refuges on State Forestry Property. 1940-41. To fence and post refuges	1,180.67
3-D	Indian Springs Wildlife Restoration Area. 1940-41. To develop the area acquired under Project 1-L	1,892.65
4-L	Indian Springs Wildlife Demonstration Area. Acquisition of 39 acres in Washington County as an addition to Project 1-L	236.59
5-L	Idylwild Wildlife Refuge. Acquisition of 512 acres in Caroline County	3,271.19
6-L	Wellington Wildlife Refuge. Acquisition of 391 acres in Somerset County	1,648.91
7-D	Wellington Wildlife Refuge. 1941-42. To develop the area acquired under Project 6-L	4,137.39
8-D	Bobwhite Quail Restocking. 1942. To restock State-owned and leased areas with game farm quail	1,411.49
9-D	Cooperative Wildlife Habitat Development Program. 1942-46. To develop wildlife habitat throughout the State	14,004.05
10-L	Millington Wildlife Demonstration Area. Acquisition of 561 acres in Kent County	2,611.57

TABLE XII—*Continued*

	Numbers, Names, Descriptions, and Duration of Projects by States	*Federal Funds*
	MARYLAND—*Continued*	
11-D	Idylwild Wildlife Demonstration Area. 1942-43. To develop the area acquired under Project 5-L	1,848.38
12-D	Millington Wildlife Demonstration Area. 1943-46. To develop the area acquired under Project 10-L	582.40
13-L	Girdletree Wildlife Demonstration Area. Acquisition of 566 acres in Worcester County	4,358.89
14-D	Girdletree Wildlife Demonstration Area. 1943-44. To develop the area acquired under Project 13-L	923.03
15-R	Wild Turkey and Other Upland Game Survey and a Management Study. To conduct a turkey management study in the mountains of Maryland	9,446.45
16-L	LeCompte Wildlife Demonstration Area. Acquisition of 494 acres in Dorchester County	4,433.14
17-D	LeCompte Wildlife Demonstration Area. 1945-46. To develop the area acquired under Project 16-L	2,534.70
18-D	Cooperative Farm Game Program. 1946-48. To revise and continue the habitat improvement program begun under Project 9-D	35,613.65*
19-L	Dorchester County Wildlife Management Project, Taylors Island Unit. Acquisition of 1,070 acres in Dorchester County	5,115.00*
20-L	Somerset County Wildlife Management Project. Acquisition of 8,029 acres in Somerset County	31,860.00*
21-C	Wildlife Management Coordination. 1949. To provide administration and coordination of restoration program	1,918.08*
	State Total	$137,363.40
	MASSACHUSETTS	
1-R	Massachusetts Waterfowl Research Project. 1939-42. To study the movement of waterfowl within the State as related to winter feeding grounds	$ 10,789.89
2-D	Massachusetts State Forests: Development of Wildlife Areas. 1939-41. To improve wildlife habitat on State forests	5,042.64
3-R	Massachusetts Farm Game Research Project. 1940-49. To study the pheasant, determine hunter kill and prepare stocking and management plans	45,591.78*
4-R	Massachusetts Waterfowl Survey. 1943-49. To make waterfowl censuses, conduct a state-wide survey of waterfowl areas and prepare restoration recommendations	43,135.32*
5-R	Beaver Survey and Management Study. 1948-49. To determine beaver numbers and distribution, and to prepare management recommendations	5,236.50*
6-D	Wood Duck Nesting Box Program. 1949. To construct and erect nest boxes in suitable habitat	5,770.88*
7-R	A Preliminary Study of the White-tailed Deer in Massachusetts. 1949. To determine numbers and distribution, and collect data during the open hunting season	7,556.25*
8-R	A Preliminary Study in Experimental Management for the Woodcock in Massachusetts. 1949. To collect life history data and conduct a banding program	10,770.00*
9-D	Massachusetts Farm Game Restoration. 1949. To establish and develop upland game refuges	7,891.50*
	State Total	$141,784.76

TABLE XII—*Continued*

	Numbers, Names, Descriptions, and Duration of Projects by States	*Federal Funds*
	MICHIGAN	
1–R	Raccoon Management Investigation. 1939-41. To conduct studies at the Swan Creek Wildlife Experiment Station	$ 3,956.49
2–R	Determination of the Degree of Coordination of Game Management and Farming Practices. 1939-46. To conduct studies, as indicated, at the Rose Lake Wildlife Experiment Station	21,671.94
3–L	Tuscola Wildlife Restoration Project. Acquisition of 3,028 acres in Tuscola County	20,722.10
4–L	Rose Lake Wildlife Experiment Station. Acquisition of 1,364 acres in Clinton and Shiawassee Counties	42,772.76
5–R	Sharptailed Grouse and Prairie Chicken Project. 1941-42. To conduct investigations of these species	4,530.31
6–R	Ecological Successions Following Forest Fires. 1940-43. To conduct investigations to determine the effect of fires on game numbers and distribution	7,727.84
7–R	Habitat Requirements of the Ring-necked Pheasant. 1940-43. To conduct an investigation of pheasants in Saginaw County	7,511.53
8–R	Population Studies and Habitat Improvement for Southern Michigan Fox Squirrels. 1940-42. To conduct management investigations at the Swan Creek Wildlife Experiment Station	4,042.54
9–R	Survival and Behavior of Hungarian Partridge Population in Michigan. 1940-41. To conduct a state-wide investigation of this exotic game bird	3,015.43
10–L	Barry County Project. Acquisition of 10,957 acres in Barry County	138,414.95
12–L	Gratiot-Saginaw Project. Acquisition of 4,936 acres in Gratiot and Saginaw Counties	46,175.75
13–R	Waterfowl Survey on Saginaw Bay, Lake St. Clair, the Detroit River, Lake Erie, and Adjacent Marshes. 1941-43. To conduct waterfowl investigations from Saginaw Bay to Lake Erie	6,625.16
14–R	Ecological Survey of Muskrat Populations and Habitats. 1941-42. To conduct a state-wide muskrat investigation	4,009.68
15–D	Rose Lake Wildlife Experiment Station Development. 1941-42. To develop the area acquired under Project 4-L	2,757.80
16–D	Barry County Development Project. 1941-42. To develop the lands acquired under Project 10-L	3,573.11
17–L	Oak Grove Project. Acquisition of 665 acres in Livingston County	11,520.75
18–L	Dansville Project. Acquisition of 1,648 acres in Ingham County	34,020.85
19–D	Tuscola Wildlife Restoration Project. 1941-42. To develop the lands acquired under Project 3-L	1,776.11
20–L	Flat River Project. Acquisition of 4,523 acres in Ionia and Montcalm Counties	51,316.50*
21–L	Minden City Project. Acquisition of 2,800 acres in Sanilac County	17,315.72*
22–L	Gourdneck Project. Acquisition of 1,180 acres in Kalamazoo County	16,942.51*
23–D	Gratiot-Saginaw Project. 1941-43. To develop the lands acquired under Project 12-L	1,152.07
24–C	Wildlife Management Coordination. 1942-49. To provide administration and coordination of restoration program	74,085.17*
25–D	Gourdneck Creek Project. 1942. To develop lands acquired under Project 22-L	265.71

TABLE XII—*Continued*

	Numbers, Names, Descriptions, and Duration of Projects by States	*Federal Funds*
	MICHIGAN—*Continued*	
26–D	Dansville Project. 1942-43. To develop lands acquired under Project 18-L	239.18
27–L	Deford Project. Acquisition of 3,533 acres in Tuscola County	36,322.05
28–L	Vassar Project. Acquisition of 1,263 acres in Tuscola County	12,304.16
29–R	Swan Creek Wildlife Management Research Project. 1943-49. To conduct wildlife investigations at the Swan Creek Wildlife Experiment Station	9,111.47*
30–L	Gregory Project. Acquisition of 777 acres in Livingston County	15,375.00
32–L	Port Huron Project. Acquisition of 2,417 acres in St. Clair County	36,296.06
34–L	Lapeer Project. Acquisition of 2,548 acres in Lapeer County	42,252.85*
35–L	Pointe Moullee Project. Acquisition of 467 acres in Monroe County, comprising a portion of the 2,609-acre marsh acquired by the State	26,250.00
36–D	Habitat Improvement for Southern State Game Areas. 1946-49. To plant trees and shrubs on game management areas acquired under the program	47,136.56*
37–R	Ecological Status and Management of the Prairie Chicken, Sharptail Grouse and Ruffed Grouse. 1947-49. To revise and continue studies begun under Project 5-R	12,239.99*
38–R	Survey of the Ring-necked Pheasant in Michigan. 1947-49. To develop and apply techniques for determining the status of the pheasant in Michigan	10,692.51*
39–R	Michigan Red Fox Investigation. 1947-49. To study the red fox with special reference to control programs, bounty payments and its role as a predator	12,852.75*
40–R	Farm Game Management Research Project. 1947-49. To revise and continue studies begun under Project 2-R	33,611.25*
41–L	Leidy Lake. Acquisition of 107 acres in St. Joseph County	7,504.98
42–L	Three Rivers Land Acquisition Project. Acquisition of 193 acres in St. Joseph and Cass Counties	6,832.50*
43–D	Farm Game Restoration Program. 1948-49. To improve pheasant habitat in 35 counties in Southern Michigan, by planting trees and shrubs on private lands	53,848.68*
44–D	Southern Michigan Waterfowl Restoration Project. 1948-49. To improve waterfowl habitat by constructing small dams for the purpose of increasing and stabilizing water levels	7,944.02*
45–R	Waterfowl Surveys and Investigations on Great Lakes Marshes. 1948-49. To continue the investigative program begun under Project 13-R	5,255.25*
46–R	Ruffed Grouse Management Investigations. 1948-49. To conduct censuses and habitat improvement experiments	3,494.25*
48–R	Relation of Habitat Types to Wildlife Management, with Special Reference to the Cottontail Rabbit. 1948-49. To study occurrence and distribution as related to cover types	2,107.87*
49–R	Northern White Cedar Reproduction Study. 1948-49. To conduct an investigation at the Cusino Wildlife Experiment Station, of the factors affecting white cedar, an important deer food producing species	1,501.50*
	State Total	$909,075.66

TABLE XII—*Continued*

	Numbers, Names, Descriptions, and Duration of Projects by States	*Federal Funds*
	MINNESOTA	
1–D	Posting and Fencing Carlos Avery Refuge. 1939. To post and fence refuge	1,040.88
2–L	Carlos Avery Refuge—Land Acquisition. Acquisition of 440 acres in Anoka County	7,125.00
3–L	Thief Lake Range—Land Acquisition. Acquisition of 80 acres in Marshall County	600.00
5–D	Brood Stock for Game Refuges. 1939. To purchase pheasants and quail and restock State refuges	9,025.77
6–L	Carlos Avery Game Refuge. Acquisition of 2,345 acres in Anoka and Chisago Counties	34,326.24
7–D	Carlos Avery Game Refuge Planting Project. 1940-44. To plant trees, shrubs and vines on the Carlos Avery Refuge	4,759.19
8–D	Talcot Lake Game Refuge Planting Project. 1941-42. To plant trees, shrubs and vines on the Talcot Lake Refuge	2,015.12
9–D	Clearing, Posting and Fencing Red Lake Game Refuge. 1941-42. To fence and post the refuge boundaries	1,349.12
10–D	Posting Minnesota Statutory Game Refuges. 1941-42. To post refuges throughout the State	15,499.89
11–R	Wildlife Restoration and Management Planning Project. 1941-49. To determine distribution and abundance of game and fur species and prepare management recommendations	239,625.68*
12–C	Wildlife Management Coordination. 1942-49. To provide administration and coordination of restoration program	48,459.70*
13–D	Thief Lake Game Refuge Development. 1942-44. To provide for habitat development and water control structures on the Thief Lake Refuge	15,467.22*
14–L	Carlos Avery Game Refuge Land Acquisition Project (South Addition). Acquisition of 4,100 acres in Anoka County, as an addition to the lands acquired under Project 6-L	20,454.28*
15–L	Whitewater Game Refuge Land Acquisition Project. Acquisition of 9,595 acres in Winona and Wabasha Counties	123,503.39*
16–D	Permanent Cover Planting Project. 1947-50. To improve upland game habitat by planting trees, shrubs and vines on farms	9,813.10*
17–L	Thief Lake Game Refuge Land Acquisition. Acquisition of 780 acres in Marshall County, as an addition to lands acquired under Project 3-L	7,381.14*
18–D	Whitewater Experimental Development Project. 1948-49. To remove unnecessary fences and buildings on the lands acquired under Project 15-L, and to improve game habitat by planting	8,033.13*
19–D	Wildlife Food and Cover Planting. 1948-49. To improve upland game habitat by planting trees and shrubs on farms	8,874.00*
	State Total	$557,355.85
	MISSISSIPPI	
1–D	Kickapoo Game Preserve Food and Cover Planting. 1939. To improve wildlife habitat	$ 195.94
2–D	Restocking Mississippi National Forest Wildlife Areas. 1940-46. To restock 3 National Forest areas with deer and turkey and to improve wildlife habitat	25,915.75
3–R	Inventory of Wildlife Resources in Mississippi. 1940-44. To conduct a State-wide wildlife inventory	16,167.44

TABLE XII—*Continued*

	Numbers, Names, Descriptions, and Duration of Projects by States	*Federal Funds*
	MISSISSIPPI—*Continued*	
4-D	Leroy Percy Game Refuge. 1941-42. To fence, post, improve habitat, and restock with deer and turkey	4,987.10
5-D	H. B. Cole Refuge Area. 1941-45. To develop this refuge and restock with turkey	12,371.47
6-D	Beaver Trapping and Transplanting Project. 1941-42. To live trap and transplant beaver	4,903.55
7-D	Habitat Restoration for Farm-Game. 1941-43. To distribute lespedeza seed and fertilizer, to correlate activities of farms in 8 counties, for the improvement of quail habitat	13,459.57
8-D	Southeastern Quail and Turkey Restoration Area. 1941-46. To fence, develop, and restock University lands in Southern Mississippi as a game refuge	21,912.13
9-D	Muskrat Restoration. 1942-45. To improve muskrat habitat and to restock by live trapping and transplanting	11,838.79
10-C	Wildlife Management Coordination. 1944-49. To provide administration and coordination of restoration program	16,716.07*
11-D	Refuge Boundary Posting. 1945. To post refuge boundaries and highways within refuges	839.69
12-D	Bienville Refuge. 1945-46. To post boundary, improve wildlife habitat, and restock with deer and turkey	3,447.01
13-D	Live trapping and Restocking. 1945-48. To live-trap and transplant game birds and mammals	11,405.52*
14-D	Sardis Waterfowl and Upland Game Refuge. 1945-46. To post refuge boundary, construct headquarters, and improve wildlife habitat	1,844.46
15-R	Quail Investigation. 1946-49. To determine relationship of quail and predators, especially the gray fox	7,986.78*
16-R	Yazoo Wildlife Resources Survey. 1947. To conduct a wildlife survey of the 29 counties within the Yazoo Basin	7,389.31
17-D	Refuge Development. 1947-49. To develop and restock refuges in 4 counties	8,260.87*
18-M	Maintenance of Leaf River and University Areas. 1947-49. To maintain the areas established under Projects 2-D and 8-D	4,987.50*
19-R	Pascagoula Drainage Wildlife Resources Survey. 1948-49. To conduct a wildlife survey of the 16 counties within the Pascagoula Basin	9,776.25*
21-D	Choctaw Lake Refuge Development. 1948-50. To fence and post refuge boundary, develop refuge, and restock with deer and turkeys	7,612.43*
23-D	Leaf River Live-trapping and Restocking. 1949. To live-trap and transplant deer and turkey from the Leaf River Refuge to other areas	1,641.75*
24-D	Farm Game Habitat Restoration. 1949. To distribute lespedeza for quail habitat improvement to cooperative farms in S. C. Districts	15,543.00*
	State Total	$209,202.38
	MISSOURI	
1-R	Wildlife Survey, Game Management and Demonstration Project. 1939-40. To conduct state-wide surveys and investigations	$ 14,755.42
3-R	Wildlife Survey and Research Project. 1940. To revise and continue investigative program begun under Project 1-R	7,951.18

TABLE XII—*Continued*

	Numbers, Names, Descriptions, and Duration of Projects by States	*Federal Funds*
	MISSOURI—*Continued*	
4-L	Caney Mountain Turkey Refuge. Acquisition of 5,527 acres in Ozark County	7,779.11
5-R	Wildlife Survey and Research Project. 1941-43. To extend and continue the investigative program begun under Project 1-R and continued under Project 3-R	106,408.40
6-L	Deer Run Game Refuge. Acquisition of 2,948 acres in Shannon and Reynolds Counties	9,422.39
7-D	Caney Mountain Turkey Refuge. 1940-42. To construct headquarters buildings, fence and stock area acquired under Project 4-L	7,015.06
8-D	Cooperative Farm Pond Project. 1942-44. To fence and improve habitat surrounding farm ponds	6,133.00
9-R	Wildlife Management, Planning and Research Projects. 1944-46. To revise and continue investigative program operated under projects 1, 3, and 5-R	67,697.84
10-L	Bradyville Wildlife Management Area. Acquisition of 252 acres in Stoddard County	1,890.67
11-D	Drury Wildlife Management Area. 1946-48. To construct improvements and improve wildlife habitat on this refuge	38,857.25*
12-L	Fountain Grove Waterfowl Management Area. Acquisition of 3,072 acres in Livingston and Linn Counties	47,910.24*
13-R	Wildlife Management Planning and Research Project. 1947-49. To continue investigative program of Projects 1, 3, 5, and 9-R	118,452.90*
14-D	Fountain Grove Wildlife Management Area. 1948-49. To develop the area, acquired under Project 12-L, for waterfowl and muskrat management	84,135.44*
15-D	Wildlife Cover Restoration Project. 1949. To establish a state-wide program of establishing multiflora rose field borders, and use of lespedeza to control ditchbank erosion	26,320.42*
	State Total	$544,729.32
	MONTANA	
1-R	Wildlife Survey and Management. 1941-49. To conduct state-wide wildlife censuses, surveys, and studies, and to prepare management recommendations	$231,811.86*
2-D	Beaver Management (Live-trapping and transplanting). 1942-47. To live-trap and transplant beaver	8,619.94
3-C	Wildlife Management Coordination. 1942-49. To provide administration and coordination of restoration program	76,759.09*
5-D	General Wildlife Restocking Project. 1942-49. To live-trap and transplant game birds and mammals.	105,222.36*
6-D	Posting of Game Preserves and Closed Areas. 1942-48. To post boundaries of game refuges and administrative closures	12,966.05*
8-D	Water Facilities and Wildlife Habitat Development. 1942-47. To develop water supplies and improve wildlife habitat, primarily for the benefit of upland game birds	25,108.97
11-L	Judith River Game Range Acquisition. Acquisition of 286 acres in Judith Basin County	375.00
12-L	Gallatin Elk Range Acquisition Project. Acquisition of 6,188 acres in Gallatin County	6,986.17
13-L	Lease of Deer and Elk Winter Ranges. To lease 123,307 acres in Missoula, Mineral, Sanders, and Flathead Counties	19,420.67
14-D	Judith Game Range Development Unit. 1945. To seed approximately 200 acres as a supplemental winter food supply	372.04

TABLE XII—*Continued*

	Numbers, Names, Descriptions, and Duration of Projects by States	*Federal Funds*
	MONTANA—*Continued*	
15-D	Fencing Judith River Game Range. 1945. To construct range fences	2,743.19
16-D	Game Bird Winter Food Refuges. 1945-47. To construct food shelters on refuges	2,888.02
17-D	Game Range Development Through Salt Distribution. 1945-48. To distribute salt on big game summer ranges to effect big game distribution and range use	6,857.73*
19-R	Big Game Utilization Studies Through Checking Stations 1947. To secure big game kill data by the operation of checking stations during the open hunting season	3,063.34
20-D	Upland Game Bird Winter Food Refuges, Flathead Valley. 1947. To lease, fence and develop small refuge areas	301.99
21-R	Magpie Control Investigation. 1947-48. To determine the importance of magpie predation on upland game birds, particularly pheasants, and to study magpie food habits, migration and experimental control	6,229.00*
22-D	Mountain Sheep Holding Pasture (Ft. Peck Game Range Area). 1947-48. To fence a pasture for the temporary holding of sheep to be released in an attempt to restock the Missouri River Breaks Area bordering Fort Peck Reservoir	6,216.61*
23-D	Predator Control on Big Game Development Areas. 1947-48. To control predators on big game restocking areas	2,571.00*
24-M	Maintenance of 8-D Water Facilities. 1948. To maintain and improve developments under Project 8-D	6,559.64*
25-L	Sun River Elk Winter Range Acquisition. Acquisition of 11,775 acres in Lewis and Clark County	82,596.82*
26-M	Game Range Maintenance Through Salt Distribution. 1948-49. To continue the salting program begun under Project 17-D	3,500.85*
	State Total	$611,170.34
	NEBRASKA	
1-D	Pheasant Restoration Project. 1939-43. To stock pheasants throughout the State by the release of game farm birds	$ 24,858.91
2-D	Quail Restoration Project. 1940-42. To stock quail by the release of game farm birds	8,892.82
3-L	Pine Ridge Acquisition. Acquisition of 4,893 acres in Sheridan and Sioux Counties	20,390.24
4-R	Study of Common Upland Game Birds of Nebraska. 1941-44. Investigation of the upland game birds of the State	17,879.69
5-D	Upland Game Restoration Project. 1942-47. To restore upland game birds by leasing, fencing, habitat improvement, and stocking management areas	39,069.05
6-C	Wildlife Management Coordination. 1942-49. To provide administration and coordination of restoration program	19,327.69*
7-D	Soil Conservation Service Wildlife Areas. 1942-46. To improve upland game bird habitat on lands under agreement with the Soil Conservation Districts	5,728.13
8-D	Loup River Public Power District Habit Restoration Project. 1942-43. To provide for upland game bird habitat improvement along canal banks within the District	233.20
9-R	Nebraska Furbearers Resource Survey. 1943-44. To study the fur resources of the State	1,410.36

	Numbers, Names, Descriptions, and Duration of Projects by States	*Federal Funds*
	NEBRASKA—*Continued*	
11-D	Hungarian Partridge Stocking Project. 1944-49. To provide for Hungarian partridge stocking by the importation of live-trapped birds from Canada	7,500.00*
12-R	Investigation of Aquatic Resources in Relation to Waterfowl in Nebraska Lakes. 1944-45. To survey the waterfowl food resources of Nebraska Lakes	4,747.60
13-R	Nebraska National Forest Wildlife Management Investigation. 1944-45. To make an aerial census of the deer herd and to prepare management recommendations	176.01
14-D	Deer Range Fencing Project. 1944-49. To fence the lands acquired under Project 3-L	23,896.12*
15-R	Wildlife Survey and Investigation. 1945-49. To conduct state-wide wildlife surveys and studies, continuing those formerly conducted under Projects 4-R and 9-R	80,660.95*
17-D	Upland Game Restoration Project. 1947-49. To improve upland game habitat by fencing and planting	99,423.86*
18-L	Plattsmouth Waterfowl Refuge. Acquisition of 1,164 acres in Cass County	16,500.00
19-R	Predator Food Habits and Control Investigations. 1948-49. To determine predator food habits and investigate predator control methods	12,879.21*
	State Total	$383,573.84
	NEVADA	
1-D	State-wide Trapping and Redistribution Project. 1948-49. To live-trap and transplant Chukar partridge and California valley quail	$ 8,456.25*
2-D	Water Hole Development and Improvement. 1948-49. To restore, improve and develop available water sources	5,775.00*
3-R	Wildlife Survey. 1949. To determine big game ranges and populations, sex ratios, and reproductive rates	27,732.37*
	State Total	$ 41,963.62
	NEW HAMPSHIRE	
1 RD	Southern New Hampshire Pheasant Demonstration and Research Project. 1939-42. To develop techniques of pheasant management and to improve pheasant habitat	$ 7,217.69
2-R	Ruffed Grouse Habitat Research Project. 1940-43. To devise techniques of food and cover manipulation to increase grouse population	12,656.19
3-D	Ruffed Grouse Habitat Improvement Project. 1940-41. To improve cover by clearing, thinning, and planting of trees and shrubs	335.87
4-R	New Hampshire Duck Survey. 1941. To determine incidence of ducks within the State and prepare management plans for selected lakes	317.49
5-D	Ruffed Grouse Habitat Improvement Project. 1942-43. To continue the program begun under Project 3-D	654.73
6-R	Varying Hare Restocking Investigation. 1942-43. To determine the results of restocking with varying hares	989.88
7-R	Investigation of Waterfowl Habitat Improvement Possibilities in New Hampshire. 1945-49. To continue the investigation begun under Project 4-R	23,616.01*

TABLE XII—*Continued*

	Numbers, Names, Descriptions, and Duration of Projects by States	*Federal Funds*
	NEW HAMPSHIRE—*Continued*	
8-R	Mapping and Evaluating New Hampshire Pheasant and Snowshoe Hare Cover. 1947-49. To map and evaluate covers within the State suitable for these species	8,725.78*
9-R	State-wide Wildlife Survey. 1948-49. To make a comprehensive survey of all game and waterfowl resources within the State	24,181.75*
11-D	State-wide Waterfowl Habitat Improvement and Restoration. 1948-49. To establish refuges, construct dams and build up supplies of breeding waterfowl	8,179.48*
12-R	Silviculture in Its Application to Deer Yard Management. 1948-49. To evaluate deer yards and to study the effects of various timber management operations	5,301.00*
13-R	Extent and Control of Damage by Deer. 1948-49. To determine the extent of deer damage to orchards and other agricultural crops and to study damage control methods	7,010.97*
	State Total	$ 99,186.84
	NEW JERSEY	
1-L	New Jersey Game Management Refuge Plan. Lease of 271 acres in Warren County	$ 928.12
2-D	Development of Game Refuge Plan. 1939-40. To fence, post, and improve the habitat on areas leased under Project 1-L	2,427.91
3-R	Study of Pheasant Nests in Relation to Refuges and Public Shooting Grounds. 1939-40. To study the effect of refuges and management areas on nesting by pheasants	2,100.82
4-L	Food Plots to Deflect Seasonal Deer Movements from Agricultural Areas. Lease of 166 acres in Atlantic County	689.09
5-D	Planting Food Plots to Deflect Seasonal Deer Movements from Agricultural Areas. 1940-42. To develop supplemental food supplies on the areas leased under Project 4-L	3,055.86
6-R	Feasibility of Natural Rabbit Propagation as a Method of Producing Rabbits in Sufficient Numbers and of Satisfactory Quality for Restocking Purposes. 1940-41. To determine the value of various management practices as affecting the natural reproduction of rabbits	1,355.68
7-R	Study of Pheasant Nests in Relation to Refuges and Public Shooting Grounds. 1940-41. To continue the investigation begun under Project 3-R	3,031.80
8-L	Game Management Seed Stock Refuge Plan. Lease of 220 acres in Somerset County	420.84
9-D	Game Management Refuge Plan. 1941-42. To develop areas leased under Project 8-L	2,961.66
10-R	Investigation of the Extent of Annual Deer Ranges, Tendency of Deer to Travel, and Population Density of Deer in the Pine Region of New Jersey. 1945. To conduct an investigation of the deer herd within 3 counties containing the pine barrens	2,230.04
11-D	Tuckahoe Wildlife Refuge and Management Area. 1941-49. To establish and develop a waterfowl refuge and management area on a coastal marsh	90,306.24*
12-D	Collier's Mills Lake. 1943. To construct water control structures on the refuge	3,375.00

TABLE XII—*Continued*

	Numbers, Names, Descriptions, and Duration of Projects by States	*Federal Funds*
	NEW JERSEY—*Continued*	
13-L	The Purchase of Existing Exceptions in the State-owned Tuckahoe and Corbin City Waterfowl Area. Acquisition of 201 acres in Atlantic County	942.96
14-R	A Survey and Evaluation of Existing Wildlife Habitat in Camden County. 1943-45. To conduct a county-wide survey	2,199.57
15-D	Collier's Mills Water Impoundment Program. 1943-45. To repair existing dikes within the refuge	4,070.96
16-R	Evaluation of Wildlife Populations on the Tuckahoe-Corbin City Area. 1947-49. To study game use and management on the area developed under Project 11-D	9,352.87*
18-L	Purchase of Greenwood Forest. Acquisition of 8,041 acres in Atlantic County	8,493.75*
19-D	Farm Game Development. 1948-49. To increase upland game by land rental, fencing and posting, habitat improvement and restocking	19,170.79*
20-L	Egg Island Migratory Bird Area. Acquisition of 4,436 acres in Cumberland County	33,750.00*
21-R	Survey of White-tailed Deer in New Jersey. 1948-49. To conduct a state-wide deer survey and study	5,370.75*
	State Total	$196,234.71
	NEW MEXICO	
1-D	Antelope Restoration Project. 1940. To live-trap and transplant antelope	$ 5,896.02
2-L	Bluit Lesser Prairie Chicken Range. Acquisition of 1,280 acres in Roosevelt County	1,920.36
3-L	Milnesand Lesser Prairie Chicken Range. Acquisition of 1,275 acres and lease of 640 acres in Roosevelt County	2,928.08
4-D	Prairie Chicken Range Development. 1940-43. To develop the areas acquired under Projects 2-L and 3-L	4,296.67
5-L	Servilleta Sage Chicken Restoration. Acquisition of 630 acres in Taos County	1,419.43
6-D	Big Hatchet Mountain Sheep Water Development. 1940-42. To develop water supplies for sheep in the Hatchet Mountain area	2,181.78
7-L	Fenton Feeding and Nesting Area. Acquisition of 256 acres in Sandoval County	4,593.22
8-L	Tres Piedras Sage Chicken Restoration. Acquisition of 3,263 acres in Taos County	5,790.68
9-D	Tres Piedras Sage Chicken Area Improvement. 1941-42. To develop the area acquired under Project 8-L	3,369.24
10-D	Antelope Restoration project. 1941-42. To live-trap and transplant antelope	12,909.92
11-L	La Joya Marshes. Acquisition of 1,169 acres in Socorro County	5,479.59*
12-L	Milnesand Lesser Prairie Chicken Range. Acquisition of 1,278 acres in Roosevelt County as an addition to the lands acquired under Project 3-L	2,883.04
13-D	Fenton Feeding and Nesting Area Improvement. 1942-43. To develop the area acquired under Project 7-L	14,106.26*
14-C	Wildlife Management Coordination. 1942-49. To provide administration and coordination of restoration program	39,702.32*
15-D	Antelope Restoration Project. 1942-43. To live-trap and transplant antelope	12,302.21

TABLE XII—*Continued*

	Numbers, Names, Descriptions, and Duration of Projects by States	*Federal Funds*
	NEW MEXICO—*Continued*	
16-D	Antelope Restoration Project. 1943-48. To live-trap and transplant antelope	10,303.21*
17-D	La Joya Marshes. 1943-48. To develop the area to be acquired under Project 11-L	3,642.54*
18-D	Servilleta Sage Chicken Restoration. 1943. To develop the area acquired under Project 5-L	1,437.94
19-L	Bishop Range Prairie Chicken Restoration. Acquisition of 3,386 acres in Harding County	11,415.68
20-D	Antelope, Prairie Chicken and Other Wildlife Restoration. 1943-49. To control predators on restoration areas	62,661.61*
21-D	Bishop Range Prairie Chicken Restoration. 1943-48. To develop the area acquired under Project 19-L	4,332.49*
22-R	Eastern New Mexico White-tailed Sandhill Deer Restoration. 1944-46. To study white-tailed deer in the sandhills area and to determine the value of predator control	7,593.12
23-R	Fox Mountain Restoration Unit. 1944-45. To conduct an investigation on this area within the Apache National Forest, to determine limiting factors affecting deer, turkey and antelope in the area	5,249.97
24-L	Gallina Wells Prairie Chicken Restoration Range. Acquisition of 3,751 acres in Roosevelt County	8,956.34
25-L	Crossroads Prairie Chicken Restoration Unit. Acquisition of 2,200 acres and lease of 160 acres in Roosevelt County	7,205.55*
26-L	Nigger Hills Prairie Chicken Restoration Unit. Acquisition of 1,320 acres in Roosevelt County	3,807.19
27-L	Rosebud Prairie Chicken Restoration Unit. Acquisition of 641 acres in Harding County	2,180.98
28-D	Nigger Hills Prairie Chicken Restoration Unit. 1944-47. To develop the area acquired under Project 26-L	2,323.06
29-L	Lesser Prairie Chicken Restoration Range (South Section Claudell unit). Acquisition of 1,600 acres in Roosevelt County	5,711.53
30-L	Lesser Prairie Chicken Restoration Ranges (S. Section S. Bluit Unit). Acquisition of 640 acres in Roosevelt County as an addition to the lands acquired under Project 2-L	1,516.50
31-R	Merriam Turkey and Other Reports. 1946-48. To publish 3 bulletins concerning the Merriam turkey, scaled quail, and live-trapping and transplanting, respectively	2,191.20*
32-L	Lesser Prairie Chicken Restoration Ranges. Acquisition of 626 acres in De Baca County, and 160 acres in Roosevelt County as an addition to the lands acquired under Project 29-L	3,582.38*
33-D	Rosebud Prairie Chicken Restoration Unit. To fence the area acquired under Project 27-L	1,626.44
34-D	Pheasant Restoration. 1945-47. To stock pheasants by purchase and release, and predator control on released areas	8,858.39
35-D	Crossroads Prairie Chicken Range Fence Development. 1945-47. To fence the area acquired under Project 25-L and to construct fire guards	1,625.09
36-D	South Bluit Prairie Chicken Restoration Range, Fence Development. 1945-47. To construct boundary fence and fire guards on the area acquired under Project 30-L	1,157.48
37-L	Santa Tomas Wildlife Range. Acquisition of 3,057 acres in Dona Ana County	1,567.50*

TABLE XII—*Continued*

	Numbers, Names, Descriptions, and Duration of Projects by States	*Federal Funds*
	NEW MEXICO—*Continued*	
38-D	Gallina Wells Prairie Chicken Range—Fence and Fireguard Development, with Building Improvement. 1946-49. To develop the area acquired under Project 24-L as indicated	8,986.47*
39-D	Bluit Prairie Chicken Range Fence Development. 1946-47. To construct fence and fire guard on the area acquired under Project 2-L	910.74
40-D	Sandhill White-tailed Deer Restoration. 1947. To control predators in the Sandhill area investigated under Project 22-R	2,299.50
41-R	Distribution and Management of Avian Malaria Occurring in New Mexico Quail. 1947-49. To determine the occurrence and percentage of infection and to investigate possible control measures	15,181.60*
42-D	Claudell Restoration Range Development. 1948-49. To construct fence and improve building on the area acquired under Project 29-L	4,429.64*
44-D	Bobwhite Quail Restoration. 1947-48. To restore bobwhite quail in the eastern part of the state by the purchase and release of game farm birds	3,606.91*
45-D	Liberty Restoration Range—Development. 1948-49. To develop the area acquired under segment 1 of Project 32-L	1,618.02*
46-L	Jackson Lake Wildlife Range. Acquisition of 440 acres and lease of 2,880 acres in San Juan County	32,732.33*
47-D	Prairie Chicken Ranges—Development. 1948-49. To develop the areas acquired under Projects 25-L, 26-L, 27-L, and 30-L	4,352.36*
48-L	Washington Ranch Restoration Range. Acquisition of 3,600 acres in Eddy County	73,630,89*
	State Total	$426,473.47
	NEW YORK	
1-R	Wildlife Management Research Project. 1939-46. To conduct state-wide specific investigations and prepare management recommendations	$219,125.26
2-L	Purchase of Additional Land for Research Center. Acquisition of 94 acres in Albany County	6,990.00
3-D	Construction of Pathological Laboratory — Wildlife Research Center. 1939-43. To construct research headquarters at Delmar	29,034.87
4-L	Leasing Land for Seed Stock Refuges for Upland Game and Furbearers. Lease of 8,172 acres in Seneca and Ulster Counties	5,460.76
5-D	Development of Seed Stock Refuges. 1939-40. To fence and post the areas leased under Project 4-L	2,471.86
6-D	Revegetation of Lands Deficient in Food and Cover on State Areas. 1939-42. To plant trees and shrubs on State areas in 16 counties	3,543.62
7-L	Establishment of Wildlife Management Areas. Lease of 18,500 acres in Steuben, Monroe, and Orange Counties	10,260.68
8-D	Development of Wildlife Management Areas. 1940-41. To develop the areas leased under Project 7-L	7,881.39
9-D	Revegetation of State Game Management Areas. 1940-41. To improve the cover on State game areas in 18 counties	4,583.40

TABLE XII—*Continued*

	Numbers, Names, Descriptions, and Duration of Projects by States	*Federal Funds*
	NEW YORK—*Continued*	
10–R	State-wide Wildlife Survey. 1941-42. To locate desirable wildlife areas and to prepare management plans	6,517.06
11–D	Miscellaneous Construction Project. 1941-43. To construct improvements at the Wildlife Research Center and at the Partridge Run Game Management Area	8,592.18
12–L	Acquisition of the Oak Orchard Swamp Game Management Area. Acquisition of 2,243 acres in Orleans and Genessee Counties	36,559.56*
13–D	Revegetation of State Game Management Areas. 1941. To continue the program begun under Projects 6-D and 9-D	9,580.20
14-C	Wildlife Management Coordination. 1942-45. To provide administration and coordination of restoration program	12,657.70
16–D	Revegetation of State Game Management Areas. 1942. To continue the program conducted under Projects 6-D, 9-D, and 13-D	6,789.69
17–R	Location and Survey of State Lands Potentially Available for Wildlife Management Purposes. 1943-44. To conduct a state-wide survey for the purpose of locating game management areas	3,155.74
18–L	Acquisition of the Cicero Swamp Game Management Area. Acquisition of 3,624 acres in Onandago County	36,517.45
19–R	Preparation of Work Plans for Upland Game Areas. 1945-46. To prepare work plans for upland game management areas	3,708.08
20–R	Ontario-St. Lawrence Waterfowl Project. 1945-48. To conduct waterfowl investigations in the north central portion of the State	15,674.50*
21–R	Organization and Correlation of New York Waterfowl Banding Records. 1946-48. To analyze and summarize the State's waterfowl banding records	1,849.29
22–R	Varying Hare and Cottontail Rabbit Investigations. 1946-49. To conduct investigations concerned with the reestablishment of these species	28,522.84*
23–R	Definition of the Major Divisions of Game Range in New York, Their Extent and Characteristics. 1946-49. To prepare a state-wide cover map, determine trends and historic changes, and correlate game range and distribution	12,979.36*
24–R	Controlling of Nuisance Game Species. 1946-49. To test and devise practicable methods for controlling crop damage by wildlife	11,707.63*
25–R	Biometrical Analysis of Management Research Data. 1946-48. To analyze the data collected under the several survey and investigation projects	4,951.11
26–R	Pheasant Management Research. 1946-49. To conduct investigations for the purpose of improving the status of this game species	36,755.69*
27–R	Fox-Pheasant Relations. 1946-49. To determine the status of the red fox as a predator on pheasants and the value of fox control	26,771.01*
28–R	Deer Management Research. 1946-49. To conduct investigations and to prepare management recommendations	31,190.10*
29–R	Food Habits Research. 1946-48. To determine the food habits of important game and predator species	1,502.02
30–D	Management of Timber Resources on Game Management Areas. 1946-48. To manage timber stands for the purpose of improving the areas as wildlife habitat	4,851.42

TABLE XII—*Continued*

	Numbers, Names, Descriptions, and Duration of Projects by States	*Federal Funds*
	NEW YORK—*Continued*	
31-D	Water Chestnut Eradication in New York State. 1946-49. To eradicate water chestnut where found throughout the State	44,052.72*
32-R	Surveys and Investigations of Potential Waterfowl and Upland Game Areas. 1946-49. To locate and investigate potential management areas throughout the State	20,514.12*
33-L	Acquisition of Baldwinsville Area. Acquisition of 2,545 acres in Onandago County	28,703.66*
34-R	Fur Resources Management Research. 1947-49. To conduct investigations of the fur resources and to prepare management recommendations	19,744.64*
35-R	Research in Wildlife Pathology and Physiology. 1947-49. To conduct investigations as indicated	11,631.28*
36-R	Lake Champlain Valley Waterfowl Investigations. 1947-48. To conduct waterfowl investigations in the Lake Champlain Valley	9,633.71*
37-D	Management of Timber Resources on Game Management Areas. 1947-49. To continue the program begun under project 30-D	6,374.75*
38-M	Maintenance of Wildlife Pathological Laboratory at Delmar (3-D). 1948. To repair the heating system in the research center	510.00
39-R	Waterfowl Banding and Census. 1948-49. To determine the migrational flight routes by censusing and banding	9,399.52*
41-D	Waterfowl Development of the Cicero Swamp and High Tor Game Management Areas. 1948-49. To construct dikes and blast potholes for the purpose of improving the areas as waterfowl habitat	6,781.50*
42-L	Acquisition of Happy Valley Game Management Area Alienation. Acquisition of 109 acres in Oswego County	412.50*
43-R	Investigations of Possibilities for Wildlife Development on Private Lands Through County Soil Conservation Districts. 1948. To investigate the possibilities for cooperative upland game habitat development	595.82*
44-D	Development of the Oak Orchard Creek Management Area. 1948-49. To develop the area for waterfowl by the construction of water control structures	44,579.63*
45-D	Emergency Winter Feeding of Wildlife. 1948. To facilitate the program of winter feeding under emergency conditions	3,712.50*
46-C	Wildlife Management Coordination. 1948-49. To provide administration and coordination of restoration program	15,101.91*
47-R	Lower Hudson Waterfowl Investigation. 1948-49. To conduct investigations in the lower Hudson River Valley	8,634.18*
48-D	Improvement of Wildlife Habitat on Private Lands Through the Soil Conservation Districts. 1948-49. To conduct a state-wide habitat improvement program based on findings of Project 43-R	69,728.14*
50-D	Demonstrational Pheasant Management Development on Oak Orchard, Baldwinsville, Cicero Swamp, and Montezuma Marsh Areas. 1948-49. To conduct demonstrational habitat development and management on these areas	13,804.37*
	State Total	$904,099.42

TABLE XII—*Continued*

	Numbers, Names, Descriptions, and Duration of Projects by States	*Federal Funds*
	NORTH CAROLINA	
1–D	Construction of Two Impounding Dams. 1939-40. To construct two dams on the Sandhills Game Management Area	$ 1,850,86
2–R	Research in Farm Game Management Practices. 1940-44. To conduct investigations and to develop practical upland game management practices	25,712.71
3–D	Holly Shelter Wildlife Refuge Area. 1940-43. To survey and post boundary and to construct roads, bridges, buildings, and other improvements	58,088.52
4–L	Holly Shelter Wildlife Refuge Area. Acquisition of 1,788 acres in Pender County	4,365.16
5–D	Water Impoundment Program, Sandhills Upland Game Refuge. 1940-43. To develop additional water supplies for wildlife on the Sandhills area	14,977.13
6–R	Marsh Resources Investigation. 1940-49. To conduct waterfowl and furbearer investigation and to develop management procedures	39,098.74*
7–D	Food and Cover Strip Planting, Sandhills Upland Game Area. 1940. To improve game habitat by planting	1,258.43
8–L	Holly Shelter Wildlife Refuge Area. Acquisition of 25 acres in Pender County as an addition to the lands acquired under Project 4-L	1,144.95
9–D	John Pickett Council Deer Refuge. 1940. To fence and post the refuge	388.34*
10–R	Deer Study. 1941-42. To conduct state-wide deer investigations and to prepare management recommendations	6,756.93
11–L	Holly Shelter Wildlife Refuge Area, Land Acquisition. Acquisition of 8,327 acres in Pender County as an addition to the lands acquired under Projects 4 L and 8-L	6,777.50
12–C	Wildlife Management Coordination. 1942-49. To provide administration and coordination of restoration program	32,332.01*
13–D	Development of Farm Game Demonstration Units. 1943-44. To develop a state-wide system of farm game demonstration areas	6,464.04
15–L	Survey and Investigate Ungranted and Other State Lands. 1944-45. To locate and investigate suitability of such lands for wildlife restoration purposes	2,749.46
16–D	Farm Game Habitat Restoration. 1944-49. To establish lespedeza border strips on a state-wide basis to improve habitat for bobwhite quail	33,162.75*
17–L	Goose Creek Land Purchase Project. Acquisition of 5,866 acres in Beaufort and Pamlico Counties	7,980.49
18–R	Study of Deer Management at Holly Shelter Wildlife Management Area. 1944-49. To investigate problems peculiar to the Holly Shelter area and to prepare a management plan	12,977.97*
19–D	Uwharrie Deer Restoration Project. 1944-45. To establish a game management area within this national forest unit and to restock same with white-tailed deer	4,138.72
20–R	State-wide Investigation of Wildlife Habitat and Distribution. 1946-49. To conduct by counties a state-wide inventory of wildlife and wildlife habitat	55,041.75*
21–D	State-wide Deer Trapping and Transplanting Project. 1946-49. To live-trap and transplant deer	25,949.52*
22–D	Wild Turkey Restoration. 1948-49. To establish and develop turkey restoration areas	12,334.50*

TABLE XII—*Continued*

	Numbers, Names, Descriptions, and Duration of Projects by States	*Federal Funds*
	NORTH CAROLINA—*Continued*	
23-M	Holly Shelter Maintenance. 1948-49. To maintain the improvements constructed under Project 3-D	11,616.34*
	State Total	$365,166.82
	NORTH DAKOTA	
1-L	Dawson Game Refuge. Acquisition of 640 acres in Kidder County	$ 1,806.11
2-D	Dawson Game Refuge. 1940-42. To develop the area acquired under Project 1-L	3,795.47
3-D	Cedar Lake Refuge. 1940-43. To fence and post the refuge and to improve habitat by planting trees and shrubs	1,122.16
4-D	Morton County Upland Game Refuge. 1940-43. To fence and post the refuge, plant trees and shrubs and construct fire breaks and a small dam	1,055.43
5-R	Factors Influencing Survival of Ring-necked Pheasant, Sharp-tailed Grouse and Hungarian Partridge. 1940-41. To conduct investigations concerning these upland game birds	4,323.36
6-L	Wells County Upland Game Refuge. Acquisition of 640 acres in Wells County	508.54
7-R	Wildlife Survey and Investigation Project. 1941-49. To conduct state-wide wildlife censuses and investigations and to prepare management recommendations	156,105.18*
8-C	Wildlife Management Coordination. 1942-49. To provide administration and coordination of restoration program	27,132.20*
9-L	Lake Washington Refuge. Acquisition of 910 acres in Eddy County	5,578.30
11-D	Posting and Marking Boundaries of State Game Refuges. 1942-44. To post and mark refuge boundaries	3,871.72
12-D	Wells County Upland Game Refuge. 1942-43. To develop the area acquired under Project 6-L	894.25
13-L	Fuller's Lake Game Refuge. Acquisition of 807 acres in Steele County	8,250.31*
14-L	Wakopa Creek Refuge. Acquisition of 3,702 acres in Rolette County	24,744.82
15-L	Cedar Lake Game Refuge. Acquisition of 177 acres in Slope County	961.30
16-D	Wakopa Development. 1948-49. To develop the area, acquired under Project 14-L, by the construction of various improvements	6,081.75*
17-D	4-H Club Cooperative Development project. 1948-49. To develop upland game bird habitat by cooperation with 4-H clubs	7,693.13*
18-D	State Refuges Development. 1949. To develop and improve refuges throughout the State	26,319.97*
19-R	Cooperative Migratory Waterfowl Project. 1948-49. To conduct state-wide waterfowl investigations and censuses	7,087.50*
	State Total	$287,331.50
	OHIO	
1-L	Resthaven Sanctuary Acquisition. Acquisition of 1,365 acres and lease of 801 acres in Erie and Sandusky Counties	$ 30,777.72*
3-R	State-wide Wildlife Survey and Game Management Project. 1940-41. To conduct a state-wide survey	18,645.04

TABLE XII—*Continued*

	Numbers, Names, Descriptions, and Duration of Projects by States	*Federal Funds*
	OHIO—*Continued*	
4-R	Research into Methods of Increasing Ruffed Grouse Population in Ohio. 1940-46. To conduct investigations and prepare management recommendations	18,795.72*
5-D	Grandview Grouse Management Area. 1940-43. To lease land, fence and post the area, and improve habitat by thinnings and clearings	1,219.07
6-D	Liberty Grouse Management Area. 1940-43. To lease land, fence and post the area, and improve habitat by thinnings and clearings	1,272.11
7-D	Grouse Restocking and Restoration. 1941-42. To restock management areas in 8 counties	2,943.70
8-L	Wyandott Game Refuge. Acquisition of 383 acres in Wyandotte County	13,502.85
9-L	Lyme Refuge. Acquisition of 438 acres in Ashtabula County	2,037.14
10-L	Willard Marsh. Acquisition of 1,509 acres in Huron and Crawford Counties	30,930.84
11-L	Williams County Refuge. Acquisition of 153 acres in Williams County	4,789.82
12-C	Wildlife Management Coordination. 1943-49. To provide administration and coordination of restoration program	52,100.76*
13-R	Testing Value of Cover Strip Development for Wildlife Nesting and Propagation. 1942-47. To determine the value to wildlife of various types of cover strips	5,315.09
14-R	Testing Methods of Increasing Raccoon Populations. 1942-46. To conduct experimental raccoon management	14,916.11
15-R	Testing of Methods of Increasing Muskrat Populations. 1942-45. To conduct investigations and experimental management	10,632.40
16-R	Testing Methods of Increasing Rabbit Populations. 1942-47. To conduct investigations and experimental management	3,929.11
17-R	Testing of Methods of Increasing Squirrel Populations. 1942-47. To conduct investigations and experimental management	10,649.71*
18-L	The Coal Grouse Demonstration Area. Lease of 1,205 acres in Jackson County	456.37
19-D	Cooperative Wildlife Habitat Restoration for Ohio Wildlife. 1942-47. To develop seed stock refuges for upland game by cooperation with land owners	69,635.56
20-R	The Cooperative Study of Reproductivity of Hungarian Partridge. 1942-45. To conduct investigations and experimental management	6,977.47
21-D	Williams County Refuge Development. 1942-48. To develop the area acquired under Project 11-L	687.46
23-D	Resthaven Sanctuary Development. 1942-48. To develop the area acquired under Project 1-L	40,818.39*
26-D	Ohio Wildlife Food and Cover Planting Program. 1943-45. To improve upland game habitat by state-wide program of food and cover planting	16,553.13
27-D	Cooperative Farm Pond Development. 1943-47. To improve wildlife habitat by cooperative program of farm pond construction and habitat improvement	79,538.63
28-L	Brush Creek Restoration Unit. Acquisition of 1,674 acres in Jefferson County	12,270.42
29-L	Leesville Restoration Unit. Acquisition of 234 acres in Carroll County	2,500.91

TABLE XII—*Continued*

	Numbers, Names, Descriptions, and Duration of Projects by States	*Federal Funds*
	OHIO—*Continued*	
30-L	Roosevelt Game Preserve. Acquisition of 1,505 acres in Scioto and Adams County	7,592.17
31-L	Waterloo Restoration Unit. Acquisition of 1,199 acres in Athens County	11,881.53
32-R	Testing Methods of Increasing Farm-Game Populations. 1943-47. To determine the relationship between bobwhite quail and farming practices and to conduct experimental management	15,780.08
33-D	Deer Disposal or Redistribution. 1943 44. To live-trap and transplant deer	1,999.13
34-L	Oldaker Wildlife Restoration Unit. Acquisition of 140 acres in Highland County	4,795.93
38-L	Trimble Restoration Unit. Acquisition of 2,051 acres in Athens County	8,704.37
39-D	Wyandotte Game Refuge Development. 1945. To repair buildings on the area acquired under Project 8-L	1,252.84
40-D	Oldaker Wildlife Restoration Unit Development. 1945-47. To repair the barn and fencing on the area acquired under Project 34-L and to improve the cover for wildlife	2,568.01
41-R	Ohio Waterfowl Survey. 1946-47. To inventory the waterfowl and waterfowl habitat within Ohio	3,792.82
42-R	Farm Pond Survey. 1946. To determine the value to wildlife of the farm ponds constructed in part under Project 27-D	1,524.10
43-D	Brush Creek Wildlife Restoration Unit Development. 1946-47. To develop the area acquired under Project 28-L	3,046.54
44-D	Trimble Wildlife Restoration Unit Development. 1947-48. To develop the area acquired under Project 38-L	5,089.19
45-M	Maintenance of Williams County Refuge. 1948-49. To maintain the improvements on the area acquired under Project 11-L and developed under Project 21-D.	2,512.50*
46-D	Cooperative Farm Pond Development. 1948-49. To develop the wildlife habitat on areas surrounding farm ponds	13,500.00*
47-M	Maintenance of Cooperative Farm Pond Development. 1948-49. To maintain the farm pond impoundments, fences, signs, and food and cover developments installed under Project 27-D	12,750.00*
48-M	Maintenance of Cooperative Wildlife Habitat Restoration for Ohio Wildlife. 1948-49. To maintain the seed stock refuges developed under Project 19-D	22,500.00*
49-D	State-wide Wildlife Habitat Development. 1948-50. To lease and establish refuges, fence and post, plant trees and shrubs, purchase standing food and cover, restock and supplement food as needed	168,750.00*
50-M	Brush Creek Wildlife Restoration Unit Maintenance. 1948-49. To maintain the wildlife habitat improvements made under Project 43-D on the area acquired under Project 28-L	3,150.00*
51-M	Oldaker Wildlife Restoration Unit Maintenance. 1948-49. To maintain the wildlife habitat improvement made under Project 40-D on the area acquired under Project 34-L	1,050.00*
52-M	Maintenance of Trimble Wildlife Restoration Unit. 1949. To maintain the improvements made under Project 44-D on the area acquired under Project 38-L	6,225.00*
	State Total	$750,359.74

TABLE XII—*Continued*

	Numbers, Names, Descriptions, and Duration of Projects by States	*Federal Funds*
	OKLAHOMA	
1-D	Bobwhite Quail Management and Restocking. 1939. To establish refuge areas and restock with game farm birds	$ 7,272.24
2-R	State-wide Wildlife Survey, Restoration and Management Project. 1940-42. To conduct a state-wide survey and prepare management recommendations	36,271.08
3-D	State-wide Bobwhite Quail Management and Restocking Project. 1940. To continue the program begun under Project 1-D	4,805.98
4-D	State-wide Bobwhite Quail Management and Restocking Project. 1941. To continue the program of Projects 1-D and 3-D	18,602.00
5-D	McCurtain County State Game Preserve. 1941-48. To construct buildings, bridges, fences and other improvements	33,743.29*
6-D	State-wide Bobwhite and Scaled Quail Restocking, and Experimental Restocking and Management Project. 1942-43. To continue and expand the restocking program of Projects 1-D, 3-D and 4-D	11,042.04
7-R	Restoration, Management and Investigation Project. 1943-44. To revise and complete the investigative program begun under Project 2-R	15,174.01
8-D	State-wide Bobwhite and Scaled Quail Restocking. 1942. To continue the restocking program of Project 6-D	1,814.64
11-D	Wildlife Restocking Project. 1944-48. To live-trap and transplant game birds and mammals	20,582.60*
12-C	Wildlife Management Coordination. 1945-49. To provide administration and coordination of restoration program	9,639.62*
13-L	Honey Creek Land Acquisition Project. Acquisition of 30 acres in Delaware County	900.75*
14-D	Honey Creek Development Project. To construct a deer proof enclosure at Honey Creek	8,457.19
16-L	Spavinaw Hills Land Acquisition Project. Acquisition of 12,355 acres in Delaware and Mayes Counties	71,688.90*
17-L	Cookson Hills Land Acquisition Project. Acquisition of 8,586 acres in Cherokee and Adair Counties	27,150.14*
18-L	Lake Okmulgee Land Acquisition Project. Acquisition of 1,349 acres in Okmulgee County	10,782.48*
21-D	Fort Supply Reservoir Development Project. 1948. To construct a fence around the lake	3,162.94*
22-D	Predatory Animal Control. 1948. To trap predators on restoration areas	1,500.00*
23-D	Wildlife Restoration Project. 1948-49. To live-trap and transplant white-tailed deer and raccoon	7,481.25*
24-D	Wildlife Habitat Improvement Project. 1949. To improve upland game habitat on farms by cooperation with landowners	14,323.05*
25-D	Lesser Prairie Chicken Restoration. 1949. To establish and develop a restoration unit	5,839.50*
26-L	Ellis County Land Lease Project. To lease 3,200 acres in Ellis County for habitat improvement and restoration	432.00*
	State Total	$310,665.70

TABLE XII—*Continued*

	Numbers, Names, Descriptions, and Duration of Projects by States	*Federal Funds*
	OREGON	
1–D	Beaver Management in Oregon. 1939-44. To live trap and transplant beaver	$ 20,056.43
2–D	Sage Grouse Habitat Improvement. 1939-42. To improve sage grouse habitat in southeastern Oregon by fencing and improving food, cover and water supplies	7,974.73
3–D	Reseeding of a Burned-over Area in Tillamook, Washington, and Yamhill Counties. 1940. To seed a large burn to improve the area as wildlife habitat	2,099.20
4–D	Establishment of Seed Stock Refuges for Small Game in the Willamette Valley, Oregon. 1940-43. To lease, post and restock small refuge areas	9,230.92
5–L	Summer Lake Waterfowl Refuge and Game Management Area. Acquisition of 1,841 acres and lease of 1,527 acres in Lake County	35,822.25*
6–R	Survey of Wildlife Resources. 1941-48. To conduct general wildlife surveys and prepare management recommendations	58,130.59*
8–L	Willamette Valley Waterfowl Refuge System—Camas Swale Unit. Acquisition of 2,432 acres in Lane County	69,009.36
9–D	Summer Lake Migratory Waterfowl and Game Management Area Development. 1945-49. To construct improvements and impoundments on the Summer Lake area	82,184.60*
11–R	A Study of Game Damage Control Methods. 1947-49. To study the control of game damage to agricultural crops and to devise practical control methods	7,342.10*
12–R	Summer Lake Valley Pheasant Study. 1947-49. To study artificial restocking of pheasants and determine success and survival	3,346.66*
13–L	Sauvie's Island Waterfowl and Game Management Area. Acquisition of 1,649 acres in Multonomah and Columbia Counties	141,098.88*
14–L	Glen Calkins Land Lease, Summer Lake Game Management Area. Lease of 120 acres at Summer Lake for the production of game bird food supplies	525.00
17–C	Wildlife Management Coordination. 1948-49. To provide administration and coordination of restoration program	6,650.04*
18–R	Investigation of Specific Game Management Units. 1948-49. To locate and evaluate potential game management areas and prepare development plans	4,320.02*
20–M	Summer Lake Game Management Area Maintenance. 1948-49. To maintain the developments made under Project 9-D	3,180.87*
	State Total	$450,971.65
	PENNSYLVANIA	
1–R	Economic Survey and General Inventory of Native Pa. Furbearers. 1939-44. To conduct a survey as indicated	$ 8,677.18
2–L	Acquisition of Lands for State Game Management Areas. Acquisition of 10,057 acres in 9 counties	33,706.52
3–L	Acquisition of Lands for Game Management Areas. Acquisition of 702 acres in Cumberland County	8,911.12
4–R	Controlled Deer Breeding Experiment. 1940-43. To conduct a breeding experiment at the Loyalsock State Game Farm	3,922.71
5–D	Establishment of Loyalsock Wildlife Experiment Station. 1940. To construct animal holding pens, install a water system, and repair buildings	2,129.20

TABLE XII—*Continued*

	Numbers, Names, Descriptions, and Duration of Projects by States	*Federal Funds*
	PENNSYLVANIA—*Continued*	
6–R	General Ecological Investigation. 1940-43. To conduct investigations to determine the relationship to habitat and the effects of habitat changes	4,258.74
7–L	Acquisitions of Lands for Game Management Areas, Designated by Pa. Law "State Game Lands." Acquisition of 15,041 acres in 11 counties	51,830.68
8–R	Furbearing Animal Investigation. 1940-42. To conduct investigations in northwestern Pa. with special reference to the muskrat	4,040.32
9–R	Study of Forest-Wildlife Problems. 1940-43. To study timber management as related to wildlife with special reference to fires and controlled burning	12,178.77
10–L	Acquisition of Lands for Game Management Areas. Acquisition of 15,712 acres in 9 counties	72,011.40
11–L	Acquisition of Lands for Game Management Areas, Designated "State Game Lands." Acquisition of 9,843 acres in 9 counties	34,108.59
12–L	Acquisition of Lands for Game Management Areas. Acquisition of 15,523 acres in 23 counties	78,662.84
13–L	Acquisition of lands for Game Management Areas—"State Game Lands." Acquisition of 16,943 acres in 3 counties	49,952.61
14–L	State Game Lands. Acquisition of 549 acres in Lehigh County	11,374.59
15–L	Acquisition of Lands for Game Management Areas. Acquisition of 11,501 acres in 12 counties	40,991.51
16–R	Bobwhite Quail Study. 1944-47. To conduct investigations and experimental management with special reference to the determination of the value of artificial restocking	11,208.85
17–L	State Game Lands. Acquisition of 27,382 acres in Dauphin and Lebanon Counties	44,529.14
18–L	Acquisition of State Game Lands. Acquisition of 12,660 acres in Dauphin and Lebanon Counties	25,168.69
19–L	Acquisition of State Game Lands. Acquisition of 4,593 acres in Carbon and Crawford Counties	31,546.38*
20–R	Survey of Pennsylvania Mammals. 1947-49. To conduct a general survey in northwestern Pa.	24,930.19*
21–R	Cover-Type and Soils Mapping of State Game Lands. 1947-49. To prepare soil and cover maps and timber estimates	91,291.67*
22–L	Acquisition of State Game Lands. Acquisition of 6,801 acres in Centre County	18,553.86*
23–L	Acquisition of State Game Lands. Acquisition of 915 acres in Carbon, Centre and Crawford Counties	3,280.47*
24–R	Survey of Pennsylvania Mammals. (S.W. Pa.) 1948-49. To conduct a general mammal survey of southwestern Pa.	20,651.25*
25–R	Cottontail Rabbit Management Study. (N.W. Pa.) 1948-49. To conduct experimental rabbit management	9,322.50*
26–R	Cottontail Rabbit Management Study. (N.E. Pa.) 1948-49. To conduct experimental rabbit management	9,322.50*
27–D	Forest-Wildlife Development. 1948-49. To improve wildlife habitat on State game lands by timber cutting and management	67,750.75*
28–D	Farm Game Development. 1948-49. To develop wildlife habitat on farm by leasing, fencing, seeding and planting	157,294.79*
29–C	Wildlife Management Coordination. 1948-49. To provide administration and coordination of restoration program	9,813.82*

	Numbers, Names, Descriptions, and Duration of Projects by States	*Federal Funds*
	PENNSYLVANIA—*Continued*	
30-R	Survey of Pennsylvania Migratory Waterfowl. 1948-49. To survey the waterfowl habitat of the State, locate potential development areas and prepare recommendations	7,500.00*
31-R	A Study in Environmental Control of Forested Lands for Game Management. 1948-49. To evaluate experiments and determine the relative value of various methods of increasing wildlife food and cover	13,500.00*
32-R	Wood Duck Nesting Box Study. 1948-49. To distribute nesting boxes on a state-wide basis and determine their value in increasing the wood duck population	2,722.50*
33-L	Acquisition of State Game Lands. Acquisition of 2,654 acres in 7 counties	24,054.83*
	State Total	$989,198.97
	RHODE ISLAND	
1-R	Demonstration Game Management Unit No. 1 "Watchaug." 1939-42. To conduct investigations on the Burlingame Reservation and to develop practicable game management methods	$ 3,312.33
2-D	Waterfowl and Muskrat Habitat Improvement Demonstration. 1944. To demonstrate habitat improvement and management of waterfowl and muskrats in Watchaug Pond	1,366.19
3-D	Seed Stock Refuge Development. 1945. To establish upland game bird refuges and improve habitat thereon	498.10
4-D	Arcadia State Park Habitat Improvement. 1946-49. To improve and develop habitat for wildlife within Arcadia State Park	10,911.57*
5-R	A survey of Rhode Island's Salt and Brackish Water Ponds and Marshes. 1948-49. To survey the coastal waterfowl habitat and prepare management recommendations	4,087.88*
6-R	Estimate of Wildlife Population in Rhode Island. 1948-49. To estimate the population of various species of wildlife within the State	2,450.25*
7-D	State Game Refuge Program. 1949. To improve upland game habitat on farms under cooperative agreement	13,546.50*
	State Total	$ 36,172.82
	SOUTH CAROLINA	
1-D	Enoree Quail Stocking and Management Program, Sumter National Forest. 1939-42. To restock the Enoree Ranger District with bobwhite quail and manage the habitat for this species	$ 1,516.87
2-D	Poinsett State Forest and Game Management Project. 1940-42. To improve the quail habitat on this area and to restock with game farm birds	13,230.79
4-L	South Carolina Game Preserve. Acquisition of 5,837 acres in Hampton County	37,725.00
5-D	Belmont State Game Management Area. 1942-45. To develop the area acquired under Project 4-L	42,576.02
6-D	Santee Waterfowl Development—Dean Swamp Unit. 1946-48. To stabilize water levels and plant waterfowl foods on this portion of the Santee-Cooper Reservoir	13,648.12*

TABLE XII—*Continued*

	Numbers, Names, Descriptions, and Duration of Projects by States	*Federal Funds*
	SOUTH CAROLINA—*Continued*	
7–D	Santee-Cooper Game Development. 1947-49. To improve and develop waterfowl and upland game habitat about the Santee-Cooper Reservoir	23,705.11*
8–M	Maintenance of Belmont State Game Management Area. 1949. To repair and maintain the improvements made under Project 5-D on the area acquired under Project 4-L	11,217.04*
9–D	State-wide Farm Game Restoration. 1947-49. To improve quail habitat by the distribution of lespedeza seed and seedlings to cooperating farmers	25,516.50*
10–D	Francis Marion Turkey Project. 1948-49. To develop the Waterhorn Tract within this National Forest as a turkey management unit	20,773.50*
	State Total	$189,908.95
	SOUTH DAKOTA	
1–L	Gerkin Refuge. Acquisition of 960 acres in Faulk County	$ 4,181.87
5–L	Vobejda Lake. Acquisition of 60 acres in Perkins County	176.70
6–L	Buffalo Slough. Acquisition of 660 acres in Lake County	9,028.93
8–D	Beaver Restocking. 1941. To live-trap and transplant beaver	1,253.69
9–D	Pheasant Restocking. 1940-41. To live-trap and transplant pheasants	3,609.63
10–L	Sioux-Poinsett Restoration. Acquisition of 1,406 acres in Hamlin, Brookings and Kingsbury Counties	20,798.21*
11–D	Sioux-Poinsett Development. 1941-48. To develop the area acquired under Project 10-L	78,708.54*
12 R	State-wide Big Game Survey. 1942-49. To conduct big game censuses, surveys, and investigations and to prepare management recommendations	48,951.65*
13 L	Lake Louise Refuge. Acquisition of 961 acres in Hand County	3,630.14
14–R	South Dakota Pheasant Study. 1946. To conduct surveys and investigations throughout the range of the pheasant within the State	5,831.15
15–D	Buffalo Slough Development. 1945-46. To construct a water control structure on the area acquired under Project 6-L	13,757.39*
17 R	South Dakota Small Game and Furbearer Study. 1947-49. To conduct investigations of upland game and furbearers and to prepare management recommendations	79,790.22*
18–C	Wildlife Management Coordination. 1948-49. To provide administration and coordination of restoration program	9,166.50*
19–D	Game Cover Development Project. 1948-49. To improve and develop upland game bird habitat by the planting of herbaceous and woody cover	99,113.98*
	State Total	$377,998.60
	TENNESSEE	
1–L	Cheatham State Game Preserve. Acquisition of 18,312 acres in Cheatham County	$ 67,998.01
2–D	Tennessee Deer Restoration Project. 1940-41. To construct a deer-proof enclosure and stock same with white-tailed deer, for the subsequent restocking of areas throughout the State	10,253.04

TABLE XII—*Continued*

	Numbers, Names, Descriptions, and Duration of Projects by States	*Federal Funds*
	TENNESSEE—*Continued*	
3-L	Catoosa Game Management Area. Acquisition of 60,559 acres in Cumberland, Morgan and Fentress Counties	27,293.28
4-L	Cheatham County Game Preserve. Acquisition of 863 acres as an addition to the lands acquired under Project 1-L	3,962.64
5-L	Cheatham County Game Preserve. Acquisition of 85 acres in Cheatham County as an addition to the lands acquired under Projects 1-L and 4-L	351.82
6-L	Cheatham Game Preserve. Acquisition of 248 acres in Cheatham County as an addition to the lands acquired under Projects 1-L, 4-L, and 5-L	929.25
7-L	Prentice Cooper State Forest and Game Management Area. Acquisition of 948 acres in Marion County	3,630.37
8-R	Quail Research. 1946-49. To study artificial restocking as a management measure and to determine the significance of predation by foxes	24,566.31*
9-D	Tennessee Waterfowl Development Project. 1947-49. To develop waterfowl habitat in the Tennessee River Valley	34,891.82*
10-D	Deer Purchase and Restocking. 1947-48. To restock areas throughout the State by the purchase and release of white-tailed deer	24,352.50
	State Total	$198,229.04
	TEXAS	
1-R	State-wide Wildlife Survey, Game Management and Demonstration Project. 1939-47. To conduct wildlife surveys, censuses and investigations	$225,276.14
2-D	State-wide Quail Restoration Project. 1940. To install restoration units, improve the habitat and restock	7,812.12
3-D	State-wide Antelope Restoration Project. 1940. To live-trap and transplant antelope	815.03
4-D	Deer and Turkey Restoration Project. 1940-41. To restore and manage deer and turkey on 10 areas within the State, including live-trapping and transplanting	6,482.70
5-D	Collared Peccary Restoration Project. 1940. To live trap and transplant peccaries	135.46
6-R	Desert Big Horn Mountain Sheep Investigation. 1940-41. To investigate the remnant of this species in Culberson County	1,939.21
8-D	Wildlife Restocking Project. 1941. To live-trap and transplant game birds and mammals	36,723.86
9-D	State-wide Quail Restoration Project. 1941-42. To establish, post, develop, and restock restoration areas	3,427.05
10-D	Deer and Turkey Restoration Project. 1941-42. To establish, post, develop, and restock restoration areas	18,839.47
11-D	Lesser Prairie Chicken Restoration and Investigation Project. 1942. To establish, fence, and develop three restoration areas	3,256.01
13-D	Waterfowl Habitat Development—Refuge Project. 1941-42. To establish waterfowl refuges, construct water control structures, and improve the habitat	2,614.87
14-C	Wildlife Management Coordination. 1942-49. To provide administration and coordination of restoration program	93,331.27*
15-D	Texas Wildlife Development. 1943-46. To establish restoration areas, and live-trap and transplant game birds and mammals	161,491.82

TABLE XII—*Continued*

	Numbers, Names, Descriptions, and Duration of Projects by States	*Federal Funds*
	TEXAS—*Continued*	
16–L	Sierra Diablo Mountain Sheep Project. Acquisition of 5,335 acres in Culberson and Hudspeth Counties	4,866.75*
17–R	Survey, Investigations of Rio Grande Turkey in Lower South Texas. 1947-49. To conduct investigations and develop management procedures	11,805.21*
18–R	Postoak Wildlife in Relation to Land Management. 1947-49. To conduct bobwhite quail investigations in the post oak region of north Texas and to develop management procedures	19,787.06*
19–D	San Saba River Basin Wildlife Development. 1947-49. To lease, develop and restock restoration areas for deer and turkey	5,857.35*
20–R	Survey, Relations of Wildlife to Land Management in Southeastern Texas, 1947-49. To conduct bobwhite quail investigation and develop management procedures	15,017.47*
21–R	Survey, Relation of Bobwhite Quail to Mesquite Grassland Type. 1947-49. To conduct investigations and develop management techniques applicable to this type in south Texas	13,500.35*
22–R	Survey, Wild Turkey in the Live Oak-Spanish Oak Erosion Area of Edwards Plateau. 1947. To determine factors limiting populations	6,619.87*
23–R	Survey, Supplemental Management of Antelope. 1947-49. To determine the status of antelope in northwest Texas and to determine the limiting factors and develop practicable methods	19,754.40*
24–D	Lower Plains River Basin Wildlife Development. 1947-49. To establish, develop and restock deer and turkey restoration areas in north Texas	21,600.57*
25–R	Survey, White-tailed Deer Investigation in the Edwards Plateau Region. 1947-48. To continue investigations in the Edwards Plateau, including the development of census and management methods	11,902.50*
26–D	Development, Restoration of Antelope. 1947-49. To live-trap and transplant antelope in western Texas	37,722.55*
27–D	Eastern Wildlife Development. 1947-49. To establish, develop and restock deer and turkey restoration areas in eastern Texas	69,092.08*
28–D	Deer Trapping and Transplanting. 1947-49. To live-trap deer on the Aransas National Wildlife Refuge and restock restoration areas throughout the State	54,861.32*
29–R	Survey, Coastal Waterfowl. 1948-49. To conduct waterfowl investigations along the Texas Coast	26,149.65*
30–R	Survey, Status of the White-winged Dove in Texas. 1947-49. To continue investigations in southern Texas and to prepare management recommendations	10,370.17*
31–R	Food Habits of Furbearers in Relation to Texas Game Species. 1948-49. To determine relationships of furbearers to game species	2,700.00*
32–R	Survey, Economic Value of Wild Game in the Edwards Plateau Region of Texas. 1948-49. To conduct an economic survey of deer and turkey management and harvest in the Edwards Plateau	5,175.00*
33–R	Survey, Wild Turkey in Central Mineral Region of Texas. 1948-49. To conduct specific investigation within a portion of the Edwards Plateau	4,125.00*

TABLE XII—*Continued*

	Numbers, Names, Descriptions, and Duration of Projects by States	*Federal Funds*
	TEXAS—*Continued*	
35–R	Survey, Experimental Trapping and Transplanting of Black-tailed Deer. 1949. To experimentally live-trap and transplant black-tailed deer in Brewster and Pecos Counties	3,375.00*
36–R	Antelope Investigations. 1949. To investigate increases in antelope herds for the purpose of setting quotas to be harvested	1,800.00*
	State Total	$908,227,41
	UTAH	
1–D	Ogden Bay Project. 1939-40. To construct a dike and install road culverts on the Ogden Bay Refuge and Public Shooting Ground	$ 11,703.01
2–R	Beaver Management and Stream Runoff Study. 1939-42. To determine the relationships between beaver activity and runoff and to prepare management recommendations	6,368.75
3–L	Millard County Winter Range Area for Deer. Acquisition of 11,117 acres in Millard County	18,817.23
4–L	Acquisition of Cache Wildlife Experiment Area. Acquisition of 116 acres in Cache County	1,500.00
5–L	Provo Bay Refuge (Bullocks Slough Area). Acquisition of 26 acres in Utah County	2,100.00
6–D	Ogden Bay. 1940. To provide for construction of a spillway and bridge, water distribution outlets, and ditches	2,433.18
7–L	Boxelder Deer Winter Range. Acquisition of 4,600 acres in Boxelder County	10,071.73*
8–R	Controlled Mule Deer Food Habits and Range Use Study. 1940-41. To conduct investigations, in part on the area acquired under Project 4-L	7,090.18
9–D	Ogden Bay. 1940-48. To provide for water control structure and outlets, repair of dikes and graveling of road and dikes at Ogden Bay	43,822.51*
10–L	Springville Game Winter Range. Acquisition of 2,925 acres in Utah County	13,020.00*
11–L	Twelve Mile Canyon Deer Winter Range. Acquisition of 5,979 acres in Sanpete County	13,447.26
12–L	Millville Game Winter Range. Acquisition of 10,440 acres in Cache County	44,721.08*
13–R	Investigation of Habitat Conditions to Determine Present Status and Management Policies on State Waterfowl Refuges. 1941. To determine the present status and management policies on State waterfowl refuges and management areas	2,483.95
14–L	Ogden Bay. Acquisition of 915 acres in Weber County	10,290.48
15–L	Mt. Nebo Game Winter Refuge. Acquisition of 434 acres in Juab County	5,006.12
16–C	Wildlife Management Coordination. 1941-49. To provide administration and coordination of restoration program	36,950.42*
17–R	State-wide Game Management Study Project. 1942-45. To combine and continue investigations begun under Projects 8-R and 13-R	14,278.70
21–L	Diamond Valley Deer Range. Acquisition of 1,160 acres in Washington County	1,087.50
26–D	Ogden Bay. 1943-44. To provide for the construction and repair of boundary fences on the Ogden Bay Refuge and Public Shooting Grounds	745.85

TABLE XII—*Continued*

	Numbers, Names, Descriptions, and Duration of Projects by States	*Federal Funds*
	UTAH—*Continued*	
28–R	State-wide Big Game Survey and Investigations. 1947-49. To revise and continue the investigations conducted under Projects 8-R and 17-R, and to prepare management recommendations	43,280.91*
29–R	State-wide Waterfowl Management Study. 1947-49. To revise and continue investigations conducted under Projects 13-R and 17-R and to prepare management recommendations	10,939.25*
30–L	Cedar City Valley Upland Bird Sanctuary. Acquisition of 120 acres in Iron County	2,550.00*
31–L	Tremonton Upland Bird Sanctuary. Acquisition of 36 acres in Boxelder County	1,472.25
32–L	Morgan Deer Winter Range. Acquisition of 2,960 acres in Morgan County	6,659.64
33–D	Ogden Bay Refuge. 1947-48. To provide for a water control structure and bridge on the Ogden Bay Refuge	22,541.62
34–L	Coalville Deer Winter Range. Acquisition of 640 acres in Summit County	2,160.00
35–D	Antelope Rehabilitation and Predator Control. 1948-49. To live-trap and transplant antelope and to provide for predator control on restoration areas	16,725.00*
36–L	Arcadia Valley Upland Bird Sanctuary. Acquisition of 80 acres in Duchesne County	6,300.00*
37–R	Upland Game Bird Investigation and Survey. 1948-49. To conduct investigations and prepare management recommendations	4,912.50*
38–L	Rockport Game Range. Acquisition of 119 acres in Summit County	358.38*
39–L	Springville Upland Bird Sanctuary. Acquisition of 43 acres in Utah County	5,812.50*
40–L	Logan Upland Bird Sanctuary. Acquisition of 53 acres in Cache County	13,125.00*
41–M	Ogden Bay Refuge. 1948. To maintain structures installed under Projects 1-D, 6-D, and 9-D	3,960.00*
42–L	Roosevelt Upland Bird Sanctuary. Acquisition of 117 acres in Duchesne County	5,625.00*
43–L	Castle Dale Upland Bird Sanctuary. Acquisition of 81 acres in Emery County	1,245.00*
	State Total	$393,605.00
	VERMONT	
1–R	Wildlife Resources Survey. 1939-48. To conduct state-wide surveys and investigations and to prepare management recommendations	$ 50,740.59*
2–R	Vermont Deer Weights and Measurements. 1940. To secure weights and measurements during the open hunting season	555.59
3–R	Vermont Fur Resources of Lake Champlain. 1940. To conduct a survey of fur resources in the 5 counties on Lake Champlain	48.12
4–R	Vermont Game Food and Cover Investigation. 1942. To conduct a survey to determine game food resources and the composition of forest covers	258.56

TABLE XII—*Continued*

	Numbers, Names, Descriptions, and Duration of Projects by States	*Federal Funds*
	VERMONT—*Continued*	
5–R	Vermont Pheasant Investigation. 1942-44. To conduct an investigation in the Champlain Valley to determine the limiting factors and to prepare management recommendations	6,787.16
6–D	Beaver Restoration. 1943-44 To live-trap and transplant beaver in four counties	342.42
7–D	Vermont Beaver Transplanting. 1946. To live-trap and transplant beaver on a state-wide basis	948.75
8–R	Vermont Waterfowl Inventory. 1948. To conduct a state-wide inventory of waterfowl habitat and conduct experimental habitat improvement	4,773.25*
9–R	Vermont Furbearer Survey. 1948. To conduct an investigation of the red fox and other furbearers	5,047.15*
10–R	Winter Deer Range Recovery Study. 1948. To study deer browse production and consumption and to determine proper deer yard management	3,765.73*
11–D	Sandbar Waterfowl Refuge Development. 1948-49. To develop the area by channel blasting and construction of necessary buildings and water control structures	15,015.81*
	State Total	$ 88,283.13
	VIRGINIA	
1–D	Stocking the Thomas Jefferson and George Washington National Forests and Adjacent Areas. 1939. To purchase and release white-tailed deer	$ 4,698.76
2–R	The Present Distribution of the Wild Turkey in Virginia and Factors Influencing its Abundance. 1939-41. To determine distribution and limiting factors	2,745.39
3–D	Restoration of the Wild Turkey. 1939. To restock areas within the Thomas Jefferson National Forest and the Mountain Lake State Game Sanctuary with game farm turkeys	72.00
4–R	The Effect of Cleared Areas on Wildlife Populations. 1939. To conduct an investigation to determine the effect of clearings within national forests and State game refuges	460.78
5–D	Virginia Quail Restoration Project. 1940-41. To select and restock areas with game farm quail	2,292.73
6–R	Study of Forest Wildlife Relationship. 1940. To conduct an investigation on two areas near Blacksburg	2,063.30
7–D	Restoration of the Wild Turkey. 1940. To restock areas within the Jefferson National Forest and adjacent areas	2,616.88
8–D	Deer Restoration. 1940-41. To restock areas within the George Washington and Jefferson National Forests by the purchase and release of white-tailed deer	15,348.73
10–R	State-wide Wildlife Survey Management—Demonstration Project. 1941-48. To conduct surveys and investigations and to prepare management recommendations	104,865.26*
11–D	Virginia Quail Restoration Project. 1941-42. To restore bobwhite quail by the release of game farm birds	6,823.54
12–D	Restoration of the Wild Turkey. 1941. To restock areas within national forests by the release of game farm birds	2,117.83
13–D	Habitat Restoration for Farm Game. 1941-42. To improve farm game habitat in five counties	663.98

TABLE XII—*Continued*

	Numbers, Names, Descriptions, and Duration of Projects by States	*Federal Funds*
	VIRGINIA—*Continued*	
14–D	Deer Restoration. 1941. To restock national forest areas within 8 counties by the purchase and release of white-tailed deer	9,453.59
15–D	Restoration of the Wild Turkey. 1942. To restock national forest areas within 6 counties by the release of game farm turkeys	316.34
16–D	Beaver Restoration. 1942. To live-trap and transplant beaver	243.27
17–D	Environmental Improvement and Development of National Forests. 1942-48. To improve wildlife habitat by clearing, seeding, planting, and other habitat improvement	71,896.23*
18–D	Habitat Restoration for Farm Game. 1942. To improve farm game habitat in 46 counties	2,449.81
19–D	Deer Restoration. 1942. To restock national forest areas with white-tailed deer	4,511.16
20–D	Virginia Quail Restoration. 1942. To restock areas by the release of game farm quail	2,248.24
21–D	Habitat Restoration for Farm Game. 1943. To improve farm game habitat throughout the State	1,883.16
22–D	Deer Restoration. 1943. To restock areas throughout the State by the purchase and release of white-tailed deer	11,228.46
23–D	Habitat Restoration for Farm Game. 1944. To improve farm game habitat throughout the State	2,259.53
24–D	Deer Restoration. 1944. To restock national forest areas by the purchase and release of white-tailed deer	586.07
25–D	Restoration of the Wild Turkey. 1944. To restock areas by the release of game farm turkeys	694.16
26–D	Restoration of the Wild Turkey. 1945. To restock by the release of game farm turkeys	450.00
27–D	Habitat Restoration for Farm Game. 1945-46. To improve farm game habitat throughout the State	11,018.11
28–D	Farm Game Habitat Restoration and Development. 1948-49. To improve farm game habitat by establishment of restoration areas, seeding and planting, and environmental manipulation	49,500.00*
29–D	Development of State Forests. To develop game habitat on state forests in Buckingham and Appomattox Counties by marking, posting, clearing, and seeding and planting	14,625.00*
30–D	Camp Peary Development. 1948. To develop an area at Camp Peary as an important wildlife habitat	2,625.00*
31–C	Wildlife Management Coordination. 1949. To provide administration and coordination of restoration program	5,625.00*
	State Total	$336,381.81
	WASHINGTON	
1–L	Sinlahekin Deer Winter Range and Wildlife Refuge. Acquisition of 8,083 acres in Okanogan County	$ 40,554.81
2–L	Oak Creek Elk Winter Range and Wildlife Refuge. Acquisition of 15,036 acres and lease of 5,705 acres in Yakima County	45,990.37*
3–L	Squaw Creek Antelope Range and Wildlife Refuge. Acquisition of 8,813 acres in Kittitas County	12,503.46
4–D	Squaw Creek Antelope Range and Wildlife Refuge. 1940-41. To fence, seed, and develop springs on the area acquired under Project 3-L	4,283.07

TABLE XII—*Continued*

	Numbers, Names, Descriptions, and Duration of Projects by States	*Federal Funds*
	WASHINGTON—*Continued*	
5–D	Sinlahekin Deer Winter Range and Wildlife Refuge. 1941-43. To construct cattle guards on the area acquired under Project 1-L	352.18
7–L	William T. Wooten Game Range. Acquisition of 10,355 acres and lease of 880 acres in Columbia and Garfield Counties	57,416.47*
8–L	Methow Winter Range and Wildlife Refuge. Acquisition of 6,808 acres in Okanogan County	45,640.37
9–D	Sinlahekin Winter Range and Wildlife Refuge. 1941-48. To develop and improve the area acquired under Project 1-L	15,709.20*
10–C	Wildlife Management Coordination. 1942-43. To provide administration and coordination of restoration program	3,945.05
11–L	Seed-Stock, Nesting Habitat Acquisition Program. Acquisition of 469 acres in 10 counties	40,285.87
12–D	Douglas Soil Conservation District Wildlife Restoration Project. 1942-48. To provide for feeding stations, water developments, and fenced plots within the grazing lands in Douglas County	3,846.36
15–D	Sinlahekin Winter Range and Wildlife Refuge, and Emergency Irrigation Developments. 1944-45. To construct a dam and metal siphon on the area acquired under Project 1-L and developed under Project 9-D	3,517.15
16–D	State-wide Upland Bird Habitat and Release Area Development. 1946-48. To fence and develop the areas acquired under Project 11-L	45,456.91*
17–L	State-wide Waterfowl Resting Area and Habitat Program. Acquisition of 30 acres in Kittitas County	4,544.14
18–D	William T. Wooten Game Range. 1946-48. To develop the area acquired under Project 7-L	34,822.09*
19–D	Oak Creek Elk Winter Range and Wildlife Refuge. 1947-49. To develop the area acquired under Project 2-L	17,154.86*
20–D	Methow Winter Range and Wildlife Refuge. 1949. To develop the area acquired under Project 8-L	19,879.61*
21–R	State-wide Range Survey. 1948-49. To conduct range surveys on lands acquired under the Federal Aid Program	10,146.94*
22–C	Wildlife Management Coordination. 1948-49. To provide administration and coordination of restoration program	27,567.13*
23–M	Maintenance of 3-L Squaw Creek Antelope Range and Wildlife Refuge. 1948. To repair the fences on the area acquired under Project 3-L	359.87
24–M	Maintenance of State-wide Federal Aid lands. To reimburse the counties for tax losses resulting from State acquisition of lands	1,899.51*
26–L	Sherman Creek Game Range. Acquisition of 776 acres in Ferry County	17,157.37*
27–R	Waterfowl Research Project. 1948-49. To conduct surveys and investigations concerning waterfowl	14,049.75*
28–M	Maintenance of Sinlahekin Game Range (1-L). 1949. To provide for general maintenance and repair of flood damage on area acquired under Project 1-L and developed under Project 9-D	10,672.20*
29–M	Maintenance of Oak Creek Game Range. 1949. To provide for general maintenance of improvements on the area acquired under Project 2-L and developed under Project 19-D	6,521.63*
	State Total	$484,276.37

TABLE XII—*Continued*

	Numbers, Names, Descriptions, and Duration of Projects by States	*Federal Funds*
	WEST VIRGINIA	
1-L	Nathanial Mountain Game Management Program. Acquisition of 8,194 acres in Hampshire County	$ 13,102.14
2-D	Nathanial Mountain Wildlife Management. 1940-42. To develop the area acquired under Project 1-L	3,582.87
3-D	Braxton County State Game Lands. 1940-41. To post and develop state game lands in Braxton County	3,920.17
4-L	Panther Creek Wildlife Lands. Acquisition of 7,703 acres in McDowell County	26,930.94
5-D	Game Refuge Metal Sign Purchase. 1940. To purchase signs for use in posting State Game Refuges	750.00
6-D	Deer Restocking Purchase. 1940. To restock white tailed deer by purchase and release	2,167.50
7-D	Deer Restocking Purchase. 1941. To restock areas in 11 counties by the purchase and release of white-tailed deer	4,213.40
8-R	State Wildlife Survey. 1941-48. To conduct state-wide game surveys and investigations	49,982.55*
9-D	Deer Restocking Purchase. 1942. To restock areas within 10 counties by the purchase and release of white-tailed deer	4,248.75
10-D	Deer Restocking Purchase. 1943. To restock areas with white-tailed deer by purchase and release	4,425.00
11-D	Deer Restocking Purchase. 1944-45. To restock by purchase and release of white-tailed deer	6,015.00
12-R	Wild Turkey Investigation. 1945-48. To conduct turkey censuses, survey ranges, and prepare management recommendations	18,068.76*
14-D	Wild Turkey Restoration. 1946-47. To construct holding pens to bring about mating of game farm turkey hens with wild gobblers	4,120.12
15-L	Short Mountain Game Management Area. Acquisition of 7,755 acres in Hampshire County	15,579.88
16-R	Beaver Ecology and Pre-management Study. 1946-48. To conduct beaver surveys and investigations and prepare management recommendations	9,501.10*
17-D	Wildlife Management of the Monongahela National Forest. 1947-48. To post and mark boundaries of management areas and to develop game habitat	62,006.85*
18-C	Wildlife Management Coordination. 1948-49. To provide administration and coordination of restoration program	12,878.62*
19-D	Wild Turkey Restoration. 1948-49. To develop wild turkey habitat on state-owned areas	34,737.30*
20-D	Short Mountain Wildlife Management Project. 1948. To post and mark boundaries of area acquired under Project 15-L and to construct fire lanes and truck trails	2,912.50*
21-R	Wildlife Cover Mapping and Habitat Analysis. 1948. To cooperate with the U. S. Forest Service in preparing the wildlife cover map and conducting wildlife surveys within the Monongahela National Forest	10,408.50*
22-R	A Survey of West Virginia Mammals. 1948-49. To conduct a state-wide mammal survey	15,000.00*
23-R	Muskrat Habitat Development Investigation. 1949. To conduct investigations and experimental habitat improvements in Tucker County	975.00*
	State Total	$305,526.95

TABLE XII—*Continued*

	Numbers, Names, Descriptions, and Duration of Projects by States	*Federal Funds*
	WISCONSIN	
2-R	Prairie du Sac Quail Census. 1940-48. To conduct periodic censuses for the purpose of determining winter mortality	$ 5,342.21*
3-L	Horicon Marsh Restoration. Acquisition of 9,978 acres in Dodge County	141,299.60*
4-R	Wisconsin Deer Management Research Project. 1941-49. To conduct state-wide surveys and investigations and to prepare management recommendations	104,847.26*
5-R	Wisconsin Pinnated and Sharp-tailed Grouse Status and Management Research. 1941-43. To conduct surveys, investigations, and experimental management	12,438.13
6-R	Wisconsin Waterfowl Management Research. 1941-49. To conduct surveys and investigations and prepare management recommendations	33,241.50*
7-R	Wisconsin Pheasant Management Research. 1941. To conduct state-wide surveys and investigations	6,993.83
8-R	Wisconsin Food Habits Research. 1942-49. To determine the food habits of game, furbearer, and predator species	18,913.84*
9-R	Wisconsin Pheasant Management Research. 1942-49. To revise and continue the investigation begun under Project 7-R	41,808.54*
10-D	Horicon Marsh Development Project. 1942-48. To improve and develop the lands acquired under Project 3-L	74,771.78*
11-C	Wildlife Management Coordination. 1947-49. To provide administration and coordination of restoration program	12,916.33*
12-R	Predator Relationships of Wisconsin Red and Gray Foxes to Upland Game Birds. 1947-49. To determine the relationships of foxes to upland game birds	12,083.05*
13-R	Research and Experimental Management of Wisconsin Grouse. 1948-49. To revise and expand the studies begun under Project 5-R	19,633.50*
14-R	Management of Wisconsin Quail Populations. 1948. To expand and continue the investigations begun under Project 2-R	3,874.50*
15-R	Wisconsin Fur Research. 1948-49. To conduct an intensive study to determine the carrying capacity of muskrat habitats	14,400.00*
18-D	Rock County Wildlife Habitat Improvement Project. 1948-49. To develop upland game habitat in Rock County by leasing, fencing, posting, seeding and planting, and other improvement practices	11,633.96*
	State Total	$514,198.03
	WYOMING	
1-R	Factors Determining the Abundance of Rocky Mountain Big Horn Sheep. 1939-41. To participate in the Tri-state Cooperative Investigation to determine limiting factors	$ 12,541.52
4-L	South Park Elk Feeding Grounds—Acquisition. Acquisition of 450 acres in Teton County	5,066.25
5-L	Gros Ventre Feeding Grounds. Acquisition of 160 acres in Teton County	2,403.75
6-R	Sage Grouse Survey and Restoration Project. 1940-41. To conduct state-wide surveys, censuses, and investigations and to conduct experimental live-trapping and transplanting	8,318.74

TABLE XII—*Continued*

	Numbers, Names, Descriptions, and Duration of Projects by States	*Federal Funds*
	WYOMING—*Continued*	
7–L	Fremont County Elk Winter Pasture. Acquisition of 1,321 acres in Fremont County	7,516.50
10–D	Beaver Survey, Trapping, and Transplanting. 1941. To conduct surveys and live-trapping and transplanting of beaver	3,383.39
11–D	Construction of Research Headquarters and Storeroom. 1941-42. To construct above facilities	11,962.25
12–C	Wildlife Management Coordination. 1941-49. To provide administration and coordination of restoration program	30,033.95*
13–R	State-wide Wildlife Survey, Investigation and Restoration. 1942-47. To conduct state-wide censuses, surveys, and investigations and experimental live-trapping and transplanting	86,163.58
14–L	South Park Feeding Grounds Extension. Acquisition of 201 acres in Teton County as an addition to the lands acquired under Project 4-L	4,316.70
15–L	Greys River Elk Winter Pasture and Feeding Grounds. Acquisition of 2,251 acres in Lincoln County	10,744.77*
16–L	Tongue River Deer Refuge and Winter Pasture. Acquisition of 336 acres in Sheridan County	1,129.11
17–D	South Park Feeding Grounds Fence. 1942-43. To fence the boundaries of land acquired under Projects 4-L and 14-L	2,184.61
18–D	Greys River Elk Winter Pasture Fence. 1942-49. To fence the boundaries of lands acquired under Project 15-L	19,632.11*
19–D	Trapping and Transplanting. 1943-47. To live-trap and transplant game birds and mammals	21,403.81
23–L	Billy Miles Deer and Elk Winter Pasture. Acquisition of 787 acres in Washakie County	5,320.10
24–D	Cyclone Lake Reservoir; Eagle Nest Draw Reservoir No. 1; Eagle Nest Draw No. 2. 1945-46. To construct three reservoirs to impound water for antelope	3,416.09
25–L	Ramshorn Peak Elk Winter Pasture. Acquisition of 760 acres in Fremont County	10,129.50
27–R	Big Game Survey. 1948-49. To continue big game surveys, censuses, and investigations formerly conducted as a part of Project 13-R	33,736.96*
28–R	Feathered Game Survey. 1948-49. To continue the sage grouse investigations begun under Project 6-R and continued under Project 13-R	5,848.37*
29–M	Tensleep Deer and Elk Winter Pasture. 1948. To repair the fence on the lands acquired under Project 23-L	1,621.81*
30–R	Survey of Furbearer Populations and Present and Potential Habitat. 1948-49. To continue furbearer surveys and investigations formerly conducted under Project 13-R	9,488.81*
31–D	Trapping and Transplanting of Game Animals, Game Birds, and Furbearers. 1948-49. To continue the live-trapping of game birds and mammals previously conducted under Project 19-D	24,232.09*
32–D	Big Horn Sheep Pasture Fence. 1948. To construct a 100-acre holding pasture	3,317.03*
33–R	Diseases of Game Animals, Game Birds, and Furbearers. 1948-49. To conduct state-wide disease investigations	15,989.32*
34–L	Pinedale Elk Winter Pasture. Acquisition of 3,397 acres in Sublette County	30,948.75*

TABLE XII—*Continued*

	Numbers, Names, Descriptions, and Duration of Projects by States	*Federal Funds*
	WYOMING—*Continued*	
35–D	South Park Feeding Grounds Fence. 1948. To elk-proof the fence constructed under Project 17-D	4,293.87*
36–L	Jelm Deer Winter Pasture. Acquisition of 640 acres in Albany County	7,567.50*
37–D	Pinedale Elk Winter Pasture Fence. 1948-50. To construct an elk-proof fence on the lands acquired under Project 34-L	6,730.37*
	State Total	$389.441.61*
	ALASKA	
1–R	Biological Investigation of Alaska. 1942-45. To conduct surveys and investigations throughout the Territory	$ 10,034.09
2–R	Research with Fur Animals in Alaska. 1942-47. To conduct furbearer investigation at the experimental fur station of the University of Alaska	52,518.63*
3–R	Wildlife Investigations of Alaska. 1947-48. To revise, expand, and resume the investigative program begun under Project 1-R	45,047.28*
	Territorial Total	$107,600.00
	HAWAII	
1–R	Upland Game Bird Survey. 1946-48. To conduct an upland game bird survey on the principal islands and to prepare management recommendations	$ 16,333.34*
2–D	Pohakuloa Game Management Area. 1947-48. To construct buildings and fences and conduct environmental improvements for the benefit of valley quail	5,300.00
3–D	Kahakuloa Game Management Area. 1948-49. To repair roads, construct fences, improve habitat, and restock with pheasants	1,465.44*
	Territorial Total	$ 23,098.78
	PUERTO RICO	
1–R	Puerto Rican Wildlife Survey. 1942-48. To conduct surveys and investigations and prepare management recommendations	$ 20,081.40*
3–D	Stocking of Mona Island with Venezuelan Crested Quail and Red-tailed Chachalaca. 1946. To stock Mona Island with these species by the importation of birds from Venezuela	931.94
	Total	$ 21,013.34
	VIRGIN ISLANDS	
1–D	Virgin Islands Deer Restoration. 1942-44. To restock islands in the group by the importation and release of white-tailed deer	$ 8,040.84
2–R	Virgin Islands Research and Restoration Project. 1944-45. To conduct surveys and investigations and prepare management recommendations	2,307.22
3–D	Virgin Islands Wildlife Restocking Project. 1947-49. To continue the deer restoration program begun under Project 1-D	7,000.00*
	Total	$ 17,348.06
	Total Federal Funds expended and Obligated	$18,253,322.28