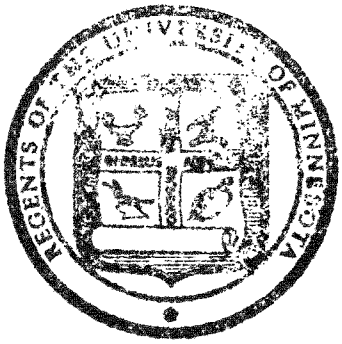


State of Minnesota

Department of Conservation

W. L. STRUNK, *Commissioner*

Statistical Report

BIENNIUM ENDING

JUNE 30, 1942

OCTOBER, 1942

To the Governor and the Legislature of 1943:

I have the honor of transmitting herewith a Statistical Report dealing with the policies, activities and achievements of the Department of Conservation for the biennium ending June 30, 1942.

Respectfully submitted,

W. L. STRUNK,
Commissioner of Conservation.

Our Natural Resources Have Made
This State and Nation Great

Its Future Greatness Can Only Be Sustained By The Proper
Use And Conservation Of These Same Resources

ADMINISTRATIVE PERSONNEL

WM. L. STRUNK, *Commissioner of Conservation*

Mandt Torrison	Assistant Attorney General for the Department of Conservation
M. J. Marrinan	Cost Analyst
E. V. Willard	Conservation Consultant

BUREAU OF INFORMATION

Harold Searls	Acting Director
Geraldine Vessels	Informational Writer

DIVISION OF WATER RESOURCES AND ENGINEERING

Walter S. Olson	Director
Claes T. Ekman	Deputy Director and Chief Designing Engineer
Carl J. Bark	Construction Engineer
S. A. Frellsen	Hydrologist in Charge of Control
L. A. Johnson	Hydraulic Engineer in Charge of Surveys and Designs

DIVISION OF FORESTRY

H. G. Weber	Director
Phil H. Hanson	Executive Assistant
Harold Ostergaard	In Charge of Recreation and Lands
A. E. Pimley	In Charge of Fire Control
Wm. Byrne	Railway Fire Prevention
Clarence Prout E. L. Lawson	In Charge of Forest Management
Ray Clement	In Charge of Nurseries and Planting
J. C. Gannaway	In Charge of State Timber
Arthur F. Oppel	In Charge of Special Projects

DIVISION OF GAME AND FISH

Verne E. Joslin	Acting Director
E. R. Starkweather	Deputy Director
George Weaver	Superintendent of Fisheries
Frank D. Blair	Supervisor of Game
Norman L. Moe	Superintendent of Fish Propagation
Lloyd Smith	Fisheries Research Supervisor
Lansing Parker	Game Projects Coordinator
Richard J. Dorer	Asst. Game Projects Coordinator
Gordon Wollan	Chief Clerk
T. Surber	Technical Adviser

DIVISION OF LANDS AND MINERALS

Ray D. Nolan	Director
Frank B. Getchell	Deputy Director
Dick Mitchell	Chief Mining Engineer
M. P. Walle	Chief Research Engineer
A. W. Killorin	Chief Clerk

DIVISION OF STATE PARKS

Harold W. Lathrop	Director
Reuben W. Law	Deputy Director
John N. Martin	District Supervisor

TOURIST BUREAU

Victor A. Johnston	Director

CONTENTS

FIGURES

DIVISION OF GAME AND FISH

TABLES

An iron ore washing plant on the Mesabi Range. Over 8,000,000 tons of state-owned low grade ore has been converted into merchantable ore by this plant during the biennium ending June 30, 1942.

COMMISSIONER'S REPORT

Review of Department Policies and Achievements

At the time I assumed the office of Commissioner of Conservation, in collaboration with the Governor and organizations and individuals interested in the promotion of the cause of conservation within Minnesota, I submitted a list of policies and a program which it was believed embodied immediate and long time needs and which should be adopted and put into immediate practice by the department. This program was presented under 16 specific headings and dealt with wild life, forests, lands and minerals, water resources, parks, tourist attractions and trade, and the building up of efficiency and morale among department employees. In the organization of the department to make this program effective the points enumerated logically divide themselves into the following captions:

Fish Propagation	Forestry
Rough Fish Removal	Water Resources
Fisheries Research	State Parks
Bureau of Game	Lands and Minerals
Pittman-Robertson Projects	Tourist Attractions and Trade
Game Law Enforcement	Conservation Education

Civil Service

Fish Propagation

Prior to the legislature of 1941 the resident fishing license fee was fifty cents, the lowest of any state with comparable opportunities for angling and the recreation afforded by this sport, as well as with the problems of management they create. The inadequacy of revenues derived from this source to meet the varied, complex and extensive problems of propagating, stocking and managing the thousands of lakes and streams within our state, and the need of creating additional sources of funds had been emphatically impressed on the general public as the demands on our game fish resources were increasing. As a result the Legislature of 1941 increased the resident fishing license fee from fifty cents to one dollar. This increase in funds gave the department an opportunity to immediately plan for an extended program of fish management.

Limitations on the distribution and use of funds imposed by the Legislature of 1941 fixes forty-one cents of every resident fisherman's dollar license fee as the maximum amount that may be expended directly on artificial fish propagation work. The question may naturally be asked as to why the whole dollar is not spent for propagation. One reason is that the legislature placed a statutory limit of $300,000 on the amount that may be spent in any one year for artificial propagation of fish, provided such an amount is available. A second reason is that fish propagation is a complex matter. There is more to it than the operation of hatcheries. Fish cannot thrive unless they have the proper environment. Therefore, ten cents of every fisherman's dollar is devoted to lake and stream improvement. Thirty-four cents of his dollar goes into the general game and fish fund. The fisherman

benefits indirectly in many ways from the activities supported by this fund, which include game and fish law enforcement, fisheries research and general administration of the Game and Fish Division.

Up to June 30, 1942, and reflecting the increase in resident fishing license fees authorized by the Legislature of 1941, revenue from the sale of resident individual and resident combination 1941 fishing licenses had produced $461,481.13. The proposed financial policy of the conservation department is to chart its spending program on the basis of the calendar year revenues. It is proposed that the actual fishing license revenue received during the calendar year be used to defray the cost of the spending program during the fiscal year. In other words, fishing license revenue collected from January 1 to December 31, 1942, will be used to defray costs incurred during the fiscal year from July 1, 1942, to June 30, 1943. In this way, there is a six months' "cushion" of accumulated revenue which helps to determine the extent of the following year's program.

The policy of the department is to plant larger numbers of fish that have a reasonably high chance of survival. Most encouraging development in our fish propagation program is the fact that the number of fingerlings planted has tripled since 1939. Five million fingerlings were stocked in that year, whereas 15,000,000 fingerlings started on their way to fishermen's creels in 1941. Of that number, about 10 per cent were trout and many were yearlings and even older.

As a part of the plan to increase the propagation of fish, numerous small lakes and pools throughout the state are being adapted as natural rearing ponds. There are 50 such ponds, comprising nearly 1,500 acres, that will be in operation in 1942. Forty-two state operated artificial ponds, about 45 acres in all, produced a half million fingerling fish in 1940. Today there are 46 of these ponds covering 226 acres.

Prior to the 1941 session of the legislature, there were, strictly speaking, no legal cooperative rearing ponds in existence. In less than two years, or on June 30, 1942, 250 of these ponds, covering over 1,500 acres, have been established. Their success has proved that sportmen's groups are anxious to do something constructive to improve fishing in Minnesota. Pike, crappies, bass and sunfish are the main species raised in the cooperative ponds. The fish produced in each pond are planted in lakes in the near vicinity.

The biggest fish propagation program in the history of the state is being carried on this year. Although increased revenue for fish propagation was not available until July 1, 1941, the Department of Conservation had a year beforehand mapped a comprehensive program to improve fishing in Minnesota. That it is being adhered to is indicated by the fact that prior to 1940 only about 50 acres of ponds were producing fish, other than trout, of fingerling size. In contrast, about 3,000 acres are ready for fingerling production this year. It means that natural lakes, cooperative ponds and state owned ponds will produce 15,000,000 fingerlings in 1942. This will reflect more sport for the anglers as soon as the fingerlings have grown to catchable size.

Rough Fish Removal

Non-game fishes are serious competitors with the fish sought by the anglers. The problem of reducing and otherwise controlling the undesirable types is a continuous one and calls for a vigilant and vigorous campaign of control. It is probably one of the most controversial problems with which the fish management personnel has to contend.

Public opinion is divided on the most effective method of combatting rough fish. It is probably true that the time will never come when there will be complete agreement on the best methods to be pursued in rough fish removal. It is believed, however, that education and a resultant better understanding of the limitations that surround this activity will create a more generally sustained support of the department's efforts to contend with the problem.

The Director of the Division of Game and Fish estimates that on June 30, 1942, there were between 12 and 15 crews working on rough fish removal in southern Minnesota's carp-infested lakes. Operations scheduled for the summer of 1942 were more extensive than those undertaken in any recent year. Contracts have been let to commercial fishermen, who will remove rough fish by open water seining. Several state crews will also be in action. Actual work did not start on open waters until about June 1, so as not to interfere with the propagation of game fish.

It is emphasized that summer operations cannot be expected to yield the same results as winter removal. During the summer season the fish are active and fight the nets, whereas they are more or less dormant in the cold months.

Under the contract plan, which is now and for the past many years has been in operation, the contract fishermen receive a percentage of the profits from the sale of saleable rough fish that they have seined. Thirty per cent or more of the catches have no market value and are given away for fertilizer, hog feed, etc. The state's share of the contract fisherman's net proceeds amounted to $18,600 in the fiscal year 1941 and $30,300 for the fiscal year 1942.

Prior to the 1941 legislative session not a dime of either the sportsmen's or taxpayers' money had ever been spent on rough fish removal. It has been a self-supporting enterprise, and has even financed other conservation projects, such as the purchase of fish hatchery lands at Waskish on Red Lake, construction of dam in Kettle River at Hinckley and other lake and stream improvements as well as contributing to general engineering expenses and administrative costs, all of them valuable assets to the Division of Game and Fish in its fish management work.

Rough fish removal operations for the fiscal year 1941 yielded 3,523,570 pounds. Income to the state from these operations, in excess of administrative costs, totaled $11,134. The rough fish "take" for the year 1942 was 4,048,360 pounds, an all time high for the last ten years.

Rough fish seining was carried on in 38 game fish lakes during the fiscal year 1941. This number was increased to 73 in the year 1942 or double

the number of the previous year. The policy is to stagger the removal of rough fish from game fish lakes in such a manner as to repeat at intervals when the need develops and so as to embrace as many lakes within the program as possible.

Fisheries Research

Progress along all lines is measured largely if not entirely, by discoveries made through research. This is as true in the management of our wildlife resources as along any other line of endeavor. The day has passed when "rule-of-thumb" methods and "witching" can be relied on as guides in fundamentals. Scientific research which will reveal the habits and environments of the various species of fish must be relied on to give the answers.

The main function of the Bureau of Fisheries Research is to provide a fish management program. An acre of water can be "farmed" the same as an acre of land. The yield to the angler will depend on the "crop."

The four major objectives of the fisheries research program are:

1. To provide a scientific background for fisheries management.
2. To make available information on individual bodies of water so that they may be efficiently managed.
3. To improve techniques in fish propagation and fish management.
4. To provide a system of continual check and evaluation of problem waters.

The first phase of fisheries research is the inventory. The Bureau of Fisheries Research has been taking just such an inventory over the past several years. The inventory reveals what fish are present in our lakes and streams, what the physical conditions of those waters are and what fish can be safely planted. This material is obtained by taking samples of the fish population, analyzing the water for chemical factors important to the growth of fish and noting the aquatic vegetation—weeds to the fisherman—and types of bottom soil, on special contour maps.

The state is divided into various watersheds which are being investigated one after the other in order of their priority. Approximately one-fourth of the work of surveying Minnesota streams has been completed. One June 30, 1942, over 1,000 of our lakes had been surveyed and mapped.

The skeptical fisherman is interested in knowing how the information obtained by the inventory can be used to improve fishing. To answer that question it should be emphasized that there is much more to fish propagation than the dumping of fish into lakes. All applications for fish stocking are carefully checked against the inventory records in the research office. After studying the data for a given lake, the biologists are able to determine which species of fish should be planted and which should not.

In the past, planting of fish was done largely on the assumption that a fish planted would grow up to be a fish for the angler. Studies have revealed that too often such is not the case. For example, some lakes are so overcrowded with stunted fish that planting of any species would be wasted effort if not a positive detriment. As a specific instance of how research has

improved fishing, biologists have discovered that fingerling trout planted in the fall have only about one or two per cent survival in our streams, whereas fishermen will catch about 25 to 50 per cent of yearling trout placed in the stream during the fishing season. This knowledge enables the fish propagation crews to adjust their planting so that trout fishing on many waters can be improved, especially on the North Shore and some streams of the southeast.

The additional problems presented by over-fishing in lakes near large centers of population, rough fish abundance and pollution of waters must all be solved on the basis of scientific research. Management, based on results of research, not guess work, will govern in the future. It will, in the long run, mean better fishing in Minnesota.

Bureau of Game

The two game farms operated by the department have, since 1939, doubled the output of artificially reared game birds for release over the state. The Madelia game farm liberated 40,971 pheasants during 1940 and 44,592 during 1941 or a total of 85,563 for the two-year period. This compares with 60,831 birds released during the previous two year period.

The last two year period was likewise a big year for the Carlos Avery game farm, with 23,424 quail and 18,234 Chukars having been liberated during 1940 and 21,849 quail and 17,159 Chukars in 1941.

Game farms cannot compete with nature in rearing game birds. But in areas where game has been burned, trapped, shot or frozen out, natural reproduction is slow in restoring the game population to normalcy. Hence, artificial restocking is a necessity if such regions are to be quickly restored as hunting grounds.

Minnesota has 3,339,873 acres in refuge areas, more than any other state. Included are six state-owned game refuges and public hunting grounds. Most popular of these is the Carlos Avery area of about 15,000 acres. During the 1941 season it offered sport to an estimated 30,000 hunters. The bureau's long-range program contemplates the extension of game refuge and public hunting ground opportunities near each heavily populated center as funds and management resources become available.

The department has recognized the importance of securing the cooperation of farmers in improving wildlife habitat. Work along the line of planting trees, shrubs and other kinds of permanent forest cover types has been retarded because of a law that prevents the state from supplying planting stock to farmers. Many sportsmen favor using part of the sportsmen's license money to finance cover and food plantings for wildlife on farmers' lands. A hardwood nursery has been built up on the Carlos Avery game refuge for the raising of food and cover plants to improve game environment. Over 100,000 pieces of planting stock have been furnished to the Highway Department for roadside planting to benefit wildlife and nearly one-half million plantings have been made in state owned game refuges and public hunting grounds.

The aid of thousands of farmers is being enlisted in making annual plantings of grain to be cut, shocked and left in the fields for the use of game birds during the winter months. An average of 7,000 acres of cane and millet have been planted annually in one-half to two acre plots over a large portion of the state during the past few years. This activity has greatly reduced artificial feeding of threshed grain from hoppers, thereby producing a more virile stock of birds and reducing losses from severe winter weather.

Unfortunately, the most effective and harmonious cooperation with farmers is imperiled because of the thoughtlessness of some hunters who are not sportsmen. Failure to request permission to hunt on the farmer's land and careless disregard of his property have caused a rash of "No Hunting" signs to break out over the rural landscape.

One approach to the problem is to provide public shooting grounds that help to reduce the hunting pressure on the farmers' lands. Such as solution will require the purchase or leasing of large areas of land at great expense. The Department of Conservation now supervises six such state owned combination game refuges and public hunting grounds. Hunting advantages and privileges from these areas, however, reach only a relatively small number of hunters.

Another way to persuade the farmer to encourage game about his premises is to reimburse him for any damage done by game to his crops. Such a proposal, known as "The Farmer-Sportsman Indemnity Stamp Plan," was presented to the last legislature. It provided that any farmer who did not post his land against hunting could request reimbursement for damages caused by game. The fund to pay such claims was to be created by the sale of 25c stamps, to be attached to small game hunting and trapping licenses. This bill did not become a law.

Another step towards encouraging the farmer to aid in promoting the conservation picture would be to help him in improving wildlife habitat. Many sportsmen are urging that present laws be modified to permit the state to furnish planting stock to farmers at cost or free of charge. A number of sportsmen are in favor of allocating a small portion of license money for that purpose. Extensive farm planting would not only provide cover for game birds, but would help prevent soil erosion and act as "living snow fences." Present laws do not permit the department to supply planting stock except for planting on public lands.

The Department of Conservation has attempted to give publicity to the so-called "Fillmore Plan," which seeks to prevent the ill feeling that sometimes results from fires and damage to livestock and property, caused by hunters who are not sportsmen. The plan involves posting farmers' lands with signs reading "Managed Game Area—Hunting By Permit Only —No Trespassing." Under such a plan sportsmen could hunt anywhere on areas thus posted and farmers have a means of preventing injurious trespass.

None of these plans has been given a legal status.

Pittman-Robertson Projects

Under the so-called Federal Pittman-Robertson Act, Federal excise taxes collected on the sale of sporting firearms and ammunition are distributed to the states for use in the management of game. On approved game restoration projects the federal government reimburses the state for 75 per cent of the costs. Minnesota, because of its unusual opportunities for hunting, shares in Pittman-Robertson funds to an extent which makes it possible to undertake extensive game development work which could otherwise not be possible.

The Division of Game and Fish has a staff of 9 wildlife technicians who devote their full time to determining the distribution and abundance of big game, fur-bearers, migratory game birds and upland game birds. Since the inception of the Minnesota Pittman-Robertson research project in 1939, the full responsibility for all investigations to aid in determining hunting and trapping regulations has been carried by the project staff. The net result is that these regulations are now determined upon a more scientific basis than has ever before been possible.

Since 1937 a 10 per cent federal excise tax has been collected on all sales of sporting arms and ammunition. Out of the moneys collected, a fund is set up every year for each of the states. The amount apportioned to any one state is determined by the relative size of its area and by the total number of hunting licenses sold. Since federal aid to wildlife was first made available to the states in 1938, Minnesota has been allocated $218,736.43. The total cost of projects completed or under way is $240,748.53.

This money has been expended on 16 projects that are divided into four classifications: (1) wildlife research; (2) acquisition of lands for wildlife refuges—to date 4 projects calling for the purchase of 6,573 acres have been approved; (3) development work—7 projects, including planting of game cover and aquatic vegetation, posting of all state game refuges, etc.; (4) coordination—general administration and applying the research project's findings to the acquisition and development phases of the Pittman-Robertson work. Only one-fourth of the cost of each of the projects undertaken is paid by the state. For example, the total cost of all Pittman-Robertson game research to the Department of Conservation for the current fiscal year will be about $9,127, yet a program to cost a total of $36,510 is being financed.

If legislation now pending before congress is enacted Minnesota's share of Pittman-Robertson funds for the fiscal year 1943 will be less than one-half of the 1942 apportionment.

Game Law Enforcement

Efficiency in Minnesota game law enforcement has advanced markedly during the biennium.

Convictions for violations of state game laws increased 32 per cent in the fiscal years 1940 and 1941, as compared with the fiscal years 1938 and 1939. During the same period the number of seizures of contraband firearms, fishing equipment, etc., increased 96 per cent. Receipts from the sale of

seizures rose from $9,560 to $31,909—an increase of 422 per cent. The total revenue from fines rose from $58,105 to $81,636.

Game law enforcement has made these gains despite the fact that only about 130 game wardens were on the payroll in the last biennium as compared with 147 or more during the previous two year period. Moreover, the law enforcement program was carried out with a decreased operating cost for the fiscal years 1941 and 1942 in excess of $50,000 per year. This saving was effected without cutting wardens' salaries or traveling expenses and in the face of a special expenditure of over $10,000 for equipping the wardens with uniforms and sidearms.

Conservationists generally agree that law enforcement is one of the most important functions of a department of conservation. Hard fought for game and fish laws are of no use unless they are vigorously enforced. To instruct wardens in new techniques and to familiarize them with special objectives, the Division of Game and Fish now conducts an annual Game Warden School. Another important development occurred in 1941 when all wardens were uniformed for the first time. The wardens report that they have received added public cooperation and respect since receiving their uniforms.

The game wardens were the first employees of the Division of Game and Fish to receive full recognition under the civil service system. Game warden vacancies are filled on the basis of merit, knowledge and experience as revealed by competitive civil service examinations.

There is more to the work of this bureau, however, than nabbing violators and confiscating equipment. Prevention, as well as apprehension, is an important part of its duties. By means of personal contact and talks to various organizations the wardens attempt to acquaint the public with the content of the game and fish laws, working on the theory that if the people are familiar with the laws and the reasons that they were enacted, violations will be reduced to a minimum.

Partly because of the increased educational work being performed by the wardens, the public is coming to realize that the game warden is the sportmen's best friend. If game hogs and commercial hunters were allowed to operate without interference, it would not be long until Minnesota's wildlife resources would be seriously decimated.

Forestry

With respect to conservation policy, the State of Minnesota is at the cross roads as regards the course to be pursued and adopted for the future management of the forest, wildlife and recreational resources in Minnesota. Either these resources are valuable assets to the state and contribute substantially to the prosperity, social well-being and happiness of the people of the state as such, or else they are of indifferent value and of no great public concern, and the recent widespread acquisition of conservation lands by the federal government to be managed under federal jurisdiction, should be promoted as a policy. Federal purchases of the most desirable forest lands have proceeded to a point now where if it is permitted to continue, the

State of Minnesota will have left only the cut over, burned over and otherwise least valuable marginal lands on which to expend its energies and resources, and on which production and reproduction will be most difficult, protection from fires most costly and on which the net results of management will remain on the defensive for all times when compared with results of the management of the more desirable lands being acquired by the National Forest Service.

State forest and wildlife management by state agencies, especially during the period of the recent depression, has been held up to unfavorable comparison with the management of lands purchased by the federal government for similar uses during the same period. The reason, of course, is simple. The federal government as a part of its enormous expenditures for unemployment relief and ventures in land resettlement, establishment of wildlife sanctuaries, expansion of Indian reservations and similar projects, has had millions of dollars to spend with which to purchase its choice of most desirable conservation lands and for their management. The states during this same period, on the other hand, have had to function on drastically reduced revenues and have had to curtail even their normal conservation management work.

It has been easy during this period of universal land tax delinquency for those who have owned lands within or in the proximity of federal purchase areas, to encourage the expansion of these areas, if for no other reason than to promote the sale of their own lands to the federal government. The chance to dispose of lands, long a burden to the owners, has created some local support to unlimited federal land acquisition. These interests are concerned largely if not entirely with the immediate advantages to themselves. They are not concerned with the long time effects that federalization of some of the state's most valuable and cherished resources will have as an element to reduce revenues to the state and its people, as well as to remove the inherent right of the people of Minnesota to govern the state's domain in accordance with state laws and regulations free from federal domination.

The formulation and adoption of a future policy to define the state's attitude towards the continued expansion of federal jurisdiction over conservation lands is of utmost importance at this time and should be declared, not by the Commissioner of Conservation within his administrative duties and prerogatives, but by the legislature after the whole matter has been considered on its merits and action taken on the facts.

Weather conditions the past two years have been generally favorable as regards the forest fire situation. There were, however, several dry periods in which prompt and efficient action was necessary to avoid loss of considerable timber and cover in the northern areas. The spring of 1942 was in fact, an unusually dry one making fires difficult to control. Due to unusually favorable weather conditions and a reorganized and alert fire protection personnel, fires during the biennium were considerably below the average for the last five years and far below the average for the years since the state forest service was first organized.

There are about 2,592,000 acres of state trust fund lands of which approximately 1,300,000 acres will produce merchantable timber. The conclusion of the Land Economic Survey and other research agencies is that an average annual cut of 100,000,000 board feet may be harvested on state owned land if done selectively and under scientific forest management. After considerable study and until actual experience has had an opportunity to be reflected in results, the division has established a ceiling of 50 million B. F. as a safe and conservative cutting limit.

Because of abnormal demands on timber due to the all-out war effort, the timber resources throughout the United States are made to contribute an abnormally high output to prevent a critical timber shortage. It has been necessary during the year 1942 for Minnesota to supply about three times the average annual cut of timber. The cut from state lands for 1942 will be about 96 million B. F. This it is noted will exceed the established average annual limit by a considerable amount. During the period 1931-1941, inclusive, however, the average annual cut was only about 32 million B. F., a figure far below the established ceiling and below the actual needs to keep pace with maturing stands. Any increase in cutting, however, demands extremely careful operation and management in order that the cut over lands may be left in a productive state and as safe from fire as possible.

An additional source of revenue to the state has resulted from the development of the Christmas tree industry. Christmas trees are cut from the slow growing spruce found in stagnant bogs. The growths range from four feet to 15 feet, but average from 50 to 125 years of age and would never produce other marketable timber products. The income to the state from this source has risen from $9,437 in 1935 to $14,124 in 1941.

Two nurseries are being maintained by the division, one at Badoura and another one at Willow River. The average combined yearly production of these two nurseries is about 12 million native coniferous seedlings. Eleven million seedlings were planted in these two nurseries during the past two years. Ten thousand acres of forest lands have been planted to seedlings reared in these nurseries during the same period.

Water Resources

The state wide program to conserve waters for as many beneficial uses as possible, begun some eight years ago, has extended into all sections of the state. Water uses have been enhanced in a great variety of ways. More dependent domestic water supplies and more uniform flows for power production as, for instance, in the stabilization of flow in the Ottertail River and the construction of a reservoir near Bronson, have been provided in many communities. Lakes reduced to dry beds of weeds during the drought have been restored to usefulness and attractive recreational bodies of water. The restoration of Minnesota Lake in Faribault County exemplifies such projects. The creation of reservoirs to serve the multiple purpose of storing flood waters in times of heavy precipitation and to conserve waters to meet human needs in times of drought, are conspicuous in the program. The Big Stone Lake and Lac qui Parle projects in western Minnesota are samples of such

improvements. And in all of the projects one or more of several phases including improved game fish environments, stimulation of the growth of wild rice and other aquatic food, increased attractions to invite tourist trade, encouragement of greater percolation of waters into the sub-soil for sub-soil storage, are valuable bi-products.

The artificial regulation of outflow from lakes is not a simple matter. In most instances the engineering of the forces of nature are the most simple, whereas the engineering of the human element is fraught with real difficulties. In periods of extreme drought public opinion clamors for the retention of all possible surface water to meet normal needs. During such times water shortages are threatened and policies that provide for the construction of dams and artificial control works are demanded and are popular. In periods of heavy rainfall on the other hand, the need for storage for normal uses is not so great, in fact, may not be needed at all. During such times high waters submerge hay meadows, pastures and fields which may have yielded an income to farmers operating lands bordering on lakes in periods of droughts. Artificial control structures even though they may be inoperative and exert no influence to cause high waters, are unpopular and on the defensive.

Our water conservation program apparently will soon have passed through a complete cycle of scarce and abundant water. One of the most severe droughts ever experienced in the state ended in 1937. For fifteen years and longer prior to that time, the public was insistent on an aggressive policy for conserving our waters in all possible manner. During the past four and five years rainfall has been returning to normal and this year to flood proportions in many sections of the state. Public reactions to structures in the outlet of lakes under present high water conditions will be of interest.

At the present time there are 369 control structures supervised by the Division of Water Resources. These structures impound more than two million acre feet of water most of which would escape as wasted runoff in a state of nature. This water, if it were uniformly distributed over the surface of the state would cover Minnesota to the depth of approximately one-half inch.

Observations are made at 530 stations from which records are made on the behavior of lake and reservoir levels under the various conditions of precipitation.

Federal priority regulations on the purchase of construction material has terminated all construction work for the duration. Notwithstanding this fact, requests are coming in from all sections of the state for aid in planning and designing water conservation units. In this connection it is interesting to note that during the month of June, 1942, the Division of Water Resources received more requests for aid in this program from all sections of the state than in any one other month since the work commenced. Another indication of the degree to which the public reacts towards water conservation in general, is the manner in which localities cooperate in sponsoring the work units and contribute funds to aid in the cost.

Probably the most vexatious problem encountered in the promotion of the control and regulation of outflow from lakes and reservoirs, is the acquisition of the rights to property needed in connection with the operation of the structures. The process is slow and in many instances causes long delays. There appears, however, to be no short cut to the procedures which have to be followed in acquiring title.

Each lake and reservoir has a "personality" of its own dependent upon many factors which affect inflow and outflow. To get the maximum benefit from controlling each of these bodies of water, it is necessary to learn this personality. One must have detailed information about their behavior in floods as well as in periods of drought. Because of the abundant waters with which our state has been endowed, it is one substantial dependable resource which will continue to contribute indefinitely to Minnesota's preeminence. Intensive research must be made to disclose the manner in which all of our waters behave. The results of such research will be the measure of the effectiveness of policies and programs for the conservation of our waters in the interest of greater benefits and uses.

State Parks

The rate of increase in the number of visitors who have made use of the facilities offered in our state parks since the division was created by the Legislature of 1935, is in itself the best indorsement by the public of the place our parks hold in public estimation. A total of 1,350,000 visited state parks in 1941. This compares with 585,000 in 1936.

To meet public needs and expectations special attention has been given to improvements within the state parks which are sought by the greatest numbers. In twelve of the state parks—Buffalo River, Camden, Cottonwood River, Itasca, Lake Bemidji, Lake Carlos, Lake Chetek, Middle River, Sibley, Two Rivers, Whitewater—public bathing beaches are operated with lifeguard protection. This has proven one of the most popular additions to the program. Prior to 1936 there were no such established beaches in the Minnesota state park system. In seven of the state parks—Gooseberry Falls, Interstate, Itasca, Lake Bemidji, Scenic, Sibley, Whitewater—complete facilities have been provided for tent and trailer campers.

The construction and marking of nature trails in eight of the parks—Camden, Gooseberry Falls, Itasca, Jay Cook, Lake Bemidji, Scenic, Sibley, Whitewater—is providing the students and lovers of nature with better opportunities for enjoying and studying flora and fauna and geologic formations.

General expansion of facilities has continued in all of the parks, especially for picnicking, which enjoys greater participation by park visitors than any other activity.

The operation of all revenue producing facilities by state personnel, including boat rentals and refectories, has given the public better and less costly service than was afforded when these concessions were leased to private operators.

The Division of State Parks has issued a multi-colored map, showing state parks, state forests and recreational areas. These have been distributed to schools, libraries, hotels, tourist information centers and resorts, thus to give the general public a picture of our state park system and the extent to which these facilities are available.

Because of insufficient funds it has not been possible to organize camps for under-privileged to the extent indicated by the real need for such service, but an effort has been made to induce civic organizations to enter into such a program. Sufficient progress, however, has not been made in this effort. Numerous organizations such as Boy Scouts, Girl Scouts and 4-H Clubs, have taken advantage of the facilities offered for group camping in several of the state parks. The unfortunate thing about camps organized by groups such as these is that they do not reach the really underprivileged boys and girls mostly in need of regulated outdoor recreation. But they do serve a number of our citizens of tomorrow who would not otherwise have been able to enjoy such experiences.

Lands and Minerals

Lands

The State of Minnesota is a large land owner. Its land domain, including lands under sales contract, and unsold and tax forfeited trust fund lands, aggregates over three million acres scattered throughout 76 counties. All state trust lands except those lying within state forests, are administered by the Division of Lands and Minerals.

Revenues yielded by these lands and from the occupational tax on iron ore make up the permanent trust funds. The interest collected on the investment of these funds helps to support public education. On June 30, 1942, Minnesota trust funds totalled $115,387,307. These funds yield annually not less than three million dollars to the support of public education which otherwise would have to be collected from the general taxpayers.

A complete land-use survey of the trust fund lands has been started. When completed it will show the classification and the use for which each parcel is best suited. Lands suitable for agriculture will be sold or leased, other lands rented for summer cabin sites, others will be available for hay and miscellaneous use, while still others are to be set aside for conservation purposes.

More than two thousand leases are now in effect and yielded approximately $50,000 rentals during 1941. About $100,000 is yielded annually from the sale of state land. The annual interest collected on present active state land contracts totals about $70,000.00.

In addition to the state trust fund lands, the Division of Lands and Minerals has jurisdiction over nearly two million acres of tax forfeited lands located within the Red Lake Game Preserve and in four "conservation areas" created by the legislature.

The enactment by the Legislature of 1941 of laws and amendments dealing with the administration of trust fund and tax forfeited lands has

gone a long way towards simplifying and clarifying past methods and procedures, many of them indefinite and confusing. The statutes now provide for a definite termination of delinquent sales contracts under which state trust fund lands are purchased, collection of interest and annual installments on principal each year and the shortening of the term of the sales contract from 40 to 20 years. Furthermore, counties may now classify and zone conservation lands and offer them to the commissioner of conservation for his acceptance for future management. These legislative enactments it is believed will aid greatly in a more businesslike and efficient administration of the state's lands.

Then, too, the 1941 legislature made possible the practical application of the so-called Land Exchange Act under which the state may exchange lands with the federal government and with individuals and thereby aid in the consolidation of publicly owned lands within state forests, state parks and game refuges on the one hand, and within national forests under the jurisdiction of the federal government on the other.

Minerals

Minnesota is known the world over as the bonanza producer of high grade iron ore. During normal times the products of our iron mines supply 60 per cent of the ores which go into the manufacture of iron and steel products consumed by this nation and nations to which our ore and iron are exported. Approximately 200,000,000 tons of ore of various grades have been taken from Minnesota state owned iron mines since mining operations began fifty years ago.

The demand by the Allied Nations' all-out war efforts on our iron ore reserves, removed from our mines during fiscal year 1942, a larger tonnage than during any one single year in the history of mining. During that year this tonnage aggregated upwards of 70,000,000 tons. This abnormally accelerated demand upon our ores brings to a sharp focus the oncoming of the time when our high grade merchantable ores will be speeded to exhaustion and the urgent need of an increase in the use of lean or low grade ores to contribute the largest possible portion of the output.

The importance of encouraging the use of low grade ore is becoming more and more appreciated by mining communities, the public at large and the operators. This subject-matter was dealt with constructively by the Legislature of 1941 by the passage of a new iron royalty law, to encourage the utilization of low grades ores found in trust fund lands. This new law provides a separate royalty rate for high grade, low grade and underground ore. There is also a very low schedule covering the mining of taconite, or iron-bearing rock.

Largely as a result of the enactment of this law the Executive Council and the Commissioner of Conservation have awarded 78 permits to prospect for taconite or iron ore on the Cuyuna and Mesabi ranges. Over half of these permits have already been converted into taconite and iron ore leases. These leases have resulted in an extensive program of exploration being conducted by the lessors and the start of the construction by the mining

companies of a new research laboratory at Hibbing, in which to study the samples of taconite that are being obtained through exploration drillings.

Two mines have already produced iron ore under leases authorized by this law, in one case by producing concentrates from low grade ore and in the other by producing a small tonnage of high grade ore from an open pit mine which was supposed to have been exhausted. Several additional low grade ore mines covered by recent leases will be added to the list of shippers in 1942.

In order to promote the utilization of low grade ore and taconite, the Division of Lands and Minerals maintains a research laboratory on the Mesabi Range.

In 1940, 13,948,762 tons of iron ore were produced from state-owned mines. Thirty-two percent of this production consisted of low grade ore which had to be concentrated before being shipped. In 1941 the production of low grade ore was increased to 45 per cent of the ore mined, an increase in low grade ore of 13 per cent.

Tourist Attractions and Trade

The Tourist Bureau is the promotional agency of the state. It seeks to publicize Minnesota and call particular attention to the recreational facilities of the state.

Tourist business has become "big business" in Minnesota. It now rates as the third largest industry, and according to government figures brings in over 150 million dollars annually. It provides employment for thousands of our citizens and, in fact, in many large areas of the state, constitutes the only income of the residents.

The small shops and business concerns and the farmers especially, share in this huge income. The one "big business" which profits most directly and in the largest amounts, is the State of Minnesota through increased revenues collected from the sale of non-resident fishing and hunting licenses, gas taxes, state park concessions, liquor taxes, etc.

More than two million dollars a year comes into the state highway funds in gas tax payments made by summer visitors, and over 300 thousand dollars a year is realized by the sale of non-resident fishing licenses.

These are but some of the things which make tourist business worth while for us in this state.

In carrying on its work, the Tourist Bureau uses all possible mediums of publicity. It works with newspapers and magazines, uses radio and moving pictures, and seeks in every way to set forth the advantages and beauties of the State of Minnesota to prospective visitors.

Probably one of the most outstanding publicity "breaks" the state received in the past year was in the production of a technicolor travelogue by one of the nation's leading moving picture studios. This motion picture is booked into 8,300 theatres and will show to over 100 million people.

Minnesota also received much favorable national publicity in a picture layout which ran in two of the leading national pictorial magazines.

The Bureau also produced, last year, a 16 mm. motion picture in color and sound, for showing at luncheon clubs and similar groups. Extra prints of this film were made and are being circulated in large cities of our tourist trade territory.

Much use has also been made of displays at sports and travel shows. These expositions attract large crowds in St. Louis, Chicago, Des Moines, Omaha, Milwaukee and other cities. The bureau prepares exhibits which have been viewed in the aggregate by over two million people.

In addition, the bureau carries publicity and advertising in newspapers of middle western states, with particular emphasis on Chicago, Cincinnati, St. Louis, Kansas City, Omaha, Des Moines and points in Oklahoma and Kansas.

Minnesota as a recreational center has definitely received a greater measure of national advertising than ever before, and this has been reflected in steadily increased tourist business income to the state.

Conservation Education

As the home, the school and the church teaches and fits the average citizen for a fuller, richer life among his fellows, so also does the institution that has to do with conserving natural resources for the common good of all people play a part.

It is the function of the conservation department's Bureau of Information to promote and, within its limitations, stimulate public interest in conservation education. This interest, it is believed, has reached a new peak in Minnesota. The bureau attempts to support and sustain this interest through the medium of conservation literature, the press, radio, lecture service, and a motion picture loan library.

The Conservation Volunteer, official monthly periodical of the department, is published solely for the purpose of furthering conservation education throughout the state. Its first objective is to present the results of research on conservation problems in such a manner as to be easily understood by the average layman. Progress in any phase of conservation cannot be lasting unless the people of Minnesota understand the new developments and, as a consequence, show a willingness to give their support.

At the present time there are nearly 15,000 Minnesota conservationists receiving the magazine and at least 500 names are on the waiting list. A complete index of back issues is included in every sixth copy designed to encourage schools and civic groups to bind the copies semi-annually and keep them for future reference material.

To add to the value of the magazine and carry out its motto, "Conservation Through Education," retention tests will be included each month starting with the October, 1942, issue to make it more acceptable in public schools. These tests (they can be used later as study guides) will cover the material in the copy which was printed one month prior to the current issue.

Besides the monthly magazine, 35,000 pieces of literature on various phases of conservation were distributed to the public. Of these, 5,000 were printed for Conservation Week, and 8,000 printed especially for rural school teachers.

Equally as important as conservation literature is the lecture bureau maintained as a free service to schools and civic organizations. An average of three men were kept busy filling request engagements during the biennium. Approximately 1,000 conservation talks were given to 100,000 persons. Usually these talks were illustrated by motion pictures. The department tries to keep abreast of the times by producing motion pictures as soon as research activities or other conservation projects are ready for filming. A total of 12 film subjects were used for educational lectures, and several copies of these films were made for use in the Film Loan Library. Records show 1,600 loans were made, with each loan averaging 100 persons in attendance.

Recognizing that radio has great educational possibilities, the department is sponsoring three weekly programs. The oldest of these, the "Land of Plenty" series, has been on KSTP at 5:30 every Saturday since the spring of 1940. This program is now carried by a state network that includes WHLB, Hibbing; WMFG, Virginia; WEBC, Duluth; KFAM, St. Cloud; KROC, Rochester, and KYSM, Mankato. "Sportsmen's Forum" plays host to representatives of sportsmen's clubs Tuesdays at 10:45 on WCCO, Minneapolis-St. Paul, and KDAL, Duluth. Interviews with authorities in the conservation field are presented by WLOL on "Conservation I. Q." every Thursday at 10:15 p. m. These programs are carried as a public service by these stations at no cost to the Department.

Minnesotans were kept informed on departmental activities through weekly news releases to 499 newspapers and several hundred special releases in Sunday papers.

Civil Service

The need for specially trained and qualified men to deal with the problems relating to the administration of our forests, waters, minerals, wildlife and recreational resources, is recognized by all who have had experience with the problem. Technicians in these fields are not born. They must be developed through years of training and work. This training can only be gained by men and women who are permitted to remain undisturbed in their tasks for a sufficiently long time to become experts in their lines. This is not possible under a system where political and other influences more than qualifications to do the work are dominant considerations. The highest morale and efficiency of an organization cannot be maintained without the employees having some assurance that their positions are secure as long as they apply themselves to their duties and are qualified to do the work assigned them.

On April 22, 1939, the Minnesota Civil Service Act went into effect establishing by law for the first time, a state wide merit system as a basis for the employment and dismissal of employees. On that day all war vet-

erans in the state employ attained permanent civil service status, and those who had been state employees for over five years were granted permanent status, subject only to a six months probationary period. All others in the state service were eligible to take a qualifying examination, based on the duties of the position that they occupied. If they passed they were granted permanent civil servic status, subject to six months probation. Anyone entering the state service after August 1, 1939, was required to take an open competitive examination. For example, in December, 1940, the Civil Service Commission conducted competitive examinations for several vacancies in the game warden force. More than 600 candidates, from nearly every county in the state, took the examination. About 300 persons received a passing score on the written part of the test and were invited to present themselves for an oral interview. Only 14 failed to do so.

Over 300 persons took the examinations for park superintendent and custodian recently, and 472 candidates presented themselves for the game refuge patrolman examination last August.

The Department of Conservation has benefited from civil service in a number of ways. A comprehensive classification system for nearly all types of employment has been instituted, along with a consistent pay plan. Civil service conducts promotional examinations and establishes what is known as an "eligible register" in each of the various job classifications. Hence, promotions must be based upon positive proof of merit. The civil service division is perfecting a service rating system, which will evaluate the performance of employees on the job, thereby providing a constant incentive for better work.

The conservation department's in-service training program increases the efficiency of its personnel. Game wardens, park superintendents, park custodians and others go to "school" for a week or more every year. Because of civil service, conservation and other state employees may make a career of their work. They are protected from capricious dismissal and know that promotion will be on the basis of merit.

Perhaps of greatest value to the conservation department is that civil service shields it from the pressure of job seekers. They are now referred to the civil service department and no longer consume the time of conservation officials.

Bureau of Information

Introduction[1]

The Bureau of Information was established in July, 1940. Its purpose was the consolidation of the educational efforts of all divisions within the department. In the past there had been considerable overlapping of these efforts. With such a consolidation it is possible to have greater efficiency at less cost. The functions of the bureau are: motion picture production, lecture service, newspaper press releases, publication of conservation magazine, preparation and distribution of conservation literature, and sponsoring of radio programs.

[1]By Harold Searls, Acting Director

Motion Picture Production

During the biennium the following films were in constant use either through the film loan library or illustrated lectures given by speakers of the bureau:

Vacationing in Minnesota State Forests
From Cone to Product
State Forest Rangers in the Canoe Country
New Era in Minnesota Logging
Beavers at Home
Flight of the Blue Geese
Wings to the North
Prairie Chicken
Upland Game Birds
Carlos Avery Game Farm
Pike Propagation
Lac qui Parle Water Project

Two new films, "Pheasant Propagation," and "Boys and Trees," will soon be ready for release.

Film Loan Library

Approximately 1,600 film loans were made within the state and shown to 160,000 people from July, 1940, to July, 1942. The only expense to the borrower was transportation or mailing costs. A majority of these loans were to the Minnesota schools.

Lecture Service

Requests from schools and civic clubs for conservation speakers were many. During the period covered by this report a few more than 1,000 conservation lectures were given by qualified speakers from the bureau to an estimated attendance of 100,000 persons. In most instances their talks were accompanied by illustrative movies.

One of many educational projects was one sponsored in cooperation with the Minnesota Department of Education. An invitation was accepted to participate in that department's county rural teachers institute programs. New conservation literature was printed and a motion picture film was edited especially for rural teachers. The State Department of Education mapped and scheduled the weekly county meetings in such a way that one conservation representative was able to attend each institute with a minimum of mileage. During the school term of 1940 and 1941 this representative gave conservation instruction to nearly all of the 7,000 rural teachers in the state. They, in turn, presented the material to more than 125,000 school children. In addition, many teachers grouped their districts and arranged student transportation to central meeting places, where conservation representatives showed movies and talked to several thousand rural children during the school year. For example, students and teachers from eleven rural schools

near Grygla attended such a meeting one afternoon when the temperature registered 30 degrees below zero. This gives, at least in part, some idea of the interest in conservation shown by the schools of the state.

Newspaper Press Releases

Weekly news releases were sent regularly to 499 newspapers. A weekly radio news service was made available to all Minnesota stations. The bureau maintained a special release service for the Associated Press and United Press, with an average of one or more stories each week. Several hundred special releases were used by Sunday papers and outdoor editors. Papers also devoted several full-page rotogravure sections to conservation from material furnished by the department.

Conservation Literature

Thirty-five thousand four hundred and seventy pieces of conservation literature, which included pamphlets on forestry, game fish, lands, minerals, state parks, water resources, Arbor and Bird Day, general conservation, and biennial reports, were distributed by the bureau to individuals, civic groups, schools, and public libraries. Of this number, 5,000 were Arbor Day programs, and 8,000 on general conservation for rural school teachers.

Conservation Magazine

The first issue of The Conservation Volunteer was printed for October, 1940. It is a pocket-size magazine designed to emphasize neatness and brevity. The contents are solely of an educational nature, contributed by the best obtainable conservation authorities in the state. Six outstanding articles from the magazine have been reprinted and distributed to schools, libraries, etc. A composite study index was included in the magazine at the end of each six-month period. Five thousand copies of the Volunteer were distributed monthly for the first eight months. Popular request made it advisable to increase the circulation to its maximum circulation of 15,000 monthly. There are at least 300 names now on the reserve list. By condensing the material from 72 pages to 52 pages, at least for "the duration," it will be possible to increase the number of copies to 17,000, which will take care of those now on the reserve list.

During the last quarter of the biennium, and after corresponding with Minnesota teachers actually teaching conservation, it was decided to include in the magazine a study guide on material within each issue to aid teachers and students in the study of conservation.

Radio

Radio has become one of the chief educational mediums of the Minnesota Department of Conservation during the past two years. Not only has it brought to the people of Minnesota weekly reports from department heads and field men, but it has featured the cooperation of sportsmen's clubs and other conservation organizations.

Six hundred and sixteen conservation radio programs were presented by the Bureau of Information during the biennium through stations WCCO, KDAL, KSTP, WLOL, KROC, KYSM, KFAM, WEBC, WHLB, and WMFG. In addition, 19 Minnesota radio stations used one-minute forest protection announcements as station breaks. This figure does not take into consideration the many small radio stations that interviewed game wardens, forest rangers, and outdoor writers on conservation problems; nor the countless times conservation was the theme of radio commentators and programs presented by schools, youth organizations, and civic groups.

"Sportsmen's Forum," the fall and winter series presented through WCCO and its affiliated station KDAL, Duluth, brought representatives of 26 clubs from all sections of the state at their own expense. On many occasions the visiting delegations packed the studio. Home town newspapers prominently featured participation of local organizations in the Forum, and recapitulated the conservation accomplishments of the organization.

The spring and summer series on WCCO stressed field activities of the department. Transcriptions were made at forest nurseries, research laboratories, fish hatcheries, game farms, rearing ponds, rangers' stations, state parks, and with a field crew making a lake survey.

Time on KSTP has remained unchanged for two years. Regularly every Saturday at 5:30 p. m. "Land of Plenty" was heard over this station and the Northwest Network—a chain of six stations which include Rochester, Mankato, St. Cloud, Hibbing, Virginia, and Duluth.

"Conservation IQ," featured by WLOL, for a time was carried to neighboring states by the North Central Broadcasting System. This program answered conservation questions mailed to the department by its listening audience, or questions submitted by department field men.

During Conservation Week every radio station in the state carried specialized programs. High school radio workshops wrote, cast, and directed dramatizations under the supervision of the conservation department radio director. Chisholm High School originated a program at the Hibbing station for the network. The University Radio Guild of WLB contributed its talent to conservation dramas.

All programs are sustaining, carried by the stations without cost to the conservation department.

Safety Program

Minnesota has a problem of almost unlimited proportions in the safeguarding of the ever increasing number of people, both residents and tourists, who annually seek the many outdoor attractions to be found in our vast recreational areas.

To meet this problem, the Department of Conservation has been assigned, under the Minnesota Safety Program, the responsibility for the prevention of drownings and the elimination of all hazards incidental to fishing, hunting and the other forms of recreation.

After careful analysis of accident records to determine the causes for these tragedies, a long-range prevention program involving gradual removal, or marking, of the physical hazards in Minnesota, and a state-wide educa-

tional campaign to correct the unsafe habits of the people who utilize this area, was planned by the safety division of the department in cooperation with the Minnesota Safety Council and has been diligently promoted by our division.

Records of the State Bureau of Vital Statistics, showing a steady decline in the number of drownings and gun-shot wounds since the inception of the department's safety program, clearly indicate how successful this division's work, integrated as it is with that of the Minnesota Safety Council, has been.

This achievement is due in a large measure to the increased interest and assistance rendered by newspapers and radio stations to publicize its aims and to the aid and cooperation of civic organizations and individuals. This cooperation has been especially marked since December 7, for on that day the safeguarding of manpower against impairment or destruction through avoidable causes took on a new meaning, not only for the usual humanitarian and economic reasons, but as a war necessity.

The safety division has recently been transferred to the Bureau of Information, directly under the administration of the commissioner, in order that its services may be made available impartially and more efficiently and directly to the other divisions of the department.

Future plans include an effort to establish definite safety rules and regulations governing every activity of the departmental personnel. Accidental injury and deaths of employees now cost the state over $10,000 per year.

I strongly urge that legislative recognition be given this departmental activity so that further saving of our most precious resource, human life, may be continued.

Acknowledgments

I wish to publicly acknowledge my grateful appreciation of the cooperation of the directors of the various divisions and the employees of the Department of Conservation in the solution of the many problems which have come before the department during the period covered by this report. Their loyalty and assistance are greatly esteemed and have been most helpful to me in my work as commissioner.

I wish also to express my deepest appreciation to the Legislature of 1941 which made possible, through allocations of funds to the various divisions, and through the passage of numerous essential laws, the achievements and advances with which this report deals.

Acknowledgment is also made of the assistance and cooperation of the National Forest Service, U. S. Fish and Wildlife Service, Works Projects Administration, Civilian Conservation Corps and all other federal and state organizations which have worked with the department during the past biennium.

I acknowledge also the cooperation of the various sportsmen's and conservation groups throughout the state which have at all times been willing to assist in the solution of the many problems in which they are vitally interested.

To all of these I am deeply grateful.

WILLIAM L. STRUNK,
Commissioner of Conservation.

Division of Water Resources and Engineering

WALTER S. OLSON, *Director*

PREFACE

During the past two years the sudden and destructive impact of the war has affected the lives and problems of all our people. The resultant changes have been accelerated as this war condition extended to additional areas and involved increasing numbers of nations. The effect has been felt in several different ways in the field of conservation. The expenditure of our raw materials in the prosecution of the war imposes drastic limitations on their use in the production of many products used for normal living. The terrific pace at which these natural resources are being consumed has made rationing necessary, and has made it increasingly difficult to supply immediate demands while maintaining a sufficient inventory of materials essential for post-war rehabilitation.

The war has affected the division in several different ways. Industrial and domestic consumption of the state's waters has increased, making their conservation for post-war period uses more imperative. The manifold purposes for which our waters will be used in the processing of raw materials, some of which were once considered waste but are now converted through chemical processes, will materially increase the drain upon our water supplies. Industry demands greater quantities of relatively pure water for its operations and also creates constantly increasing problems of disposing of the waters polluted by its use.

Certain new water problems have already engaged the division's attention, including, for example, the determination and development of a supply for the beneficiation of our low grade iron ores and taconites on the Mesabi Range, and also for the development of the manganiferous ores of the Cuyuna Range.

Demand for materials needed in the construction of war plants has created shortages, with the result that many materials have had to be classified as "critical." These critical materials have not been available for construction work except that directly connected with the defense program. This is also true of manpower, especially in the fields of engineering and skilled labor. As a result during the past year there has been a serious depletion of the personnel of the division.

While the return of normal to excessive rain might be assumed to lessen the division's burden, the fact of the matter is that its problems have been intensified in character and become more numerous. Control operations have become increasingly complicated and public recognition of the importance of our waters has given rise to a large number of requests for investigations by the division to determine the best means of maintaining levels on those lakes which have been restored to normal elevations. The excessive amount of water from heavy rainfall during the past two years has made it neces-

sary to give further attention to structures built before 1937. All of these factors demonstrate that water control in the future is going to be more necessary than it has ever been in the past, and that a sound program will be necessary in developments certain to take place in the post-war period.

The reports of the various sections are taken up individually in the course of this summary. Emphasis, however, should be placed at this time upon the question of control. Much progress has been made during the past two years in the accumulation of data and information. The lack of personnel and the short time that this work has been in progress have made it impossible so far to take care of many of the problems involved in the control of the numerous structures under the jurisdiction of the division's control section. The compilation of these data and their study is necessary to formulate a plan of control. A proper plan, because of varying hydrologic conditions, cannot be definitely arrived at until sufficient time will have elapsed in which to get information on all conditions which might affect these controls.

Cooperation with both the United States Geological Survey and the United States Weather Bureau has been increased and as a result, the division now receives information of great usefulness to the conduct of control operations immediately after it has been obtained by these cooperating agencies.

To make this report as brief as possible, discussion regarding the affect of natural conditions on our water supplies and the benefits derived from the control program will not be included because these matters have been rather extensively considered in previous biennial reports. It is emphasized, however, that the division has endeavored in every instance to restrict its construction program to projects which will add to both private and governmental income by increasing revenues and raising taxable values, as well as producing aesthetic and recreational benefits.

With the personnel available, the division has attempted to formulate a program of post-war construction in the hope that when the war is over a large number of projects on which all preliminary engineering and legal work will have been completed will be ready for immediate construction. It is especially unfortunate that the limited personnel now available makes it impossible to investigate more than a small number of such projects which are constantly being brought to the division's attention.

During the past biennium the division has been directed to furnish the engineering services required for the operation of the Division of Game and Fish. This additional work has been of a varied nature, and has included the design and construction of buildings, hatcheries, wardens' residences, sewage disposal systems, bridges, control structures, pumping plants, as well as numerous miscellaneous designs. These activities are touched upon in the sectional reports. Particular attention is called to the manner in which these services have been carried during the past two years. They are rendered the Division of Game and Fish upon specific project requests by that division. Funds are expended from moneys allocated by the Legisla-

ture to the Division of Water Resources and Engineering, and reimbursements are then made for these expenditures by the Division of Game and Fish on the basis of monthly statements.

Because of the national emergency, the division has made every effort to curtail expenditures and to carry on its activities within the limitations of state and federal war policies. It is already apparent, however, that the benefits derived from control are an integral part of the defense program, and that the control section and its activities should be expanded during the coming biennium.

One of the most serious problems the division has had to contend with in the development of its water conservation program arises from the legal phase of that work. The investigation and analysis of law affecting water control and dam construction, the negotiation and drawing of deeds, easements, and other instruments granting to the state the rights and privileges which have to be obtained before a project can be built and operated, and related legal work dealing with various riparian questions is as basic as engineering design to soundly conceived water policies. The complexity of legal questions arising from water problems is obviously such that the division's acquisition work cannot be safely left to a layman but demands the services of an attorney. Although the assistance and advice of the Special Assistant Attorney General in Charge of Conservation has been available to the division during the development of the program and has been invaluable in the work, it has become obvious that the amount of detail work on individual projects is so great as to require additional legal assist-

Dam in the Outlet of Potato Lake, Hubbard County

ance. It is, therefore, earnestly recommended that funds be provided to permit the permanent assignment by the Attorney General of an attorney to carry on this detail work under the supervision of the Special Assistant Attorney General for Conservation.

Cooperation with various federal agencies has increased considerably during the past biennium. The reports of Mr. D. G. Miller, reviewing the work of the Cooperative Drain Tile Testing Laboratory, and Mr. Paul R. Speer of the U. S. Geological Survey on stream gaging in the state of Minnesota during the biennium, are included as a part of this report. No reports are included which cover activities carried on in cooperation with other agencies. The division, however, has been in constant touch with the United States Corps of Engineers in the correlation of mutual problems. Here especial attention is called to the consummation of the Lac Qui Parle project agreement made possible by the passage of Laws of 1941, Chapter 518. This is covered in brief detail in the construction and maintenance section.

In the next biennium, finances will be of paramount concern. The division's responsibility is to obtain maximum results from each dollar spent, and requests funds on this basis. However, and despite the fact that the war will undoubtedly impose a severe curtailment on construction during the next biennium, it is essential that the progress that has so far been made be preserved and that generous provisions be made to increase the scope and efficiency of present operations, especially in the many cases which have a direct relationship to the war program. Further, rapidly increasing numbers of communities are demanding assistance with their water projects, which will be of fundamental importance in drafting of a post-war program. Therefore, the Division of Water Resources and Engineering submits that this is a proper time to investigate and analyze these problems and prepare, in as much detail as possible, a state-wide water program designed to obtain maximum revenues and advantages from Minnesota's waters.

INVESTIGATIONS AND SURVEYS SECTION[1]

Introduction

Sound conservation planning entails detailed investigations, surveys, and research at all times, and more especially under present abnormal demands on our resources, and must receive more careful attention and long-range thinking than ever before in order that no spur-of-the-moment proposal or temporary remedial measures be seriously considered and put into operation that will lead to complexities out of which future generations will have to extricate themselves. In conservation, as in all other enterprises governed by public policies, the course of events during the war may well create problems hitherto unknown and for which a new uncharted public opinion may demand leadership.

The temporary but tremendously accelerated demand on our natural resources for war purposes will obviously create a serious drain upon at least some of these. To the extent that this war emergency will permit

[1]By L. A. Johnson, Hydraulic Engineer

judicious control, their use should be governed with a thought to retaining as much of them as possible for use during the rehabilitation period and for the distant future. This places upon those engaged in conservation work an additional and paramount responsibility in directing and guiding public opinion to an understanding of future eventualities. This concern with future public opinion more than ever becomes the responsibility of the personnel of the division, as opportunities present themselves in every-day routine activities and as contacts are being made with individuals in all walks of life.

The operations under Investigations and Surveys Section during the past two years are discussed under two captions for the purposes of this report, the first being devoted to the division's normal duties, under several subheads, followed by brief discussions dealing with the work arising from requests for engineering services received from the Division of Game and Fish.

Need for Investigations and Surveys

Under present circumstances and until more basic information is secured on the distribution and behavior of our water supplies, solutions to many problems and answers to numerous inquiries dealing with this resource must remain largely matters of speculation. The need for intensive research and investigation is keenly felt by those who are responsible for water planning and administration for the greatest public good. What is the nature and extent of the state's underground water supply? Can we replenish the lakes in glacial drift areas by tapping underground sources? What effect has topography and vegetal cover on yield, maximum rate of runoff, and low water flows? What are the characteristics of the sediment transported by streams and rivers? What is the effect of materials in suspension on project planning, on fish life, and the like? Is the straightening of tortuous rivers and streams to increase carrying capacity always advisable? If not, what are the limitations? These are but a few of the many questions and problems that arise nearly every day.

Project Surveys and Planning

During the past biennium one of the objectives of the division has been the accumulation of informative data on as many projects as possible in order to determine their feasibility and practicability, not only as single units, but as integral parts of a state-wide water conservation plan. By far the greater number of plans made for regulatory work has been in response to demands and requests from local civic organizations and governmental agencies. All investigations and surveys have not evolved into completed projects. Many cannot be adapted to a general state-wide scheme; others, because of excessive costs or other reasons, have been found not feasible. Nevertheless, each has required study and planning, and to the extent that the data thus obtained have become available for use in future studies, they have added to the total, and perhaps would not otherwise have been obtained.

Local civic and governmental groups have referred a total of 251 problems to the division for investigation during the biennium. In the same period the division has completed investigations and surveys of 306 units. Plans, maps, and miscellaneous designs have required the preparation of 296 completed tracings.

Personnel Problems

One of the main difficulties which has confronted the section during the past biennium, and more especially during the last year, has been that of retaining its trained personnel. The demands upon the engineering profession by the armed forces and the inducement through higher compensation for skilled engineers to enter the field of equipment production for war needs have seriously depleted the supply of engineering talent engaged in private practice and industries, as well as in public service. The inroads made on the personnel of the division, more especially its field engineering force, have forced a marked curtailment in field operations. Replacements on short notice are difficult because of the scarcity of trained and experienced men in this particular field.

Lake Seepage Studies

Studies designed to determine loss from lake seepage are now going into the fourth year. During each fall, winter and early spring when losses from evaporation are the lowest and when supply from inflow is at a minimum, considerable field work, to acquire data on the behavior of lake levels, is done. Marked lowering of lake levels under such conditions are presumed to be caused by losses due to seepage into ground storage. Where such losses take place, it is of utmost value to know what they are, whether or not they reappear as springs to sustain flow in streams and wells, the location of underground strata in which such waters store, or whether they are lost for all use. Lakes on which such studies are conducted have their levels checked in the fall after the ground is frozen, and again before break-up in the spring. These data are being gathered on 81 lakes carefully chosen at the beginning of the study. No conclusion can be reached from these data until they have been carefully assembled and weighed, and the studies must continue over a period of years. No attempt at actual computations of seepage losses has as yet been made.

Drainage Activities

The present increased demands upon agricultural products calls for an increase in production of crops, limited only by availability of labor, equipment, fertilizers, and materials. Food is as important a war necessity as are munitions. Farmers as a whole have done a commendable job of production expansion. To the extent that lands actually under cultivation are limited in production because of lack of drainage, drainage improvements properly designed and economically justifiable are a conservation practice that can substantially increase crop production.

Improvements to facilitate the drainage of lands now or recently in cultivation are the type that will contribute the most to the war effort. It is important that the scope of drainage be confined to cultivable lands otherwise fertile and productive, and should not include speculative ventures in the field of idle swamp lands which cannot be made to produce during the present emergency.

An interesting comment on the value of draining lands in England and the importance which our Allies attach to this type of effort was recently made by the British Minister of Agriculture, in a message to the House of Commons, on March 18, 1942, in which he had this to say:

"The ministry has already completed or had in hand the improvement of between two million and three million acres of land and one of the most encouraging features is the extent to which farm ditching is being carried out. Up to the end of 1941 farm ditching schemes have been approved for 1,300,000 acres; forty-one per cent of this work has been finished and forty per cent is in progress. . . . Every kind of machinery on which we can lay our hands is being used for drainage purposes to try to diminish the use for labor. Unfortunately there are thousands of miles of ditches that are not doing their job, and in consequence, there are tens of thousands of acres water-logged and cannot produce their crops. Ditches are the key to the whole drainage problem, and I want farmers, land owners and my communities to make it their watchword to fight to the last ditch."

Although a complete inventory of drainage needs for Minnesota is not available, it is known that a large percentage of systems neglected during the recent drouth when the need for drainage was not so apparent, are in need of repair. During the past two years an increased interest in drainage work has been noticeable. Plans and reports have been received on seven new drainage systems; consulting services requested on twelve others; and notices received of the pendency of proceedings for the repair of twenty-two county and judicial ditches.

Special Problems

Red River of the North

The problem of conserving the water supplies of the Red River Drainage Basin to provide for normal needs is without doubt one of the vital conservation problems of the state. With the unquestioned fertility and productivity of the vast areas of agricultural lands within the basin, the future progress of the entire valley, as well as the maintenance of its present state of development, are primarily dependent upon the development of an adequate water supply. This problem has been before the division and its predecessors for many years. Many single water conservation units, integral parts of the whole, have already been completed, reports and plans on others are finished and pending approval, and studies are being continued on still others to fit into the pattern as a whole. The U. S. Corps of Engineers has been authorized to make a complete study of the entire area with a view to developing a comprehensive plan for the entire basin in all of the three states of South Dakota, North Dakota and Minnesota.

Water Pollution from Iron Ore Concentration

The division, in cooperation with mining companies, has initiated a program for the elimination of pollution of the waters in the Iron Range area from discolored wash waters and fine sediment wasted by plants engaged in the concentration of low grade iron ores. A method and policy has been established whereby settling basins into which these concentration plants discharge wash waters are set apart, with no water to be released from them until settlement and clarification will have been completed. In this work the division has received the full cooperation of the mining companies thus far contacted.

Water Supply for Processing Manganese Ores

The need of finding an adequate supply of water for the processing of manganese ores near Ironton has been before the division since the initiation of the nation's defense program more than a year ago. The matter was first brought to the division's attention by a representative of the federal government and the consulting engineer for the Anaconda Copper Company. Since that time the subject has been studied and a tentative plan has been proposed but detailed investigations and surveys have not been completed.

Topographic Mapping

Appeals for funds to resume and prosecute topographic mapping have been made without success at each succeeding session of the legislature for many sessions. The need of these data is greater today than ever before. The question of importance is as to how many more times the state has to be surveyed over and over again and enormous expenditures of public and private funds dissipated on duplications of preliminary surveys for every variety of development, where one state-wide standard topographic map may be made to answer these needs at only a fraction of the costs.

Wild Rice Production and Muskrats

Investigations should be made of many lakes for plans to regulate and control them for increased production of wild rice. Minnesota ranks as a leader in the production of this popular cereal and has developed an industry which is becoming recognized more and more as a substantial source of income, especially to the Indians. It is believed that an intensive survey of this situation may add many lakes not now producing wild rice and increase the yield of those now producing this cereal, to materially add to this resource and industry.

A closer knit cooperation with the Division of Game and Fish for the control of waters in areas suitable for the increasing of muskrats and other fur-bearing animals is being developed and actual work on plans has been started. In two or three instances, the division has developed muskrat areas in connection with lake control, the benefits from which are in addition to those for which the projects were originally planned and largely incidental thereto. Engineering investigations and designs for the creation of several

other areas have been completed. It is believed that this work, if prosecuted on a state-wide basis, can be made to restore much of the state's vanishing fur industry, and add several millions of dollars to enhance small incomes.

Capping of Artesian Wells

The Legislature of 1941 authorized the Department of Conservation to order the capping of artesian wells that do not serve some beneficial use. The division has made investigations of flowing wells near Judson, and has requested a number of owners to cooperate by installing devices to limit the flow of wells on their properties to actual needs. Indications in this instance point to a sincere cooperation by the property owners to comply with the division's recommendations. Here again progress is restricted because of the priorities which have been placed on the use of highly critical materials.

Requests for Engineering Services from the Division of Game and Fish

As has already been indicated, the division performs the engineering work for the Division of Game and Fish under a cooperative agreement. By this arrangement, 112 requests for engineering services have been received from the latter during the biennium. Of these, 80 have been fully completed, 12 have had designs completed ready for construction, work is under way on 18, and on two of them no work has been started.

Dam in Mustinka River in Grant County Creating Artificial Lake

CONSTRUCTION AND MAINTENANCE SECTION[1]

General

The construction program of the division, because of its dependency to a very large degree upon manpower supplied by federal relief agencies, has of necessity had to be severely curtailed during the biennium. The factors which acted to restrict this program included the diversion of WPA and CCC manpower to normal industry and increasing priority limitations placed on both the amount and kinds of materials available for use in construction because of the war production demands. This shortage of materials began to be felt early in 1941 and with progressive increases in armament production, it has become increasingly difficult to secure many construction materials needed to complete projects in the building stages. A similar shortage of manpower, especially skilled classes, developed early in 1941.

Recognizing the war emergency and desiring to conform to national and state war production policies, the division as early as December, 1941, curtailed its construction program to include only unfinished projects where it was necessary to complete construction in order to save from failure and loss the work that had already been done. Some few small projects that did not require any critical material or equipment have been prosecuted in areas where labor was still available. These were of short duration involving only small expenditure of funds. It is planned that, with the exception of projects of a minor type requiring no critical materials and located in areas where labor may still be had, no new construction shall be undertaken until after the war.

Table 1 summarizes and describes all water units completed by the division or under its direction as of June 30, 1942.

Game and Fish Projects

During the past biennium the division has been charged with the additional responsibility and work of designing and supervising all construction projects sponsored by the Division of Game and Fish. The work includes various operating units such as new hatcheries, fish rearing ponds and miscellaneous structures, as well as repairs. Game and fish projects approved, completed and accepted, respectively, are shown in Tables 5, 6, and 7.

The construction of many game and fish projects has been postponed because of the recent increase in cost of equipment rental and the division's determination to avoid the use of temporary timber and other substitute materials in structures where their long-time permanence and use require construction of a more permanent character. Substitute materials have been used only in structures where their subsequent replacement by materials of a more permanent type will be relatively inexpensive.

Tables 2, 3, and 4 contain complete summarizations of projects other than those of the Division of Game and Fish, those approved, completed, and accepted, respectively, during the biennium. They are self-explanatory.

[1]By C. J. Bark, Construction Engineer

Brief comments will be made on five main projects which have been before the public for a number of years. They are the Whetstone River Diversion Project, Lac Qui Parle Flood Control Project, Lake Traverse Reservoir Project, Red Lake River Flood Control Project, and the Roseau River Flood Control Project.

Major Water Conservation Projects

The Whetstone River Project has been completed as planned. The control of the levels of Big Stone Lake, to prevent objectionable extreme fluctuations, cannot be effectuated, however, until waters from Little Minnesota River can be diverted into Lake Traverse Reservoir in periods when Big Stone Lake is full, and until outlet improvements to increase a present inadequate capacity of the outlet of Big Stone Lake have been provided. The Little Minnesota River Diversion Project has been studied by the War Department and recommendations made for its construction. Further studies will be made to determine the most effective and economical plan of increasing the outflow from Big Stone Lake and at the same time protecting the farm lands below.

The Lake Traverse - Bois de Sioux Project has been completed by the U. S. Corps of Engineers and was placed in operation in the spring of 1942.

The investigation and report of the Red Lake River Improvement Project authorized by the Flood Control Act of 1938 has been completed by the U. S. Corps of Engineers. This investigation also includes a report on the Clearwater River.

The Roseau River Flood Control Project was unfavorably reported by the Corps of Engineers, but on an appeal by the department and the Tri-State Waters Commission, was referred back to them for further study.

The Lac Qui Parle Flood Control Project, as originally designed, has been completed. Laws of 1941, Chapter 518, provides that the state may sell in fee to the War Department only those lands on which the structures rest, some 600 acres out of a total of approximately 21,000 acres, and that the War Department may be granted an easement on the remainder of the lands up to an elevation of 945, Mean Sea Level Datum, for flowage purposes only. Negotiations with the War Department under the authority of this chapter on the subject matter of this easement are still in progress.

The War Department has completed improvement of the channel of Minnesota River from the Lac Qui Parle control structure to Granite Falls and is now engaged in completing other work for which no state moneys were made available. Such work includes changes in the grade of the Great Northern Railway where it crosses the reservoir and where existing grades have prevented use of the reservoir to its full capacity.

The War Department will reimburse the state for moneys paid for rights-of-way and flowage easements, and will take over, at the federal government's expense, the maintenance and operation of the various structures as soon as land titles have been cleared and funds made available.

Maintenance

Prior to 1941 no funds were provided the division from which to maintain the hundreds of structures on which it has responsible control. The most necessary repairs were made by unemployment relief agencies as part of their construction programs. During the biennium ending June 30, 1942, one maintenance unit has been in operation, financed by funds obtained from the Division of Game and Fish. This unit consists of a truck and miscellaneous small tools, manned by a superintendent. Funds for this purpose were not made available until about the first of November, 1941, and until the spring of 1942, little was accomplished. However, the work done by this one unit during the spring and summer of 1942 not only has proved its value but amply justifies if not actually demands the addition of further similar units to the division's organization. Obviously, 785 control structures, more than 30,000 feet of pipe line, and 225,000 feet of open ditch located in practically every county in the state cannot be neglected and permitted to deteriorate for want of repairs and maintenance. One maintenance unit cannot do all of this work. The failure of one single unit from causes that could have been remedied at their inception may well entail a loss greater in amount than the total annual cost of providing an adequate permanent maintenance organization within the division.

The division is legally responsible for the maintenance of the structures assigned to its care, and wants to do the work assigned to it. It does not seem equitable, however, that all of the maintenance costs should be a charge against game and fish funds, as is the case at present. The widespread public benefits, other than those of direct benefit to game and fish, derived from lake control and water conservation, should place an equitable portion of the burden of maintenance on the general revenue fund.

It is recommended that funds be set up for operating not less than three fully equipped units similar to the one now in operation, together with incidental labor costs.

TABLE 1

Summary and Description

Completed Units of the Water Conservation Plan

June 30, 1942

A. Structures and Other Works:

Type "C" Dams		
1 Bay		4
2 Bay		56
3 Bay		32
4 Bay		46
5 Bay		15
6 Bay		20
7 Bay		3
8 Bay		6
9 Bay		2
10 Bay		11
11 Bay		1
12 Bay		3
16 Bay		2
17–20 Bay		6
Total Number of Type "C" Dams		207
Combination Dam and Bridges		36
Combination Dam and Culverts		27
Timber Bridges		38
Concrete Bridges		5
Concrete Culverts		14
Corrugated Metal Culverts		57
Concrete Box Culverts		26
Check Dams		5
Bulkheads		20
Special Dams		54
Pumping Stations		3
Timber Stop Log Houses		268
Concrete Stop Log Houses		25
Total Number of Structures		785
Pipe Line Installed (all sizes)	30,200	L. F.
Open Ditches	225,210	L. F.
Stream Cleaning Completed	290	Miles

B. Major Items of Work:

Structural Excavation	240,000	C. Y.
Concrete	45,693	C. Y.
Reinforcing Steel	1,225	Tons
Structural Steel	1,016,800	Lbs.
Sheet Piling	1,310,000	FBM
Bearing Pile	80,530	L. F.
Pipe Railing	23,100	L. F.
Lumber	1,738,500	FBM
Masonry	5,100	C. Y.
Earth Work (Channels, Dykes, Roads)	3,440,000	C. Y.
Rip Rap (Grouted)	13,250	Sq. Yds.
Rip Rap (Common)	218,300	Sq. Yds.
Gravel Protection	153,000	C. Y.
Seeding	383	Acres
Sodding	32,420	Sq. Yds.

TABLE 2

Projects Approved
Biennium Ending June 30, 1942

All Federal Agencies

Ident. No.	Project	County
9- 30	Straight Lake	Becker
14- 40	Birch Lake	Cass
10- 6	Hubert Lake (Outlet)	Crow Wing
10- 72	Duck Lake	Crow Wing
2- 51	Bear Lake	Freeborn
5- 75	Nine Mile (Coleman) Lake	Hennepin
14- 31	Long Lake	Itasca
4- 66	Eagle Lake	Kandiyohi
3- 5	Yankton Lake	Lyon
4- 77	Winsted Lake	McLeod
2- 27	Fox Lake	Martin
3- 44	Ocheda Lake	Nobles
9- 71	Pelican River Dam	Otter Tail
11- 7	Cameron Lake	Polk
2- 56	Alexandria-Faribault Park	Rice
3- 48	Rock River Dam	Rock
17- 57	Stone Lake	St. Louis
2- 45	Elysian Lake	Waseca
4- 85	Cedar Lake	Wright
4-189	Swart Watts Lake	Wright
4- 86	Bertram Lake	Wright
4- 7	Clearwater Lake	Wright
4- 84	Ramsey Lake	Wright

TABLE 3

Projects Completed
Biennium Ending June 30, 1942

All Federal Agencies

Ident. No.	Project	County
5- 19	Crooked Lake	Anoka
9- 30	Straight Lake	Becker
14- 40	Birch Lake	Cass
2- 51	Bear Lake	Freeborn
14- 33	Wabana Lake	Itasca
4- 12	Mud-Willmar Lakes	Kandiyohi
4- 66	Eagle Lake	Kandiyohi
18- 15	McDougal Lake	Lake
3- 5	Yankton Lake	Lyon
7- 20	Pierz Dam (Skunk River)	Morrison
3- 44	Ocheda Lake	Nobles
8- 20	Willow River Dam	Pine
3- 48	Rock River Dam	Rock
17- 9	Floodwood Lake	St. Louis
2- 48	Dartts Park Dam	Steele
2- 49	Mineral Springs Dam	Steele
2- 50	St. Olaf Lake	Waseca
2- 32	Mary Lake	Watonwan
4- 85	Cedar Lake	Wright
4-189	Swart Watts Lake	Wright
4- 86	Bertram Lake	Wright
4- 15	Deer Lake	Wright
4- 7	Clearwater Lake	Wright
4- 84	Ramsey Lake	Wright

TABLE 4

Projects Accepted
Biennium Ending June 30, 1942

All Federal Agencies

Ident. No.	Project	County
9- 22	Otter Tail River Dam	Becker
14- 40	Birch Lake	Cass
9- 38	Moorhead Dam	Clay
4- 12	Mud-Willmar Lakes	Kandiyohi
4- 66	Eagle Lake	Kandiyohi
2- 51	Bear Lake	Freeborn
3- 5	Yankton Lake	Lyon
2- 27	Fox Lake	Martin
7- 20	Pierz Dam (Skunk River)	Morrison
3- 44	Ocheda Lake	Nobles
8- 20	Willow River Dam	Pine
17- 9	Floodwood Lake	St. Louis
2- 48	Dartts Park Dam	Steele
2- 49	Mineral Springs Dam	Steele
2- 50	St. Olaf Lake	Waseca
2- 32	Mary Lake	Watonwan
4- 85	Cedar Lake	Wright
4-189	Swart Watts Lake	Wright
4- 86	Bertram Lake	Wright
4- 15	Deer Lake	Wright
4- 7	Clearwater Lake	Wright
4- 84	St. Olaf Lake	Wright

TABLE 5

Division of Game and Fish

Projects Approved
Biennium Ending June 30, 1942

Ident. No.	Project	County
FH- 1	Mounds Park Hatchery	Ramsey
FH- 2	Glenwood Hatchery	Pope
FH- 3	Detroit Lakes Hatchery	Becker
FH- 4	French River Hatchery	St. Louis
FH- 5	Southern Minnesota Hatchery	Nicollet
FH- 6	Redby Hatchery	Beltrami
FH- 7	Root River Basin Hatchery	Fillmore
FH-12	Otter Tail Hatchery	Otter Tail
FH-14	Park Rapids Hatchery	Hubbard
FH-17	Lake of the Woods Hatchery	Lake of the Woods
FH-18	Waskish Hatchery	Beltrami
	FISH PONDS	
FP- 3	Izaak Walton Fish Pond	Hennepin
FP- 7	Mille Lacs Fish Pond	Crow Wing
FP-13	Crystal Springs Fish Pond	Olmsted
FP-16	Sturgeon Lake Fish Pond	St. Louis
FP-22	Straight Lake Fish Pond	Becker
FP-23	Park Rapids Fish Pond	Hubbard
FP-27	Warren Lake Fish Pond	Cottonwood
	GAME REFUGE	
GR- 2	Thief Lake Refuge (Bridge)	Marshall
GR- 3	Carlos Avery Refuge (Bldg.)	Anoka

TABLE 6

Division of Game and Fish

Projects Completed
Biennium Ending June 30, 1942

Ident. No.	Project	County
FH- 2	Glenwood Hatchery	Pope
FH- 4	French River Hatchery	St. Louis
FH- 7	Root River Basin Hatchery	Fillmore
FH-17	Lake of the Woods Hatchery	Lake of the Woods
FH-18	Waskish Hatchery	Beltrami
	FISH PONDS	
FP- 3	Izaak Walton Fish Pond	Hennepin
FP- 7	Mille Lacs Fish Pond	Crow Wing
FP-16	Sturgeon Lake Fish Pond	St. Louis
FP-22	Straight Lake Fish Pond (30% Complete)	Becker
FP-27	Warren Lake Fish Pond	Cottonwood
	GAME REFUGE	
GR- 3	Carlos Avery Refuge	Anoka

TABLE 7

Division of Game and Fish

Projects Accepted
Biennium Ending June 30, 1942

Ident. No.	Project	County
FH- 2	Glenwood Hatchery	Pope
FH- 4	French River Hatchery	St. Louis
FH- 7	Root River Basin Hatchery	Fillmore
FH-17	Lake of the Woods Hatchery	Lake of the Woods
	FISH PONDS	
FP- 3	Izaak Walton Fish Pond	Hennepin
FP- 7	Mille Lacs Fish Pond	Crow Wing
FP-27	Warren Lake Fish Pond	Cottonwood

CONTROL SECTION[1]

Discussion of Problems

It is axiomatic that life and its social organization are dependent upon water. The location of populations and their progress are measured and controlled by the quantity and quality of available water supplies. The vital necessity of conserving it for ever-increasing uses is accentuated as man becomes more familiar with the natural laws controlling it. An abundance of water supplied during one period does not necessarily insure against scarcity in a subsequent period. Uncontrolled supplies yielded by heavy rain and snow fall frequently cause floods that destroy progress developed during years of normal conditions, while deficient supplies in periods of drouth depreciate property values and even completely depopulate extensive regions that prospered when water was plentiful. All too often such disasters result from man's lack of appreciation of how water behaves, his consequent encroachment upon areas which under natural conditions were used for the storage and drainage of excessive quantities, and his stubborn refusal to believe that floods or drouths, no matter how severe, are almost certain to return and at relatively short intervals. Tremendous sums are expended in times of floods for flood protection works and flood relief, and in times of drouth for water conservation projects and drouth relief, but too little thought is given in normal times to prepare for and prevent oncoming disasters.

That deficiencies in normal supplies during drouth periods create problems at least as serious as those caused by floods was emphasized during the protracted drouth between 1920 and 1937. Projects to conserve water demanded by the public during that period still engage the attention of the division.

Until recently, water control projects were usually designed to serve a single purpose, such as flood control, or storage to alleviate drouth conditions, or for power development, or for industrial, domestic and sanitary purposes, or for irrigation. More recently, water planning has sought to reckon with both extremes and control works are designed, whenever practicable, to serve as many purposes as possible.

It is obvious that any plan of multiple use must sacrifice the concentrated emphasis upon a single purpose which would be possible by directing operations exclusively for such a single purpose. It, therefore, becomes the duty of those charged with the responsibility of control to seek the maximum benefit for each of the purposes, bearing in mind at all times the effect that over-emphasis of any one use will have upon the others. The reluctance of groups profiting from control for one purpose to recognize the rights of others who benefit from control for different purposes has been and continues to be one of the main obstacles to a sound program of water conservation. The problem of creating a proper understanding by groups of conflicting interests of the necessity of compromising and reconciling their

---

[1]By S. A. Frellsen, Hydrologist

views is made more difficult by unchangeable physical characteristics and also by the economic limitations imposed by the well-established and sound principle that cost must not exceed benefits.

The hazards to which property is subjected and the economic limit to which such property can afford protection determine the cost of protective works. Flood control structures, for instance, are usually designed to protect property against maximum floods that may be expected to occur, on the average, once in a given number of years, as once in 15 years, once in 25 years, once in 50 years, etc. It follows that full protection is not afforded from the larger floods which may be expected to occur, on the average, at longer intervals than that for which the project has been planned. Similarly improvement works designed to conserve water for beneficial uses in times of deficient supplies must reckon with the probable recurrence of drouths and the limitations which surround artificial storage. These limitations usually are not understood.

The legislature of 1937 enacted the so-called "Water Control Bill" declaring that all waters of the state, whether meandered or non-meandered, surface or underground, are public waters, and placed responsibility for their regulation and use in the Division of Water Resources and Engineering, Department of Conservation. The meager data now available on the behavior of both surface and subsurface water supply makes it obvious that studies directed toward the accumulation of sufficient information and data are of paramount importance.

Minnesota, with its 11,000 lakes, totaling upwards of 3,600,000 acres, and its thousands of miles of streams, affords an enviable opportunity for the development of a water conservation program which will benefit the state not only in a general aesthetic and recreational way, but most especially by stabilizing and increasing revenues. Minnesota is embarked upon a state water control program as extensive and far-reaching as is consistent, within the framework indicated, with the physical opportunities available. The most direct and immediately effective program calls for the utilization of our lakes and streams for storage purposes. This by no means constitutes the entire program, however, as it is rapidly being recognized that soil and subsurface percolation provide another widely effective means of water storage. Work which has been done demonstrates that this latter method not only increases the water supply which can be made immediately available for crop production, but also sustains a more uniform stream flow and reduces erosion and its attendant pollution. Contour plowing, strip farming and terracing, and similar corrective farm practices can also be made to contribute their share towards increasing soil and underground storage.

On July 1, 1937, the division began to operate lake control structures that had been erected by federal work relief agencies. Most of these structures were built at the request of communities awakened by the drouth to the necessity of such control. At the beginning of the program the control mechanisms of these structures were operated by the regular construction personnel, but as the number of structures increased, the volume of operational and observational work reached a point where the construction force

could not continue to carry it. An attempt was made to solve this problem by enlisting the assistance of the game warden force, and the division also experimented with the control of groups of lakes by a single individual assigned to a given area. This latter method, after a short trial, was found to be prohibitively expensive. Direct operation by the game warden force also proved unsatisfactory because weather conditions often made it impossible for the wardens to reach the controls and because there were frequent conflicts with their regularly assigned duties.

During the past biennium individuals living adjacent to the structures have been hired under a cooperative agreement between the Division of Water Resources and the United States Geological Survey. It has been possible thus far to match each dollar of federal funds with a dollar of state funds in employing these local private observers to report gage readings and operate the control structures. In instances where no one competent to do this work lives near the structures, observations are still being made by game wardens, forest rangers, or other state employees. This work is still in a state of organization.

On June 30, 1942, 369 structures were under control by the division. In addition, observations were taken from gages on 33 uncontrolled lakes where stage observations were being carried on to accumulate sufficient data on the characteristics of control operation. In addition, readings were obtained from 130 stream gaging stations of the U. S. Geological Survey, making a total of 532 stations of various types from which the division receives readings and compiles records.

Control operation can be roughly divided into three phases: the first one, which has just been outlined, embraces the gathering of field records; the second is the tabulation, compilation, and study of these records to determine the water behavior and serve as a basis for the third phase, the physical manipulation of controls in the field.

The second phase of the work, that of tabulating, compiling, and studying the records, has not been fully developed, but it is obvious that the determination of the most widely beneficial plan of operation will require a tremendous amount of this work. Ground waters, for example, play a significant role in stream flow in this state. Very little information has as yet been obtained relative to the extent or behavior of these reservoirs, although to properly control any body of water at its maximum efficiency, the extent to which ground waters may reach this body of water must be known. This is especially true in situations where communities are dependent upon water for their domestic and sanitary supply, as on the Otter Tail River and basin. An expansion of this phase of the work, as soon as personnel is made available, is an essential to successful control.

The physical operation of control structures should be given more detailed supervision. It has been found that local private observers do not always understand the problems involved, and, therefore, do not, when left entirely to themselves, obtain the maximum results possible. It is keenly felt that a contact by a trained hydraulic engineer with these observers once or twice during the observation period of the year would materially aid in effecting far more efficient control.

Progress has been made in demonstrating and explaining to the general public the uses of our waters and some of the many problems involved in their control. There has been a general and erroneous assumption throughout the state that control structures at the lake outlets can absolutely stabilize surface elevations. Lake elevations can be "stabilized" from an engineering standpoint, but such stabilization does not bring about a maximum use of water. However, much can be done to reduce the large variations occurring in nature. An outstanding example may be found at Otter Tail Lake, which in a state of nature varied some 4 feet. Under control, it has been held within a variation of as little as 0.4 feet during the summer use season.

The physical conditions surrounding each particular body of water are ordinarily the factors upon which controls are based. Each lake has a "personality" determined by these physical conditions. Its behavior is affected by the ratio of the area of its drainage basin to its surface. It is obvious that with an extremely large tributary area yielding considerable quantities of water, the effectiveness of control is largly limited to periods of low flow, as the storage available in such lakes is not sufficient to effect substantial permanent regulation.

Bear Lake Dam—Freeborn County

As data are being accumulated, subsurface waters are being increasingly recognized as a major influence in a large number of instances in control operation, especially in discovering the quantities that can be released during the winter months with a reasonable assurance of a recovery of the lake elevation during the following summer use months.

With the return during the past two years of normal to excessive rainfall, subsurface waters are gradually being restored and lakes are again returning to normal. This is especially true of the lakes in the Douglas County area where, almost without exception, lakes have returned to normal levels. The policy of the division will be to retain as much of these waters as possible and regulate their use for the most beneficial purposes.

During the last year game and fish funds to the amount of $10,000 have been expended for use on control work. Here, as in maintenance, it is believed that in view of the widespread benefits derived from the control of the waters of our state, the state should appropriate moneys to defray at least a portion of the costs from the general revenue fund in order to make a more equitable distribution of the costs of control operations.

In spite of the fact that rainfall in the past two years has been at least normal, and much in excess of rainfall for the past several years, complaints have been comparatively few. It is significant that the complaints which have been received have been about equally divided between those asking for a reduction in lake elevations and those asking for the maintenance of present high or even higher levels, indicating that the people of the state are becoming aware that uniformly higher levels on lakes are desirable.

Identification System for Lakes

The control section has been charged with designing an identification number system for the lakes throughout the state, a work especially needed where lakes of the same name are located in close proximity to each other. For this purpose the state has been divided into 18 numbered control districts used in the control operations. Lakes are then identified by a reference to the control district number, which is followed, after a hyphen, by the number of the individual lake within the district. These individual numbers are assigned in the order in which lakes come to the attention of the division. This system is being adopted largely by other agencies.

The section is also charged with the responsibility of investigating and passing upon requests for permits on applications submitted to the division under Laws 1937, Chapter 468, which governs proposed changes in the course of streams, use of waters, and related matters.

In order to accumulate more data dealing with subsurface water, the section recommends that Chapter 468 be amended to provide that permits be required for all wells, except those for domestic consumption or for water supply for 25 families or less, and that as a condition of the permit, the division be supplied with information as to the character and extent of the material encountered, by the submission by the permittee of a well log, accompanied by samples. Such a law should also require a statement giving

the proposed capacity of the well, and that it shall be constructed in such a manner as to protect against the pollution of adjacent aquifers or water-bearing strata.

FIG. 1

Map of Minnesota Showing Control Districts and Dams by Counties

The benefits derived from proper control and use of public waters are state-wide and not confined to any one section or group of individuals. Agriculture and dairying derive benefits, as does the tourist industry, from the improvement of ground water conditions. Game and aquatic wild fowl, industrial plants depending upon an adequate supply of water for power purposes, and in general the entire citizenry of the state who rely upon

surface waters for municipal supply and domestic and sanitary uses, will benefit.

Progress has been made, but much remains to be accomplished, more particularly in developing an understanding and comprehension of the potentialities and limitations of water use, both from a commercial as well as an aesthetic standpoint. Only the far-sighted cooperation of all our citizens can insure maximum domestic, agricultural, and industrial benefits from the use of our waters, and at the same time create the fullest possible enjoyment of the greatest recreational heritage of any state in the nation—Minnesota's waters.

TABLE 8

Showing Total Number of Observers and Stations Reporting

	June 30, 1937	June 30, 1938	June 30, 1939	June 30, 1940	June 30, 1941	June 30 1942
Number of structures under control	119	237	303	325	356	369
Number of lake gages	1	3	4	9	21	33
Number of U.S.G.S. stream gaging stations	....	....	....	....	91	130
Total number of stations reporting	120	240	307	334	468	532
Number of paid observers	....	....	....	11	66	218
Number of volunteer observers	....	2	5	37	53	43
Number of watermasters	....	....	....	1	....	....
Number of dam tenders	....	....	....	1	1	1
Number of Game Wardens acting as observers	....	64	72	68	39	30
Number of Forest Rangers acting as observers	....	1	2	3	5	3
Total number of observers	....	67	79	121	164	295

REPORT OF STREAM GAGING IN THE STATE OF MINNESOTA DURING THE BIENNIUM ENDING JUNE 30, 1942[1]

War conditions lead to unnatural concentrations of population, both civil and military.

Civil concentrations result from migrations of workers to locations close to war industry plants. An extra load is thus placed on public utilities in these areas with the result that means must be found to meet the extra demand. Most hard pressed of the utilities when it comes to coping with these increases are the sewer and water supply sustems which are usually designed for a fixed maximum capacity. Population increases in large cities are not usually as serious as in smaller towns and villages. The percentage of increase in the former is almost always well within the limit of the existing facilities or within the limit of the maximum planned facilities. Smaller communities find that their plans for natural expansion, if any such plans have been made, are wholly inadequate to take care of an influx of population far beyond any reasonable expectations. Increased water supplies must be developed and sewage disposal plants enlarged in the shortest possible time. A knowledge of available water supplies is essential in order to proced on a sound basis with such expansion. The best distribution system in the world is of no avail if water to fill the pipes is lacking at certain periods of the year. Where treated sewage is discharged into a nearby stream the amount of flow in the stream must be accurately known in order to properly regulate the plant discharge so as not to overload the stream and to permit plant operation at a minimum of cost. Many war industries depend, owing to their processing methods, on a large and constant supply of water. Such plants will obviously only locate where such a supply is known through adequate stream-flow records to be available.

Military concentrations of population are, of course, located at the various camps throughout the nation, and adequate water supply is one of the first considerations in choosing a site. Locations where stream records over a period of years indicate an adequate supply are naturally favored over those where the supply may be subject to question.

In short, for any community, or for the State itself, to take the maximum advantage of the opportunities afforded by the war industry expansion, a thorough knowledge of the existing water supply is essential. In order to increase the stream-flow data available in Minnesota, cooperation was continued with the Water Resources Branch of the U. S. Geological Survey throughout the past biennium. On June 30, 1942, there were 91 stream-flow stations in operation throughout the State, including those on the Red River of the North and on the Canadian boundary streams. This is a small increase over the 89 afforded for the biennium ending June 30, 1938; but the number is still inadequate. Special investigations by the U. S. Engineer Office of St. Paul are still responsible for the continuation of a large number of discharge stations which should normally be maintained by State funds matched dollar for dollar with Federal funds.

Stream-gaging stations in operation on July 1 were grouped as shown in Tables 9 to 13, inclusive.

[1]Paul R. Spear, District Engineer, U. S. Department of Interior, Geological Survey, Water Resources Branch and located at St. Paul, is in charge of cooperative stream gaging in Minnesota and has furnished the material for this report.

TABLE 9

Gaging Stations Maintained in Cooperation with U. S. Geological Survey

Station	Type of Gage
Baptism River near Beaver Bay	Recorder
Bois de Sioux River near Fairmont (part cost)	Chain
Buffalo River near Dilworth	Recorder
Cannon River at Welch	Recorder
Clearwater River near Leonard	Staff
Clearwater River at Red Lake Falls	Recorder
Cottonwood River at New Ulm	Staff
Crow River at Rockford	Recorder
Crow Wing River at Nimrod	Chain
West Fork Des Moines River near Jackson	Chain
Elk River near Big Lake	Recorder
Heron Lake Outlet near Heron Lake	Staff
Minnesota River at Ortonville	Recorder
Mississippi River at St. Paul (part cost)	Recorder
Mustinka River above Wheaton	Chain
Otter Tail River near Detroit Lakes	Recorder
Otter Tail River below Pelican River near Fergus Falls	Recorder
Poplar River at Lutsen	Recorder
Red River at Fargo (part cost)	Staff
Red Lake River at Highlanding near Goodridge	Recorder
Red Lake River near Red Lake	Recorder
Redwood River near Redwood Falls	Wire-weight
Root River near Houston	Recorder
Zumbro River at Zumbro Falls	Recorder
Rum River near St. Francis	Recorder
Sauk River near St. Cloud	Recorder
South Fork Crow River near Mayer	Staff
Thief River near Thief River Falls	Recorder
Whetstone River near Big Stone (Big Stone Lake Diversion)	Recorder
Wild Rice River at Twin Valley	Recorder

TABLE 10

Gaging Stations Maintained by the U. S. Geological Survey in Cooperation with U. S. Army Engineers

Station	Type of Gage
Minnesota River near Carver (part cost)	Recorder
Minnesota River at Mankato	Recorder
Mississippi River at La Crosse, Wis.	Recorder
Mississippi River at St. Paul (past cost)	Recorder
Whitewater River at Beaver	Recorder
Zumbro River at Thielman	Chain
Blue Earth River near Rapidan	Recorder
Clearwater River at Plummer	Recorder
Gilmore Creek at Winona	Recorder
LeSueur River near Rapidan	Recorder
Little Minnesota River near Peever, S. D. (Lake Traverse Diversion)	Staff
Minnesota River at Judson	Chain
Minnesota River near Montevideo	Recorder
Root River at Hokah	Chain
Root River below South Fork near Houston	Chain
Root River near Lanesboro	Chain
South Branch of Root River near Lanesboro	Chain
South Branch of Whitewater River near Altura	Recorder
Yellow Bank River near Odessa	Wire-weight
Yellow Medicine River near Granite Falls	Staff
Clearwater River near Pinewood	Staff
Redwood River at Marshall	Chain
Rush Creek near Rushford	Recorder
Watonwan River near Garden City	Chain

TABLE 11

Gaging Stations Maintained by U. S. Geological Survey by Funds Transferred from U. S. Department of State

Station	Type of Gage
For Roseau River Investigation:	
Red River at Grand Forks, N. D.	Recorder
Roseau River near Roseau	Staff
Roseau River at Ross	Recorder
Roseau River near Badger	Recorder
Roseau River near Haug	Recorder
Roseau River at head of State Ditch 51	Recorder
Roseau River at Oak Point	Staff
Roseau River at Roseau Lake	Staff
Roseau River below State Ditch 51 near Caribou	Recorder
Roseau River at Outlet of State Ditch 69	Staff
Roseau River at International Boundary near Caribou	Recorder
Mud Creek near Sprague, Manitoba	Recorder
Pine Creek near Pine Creek	Recorder
Red Lake River at Crookston	Recorder
South Fork Roseau River near Malung	Staff
Roseau River near Malung	Staff
For Rainy River Investigations:	
Rainy River at Manitou Rapids	Recorder
Basswood River near Winton	Recorder
Vermilion River below Lake Vermilion near Tower	Recorder
Big Fork River at Big Falls	Recorder
Little Fork River at Little Fork	Recorder
Pigeon River at Middle Falls below International Bridge	Recorder

TABLE 12

Gaging Stations Maintained by U. S. Geological Survey Solely from Federal Funds

Station	Type of Gage
Mississippi River below Sandy River near Libby	Recorder
Mississippi River at Elk River	Recorder
Mississippi River at Winona	Recorder
Mississippi River at Prescott	Recorder
Minnesota River near Carver (part cost)	Recorder

TABLE 13

Gaging Stations Maintained in Cooperation with Federal Power Commission Licensees

Station	Type of Gage
Minnesota Power and Light Company	
Kawishiwi River near Winton	Powerhouse Records
Mississippi River near Royalton	Powerhouse Records
Ford Motor Co.	
Mississippi River near Anoka	Recorder

During the past biennium, the following funds were spent in the State for stream-flow studies:

Minnesota State	$ 9,325.00
Federal Cooperative funds	9,325.00
U. S. Engineer Office	36,670.09
U. S. Department of State	19,500.00
U. S. Geological Survey	6,900.00
Federal Power Commission Licenses	796.23

During the past biennium the percentage of State funds available for stream flow studies has been small. Federal non-cooperative funds which are subject to much variation from year to year have carried the major portion of the load. In order to establish the stream-flow investigations on a sound basis whereby plans can be laid for a long time program, the State should assume more of the responsibility of carrying out this work in cooperation with the U. S. Geological Survey. As mentioned in the past biennium report, many rather costly installations have been made purely by the use of Federal funds, and this investment is available to the State for carrying out the work in the future.

Lake Stations

The program of maintaining lake records on approximately 350 lakes was continued by the Division of Water Resources and Engineering. The U. S. Geological Survey has cooperated in the collection and assembling of records of stage for 327 lakes. Records for 109 of these were published in official water supply papers. In order to place the records on a more impartial basis, gage readers were employed and supervised by the Geological Survey at 330 stations. State funds spent for the collection and publication of lake records during the past two years amounted to $9,673.00 which was matched by a like amount of Federal funds.

REVIEW OF WORK OF THE COOPERATIVE DRAIN TILE TESTING LABORATORY[1]

In the Department's report for the biennium ending June 30, 1940, the various activities of the laboratory for the preceding several years were set forth in detail on pages 60-66. Therefore, it is the intention of this report to summarize only those accomplishments in the field of research upon which the personnel of the laboratory devoted the larger part of its time during the past two years.

Concrete-Alkali

As indicated in the 1940 report, this activity, to a large degree, has been narrowed down to fundamental studies of the chemical composition of cements as affecting resistance to soil alkalies of the sulfate type common to western Minnesota. As a means to the end of securing cements of high sulfate resisting properties for any particular job, there is need of a reliable acceptance test that can be applied in the laboratory within a relatively short time. Out of this need, a number of short time tests were devised, none of which were of proven reliability. Therefore, the work of the laboratory during the past two years has been very largely devoted to studies of existing and possible short time acceptance tests. As stated in

[1]By Dalton G. Miller, Senior Drainage Engineer, Division of Drainage, Soil Conservation Service, U. S. Department of Agriculture, in charge of laboratory at University Farm, St. Paul, conducted under cooperative agreement of the Soil Conservation Service of the U. S. Department of Agriculture, the Agricultural Experiment Station at the University of Minnesota, and the Division of Water Resources and Engineering, Department of Conservation, State of Minnesota.

the report of two years ago, these studies have been sponsored by the American Society for Testing Materials. As a result, the finest possible active cooperation has been given this work by the following five organizations, all of which have participated in making laboratory tests assigned them by the writer (D. G. Miller) as chairman of the Working Committee on Sulfate Resistance, A.S.T.M. Committee C-1.

Board of Water Supply, City of New York
California Portland Cement Company
National Research Council of Canada
Portland Cement Association
Public Roads Administration, Federal Works Agency

The 132 cements used in this work are cements of known durability as determined by the laboratory at University Farm after 5-year exposures to solutions of sodium and magnesium sulfate and to the natural alkali waters of Medicine Lake, South Dakota. In the search for a reliable short-time test, details have been fairly well worked out for a test based on length changes of a 1-5 cement mortar in 1x1x5-inch bars. This test requires about 5 weeks for completion and gives results that fall within reasonable expectations for a short-time test although somewhat short of an ideal test. Considerable work also has been done on a simple test based on use of the water solubility of a cement as an index of sulfate resistance. This test requires about 10 days for completion and agreement of results of three laboratories making this test of the 132 cements are well in line and compare favorably with any of the short-time tests so far applied to these cements in the matter of correlation with sulfate resistance as determined by the 5-year exposure tests of cylinders. Work on the short-time tests will continue to a limited extent on a few phases for much of the remainder of 1942 and this will just about bring to very satisfactory conclusion the long-time research program of the laboratory as related to the concrete-alkali studies except for the preparation of the final report and the testing of a few specimens still under observation.

Concrete-Peat

For all practical purposes, the experiments are completed on this activity, except for preparation of a final report. Actually there are experimental specimens buried in peat at a number of locations in Minnesota and Wisconsin, the testing of which eventually may seem desirable in which case a short supplementary report can be prepared.

Masonry Silos

Dating back to 1927, the facilities of the laboratory have been made available for testing concrete and clay products used in silo construction in Minnesota. As a result of this cooperation, a Minnesota manufacturer in 1940 erected a full size 14x45 foot silo and donated it for use by the University of Minnesota Agricultural Experiment Station for experimental purposes. This silo was erected primarily to study drainage and reinforcing of silos used for ensiling the wetter silages that have come into the picture

along with the practice of ensiling green grasses and legumes with little or no preliminary field curing. This work is now conducted as a research project of the Division of Agricultural Engineering of the University of Minnesota and as such is not now directly a part of the work of the Cooperative Laboratory. However, as in the past, it is expected that the facilities of the laboratory will continue to be available for the testing of concrete and clay products used in silo construction insofar as state funds and personnel will permit.

GROUND WATER STUDIES IN THE PEAT MARSHES OF NORTHERN MINNESOTA

These studies never have been exhaustive enough to be of utmost value and an outline has been prepared to modify the whole set-up of this project. With present limimtations on travel, it does not appear that much field work will be possible on this project for the duration.

Conclusion

As in past years, tests of drain tile were made in the laboratory for individual farmers, manufacturers, and public organizations.

It is planned in the immediate future to give particular attention to a number of details of design and maintenance of tile and open ditch systems to the end that drainage systems may be more effective and consequently more economical. This work, as planned, will entail limited laboratory research and field studies.

Division of Forestry

H. G. WEBER, *Director*

INTRODUCTION

The Division of Forestry submits its report by sections. Each section of the report has been prepared by the man in responsible charge of the work.

FOREST FIRE CONTROL[1]

Over half of the state of Minnesota is under some degree of forest or prairie fire protection. The extent of protection afforded the different regions is based upon the hazard, risk and values involved, and is classed as either intensive or extensive.

Protection Areas

The intensively protected portion is in the northern half of the state, which was the original coniferous or pine belt. The risk of fires starting in this area is high because of extensive travel and the large increase in population during the vacation months. The hazard is considered extreme because of the timber and cover types and the general climatic conditions. This is the territory in which the permanent ranger force is located, and comprises approximately twenty million acres.

The southern or former hardwood region, aggregating over eleven million acres, is placed under extensive protection. The fire hazard and risk are much lower than in the northern section. This fact together with the lack of funds does not, at present, justify the maintaining of a regular paid fire control organization. The protection work is handled by unpaid cooperative and public-spirited groups and individuals, with limited supervision by the Division of Forestry. During the seasons of 1940 and 1941, over 100 men volunteered their services for fire protection work within the state.

The 1940 Fire Season

The extreme shortage of moisture during the fall and winter of 1939 and 1940 created an unusually high fire hazard in the early part of April, and had all indications of developing into one of the most severe spring fire seasons in many years. General rains, however, occurred over the entire protection area during late April, temporarily relieving the situation and it did not again become generally critical during the remainder of the season. There were periods when certain small portions of the protection zone became quite dry, but because of occasional scattered showers high hazard conditions did not again extend over any large continuous area. In general, the 1940 fire season was classed as about normal.

The first occurrence of fires for the season was on April 13, and the last on October 27, making a total of 197 days when the control force was

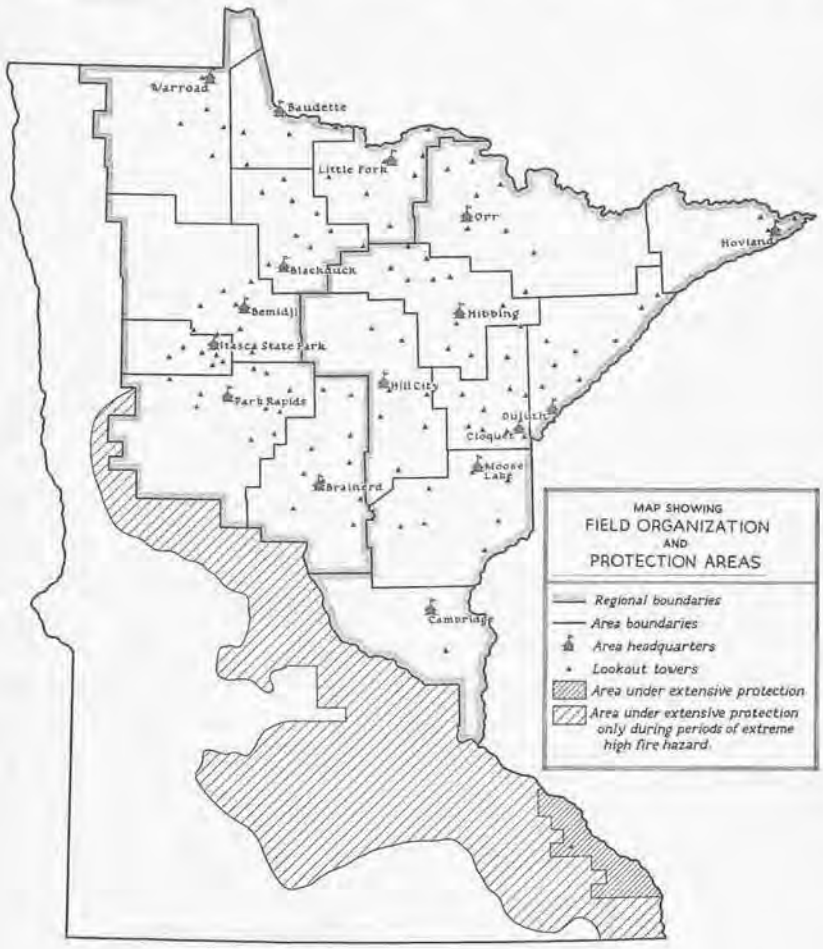
[1]A. E. Pimley, in Charge

on the alert. The number of fires on which control action was necessary totaled 996, burning over 25,448 acres of highland, and 48,725 acres of peat land. Of this area, 48,976 acres was non-forest land, and 14,510 acres denuded forest land, and 10,687 acres timber land.

The fire damage in 1940 is estimated at $70,000 of which $23,000 was charged to timber, $26,000 to game cover and recreation, and the remainder to watershed and miscellaneous items.

The 1941 Fire Season

There were but two years since 1916 when fewer fires burned in the state than during the 1941 season. From April 1, when the first fire occurred, until November 10, the end of the 1941 season, 329 fires had been recorded on which control action was necessary. In 1916, 246, and in 1917, 174 fires were reported.



An unusual amount of rain fell during the summer months. A total of 29.65 inches was recorded from April 1 to November 1, as compared with 19.14 inches in 1940, and 18.19 inches in 1939, for the same period. This is an excess of 5.15 inches above normal for 1941, as compared with a deficiency of 1.29 inches for 1940 and 3.28 inches for 1939.

The total area burned over in 1941 was 4,321 acres, of which 3,135 acres was highland, and 1,186 acres was open peat bog. The total estimated damage was $11,963.00, or an average of $36.00 per fire. Of this amount, $5,271.00 was suffered by timber resources, or an average of $16.00 per fire.

Fire Control Organization

The state forest fire control organization is divided into two distinct groups, the permanent state force of the Division of Forestry responsible for all fire control activities, and the cooperative or auxiliary voluntary force which is unpaid and acts under the direction of the regular force.

Stairway Fire Observation Tower Under Construction

The regular field fire protection organization functions under the direction of the administrator in charge of the Division's central organization. It consists of two regional coordinators, 16 area supervisors, and forest rangers, towermen and forest guards. Each coordinator has under his jurisdiction one-half of the protection zone, or eight supervisory areas. The supervisors are responsible for all activities within their respective areas. These areas are further subdivided into districts each under the supervision of a ranger who has direct charge of the tower lookouts, forest guards, smoke chasers and other temporary employees.

The cooperative or auxiliary force consists of public spirited groups, organizations and individuals, who are selected by the supervisors and rangers because of their interest in fire prevention, willingness to cooperate and ability to serve as keymen or fire bosses, crew foremen and smoke chasers, as well as pump, engine and tractor operators. In addition to these, there are one or more men appointed in each township within the protection region to act as township fire wardens, and it is their duty, as commissioned state cooperators, to issue burning permits within their respective townships. Some of these wardens are members of township boards, in which case they have a dual responsibility. As township officials they are authorized and directed by law to prevent the starting and spreading of forest and prairie fires within their respective townships.

None of the men in the auxiliary force receives pay for his services, except when actually engaged in fire control activities. In the extensively protected area alone there were over 1,000 township fire wardens commissioned and over 1,100 keymen appointed each of the two years covered by this report.

Fire Control Training

Due to the importance of the work, the numerous complicated subjects involved and because each ranger, towerman and guard, after being specifically assigned to a field station, must act upon his own initiative and must be capable of making immediate decisions, it is of paramount importance that he be thoroughly trained. The basic training of these men is accomplished through study courses, conferences, demonstrations and personal contacts.

During the past biennium, two 3-day assemblies have been held at the Grand Rapids Supply Depot, attended by all area supervisors at which instructions and discussions of important fire control problems, including law enforcement, were taken up. Area schools were held shortly before the spring fire season both in 1940 and 1941. In most cases meetings were held at each of the area headquarters and were attended by the entire area personnel. In some areas the local game wardens, railway fire patrolmen and keymen were invited to participate in the training. Subjects were confined to fire control activities and other closely allied activities.

At least one man from each area attended a mechanical school held in four sections: Grand Rapids, Duluth, Park Rapids and Baudette. The topics were principally confined to those relating to inspection and adjustment of

fire fighting motorized equipment. Similar schools were held later at the same locations, designed to train field employees in the care and maintenance of telephone lines and instruments. Each trainee, after returning to his station, assisted his area co-workers in studying the subjects, so that eventually all of the field men may receive the benefits of the courses.

Several times during the season, fire schools were held at each of the CCC camps attended by all enrollees and foremen. Subjects discussed were general fire fighting techniques. Field demonstrations were given on all subjects. These schools were conducted in most instances under the direction of the camp superintendent in cooperation with the area supervisors.

In dealing with the present fire situation, it is found that the immediate job is not so much the development of new ideas, important as they may be, but the expansion and bringing to perfection of the plans and practices which in the past have only partially produced the desired results. So far the work has progressed splendidly. The coordinators, area supervisors, district rangers and all others of the field fire control personnel deserve commendation for their efforts to coordinate the various groups, agencies and individuals into a more compact state-wide organization.

The following summarizes the major accomplishments of the Division's efforts to build up efficiency and morale in its fire protection personnel.

1. Newly employed members of the regular personnel are given special training.

Initial Attack—Fire Fighting Squad Truck

2. Such local agencies as the Home Defense Corps, civic groups, game clubs, Boy Scouts, 4-H Clubs, high school boys, and similar groups are coordinated and trained as organized units.
3. Many of the mining and lumber companies located in the protection zone were contacted and plans made for handling emergencies in their localities, with the idea in mind of eliminating as far as possible any disruption of the defense work by taking the men from their jobs for the purpose of fighting fire.
4. A training program which includes general fire crew organization and basic fire control problems has been started among the auxiliary fire fighters. This includes the township fire wardens, keymen, smoke chasers and temporary towermen. From this group the fire foremen, crew and fire bosses are selected.

The following summarizes specific projects which have been made a part of the Division's operating regulations.

1. An automotive inspection system calling for inspection of mechanical equipment at shorter intervals has been adopted.
2. Fire control projects have been developed through CCC and WPA, details of which are given in another portion of this report.
3. Cooperation in fire control research has been established with the states of Wisconsin and Michigan and the Lake States Forest Experiment Station.
4. Forest fire radio broadcasting is in process of development and use.
5. Testing and acquiring new fire fighting equipment of proven efficiency is in effect.
6. Preparation of a fire control work plan tied into defense has been developed to meet present emergencies.
7. Seven hundred fire warning signs, twenty 70-gallon tanks and twenty-five rain gauges have been fabricated by NYA.

Permanent Personnel—Field Force

The Division of Forestry has previously operated with from 100 to 110 all-year field men and from 45 to 50 seasonal men, but by making adjustments in the divisional budget it is now possible to maintain a permanent force of 156, an increase of 47 men. This adjustment also provides pay increases for the men in the lower salary brackets.

Tables 14 to 20, inclusive, are statistics relating to fire protection and are self-explanatory.

TABLE 14

Number of Fires, Area and Damage
By Cause

	Calendar Years 1940-1941					
	NO. FIRES		AREA-ACRES		DAMAGE	
Causes	1940	1941	1940	1941	1940	1941
Lightning	9	11	12	22	$ 93.93	$ 228.00
Railroads	99	103	587	162	841.72	1,585.00
Camp Fires	66	14	513	22	1,935.32	101.00
Smokers	266	85	27,041	1,689	12,048.93	2,793.00
Land Clearing	133	25	6,058	701	11,276.98	2,097.00
Incendiary	25	14	2,476	254	6,584.07	1,280.00
Lumbering	7	11	197	339	677.24	2,151.00
Meadow Burning	283	37	24,450	827	30,194.70	958.00
Miscellaneous	108	29	2,839	305	6,896.91	771.00
	996	329	64,173	4,321	$70,549.80	$11,964.00

TABLE 15
Type of Area Burned Over

Year	Merchantable Timber	Reproduction	Denuded Forest Land	Non-Forest Land	GRAND TOTAL
1937	1,912	4,237	7,931	14,000	28,080
1938	4,775	61,864	48,986	74,582	190,207
1939	993	18,852	20,031	28,178	68,054
1940	145	10,542	14,510	48,976	74,173
1941	10	1,779	1,396	1,136	4,321

TABLE 16
Classification of Fires by Size

Year	"A" Under ¼ Acre	"B" ¼ Acre to 10 A.	"C" 10 Acres to 100 A.	"D" 100 Acres to 1,000 A.	"E" Over 1,000 A.
1937	373	266	193	43	3
1938	327	500	378	189	39
1939	270	574	394	109	10
1940	190	411	318	70	7
1941	133	138	49	9	0

TABLE 17
Forest Fire Damage

Year	Timber Reproduction	Merchantable Timber	Game Cover and Recreation	Misc. Damage	Total Damage
1937	$ 8,590	$ 1,413	$ 7,156	$ 9,168	$ 26,327
1938	250,034	23,405	115,625	185,309	574,373
1939	44,953	4,720	53,849	46,058	149,580
1940	854	22,838	26,522	20,314	70,528
1941	193	5,078	3,284	3,408	16,963

TABLE 18
Precipitation Record for Fire Season
Average Rainfall

Month	1938	1939	1940	1941
April	3.11″	1.45″	2.59″	3.08″
May	6.55″	2.30″	1.91″	3.45″
June	3.41″	5.15″	3.67″	5.05″
July	3.30″	2.37″	2.68″	2.24″
August	2.59″	3.88″	4.51″	3.88″
September	3.62″	1.42″	1.01″	4.76″
October	0.51″	1.62″	2.77″	3.23″
November	1.90″	0.06″	2.59″	0.57″

TABLE 19
Deviation from Normal

Month	1938	1939	1940	1941
April	+1.00″	—0.64″	+0.49″	+0.96″
May	+3.33″	—0.91″	—1.27″	+0.27″
June	—0.60″	+1.12″	—0.35″	+1.01″
July	+0.01″	—0.90″	—0.58″	—1.00″
August	—0.59″	+0.69″	+1.30″	+0.65″
September	+0.75″	—1.42″	—1.79″	+1.92″
October	—1.33″	—0.22″	+0.91″	+1.34″
November	+0.74″	—1.08″	+1.42″	—0.59″

TABLE 20

Prosecutions for Forest Law Violations

1940 — 1941

Nature of Complaint	
Burning without permit	18
Failure to post camps or to report cutting	180
Timber trespass	21
Slash law violation	17
Failure to report fire	2
Setting fire	16
Christmas tree violation	4
Timber transportation violation	1
Total	259
Total number of convictions	256
Amount of fines imposed	$7,092.84
Amount of fines paid	3,692.57
Number of days, jail terms	673

RAILWAY FIRE PREVENTION[1]

Before devastating forest fires focused public opinion on the necessity of protecting the forests little heed was given to the menace created by the locomotive. The railroads were in fact one of the worst offenders. Coal-burning locomotives are always a potential cause of fire and since they must be operated at all times regardless of weather conditions, constant vigilance and equipment to reduce the hazard are an essential part of operation. Not only does the locomotive itself create a serious fire hazard, but the annual burning over rights-of-way in order to destroy inflammable material immediately adjacent to the tracks is in itself a hazard while being done. Rights-of-way under the intensely protected area of the state alone aggregate 2,300 miles. This burning must be done usually within the limit of the few days on which burning conditions are just right.

In order to combat the situation the railroads and the state are working together to develop effective preventive measures. Effective spark arresting devices on the locomotives are a prime essential. Studies and research to improve these devices are constantly being made.

Today there are two basic types of front end spark arresters in use—the netting and the cyclone. Although both of these types are the result of most recent improvement, neither is a total spark arrester. Inspection of these appliances to enforce their use and maintenance is the duty of the division. In the past ten years, 3,707 locomotives have been inspected, 575 having been found defective, or 15 per cent of the total number inspected.

Since some fires occur in spite of all efforts, the endeavor is to detect and extinguish them at the earliest possible moment. Detection is the duty of all railroad employees, station agents, signal maintainers, trainmen section forces and fire patrolmen. Suppression, however, falls mostly upon the section forces and the patrolmen.

[1]Wm. M. Byrne, in Charge

Of the 2,300 miles of railroad in the intensely protected area of the state, 1,583 are patrolled by special men on speeders and 196 by section crew patrol during times of high hazard. Over a ten-year period, 31% of the fires were detected by the patrolmen, 22% by section forces and 17% by other railroad employees.

The problem of railway fire detection and suppression is simplified somewhat because of the restricted area in which fires occur. All fires of railway origin are set on or adjacent to the right-of-way, and access to them is relatively easy and rapid.

The small area burned over by fires since inspection of railroad equipment by the state went into effect is an indication of the efficiency of the detection and suppression system.

NURSERIES AND PLANTING[1]

The objective of the Division of Forestry's nursery and planting program is the production of planting stock to aid in the solution of the reforestation problem on an estimated 4,120,000 acres of idle non-producing forest land in Minnesota.

To add to the momentum of this program the General C. C. Andrews Memorial Nursery situated on Highway 61 some fifty miles south of Duluth was put into operation during the biennium. This nursery is now developed to the point where trees are available for forest planting.

The Badoura Nursery, established in 1931, still leads state-owned nurseries in the production of coniferous trees, with an inventory of about 28 million trees as of January 1, 1942. In order to produce these trees, 10,404 man-days of CCC labor and 984 man-days of WPA work were required. Additional accomplishments for the biennium were the extraction of seed from 1,245 bushels of cones, the construction of a new pump and power house, and the installation of a new deep well pump.

On the experimental nursery and forest adjacent to Badoura Nursery, 400 acres of timber stand improvement work was accomplished as well as 61 acres of experimental plantings completed and cared for.

The General Andrews Nursery had an inventory on January 1st, 1942, of 13 million trees. In addition to the completion of the development program at General Andrews Nursery projects embracing thirteen miles of firebreak, 1,460 acres of timber stand improvement, 200 acres of field planting, and ten miles of highway planting were completed.

This biennium has witnessed the gradual contraction of the CCC and WPA organizations to a point where there remain only two skeleton CCC companies and one WPA camp.

Progress made during the biennium in nursery and planting activities has been almost entirely dependent upon relief labor. Over eleven million trees have been planted by these two organizations upon state-owned land during the two-year period.

[1]R. Clement, in Charge

The 1941 legislature passed an act amending the nursery law. Under the changed law the state can now furnish trees for use upon publicly-owned lands. As a result during the spring of 1942 there were 505,099 trees shipped to schools, cities, municipalities, etc.

Only once in twenty to twenty-five years are all of the factors of site, environment, and seed production found to operate in perfect harmony and balance for the ideal reproduction of trees in nature. To study and measure these ideal environmental factors is the object of research. To this end there have been developed two areas, one each at Badoura and General Andrews Nursery for experimentation relating to research dealing with nurseries and field planting.

Our all-out war effort will restrict all conservation activities. Tree production and planting in particular will be reduced in scope. The plan is to carry on in such a manner as to be able to swing into high production when economic conditions change.

Transplanting Seedlings in General Andrews Nursery

STATE FORESTS[1]

Minnesota leads all states in extent of areas within organized state forests. Records indicate that 41 states have a total of about 750 state forests, with an aggregate area of over 13 million acres. Minnesota alone has 40 state forests, in which there are 5,385,519 acres.

The net area of state-owned land within these forty state forests is 1,412,452 acres. This acreage is gradually being increased by purchase and gifts of additional land. Federal, private and tax-forfeited lands, the latter being under the control of the county boards, make up the remaining acreage within the state forest boundaries. The state-owned areas consist largely of trust fund lands, ceded by the federal government to the state many years ago. The income from these lands helps support the public schools and the university.

A bulletin, "Minnesota State Forests," has been issued by the Division which gives in detail the names and locations, gross area, and other information.

Special Use Permits

In order to more fully utilize state forest lands opportunities are afforded people to spend their vacations in the forest in the enjoyment of camping and for the use of lands at present not needed exclusively for forest management. Within the forests are lake shores suitable for summer cottages and for other uses, natural meadows and abandoned farms, which until planted do not produce trees. These lands are available for use through a system of issuing special use permits or leases for a number of activities. The permits are issued for a one-year period or less and are cancellable by the director upon due notice.

Table 21 is a summary of the number of permits in force and the revenues yielded during the past four fiscal years:

TABLE 21

Permits in Force and Revenues Collected

1939-1942

	1939		1940		1941		1942	
	No.	Amount	No.	Amount	No.	Amount	No.	Amount
Homesites	247	$2,895.00	290	$3,394.00	263	$2,939.00	303	$3,181.85
Hay and Farm	211	1,442.47	156	1,145.32	229	1,454.46	212	1,502.78
Commercial	9	355.00	12	365.00	35	890.00	48	1,188.00
Rights-of-Way	94	591.79	57	694.20	19	115.00	15	49.98

Homesite Development

Before any state lakeshore is leased for a summer homesite, the area is carefully studied and subdivided so as to provide one suitable building location on each site. The sites usually have one hundred feet or more of lake frontage and extend back from the lake two hundred feet. After the area is subdivided, maps are made and use permits issued according to the descriptions shown on subdivision maps.

[1]H. Ostergaard, in Charge

The Division of Forestry now has 84 platted subdivisions of lakeshore in the state forests. Five of these, located one each on Crane, Superior, Rainy, Beltrami and Namakan Lakes, have been subdivided within the last two years.

Campgrounds

To accommodate the forest visitors who prefer to camp rather than stay at resorts, the Division has prepared and endeavors to maintain a number of camp and picnic grounds. A few of these receive a tremendous patronage, particularly on Sundays and holidays. The chief problem is to find means for their maintenance.

Land Acquisition

In accordance with the provisions of Chapter 511, Laws of 1941, several counties have relinquished to the state their equity in certain tax-forfeited lands so that they may be used for conservation purposes. The following tabulation shows the acreage by counties:

Pine County—30,760 acres in the Nemadji State Forest and 1,080 acres for the General C. C. Andrews Experimental Forest.

Koochiching County—3,240 acres in the Pine Island and Koochiching State Forests.

Cass County—760 acres, of which 40 are for the Longville tower site and 720 acres in the Foot Hills State Forest.

Morrison County—160 acres for the Rail Prairie lookout tower site.

Mille Lacs County—40 acres for the Isle Harbor lookout tower site.

In addition, the state has acquired land from private owners, some by purchase and some as a gift. In Itasca County six hundred acres were given to the state in fee by a private owner, as well as part interest in several hundred acres more. The purchases, mostly for the General C. C. Andrews Nursery and experimental forest and some for administrative sites, aggregate 1,203 acres.

Chapter 315, Laws of 1919, provides that lands better adapted for the production of farm crops than for forestry may be eliminated from state forests and sold. During the biennium twenty-two parcels of land, totalling 880 acres have been thus eliminated from the forests. Before parcels of land are classed as farm lands they are carefully examined as to their agricultural value. This takes into consideration not only the land itself but also the location with reference to improvements, such as roads, schools and developed farms.

THE CHRISTMAS TREE LAW[1]

The Division is entering its eighth year of administration of the Evergreen Tree Law, designed to extend public supervision and control of traffic in coniferous trees used for decorative purposes.

This law was inspired by abuses of trespassing and bootlegging of Christmas trees. It has been most effective in accomplishing its purpose. After seven years of operation infractions have been so reduced as to be almost negligible.

Since the passage of this law there has been a steady expansion in the activities of the Christmas tree industry and its application has placed the industry in a much better economic position than before.

Income to the Division of Forestry under the law from all sources has risen from $9,437.33 in 1935 to $14,124.83 in 1941. The following tabulation shows the total income to the state from the administration of the Christmas tree industry for a period of five years:

1936	$10,582.31
1937	13,169.03
1938	13,653.65
1939	13,822.41
1940	13,132.39

There is a definite trend downward in the number of operators or loggers engaged in the cutting of Christmas trees. During 1940 there were 1,102 recorded, while in 1941 the number of tag applicants had fallen to 1,002. Table 22 is a summary by supervisory districts of the 1940 and 1941 Christmas tree activities:

TABLE No. 22

Fiscal Statement on Christmas Tree Activities
Biennium 1940-1941

	1940		1941	
Area	Two-Cent Tags Sold	Tag Money Received	Two-Cent Tags Sold	Tag Money Received
St. Paul	172,483	$ 3,449.66	207,419	$ 4,148.38
Cambridge	1,359	27.18	3,274	65.48
Moose Lake	115,107	2,302.14	142,254	2,845.08
Cloquet	58,002	1,160.04	66,091	1,321.82
Brainerd	16,792	335.84	24,610	492.20
Hibbing	22,023	440.46	9,539	190.78
Hill City	82,712	1,654.24	67,280	1,345.60
Bemidji	18,712	378.06	22,554	451.08
Park Rapids	34,781	695.62	32,510	650.20
Arago	6,564	131.28	2,150	43.00
Warroad	7,398	147.96	10,495	209.90
Baudette	1,142	22.84	407	8.14
Blackduck	6,669	133.38	7,685	153.70
Littlefork	1,811	36.22	1,110	22.20
Orr	4,653	93.06	6,429	128.58
Duluth	38,515	770.30	43,491	869.82
Grand Marais	55	1.10	27	.54
Grand Rapids	9,008	180.16	6,896	137.92
Total	597,977	$11,959.54	653,864	$13,077.28

[1]R. Clement, in Charge

In addition to the tag moneys received during 1940, licenses yielded $800.00, and 29 seizures produced an additional $372.31.

In 1941 licenses again yielded $800.00 and 30 seizures produced $240.14. It is also noticed that each operator cuts an increased number of trees and products with a resultant increase in the volume of business.

Minnesota's resources in Christmas trees are extensive. During the biennium the Division of Forestry offered for sale at public auction between 500,000 and 600,000 trees, with a stumpage value in excess of $11,000.00. Trees sold from state-owned lands are slow-growing spruce growing in stagnant swamps for which there is no other economic outlet.

The use of other products of the forest in the industry is expanding tremendously. Hundreds of bushels of cones are now collected and used for everything from boutonnieres to wreaths and Christmas tree ornaments.

Christmas Trees Hauled Out of Swamp and Awaiting Truck for Trip to Processing Plant

FOREST INSECTS AND FOREST TREE DISEASES[1]

During the biennium the canker worm again reached epidemic form in a few localities and did considerable damage to elm, maple and basswood. The only request for spraying for this pest came from Thief River Falls in the spring of 1941. In the spring of 1942, a request for spraying for pine needle scale was received from the Ferndale Nursery at Askov.

The forest insect and disease survey was continued in 1940. This survey was made in cooperation with the Division of Entomology and Economic Zoology and the Division of Plant Pathology and Botany, University of Minnesota and the State Entomologist.

A severe sleet storm in April and a heavy wind storm in July damaged many pines in the state. The heavy deposit of ice caused the greatest damage to jack pine although other species were injured to a lesser extent. The wind storm did great damage to Norway pine. As it was impossible to salvage all the broken and damaged timber, excellent breeding places were left for bark beetles and borers. The wind-damaged trees were quickly infested by a borer **Ips pini.** This infestation increased in 1941 and in some instances vigorous growing jack pine was attacked.

The general situation for the season of 1940 may be described as having been quiet in that there were no reports of serious damage other than the work of bark beetles and borers in ice and wind-damaged timber. A number of species of insects which had been numerous in 1939 were less common in 1940. The cool wet weather may have been partly responsible for the population reduction because disease among many of the insects, especially the bud worm and sawfly caterpillars was much more prevalent.

The pine variety of the spruce bud worm continued to be the principal pest in jack pine. However, the damage to trees was much less than had been expected because of the larval mortality and excellent growing conditions. In previous years considerable jack pine was killed by repeated defoliation but no dying trees were observed in 1940 even where there was heavy defoliation for the third year.

During the summer of 1941 when the eggs of the bud worm were hatching, an experiment on control was conducted at Badoura Nursery. The newly hatched larvae were sprayed with different strengths of lime sulphur both liquid and dry. Results will be checked further this year. It is hoped that the pest might be easier to kill at this stage than it is when feeding. There was considerable parasitism of bud worm pupae during 1942.

A heavy infestation of birch sawfly occurred on the southeast part of Lake Vermilion in 1941 where many of the trees were completely defoliated. As this defoliation usually takes place after the first of August there usually is not much damage to the trees since it occurs close to the time when the trees naturally drop their leaves. While the trees may not be damaged to any great extent, they present an unsightly appearance around the homes and summer resorts during the tourist season. Some control work will be started this season.

[1]A. F. Oppel, in Charge

The most significant insect found on spruce was a single larva of the European spruce sawfly. This specimen was found on a white spruce in the Duluth area. Dr. A. C. Hodson, Division of Entomology and Economic Zoology, University of Minnesota says:[2]

"The discovery is of great significance because it is the first record of the pest in the Lake States. In Canada and Northeastern United States this sawfly has caused heavy losses in spruce. Although it is not possible to predict exactly what we may expect in Minnesota, it seems likely that there will be only one generation in much of the state. Under such conditions it has been found in Canada that the pest is less abundant but more persistent than where there are two or more generations in one year. An intensive search will have to be made to determine the exact status of the pest before any attempt at control or eradication can be pursued. According to A. W. A. Brown, Canadian Entomologist, this new record places the European spruce sawfly about 600 miles from the nearest known infestation in Canada. However, it is extremely unlikely that other infested areas will not be found between the two points."

Another insect that is doing considerable damage to tamarack is the Eastern bark beetle. At this time there is a very serious infestation in the Pine Island State Forest. Other infestations have been observed near Grand Rapids in the northern part of the state and near Lake Minnetonka and Cambridge in the southern part of the state. This is the first known serious outbreak of this insect in the state. This pest has always been considered a secondary insect, attacking only dying and weakened trees. Therefore, very little is known about its habits or methods of control.

During the past season this insect has killed healthy but slow growing trees. It is planned to start studies this year in cooperation with the state Entomologist and the Division of Entomology and Economic Zoology of the university to determine what can be done to control this pest.

During the biennium there were some reports of unusual occurrences of insect species and damage. Mound building ants were reported in the Pillsbury State Forest. Hundreds of huge mounds from six to eight feet wide at the base and two to four feet high were scattered over some twenty acres. Not much damage was noted at the time these mounds were visited. The ants may destroy all vegetation for a distance of twenty or twenty-five feet around the mounds. Young pine trees are killed up to an age of about ten years.

On West Sheep Island in Lake Kabetogama all trees and herbacious plants were completely defoliated by the Fall Web worm while East Sheep Island only a quarter of a mile away was not infested. West Sheep Island is approximately one mile from the mainland. An examination of the soil indicated that countless numbers of the larvae had died from starvation.

A less important but more spectacular phenomenon was the uncommon appearance of an outbreak of the Northern Walking Stick. About forty acres of mixed hardwoods near Brainerd were completely defoliated by this strange insect. An outbreak of this insect was also reported near Wadena.

[2]Paper No. 1997 Scientific Journal Series. Minnesota Agricultural Experiment Station, St. Paul.

During the biennium a forest tree disease survey was started. Dr. Clyde Christensen, Division of Plant Pathology and Botany, makes the following report:[3]

"A severe epidemic of spruce leaf rust, **Chrysomyxa cassandrae**, occurred throughout the northern region of the state on black and Colorado blue spruce. A small amount of this rust is found every year, and probably in many years sufficient incoulum is carried through the winter on leatherleaf to cause an outbreak when weather conditions are favorable. The moist spring of 1941 apparently provided ideal conditions for infection, for collections of rusted needles from black, white and blue spruce were received from approximately thirty localities representing most of the northern half of the state. On black spruce, the principal host, from 50 to 98 per cent of the needles were infected on almost 100 per cent of the trees throughout large bogs.

"Leatherleaf, on the leaves of which the fungus spends the winter, forms a large part of the ground cover in the larger and wetter bogs where black spruce grows. In some of the smaller bogs where Labrador tea makes up the chief ground cover, the infection was very light and sometimes could not be found at all even a few hundred yards away from where leatherleaf was common. Colorado blue spruce, grown so commonly as an ornamental tree, appears to be very susceptible to the rust, and some trees growing a mile or more away from the nearest bogs were heavily infected. No cases of severe infection were reported on white spruce.

"The damage caused by this epidemic of rust will be comparatively light insofar as the health and vigor of the trees are concerned, although this can be determined only by comparing the growth of trees this year and following years with that of the past. In spite of the heavy infection on spruce, the subsequent infection on leatherleaf in the fall was very light. There have been no records of such epidemics on spruce occurring in successive years and so a repetition of it in 1942 is hardly to be expected."

TIMBER ADMINISTRATION[1]

Timber Sales

The state is the largest single owner of timber in Minnesota. It is estimated that the state owns in excess of 2½ billion board feet of merchantable timber. A large portion of this is fully matured or over-mature and should be utilized. In addition to the acreage producing merchantable timber, the state has thousands of acres of land on which there is a fine young growth of all species. This should produce a large crop for the future. Careful management by the state and owners will mean a future supply to maintain present scale operations of the timber using industries.

It is the policy to cut timber from state lands at the conservative rate of fifty million board feet annually. This general over-all limitation has

[1]By J. C. Gannaway, Clarence Prout and E. L. Lawson
[3]Paper No. 1997 Scientific Journal Series. Minnesota Agricultural Experiment Station, St. Paul, Minnesota.

been considered a safe margin, as all growth studies indicate that the growth of state timber is in excess of this amount.

The timber resources of the state are contributing in a large measure to the national war effort. The war emergency has greatly increased the demand for all timber products and undoubtedly it will become necessary to double our over-all limitation of fifty million board feet during the emergency. Adjustments can be made after the war to balance our predetermined conservative cutting budget. As a matter of fact, the average yearly cut for the eleven years prior to the war was only 32 million feet, leaving a "cushion" to absorb at least some of the expansion in cutting made necessary by defense and war needs.

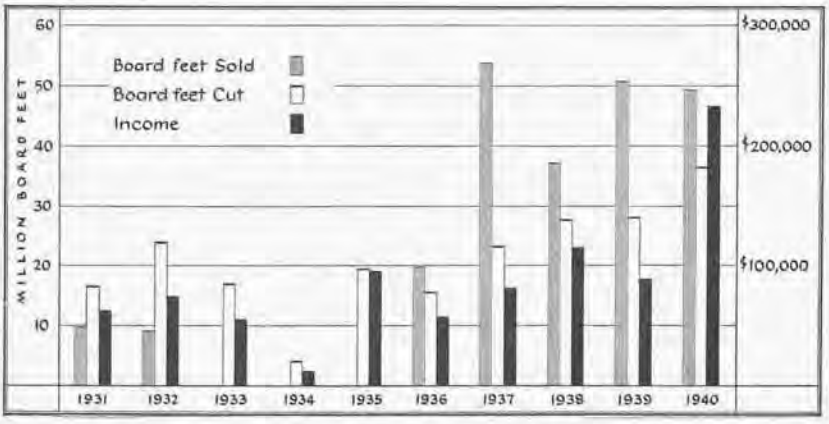
During the biennium county auction sales were held in Koochiching, Itasca, Cook, Lake and St. Louis Counties. Table 23 shows the amount and value of timber cut under state timber auction sale permits.

During the 1939 session, the legislature authorized the private sale of state timber in quantities of $250.00 or less per sale without the formality of advertising for bids under the provisions of Chapter 352. As many sales of this type as could be arranged by the limited supervisory force have been made. This type of sale is popular with the settler and small operator, as it gives them an opportunity to work for themselves at a season when farm work is low. Table 24 gives a detailed report of timber sold under the provisions of Chapter 352, Laws of 1939.

One of the important duties of the personnel working on state timber is the continuous policing of approximately two million acres of land for the purpose of preventing or apprehending the cutting of timber in trespass. Table 25 shows the amount of timber cut in trespass and the amount collected.

Figure 3 shows the trend of state timber sales for the past ten years and is an interesting indication of the trend of the whole industry for that period.

FIG. 3



Timber Sold at Public Sales

State appraisers and forestry personnel supervise the cutting of all state timber. The standards of cutting are being raised each year, resulting in better cutting practices. A large number of studies and experiments have been carried on during the past biennium. They are discussed in detail in another part of this report. No state lands are denuded and under present cutting regulations timber lands are left in a productive condition for future crops.

The department has been severely handicapped during the past biennium by the lack of sufficient funds to meet the increased demands for timber to be used in war production, and has had to request additional funds for the work.

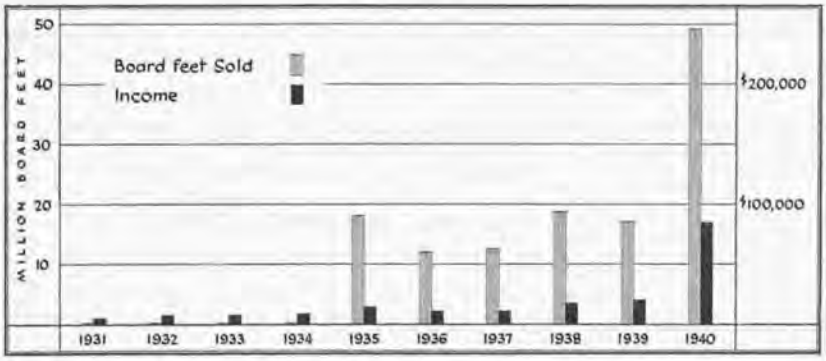
Forest Research

I. Partial Cutting Experiments in Black Spruce Stands

For some time those connected with timber management have felt a definite need for investigative studies in connection with the silvicultural practices now in force on state timber lands. This is true especially since the adoption of the partial cutting practice in black spruce stands, in which more of the stand is being left than has been the practice in the past. As a consequence cooperative experiments are being conducted by the Division of Forestry and the Lake States Forest Experiment Station. The Minnesota & Ontario Paper Company has also assisted by conducting light selective cutting on areas offered for sale by the state and over portions of company owned lands.

The experiments have been undertaken for the purpose of learning the best method of managing the black spruce forest type so as to obtain greater yields and more frequent cuts. The present studies chiefly center around problems concerning reproduction and mortality in partially cut black spruce stands, and the response of mature black spruce stands to partial cutting.

FIG. 3-a



Dead and Down Timber Sold Under Laws 1939, Chapter 352

II. Slash Experiments

Experiments are being conducted in black spruce stands to compare the influence of various methods of slash disposal upon the establishment and development of reproduction. The work of establishing sample plots was undertaken cooperatively by the Division of Forestry and the Lake States Forest Experiment Station.

III. Utilization Studies

The Division of Forestry has long been concerned about a more complete utilization as a means of preserving the present timber supply, and thus insure a continuous yield of forest products. At this time when sacrifices must be made to meet the needs of the nation at war, improved utilization practices will not only help to add to the present timber supply, but will also lessen the danger of needless waste.

In line with this idea, a utilization study was undertaken last fall on an eighty-acre tract of black spruce located in Township 65, Range 24, Koochiching County. The study was a cooperative project engaged in by the Division of Forestry and the Minnesota & Ontario Paper Company. The objects were to determine the relative costs and yields from cutting spruce pulpwood to a series of utilization standards. Analyses of data obtained from this study may warrant the adoption of new standards in state cutting and utilization regulations on future timber permits.

IV. Other Investigations

Some time was given to the study of the Christmas tree operations on state lands to determine the effects of cutting on regrowth, on quality, and form of trees, as well as possibilities for future cutting operations in these same stands. The investigations also aimed to develop regulations on cutting practices that would secure permanence and evenness of output to this fast growing and important industry.

Minnesota's abundant supply of high grade black spruce Christmas trees are attracting new operators to this comparatively new and valuable industry to the state. The trees are harvested from stagnant spruce swamps which for years were thought valueless as they did not produce trees large enough for other commercial use. The bulk of these swamp lands are state owned and today bring in an income approaching $10,000 annually. This resource is only partially developed.

Timber Marking

In order to insure proper cutting and to secure reproduction on logging areas, substantially all of the tracts on which timber is to be cut are being marked by forestry division crews prior to sale of timber stumpage.

Forest Improvement—Winter Logging Roads

New winter logging roads were constructed on the Pine Island Forest under state sponsored WPA and CCC projects. These roads open up a former inaccessible portion of the state forest and pass through valuable timber stands on state-owned lands. Opening up these new areas in the forest gives one a glimpse of the large work reservoir which is available in a program for developing, as well as utilizing the timber resources of this area.

Timber Inventory and Reconnaissance Surveys

A knowledge of how much timber the state has on hand, its location, when it will be ready to market, how fast the new forest is replacing the old and the kind and quantity of its products are essential in organizing the state's forest lands for management. It is basic in developing a practical forest budget to obtain a systematic control of the forest resource.

In Minnesota the state itself is the largest land owner. About 7,500,000 acres, or one acre in seven, are owned or controlled by the state. Of this amount 2,729,000 acres are tax-forfeited and nominally belong to the state, but are controlled by the counties. About 90 per cent of this acreage is forest land, little of it being suitable for any other use.

Taking a timber inventory of this forest resource requires a timber survey on the ground. This is one of the tasks that occupies an important place in the sphere of activities of the Division of Forestry.

Field crews engaged in this work consist of CCC, WPA and regular Forest Service personnel. Although a gradual retrenchment in both CCC and WPA activities during the biennium and at present have all but suspended entirely, substantial progress was made during the biennium. During this period, CCC crews have type mapped and cruised 438,720 acres within or adjacent to nine state forests.

WPA crews working under the direction of the Division of Forestry, inventoried 131,627 acres of state-owned and tax-forfeited lands in Carlton, Itasca, Koochiching and Pine Counties.

During the winter of 1941-42, timber reconnaissance work was carried on in the Sawbill Lake district in Cook County, and the Third River State Forest in northwestern Itasca County. The two crews engaged in this work consisted of field personnel of the Division of Forestry. The area examined involved approximately 51,000 acres of state land, scattered throughout eleven townships on which previous to the survey little or no information was available with reference to the timber stands.

The work on this project consisted of cruising and mapping each forty-acre tract and cruise data and type maps thus obtained will be used in planning future timber sales in these areas.

TABLE NO. 23

TIMBER CUT UNDER STATE TIMBER PERMITS

BIENNIUM ENDING JUNE 30, 1942

SPECIES	FEET		CORDS		TIES		POLES		POSTS		TREES		VALUE	
	1941	1942	1941	1942	1941	1942	1941	1942	1941	1942	1941	1942	1941	1942
Pine	1,967,200	7,269,241											$11,933.38	$47,399.62
Jack Pine	972,580	1,172,588	1,064	1,914									5,699.52	6,212.26
Spruce	230,570	654,350	65,438	83,009									111,504.96	164,630.02
Tamarack	932,010	1,286,910	253	542	29,698	36,927				200			6,549.66	10,714.95
Poplar	764,430	4,941,321	996	3,724		4,162							2,144.92	14,183.70
Balsam	36,690	65,440	11,626	12,084									7,944.17	9,824.84
Birch		13,510	14		13,774	20,438							1,693.97	3,150.37
Basswood	7,470	11,460											27.40	36.10
Cedar		530			29,512	36,480	22,020	50,698	80,985	187,876			8,768.00	27,295.26
Oak						427								61.97
Mixed Timber	18,440	49,910	70	8	3,579	790							375.55	195.03
Cedar and Jack Pine Lagging			226	858									124.38	285.95
Mixed Bolts			612	3,206									531.90	3,544.66
Fuel Wood			886	846									311.07	301.89
Christmas Trees											482,564	591,466	7,445.96	11,389.64
Totals	4,929,390	5,465,260	81,185	106,191	76,563	99,224	22,020	50,698	80,985	188,076	482,564	591,566	$165,054.84	$299,226.26
													Extension Interest	8,565.59	14,569.13
													Penalty Interest	315.43	56.64
														$173,935.86	$313,852.03

TABLE NO. 24

TIMBER SOLD AT PRIVATE SALE UNDER SECTION 1, CHAPTER 352, LAWS OF 1929

BIENNIUM ENDING JUNE 30, 1942

SPECIES	FEET		CORDS		TIES		POLES		POSTS		TRFES		RECEIPTS	
	1941	1942	1941	1942	1941	1942	1941	1942	1941	1942	1941	1942	1941	1942
Pine	1,461,461	1,355,061	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	$5,465.41	$6,917.04
Jack Pine	1,321,927	1,648,074	1,705	6,125	.....	.....	.....	.....	.....	.....	.....	.....	4,375.59	10,644.18
Spruce	372,613	177,996	20,770	13,787	.....	.....	1,200	.....	.....	.....	.....	.....	30,749.01	25,393.10
Tamarack	172,534	108,047	12,786	13,044	5,173	13,810	.....	.....	.....	14	.....	.....	5,726.12	6,543.79
Poplar	923,761	2,404,231	5,021	4,967	.....	352	.....	.....	.....	.....	.....	.....	4,019.97	9,054.03
Balsam	160,130	164,722	2,957	2,872	.....	.....	.....	.....	.....	.....	.....	.....	2,347.97	3,320.86
Birch	12,000	24,566	232	32	4,582	4,601	.....	.....	.....	.....	.....	.....	712.92	682.86
Basswood	84,430	51,449	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	288.53	199.76
Cedar	.....	2,140	490	1,091	8,667	6,856	13,641	7,202	194,533	173,982	.....	.....	3,905.30	3,791.71
Mixed Timber	417,117	124,136	2,509	1,890	1,423	1,046	.....	.....	.....	.....	.....	.....	1,937.18	1,112.25
Cedar and Jack Pine Lagging	.....	.....	227	253	.....	.....	.....	.....	.....	.....	.....	.....	66.08	105.62
Mixed Bolts	.....	.....	1,092	2,036	.....	.....	.....	.....	.....	.....	.....	.....	605.75	1,853.88
Fuelwood	.....	.....	3,739	4,305	.....	.....	.....	.....	.....	.....	.....	.....	1,325.11	1,528.27
Christmas Trees	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	224,197	13,040	4,575.69	256.25
Oak	.....	.....	3,775	.....	.....	553	.....	.....	.....	.....	.....	.....	.....	71.49
Totals	4,925,973	6,064,197	51,526	50,402	19,845	26,514	14,841	7,202	194,533	173,996	224,197	13,040	$66,100.63	$71,475.09

TABLE NO. 25

TIMBER CUT IN TRESPASS ON STATE LANDS

BIENNIUM ENDING JUNE 30, 1942

SPECIES	FEET		CORDS		TIES		POLES		POSTS		TREES		RECEIPTS	
	1941	1942	1941	1942	1941	1942	1941	1942	1941	1942	1941	1942	1941	1942
Pine	16,810	59,655											$124.15	$387.73
Jack Pine	17,194	14,083	327	555									256.62	447.26
Spruce	10,669	9,179	287	531									510.51	1,081.87
Tamarack	15,080	1,600	620	94	68	320				1,025			163.56	102.03
Poplar	18,914	41,846	72	186									76.30	238.79
Balsam	3,510	3,780	43	72									53.35	82.27
Birch		1,500	18	5	72	43							24.50	16.60
Basswood		350												1.05
Cedar	500	1,069	2		167	132	1,811	813	17,429	5,404			358.28	145.92
Mixed Timber	7,474	1,634	184	616	207								142.30	329.50
Cedar Lagging			1	1									.35	.47
Mixed Bolts			93	7									38.39	7.00
Fuel Wood			26	78									5.53	59.55
Oak		2,224				19								14.41
Christmas Trees											599	288	19.02	21.09
Totals	90,151	136,920	1,673	2,145	514	514	1,811	813	17,429	6,429	599	288	$1,772.86	$2,935.54
												Penalty	1,274.85	2,068.53
												Totals	$3,047.71	$5,004.07

COMMUNITY FORESTS[1]

Our forest resources have been used without thought of renewing them, leaving the cut-over land in a non-productive condition. As a result communities are unable to support the timber industry and population as they once did. Community leaders are recognizing this fact and are seeking ways and means to remedy the situation. One approach to the problem which is receiving increased attention is the building up of depleted timber resources by the establishment and development of community forests.

During the past two years there has been much favorable sentiment for the establishment of community forests and some far-sighted communities already own and operate nearby forest properties. Several new laws enacted by the 1941 legislature have had a stimulating effect on the establishment of community forests. With this increased interest and some assistance from the state there should be a large number of these forests established in the near future.

Shipments of trees for planting from the state operated nurseries in 1942 record nine new community and municipal forests.

Properly managed community forests can be made of great benefit to all the people. They are economically important because:

(1) They utilize the poorer grades of land, often made income-producing from the sale of fuel wood, fence posts, poles, lumber and other raw material for use in the different industries. Such income may be used to help defray the cost of local government thereby reducing taxes.

(2) They are a reservoir for work, furnishing an opportunity for employment to seasonal workers and during periods of depression. It is estimated that it requires one man, working the year round, to take care of from 50 to 100 acres of well managed, producing forest lands. Additional men will always be needed at seasonal periods.

(3) They are of inestimable value in the protection of watersheds. Forests hold water and reduce flood runoff. They also help to prevent erosion and this way keep reservoirs and channels from filling with silt.

They are socially important because:

(1) They afford naturally attractive places for recreation—picnic areas, recreational fields, camping grounds—easily accessible to all the people of a community. In most publicly-owned forests, timber production, recreation and wild life, can be coordinated without serious sacrifice to any one of them.

(2) They offer opportunities for the development of wild life and sports by having them declared game refuges and public shooting grounds. Areas in which people may hunt are becoming more scarce as time goes on.

In Minnesota there is legal authority for the establishment of community forests. Cities, villages and towns are authorized to acquire lands and to levy taxes for community forest purposes.

The best opportunity for the creation of community forests is on tax-forfeited lands. A number of communities are availing themselves of this chance to acquire a community forest.

---

[1]A. F. Oppel, in Charge

IN-SERVICE TRAINING[1]

The in-service training school project was continued during the biennium. In the spring of 1941, the third school for tree planting was held at the Badoura Nursery. This school was well attended.

In anticipation of an extensive tree planting program the spring school devoted most of its efforts toward the intensive training of personnel in this kind of work. Twenty-one trainees attended this school. Most of the men now in the service have received such training.

No planting school was held in the spring of 1942, but one is planned for a later date.

In October, 1940, a ten-day timber management school was held at Thistledew Lake Camp. The purpose of this school was to give men training in the management of state timber. The training included both lectures and actual field work.

No school for forest insect control was held in 1941. Instead a personal inspection was made of the several areas. Dr. A. C. Hodson of the Division of Entomology and Economic Zoology, University of Minnesota, cooperated in this inspection. Special problems were investigated and the supervisors and rangers were given an opportunity to receive further instructions on local problems. The trip provided unusual opportunity for employees to view actual effects of insect infestations peculiar to each area visited.

These schools have proved of great value and the plan is to continue them.

INVENTORY AND MAINTENANCE[1]

The Division's inventory records have been adjusted and expanded to conform to the records being set up by the State Division of Public Property. In addition to the regular physical inventory, the value of all property and equipment under the jurisdiction of the Division of Forestry is being appraised. Pending the final completion of this appraisal it has been necessary to estimate the value of some of the items.

Detailed inventory records include 519 buildings of various types valued at $878,745.00; 100 wells at $20,719.00; 137 lookout towers at $152,227.00; equipment of all types at $356,408.00, and supplies valued at $116,638.00. In addition this inventory includes 1,408 miles of telephone lines. Inventories are also kept on equipment loaned to the Division by various federal agencies. Records are kept of all lands, and a system of recording and analyzing maintenance costs on structures and equipment has been installed.

CIVILIAN CONSERVATION CORPS

The marked trend towards increased opportunities for employment has caused a gradual but drastic curtailment of CCC camps and work programs during the biennium.

[1]A. F. Oppel, in Charge
[1]R. A. Schneider, in Charge

Ten camps operated within the various state forests at the beginning of the biennium. They have been reduced until at the present only two remain. One of them is located in the George Washington Forest and the other is operating in the Koochiching and the Pine Island State Forests. Furthermore, the average company strength of these camps has been reduced from 200 men to 165.

All of the camps located on state land that have been closed during the biennium have been left intact for future occupancy. Work plans, already prepared, will be available should the CCC or other comparable organizations resume operation after the war.

During the spring fire season of 1942, side camps were established at some of the abandoned camps in districts where manpower was scarce, thus making crews available for fire suppression duty. Enrollees in these side camps were engaged on regular CCC projects when not fighting fires.

Table 26 compiled by the CCC Central Office under the direction of Mr. L. R. Beatty, State CCC Supervisor, shows the accomplishments of the CCC during the nine years of operation, or since the camps were first established in Minnesota.

TABLE 26

Accomplishment of CCC

Protective Accomplishments

Fire Suppression—400 fires	123,800	Man days
Fire Suppression, tower duty	11,800	Man Days
Fire Suppression, enrollee fire school	6,400	Man Days
Firebreak	330	Miles
Roadside hazard reduction	3,900	Miles
Interior hazard reduction	24,600	Acres
Telephone line construction	1,635	Miles
Truck trail construction	1,380	Miles
Building and structures—184	$209,290.00	

Improvement and Restoration Accomplishments

Planting and replanting—16,200 acres	24,786,000	Trees
Nursery work, Badoura State Nursery, Gheen, Side Lake, Owen Lake, camp nurseries	50,800	M. D.
Seed cone collection for Badoura and Gheen	9,300	Bu.
Forest cultural work	45,100	Acres
Forest reconnaissance	3,729,500	Acres
Forest lineal and corner survey	10,540	Mi.
Game and fish lake surveys	336	Lakes

Permanent Improvements

66	Lookout towers (On State Forests) 47 new, 19 rebuilt, total 66		$ 49,956.77
35	Water conservation dams		82,162.80
47	Warehouses (1 remodel)	57,011.93	
9	Offices (3 combination, 1 add., 1 reconstruction)	17,288.33	
56	Cabins (4 remodel, 1 add.)	92,109.61	
10	Garages (1 reconstruction)	6,258.30	
2	Pumphouses	1,395.83	
6	Bath houses	2,208.38	
1	Fish hatchery building	552.42	
1	Machine shed	225.00	
2	Bunkhouses	4,392.06	
3	Seed extraction plants	1,844.89	
1	Speeder House (remodel)	250.00	
1	Refectory	3,500.00	
1	Cold Storage Plant	5,587.35	
1	Sprinkler System	7,229.05	
1	Well Shelter	182.69	
23	Latrines	1,712.68	
1	Boathouse	1,005.15	
8	Icehouses (1 combination)	2,747.70	
8	Oil houses	2,720.27	
1	Shelter camp ground	350.00	
1	Barn	543.42	
1	Supply Building	174.07	
184	Buildings and structures		209,289.13
1,635	Miles telephone line		101,675.00
	Grand Total		$446,860.38

On sixteen projects scattered throughout the northern part of the state, the WPA has accomplished work as shown in Table 27.

TABLE 27

Work Projects Administration Accomplishments

Firebreaks	32⅝	Mi.
Fire Trail Construction	1,225	L. F.
Winter Logging Roads	13,500	L. F.
Truck Trail Construction	56.9	Mi.
Road Improvement and Maintenance	35,311	M. H.
Graveling Roads	20,008	Cu. Yds.
Clearing Right-of-Way	28,900	L. F.
Road Brushing	1½	Mi.
Seed Planting	167	Lbs.
Transplanting	1,628,700	Trees
Tree Planting	2,901,462	Trees
Preparation for Planting	196.3	Acres
Planting Site Improvement	135.2	Acres
Construction of Seed Beds	161	Beds
Tree Snow Fence Planted	2	Mi.
Cultural Work	864	Acres
Timber Stand Improvement	976¼	Acres
Plantation Release	983.7	Acres
Sprinkling System Pipe Placed	28,672	L. F.
Sprinkling Heads	5,900	Units
Cone Collection	3	Bu.

Moss Gathering	16	Tons
Nursery Operation	984	Man Days
Lifting and Packing Nursery Stock	100,000	Trees
Reconnaissance	131,627	Acres
Blister Rust	469	Acres
Telephone Line Construction and Reconstruction	94.92	Mi.
Telephone Line Brushing	67½	Mi.
Hazard Reduction	4,476⅛	Acres
Fire Fighting	2,253	Man Hours
Snag Felling	45	Acres
Fencing	560	Rods
Landscaping	39,600	Sq. Ft.
Gates Constructed	4	
Construction of Retaining Wall	31	M. D.
Put in 600 ft. of 4 in. drainage tile to drain basement at Onamia Ranger Station		
Ground Fill at Rapid River Station	175	Cu. Yd.
Building Construction	11	Bldgs.
Moving Buildings	2,079	M. H.
Bridge Construction	3	
Culverts Constructed	34	
Ditches Dug	14,165	Ft.
Working on Dams	6,172	M. H.
Tower Construction (2)	414	M. H.
Dismantling L. O. Towers	2	
Lumber Cut	476,344	B. F.
Cedar Poles	191	
Shingles Produced	946	Bdls.
Lath Produced	4,893	Bdls.
Saw Logs Produced	17	M.B.F.
Cordwood Produced	379	Cds.
Planing Lumber	276,125	B. F.
Peat Procurement	4,034	Cu. Yds.
Ice Procurement	200	Tons
Camp Rehabilitation	25,461	M. H.
Camp Operations	11,225	M. H.
Shop Operation	4,354	M. H.
Wells	2	
Obliteration of farmsteads	5	
Shade Frames	13,000	L. F.
Making necessary cabinets and work benches	90%	Complete

WHITE PINE BLISTER RUST CONTROL[1]

Blister rust, European disease on white pine, was first found in Minnesota in 1916. It has been found in all counties within the range of white pine in Minnesota except Lake of the Woods, Clearwater, Sherburne and Houston. Some blister rust infection can be found in every pine stand within more than half of the range of white pine. Serious damage is occurring in unprotected white pine stands in the eastern and central parts of the state. Weather conditions that have been more favorable for the occurrence of white pine reproduction since 1936 have also been more favorable for the occurrence of blister rust infection. In that part of the state lying north and east of Duluth, infection is occurring at an alarming, disconcerting rate.

[1]Conducted by the Division of Forestry in cooperation with the Bureau of Entomology & Plant Quarantine, U. S. Dept. of Agri.

Today Minnesota possesses only a fraction of original acreage of white pine. White pine grows on over 850,000 acres and sufficient white pine values to justify cost of this protection against white pine blister rust are found on about 300,000 acres.

Blister rust is caused by a parasitic fungus plant that lives alternately on two entirely different host plants: the white or five needle pines, and the various wild and cultivated species of currants and gooseberries. The most important blister rust control activity is the eradication of these plants in white pine stands and within distances up to 900 feet to secure protection of these stands. During the biennium, 15,073 man days were used in pulling 5,476,579 currants and gooseberries from 24,911 acres, to protect 15,327 acres of white pine. To date, protection has been established for 152,853 acres of pine, or slightly less than half the total acreage scheduled for protection. The average protective zone must be worked three times, at intervals of about five years, to maintain white pine protection. During the biennium it has been the policy to maintain protection already established in preference to protecting additional white pine stands, and 12,138 man days were expended in the eradication of 2,237,742 currants and gooseberries from the protective zones for 16,210 acres of white pine.

TABLE 28

Local Control

	Acres White Pine Protected	Acres Worked	Ribes Pulled	Man Days Expended
1940	8,457	12,923	3,023,341	7,723
1941	6,826	11,544	2,404,287	7,161
1942	44	444	48,951	189
Total for Biennium	15,327	24,911	5,476,579	15,073
Total to July 1, 1942	152,853	373,957	58,209,842	146,400

TABLE 29

Local Control

Re-Eradication

	Acres White Pine Protected	Acres Worked	Ribes Pulled	Man Days Expended
1940	4,541	13,173	782,847	3,833
1941	8,689	23,375	954,985	4,989
1942	2,980	5,134	499,910	3,316
Total for Biennium	16,210	41,682	2,237,742	12,138
Total to July 1, 1942	43,734	95,186	6,322,950	29,965

When the currant and gooseberry population within a protective zone has been so reduced that the area will need very little atttention until the white pine is mature, it is said to be on maintenance. To date, 68,061 acres of control area for 31,673 acres of white pine has been so classified.

Before local control operations are undertaken, it is necessary to have maps of the white pine stands and their environs together with information as to the amount of white pine present, its age, and the factors that influ-

ence the cost of currant and gooseberry eradication. This information is secured through pre-eradication surveys. During the biennium over 70,000 acres of white pine of sufficient value to justify its cost of protection against blister rust were mapped. It will be necessary to work 108,000 acres to protect this white pine.

TABLE 30

Pine Location and Pre-Eradication Surveys

	Acres White Pine Worth Protection Mapped		Acres to
	Native	Planted and Planting Site	Work
1940	6,567	1,350	17,577
1941	19,827	875	34,383
1942	43,954	458	56,137
Total Biennium	70,348	2,683	108,097
Cumulative Total	305,974		737,465

Currants and gooseberries vary greatly in their susceptibility to blister rust infection and in the amount of white pine infecting spores produced on their leaves. The European or cultivated black currant, **R. nigrum**, far exceeds all other wild and cultivated currants and gooseberries in its potential pine infecting power. This species has been destroyed wherever it has been found growing within the range of Minnesota white pine. During the biennium, 55,374 properties were inspected and 217 plantings containing 1,056 cultivated black currants destroyed.

TABLE 31

Cultivated Black Currant Elimination

	Inspections Made	Locations Destroyed	Bushes Destroyed
1940	31,756	86	431
1941	23,618	131	625
Total Biennium	55,374	217	1,056
Cumulative Total	211,664	3,260	23,306

The protection of disease free white pine nursery stock is highly desirable. We are assisting ten private, state and federal nurseries to maintain sanitation zones totaling 4,183 acres. The purpose of sanitation zone maintenance is to reduce to an absolute minimum the amount of white pine blister rust infection that may occur in white pine producing nurseries. Therefore, nursery sanitation zones are examined every other year.

TABLE 32

Nursery Sanitation

	Nurseries Protected			Acres	Ribes	Man Days
	Private	State	Federal	Worked	Pulled	Expended
1940		1	3	632	3,003	314
1941	2	1	4	3,159	6,613	83
1942		1	1	1,493	3,524	24
Total Biennium	2	2	4	5,284	13,140	421

Blister rust control work has been done in Minnesota since 1917. During the first three years it was hoped that the disease could be eliminated entirely from the state. By the end of the third year it was recognized that this was not possible and that control methods designed to reduce to a practical minimum the amount of damage that might occur because of blister rust infection were devised. Standards and methods adopted in 1919 are still in use today, modified, of course, by 25 years of control experience.

Nearly all the blister rust control accomplishments for the 25 years can be credited to the past nine years. Large scale blister rust control efforts began in 1933 when the Civilian Conservation Corps came into existence. A PWA grant in 1933 was followed by Federal Agency WPA projects in 1935. Federal Agency WPA projects were continued until eliminated from the WPA program, December 31, 1941, by congressional action. A regular project in the State WPA program continues.

During the next several years the amount of money available for blister rust control will be limited and it is necessary to spend this money to secure the maximum prevention of pine damage. Fortunately, protection has been established for a major portion of the better white pine within the areas where the disease is prevalent. Unfortunately, a large amount of work remains to be done in St. Louis, Lake and Cook Counties. These counties contain large acreages of white pine, much of which is inaccessible. Only a limited amount of work was done in these counties because of the limited manpower in the case of Cook and Lake Counties and because of the high WPA wage rates that prevailed in St. Louis County. It has become evident that we underestimated the ability of disease to do damage in this area. It is our opinion that most of the available funds during the next several years should be spent within this area.

TABLE NO. 33

FINANCIAL REPORT FOR FISCAL YEAR 1940-1941

NAME	Number	Free Cash Balances June 30, 1940	Reimbursements, Rents and Federal Aid	Appropriations	Transfers	Total Funds	Total Expenditures	Free Cash Balances June 30, 1941
Salaries, Supplies and Expense	31200:01	$29,048.07	$95,484.79	$180,000.00	.....	$304,532.86	$272,707.17	$31,825.69
Buildings and Towers	31202:00	9,637.28	170.47	5,750.00	.....	15,557.75	5,344.04	10,213.71
Burntside Forest	31203:00	10.03	15.00	.....	.....	25.03	.....	25.03
Equipment	31204:00	7,928.88	96.73	18,000.00	.....	26,025.61	25,871.19	154.42
Fire Fighting	31205:00	177.78	172.44	70,000.00	.....	70,350.32	24,028.81	46,321.51
Nursery	31206:00	2,284.60	1,113.02	5,250.00	.....	8,647.62	7,704.64	942.98
Power Spray Equipment	31207:00	762.64	100.00	.....	.....	862.64	164.19	698.45
Timber	31208:00	1,103.87	.....	30,000.00	*$2,350.00	33,453.87	33,034.90	418.97
Christmas Tree Law Enforcement	31211:00	8,906.56	13,579.19	.....	.....	22,485.75	14,173.94	8,311.81
Land Acquisition	31212:00	3,305.99	.....	.....	.....	3,305.99	1,019.00	2,286.99
Sponsor's Project Allotment	31291:00	27,252.38	.....	.....	*24,621.00	51,873.38	37,547.78	14,325.60
Totals	.....	$90,418.08	$110,731.64	$309,000.00	*$26,971.00	$537,102.82	$421,595.66	$115,525.16

*L.E.C. Grant.

TABLE NO. 34

FINANCIAL STATEMENT FOR THE FISCAL YEAR 1941-1942

NAME	Number	Cash Balance July 1, 1941	Appropriation	Reimbursements Rentals and Federal Aid	Transfers and Donations	Total Funds	Total Expenditures	Cash Balance June 30, 1942	Estimated Accounts Payable June 30, 1942	Estimated Free Balance July 1, 1942
Salaries	31200:01		$138,167.00	$101,056.76		$239,223.76	$236,135.77	$3,087.99		$3,087.99
Supplies and Expense	31200:02		50,000.00	12,021.11		62,021.11	43,808.48	18,212.63	$3,000.00	15,212.63
Employees Compensation	31200:03		3,624.73			3,624.73	3,624.73			
Donor's Fire Prot. Acct.	31200:60				[1]$360.00	360.00	171.29	188.71		188.71
Buildings and Towers	31202:00		4,000.00	5,564.00		9,564.00	5,859.21	3,704.79	500.00	3,204.79
Burntside Forest	31203:00	$25.03		778.32		803.35		803.35		803.35
Equipment	31204:00		20,000.00	80.49		20,080.49	13,406.83	6,673.66	5,000.00	1,673.66
Fire Fighting	31205:00		50,000.00	118.82		50,118.82	16,650.31	33,468.51	100.00	33,368.51
Nursery	31206:00		6,000.00	525.51		6,525.51	5,017.58	1,507.93	700.00	807.93
Power Spray Equipment	31207:00		350.00	25.00		375.00		375.00		375.00
Timber	31208:00		32,000.00		[3]500.00	32,500.00	31,144.57	1,355.43	450.00	905.43
Timber—War Emergency	31208:50				[2]2,500.00	2,500.00	1,642.24	857.76	125.00	732.76
Trespass on Tax Del. Lds.	31209:00	155.50				155.50		155.50		155.50
Christmas Tree Law Enf.	31211:00		14,000.00			14,000.00	13,723.78	276.22		276.22
Land Acquisition	31212:00		850.00			850.00	61.78	788.22	400.00	388.22
CCC Campsite—Orr	31213:00		5,000.00			5,000.00	5,000.00			
CCC Campsite—Becker	31214:00		820.00			820.00		820.00	820.00	
Sponsors Project Allot.	31291:00	19,941.72				19,941.72	17,725.75	2,215.97	300.00	1,915.97
Totals		$20,122.25	$324,811.73	$120,170.01	$3,360.00	$468,463.99	$393,972.32	$74,491.67	$11,395.00	$63,096.67

[1]Donated by Mead Timber Company.
[2]L. A. C. Grant.
[3]War Emergency Grant by Executive Council.

Division of Game and Fish

VERNE E. JOSLIN, *Acting Director*

PREFACE

On June 30, 1942, the end of the two year period for which this report is made, I had served as Director of the Division of Game and Fish for only about four months. It follows that the activities and problems discussed herein are largely those which were administered by my predecessor, hence the report which follows is a compilation of contributions made by the heads of the bureaus who were responsible for the operations discussed under their respective captions.

There are, however, a few matters which have been brought to my attention during my brief period of incumbency, to which I desire to make reference. They are discussed later in this report but are worthy of further emphasis.

Thus far the legislature has failed to provide, by specific authorization, any funds for the operation and maintenance of the large number of control works erected at the outlet of lakes, as a part of a state-wide water conservation program developed during the past six or seven years under the direction of the Division of Water Resources and Engineering. These items are now being paid from Game and Fish funds allocated from the appropriations set aside for Lake and Stream Improvement in Laws 1941, Section 37, Subdivision G, Item 5.

Conceding that the regulation of outflow from lakes and improvement works to conserve our waters do aid in the improvement of environment for wild life, it must also be recognized that there are other extensive benefits resulting from this program that are shared by all of the people of the state. Tourist trade in Minnesota is attracted very largely by its lakes. Where their levels can be maintained against objectionable lowering from evaporation in periods of droughts, their attractiveness is enhanced and tourist business is stimulated and sustained. Cities and villages assured of ample and sanitary water supplies by the storage of surplus run-off and regulation of outflow from lakes and reservoirs benefit extensively, and in some instances find themselves dependent entirely on storage and regulation afforded by water conservation works. Forest restoration and protection are more effective by the conservation of water supplies. Lakes with stable levels and streams with continuous flows are invaluable assets to our parks. Increasingly low water flows in streams add to the value of water powers.

It follows that to charge all of the expenses of operating and maintaining the water structures to the Division of Game and Fish and the sportsmen of the state is neither just nor equitable. To the extent that this program reflects benefits to the general public, to that extent the expense of operating and maintaining the structures should be shared by the general revenue fund.

I find there is much confusion in the public mind as to the methods used in the removal of rough fish from our inland lakes, the scope of the work, the revenues available with which to pay the costs and the general policies of the department which govern this activity.

Rough fish removal thus far has been entirely self-sustaining. Not one dollar of moneys raised from general taxation or from funds paid by the sportsmen has been expended on this work. Not only has the expense of removing rough fish been paid from the revenues yielded by the sale of the fish caught but many worthwhile improvements have been financed from these funds. Among projects initiated and completed from rough fish revenues may be mentioned the purchase of the Waskish tract at the outlet of Tamarack River on Upper Red Lake; appropriations made to the Department of Public Health for cooperative pollution studies; burying of dead fish smothered under the ice; construction of dams in the outlets of a number of lakes; payment of engineering investigations on game and fish projects; and material contributions to the costs of law enforcement; all of them worthy projects and proper charges against rough fish removal revenues.

Increased public demands for a more vigorous campaign to exterminate predator fish have been recognized by the department, by an expanded program of operations. The present scope contemplates the use of all of the revenues derived from the activity on seining operations alone. In other words, all of the receipts will constitute a revolving fund to be used for the removal of rough fish.

If the program of rough fish removal is to be materially expanded beyond what it is today, the Legislature will have to appropriate additional funds. Presumably these funds will be taken from revenues derived from the sale of fishing licenses to anglers. Even if funds were available at present from which to purchase fishing gear to increase the equipment of the Division, it would be of questionable prudence to make this investment under present conditions. War priority restrictions make it difficult to secure some of the material. The material that is available can be purchased only at very decidedly advanced prices. These restrictions, coupled with a scarcity of labor and increased labor costs, would make any materially expanded program excessively costly and should be made to await the close of the war.

It is to be regretted that the war emergency has stymied the extensive plans and preparations which were initiated by the Division to materially expand its fish propagation program. As will be noted in the discussion under "Fish Propagation" herein, the Division began preparations for increasing its plant and personnel to enable it to carry on a more vigorous restocking program as early as 1940. This program was put into effect immediately after the legislature of 1941 had increased the resident angler's license fee to provide additional revenues. Defense preparations and the outbreak of the war have terminated construction of all kinds and before very many of the rearing ponds and propagation equipment were completed. The prosecution and completion of this work will, of course, have to wait until after the termination of the present emergency.

The Division, however, is doing everything within its resources to equip its existing hatcheries and units, so as to operate them at volume capacity and thus to carry on at maximum output.

I wish to express to the heads of the bureaus of the Division, and to all employees, my appreciation for the whole-hearted cooperation they have shown me during the brief time I have been its director. Without this cooperation my task would have been much more difficult.

BUREAU OF LAW ENFORCEMENT

Attention is called to the report of the Bureau of Law Enforcement for the biennium ending June 30, 1942, published in the department's 1940 statistical report, on the reorganization of the warden force, the reduction in operating costs of approximately $40,000 per year, increased efficiency of the bureau as reflected in activity reports on the apprehension and conviction of violators and increase in revenue of approximately $45,000 per year.

During the fiscal year 1942 the operating costs were reduced another $10,000, this in face of salary increases to employees in the lower brackets.

The term "law enforcement" does not convey to those not acquainted with the bureau's activities, the wide and diversified fields in which it operates. Game wardens are more and more becoming "conservation officers" performing delegated field work in connection with the operations of the other bureaus of the division, public relations and education.

The demands on the bureau personnel for other than strictly law enforcement duties emphasized in previous reports, continues to expand until these duties are consuming a salient portion of the bureau's funds. As an example, the extra activities imposed on the Bureau of Law Enforcement by the Bureau of Research alone cost $30,000 for warden services and mileage, during the last biennium. Add to this the warden service rendered the Division of Water Resources and Engineering on lake control and observations, the Bureau of Fisheries in connection with rough fish removal, and aid on stream improvements, the extensive sphere embraced in law enforcement is appreciated. These duties delegated to the bureau are emphasized to indicate the wide and diversified fields in which the bureau is expected to function as a part of the Division of Game and Fish.

Assignment to the bureau of duties not directly related to law enforcement may well reach a point where further assignments will be at a sacrifice of efficiency in its major field, that of the enforcement of fish and game laws, and that if this plan of operation is to continue as a future policy, additional funds may have to be provided for the bureau.

TABLE 35

Game and Fish Law Violations by Classes

Biennium Ending June 30, 1942

Class of Violation	Fiscal Year 1941	Fiscal Year 1942	Recapitulation
Big Game	328	221	549
Small Game	576	604	1,180
Fishing	942	1,159	2,101
Netting	50	90	140
Trapping	107	305	412
Fur	83	126	209
Guns set up	310	450	760
Hunting and Carrying Guns in Refuge	416	111	527
Miscellaneous	59	38	97
	2,871	3,104	5,975
Seizures			
Trapping Equipment			
Fur Stretchers	7	11	18
Snares	14	4	18
Traps	861	1,538	2,399
Pelts			
Badger	51	117	168
Bear hides	6	14	20
Beaver	311	612	923
Bobcat	4	2	6
Civet cat	6	14	20
Deer hides	52	63	115
Deer tails	14	.....	14
Dog hide	1	.....	1
Elk hide	.....	1	1
Fisher	1	3	4
Fox	16	20	36
Lynx	.....	8	8
Mink	273	374	647
Moose hides	1	1	2
Muskrats	12,067	16,957	29,024
Oppossum	1	.....	1
Otter	12	23	35
Raccoon	127	198	325
Skunk	211	358	569
Squirrel	.....	9	9
Weasel	55	106	161
Wolf	13	14	27
Firearms and Hunting Equipment			
Holster	.....	1	1
Pistols	1	4	5
Rifles	165	115	280
Shotguns	201	185	386

Fishing Equipment

Class of Violation	Fiscal Year 1941	Fiscal Year 1942	Recapitulation
Boats	4	6	10
Daredevil	.....	1	1
Fishbag	.....	1	1
Fish Container	1	.....	1
Fishhouse	22	2	24
Fishtraps	.....	9	9
Hooks	1	97	98
Ice Fishing Stick	.....	24	24
Lines	114	172	286
Minnow boxes	.....	3	3
Nets—Number	189	213	402
Feet	200	1,100	1,300
Anchors	.....	3	3
Oars—Pair	1	2	3
Poles	32	58	90
Plugs	.....	3	3
Reels	31	65	96
Rods	31	46	77
Seines	.....	3	3
Stringer	.....	1	1
Tackle boxes	2	2	4
Wire Basket Net	.....	1	1
Wire leaders	.....	2	2

Perishables

Bald Eagle	.....	1	1
Bear—Number	25	63	89
Pounds	.....	485	485
Quarts	.....	20	20
Beaver carcasses	2	.....	2
Blue Jay	.....	1	1
Coots	.....	13	13
Deer—Cans	146½	.....	146½
Heads	.....	4	4
Horns—set	.....	1	1
Number	429	676	1,105
Pounds	1,375	1,561½	2,936½
Quarts	.....	18	18
Doves	.....	4	4
Ducks	441	565	1,006
Elk—number	.....	2	2
Fish—Boxes	6	633	639
Cans	114	755	869
Number	7,482	9,556	17,038
Pounds	2,154	605½	2,759½
Quarts	.....	1	1
Tubs	.....	7	7
Minnows—Dozen	65	.....	65
Frogs—Dozen	856	.....	856
Number	2,953	.....	2,953
Pounds	7	.....	7
Sacks	.....	4	4
Geese	.....	1	1
Grebe	.....	1	1
Grouse	26	136	162
Helldivers	1	.....	1
Meadow Lark	.....	1	1

Class of Violation	Fiscal Year 1941	Fiscal Year 1942	Recapitulation
Moose—Number	4	1	5
Pounds	525	35	560
Muskrat carcasses—Number	.....	9	9
Owl	.....	1	1
Partridges	77	52	129
Pheasants—Cans	71	.....	71
Number	649	804	1,453
Prairie chickens	5	6	11
Rabbits	21	59	80
Raccoon carcasses	.....	2	2
Rice hens	8	4	12
Robins	.....	8	8
Sandpipers	3	.....	3
Squirrels	21	1	22
Swans	2	7	9
Turkey buzzard	.....	1	1
White Tern	.....	1	1
Yellowleg	1	1	2
Live Animals			
Bear	2	4	6
Grouse	.....	1	1
Mink	1	1	2
Raccoon	.....	3	3
Skunk	.....	8	8
Swan	.....	1	1
Miscellaneous			
Axes	8	8	16
Automobiles (Returned to owners by order of court)	.....	2	2
Bag	.....	1	1
Caps	.....	7	7
Chisel	4	4	8
Chair	1	.....	1
Coveralls, white	1	.....	1
Cream can	.....	1	1
Decoys	.....	41	41
Dipping pan	.....	1	1
Dynamite, stick	.....	½	½
Fish—Box	.....	1	1
Sack	.....	1	1
Flashlights	27	61	88
Gaslights	.....	3	3
Hatchets	3	5	8
Headlight	.....	1	1
Hunting coat	1	.....	1
Ice boxes	.....	3	3
Jars	1	1	2
Knives	2	1	3
Lamps	1	1	2
Lanterns	5	5	10
Licenses	18	24	42
Live box	.....	1	1
Motor	1	1	2
Packsacks	8	7	15
Pail	1	1	2
Pheasant feathers	.....	4	4

Class of Violation	Fiscal Year 1941	Fiscal Year 1942	Recapitulation
Reflector light	.....	1	1
Retaining tags	5	.....	5
Shipping tub	.....	1	1
Skiis	2	.....	2
Sleeping bag	2	.....	2
Snowshoes—Pair	.....	1	1
Spades	1	3	4
Spears	87	90	177
Spotlights	2	2	4
Stove	1	.....	1
Wild rice—Pounds	430	.....	430

TABLE 36

Outstanding Fines

June 30, 1940 - June 30, 1941

Month	Charges	Cost Adj'ts	Payments	Credit Adj'ts	Balance
1940					
June 30th					$11,337.16
July	$ 1,203.50	$ 141.63	$ 1,921,22	$ 100.25	10,660.82
August	677.75	62.50	1,631.02	486.86	9,283.19
September	1,243.75	92.51	1,085.81	355.75	3,177.89
October	5,292.12	92.50	1,595.81	289.74	12,676.96
November	2,624.63	135.26	2,453.63	385.47	12,597.75
December	1,793.77	91.33	2,891.02	599.24	10,992.59
1941					
January	758.50	62.50	1,783.28	30.00	10,000.31
February	616.25	30.01	668.10	40.00	9,938.47
March	786.10	95.01	1,227.63	84.38	9,507.57
April	1,356.75	54.50	575.25	667.18	9,676.39
May	1,832.50	23.00	1,030.72	653.01	9,838.16
June	1,385.25	307.55	1,918.55	1,071.74	8,550.67
Total	$19,570.87	$1,188.30	$18,782.04	$4,763.62	

TABLE 37

Outstanding Warden Costs

June 30, 1940 - June 30, 1941

Month	Charges	Cost Adj'ts	Payments	Credit Adj'ts	Balances
1940					
June 30th					$1,083.26
July	$ 300.90	$ 1.00	$ 346.80	.....	1,038.36
August	171.15	.....	171.25	$ 2.25	1,036.01
September	266.70	7.00	232.40	.....	1,077.31
October	1,271.10	7.20	993.15	5.15	1,357.31
November	477.60	13.00	555.40	11.50	1,281.01
December	386.45	3.40	439.84	17.66	1,213.36
1941					
January	159.38	13.75	171.80	6.10	1,208.59
February	107.57	1.34	150.74	103.31	1,063.45
March	111.67	1.70	137.47	179.56	859.79
April	224.85	3.35	186.40	1.30	900.29
May	238.95	.....	117.05	2.65	1,019.54
June	229.55	13.10	180.60	18.75	1,062.84
	$3,945.87	$64.84	$3,682.90	$348.23	

BUREAU OF FISH PROPAGATION[1]

Water levels generally were satisfactory during 1941, but the unusual weather conditions which prevailed in the late fall of 1940 took a heavy toll of fish life in our lakes later on in the winter. The Armistice Day blizzard hurled soil and snow on the early formed thin ice and the freezing of this mixture later on shut off substantially all the sunlight from the lakes, causing a depletion of oxygen. The entire fish population was killed in many lakes, especially in the shallower ones throughout the southern counties. Rough fish, as well as game fish, suffered but due to the fact that game fish apparently are the least able to survive conditions of this kind and the first to be overcome, the effect was a relatively greater destruction of the desirable types.

In sharp contrast to the hardships suffered by fish life in 1941, conditions in 1942 combined to favor winter survival. The winter was unusually mild with the ice cover relatively thin. The snowfall generally was much below normal with a resultant sparse cover over the ice, thus to permit more sunlight to act in sustaining the oxygen content of the water.

Fish propagation is popularly associated with the operation of hatcheries and distribution of their output. The activity embraces much more than that. In its broadest sense it includes the whole field of operations designed to promote increases in game fish population. It embraces the gathering of eggs, operation of hatcheries, rearing of fry to fingerling size in artificially constructed ponds, and selection, improvement and production of natural spawning grounds. It includes the distribution of the output of hatcheries and ponds to their ultimate destination in lakes and streams—a phase in itself of no small proportion in a state like Minnesota with its thousands of lakes and miles of streams. Furthermore, it includes the scientific management of all the sources of supply such as fixing of open seasons and daily and possession limits, control of predator fish, elimination of pollution, control of water levels and kindred requirements.

Certain species, such as trout, pike, pickerel and muskellunge, may be propagated to best advantage through hatchery operations. Trout are reared to fingerling size, while pike, pickerel and muskellunge are usually released to lakes as fry. Others such as bass, crappies and sunfish, commonly referred to as nesting fishes, are not susceptible of this form of reproduction, but must be permitted to propagate in natural waters or in artificial spawning ponds and reared more nearly under natural conditions.

Artificial fish propagation is water farming. The fish are hatched in hatcheries and either planted directly in waters of their ultimate destination as fry, or are transplanted to ponds and later in the fall released for the fisherman to reap through his favorite sport of angling.

The drain on our game fish by anglers, predators, winter suffocation and disease, creates an enormous field in which the bureau is expected to operate to meet the expectations of sportsmen, and is limited only by the resources available for the bureau to carry on.

---

[1]By Norman L. Moe, Supervisor Fish Propagation

Recognizing the increasing demands for game fish as more and more people participate in angling, the ease with which fishermen can travel long distances in quest of this sport, the encroachment of agricultural development on environments, and the effects of pollution from domestic and industrial waste, sportsmen have realized for many years that an expanded program of fish propagation to offset so far as possible these heavy drains on the game fish resources, and additional funds with which to finance such a program, was imminent. Plans and a program for a more extensive restocking of game fish as a basis to indicate the requirements as compared with the limited resources at the disposal of the division had been tentatively begun at the close of the fiscal year 1940. This program included the proposed rearing in ponds of a larger number of walleyed pike to fingerling size, the promotion of the cooperative rearing pond program with sportsmen and resort owner groups, rearing of trout to catchable sizes, improvement of and extending adequate protection to natural spawning grounds and modernizing and increasing facilities for transporting pond and hatchery outputs.

The Legislature of 1941 increased the resident fishing license fee from fifty cents to one dollar, thus providing a substantial increase in revenues for putting an expanded fish program into operation. The early planning of the program above referred to proved to be just that much of an advancement of the plans for the fiscal year 1942 and years to follow.

Because of the change in operations made possible by the increase in fishing license fees for the fiscal year 1942 as compared to the activities of 1941, the bureau's operations for the two year period will be outlined briefly for each year. Brief references to the operations for 1941 follow:

COOPERATIVE FISH REARING PONDS: Promotion of the cooperative fish rearing ponds was begun during the fiscal year 1940 and continued through 1941. Eighty-seven ponds were established in 21 counties. These ponds yielded 100,698 walleyed pike, 56,009 bass, 440,286 crappies and 1,597,365 sunfish fingerlings. The outputs from these ponds were stocked in lakes recommended by the groups sponsoring the ponds.

In the early spring of 1941 the cooperative ponds had been increased to 121. Tables 39 and 40 show production from all fish propagation plants for the biennium.

SPAWNING BED AREAS: Recognizing the importance of selecting, developing and protecting natural spawning beds as an indispensable part of the state's propagation program, this phase of the bureau's activities was promoted with vigor during the first year of the biennium.

WALLEYED PIKE—NORTHERN PIKE—MUSKELLUNGE—SUCKER—REARING: Experiences thus far had with the raising of walleyed pike to fingerling size indicate that its success depends upon the proper preparation of the ponds and subsequent close supervision. Accordingly, much attention was devoted to this phase of the work. 130,000 fingerling pike were harvested from the cooperative ponds and one state pond in the fall of 1940. Preparation to expand the pike fingerling rearing operations were planned during the year.

TABLE 38

Showing Locations and Nature of Fish Propagation Plants

Name	Location	Nature of Operations
Root River Hatchery	Near Lanesboro	S. M. Bass Rearing Ponds Trout Hatchery
Mounds Park Hatchery	St. Paul	Trout and Walleyed Pike Hatchery, Rearing Ponds, Shop and Garage
French River Hatchery	French River on North Shore	Lake Trout, Whitefish and Herring Hatchery
Tower Field Station	Near Tower	Walleyed Pike Hatchery
Cut-Foot Sioux Field Station	20 Miles North of Deer River	Walleyed Pike Hatchery
Lake of the Woods Field Station	Near Baudette	Walleyed Pike Hatchery
Waskish Field Station	Waskish, on Upper Red Lake	Walleyed Pike Hatchery
Redby Hatchery	Redby on Lower Red Lake	Whitefish and Walleyed Pike Hatchery
Ranier Field Station	Ranier on Rainy Lake	Walleyed Pike Hatchery
Bemidji Field Station	9 Miles East of Bemidji	Walleyed Pike Hatchery
Nevis Field Station	Near Nevis	Muskie Hatchery
Park Rapids Pike Station	Park Rapids	Walleyed Pike Hatchery
Detroit Lakes Hatchery	Near Detroit Lakes	Walleyed Pike Hatchery and Rearing Ponds
Ottertail Field Station	Near Ottertail	Walleyed Pike Hatchery
Glenwood Hatchery	Near Glenwood	Trout and Walleyed Pike Hatchery, Rearing Ponds
Southern Minnesota Hatchery	Near St. Peter	Northern Pike Hatchery, Rearing Ponds
Jenkins Field Station	5 Miles East of Jenkins	Walleyed Pike Hatchery
Crystal Springs Rearing Ponds	Whitewater State Park near Altura	Trout Rearing Pond
Windom Rearing Pond	Windom	Rearing Pond
Hinckley Rearing Pond	Hinckley	Rearing Pond
Hutchingson Rearing Pond	Hutchinson	Rearing Pond
Izaak Walton Bass Ponds	4 Miles South of Minneapolis	Rearing Ponds
Warren Lake	Near Windom	Rearing Pond
Mille Lacs Pond	Garrison on Mille Lacs Lake	Rearing Pond
Sturgeon Lake	Near Sturgeon Lake	Rearing Pond

TABLE NO. 39

PRODUCTION BY HATCHERIES AND PONDS

1940-1941

	Large Mouth Bass	Small Mouth Bass	Crappies	Sunfish	Brook Trout	Brown Trout	Rainbow Trout	Lake Trout	W. E. Pike	Northern Pike	Whitefish	Muskies	Suckers	Miscellaneous	Total
HATCHERIES															
Detroit Lakes	13,650	.....	37,100	45,000	142,840	38,940	.....	.....	52,491,578	120,000	.....	.....	3,450,000	.....	56,339,108
French River	.....	.....	.....	.....	318,740	92,742	87,163	3,560,000	11,320,000	.....	600,000	.....	.....	.....	15,978,645
Glenwood	23,753	.....	7	15	192,925	358,191	167,640	.....	33,325,019	2,300,000	.....	.....	.....	M 10,000	36,377,550
Lanesboro	650	2,025	14,735	3,500	656,325	602,532	155,676	367,930	.....	.....	.....	.....	.....	.....	1,803,373
Redby	.....	.....	.....	.....	.....	.....	51,196	.....	63,775,286	.....	8,595,200	.....	.....	.....	72,421,682
St. Paul	.....	.....	67,700	.....	312,595	110,625	133,000	181,452	16,481,150	910,000	.....	.....	1,380,000	M 100	19,576,622
St. Peter	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Baudette	.....	.....	.....	.....	.....	.....	.....	.....	45,000,000	.....	.....	.....	500,000	.....	45,500,000
Bemidji	.....	.....	.....	.....	.....	.....	.....	.....	54,312,100	.....	.....	.....	1,750,000	.....	56,062,100
Cut Foot Sioux	.....	.....	.....	.....	.....	.....	.....	.....	129,375,000	600,000	.....	.....	.....	.....	129,975,000
Jenkins	.....	.....	.....	.....	.....	.....	.....	.....	37,390,000	.....	.....	.....	1,266,000	.....	38,656,000
Nevis	.....	.....	.....	.....	.....	.....	.....	.....	.....	115,175	.....	128,520	.....	.....	243,695
Ottertail	.....	.....	.....	.....	.....	.....	.....	.....	29,076,404	875,550	.....	.....	.....	.....	29,951,954
Park Rapids	.....	.....	.....	.....	.....	.....	.....	.....	51,522,140	1,665,000	.....	.....	4,642,230	.....	57,829,370
Ranier	.....	.....	.....	.....	.....	.....	.....	.....	54,140,000	.....	.....	.....	.....	.....	54,140,000
Tower	.....	.....	.....	.....	.....	.....	.....	.....	42,769,430	.....	.....	.....	.....	.....	42,769,430
Waskish	.....	.....	.....	.....	.....	.....	.....	.....	75,000,000	309,630	.....	.....	173,235	.....	75,482,865
Crystal Springs	.....	.....	.....	.....	35,484	49,368	1,104	.....	.....	.....	.....	.....	.....	.....	85,956
STATE PONDS															
Windom	.....	.....	133,400	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	133,400
Hutchinson	63	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	M 80,000	80,063
I. W. L. A.-Hennepin	236,146	.....	52,900	30,690	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	319,736
Hinckley	.....	.....	.....	.....	.....	.....	.....	.....	29,800	.....	.....	37	.....	M 20,000	49,837
Federal Hatcheries and Ponds	3,900	360	71,300	14,855	554,069	160,286	81,761	28,721	27,512,171	14,670,000	.....	.....	.....	.....	43,097,423
Cooperative Ponds (55)	57,224	.....	355,846	1,680,246	.....	.....	.....	.....	100,972	3	.....	.....	.....	.....	2,194,291
Rescue Operations	29,204	.....	45,843	202,380	.....	.....	.....	.....	.....	600,247	.....	.....	10,006	B 198,807	
														P 16	1,086,503
Totals	364,590	2,385	778,831	1,976,686	2,212,978	1,412,684	677,540	4,138,103	723,621,050	22,165,605	9,195,200	128,557	13,171,471	308,923	780,154,603

M—Minnows. P—Perch. B—Bullheads.

TABLE NO. 40

PRODUCTION BY HATCHERIES AND PONDS

1941-1942

	Large Mouth Bass	Small Mouth Bass	Crappies	Sunfish	Brook Trout	Brown Trout	Rainbow Trout	Lake Trout	W. E. Pike	Northern Pike	Whitefish	Herring	Minnows	Suckers	Miscellaneous	Total
HATCHERIES																
Detroit Lakes	6,600		1,700	45,500	93,585	45,830			35,740,000	460 952,620				3,705,021		40,591,316
French River			100	2,144	242,132	152,460		3,398,880	6,000,000		681,939	12,220,000		120,000		22,817,655
Glenwood	7,810			1,400	124,407	216,530	66,731		40,000,000	2,025						40,418,903
Lanesboro	450	2,565	31,529	62,865	284,622	198,669	22,967	70,000								673,667
Redby									28,234,800		3,657,780					31,892,580
St. Paul	8,500		580	6,000	297,430	85,735	1,685	287,100	37,920,000				40,000			38,647,030
St. Peter	725	338								520 365,000						366,583
Baudette									69,900,000							69,900,000
Bemidji									47,480,000	160,000				135,228		47,775,228
Cut Foot Sioux									99,238,000							99,238,000
Jenkins									70,236,000							70,236,000
Nevis									7,100	290,000					M 17,800	314,900
Park Rapids									33,365,777					7,000,000		40,365,777
Ranier									51,660,000	60,000						51,720,000
Tower									52,280,000	95,649				1,840,000		54,215,649
Waskish									46,040,000							46,040,000
Ottertail									33,591,650	673,040						34,264,690
Crystal Springs					24,634	34,097	18,084									76,815
STATE PONDS																
Sturgeon Lake									6,240							6,240
Hutchinson	72,915															72,915
Hinckley	2,000															2,000
Windom										2,915						2,915
I. W. L. A.-Hennepin	365,500		128,250													493,750
Mille Lacs									125,842							125,842
Federal Hatcheries and Ponds	66,770	12,875	392,958	1,292,660	252,800	122,200	85,100	247,100	10,135,000 181,040	11,970,000 27,328	1,050,00	9,200,000				35,035,831
Cooperative Ponds (94)	88,278	4,292	554,359	713,694					358,033	2,822			1,610,000	8,950		3,340,428
Rescue Operations	212,890		256,200	104,176					2,445	15,401			1,033,150	7,638	B688,983 P 39,192 C 360	2,360,435
Totals	832,438	20,070	1,365,676	2,228,439	1,319,610	855,521	194,567	4,003,080	662,501,927	14,617,780	5,389,719	21,420,000	2,683,150	12,816,837	746,335	730,995,149

B—Bullheads. P—Perch. C—Catfish. M—Muskies.

Pickerel or northern pike is becoming more and more a popular game fish, especially with the visiting tourists. To meet the demand for this species the bureau is gathering an increasing number of eggs for hatching in hatcheries for transplanting to ponds for rearing to fingerling size. 21 million northern pike fry were distributed to rearing ponds in 1941. From observations made fry grew to 3-inch long fingerlings in thirty days and were of generally uniform size. In sixty days the number of fingerlings had become greatly reduced and varied greatly in size, ranging from six inches to eleven inches. Apparently, as the fingerlings in captivity grow larger, cannibalism increases, indicating that the best results may be had by releasing the fingerlings at the age of about six weeks.

Northern pike spawn early, and if ponds are constructed so as to admit of their drainage, it is possible to harvest the pike fingerlings in time to use the same pond during a season for the rearing of bass fry to fingerling sizes, thus harvesting two crops of fingerlings per season from each of such ponds.

Muskellunge production was increased during the year both in the production of fry and the rearing of fingerlings. The big problem has been and still is, how to acquire the brood stock from which to secure the eggs.

Sucker minnows are valuable as food for game fish reared in ponds, as well as in natural lakes. Instead of giving away the mature suckers or releasing them at the time game fish are being seined for eggs in the spring, sucker eggs are extracted also and hatched and reared as food for game fish.

U. S. FISH AND WILDLIFE SERVICE: The bureau has cooperated with the U. S. Fish and Wildlife Service in supplying pike eggs to the Federal hatcheries located at Duluth and New London. Fry from these hatcheries were subsequently distributed to waters within the Superior National Forest for restocking purposes.

All fry hatched from eggs supplied to the U. S. Fish and Wildlife Service hatchery at New London were either reared in ponds or distributed directly to Minnesota lakes. The bureau handled the distribution of all the pike, crappies, bass and sunfish reared in ponds at this station.

During the latter part of the fiscal year 1941 the stocking of fishable size trout to provide angling during the same fishing season was tried. This was in the nature of an experiment which met considerable opposition at the start, but experiences indicate that it may well be accepted as a future policy and practice.

Experiences with trout propagation in Minnesota point to certain policies and conclusions:

(1) A large percentage of trout should be raised to yearling size.

(2) Trout streams where experiences have indicated conditions to be unfavorable or questionable for successful trout propagation should be eliminated from the trout planting program and greater concentration applied to streams where conditions have proved most favorable.

(3) Seasonal stocking to afford seasonal fishing may be made in streams in which trout cannot survive throughout the whole year.

(4) Research should be made to find less expensive feed for trout in rearing than the packing house products which now furnish the greater percentage of the feed.

(5) Trout ponds should be located in the northern section of the state, from which fingerlings may be supplied to restock trout streams more economically in that area.

BASS—CRAPPIES—SUNFISH: The rearing of these species on an expanded scale is being urged under the cooperative pond program and the state's facilities are being enlarged.

THE LARGE MOUTHED BASS: There is need for the promotion of greater reproduction of this species. Facilities for the production of a larger number of fry in the southern part of the state to be transferred for rearing in ponds in the northern sections was being planned.

SMALL MOUTHED BASS: The state has numerous waters suitable for the species but artificial production has not been adopted except on a small scale. Here again greater facilities for the production of fry should be provided in the southern part of the state and transferred to rearing ponds in other sections for fingerling rearing.

FISH RESCUE: It is believed that a more aggressive program to rescue fish trapped in landlocked pools caused by receding flood waters can be made to supply a much larger number of fingerlings for restocking purposes. Most of the fish rescued are pan fishes. They are sufficiently mature so that when they are released in lakes and streams most of them will survive and reach catchable size in a relatively short time and at a low cost.

FISH DISTRIBUTION AND UNITS: Trucks traveled an aggregate of approximately 250,000 miles in 1940, in the transportation of the outputs from hatcheries and ponds to their ultimate destination in lakes and streams. In 1941 transportation units traveled 300,000 miles. New tank units were planned more in keeping with the needs and more economical and efficient in service. With proposed new equipment, one truck will be able to transport as many fish and at less cost than three trucks loaded with the customary cans.

MANAGEMENT AREAS: The state was divided into ten management areas each with a headquarters and fisheries supervisor in charge. These supervisors are expected to cooperate with game wardens, sportsmen's clubs and interested individuals and keep informed of conditions which prevail in lakes and streams in their districts as regards fish restocking and other management needs, and make their report to the supervisor of fish propagation. Table 38 shows location and nature of operations of each unit.

IMPROVEMENTS TO FISH PROPAGATION PLANTS

ST. PAUL FISH HATCHERY: A WPA project which had been in operation for several years on general construction work, continued through 1941 but was terminated early in 1942. The hatchery building itself was completed, but the landscaping of the grounds, reconstruction of the spring basin, repair of ponds and the furnishing of some of the equipment are still

uncompleted items interfering with the most efficient operation of the hatchery. Damage to ponds from the failure of one of St. Paul's large storm sewers to function and from general flooding caused by rains of cloud burst proportions caused further complications to operation.

About fifty cooperative fish rearing ponds were stocked and fish for exhibition purposes for the State Fair, Sport Show and Bowling Tournament were supplied from this plant.

LANESBORO HATCHERY: Construction during 1941 included cross dykes through two ponds, spawning stalls for small mouthed bass, and the installation of a walk-in refrigerator.

GLENWOOD HATCHERY: A WPA project continued in operation during 1941, landscaping the grounds, building concrete pond controls, installing flume anchors and constructing parking area and walks.

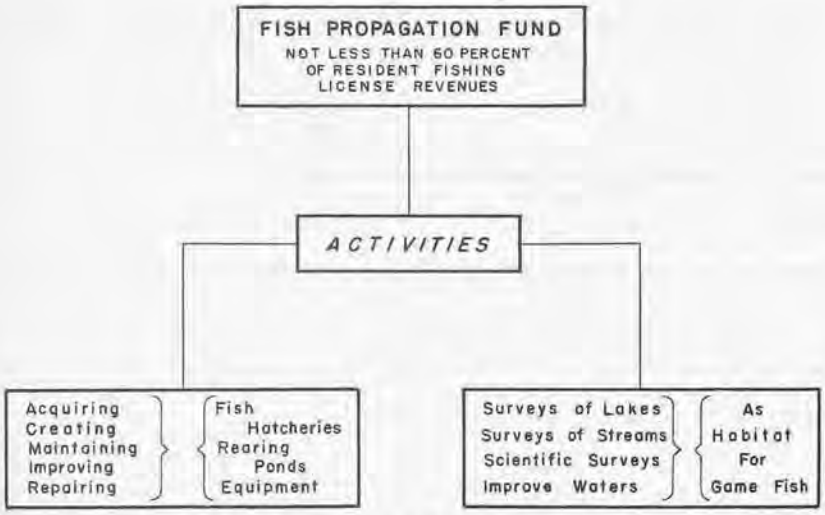
FRENCH RIVER HATCHERY: Raceway covers and the drilling of the new well are noted as improvements for 1941.

In addition to the above improvements to hatchery sites, new rearing ponds were completed at Sturgeon Lake near Hibbing, Mille Lacs Lake near Garrison, and one in the St. Croix recreational area.

Expanded Program from Increase in Revenues

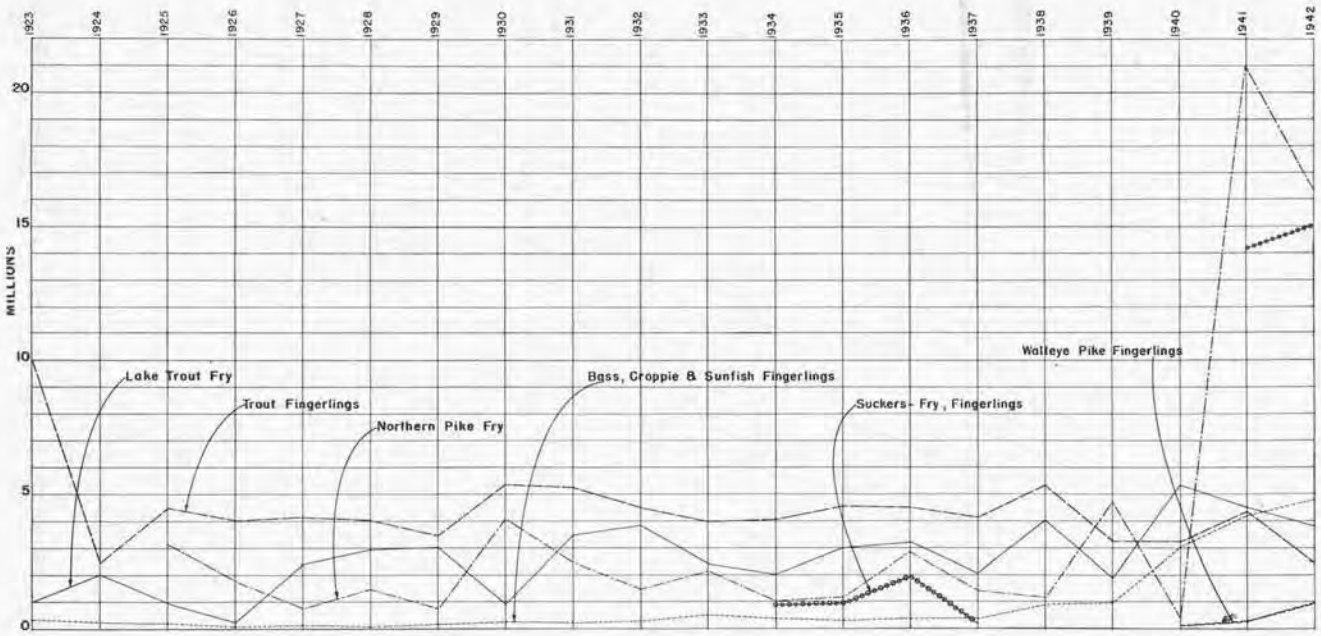
The Legislature of 1941 fixed 60 per cent of the revenues to be received from resident fishing licenses as the maximum that may be expended any one year on fish propagation. Figure 4 indicates the origin and distribution of the Fish Propagation Fund and nature of activities.

FIGURE 4



Fish Propagation Fund and Activities Supported By It

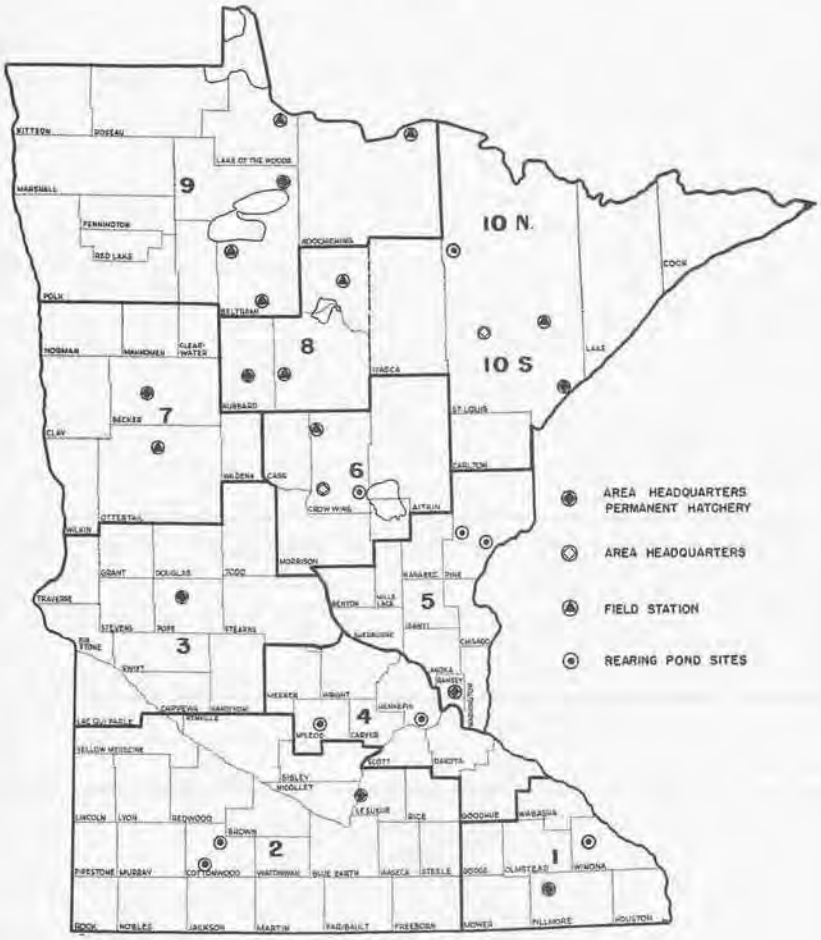
FIGURE 5



Graph Showing Fish Fry and Fingerling Production of Species Noted 1923-1942

With the increase in fishing license fees granted by the Legislature of 1941, it became necessary to reorganize the bureau and set in motion a program to increase its field of operation. A program designed to more nearly meet the needs of the state and which had been given preliminary study

FIGURE 6



FISH PROPAGATION
MANAGEMENT AREAS AND HEADQUARTERS
HATCHERIES - FIELD STATIONS - REARING PONDS

DEPARTMENT OF CONSERVATION
DIVISION OF GAME & FISH

and preparation in 1940 and 1941, became the basis on which plans were perfected for expanding fish propagation with the increased revenues. Sites for rearing ponds were investigated and proceedings for the acquisition of lands for rearing ponds and hatchery sites were instituted and detailed plans for pond construction and controls were begun immediately after the license fee increase had been authorized.

This program had barely taken on its initial momentum when Federal priority restrictions placed on building material because of defense needs imposed serious limitations on progress. These restrictions became more stringent after the actual declaration of war and will cause a complete cessation of work during the emergency so far as the building of new structures is concerned. As a result, the plans conceived to launch the most extensive fish propagation program in the history of the state will have to await the return of normal peace times for its fullest development.

To offset in part the limitations imposed by war restrictions, the present existing plants will be utilized to the fullest extent by increasing production to the full capacity of present operating hatcheries and ponds. Special studies will be made of natural spawning grounds to discover means of making them produce as many game fish as intensive management will make possible and rescue operations expanded to the limit of available equipment.

Figure 5 shows graphically the production of fry and fingerlings of the species noted for the years 1923-1942, compiled from available statistics. No authentic information is available from which to explain the variations from year to year in volume of production. In all probability the major cause of the fluctuations noted is accounted for by temperature and weather conditions affecting the gathering of eggs. In the case of the increases shown in northern pike fry, walleyed pike fingerlings and pan fishes, indicated for 1941, however, they reflect the beginning of a program to rear a larger number of fingerlings and to increase the stocking of lakes and streams with northern pike, a species of game fish which is growing in popularity as a source of real sport to the anglers.

Figure 6 is a map showing the boundaries of management areas and nature and distribution of fish propagation units.

ROUGH FISH REMOVAL[1]

A larger volume of rough fish was removed from our inland lakes and streams during the past biennium than in any similar period for the past 15 years. There are two reasons for this. One is due to an increased activity to keep predator fish under control. The other and perhaps the most important factor is the increase in the number of carp that reach our lakes from the Mississippi and Missouri Rivers, the chief sources of migrating carp, through tributaries that have had their flow restored by increased rainfall. Many streams that originate in or flow through lakes in the southern part of the state with outlets into the larger streams, dried up during the recent

[1]By Geo. Weaver, Fisheries Supervisor

In Carp Removal Operations, Little Ones as Well as Big Ones Are Removed

drought, thus cutting off the movement of rough fish into headwater lakes. This natural barrier to the free movement of predators was a factor which aided materially in controlling rough fish during recent dry years.

With the increase in rainfall experienced during the past few years, especially during 1942, to restore the flow in the smaller tributaries, an increase in carp population and a consequently greater burden of control is to be anticipated.

The Bureau has fished 78 lakes and streams through contractors who cooperate under the direction of the Bureau and are paid by the Division from a portion of the gross receipts yielded by the sale of the fish. 30 crews were engaged during the season 1941-1942, employing an aggregate average of approximately 250 men. In addition to the contract fishing state crews operating on a per diem basis have fished 12 additional bodies of water during the same period.

The tables which follow contain statistics to indicate the scope of the work carried on by the Bureau in the removal of rough fish as well as other activities which come within the field of its operations and are self-explanatory.

TABLE 41

Rough Fish Removed

Fiscal Years 1941 and 1942

Species	1941	1942
Carp	1,719,878 lbs.	2,968,269 lbs.
Buffalo	1,186,143 lbs.	836,574 lbs.
Sheepshead	100,859 lbs.	87,142 lbs.
Dogfish	3,395 lbs.	11,925 lbs.
Turtles	.....	688 lbs.
Bullheads	.....	91,751 lbs.
White Carp	943 lbs.	3,898 lbs.
Mooneyes	203 lbs.	1,095 lbs.
Suckers	35 lbs.	.....
Garfish	.....	383 lbs.
Eelpout	.....	40,647 lbs.
Perch	.....	5,988 lbs.
	3,011,456 lbs.[1]	4,048,360 lbs.

[1]Includes 358,620 lbs. rough fish turned over to charitable institutions and used for hog feed and fertilizer during the fiscal year 1940-1941, and 242,092 lbs. during the fiscal year 1941-1942.

TABLE No. 42

VALUE OF ROUGH FISH AND BULLHEADS REMOVED BY YEARS

Period 1931-1942

SEASONS	Total Lbs. [1] Rough Fish	Total Lbs. Bullheads	Gross Receipts	Net to State	Net to Contractor	State's % of Gross
1931-1932	2,903,649	393,863	$139,426.39	$24,817.79	$114,608.60	17.8
1932-1933	1,991,818	182,906	66,671.09	11,843.62	54,827.47	17.8
1933-1934	1,814,147	5,613	56,581.24	11,453.09	45,128.15	20
1934-1935	3,412,927	384,211	103,320.45	21,683.19	81,637.26	21
1935-1936	1,686,356	327,506	[2]80,655.29	19,407.77	60,759.66	24
1936-1937	1,647,101	55,211	[3]56,772.82	12,668.07	42,489.24	22
1937-1938	1,963,182	195,300	[4]59,359.20	12,624.68	44,487.64	21
1938-1939	2,268,779	185,726	[5]56,688.38	11,294.07	44,436.97	20
1939-1940	1,662,213	134,097	[6]35,126.77	6,263.04	28,250.64	18
1940-1941	3,011,456	.....	[7]79,537.64	[8]18,599.43	58,809.66	23
1941-1942	3,956,609	91,751	[9]144,631.87	[9]30,301.43	111,026.70	20.9

[1]Rough fish referred to above, includes carp, buffalo, sheepshead, dogfish and garfish.
[2]Includes $487.86 South Dakota's share from sale of fish taken from Big Stone Lake.
[3]Includes $1,615.51 South Dakota's share from sale of fish taken from Big Stone Lake.
[4]Includes $2,246.88 South Dakota's share from sale of fish taken from Big Stone Lake.
[5]Includes $957.35 South Dakota's share from sale of fish taken from Big Stone Lake.
[6]Includes $613.14 South Dakota's share from sale of fish taken from Big Stone Lake.
[7]Includes $2,128.19 South Dakota's share from sale of fish taken from Big Stone Lake.
[8]Includes $3,304.10 South Dakota's share from sale of fish taken from Big Stone Lake.
[9]36¢ shortage in account—remitted during 1941-1942 season.

TABLE 43

Resume of Licenses Issued and Revenue Derived
Interstate Fishing Operations
Calendar Years 1940 and 1941

	1940	1941
Number licensees reporting	101	89
Number licensees reporting "no fishing"	6	41
Number licensees not reporting	87	15
	194	145
Revenue Derived from Sale of Licenses		
Interstate set line	$157.00	$112.00
Interstate set line tags	39.75	28.00
Interstate seine and net	$230.50	$221.00
Interstate tags	71.00	79.00
	$498.25	$440.00

TABLE 44

Resume of Itasca County Bullhead Fishing Operations
Fiscal Years 1941 and 1942

	1941	1942
Administrative deductions	$ 5,488.05	$ 6,576.88
Amount credited to fishermen	19,616.28	32,936.92
Gross value of fish sold	$25,104.33	$39,513.80
Production		
Dora Lake	11,049 lbs.	49,516 lbs.
Sand Lake	11,010 lbs.	.....
Little Sand Lake	11,331 lbs.	.....
Spring Lake	590 lbs.	.....
Round Lake	136,300 lbs.	85,115 lbs.
Little Cut Foot Sioux	30,410 lbs.	6,574 lbs.
Big Cut Foot Sioux	75,103 lbs.	50,736 lbs.
Middle Pigeon	.....	27 lbs.
Winnibigoshish	104,625 lbs.	269,760 lbs.
	380,418 lbs.	461,728 lbs.

TABLE 45

Resume of Waterville Area Bullhead Fishing Operations
Fiscal Years 1941 and 1942

	1941	1942
Administrative deductions	$ 901.47	$ 827.18
Amount credited to fishermen	3,165.37	3,214.00
Gross value of fish sold	$4,066.84	$4,041.18
Production		
Cannon River	23,670 lbs.	2,539 lbs.
General Shields Lake	.....	27,794 lbs.
Gorman Lake	.....	7,554 lbs.
Lake Elysian	.....	218 lbs.
Rice Lake	.....	5,272 lbs.
Lower Sakatah	8,519 lbs.	1,891 lbs.
Lake Sakatah	36,589 lbs.	9,975 lbs.
Lake Tetonka	51,541 lbs.	55,064 lbs.
	120,319 lbs.	110,307 lbs.

TABLE 46

Summary of Production and Value of Fish

Interstate Fishing Operations

Calendar Years 1940 and 1941

Species	1940 Pounds	1940 Value	1941 Pounds	1941 Value
Buffalofish	29,203	$1,383.17	154,061	$6,737.99
	4[1]			
Carp	144,317	4,732.20	203,889	6,850.37
	805[1]			
White Carp	3,214	185.45	2,993	66.32
Catfish	12,985	1,551.95	10,722	1,324.95
	968[1]			
Suckers	611	23.45	152	2.40
	212[1]			
Dogfish	3,225	70.16	12,425	253.00
	125[1]			
Sheepshead	3,890	239.68	30,787	1,190.69
	73[1]			
Bullheads	252	33.54	545	46.00
	406[1]			
Garfish	150	3.60	11,558	207.75
	9,115[1]			
Eelpout	127	12.46	121	17.16
	26[1]			
Turtles	90	11.20	149	.....
	2,110[1]			
Sturgeon	700	68.00	.....	.....
	198,764	$8,314.86	427,402	$16,696.63
	13,844[1]			
	212,608			

[1]No value.

TABLE 47

Resume of Licenses Issued and Revenue Derived

Inland Mississippi River Fishing

Calendar Years 1940 and 1941

	1940	1941
Licenses issued	9	6
Revenue		
Licenses	$18.00	$15.00
Tags	2.25	1.50
	$20.25	$16.50

TABLE 48

Commercial Fishing Production International Waters

	Lake of the Woods Pounds		Rainy Lake Pounds		Namekan Lake Pounds	
	1940	1941	1940	1941	1940	1941
Yellow Pike	520,790	643,209	42,059	35,457	7,655	8,940
Pickerel	168,435	127,680	26,064	19,310	2,790	4,402
Whitefish	3,532	3,218	36,553	34,864	26,396	18,103
Perch	41,259	16,712	1,442	318	.....	.....
Crappies	370	.....	.....	.....	.....	.....
Suckers	100,297	98,688	29,208[1]	6,000	.....	.....
	.....	.....	.....	19,625[1]	7,456[1]	7,049[1]
Tullibees	1,226,293	471,563	91	.....	.....	.....
	.....	.....	5,390[1]	28,560[1]	.....	.....
Carp	4,231	1,688	.....	.....	.....	.....
Bullheads	20,893	26,545	.....	.....	.....	.....
Saugers	82,072	69,706	.....	.....	.....	.....
Sturgeon	480	.....	150	.....	.....	.....
Red Fins	28,838	12,091	2,477	1,103	.....	.....
	.....	.....	5,300[1]	.....	.....	.....
Burbot	42,037	49,216	22,700	.....	.....	.....
	.....	200[1]	36,462[1]	25,470[1]	9,684[1]	6,658[1]
Goldeyes	1	.....	.....	.....	.....	.....
Burbot Livers	1,343	1,671	.....	.....	.....	.....
Caviar	28 pts.	35 pts.	.....	.....	.....	.....
Blue Fins	.....	.....	176	54,000[1]	.....	7,101[1]
	.....	.....	31,000[1]	.....	13,565[1]	.....
Eelpout	.....	.....	.....	.....	3,000[1]	1,500[1]
Trout	.....	46	.....	.....	.....	.....
	2,240,871	1,522,033	131,712	97,052	36,841	31,445
	28 pts.	35 pts.	107,360[1]	127,655[1]	33,705[1]	22,308[1]
	.....	200[1]	.....	.....	.....	.....

	1940-1941	1941
Production sold	2,409,424 lbs.	1,650,530 lbs.
	28 pts.	35 pts.
Production of "no value"	141,065[1] lbs.	150,163[1] lbs.
	2,550,489 lbs.	1,800,693 lbs.
	28 pts.	35 pts.
Total value	$114,192.86	$ 118,297.69
Number of licensees	68	64
Number of licensees reporting	66	63
Number of licensees not reporting	2	1
Revenue derived from sale of licenses	$5,325.00	$ 5,137.50
47 Helper's licenses	.....	47.00
Lake of the Woods fishermen paying Baudette hatchery fees	.....	980.00

[1]No value.

TABLE 49

Production and Value of Fish

Lake Superior Commercial Fishing

Calendar Years 1940 and 1941

Species	1940 Pounds	1940 Value	1941 Pounds	1941 Value
Trout	310,899	$ 48,521.34	315,277	$ 44,781.81
Herring	7,311,724	113,368.69	5,706,621	132,489.03
Ciscoes	165,223	9,559.79	105,660	14,653.08
Ciscoets	9,670	2,422.67	37,932	4,807.56
Pickerel	500	35.00	1,100	77.00
Menominees	6,593	340.81	3,648	260.64
Suckers	10,700	351.50	5,500	234.00
Whitefish	8,607	1,262.73	8,849	1,339.85
Bluefins	.....	.....	17,200	520.00
Pike	.....	.....	150	19.50
	7,823,916	$175,862.53	6,201,937	$199,182.47

TABLE 50

Resume of Licenses Issued and Revenue Derived—

Commercial Fishing, Lake Superior

Calendar Years 1940 and 1941

	1940	1941
Number Master licensees reporting	291	260
Number Master licensees reporting "no fishing"	17	27
Number Master licensees not reporting	30	28
Revenue derived from sale of Master's Licenses	$845.00	$787.50
Revenue derived from sale of Helper's Licenses	135.00	130.00
	$980.00	$917.50
Equipment:		
Skiffs, one man	276	264
Skiffs, two man	53	53
Power boats, one ton or less	61	53
Power boats, 5 ton or greater	8	7
Power boats, more than 1 ton, less than 5 ton	19	28

TABLE 51

Production by Red Lake Fisheries Association

Calendar Years 1940 and 1941

Variety	1940	1941
Pike	799,753 lbs.	929,935 lbs.
Perch	179,484 lbs.	98,494 lbs.
Whitefish	3,302 lbs.	1,394 lbs.
Pickerel	29,547 lbs.	34,032 lbs.
Sheepshead	18,882 lbs.	14,513 lbs.
Goldeyes	148,191 lbs.	135,392 lbs.
Suckers	3,468 lbs.	1,291 lbs.
Bullheads	3,020 lbs.	3,288 lbs.
	1,185,647 lbs.	1,218,339 lbs.
Value of fish purchased from Indians by the Red Lake Fisheries Association	$76,322.56	$97,974.78

TABLE No. 52

MUSSEL PRODUCTION AND VALUE

Calender Years 1940 and 1941

	1940 Total Tons	Lbs.	Shell Value	Slug Value	Pearl Value	Total	1941 Total Tons	Lbs.	Shell Value	Slug Value	Pearl Value	Total
Cannon River	9	1,740	$301.00	$16.25	$11.00	$328.25	10	1,890	$492.52	$1.25	.....	$493.77
Mississippi River	6	305	132.84	12.30	3.00	148.14	3	.....	90.00	1.00	$1.00	92.00
Crow River	8	1,235	198.13	.....	.....	198.13	.....	.....	.....	.....	.....	.....
Lake Pepin	18	1,050	431.62	3.00	1.00	435.62	12	.....	400.00	.....	.....	400.00
Rum River	.....	600	25.00	.....	.....	25.00	.....	.....	.....	.....	.....	.....
Totals	41	4,930	$1,088.59	$31.55	$15.00	$1,135.14	25	1,890	$982.52	$2.25	$1.00	$985.77
	2											
	43	930										

Resume of Licenses Issued and Revenues Derived—Mussel Fishing

	1940	1941
Number of licensees reporting	17	6
Number licensees not reporting	13	
Revenue derived from sale of licenses	$150.00	$30.00

TABLE 53

Resume Licenses Issued and Revenue Derived

Minnow Dealer Licenses

Calendar Years 1940 and 1941

1940

1,484	licenses issued, at $2.50 each	$3,710.00

1941

2,226	Minnow dealer licenses issued at $2.50 each	$5,565.00
113	Itinerant licenses issued at $25.00 each	2,825.00
		$8,390.00

TABLE 54

Resume Permits Issued and Revenue Derived

Private Fish Hatchery

Calendar Years 1940 and 1941

1940

18	permits issued, at $5.00 each	$ 90.00
3	tags issued, at 25c each	.75
		$90.75

1941

20	permits issued, at $5.00 each	$100.00
3	tags issued, at 25c each	.75
		$100.75

TABLE No. 55

SOURCES OF RECEIPTS

Fiscal Years 1941 and 1942

SOURCES	STATE		CONTRACTOR		GROSS		Total
	1941	1942	1941	1942	1941	1942	
Rough Fish Removal—							
Fish Lakes Improvement Revolving Fund	$42.73	$2.00			$42.73	$2.00	$44.73
Rents, Waskish	812.50	360.00			812.50	360.00	1,172.50
State Fish Revolving Fund	18,556.70	[3]30,299.43	$58,809.66	$111,026.70	[1]79,494.91	[4]144,629.87	224,124.78
Rents, Redby	195.00	157.50			195.00	157.50	352.50
Waterville Bullhead Fishing	901.47	827.18	[2]3,165.37	[2]3,214.00	4,066.84	4,041.18	8,108.02
Itasca County Bullhead Fishing	5,488.05	6,576.88	[2]19,616.28	[2]32,936.92	25,104.33	39,513.80	64,618.13
Red Lake Fisheries, Refund Hatchery Operating Expense	2,142.26	2,105.90			2,142.26	2,105.90	4,248.16
Rents, Waskish		366.00				366.00	366.00
Total	$28,138.71	$40,694.89	$81,591.31	$147,177.62	$111,858.57	$191,176.25	$303,034.82

[1]Includes $2,128.19 South Dakota's share of proceeds from sale of fish taken from Big Stone Lake and 36¢ shortage in one of the accounts.
[2]Amounts returned to fishermen employed by the state in bullhead operations, Waterville Area and Itasca County.
[3]Includes 36¢ shortage in 1940-1941 account.
[4]In January 1942 the Fish Lakes Improvement Revolving Fund and the State Fish Revolving Fund were merged resulting in the establishment of the State Fish Revolving Fund and Rough Fish Removal Revolving Fund.
Includes $3,304.10 South Dakota's share of proceeds from sale of fish taken from Big Stone Lake.

BUREAU OF FISHERIES RESEARCH[1]

The activities of the Bureau of Fisheries Research during the biennium 1941-1942 were varied and extended to all phases of fisheries management and fisheries investigation. During that period, a reorganization of the research setup was effected and a general change of policy enacted. The objectives outlined under the new policy may be defined under four principal heads:

(1) The determination of existing physical and biological conditions in Minnesota waters through lake and stream surveys.

(2) The investigation and development of improved fish management and propagation techniques.

(3) The formulation of management plans for individual waters and long-range programs for state management areas.

(4) Maintenance of testing and investigational services for routine administrative problems.

Since lake and stream reconnaissance is essential to provide the background for fisheries management and propagation, the final objective of the present survey plan is to secure sufficient data on all fishing waters to insure complete and efficient administration. Because such a project is of long-range proportions, individual watersheds and natural geographical areas are being completed, one at a time, so that they may be operated as units without waiting for state-wide coverage. This system will make possible quicker application of carefully integrated plans employing modern techniques.

Because the development of improved fisheries techniques and the evaluation of existing procedures is quite as essential as complete lake and stream survey, department biologists are now devoting much of their activity to these important questions. A typical problem concerns the evaluation of fish planting methods. It is known that in many waters fry planting may be entirely ineffective. Such planting of commercial species in the Great Lakes has not appreciably affected the actual return to the fisherman, and it may be possible that in many inland lakes similar results will be found.

Reconnaissance work and experiments in basic fisheries management are part of a larger plan to provide a sound basis for long-range fisheries planning. Before extensive plans for development of hatchery facilities, lake and stream improvement, and management programs are justified, the needs of our waters must be established and efficient techniques made available by careful research.

In addition to its more fundamental activities and aims, the fisheries research laboratory provides a testing and checking service for the various administrative units. This work includes water analysis, fish parasite examination, pollution investigation, fish identification, checks on winter oxygen depletion, investigation of fish kills, and the making of recommendations for aquatic vegetation planting.

[1]By Lloyd L. Smith, Jr., Research Supervisor

Establishment of Fisheries Laboratory

Fisheries research and reconnaissance work was started by the department more than 20 years ago by its technicians. It continued sporadically until the early '30's, when it was suspended. In 1937, the cooperation of the University of Minnesota was secured to coordinate C.C.C. and U. S. Forest Service biological survey work with the needs of the department. Additional assistance to develop a cooperative research program was given to the University until 1941. At that time, the department felt that future development of research and administrative service programs would be most benefited by the establishment of a research laboratory directly connected with the Department of Conservation. In accordance with this policy, a laboratory was set up in the State Office Building, equipped to conduct lake and stream surveys and to carry on various fisheries research projects. Existing personnel was reorganized and fitted into the new unit.

Cooperation with the University continued on special problems, such as muskie propagation and general fish growth rate studies.

Progress of Research Projects

Lake and Stream Reconnaissance

Up to and including 1940, the greatest portion of the lake reconnaissance work was sponsored by the U. S. Forest Service and State C.C.C. working in cooperation with and under the direction of departmental and University of Minnesota technicians. The waters investigated were largely in camp work-areas or near other sources of available labor. An attempt was made to get a spot-check of lakes over the entire state to determine the general suitability of waters for fish and to provide a general lake classification. The large scope of this program precluded the securing of intensive data on all but a relatively small proportion of the fishing lakes. Extensive stream surveys were not started until 1939, when a study of the upper Mississippi River was conducted. With the establishment of the state fisheries research laboratory, the plan of lake and stream reconnaissance was changed from scattered spot coverage to completion of the work in small areas. Under this system, it has been possible to finish single districts and place them under management much sooner than could have been done if they were to have awaited state-wide coverage. In addition to the area reconnaissance work, it has been necessary to make spot-checks on problem lakes and on those which were recommended for rough fish removal. The long-range research program developed during the past biennium contemplates the completion of individual watersheds and portions thereof before going on to new areas.

The first of the area projects completed was a survey of the North Shore streams. Crews worked on this watershed during the summers of 1940 and 1941. They collected physical and biological data on which complete stocking programs and stream improvement recommendations were based. These data have been presented in Bureau of Fisheries Research Investigational Report No. 43. The St. Louis River system was 75 per cent completed during the biennium and is being finished during the summer of 1942.

The program of completing the lakes in each district before moving into other areas was carried on in Crow Wing and Aitkin counties. During the biennium, a total of 193 lakes and 52 streams was surveyed and management recommendations projected.

In accordance with the policy developed by the Division of Game and Fish, a biological check was made on all carp lakes before rough fish removal was recommended or attempted. This project, although not yet complete, has covered 125 problem lakes and has permitted the formulation of a long-range carp removal program based on the requirements of the individual bodies of waters and practical removal methods.

The Bureau of Fish Propagation established a series of ten management areas, each under the direction of an area fisheries manager. This system was designed to care for local service problems more rapidly and to permit more intensive coverage of individual waters. To assist in this work, the Bureau of Fisheries Research set up a cooperative project with the area fisheries managers to secure data on problem waters and make recommendations for individual lake management procedures. The Bureau of Fisheries Research also cooperated with area managers in the preparation of stocking lists which, it is hoped, will eventually supplant the old system under which lakes were stocked largely on applications by local interest. Stocking lists are built up by the area fisheries managers and submitted to the Bureau of Fisheries Research for its suggestions and approval. Criticisms, deletions and additions are made on the basis of scientific data available in the research files. To assist in this work, the biological information available from departmental files, the University of Minnesota, the State Board of Health, and the Division of Water Resources and Engineering has been compiled into one index system covering 3,550 lakes. At the present time, all available physical, chemical, biological and management data on the waters of the state are bound into permanent files. All available wildlife management maps of state waters have been compiled and indexed, for the first time, into a usable source of information.

Wild Rice Investigations

The Bureau of Fisheries Research, in 1941, undertook to evaluate Minnesota's wild rice stands and to develop a system of administration under the wild rice law (Laws 1939, Chapter 231, as amended by Laws 1941, Chapter 217). The first step was the examination of 292 rice stands and the development of management recommendations for their use. These recommendations included the allowable harvest, the determination of proper water levels, the designation of certain lakes and certain areas of other lakes for exclusive rice management, and the exclusion of certain bodies of water from consideration as rice producers. At the same time, investigations on the causes of fluctuation in yields and the most suitable conditions for establishing and maintaining a uniform crop were carried on.

A system of administration was developed which employed local volunteer rice committees on each stand to determine the date of the harvesting and to help enforce the boat allotments designated for individual stands. The research findings and experiences in the administrative setup are reported in Bureau of Fisheries Research Investigational Report No. 40.

From results of investigations completed up to the present, it may be concluded that (1) harvesting by present legal methods, even on sparse stands, has no effect on subsequent rice crops or maintenance of the stands, (2) crops have fluctuated periodically in past years in response to environmental conditions, particularly water levels, and (3) practical control of the rice crop will depend, to a large extent, on water level adjustment.

Lake of the Woods Management Report

During the past biennium, a complete survey and analysis of the Lake of the Woods fishery has been made. This work covered all phases of the sport and commercial fishing activities and basic lake productivity. Production statistics from 1888 to the present time were analyzed and the effect of fry planting on commercial species was evaluated. Methods of commercial fishing were investigated to determine their effect on the fish population. Experimental netting was done for three seasons to analyze the existing population and approximately 6,000 fish were examined for age, growth rate, and age composition of the commercial catch to determine its trends. From the foregoing observations a detailed management report has been prepared (Bureau of Fisheries Research Investigational Report No. 42). It includes a description of the present fishery, trends in fish population, life history studies of the commercial species, and detailed recommendations for limitations on seasons, fish sizes, and amounts and types of gear. Some work has been done by federal agencies on Lake of the Woods fisheries. The present investigation, however, is the first extensive treatment of the problem since the work of Evermann and Latimer in 1911. The results of these investigations indicated that (1) there has been no relationship between the number of fry planted and the amount of fish caught by commercial fishermen or the abundance of fish in the lake, (2) further limitations on commercial gear will have to be imposed to maintain a continued high fish yield, and (3) under proper safeguard commercial fishing and sport fishing can be carried on and developed without detriment to each other.

Muskellunge Investigation

A series of investigations on the propagation of muskellunge has been conducted by the Bureau of Fish Propagation in cooperation with the Bureau of Fisheries Research and the University of Minnesota. The results are not yet conclusive, but show definite promise of providing adequate methods of propagating this species and establishing the true relationships between the different types of muskellunge now taken in the state.

Creel Census Data

During the past biennium, creel census studies on Minnesota lakes have been continued. Approximately 450 lakes have been checked during this period. The work has been carried on with the cooperation of the warden service and individual fishermen who were contacted to determine the results of their angling efforts. Although the limited extent of the coverage has made it impossible to determine the exact numbers of fish which are removed annually from Minnesota waters, an accurate estimate of the rate of return has been secured (Bureau of Fisheries Research Investigational Report

No. 44; Smith,[1] 1942). The creel census not only permits state-wide evaluation of our fisheries resources, but is an integral part of fish management for individual waters. The most important general information derived from the creel census is that (1) although individual waters vary widely from year to year, very little change in the general averages for the state are obvious over extended periods and (2) Minnesota's angling returns are above those of many other states.

Long-range Planning

The Bureau of Fisheries Research has built up over the past two years a long-range program of research activities and a tentative plan of fish propagation activities. These plans are still in the preliminary stage because a large amount of essential data has not yet been secured, but they already form the groundwork upon which fish management administration is being based. Since the duration of the present emergency and the future availability of personnel and resources is indefinite at this time, no year-to-year program can be established. It is estimated, however, that complete reconnaissance and formation of management plans for all important fishing waters will take from eight to ten years.

The many and varied activities of the Bureau of Fisheries Research and the increased demands made upon it by administrative units tax its present facilities. In order to make its services more effective and to permit continual check on changing conditions in various areas, the future program contemplates the establishment of area fisheries biologists to work in conjunction with the area fisheries managers. They will be strategically located throughout the state, so that facilitation of fisheries management can be accomplished without delay.

STREAM IMPROVEMENT PROGRESS[2]

A program of stream improvement based on biological surveys conducted by the Bureau of Fisheries Research was started early in the biennium. The first step was the division of the state into five improvement areas distinguished by different watersheds and stream characteristics and the adoption of a work plan defining policies and objectives.

Upon recommendation of the Bureau of Fisheries Research, plans were begun during the summer of 1942 for the improvement of the Knife River in Lake County. Land owners were contacted for easements granting to the state necessary rights to carry on the work on privately owned lands. Easements have been secured on approximately two-thirds of the area of the Knife river requiring improvement.

Erosion control is the first step in stream improvement for the southern part of the state. To this end, cooperation has been developed between the United States Soil Conservation Service, local Soil Conservation Districts, and the Division of Game and Fish. In March, 1942, five cooperative agreements were entered into with as many conservation districts, one each in Houston, Winona, Fillmore, Olmsted and Dodge counties. These

[1]Lloyd L. Smith, 1942, "The 1941 Creel Census," Conservation Volunteer, Vol. III, No. 18, pp. 7-9.
[2]By Thomas R. Evans, Stream Improvement Supervisor.

agreements provide for cooperative activity between the Division of Game and Fish and the members of the soil conservation districts. The United States Soil Conservation Service is aiding farmers in the development of plans for each farm in conjunction with its erosion control work, and in this program stream improvements and improvement of environments for wild life is emphasized and made a part of each project.

The United States Forest Service, which has already done considerable work to improve streams within the boundaries of the Superior National Forest, is cooperating with state efforts to develop the entire North Shore area. Since work within the forest will proceed under federal direction as soon as funds and labor are again available, the state will cooperate on the planning, but will concentrate its efforts and expenditures on streams outside the forest.

Limitations imposed by the war effort on the original work program for the North Shore confined activity to the Knife river and Lester river. To provide adequate shade along the Knife river, 20,000 coniferous seedlings of white spruce, white pine, white cedar, jackpine and red pine were planted. In addition 4,000 willow cuttings and 3,800 alder seedlings were planted in old beaver meadows and on eroding banks. When such plantings were made in pasture areas, fences were built to prevent livestock damage. In addition to tree planting, bank improvements include construction of willow mats on severely eroding bends.

Channel improvements have included creation of deeper pools by digging and blasting in conjunction with the construction of log and boulder wing deflectors, log and rock dams, and the installation of floating shelters. Abandoned beaver ponds which permitted serious warming of the water impounded in the pools were lowered preparatory to complete elimination and re-establishment of vegetation along original stream channels.

A long-range program has been developed to cover all major streams of the state on which stream improvement work is justified. Detailed estimates are being prepared for the Division's work and for future cooperative work with soil conservation districts in southern Minnesota. Since the erosion control problem in the southeastern part of the state is of large scope, the cooperation of land owners, local sportsmen and other locally interested people will be sought to facilitate the solution of the general program.

BUREAU OF GAME[1]

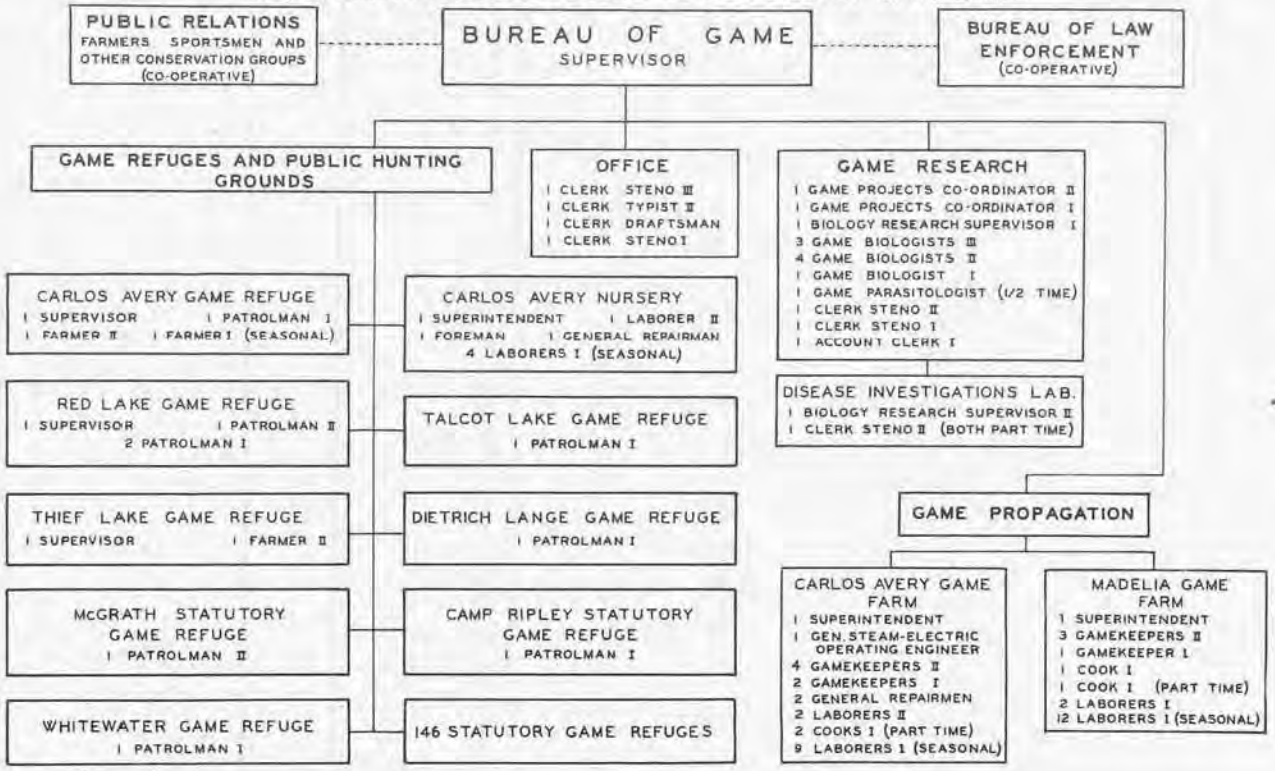
The former Bureau of Game Propagation and Refuges was enlarged during the biennium to include all game and fur bearing animal work and the name was changed to the Bureau of Game.

During the latter part of 1941, the former Bureau of Research was divided into two units, Fisheries Research and Game Research. Because of increased Pittman-Robertson activities, a Pittman-Robertson coordination project was initiated in July, 1941. The coordinator has charge of all game research and Pittman-Robertson projects. This unit was placed under the

[1]By Frank D. Blair, Supervisor of Game.

FIG. 7

ORGANIZATION CHART BUREAU OF GAME AS OF JULY 1, 1942



Bureau of Game the early part of 1942, but actual operations were begun the latter part of 1941. Also added to the duties of the Bureau of Game was the management of a large portion of the so-called Beltrami Island Resettlement Project Area because of its relationship to the Red Lake Game Refuge.

The research and Pittman-Robertson personnel included a coordinator, a deputy coordinator, three stenographers and thirteen biologists. Because of lack of space in the State Office Building to house this unit, the Pittman-Robertson project was amended to include rental of office space and incidental costs of maintaining office quarters. The coordination project is now located in the Commerce Building in St. Paul. The federal government reimburses the state 75 per cent of the cost of this unit and all Pitman-Robertson projects.

The work of the Bureau of Game is primarily to conserve and increase the game and fur-bearing species. This includes game propagation; establishment and operation of game refuges and public hunting grounds and food and cover plant nurseries; annual plantings of grain feeds for winter food for game species; planting of aquatic plants for waterfowl; planting of trees, shrubs and vines for permanent food and cover for wildlife; artificial feeding of wildlife during winter months when necessary; investigation of complaints of damage by wildlife; control of predatory species; dissemination of information on supply and condition of wildlife; recommendations on open seasons and bag limits; miscellaneous game research work, and public relations contacts with sportsmen, conservation clubs and farmers.

Because of war restrictions, plans were made in January of 1942 to cut down production on the Carlos Avery and Madelia game farms about 30 per cent. Operations were also restricted on the Carlos Avery nursery and on the game refuges and public hunting grounds. All W.P.A. projects on game refuges had been suspended by June 30, 1942.

Madelia Game Farm

This farm, up to 1942, specialized in the production of pheasants only. A record production was made in 1941 when 45,631 pheasants were reared and 44,592 released. A total of 40,971 were released in 1940.

Plans were made in 1941 to gradually cut down the number of pheasants reared and begin an increase in the propagation of Hungarian partridges. An egg-laying and partially domesticated strain of Hungarian partridges that were produced on the Blair Mound Farm during a six-year period were moved to the Madelia farm in 1941. One hundred pair of these birds were used for breeding in 1942. It is expected that enough birds will be reared to permit the release of several thousand of them in 1943 if sufficient breeding coops and yards can be built to take care of the stock on hand.

Plans call for the rearing of 33,000 pheasants for release in 1942.

New equipment added to this farm during the biennial period included 100 new electric brood coops and 150 tectiform field pens. Roadways were constructed and two thousand trees and shrubs planted along them to serve as wind breaks and to replace snow fences. All buildings and equipment were repainted and a number of other minor improvements made.

Fifteen new 50-foot awnings were made during the 1941-42 winter for replacement on rearing units in 1942, and ten 50-foot awnings for replacement on the Carlos Avery Game Farm.

A very heavy snow storm at the end of the 1941-42 winter caused the complete collapse of the entire pheasant yard. The two-inch angle posts and braces, with the mesh wire, was almost a total loss. Because of the vigilance of the employees, almost all of the 1942 breeding stock was rescued and moved before the winter quarters collapsed. The mesh wire, posts and

Tray of Chukar Partridge Eggs Ready for the Incubator

steel angles salvaged from the wreck were later used in the construction of an improved winter yard.

As the production of pheasants has increased on the Madelia Game Farm, the unit cost per bird has decreased; the bird unit cost having dropped from $1 in 1938 to 68.5 cents in 1941.

Carlos Avery Game Farm

The Carlos Avery Game Farm, the most modern plant of its kind, started propagation of Bobwhite quail in 1937. In 1938 this farm made an all-nation record production from a single quail farm when 27,224 quail were reared. The production of Chukar partridges started that year on a fairly large scale from breeding birds hatched from eggs in 1937. Since that time and up to 1942 the production of quail has been reduced while the number of Chukar partridges has been increased. Because these two species are raised together as one activity no attempt has been made to obtain the cost per bird of each species. Therefore, the cost per bird on this farm is based on a total of both species. Each year, as the total number of birds produced has been increased, the cost per unit has decreased, having been reduced from $1.10 in 1938 to 82.4 cents in 1941. Bobwhite quail and Chukar partridges are must more difficult to rear than are pheasants because of the extraordinary care required in producing them, and the rate of decrease in bird unit costs has not been the same as in the case of pheasants.

As this game farm was started in 1936 with complete new buildings and equipment no new improvements were made during the biennium with the exception of the replacement and installation of a Fairbanks Morse 30 K.V.A. Diesel engine and dynamo, replacing a small 10 K.V.A. unit that was traded in. This new power plant together with two other Diesels totaling 25 K.V.A. makes it possible for the Carlos Avery Farm to have electric power at all times. After the new engine had been added, a complete new exhaust system for the entire power plant was installed. These improvements have added to the efficiency of the plant and will result in some slight decrease in the future cost of production.

As in the case of the Madelia Game Farm, and because of war restrictions arrangements were made in the early part of 1942 to cut down production about one-third. About 12,000 quail and 18,000 Chukar partridges will be reared and released in the late summer and early fall of 1942.

In 1941 because of a surplus of quail eggs and not enough equipment to rear a total hatch, arrangements were made with the Watkins Company of Winona to rear surplus birds for release in Winona County. Of a total of 2,799 quail hatched and sent to the Watkins Farm, 2,552 were reared by one of our gamekeepers and released in Winona County. A surplus of 6,662 quail eggs were sold to the State of Iowa in 1941 and 1942. In the fall of 1941, 3,975 late quail eggs were traded to the State of Illinois for early 1942 eggs.

A total of 18,234 Chukar partridges and 23,421 quail were released in 1940, and 17,159 Chukar partridges and 21,849 quail in 1941.

Carlos Avery Nursery

This nursery was started in 1938 in which to propagate hard wood trees, shrubs and vines, upland and aquatic, for food and cover for upland game and waterfowl. It was constructed by W.P.A. with but a small cost to the state. Three cottages were built for employees. Other construction includes a garage and machine shop, a root cellar for the storage of seeds and plants, an aquatic pool for the raising of duck foods and a start on a project for the remodeling of a farm house intended as the superintendent's headquarters.

Included in the W.P.A. project were improvements of the grounds, construction of seed beds and the planting and transplanting of the various species of nursery stock. This project was discontinued June 30, 1942, leaving much uncompleted work. However, as regular employees become available it is hoped that the nursery headquarters building and most of the other unfinished work may be completed.

During 1941 148,664 seedlings of all kinds were taken from the nursery and planted on game refuges along state highways and on other tracts owned or controlled by other divisions, bureaus or departments.

In the spring of 1942, 77,558 seedlings were planted. A large portion of these were planted on state-owned game refuges and public hunting grounds under Pittman-Robertson development projects for which the state will receive reimbursement. The total plantings were to have included more than 125,000 seedlings but because of the suspension of W.P.A. and the shortage of labor less than one-half of this program could be completed.

A total of 800,000 seedlings representing 117 species of trees, food and cover plants are at present growing in the nursery. The original plan was to use most of this stock for plantings along public roads in southwestern Minnesota not only for the use of game life but to hold snow and moisture in the fields, to prevent soil erosion and generally improve farm lands.

From present indications it appears that most of this stock will have to remain in the nursery to be used on planting projects when the war is over.

Carlos Avery Game Refuge and Public Hunting Grounds

The Carlos Avery Game Refuge and Public Hunting Grounds originally embraced 8,574 acres. This area was increased during the biennial to 14,896 acres. These additional 6,322 acres of land, nearly all submarginal, cost a total of $65,000. The federal government reimbursed the state to the amount of $49,000.00 from Pittman-Robertson funds. This addition has permitted the enlargement of the game sanctuary portion to about 5,000 acres while the balance of almost 10,000 acres is public hunting grounds.

For the past several years, improvements made on this area under a W.P.A. project have made it the outstanding game refuge and public hunting grounds of the country. The improvements include approximately 30 miles of new roadways and fire breaks; remodeling of extensive headquarters building at Camp I; wrecking of old farm buildings on purchased lands and material salvaged; planting of a quarter of a million trees, food and cover

plants during a six-year period; building of dams and dikes creating approximately 3,000 acres of aquatic fowl habitat; construction of a rail fence around a large portion of the sanctuary and the stringing of wire around the balance; placing steel posts and refuge signs around the entire area, and other miscellaneous improvements designed to benefit wildlife.

This area located as it is within one-half hour's driving time from the Twin Cities, gives opportunity for a large number of Twin City sportsmen to make several trips during each open game season where they have enjoyed excellent hunting of ducks, pheasants, and quail. The public hunting grounds have now been opened for five seasons, and have furnished sport to many thousands of Twin City sportsmen each year.

All species of game life found in Minnesota, with the exception of bear and moose, may be found on the Carlos Avery Game Refuge and Public Hunting Grounds. Comments from visitors and officials from other states would indicate that there is no other area in the country containing as large a number and variety of game species. This area should provide excellent pheasant, quail and duck hunting during the 1942 game seasons.

Thief Lake Game Refuge and Public Hunting Grounds

This area, located in northeastern Marshall County, covers approximately 16,000 acres, and is primarily a waterfowl game refuge and public hunting grounds. More and more sportsmen have been taking advantage of it each year. It is estimated that more than 20,000 duck hunters were on this area in 1941. Many of them were able to take the limit during the first few days of the open season.

Upland species are also found here. Sharptail, Pinnated and Ruffed grouse as well as moose and deer add to the wildlife resources of the area.

Improvements made during the biennial period under a W.P.A. project include grading and gravelling of about 16 miles of patrol road; remodeling of the Pratt Cabin in the south-central portion; general repairs and painting of headquarters buildings at the Thief Lake dam; planting of 1,000 trees and shrubs, and cleaning up of brush and dead and down timber.

The dam at Thief Lake will be in danger of failure during next spring's high water unless the embankments at the lower ends of the wing-walls are rip-rapped. Failure may cause loss of life and property.

A Pittman-Robertson project for the enlargement of this area to take in additional adjacent private lands including about 5,000 acres of tax-forfeited lands was prepared the early part of 1942 for submission to the federal government. This project has not been approved.

Another Pittman-Robertson project for development work on this area is pending but has been held up because of difficulty in obtaining the necessary materials. It proposes the planting of upland and acquatic foods; repairs to buildings; construction of an aquatic nursery; construction of additional fire lanes and a bridge to replace an old one across the Moose River on a main highway.

Dietrich Lange Game Refuge and Public Hunting Grounds (Kandiyohi County)

This game refuge and public hunting grounds covers only 678 acres, of which about 200 acres are game sanctuary while the balance is public hunting grounds. This is primarily an aquatic fowl area and contains almost one mile of roadway which is an excellent duck pass.

More than a thousand sportsmen take advantage of duck hunting on this area annually. There are no buildings or headquarters on this refuge. A Pittman-Robertson project was contemplated for the purchase of additional lands to square off irregular boundaries and another, a development project, was to include planting and the construction of headquarters buildings for the patrolman. These projects are held in suspension for the duration of the war.

Talcot Lake Game Refuge and Public Hunting Grounds (Cottonwood County)

This game refuge and public hunting grounds is operated jointly by the U. S. Fish and Wildlife Service and by the state. The federal government owns approximately 800 acres in the middle of the area while the state owns 1,438 acres bordering north and south on the federal lands. In order to operate the area as nearly as possible under the state-owned public hunting grounds law, the federal area is used as refuge while the bordering state-owned lands are being used as public hunting grounds.

This area provides excellent pheasant as well as duck hunting. Between 15,000 and 20,000 sportsmen hunted here during the 1941 pheasant and duck seasons.

A Pittman-Robertson Project for the planting of upland food and cover plants was completed in 1942. A total of 15,435 seedlings were planted. Proposed additional Pittman-Robertson projects for the acquisition of more lands and developments have been suspended for the duration of the war.

Whitewater Game Refuge and Public Hunting Grounds (Winona, Olmsted and Wabasha Counties)

The former Conservation Commission established this refuge and purchased 2,440 acres in scattered parcels in Winona County and a few small plots in Olmsted and Wabasha Counties. These lands generally are contiguous to the three branches of the Whitewater River. The manner in which these lands are scattered, however, makes it impossible to operate the area successfully as a game refuge and public hunting grounds. A Pittman-Robertson project was initiated in 1942 to start consolidation of lands in Winona County to be operated as a game refuge and public hunting grounds. This project has not been approved.

Crystal Springs, a part of the Whitewater area, has been turned over to the Bureau of Fisheries for the operation of trout rearing ponds.

Red Lake Game Refuge and Public Hunting Grounds

This refuge covers approximately 434,580 acres in Beltrami, Lake of the Woods and Roseau Counties. It may best be described as a combination of state-owned and statutory game refuges. In 1940, 70 square miles surrounding this area were opened to public deer hunting. The entire area is primarily suited for big game. It contains a large population of deer, a number of moose and about 10 caribou. Because of its extent, four patrolmen are employed to take care of it. Indications are that an additional ten square miles along the northeast portion of upper Red Lake may be opened to deer hunting during the 1942 season.

This refuge lies within what is known as the Beltrami Island Resettlement Area established and approved in 1934 by the Federal Resettlement Administration as a submarginal land retirement project. The federal government as a part of this project purchased 77,156 acres, much of which is within the Red Lake Game Refuge. On the completion of the development work by the federal SCS on June 30, 1940, the management of the area was assumed by the department under a 50-year lease.

During the six years in which FRA, SCS, and WPA carried on development work in the area extensive improvements such as construction of roads, fire lanes, and telephone lines; building of dams; planting of trees; construction of patrolmen's cabins and other structures has added much to aid in the administration of the area. A WPA camp was discontinued June 30, 1942. Further development work will be suspended for the duration of the war.

Statutory Game Refuges

On June 30, 1940, there were 152 statutory game refuges in the state embracing 2,787,913 acres. During the period between July 1, 1940, and June 30, 1942, 14 refuges totaling 195,294 acres were vacated. Ten new refuges totaling 11,650 acres were established during the same period, leaving 148 refuges covering 2,604,269 acres on June 30, 1942. If to this total, state parks and state owned game refuges and public hunting grounds are added, Minnesota has a grand total of 183 refuges, totaling 3,125,466 acres. In addition, there are approximately 3,000,000 acres of open water which are legal refuges for wild waterfowl. Minnesota leads all of the states in the extent of wildlife sanctuaries which accounts for its great variety and abundance of game. Exclusive of big game and of rabbits, the estimated aggregate bag for 1941 reached approximately fiv and one-half million animals of all species, probably the largest bag of any one state for that year.

The management of this extensive refuge area, so as to protect and stimulate increases in game population is a big job, and if it is to produce results requires funds sufficient to maintain an adequate organization. Only about $60,000 per year has been made available during the biennium. This is entirely insufficient to properly operate and maintain the refuges. In

fact, it is not enough to provide for their patrolling alone. Only two of the larger statutory refuges, Camp Ripley and McGrath, are being patrolled. All of the state-owned refuges, however, are patrolled.

One of the other leading game states with an acreage in refuges of a little more than one-half million acres spends more than $300,000 a year in operations.

A two-year Pittman-Robertson project to post Minnesota refuges was put into operation in July, 1940. It affects 114 areas, covering 1,329,820 acres, with an aggregate boundary line of approximately 2,600 miles. The total cost of placing steel posts with heavy metal signs on the boundaries of these refuges was estimated at $23,622.20 of which amount the federal government will reimburse the state by $17,716.65. This work could not have been done by the state alone in less than ten years without curtailing other necessary game refuge work.

Because of a bounty on wolves paid by the state, a bounty on foxes paid by a number of counties and the division's system of issuing permits for the taking of protected and unprotected species on a pelting fee basis, it has been possible to keep predatory species pretty well under control. To do this work by salaried employees paid from division funds would have cost as much or more than the total now spent to operate all refuges. This permit system has worked out very satisfactorily. On state-owned refuges

Curious

regular patrolmen do the trapping of predators and surplus species, the sale of which bring into the department about $15,000.00 each biennial period.

In addition to the permanent posting of refuges, temporary posters are placed around state parks, all of them refuges by law, and two miles outside of the city limit of Minneapolis, St. Paul and Duluth before the opening of each hunting season. Every effort is made to make it easy for sportsmen to recognize restricted lands. Separate maps of each state-owned game refuge and public hunting grounds and large maps of the state, showing all game refuges and state parks are available for those interested. At the opening of the 1942 seasons, a pamphlet giving the name, location, acreage and nearest town of each refuge may be had by hunters. They will be supplied to county auditors.

Tables 57 and 58 list all game refuges and state parks. Table 56 shows animals taken by patrolmen on state-owned refuges and on statutory refuges by permittees, and the number of wolves and foxes on which the state and counties paid a bounty during the biennium.

TABLE 56

Predators Taken on Game Refuges During Biennium

Ending June 30, 1942

	State-owned Game Refuges and Public Hunting Grounds	Statutory Refuges by 413 Permittees
House Cats	227	116
Rats	46	.....
Stray Dogs	2	1
Wolves	20	30
Mink	105	73
Weasel	510	345
Beaver	138	2
Skunk	184	160
Civet Cats	6	49
Red Fox	52	92
Grey Fox	32	43
Raccoon	26	4
Muskrats	1,190	1,657
Woodchucks	531	1
Bear	2	.....
Badger	3	1
Bay Lynx	35	4
Porcupine	81	2
Crows	749	46
Great Horned Owls	277	78
Hawks	545	11
Ferret	.....	1
Foxes for which bounties were paid by Counties		7,126
Crows for which bounties were paid by Counties		8,471
Wolves for which bounties were paid by the State		1,472

TABLE No. 57
STATE OWNED GAME REFUGES AND PUBLIC HUNTING GROUNDS

County	Name of Game Refuge	Acres	Nearest Town	Approximate Distance	Direction from town
Anoka and Chisago	Carlos Avery	14,896	Forest Lake	4	W
Marshall	Thief Lake	15,772	Gatzke	2	N
Kandiyohi	Dietrich Lange	678	Spicer	3	E by NE
Cottonwood	Talcot Lake	1,438	Fulda	6	E
Clearwater	Lower Rice Lake	1,099	Zerkel	2	W
Winona, Olmsted and Wabasha	Whitewater	2,440	Elba	2	

STATE OWNED AND STATUTORY GAME REFUGE AND PUBLIC HUNTING GROUNDS

County	Name of Game Refuge	Acres	Nearest Town	Approximate Distance	Direction from town
Beltrami and Lake of the Woods	Red Lake	434,580	Waskish	–0–	NW

STATUTORY GAME REFUGES

County	Statutory Game Refuge	Acres	Nearest Town	Approximate Distance	Direction from town
Aitkin	Floodwood	38,720	Floodwood	6	W
Aitkin and Mille Lacs	McGrath	181,760	McGrath	–0–	N
Anoka	Radisson	2,080	Coon Creek	4	E by NE
Anoka	Anoka County	16,000	Anoka	–0–	E & SE
Anoka	Fridley	2,180	Columbia Heights	–0–	N
Anoka and Isanti	Anoka and Isanti Counties	420	Bethel	1½	E
Becker	Lake Park Audubon	1,360	Lake Park	1½	SE
Becker	Silverleaf Township	2,560	Frazee	6	NE
Beltrami	Kelliher	69,000	Kelliher	4	W
Beltrami	Bemidji	45,120	Bemidji	–0–	N
Beltrami	O'Brien	23,040	Quiring	–0–	–0–
Beltrami and Cass	Star Island	666	Cass Lake	2½	N by NE
Blue Earth	Mankato	5,760	Mankato	–0–	NE
Blue Earth	Minnesota Lake	1,600	Minnesota Lake	10	NE
Blue Earth	Lily Lake Waterfowl	400	Lake Crystal	–0–	N
Blue Earth and Le Sueur	East Minnesota River	2,625	Kasota	–0–	SW
Carlton	Cloquet Forest	2,600	Cloquet	2	SW
Carlton and St. Louis	Carlton	9,120	Carlton	–0–	E
Carver and Hennepin	Minnetonka	20,020	See Hennepin Co.		
Cass	Kinnerberg	640	Leader	4	SE
Cass	Grass Lake Waterfowl	390	Schley	1½	NW
Cass	Moss Lake Waterfowl	360	Raboin	4	NE
Cass	Hovde Lake Waterfowl	700	Cyphers	4	E by SE
Cass	Drumbeater Lake Waterfowl	922	Federal Dam	2	NE
Cass and Beltrami	Star Island	333	See Beltrami Co.		
Cass and Crow Wing	Emily	7,920	See Crow Wing Co.		
Chippewa	Montevideo	1,000	Montevideo	–0–	NE
Chippewa and Kandiyohi	Chippewa and Kandiyohi	420	Raymond	–0–	NW

TABLE No. 57—Continued

Chisago	Linn Lake Waterfowl	700	Center City	1½	SW
Clay	Clay County	24,827	Felton	2	E
Clay	Eglon Township	649	Hawley	3	SE
Clearwater	Bagley	5,760	Bagley	-0-	-0-
Clearwater	Clearbrook	7,680	Clearbrook	1½	N
Clearwater and Polk	Polk-Clearwater	1,920	See Polk Co.		
Cook, Lake and St. Louis	Superior State		See St. Louis Co.		
Cottonwood	Lake Warren Waterfowl	49	Windom	1	NE
Crow Wing	Cross Lake	8,000	Cross Lake	1	E
Crow Wing and Cass	Emily	9,800	Emily	3	NE
Crow Wing and Morrison	Platte Lake Waterfowl	551	Harding	6	NE
Dakota and Hennepin	Minnesota River	1,500	See Hennepin Co.		
Dodge	Dodge County	1,073	Eden	1	SE
Dodge and Goodhue	Skyberg	9,050	Skyberg	-0-	S
Faribault	Blue Earth	1,320	Blue Earth	-0-	E
Faribault	Prescott Township	720	Delavan	-0-	S
Freeborn	Fountain and Albert Lea	15,200	Albert Lea	-0-	-0-
Goodhue	Frontenac	825	Frontenac	-0-	-0-
Goodhue and Dodge	Skyberg	590	See Dodge Co.		
Hennepin	Gleason Lake	790	Parker	-0-	W
Hennepin and Carver	Minnetonka	49,980	Excelsior	-0-	-0-
Hennepin and Dakota	Minnesota River	9,700	Bloomington	-0-	-0-
Houston	Caledonia Township	680	Caledonia	-0-	W
Hubbard	School Craft	23,040	Becida	2	SE
Hubbard	Paul Bunyan	8,960	Nevis	9	N
Hubbard	Park Rapids	1,040	Park Rapids	-0-	N
Hubbard	Sunday Lake Migratory Waterfowl	62	Hubbard	7	NE
Isanti	Lake Elizabeth Waterfowl	314	Walbo	2	S by SE
Isanti	German Lake Waterfowl	389	Tarn	1	NE
Isanti and Anoka	Isanti and Anoka Counties	440	See Anoka Co.		
Itasca	Wasson Lake	1,280	Release	8½	N by NE
Itasca	Thistle Dew Lake	2,326	Togo	5	SW
Itasca	Sawyer	4,320	Release	5	W by NW
Itasca	Pokegama	3,840	Grand Rapids	5	SW
Itasca	Grand Rapids	8,350	Grand Rapids	-0-	NE
Itasca	Owens Lake	15,360	Release	9	N
Itasca	Bearville Township	11,320	Greenrock	3	W
Itasca	Pidgeon River Flowage Waterfowl	1,300	Pinecrest	9	SE
Itasca	Lower Pidgeon Lake Waterfowl	1,100	Pinecrest	7	E
Itasca	Third River Waterfowl	4,322	Pinecrest	6	S by SE
Itasca and Koochiching	Plumb Creek	2,198	Pomroy	4	E
Kanabec	Fish Lake and Part of Ann River Waterfowl	710	Mora	1	S
Kandiyohi	Monongalia	7,680	New London	3	NW
Kandiyohi	Kandiyohi County	2,117	Thorpe	-0-	E by NE
Kandiyohi and Chippewa	Chippewa and Kandiyohi	420	See Chippewa Co.		
Kittson	Hazelton Township	23,040	Bronson	-0-	W
Kittson	Hallock Township	2,560	Hallock	-0-	-0-
Koochiching	Gowdy-Bannock Township	46,080	Big Falls	10	NW
Koochiching	U.S.F.S.A. Refuge No. 1	32,000	Frontier	2	SW
Koochiching	U.S.F.S.A. Refuge No. 2	27,840	Big Falls	16	W by NW

TABLE No. 57—Continued

County	Name of Game Refuge	Acres	Nearest Town	Approximate Distance	Direction from town
Koochiching	U.S.F.S.A. Refuge No. 3	3,840	Big Falls	18	W by NW
Koochiching and Itasca	Plum Creek		See Itasca Co.		
Lake	Castle Danger	5,000	Two Harbors	2	NE
Lake, Cook and St. Louis	Superior State		See St. Louis Co.		
Lake of the Woods	Baudette	3,200	Baudette	-0-	-0-
Lake of the Woods	U.S.F.S.A. Refuge "A"	2,560	Bankton	5	NE
Lake of the Woods	U.S.F.S.A. Refuge "B"	2,560	Faunce	7	N by NW
Le Sueur	Montgomery	1,360	Montgomery	-0-	S
Le Sueur and Blue Earth	East Minnesota River	4,875	See Blue Earth Co.		
Lyon	Marshall	1,600	Marshall	-0-	SW
Lyon	Lyon Township	640	Russell	-0-	NW
McLeod	Gopher Campfire	7,520	Hutchinson	-0-	S
McLeod	Eagle Lake Waterfowl	2,880	Stewart	5	N by NE
Marshall	Marshall County	46,080	Luna	-0-	-0-
Marshall	Marsh Grove	800	Ellerth	2	S by SE
Martin	Fairmont	8,080	Fairmont	-0-	-0-
Martin	Sherburn Waterfowl	779	Sherburn	-0-	NE
Meeker	Lake Ripley Waterfowl	1,500	Litchfield	-0-	SW
Mille Lacs	Wahkon	2,000	Wahkon	-0-	-0-
Mille Lacs and Aitkin	McGrath		See Aitkin Co.		
Morrison	Camp Ripley	12,307	Topeka	1	W
Morrison	Williams	1,200	Little Falls	-0-	NW
Morrison	Platte River Addition	2,020	Little Falls	-0-	SE
Morrison and Crow Wing	Platte Lake Waterfowl	119	See Crow Wing Co.		
Mower	Mower County	2,400	Le Roy	1	NW
Mower	Austin	645	Austin	½	NE
Nicollet	Middle Lake	915	Nicollet	3	NE
Nobles	Worthington	7,360	Worthington	-0-	-0-
Olmsted	Rochester	30,080	Rochester	-0-	-0-
Pennington	Thief River Falls	3,200	Thief River Falls	-0-	N
Pennington	Rocksbury-Smiley	46,080	Thief River Falls	-0-	S
Pine	Islands owned by N. S. P. Co.	640	Beroun	13	E
Polk	Red River	7,040	Crookston	½	E
Polk	Lake Arthur Waterfowl	760	Fertile	2½	NE
Polk	Oak Lake Waterfowl	640	Erskine	1½	E
Polk	Union Lake-Polk County Migratory Waterfowl	5	Erskine	5	NW
Polk and Clearwater	Polk-Clearwater	11,520	Gully	-0-	-0-
Pope	Glenwood	1,206	Lowry	2	S
Ramsey	Ramsey County	108,280	St. Paul	-0-	-0-
Ramsey	Hill Farm	5,000	White Bear	6	W
Renville	Bird Island	2,160	Bird Island	1	E
Renville	Norfolk-Henry	2,560	Olivia	4	S
Renville	Phare Lake Waterfowl	480	Lakeside	½	W by SW
Rice	Union Lake	1,600	Northfield	4	W
Rice	Faribault	640	Faribault	-0-	E
Rice	Cannon Valley	658	Northfield	-0-	SW
Roseau	Warroad	2,880	Warroad	-0-	-0-

TABLE No. 57—Concluded

St. Louis	Cloquet Valley	2,520	Sheils	1	N
St. Louis	Work Farm	3,200	Bartlett	-0-	E
St. Louis	Toivola	27,000	Toivola	1	W
St. Louis	Meadowlands	6,900	Birch	-0-	W
St. Louis	Chisholm	8,040	Chisholm	-0-	N
St. Louis	Twin Lake Duck	666	Mountain Iron	2½	N
St. Louis	Fayal Township	21,760	Eveleth	-0-	SE
St. Louis	Arrowhead Lake	1,315	Idington	2	S
St. Louis	Dupont	22,080	Wilpen	-0-	-0-
St. Louis and Carlton	Carlton	3,040	See Carlton Co.		
St. Louis, Lake and Cook	Superior State	1,255,480	Buyck	3	E
Sherburne and Stearns	St. Cloud	1,000	See Stearns Co.		
Sibley	Mud Lake	700	Gaylord	-0-	S
Stearns	Collegeville	2,430	Collegeville	-0-	W
Stearns	Rockville Township	1,280	Rockville	2	S by SE
Stearns	Le Sauk	1,360	Sartell	-0-	NW
Stearns	Sauk River	1,278	St. Cloud	-0-	NW
Stearns	Stearns County	1,640	Kimball	-0-	S
Stearns	School Section Lake Waterfowl	564	Kimball	1½	N by NE
Stearns	Cedar Lake Waterfowl	720	Sauk Center	2	E by NE
Stearns and Sherburne	St. Cloud	858	St. Cloud	-0-	S
Steele	Medford	960	Clinton Falls	-0-	N
Stevens	Horton Township	960	Hancock	3	E by NE
Stevens	Pepperton Township	1,920	Alberta	1	N
Traverse	Taylor Township	7,520	Wheaton	9	N by NE
Wabasha	Underwood	1,440	Lake City	-0-	W
Wadena	Morgan Lake Waterfowl	70	Menhaga	½	N by NE
Waseca	Elooming Grove	23,360	Waseca	1½	N by NE
Washington	Mahtomedi-Lincoln Township	7,600	Mahtomedi	-0-	-0-
Washington	St. Croix River	3,000	Marine	-0-	N
Washington	Afton and Denmark Township	1,521	Afton	1	S
Washington	Stillwater	4,479	Stillwater	1	N by NE
Wilkin	Connelly Township	2,814	Breckenridge	1	N
Wilkin	Sunnyside Township	640	Breckenridge	4	E by SE
Winona	Gilmore Valley	8,425	Winona	-0-	SW
Winona	Wiscoy Valley	2,580	Hart	2	E by SE
Wright	Clearwater	1,542	Annandale	1	N
Wright	Howard Lake Waterfowl	650	Howard Lake	-0-	N
Yellow Medicine	Hanley Falls	1,200	Hanley Falls	3	W

TABLE No. 58

MINNESOTA STATE PARK GAME REFUGES

County	Name of State Park	Acres	Nearest Town	Approximate Distance	Direction from town
Redwood	Alexander Ramsey	185.38	Redwood Falls	-0-	-0-
Houston	Beaver Creek Valley	325.17	Caledonia	2	W
Clay	Buffalo River	281.46	Moorhead	13	E
Lyon	Camden	469.96	Russell	1	N by NE
Brown	Cottonwood River	836.48	New Ulm	-0-	S
Lake	Gooseberry Falls	637.83	Castle Danger	2	SW
Chisago	Interstate	154.00	Taylor Falls	-0-	S
Clearwater, Hubbard and Becker	Itasca	31,816.00	Park Rapids	15	N by NW
Carlton	Jay Cooke	8,126.57	Duluth	4	W
Winona	John A. Latch	350.20	Altura	5	W
Steele	Kaplan Woods	180.00	Owatonna	-0-	S
Chippewa and Lac qui Parle	Lac qui Parle	Est. 470.00	Watson	3	NW
Beltrami	Lake Bemidji	205.48	Bemidji	4	S by SW
Douglas	Lake Carlos	403.56	Alexandria	10	N
Murray	Lake Shetek	184.62	Currie	2	N by NW
Marshall	Middle River	285.00	Newfolden	11	W
Blue Earth	Minneopa	110.24	Mankato	3	W
Itasca	Scenic	2,121.30	Big Fork	3	W by SW
Kandiyohi	Sibley	354.59	New London	5	W by NW
Kittson	Two Rivers	711.76	Bronson	1	SE
Winona	Whitewater	688.28	Altura	4	W

MINNESOTA STATE MEMORIAL PARKS

County	Name of Memorial Park	Acres	Nearest Town	Approximate Distance	Direction from town
Renville	Birch Coulee	82.00	Morton	1	N
Morrison	Charles A. Lindbergh	110.42	Little Falls	-0-	S
Nicollet	Fort Ridgely	224.80	New Ulm	15	SE
Swift	Monson Lake	198.95	Benson	15	E

MINNESOTA STATE RECREATIONAL RESERVES

County	Name of Reserve	Acres	Nearest Town	Approximate Distance	Direction from town
Rock	Mound Springs	194.90	Luverne	4	N
Stevens	Pomme de Terre	363.51	Morris	1	SE
Pipestone	Split Rock Creek	221.64	Ihlen	1	E

TOTAL ACRES EQUALS 50,294

Annual Food Plots of Cane and Millet

During the biennium 6,180 acres of black amber cane and 5,280 acres of white Proso millet were planted by farmers in plots ranging from one-half acre to two acres over the state for the use of birds during winter months.

The sportsmen of Minnesota owe much to our farmers who have proved themselves also to be real sportsmen in the extent to which they are responding to the need of food and cover for game. The program of annual planting of feed to be sought and eaten by the birds in the fields rather than of artificial feeding of grains in feeders and feeding places was inaugurated in 1935. The cost of artificial feeding of game during the winter of 1934-35 for instance was $21,761 to the state while sportsmen's clubs spent an additional $15,000. Very little artificial feeding has been necessary since that year, the average annual cost having dropped to about $400 and this spent mostly on the feeding of deer. A map, Figure 6, shows the acreage planted to cane and millet and the counties participating in the program.

Complaints of Damage by Wildlife

The warden service, in addition to its numerous other duties, has been investigating complaints of damage by wildlife to agriculture and in cases, damage to automobiles colliding with deer. The research unit of the Bureau has been taking over investigations where specialists were required.

In most of the cases of complaints, damage had actually been done. It has been difficult in most cases to give any immediate relief. Deer because of their abundance come in for most of the complaints. No solution is in sight under present laws which authorize an open deer season only once in two years.

Beaver complaints run second. Under the present permit system and open seasons, however, they can be kept fairly well under control.

Complaints on pheasant damage come third. The warden service investigated 186 complaints during the biennium. In the case of pheasants, however, lengths of open seasons and bag limits can be made to meet the situations that arise. To this end the legislature should authorize the Director to fix seasons and set bag limits based on populations at each season. At present, the season is limited to 23 days and a bag of three per day.

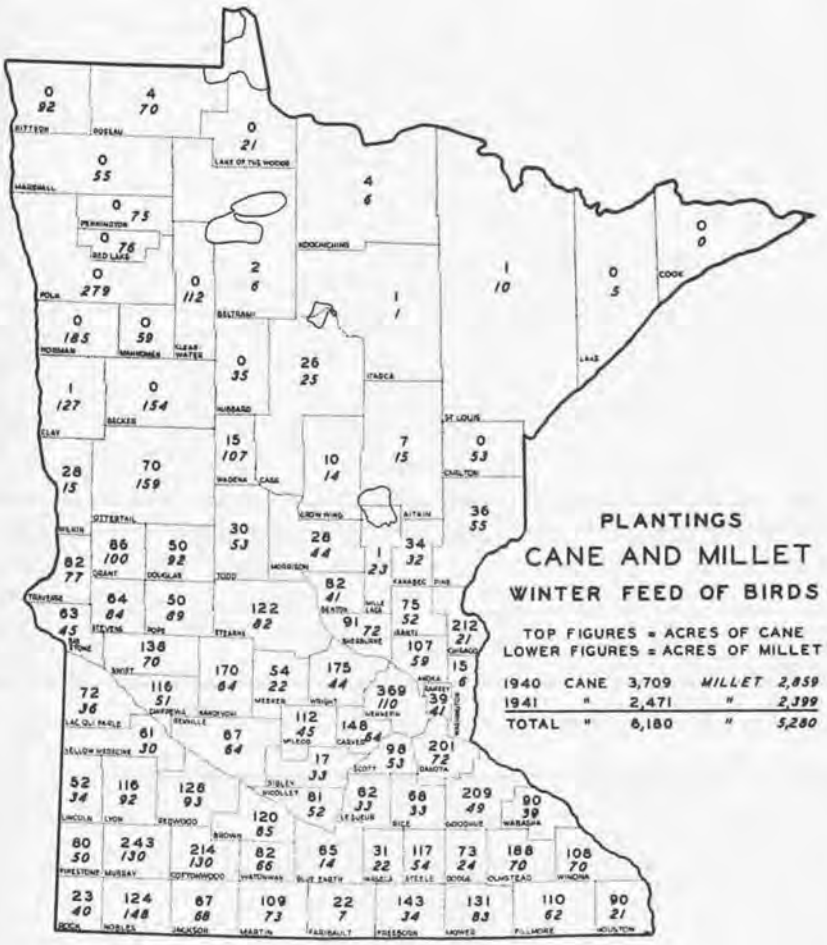
Other complaints are mostly the result of damage to poultry or livestock by protected and unprotected fur bearers such as weasel, mink, skunk, raccoon, wolves and foxes. As there are few people who desire the same degree of protection for these species as for deer, pheasants and other game varieties that may be taken and used for food, their control is not so difficult.

Probably the most effective and economical plan to adopt to control damages from protected wildlife would be one similar to that proposed in the "Farmer Sportsmen Indemnity Bill" introduced in the 1941 Legislature but not enacted. It proposed a 25-cent stamp to be purchased by hunters and trappers, the money thus collected to be earmarked for damage payments to agriculture. The sportsmen at that time backed this measure and felt it was a step in the right direction. A measure of this kind would

undoubtedly assist in creating a more friendly relationship between farmers and sportsmen and would bring about better control of over-abundant species.

Table 59 shows by counties the number of complaints of damage caused by deer, received from 1936 to 1941. It is to be noted that most of the counties listed are located outside of the former deer range.

FIG. 8



Map of Minnesota Showing Bird Feed Plantations

TABLE 59

Wardens' Reports of Deer Damage

Calendar Years 1936-1941

Kittson	47	Douglas	1
Roseau	6	Todd	89
Lake of the Woods	5	Morrison	42
Koochiching	3	Mille Lacs	4
St. Louis	126	Pine	7
Lake	1	Big Stone	1
Cook	3	Stevens	3
Polk	53	Pope	10
Pennington	1	Stearns	19
Red Lake	1	Sherburne	7
Norman	35	Isanti	8
Hubbard	2	Chisago	7
Cass	1	Lac Qui Parle	2
Itasca	67	Swift	5
Clay	17	Kandiyohi	55
Ottertail	241	Wright	1
Wadena	39	Anoka	131
Crow Wing	1	Washington	3
Aitkin	68	Martin	2
Carlton	71	Houston	6
			1,191

Beaver damage complaints, 1940 and 1941—502.
Pheasant damage complaints, 1940 and 1941—186.

TABLE 60

Deer Killed by Automobiles, by Counties

Calendar Years 1940-1941

Kittson	8	Crow Wing	7
Marshall	9	Traverse	13
Pennington	12	Grant	28
Red Lake	1	Douglas	44
Polk	38	Todd	33
Norman	13	Morrison	32
Mahnomen	2	Kanabec	7
Clay	32	Mille Lacs	42
Becker	43	Big Stone	1
Ottertail	161	Pope	23
Wadena	11	Stearns	45
Sherburne	29	Redwood	3
Anoka	12	Nobles	1
Chisago	27	Cottonwood	1
Washington	2	McLeod	4
Ramsey	1	LeSueur	1
Hennepin	7	Dakota	1
Wright	13	Steele	1
Kandiyohi	41	Olmsted	1
Swift	7	Wabasha	4
Chippewa	11	Winona	7
Yellow Medicine	1	Fillmore	1
Lyon	5	Houston	2

Game and Improved Hunting Conditions are Being Maintained

In 1915, the first year of the general hunting license law, approximately 40,000 small game hunting licenses were sold. The number gradually increased until in 1926, the first year open to pheasant hunting, when 126,676 licenses were sold. In 1927, with no open season on pheasants, the number decreased to 117,016. With an open season in 1928, it again increased to 139,156. In 1929, with no open season, the number dropped to 110,536. In 1930, the first big jump took place when 183,567 licenses were issued. From 1930 on there was a pheasant season each year with an abundance of birds, with an increase in license sales to 295,473 in 1941. This record speaks eloquently of the part the ringnecked pheasant has played to add to the sport of hunting in the state, also that as game life increases, the number of hunters and revenues to promote still more game increase.

Table 61 is a record of licenses sold and the aggregate bag of each species for the calendar years 1940 and 1941. Table 62 gives furbearers reported taken during the same period.

TABLE 61

Licenses Sold and Aggregate Bags

Calendar Years 1940 and 1941

	1940	1941
Licenses sold	286,993	295,473
Ducks	2,096,754	2,179,756
Shore Birds	91,820	161,055
Geese	3,365	5,556
Pheasants	1,498,000	1,790,250
Ruffed Grouse	218,000	384,110
Pinnated and Sharp-tail Grouse	125,000	135,460
Quail	7,740	8,760
Doves	31,400	24,800
Hungarian Partridge	30,600	35,200
*Cottontail Rabbits	247,700	367,000
Squirrels	301,500	377,500
*Raccoon	2,820	2,550

*Those of these species taken by trappers are not included.

Big Game

Licenses — 1940	69,290
Deer Taken	56,049
Bear Taken	623

Conservation and Sportsmen's Meetings

The Bureau was represented at 72 meetings during the biennium and staff members addressed 66 of them. The bureau keeps in touch with sportsmen and other conservation groups and attempts to contact each of them at least four times each year on game conditions, suggestions for open seasons and bag limits; cooperation with farmers on plant food plots; distribution of game birds from game farms, and planting of permanent food and cover plants for both upland game and waterfowl.

The bureau acknowledges with appreciation the splendid cooperation received from the sportsmen and farmer groups. This has made its work a pleasure. The bureau personnel is trained as servants of the people but primarily of the sportsmen who pay the bill, and all are anxious to do their part in trying to make the trip of the sportsman to the woods and fields as successful and pleasant as possible.

A separate report on the Pittman-Robertson and Game Research activities of the Bureau of Game by the Pittman-Robertson Research Project Staff is made a part thereof.

TABLE 62

Fur Animals Reported Taken

Calendar Years 1940-1941

	1940	1941
Trappers' Licenses Sold	28,945	32,500
Beaver	Closed Season	7,669
Bobcat	1,267	604
Civet Cat	3,504	8,226
Fox, gray	4,530	2,746
Fox, red, cross and silver	21,483	9,014
Lynx	3,815	138
Mink	50,287	53,657
Muskrat, spring	850,815	147,493
Muskrat, fall	.....	720,115
Opossum	.....	20
Raccoon	10,052	8,088
Skunk	130,454	136,768
Squirrel, fox	559	3,476
Squirrel, gray	934	5,893
Rabbit, cottontail	1,961	12,614
Rabbit, jack	5,868	22,561
Snowshoe Hare	1,189	17,982
Weasel	110,435	100,475
Wolf, brush (coyote)	4,049	940
Wolf, gray, timber	715	164

GAME RESEARCH[1]

Introduction

During 1940, the game research studies were continued under a cooperative arrangement with the State University.

In January, 1941, the Pittman-Robertson Surveys and Investigation Project was initiated, expanding the field of game research. The objectives were to determine the distribution and abundance of game and fur animals for the purpose of developing plans of management. A staff of two men was engaged to pursue studies in each of the fields of big game, furbearers, migratory game birds, and upland game birds. A project leader and two laboratory assistants completed the staff.

In December, 1941, all game research activities of the division were brought together under this project and all of the personnel engaged in game work other than in the Disease Investigation Laboratory were trans-

[1]Prepared by the Pittman-Robertson Research Project staff

ferred to it. This action reduced considerably the cost of game research to the state, as under it only one-quarter of the cost is borne directly by the Division. The disease investigation studies under Dr. R. G. Green, of the state university, have continued independently as a unit during the biennium and is not a Pittman-Robertson project.

The research studies which have engaged the bureau during this biennium are discussed under the captions of the species with which they deal. Cooperation has been received from the U. S. Fish and Wildlife Service, U. S. Forest Service, Soil Conservation Service, the CCC, the NYA and the WPA. Without the help of these agencies, activities would have been much more limited.

Deer

This report will not deal with the detailed description of the methods used in deer research studies, the areas covered, or the technic used. The following summary, however, is presented to state tersely some of the observations and conclusions brought out by the studies.

1. The present methods of regulating the deer herd does not reduce the population but the harvesting of a larger number of animals may be made to conserve this resource against heavy losses from natural causes.
2. During the years 1936 and 1938 the winter kill was twice as great as the hunting kill for these same seasons.
3. The winter range of the deer is heavily overstocked, mortality is great from starvation and malnutrition and much more hunting pressure is necessary to keep the population at a level to insure a sustained winter food supply.
4. During the open season of 1940, only 9 to 13 per cent of the population was harvested by hunters, where as a matter of fact, twice this number could have been taken without endangering this resource.
5. Because of the mildness of the winters of 1940, 1941 and 1942, there was little mortality during these seasons.
6. Deer are expanding southward into agricultural areas, where these animals have not been since pioneer days and are causing damages to crops, in some cases, of considerable concern. The liberalization of hunting restrictions and legalizing open seasons in complaint areas appears to be the only practical remedy to control crop damages.
7. The high proportion of bucks to does taken by hunters is a reflection of the selectivity by the hunter rather than an indication of a surplus of bucks over does. This is supported by census studies, which indicate a preponderance of does over bucks.
8. Efforts are being made to devise a method of conducting deer census studies requiring less manpower. The cessation of CCC has eliminated the enrollees as a source of manpower available for such censuses. Several methods are under study.

9. Figure No. 9 is a comparison between fawns, does and bucks legally killed during each of the open deer seasons from 1930 to 1940.
   The population trend from 1935 to 1941 is illustrated on Figure No. 10 together with a picture of the average number killed per section and the percentage of hunters successful. Note that in spite of seasons in 1938 and 1940 the deer population continued to climb, reaching a new high in 1941.
10. Banding work carried out during the past seven years indicates that deer return year after year to the same yarding area in spite of a depleted food supply. Also, tagged deer which were shot were only an average distance of five miles away from the placing of banding.

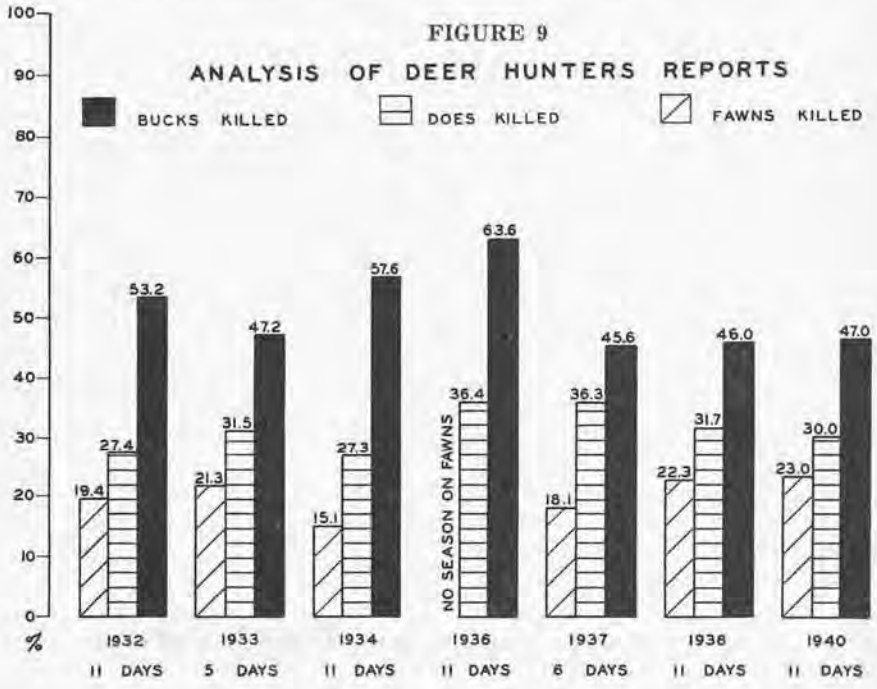
Caribou

The caribou which were imported from Canada to restock the Red Lake Game Refuge continued to show promise of becoming permanently established. Latest available estimates list the total population of this species to be approximately 15 to 18.

Elk

Indications are that the American elk is now successfully re-established in northwestern Minnesota. During the past two years a further dispersal of this species from the point of release has been noted. This fact makes it rather difficult to estimate the population of the species at the present time, but it is felt that there are now between 75 and 125 elk in Minnesota.

FIGURE 9



Moose

To the best of our knowledge, the condition of the moose remained unchanged. Several sick moose have been reported during the past biennium. Where possible, intensive pathological investigations have been made in cooperation with the Division of Veterinary Medicine, University of Minnesota.

Bear

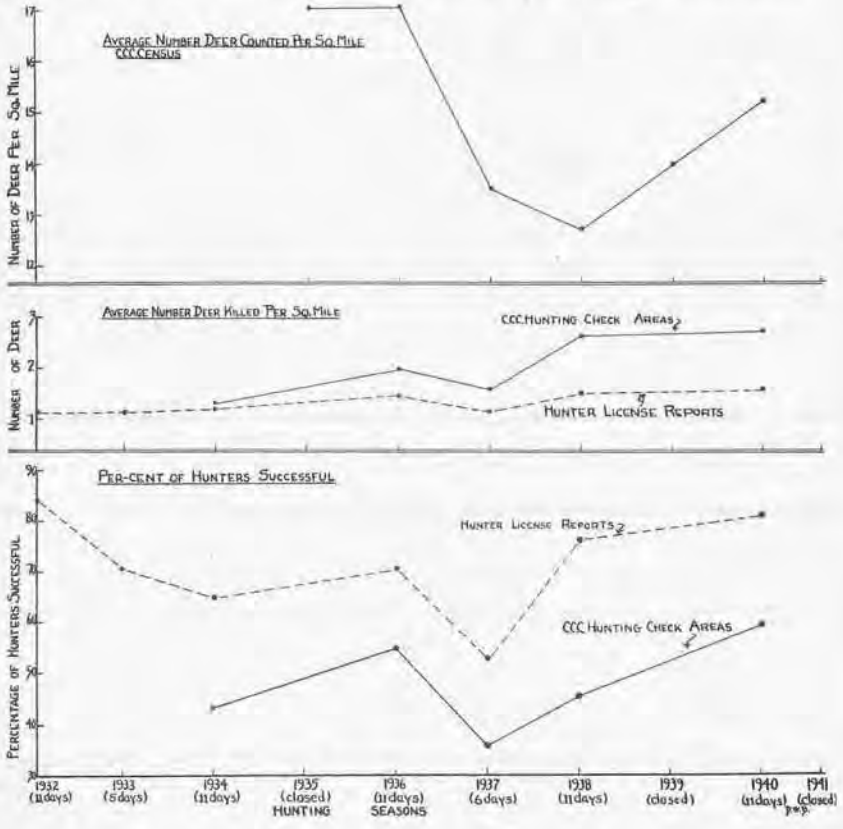
Bear have shown an increase during the past two years. In some areas, considerable damage to livestock has been reported.

Beaver

State game wardens and the CCC cooperated with the Research Bureau in a state-wide survey of the beaver population in 1940. Recognizing the need for a more rapid beaver survey technic, 88 townships, representing a 10 per cent sample of the normal beaver range, were selected by a biologist in cooperation with local game wardens. Beaver colonies outside the proper

FIG. 10

COMPARISON OF DEER CENSUS & AVERAGE LEGAL TAKE WITH HUNTER SUCCESS — 10 YEAR PERIOD



range, that is, in agricultural areas, were tallied 100 per cent by local wardens. Salient findings relative to beaver research are briefly enumerated below:

1. The active beaver colonies, amounting to 8,000, were recorded for the state as a whole in 1941.
2. The 1939 season occurred in early May. Conditions were so favorable that an excessive take of 11,048 beaver was made. There was no season in 1940.
3. The 1941 beaver season opening in late March was difficult because of high water conditions encountered with the spring break-up. Seven thousand, six hundred sixty-nine beaver were trapped, an average of 2.86 per trapper.
4. The 1942 season was opened early in March to conform with seasons in Wisconsin, Michigan and New York, and to eliminate spring break-up difficulties. Most trapping had to be done through the ice and inexperienced trappers had poor success. Though the entire state was opened for a fifteen-day season, only 4,259 beaver were taken, an average of 1.4 per trapper.
5. Like deer, beaver have greatly extended their range into the agricultural region and over 30 per cent of these colonies caused considerable destruction to crops, timber and pasture. The only logical control is by opening these complaint areas to trapping.
6. Studies on beaver carcasses during both seasons indicate that about 53 per cent of the animals caught are females, nearly 40 per cent were adults and the percentage of adult females bearing young was about 65, having on an average of 5.4 young per litter.

Muskrats

Muskrat studies were concerned with pre-seasonal population surveys as a basis for trapping regulations, success of trappers and evaluation of the catch.

1. The 1941 muskrat season declared for a limited territory in east-central and southeastern Minnesota resulted in an average catch of 48.7 rats per trapper.
2. The key to sustained muskrat yield in Minnesota lies in an early fall or winter trapping season. Muskrats, normally dying of starvation or exposure, are thus harvested before the loss occurs.
3. Complaints on the early winter season of 1941, the first since 1925, were due largely to abnormal weather conditions which made ice unsafe for travel. Inexperience with trapping through the ice was also responsible for dissatisfaction with the season.
4. The per trap-day catch was 10 per cent greater in December than the trap-day catch in March of the previous spring, and the average catch per trapper was 20 per cent higher.
5. Approximately one million 'rats were taken in the December season. Previous high in the last ten years was in the spring of 1940, when the catch was estimated at 850,000.

6. A pelt-grading study of more than 100,000 skins revealed no loss to trappers because of lower grading by the dealers of December-caught 'rats than spring-caught 'rats.
7. A December muskrat season proved entirely practicable for Minnesota.

Other Furbearers

In addition to recording the take of other important furbearers, studies have started on the development of simple census technics for some of the more important ones, such as the mink, raccoon and skunk.

Pheasants

With the close of the 1941 season, a three-year study of pheasant habits and requirements has been completed. Basic data vital to practicable pheasant management have been collected. The following is a brief summary of conclusions reached by investigations of the past biennium.

1. Of a total of 497 pheasant nests under careful scrutiny, only 25 per cent were successfully hatched.
2. Greatest losses in nesting were attributed to activities of man, such as mowing, harvesting and burning. These factors accounted for the destruction of 30 per cent of the nests under observation.
3. The pheasant is a very careless nester. Twenty-two per cent of the nests were unsuccessfully terminated because of the laxity or promiscuity with which the pheasant went about its nesting.

Dead Male Pheasant in Roosting Position, Frozen During 1940 Armistice Day Blizzard

4. Crows, wild dogs, foxes, skunks and ground squirrels are the chief predators with which the pheasant has to contend and which destroyed 14 per cent of the nests under observation.

5. Miscellaneous factors, such as inclement weather, accounted for the remaining 9 per cent of the nests.

6. Extensive damage to pheasant nests by activities of man can be materially reduced by regulating the time of mowing and burning and by the use of flushing bars. Because roadsides are a choice pheasant location, county and state highway departments can make especially valuable contributions by using flushing bars and delaying roadside cleaning until the latest possible time.

7. Fifty to 70 per cent of the hens going into the nesting season finally succeeded in raising a brood. Though nesting losses are high, pheasants will often re-nest and succeed in bringing off a brood. Broods from re-nests are smaller and later and give rise to the impression that pheasants raise more than one brood in a season.

8. The pheasant is closely associated with corn and small grain production. Pheasants are most abundant where 56 to 68 per cent of the county area is devoted to corn and small grain crops. Dairy farming, on the other hand, is a criterion of poor pheasant range. Lack of an adequate winter supply of granivorous foods is responsible for the shortage of pheasants in some regions of the state.

9. The pheasant roadside census, rather than winter census, has proven to be a rapid and economical method for revealing the current status of the pheasant population. Table 63 summarizes the results obtained by the roadside census during the last three years.

TABLE 63

Results of Pheasant Roadside Census Compared with the Hunting Kill

Year	Miles	Sex Ratio Males to Females	Birds per Mile	Kill	Bag Composition
1939	7,094	1:1.0	1.66	1,133,625	Cocks only
1940	6,514	1:1.2	2.43	1,483,298	Cocks only
1941	6,765	1:1.6	2.17	1,790,000	One hen in possession

10. Game wardens cooperated in gathering winter sex ratio data on 17,000 to 18,000 pheasants in 1941-1942 respectively. These data supplement the roadside census to ascertain whether or not hen shooting is permissible.

11. An enormous toll was taken of the pheasant population by the 1940 Armistice Day and March storms. Investigations revealed that the damage was confined to the prairie regions of the state, where cover is very scarce and poorly distributed. Private ownership of these lands prevents the Division from making habitat improvements. Cooperative means of developing cover are being sought.

12. In spite of severe winter mortality in 1940-1941, a heavy pre-nesting population survived and the 1941 bag was the largest on record.
13. Hunting under present season limitations does not provide satisfactory control of the pheasant population in the southwestern part of the state. In spite of record-breaking bags during the last two years, coupled with severe storm losses, pheasants are extremely abundant and cause damages to crops in these areas. Legislation should be enacted to liberalize bag limits and season length.

Prairie Chicken and Sharp-tailed Grouse

Intensive studies on the distribution, abundance, habits and habitat requirements of the prairie chicken were begun in the spring of 1941. Knowledge essential to the practical management of these species is being sought. Immediate efforts concern the development of a method which will reveal the annual abundance of these species accurately and economically. The critical status of the prairie chicken demands a factual basis for season regulations.

Accomplishments and conclusions to date are enumerated below:

1. A booming ground census which has proved adequate in several other states has been found inapplicable to Minnesota.
2. Reproductive studies have been made but these have been hampered by a scarcity of birds.
3. Decline of the prairie chicken in Minnesota was brought about by a combination of overshooting and habitat destruction. One of the chief factors limiting its increase is the scarcity of unbroken prairie.
4. The sharp-tailed grouse has been maintaining itself much better than the prairie chicken. This has been due to the fact that whereas much of its habitat was destroyed, much new usable habitat has been provided by agriculture, fire and logging in the forested areas.

The effect of hunting on the recovery of these species, and the significance of the annual migration of the prairie chicken, is also being investigated.

Hungarian Partridge

Hungarian partridge information has accumulated in the course of pheasant and prairie chicken surveys. Beginning in the spring of 1942, an intensive study of its habits and requirements, present and potential range, is being made. Findings and progress to date may be briefly summarized as follows:

1. Studies reveal that the "Hun" is most successful in the prairie grain region.
2. Its future in southwestern Minnesota may be limited because of the extent to which its nests are being used promiscuously by pheasants.
3. Though the Hungarian partridge survives under intensive cultivation, heavy mortality is exacted by farming operations. Its future will depend in a large measure upon the cooperation received from the landowner.

4. An accurate, economical method of determining the current status of the population is also being sought. Observations to date indicate that a modified roadside census or bird dog census may be applicable.

Ruffed Grouse

Our work on this species during the past biennium has been concerned chiefly with obtaining census data. In cooperation with the CCC, pre-nesting censuses were made on ten sample areas in 1940 and eleven in 1941. A pre-hunting season check made on five areas in August, 1941, showed an average population of 4.7 acres per bird. This is a high population and indicates that the ruffed grouse cycle is rapidly approaching the peak.

Other studies to measure the effect of hunting on this species, especially in relation to the various stages of the cycle, are in progress.

Bobwhite Quail and Chukar Partridge

Investigations on these two species have been largely in the nature of a study of their movements and causes of mortality. Within the past two years, 8,050 quail and 2,880 Chukar partridge were banded before release. Cooperation of the Carlos Avery Game Farm staff was received in this project. Band recoveries continue to come in, and valuable information is accumulating.

Migratory Game

Investigations in the migratory game field are enumerated below:

1. Outbreaks of botulism, occurring in our waters during the summers of 1940 and 1941, and the spring of 1942, were examined on Lower Lightning, Round and Mud lakes. Five hundred and eighty-eight dead and sick ducks were found on Lower Lightning Lake and many others had perished before the outbreak was reported. One hundred nineteen sick ducks were rescued and treated. Only 14 survived. Immediate remedial measures included disposal of the dead ducks and keeping healthy ducks frightened away from the infected area by firing blank cartridges. The frightening measure proved very effective. Ninety-eight per cent of the birds found dead were of the spring hatch.

   In 1941 the only outbreak of importance occurred on Round Lake in Grant County with 978 ducks and shorebirds found dead. Sanitation measures and frightening devices were employed. These measures again proved effective.

   The outbreak at Round Lake in 1942 was of interest because it occurred so early in the season shortly after the ice melted.

2. Intensive migration studies were made in the springs of 1941 and 1942. Cooperation was received from ornithologists throughout the state. The chief value of these studies lies in completing the nation-wide picture of the pre-nesting wildlife population and in indicating the degree to which Minnesota serves as a duck breeding grounds.

3. Intensive nesting studies on 129 waterfowl nests revealed 75 per cent were successful. The skunk was the chief predator, being responsible for 25 per cent of the nest losses. All of the coot nests under observation hatched successfully. This explains, in addition to their lesser appeal to sportsmen, why coots are so abundant on our waters.

4. Brood counts on eight water areas will be of vital importance in measuring the current productivity of waterfowl in Minnesota.

5. The Talcot Lake Public Shooting Grounds was selected for environmental analysis of waterfowl refuges and public shooting grounds. At the time of this report, this area has been thoroughly examined and recommendations as to its development made. Surveys of all the others are underway and recommendations will be made as the work progresses.

6. A lead shot survey was made in the fall of 1941 to study the incidence of lead pellets in the gizzards of ducks shot in Minnesota. One thousand and thirty-six gizzards were collected from hunters in the fall of 1941. It was found that 9.3 per cent of these contained shot, but only 0.9 per cent contained a lethal dose — six or more shot. Local ducks had more shot than northern ducks and diving ducks contained more shot than the puddle ducks. Further detailed study is needed to ascertain just how many ducks die of sub-lethal doses and also how severely sub-lethal doses affect egg fertility.

7. A survey of duck hunting success was made on four areas in southwestern Minnesota during the 1941 season. Average daily bags were recorded as follows: Talcot Lake yielded 5.9 ducks, Heron Lake 8.0 ducks, Lake Ocheda 2.5 ducks and Lake Shetek 3.0 ducks per hunter. These daily averages were noted during the period between October 15th and November 13th.

Parasitological Investigations

In addition to the investigations and observations above specifically referred to, extensive studies were made in cooperation with the Department of Immunology, the Division of Entomology and Economic Zoology, and the Division of Veterinary Medicine of the University, of parasites in animals. The project included parasitological examinations of 637 mammals, 342 birds, and 59 fishes. Infestations by significant parasites were found in jack rabbit, cottontail rabbit, muskrat, beaver, mourning dove, Canada grouse, sharptail grouse, ruffed grouse and American merganser, anyone of which may prove a cause of future decimation of the species affected.

Miscellaneous

The staff contributed a large number of papers for publication. About one article a month was written for the CONSERVATION VOLUNTEER, describing the current findings. In addition, numerous talks and radio appearances were made.

Minnesota Wildlife Disease Investigation Laboratory Report[1]

During the biennium just closing, the Minnesota Wildlife Disease Investigation Laboratory has continued a broad study of wildlife disease problems, and has completed some specific projects, notably the toxicity of raw fish, such as carp, when fed to fur animals; and the investigation on the nature of the current periodic die-off of snowshoe hares. Significant progress has also been made in the study of game-bird mortalities. Analysis of data, collected on the Lake Alexander Area during the past twelve years of the cycle-study and not already published, has been brought close to completion; and, to a considerable extent, these data are now in preliminary manuscript form.

1. The Ten-Year Game Cycle

Population studies on the Lake Alexander Area, as well as general field observations seem to show that during the past two years, while the ruffed grouse populations have been on the increase, continued mortalities have held the snowshoe-hare populations at a low level. On the Lake Alexander Area snowshoe hares increased from 74 to the square mile in 1940 to 160 to the square mile in 1941, but an increased mortality in 1942 has again reduced the numbers to fewer than 100 hares to the square mile. Shock disease has been in evidence both in Minnesota hares and in a sampling of hares sent in from Michigan. It seems likely that 1942 represents a completion of the die-off period for Minnesota.

2. Lead Poisoning

Many species of waterfowl found dead have been submitted for diagnosis. The preponderant cause of mortality in this class of game continues to be lead poisoning. The gizzard of a dead swan sent in by a game warden from Alexandria in April, 1942, contained 32 lead pellets. A study of mallard ducks wintering in Minnesota has demonstrated that in a large part such birds are suffering from lead poisoning.

3. Mortalities of Wildlife

In addition to the studies on waterfowl, investigations have been conducted to determine the cause of death of numerous game birds found by wardens or submitted from game farms. Blackhead was found to be the cause of mortality among chukar partridges under control for propagation purposes. Upon our findings, game farms were able to eliminate the cause. Tularemia has been at a low ebb, with occasional cases of the disease found. During the recent epidemic of human encephalitis in western Minnesota due to the equine encephalomyelitis virus, a sampling of pheasants and sharp-tailed grouse from that part of the state failed to show that these birds were infected, although a sharp-tailed grouse found sick in South Dakota was reported by the U. S. Public Health Service to be infected with this disease. A considerable number of fur animals have been examined for fur farmers.

---

[1]By Dr. Robert G. Green, Professor of Bacteriology, University of Minnesota.

4. Disease Due to the Feeding of Raw Fish

For many years severe outbreaks of disease have developed on Minnesota fur farms feeding raw fish, especially carp. This condition, originally described by the Minnesota Wildlife Disease Investigation, has come to be called Chastek paralysis. The disease has now been found to be due to the destruction of vitamin B_1 when ground fish is mixed with the animal's diet. Feeding methods for preventing the disease have been worked out. In cooperation with Louis E. Wolf of the Connecticut Department of Game and Fish and Dr. Leo Alexander of Harvard University, the same disease has been identified in fingerling trout in fish hatcheries where ground fish is given as food.

5. Compilation of Data

A great mass of data collected on the Lake Alexander Area is now largely compiled, and much of it is in manuscript form. A number of additional papers based on the Lake Alexander data will be published during the coming year.

Federal Aid in Wildlife Restoration Projects[1]

Since the inception of the Federal Aid in Wildlife Restoration Act, better known as the Pittman-Robertson Fund, Minnesota has participated to the full extent of available monies.

Table 64 gives the annual appropriations received by the state as its share of the apportionment.

TABLE 64

Annual Pittman-Robertson Appropriations

Fiscal Years 1939-1942

Date	Period	Amount
July 1, 1938	Fiscal year, 1939	$ 26,352.06
July 1, 1939	Fiscal year, 1940	40,860.49
Jan. 26, 1940	Additional share of 1940 apportionment	592.18
July 1, 1940	Fiscal year, 1941	74,269.58
July 1, 1941	Fiscal year, 1942	76,662.12
	Total	$218,736.43

In order to use these funds, projects must first be prepared by the Division of Game and Fish and formally submitted to the U. S. Fish and Wildlife Service for approval before expenditures can be made other than for preliminary surveys.

The costs of executing an approved project must be borne by the state which later is reimbursed to the amount of 75 per cent of qualified disbursements.

[1]By the office of Pittman-Robertson Coordinator.

Since the approval of the first project on December 21, 1938, $180,613.77 of Pittman-Robertson funds have been spent or encumbered. Adding to this the state's contribution of 25 per cent brings the total cost of all projects to $240,818.43. Table 65 lists these projects and their respective costs. Where they are still in operation the estimated or encumbered costs are shown.

TABLE 65

Approved Pittman-Robertson Projects and Federal and State Contributions to Costs

Project No.	Description	Total	Federal	State
1-D	Carlos Avery Game Refuge Posting	$ 1,387.84	$ 1,040.88	$ 346.96
2-L	Carlos Avery Game Refuge Land Purchase	9,500.00	7,125.00	2,375.00
3-L	Thief Lake Game Refuge Land Purchase	800.00	600.00	200.00
5-D	Pheasant and Quail Release in Game Refuges	12,034.36	9,025.77	3,008.59
6-L	Carlos Avery Game Refuge Land Purchase	34,323.97*	25,742.98	8,580.99
7-D	Carlos Avery Game Refuge Planting Program	5,970.81*	4,478.11	1,492.70
8-D	Talcot Lake Game Refuge Planting Program	1,327.98*	995.98	332.00
9-D	Red Lake Game Refuge—Posting, Fencing and Clearing	4,172.96*	3,129.72	1,043.24
10-D	Posting Statutory Game Refuges	24,803.31*	18,602.48	6,200.83
11-R	Wildlife Restoration & Management Planning Project, 1941	11,009.73	8,257.24	2,752.49
11-R	Wildlife Restoration & Management Planning Project, 1942	36,510.00*	27,382.50	9,127.50
11-R	Wildlife Restoration & Management Planning Project, 1943	36,500.00*	27,000.00	9,000.00
12-C	Wildlife Management Coordination Project, 1942	8,449.97*	6,337.48	2,112.49
12-C	Wildlife Management Coordination Project, 1943	11,800.00*	8,850.00	2,950.00
13-D	Thief Lake Game Refuge Development Project	18,000.00*	13,500.00	4,500.00
14-L	Carlos Avery Game Refuge Land Purchase (S. Addition)	24,727.50*	18,545.63	6,181.87
		$240,818.43	$180,613.77	$60,204.66

*Encumbered amount, project still active.

The following outlines the scope of the Pittman-Robertson Projects exclusive of those which were closed before July 1, 1941:

Project 6-L—The Carlos Avery Game Refuge Land Acquisition Project was approved January 13, 1941. To facilitate the work, it was divided into three initial segments, covering the purchase of 2,029.22 acres of land of which 1,829.92 acres already have been acquired. The final segment will add 347.34 acres for the purpose of squaring up the north half of the refuge.

Project 7D—The Carlos Avery Game Refuge Planting Program was designed for the purpose of improving upland and aquatic environments through introducing suitable plant species. The first segment, which was completed during the spring of 1942, included 55,049 trees, 4,375 shrubs and 3,200 vines for the uplands and 300 pounds of wild rice and 8,750 aquatic plants for the impounded water areas which were created under a WPA construction project. The balance of the work under this program will be completed during the spring of 1943 with the submission of a second segment.

Project 8-D—The Talcot Lake Game Refuge Planting Program, which was approved January 29, 1941, provided for the planting of trees, shrubs and vines on the highlands and aquatic plants in the marshes and lakes. There were 15,181 trees, 5,850 shrubs and vines set out in the spring of 1941. If the carp are brought under control during the coming winter, it will be possible to terminate both the upland and aquatic plantings during the spring of 1943.

Project 9-D—The Red Lake Game Refuge Clearing, Fencing and Posting Project, which was approved June 28, 1940, provided for the clearing of 102 miles of refuge line and the fencing of 38 miles of sanctuary boundary. Field work was completed in December, 1941.

Project 10-D—The Posting of Statutory Game Refuges was approved June 12, 1940, and covered the posting of 112 Statutory Game Refuges which were scattered throughout the state. The completion of this work required the use of 20,066 steel posts, 19,793 steel signs, and a total of 120,096 bolts, nuts and washers.

Project 11-R—The Wildlife Restoration and Management Planning Project began in January, 1941. As the name implies, its activities, which are state-wide, are confined to game surveys and investigations, preparation of management plans and the compilation of all records pertaining thereto. A detailed description of its organization, activities and accomplishments are described elsewhere in the report. Although this project is planned to cover a period of five years, it is necessary to renew it at the end of each fiscal year.

Project 12-C—The Wildlife Coordination Project was set up within the Division of Game and Fish to provide a single administrative unit to direct and coordinate all activities carried on under Pittman-Robertson authorization. It will remain in effect so long as its existence is justifiable and funds are available. In spite of its continuous functions, it also must be renewed at the end of each fiscal year.

Project 13-D—The Thief Lake Game Refuge Development Program, which was approved on March 13, 1942, provided for the construction of a bridge, fences and roads, the improvement of firelanes, the installation of culverts, the remodeling of buildings, landscaping, and the planting of upland and aquatic vegetation. Under the first segment, 5,760 trees, shrubs and vines have been planted together with 10,000 sago pondweed bulbs. The construction and improvement program has been inaugurated but the progress in these fields is being retarded due to the stringent restrictions which the present national emergency places on certain types of building materials.

Project 14-L—The Carlos Avery Game Refuge Land Acquisition Project (South Addition) covers the expansion of the refuge to the south to include 4,224.17 acres which are ideal for pinnated grouse and waterfowl. The first segment was completed recently with the purchase of 3,862.13 acres. With the completion of this project the refuge embraces 15,466 acres which is almost double its original size.

Proposed Projects

In view of the existing emergency, it is planned to confine our activities to those projects which do not involve materials essential to the conduct of the war. Consequently, the expansion of our game refuges to their ultimate limitations will be stressed during the coming biennium. Among the larger acquisitions which are contemplated is an addition of 4,330 acres to the Thief Lake Game Refuge and Public Shooting Grounds which, together with available tax forfeited lands, will expand the refuge to approximately 29,000 acres.

At the present time preliminary plans have been completed for the acquisition of 722 acres of land adjacent to the Crystal Springs Rearing Ponds in Winona County to be known as the Whitewater Game Refuge. From this nucleus, it is hoped, through other acquisition projects, to consolidate the scattered holdings of the Division of Game and Fish into a contiguous game refuge and public shooting grounds which will contain approximately 10,270 acres.

DIVISION FINANCES

As indicated in the tables that follow, the Division of Game and Fish had a cash balance to its credit at the beginning of the fiscal year 1940 of $203,772.47. The income for the biennium ending June 30, 1942, from all sources, was $2,658,982.02. The cost of operation for this same biennium was $1,991,252.96. After deducting the net transfers made for purposes outside of the jurisdiction of the division of $273,646.92, there remained a cash balance on June 30, 1942, of $597,855.61.

The Legislature of 1941, for the first time since 1927, made fixed appropriations for the operation of the Division of Game and Fish from receipts to accrue for the fiscal years 1942 and 1943 and provided that the receipts collected by the division not specifically appropriated or transferred shall be deposited in the State Treasury to the credit of the division.

Laws of 1941, Chapter 548, Section 37, Subdivision G, appropriated for operation and maintenance a total of $1,089,600 for the fiscal year 1942, and a total of $1,101,100 for the fiscal year 1943, both appropriations exclusive of the Pittman-Robertson Revolving Fund and the Rough Fish Removal Revolving Fund.

Recognizing the existing war emergencies the division reduced its contemplated expenditures for the fiscal year 1942, exclusive of Pittman-Robertson and Rough Fish Removal Revolving Funds, by approximately $245,000.

The Legislature of 1941 appropriated upwards of $400,000 of game and fish income for the fiscal years 1942 and 1943 for purposes over which the Division of Game and Fish has no administrative charge. These transfers are—

Conservation Administration	$ 27,750
Fire Fighting	50,000
Wolf Bounties	50,000
Bureau of Information	85,000
Legal Bureau	14,000
Stream Pollution Survey	10,000
Water Resources and Engineering	57,000
General Administration Fund (approximately)	100,000

On the face of the above list of transfers it might appear that the items all have to do with matters of prime interest to the department and, therefore, are proper. Most of them are of department-wide concern but the point is that one division, the Division of Game and Fish, is made to bear the total cost. Conceding that wildlife management and the division benefit in some degree from the uses of its funds indicated in the above list the fact remains that the other divisions of the department supported by appropriations from the general revenue fund and the public at large are in some, if not most, of the instances the major beneficiaries.

To the extent that wolves prey on wild life the funds of the Division of Game and Fish rightly should be used to control them but under its own plans and control of funds. The payment of bounties on all wolves captured in all of the counties of the state from funds paid for hunting licenses, regardless of agricultural and other interests that may well be the chief beneficiaries, is making the sportsmen carry an inequitable burden of the costs.

The Bureau of Information functions for all of the six divisions of the department as well as for a large circle of persons and agencies interested in conservation education. Yet the total cost of the bureau is taken from game and fish funds. Similarly the Assistant Attorney General for the Department of Conservation is the legal advisor for the whole department. His entire budget is charged to the Division of Game and Fish.

No one will deny the fact that the benefits derived from the general water conservation program directed by the Division of Water Resources and Engineering is public and statewide. Domestic, municipal and industrial water supplies are made more secure and dependable. The restoration and conservation of lake levels increase shore line property values and tax-yields, and create attractive environments to invite and sustain tourist trade. Increased and more uniform flows in streams add to water power and aid in waste disposal. Wild life is benefited to be sure but the assessment of a major portion of the cost of maintaining and operating this program to the sportsmen, is neither fair nor equitable.

A similar analysis of the other items could be made to show that the trend towards allotting game and fish funds for projects and programs that are of a general public concern and in the support of which public funds should share, is assuming proportions that need be analyzed and checked seriously and a fair appraisal made of the burden that should be

assumed by general taxation as against that of the sportsmen who support the Division of Game and Fish. The only fair method of dealing with this problem is an allocation, on a percentage basis, of the items of Conservation Administration, Bureau of Information and Legal Bureau to the various divisions. In such an allocation the Division of Game and Fish being without doubt the greatest beneficiary, should be made to bear not less than 50 percent of the total. On the items of Fire Fighting, Wolf Bounties, Stream Pollution and Water Resources and Engineering, the burden should be shared by the general revenue fund.

Under the limitations imposed by federal emergency measures that are becoming more and more restrictive, a sharp reduction in receipts is to be anticipated. Tire and gasoline rationing will affect directly and immediately future income from the sale of hunting and fishing licenses, particularly the revenues to be received from non-resident licenses.

With greatly reduced income it will be difficult, if not impossible, for the Division of Game and Fish to function in its most necessary fields unless the large portion of its receipts which is now being allotted by each legislature to activities outside the division's jurisdiction, is permitted to remain to the credit of the division. Not only will these funds be needed to pay current most urgent needs, but the Division in common with other governmental departments and bureaus should be permitted to accumulate reserve funds for post-war planning and contingencies.

TABLE No. 66

SUMMARY OF FUNDS

July 1, 1940 to June 30, 1941

FUNDS	Cash Balance July 1, 1940	Previous Encumbrances Liquidated	Unencumbered Balance July 1, 1940	Receipts	Debit Transfers	Credit Transfers	Current Expenditures	Cash Balance June 30, 1941	Unliquidated Encumbrances	Unencumbered Balance June 30, 1941
Game and Fish	$154,405.84	$36,327.83	$118,078.01	$985,619.97	$89,859.88	$15.07	$676,690.15	$337,163.02	$49,380.43	$287,782.59
Fish Fry Fund	1,745.63		1,745.63				98.75	1,646.88		1,646.88
State Fish Revolving	8,287.46		8,287.46	50,065.13			27,772.11	30,580.48	965.90	29,614.58
Predatory Animal Control	15.07		15.07		15.07					
Fish Lakes Improvement Revolving	6,024.48	260.32	5,764.16	892.56	5,000.00	10,000.00	9,648.30	2,008.42	625.49	1,382.9
Public Shooting Grounds	55,628.06	11,599.40	44,028.66	220,162.19	44,000.00		67,715.48	152,475.37	14,582.31	137,893.06
Mary L. Shields Award	2,113.04	440.39	1,672.65					1,672.65	342.38	1,330.27
Pittman Robertson-Research				53.04		25,000.00	10,492.98	14,560.06	685.71	13,874.35
Pittman Robertson-Refuge	18,039.67	71.31	17,968.36	5,295.99			22,320.65	943.70	2,165.51	—1,221.81
Public Hunting Grounds and Game Refuge	8,940.34	3,965.93	4,974.41	1,923.70		44,000.00	43,662.50	7,235.61	4,430.46	2,805.15
Minnesota Conservationist	1,238.06		1,238.06	105.00			23.40	1,319.66		1,319.66
Total	$256,437.65	$52,665.18	$203,772.47	$1,264,117.58	$138,874.95	$79,015.07	$858,424.32	$549,605.85	$73,178.19	$476,427.66

OUTSIDE TRANSFERS

Conservation Administration	$13,500.00
Fire Fighting	25,000.00
Stream Pollution	5,000.00
Wolf Bounties	8,118.00
Legislative Claims	262.64
Game and Fish Interim Commission	5,000.00
Employees Retirement Fund	2,979.24
	$138,874.95

TABLE No. 67
SUMMARY OF FUNDS
July 1, 1941 to June 30, 1942

FUNDS	Cash Balance July 1, 1941	Previous Encumbrances Liquidated	Unencumbered Balance July 1, 1941	Receipts	Debit Transfers	Credit Transfers	Current Expenditures	Cash Balance June 30, 1942	Unliquidated Encumbrances	Unencumbered Balance June 30, 1942
Game and Fish	$337,163.02	$49,380.43	$287,782.59	$791,954.56	$348,913.29	$30,835.34	$474,683.85	$286,975.35	$20,696.80	$266,278.55
Permittee Trappers Refunds				2,803.93		13,418.49	13,418.49	2,803.93	2,803.93	
State Fish Propagation	1,646.88		1,646.88	287,781.51	15,018.35	100,279.70	208,677.89	166,011.85	7,629.68	158,382.17
Fish Lakes Improvement Revolving	2,008.42	625.49	1,382.93	362.00	71.82	2,260.19	3,933.30			
Public Shooting Grounds	152,475.37	14,582.31	137,893.06	154,599.78	141,160 95	4,480.96	74,426.55	81,386.30	2,456.24	78,930.06
Mary L. Shields Award	1,672.65	342.38	1,330.27		1,330.27					
Public Hunting Grounds and Game Refuge	7,235.61	4,430.46	2,805.15	3,449.90	.75	60,001.17	51,013.31	15,242.16	3,415.71	11,826.45
State Fish Revolving and Rough Fish Removal Revolving	30,580.48	965.90	29,614.58	110,618.62	68,730.63	25,013.39	96,515.96		2,059.72	—2,059.72
State Fish Revolving and Rough Fish Removal Contract						21,470.44		21,470.44		21,470.44
State Fish Revolving and Rough Fish Removal Bullheads						20,000.00		20,000.00		20,000.00
State Fish Revolving and Rough Fish Removal Day Labor						25,000.00		25,000.00		25,000.00
Pittman Robertson-Research	14,560.06	685.71	13,874.35	40,274.14	21,282.95	10,000.00	28,537.22	14,328.32	585.20	13,743.12
Pittman Robertson-Refuges	943.70	2,165.51	—1,221.81			71,282.95	39,560.76	30,500.38	27,839.24	2,661.14
L.A.C. Grant to Work Relief Project Beltrami Isl. #4				2,500.00			973.53	1,526.47	129.25	1,397.22
Beltrami Island Federal Lease				520.00			293.82	226.18		226.18
Minnesota Conservationist	1,319.66		1,319.66		1,319.66					
Total	$549,605.85	$73,178.19	$476,427.66	$1,394,864.44	$597,828.67	$384,042.63	$992,034.68	$665,471.38	$67,615.77	$597,855.61

OUTSIDE TRANSFERS

Conservation Administration	$3,316.78	$13,875.00
Fire Fighting	19,300.63	25,000.00
Wolf Bounties	1,380.00	14,241.00
Bureau of Information		42,500.00
Legal Bureau		7,000.00
Stream Pollution Survey		5,000.00
Division of Drainage and Waters		28,500.00
Department of Administration		96,780.27
State Employees Retirement		2,887.18
Soil Conservation Committee		2,000.00
	$621,826.08	$621,826.08

TABLE No. 68

EXPENDITURES BY CLASSIFICATION

Fiscal Year 1940-1941

EXPENDITURE CLASSIFICATIONS	Game and Fish Fund	Fish Fry Fund	Fish Lakes Improvement Revolving	Public Shooting Grounds	Minnesota Conservationist	Public Hunting Grounds and Game Refuges	Mary L. Shields Award	State Fish Revolving	Pittman Robertson Research	Pittman Robertson Refuges	Totals
Permanent Salaries	$385,846.05		$6,460.00	$32,976.50		$21,818.62				$1,216.25	$448,317.42
Temporary Salaries	44,023.61		1,038.20	11,902.64		7,427.64		$12,441.64	$7,333.75	3,050.20	87,217.68
Other Salaries	1,779.27		38.13					14,609.15		125.00	16,551.55
Communication	8,382.55			251.65		254.60		3.55	15.00		8,907.35
Travel	126,535.41	$98.75	1,719.94	1,857.25		6,571.80		1,449.89	2,043.39	1,940.93	142,217.36
Freight, Express and Drayage	1,394.15			74.90		344.13		1.43	33.25	747.05	2,594.91
Steam, Electricity, Gas and Water	2,823.52			1,188.90		111.66		3.85			4,127.93
Rents and Leases	777.51					103.38		32.50			—913.39
Care of Animals and Vehicles	8.50			4.50		11.50					24.50
Advertising and Publications	6,553.73				$8.40	59.85		73.80			6,695.78
Repairs and Alterations	3,746.64		16.69	883.05		499.66		10.51		67.02	5,223.57
Other Contractual Services	4,756.00			1,126.51	15.00	998.24			2.00	2.50	6,900.25
Stationery and Office Supplies	3,914.66		4.96	21.20				28.11	126.80		4,095.73
Printing and Binding	16,667.95		87.49	36.35		16.04		23.60	81.19		16,912.62
Medical and Hospital Supplies	636.90			527.28		4.60					1,168.78
Scientific, Educational Supplies	3,020.18								168.19		3,188.37
Clothing and Sewing Supplies	8,841.57		22.41	123.53							8,987.51
Provisions	1,053.53										1,053.53
Forage and Supplies for Animals	14,239.39			8,096.25		767.73			17.89		23,121.26
Fuel	10,024.46		370.89	4,874.40		1,496.26		11.30	1.47	461.76	17,240.54
Maintenance and Construction Material	3,154.40		58.76	1,619.70		1,416.86				16,851.05	23,100.77
Sundry Materials and Supplies	4,229.42		453.12	2,079.05		3,762.13		42.04	165.97	24.40	10,756.13
Annuities and Pensions	11,024.38		3.20	53.00		11.18	$342.38				11,434.14
Refunds, Awards and Indemnities	8,879.26			10,894.47		4.00					19,777.73
Buildings and Improvements	32,816.36					1,145.93					33,962.29
Motor Vehicles	2,042.65			1,720.00		884.40					4,647.05
Furniture and Fixtures	1,736.01			68.59		15.00			305.15		2,124.75
Educational and Scientific	1,617.91								535.90		2,153.81
Livestock						85.00					85.00
Other Equipment	14,672.99			1,918.07		282.75		6.64	348.74		17,229.19
Stores for Resale	871.62										871.62
Advances for Petty Cash											
Totals	$726,070.58	$98.75	$10,273.79	$82,297.79	$23.40	$48,092.96	$342.38	$28,738.01	$11,178.69	$24,486.16	$931,602.51

TABLE No. 69

EXPENDITURES OF GAME AND FISH FUND BY BUREAUS

Fiscal Year 1940-1941

EXPENDITURE CLASSIFICATIONS	Bureau of Administration	Bureau of Law Enforcement	Bureau of Fish Propagation	Bureau of Research and Education	Bureau of Information	Totals
Permanent Salaries	$61,601.16	$236,671.54	$61,565.48	$12,273.60	$13,734.27	$385,846.05
Temporary Salaries	1,835.00	1,409.30	15,456.30	21,507.70	3,815.31	44,023.61
Other Salaries	400.06	102.00	1,277.21			1,779.27
Communication	5,357.85	577.90	507.75	2.14	1,936.91	8,382.55
Travel	4,800.04	105,320.45	5,841.18	7,877.59	2,696.15	126,535.41
Freight, Express and Drayage	744.64	268.45	330.67	40.96	9.43	1,394.15
Steam, Electricity, Gas and Water		68.61	2,754.91			2,823.52
Rents and Leases	187.50	216.51	313.00	15.00	45.50	777.51
Care of Animals and Vehicles		5.50	3.00			8.50
Advertising and Publications	457.81		182.75		5,913.17	6,553.73
Repairs and Alterations	801.06	1,864.76	955.84	36.48	88.50	3,746.64
Other Contractual Services	427.41	987.33	3,282.68	46.56	12.02	4,756.00
Stationery and Office Supplies	3,147.75		18.65	242.56	505.70	3,914.66
Printing and Binding	14,602.23	30.00	147.56	90.12	1,798.04	16,667.95
Medical and Hospital Supplies	10.63		32.09	594.18		636.90
Scientific, Educational Supplies				672.22	2,347.96	3,020.18
Clothing and Sewing Supplies		8,478.75	362.82			8,841.57
Provisions			1,053.53			1,053.53
Forage and Supplies for Animals			14,017.01	222.38		14,239.39
Fuel		1,408.67	8,589.62	26.17		10,024.46
Maintenance and Construction Material		1,127.82	1,988.04	38.54		3,154.40
Sundry Materials and Supplies	106.65	448.40	3,132.52	531.85	10.00	4,229.42
Annuities and Pensions		9,851.47	1,172.91			11,024.38
Refunds, Awards and Indemnities	3,628.98	4,750.28		500.00		8,879.26
Buildings and Improvements		265.60	32,550.76			32,816.36
Motor Vehicles			2,042.65			2,042.65
Furniture and Fixtures	1,062.45		115.50	432.13	125.93	1,736.01
Educational and Scientific				784.80	293.11	1,077.91
Livestock			540.00			540.00
Other Equipment		6,402.49	7,893.06	377.44		14,672.99
Stores for Resale		871.62				871.62
Totals	$99,171.22	$381,127.45	$166,127.49	$46,312.42	$33,332.00	$726,070.58

TABLE No. 70
EXPENDITURES BY CLASSIFICATION
Fiscal Year 1941-1942

EXPENDITURE CLASSIFICATIONS	Game and Fish Fund	Permittee Trappers Refunds	State Fish Propagation	Fish Lakes Improvement Revolving	Public Shooting Grounds	Public Hunting Grounds	State Fish Revolving and RoughFish Removal Revolving	L.A.C. Grant to Work Rel. Project Beltrami Isl. #4	Pittman-Robertson Research	Pittman Robertson Refuges	Beltrami Federal Lease Fund	Totals
Permanent Salaries	$303,648.27		$72,432.71	$2,115.00	$37,437.42	$25,372.98	$10,524.76		$21,591.55	$5,960.00		$479,082.69
Temporary Salaries	14,477.98		27,154.18	54.00	11,040.22	6,466.94	41,649.92		337.50	883.20		102,063.94
Other Salaries	4,651.97		292.50		280.00	27.20						5,251.67
Communication	5,405.10		618.39		208.63	158.74	23.70		92.32	45.65		6,552.53
Travel	119,166.84		8,978.72		2,050.62	7,326 08	7,702.30		6,199.96	1,264.66		151,689.18
Freight, Express and Drayage	1,199.64		417.51	113.50	104.46	259.84	48.68		16.36	56.24		2,216.23
Steam, Electricity, Gas and Water	51.33		2,122.54		1,058.35	108.99	1.43			37.16		3,379.80
Rents and Leases	220.04		1,178.61			273.60	10.00		196.00	301.50		2,179.75
Care of Animals and Vehicles	80.50		84.25									164.75
Advertising and Publications	319.07		437.13			118.80	26.55					901.55
Repairs and Alterations	1,488.93		1,511.08		629.92	1,106.86	139.24				$293.82	5,169.85
Other Contractual Services	1,997.60		28,298.32	156.00	392.01	2,994.46	34,326.63		47.70	609.48		68,822.20
Stationery and Office Supplies	3,217.35		173.40		224.40	6.96	35.19		132.24	106.34		3,895.88
Printing and Binding	10,377.56		257.69	40.23	50.19	128.85	176.07		101.59			11,132.18
Medical and Hospital Supplies	452.03		108.47		665.39		2.20					1,228.09
Scientific, Educational Supplies	735.55		16.89						55.95			808.39
Clothing and Sewing Supplies	766.52		649.99		26.59	1,201.81						2,644.91
Provisions			45.68									45.68
Forage and Supplies for Animals	273.83		16,692.42		7,451.46	481.25			12.08			24,911.04
Fuel	1,749.51		9,861.73	45.60	4,337.07	1,408.21	537.93		7.71			17,947.76
Maintenance and Construction Material	1,149.67		5,938.72	19.70	3,527.16	3,692.70	409.11				538.65	15,275.71
Sundry Materials and Supplies	1,255.27		4,911.17	284.27	3,935.84	779.57	835.54	$1,102.78	44.90	50.00		13,199.34
Annuities and Pensions	6,030.71		179.33		152.04		98.73			736.13		7,196.94
Refunds, Awards and Indemnities	3,728.32	$16,222.42			292.30							20,243.04
Land and Interest in Land			3,573.57							56,007.93		59,581.50
Buildings and Improvements	68.70		8,182.74									8,251.44
Motor Vehicles			5,812.55	640.00		1,449.36						7,901.91
Furniture and Fixtures	494.43		1,029.11		197.53	6.47			244.00	695.98		2,667.52
Educational and Scientific	834.20		288.38						27.50			1,150.08
Livestock			469.44									469.44
Other Equipment	4,644.06		14,590.35	465.00	2,821.19	1,059.35	3,027.70		15.06	107.08		26,729.79
Stores for Resale	4,895.67											4,895.67
Advances for Petty Cash	2,000.00											2,000.00
Total	$495,380.65	$16,222.42	$216,307.57	$3,933.30	$76,882.79	$54,429.02	$98,575.68	$1,102.78	$29,122.42	$67,400.00	$293.82	$1,059,650.45

TABLE No. 71

EXPENDITURES OF GAME AND FISH FUND BY BUREAUS

Fiscal Year 1941-1942

EXPENDITURE CLASSIFICATION	Bureau of Administration	Bureau of Law Enforcement	Bureau of Fish Research	Totals
Permanent Salaries	$56,460.45	$236,937.82	$10,250.00	$303,648.27
Temporary Salaries	1,282.74	96.95	13,098.29	14,477.98
Other Salaries	.....	68.00	4,583.97	4,651.97
Communication	5,103.17	242.09	59.84	5,405.10
Travel	4,372.85	108,834.66	5,959.33	119,166.84
Freight, Express and Drayage	936.90	223.13	39.61	1,199.64
Steam, Electricity, Gas and Water	.....	51.33	.....	51.33
Rents and Leases	11.00	185.04	24.00	220.04
Care of Animals and Vehicles	.....	80.50	.....	80.50
Advertising and Publications	319.07	.....	.....	319.07
Repairs and Alterations	64.48	1,333.20	91.25	1,488.93
Other Contractual Services	420.28	1,368.70	208.62	1,997.60
Stationery and Office Supplies	2,886.79	12.91	317.65	3,217.35
Printing and Binding	10,074.00	93.11	210.45	10,377.56
Medical and Hospital Supplies	7.46	.....	444.57	452.03
Scientific, Educational Supplies	.....	.....	735.55	735.55
Clothing and Sewing Supplies	.....	716.05	50.47	766.52
Forage and Supplies for Animals	.....	.....	273.83	273.83
Fuel	.....	1,703.78	45.73	1,749.51
Maintenance and Construction Material	7.48	795.95	346.24	1,149.67
Sundry Materials and Supplies	247.04	572.06	436.17	1,255.27
Annuities and Pensions	.....	6,023.32	7.39	6,030.71
Refunds, Awards and Indemnities	3,713.64	14.68	.....	3,728.32
Buildings and Improvements	.....	68.70	.....	68.70
Furniture and Fixtures	251.94	73.00	169.49	494.43
Educational and Scientific	.....	.....	834.20	834.20
Other Equipment	.....	4,644.06	.....	4,644.06
Stores for Resale	.....	4,895.67	.....	4,895.67
Advances for Petty Cash	.....	2,000.00	.....	2,000.00
Totals	$86,159.29	$371,034.71	$38,186.65	$495,380.65

TABLE No. 72

SOURCES OF RECEIPTS BY FUNDS

Fiscal Years 1940-1941 and 1941-1942

FUND	1940-1941		1941-1942	
FISHING LICENSES				
Game and Fish Fund				
Non-resident Individual	$170,126.10		$172,166.70	
Non-resident Combination	134,833.05		153,058.95	
Non-resident Shipping Coupons	10,801.90		10,708.70	
Non-resident Short Term	202.50		279.00	
Non-resident Courtesy	3.00		81.00	
Resident Individual .50	204,049.80		7,336.35	
Resident Individual 1.00	80,683.80		269,155.38	
Resident Combination	76,854.75		212,846.10	
Fish House	9,588.90		11,040.05	
Whitefish	1,301.80		2,120.90	
Inland Herring	117.60		110.80	
International Settlers			3.00	
Tip Up	9.00		16.00	
Less Exchange on Fishing Licenses	—13,471.05	$ 675,101.15	—27,896.70	$ 811,026.23
HUNTING LICENSES				
Resident Small Game	$256,685.40		$265,621.50	
Non-resident Small Game	8,930.00		11,217.50	
Resident Big Game	124,637.40		5.40	
Resident Big Game Seals	17,319.25		.50	
Non-resident Big Game	2,180.00		.....	
Non-resident Big Game Seals	12.00		.75	
Resident Bear Hunting	162.00	409,926.05	.....	276,845.65
TRAPPING LICENSES				
Resident Trapping	$ 13,723.20		$ 25,977.60	
Special Beaver Permits			580.00	
Beaver Trapping	6,021.00		6,630.75	
Beaver Trapping Seals	7,668.00	27,412.20	4,950.00	38,138.35
GAME BREEDERS				
Game Breeders Licenses	$ 2,893.80		$ 3,481.25	
Game Breeders Tags	656.45		727.83	
Pet Permits	38.00		57.00	
Posters	5.25	3,593.50	4.00	4,270.08
COMMERCIAL LICENSES				
International Commercial	$ 5,144.00		$ 4,740.50	
Lake Superior "Masters"	755.00		720.00	
Lake Superior "Helpers"	127.50		127.50	
Non-resident Lake Superior Inland Herring	75.00		325.00	
Interstate Fishing	359.50		311.00	
Interstate Fishing Tags	111.75		84.75	
Mississippi and Minnesota Fishing	15.00		15.00	
Mississippi and Minnesota Fishing Tags	1.50		1.50	
Mussel Fishing	110.00		55.00	
Non-resident Mussel Fishing	.....		50.00	
Bait Dealers	7,692.50		7,165.00	
Lake Superior Fish Buyers	675.00		377.50	
International Fish Buyers	545.00		260.00	
Private Fish Hatchery	95.00		100.00	
Private Fish Hatchery Tags	1.25		1.25	
Resident Fur Buyers	2,671.00		5,044.00	
Non-resident Fur Buyers	700.00		725.00	
Taxidermist	204.00		114.00	
Fur Tanning and Dressing	24.00		12.00	
Wild Rice Harvesting	1,201.50		301.00	
Wild Rice Dealers	270.00	20,778.50	165.00	20,695.00
		$1,136,811.40		$1,150,975.31
License Adjustments		+1,472.44		-885.33
		$1,138,283.84		$1,150,089.98

TABLE No. 72—Continued

SOURCES OF RECEIPTS BY FUNDS

Fiscal Years 1940-1941 and 1941-1942

FUND	1940-1941		1941-1942	
COMMERCIAL LICENSES—Concluded				
Fines		$18,789.54		$20,635.59
Wardens' Costs		3,699.76		3,460.60
Seizures		11,066.70		19,880.61
Legalization of Furs		13,880.17		12,558.46
Rents		511.00		880.50
Baudette Hatchery Fees		880.00		.....
Sustenance and Lodging—Spawning Crew		501.25		.....
Miscellaneous		.50		.09
Reimbursements		2,973.95		7,341.19
Returned Checks		—3.70		+7.75
		$1,190,583.01		$1,214,854.77
Less ½ Hunting License Receipts to Public Shooting Grounds Fund		—204,963.04		—138,422.82
		$ 985,619.97		$1,076,431.95
Less 60% of Resident Fishing License Receipts to State Fish Propagation Fund		.....		—284,477.39
Total to Game and Fish Fund		$ 985,619.97		$ 791,954.56
Permittees Trappers Refunds				
Sale of Furs			$ 2,803.93	$ 2,803.93
State Fish Propagation				
60% of Resident Fishing Licenses			$284,477.39	
Baudette Hatchery Fees			920.00	
Rough Fish Removal			472.64	
Fleet Discount of Trucks			44.25	
Rents			1,215.00	
Reimbursements			652.23	287,781.51
Fish Lakes Improvement Revolving				
Rough Fish Removal	$ 42.73		$ 2.00	
Rents	812.50		360.00	
Reimbursements	37.33	892.56	.....	362.00
Public Shooting Grounds				
½ Hunting License Receipts	$204,963.04		$138,422.82	
Legalization of Furs	14,418.06		13,079.40	
Rents	243.75		2,177.00	
Reimbursements	537.34	220,162.19	920.56	154,599.78
Minnesota Conservationist				
Advertisement	$ 105.00	105.00		
Public Hunting Grounds and Game Refuges				
Hay Stumpage	$ 1,693.63		$ 1,549.67	
Freight Pickup	95.43		40.50	
Rents	94.50		650.50	
Reimbursements	40.14	1,923.70	1,209.23	3,449.90
State Fish Revolving Fund				
Rough Fish Removal—Contracts	$ 18,556.70			
Bullhead Removal—Itasca	25,104.33			
Bullhead Removal—Waterville	4,066.84			
Rents	195.00			
½ Operating Expenses of Redby Hatchery	2,142.26	50,065.13		
State Fish Revolving and Rough Fish Removal Revolving Fund				
Rough Fish Removal—Contracts			$ 63,948.22	
Bullhead Removal			43,786.56	
Boxes and Cans—to be Refunded			186.14	
Rents			523.50	
½ Operating Expenses of Redby Hatchery			2,105.90	
Reimbursements			68.30	$ 110,618.62
L.A.C. Grant to Work Relief Project				
Beltrami Island #4			$ 2,500.00	2,500.00
Pittman-Robertson—Research				
Reimbursements	$ 53.04	$ 53.04	$ 19,071.19	19,071.19
Pittman Robertson—Refuges				
Reimbursements	$ 5,295.99	5,295.99	$ 21,202.95	21,202.95
Beltrami Island Federal Lease				
Land Leases		.....	$ 520.00	520.00
Total of All Receipts		$1,264,117.58		$1,394,864.44

Division of Lands and Minerals

RAY D. NOLAN, *Director*

INTRODUCTION

The Preamble to the Constitution of the State of Minnesota, which was adopted in 1857, reads as follows: "We, the people of the State of Minnesota, grateful to God for our civil and religious liberty, and desiring to perpetuate its blessings and secure the same to ourselves and our posterity, do ordain and establish this Constitution."

The full intent of this Preamble was written into Article 8, Section 2, of the Constitution. This provides that the principal income derived from State lands shall be forever preserved inviolate and undiminished. This resulted in the establishment of the Permanent Trust Funds, the annual income from which has been used for the support of our State University, our public schools and other educational institutions.

These trust funds were augmented when subsequent legislatures reserved to the state all mineral rights on state-owned land; and an additional source of revenue was provided when an amendment to Article IX of the constitution was adopted in 1924. This stipulated that one-half of the occupational tax paid on iron ore was to be added annually to the public school and university trust funds.

On June 30, 1942, the State Treasurer reported that the permanent trust funds of the state totaled $115,387,307, distributed as follows:

Permanent School Fund	$ 90,989,270
Permanent University Fund	12,696,124
Swamp Land Fund	11,417,856
Internal Improvement Land Fund	284,057
Total Permanent Trust Funds	$115,387,307

During the two years ending June 30, 1942, the revenue derived from the sale and lease of lands and minerals totaled $8,219,136.00, and over $8,200,000.00 of this revenue was added to the permanent trust funds of the state.

Table 72-a is a record of the revenue collected for each fiscal year:

Table 72-a

Revenue Collected During Biennium

	Fiscal Year Ending June 30, 1941	Fiscal Year Ending June 30, 1942
Land Lease Rentals	$ 40,883.29	$ 36,331.74
Sale of State Lands and Buildings	107,965.15*	76,482.82*
Interest on Land and Bldg. Contracts	73,691.43*	69,988.59*
Royalties from State Mineral Leases	3,532,146.52	4,286,847.05
Iron Ore and Gold Ore Permits	100.00	3,700.00
Totals	$3,754,786.39	$4,473,350.20

*Figures obtained from State Auditor, to whom payments are certified by County Auditors.

Laws of 1937, Chapter 310, provides that the Division of Lands and Minerals shall have administrative authority over all state lands and minerals, with the exception of land located in state forests.

All mineral permits and leases are issued by this Division, and operations under such permits and leases are subject to inspection by its mining engineers.

Records are kept of all ore shipped to determine royalty payments, and all crude ore which is not shipped direct is weighed by our weighmasters before being concentrated. Lean ore which cannot be shipped is held in reserve in separate stockpiles, according to structure or chemical properties, so that it may be recovered by beneficiation at some future time.

A research laboratory is maintained at Hibbing to develop methods for concentrating low grade iron ore and taconite and to conduct research tests on the ore material that is mined and stockpiled from our active mines.

Some research work has also been done to promote the commercial development of our large state-owned peat beds, and geophysical surveys are also being conducted by this section in an effort to locate precious minerals in northern Minnesota.

Surface rights are leased by the Division for various purposes. State trust fund agricultural lands which are not isolated are appraised, advertised and offered for sale. Interest delinquent lands, sold under certificate of sale, are checked annually and collections supervised.

The Division is also charged with the administration of tax forfeited lands in the Red Lake Game Preserve, which is located in Beltrami, Koochi-

Coons Mine Showing Truck Operations

ching and Lake of the Woods Counties, and tax forfeited lands in the four conservation areas which are located in Aitkin, Mahnomen, Marshall and Roseau counties.

Under the authority of the Land Exchange Commission, the Division also appraises and investigates state-owned land and other lands which are subject to exchange under Laws of 1941, Chapter 393.

Tax Forfeited Land Project

Up to May 1, 1942, approximately 7,000,000 acres of privately-owned land forfeited for taxes in 76 counties. Most of this forfeiture took place in northern Minnesota.

For several years the Work Projects Administration has had a statewide Tax Forfeited Land Project in Duluth. This project was sponsored jointly by the Division and Saint Louis County.

Graphs and charts showing the percentage of forfeiture in each township were prepared, and two sets of colored maps were completed showing the location of the tax forfeited land in each county. One set of these maps will be kept on file in the Division's Saint Paul office, and the other set will be made available to county boards in connection with their land use and zoning program.

These maps and records will have a permanent value in the future classification of land within the state. Acknowledgment is made to the officials of Saint Louis County who assisted in sponsoring this project, and to the officials of the Work Projects Administration for the fine cooperation the department received in completing this project.

Iron Ore Production

Due to the emergency demand for iron ore and to the progressive iron ore royalty law which was passed by the last legislature, production of iron ore from state-owned mines reached a new high for the biennium of 32,000,000 tons. This exceeds the best previous two-year production by 13,000,000 tons.

Twenty state-owned mines were active in producing this ore. The most interesting and gratifying phase of this production, from a conservation angle, is the fact that the production of low grade ore from state-owned mines is constantly increasing. Twenty-seven per cent or 2,834,757 tons of the 1939 production was low grade ore which had to be concentrated before being shipped. In 1940 this percentage increased to 32 per cent or 4,475,447 tons, and in 1941 to 47 per cent or 7,925,000 tons.

Iron Ore Reserves

Over 200,000,000 tons of royalty iron ore was produced from state-owned mines up to June 30, 1942. Our present State reserve of iron ore consists of 83,000,000 tons of merchantable and sub-standard ore than can be shipped direct, and 27,000,000 tons of low grade iron ore which can be concentrated.

About 100,000,000 tons of this reserve was under permit or lease on June 30, 1942. The remaining reserve of 10,000,000 tons, which is not under lease, consists mainly of underground ore.

In addition to this commercial reserve of iron ore, the state owns about 10 billion tons of iron formation or taconite, containing an estimated 30 per cent of iron, which is not being mined for commercial use at the present time.

There are also 37,000,000 tons of lean ore and taconite stored in stockpiles on state-owned land. A good portion of this material will probably be concentrated and shipped.

Iron Ore Royalty Laws

State iron ore lands are leased to operating mining companies for a period of 50 years at a minimum royalty per ton which is based on the iron content of the ore.

Up until 1941 the state royalty law which was in effect provided one schedule of royalty for all iron ore, regardless of its accessibility or structure or whether it had to be mined by underground or open pit methods. As the royalty schedule under this law was too high to encourage the mining of low grade or underground ore, only 12 leases were issued during the 20-year period prior to 1941, and iron ore was produced from only four of these leases.

In 1941, in order to promote the development and mining of low grade and underground ore, a new royalty law, Chapter 546, was passed by the Minnesota legislature. This law provides for a lower rate of royalty on all iron ore except open pit ore which is shipped direct to the furnaces, and that the royalty per ton may be applied to the ore after being concentrated and prepared for shipment.

Under this new law the royalty paid by the mining companies to the state is based on the iron content of the ore when shipped. This law provides a progressive schedule of royalties for each class of ore. For example, merchantable ore or merchantable concentrates averaging 60 per cent in dried iron, provides the following minimum schedule per ton of ore shipped:

Open-pit merchantable ore	66 cents
Open-pit wash concentrates	56 cents
All other open-pit concentrates	47 cents
Underground merchantable ore	37 cents
Underground wash concentrates	31 cents
All other underground concentrates	22 cents
Taconite concentrates	13½ cents

This means that the minimum royalty rate, which is 66c per ton on open pit 60 per cent iron ore, has been reduced to 13½c per ton on taconite concentrates which contain the same percentage of iron.

As a result of the reduction in royalty rates on state-owned ore and as a result of the reduction in taxes on low grade ore and taconite, new mines are being developed and some of these produced ore during the season of 1941.

A schedule of minimum iron ore royalty in cents per ton, under Laws of 1941, Chapter 546, is shown in Table 73.

Under our present state law, 78 permits to prospect for iron ore and taconite have been issued, and 35 of these permits have been converted into taconite mining leases and 9 into iron ore mining leases.

TABLE No. 73

MINIMUM IRON ORE ROYALTY IN CENTS PER TON UNDER LAWS OF 1941, CHAPTER 546

DRIED IRON	Schedule 1 Open Pit Direct	Schedule 2 Open Pit Wash Concentrate	Schedule 3 Other Open Pit Concentrate	Schedule 4 Underground Direct	Schedule 5 Underground Wash Concentrate	Schedule 6 Other Underground Concentrate	Schedule 7 Taconite Concentrate
25%	12.00	12.00	12.00	11.00	11.00	11.00	.....
26%	12.60	12.54	12.48	11.39	11.33	11.22	.....
27%	13.23	13.10	12.98	11.78	11.67	11.44	.....
28%	13.89	13.69	13.50	12.20	12.02	11.67	.....
29%	14.59	14.31	14.04	12.62	12.38	11.91	.....
30%	15.32	14.95	14.60	13.06	12.75	12.14	.....
31%	16.08	15.63	15.18	13.52	13.13	12.39	.....
32%	16.89	16.33	15.79	14.00	13.53	12.64	.....
33%	17.73	17.07	16.42	14.48	13.93	12.89	.....
34%	18.62	17.83	17.08	14.99	14.35	13.15	.....
35%	19.55	18.64	17.76	15.52	14.78	13.41	.....
36%	20.52	19.47	18.47	16.06	15.23	13.68	.....
37%	21.55	20.35	19.21	16.62	15.68	13.95	.....
38%	22.63	21.27	19.98	17.20	16.15	14.23	.....
39%	23.76	22.22	20.78	17.81	16.64	14.51	.....
40%	24.95	23.22	21.61	18.43	17.14	14.80	11.00
41%	26.19	24.27	22.48	19.07	17.65	15.10	11.11
42%	27.50	25.36	23.37	19.74	18.18	15.40	11.22
43%	28.88	26.50	24.31	20.43	18.73	15.71	11.33
44%	30.32	27.69	25.28	21.15	19.29	16.02	11.45
45%	31.84	28.94	26.29	21.89	19.87	16.35	11.56
46%	33.43	30.24	27.35	22.65	20.46	16.67	11.68
47%	35.10	31.60	28.44	23.45	21.08	17.01	11.79
48%	36.86	33.03	29.58	24.27	21.71	17.35	11.91
49%	38.70	34.51	30.76	25.12	22.36	17.69	12.03
50%	40.64	36.07	31.99	26.00	23.03	18.05	12.15
51%	42.67	37.69	33.27	26.91	23.72	18.41	12.27
52%	44.80	39.38	34.60	27.85	24.43	18.78	12.40
53%	47.04	41.16	35.98	28.82	25.17	19.15	12.52
54%	49.39	43.01	37.42	29.83	25.92	19.53	12.64
55%	51.86	44.94	38.92	30.87	26.70	19.92	12.77
56%	54.46	46.97	40.48	31.96	27.50	20.32	12.90
57%	57.18	49.08	42.10	33.07	28.33	20.73	13.03
58%	60.04	51.29	43.78	34.23	29.18	21.14	13.16
59%	63.04	53.60	45.53	35.43	30.05	21.57	13.29
60%	66.19	56.01	47.35	36.67	30.95	22.00	13.42
61%	69.50	58.53	49.25	37.95	31.88	22.44	13.56
62%	72.98	61.16	51.22	39.28	32.84	22.89	13.69
63%	76.63	63.91	53.27	40.66	33.82	23.35	13.83
64%	80.46	66.79	55.40	42.08	34.84	23.81	13.97
65%	84.48	69.80	57.61	43.55	35.88	24.29	14.11

Taconite Leases

The taconite leases have been issued to two large steel companies on 3,000 acres of state-owned land containing large deposits of taconite or iron-bearing rock.

Exploration of the taconite by drilling has already been started, and both companies plan an extensive program of research to determine the possibilities of concentrating this low grade iron ore material on a commercial basis.

Taconite is a local name for the original iron formation or rock from which our iron ore is derived. Where nature did not complete the concentration of this material, the iron and silica are closely knit together, and any process that is developed to separate the iron from the rock will be costly.

Under any plan for beneficiating this material, it will require at least three tons of ore to make a ton of high grade concentrates, as the taconite in place contains as little as 28 per cent in iron.

If methods for concentrating this material at a profit can be found in the next few years, large concentrating plants will undoubtedly be constructed on the Mesabi Range.

These two companies started their program of exploration and experimentation after they had been assured by the State that they would be given every encouragement. This encouragement is evidenced by the action of the Legislature of 1941 in providing a low royalty rate of about 13c per ton for taconite concentrates and a tax rate that will not exceed 6c per ton on the finished product.

Minnesota's reserve of high grade ore is rapidly being depleted as the state is now furnishing about 70 per cent of the nation's iron ore requirements. If taconite can be successfully treated, millions of tons of iron ore will be added to our reserve, employment on the Iron Range will be increased, and many years will be added to the life of our Minnesota mining industry through the conservation of high grade ores.

Gold Prospecting Permits

During the biennium several permits to prospect for gold were issued but very little prospecting was done under these permits and none were converted into leases. Only one gold lease is in effect at the present time. Some manganese ore has been encountered on this lease, but gold in commercial quantities has not been discovered.

Cuyuna Range Manganese Ore

Ferro-manganese is indispensable in the manufacture of steel. Before the war 97 per cent of our high grade manganese was shipped in from foreign source. Since our foreign supply has been cut off, the federal government has been investigating the possibilities of developing a source of high grade manganese in the United States.

Minnesota is particularly fortunate in having one of the largest deposits of low grade manganese ore in the United States. This deposit is located on the Cuyuna Range; and while methods for concentrating this ore into a higher grade manganese product have been developed, the federal government is not utilizing this ore, despite the apparent shortage of ferro-manganese and the efforts of the state to obtain a manganese concentrating plant for Minnesota.

Pilot plants and commercial plants are being erected in other states, and the press has reported at various times that a commercial manganese plant would be erected in Minnesota, but to date no definite action has been taken. Further efforts should be made to interest the federal government in erecting a manganese concentrating plant on the Cuyuna Range.

Engineering and Research Building

The 1941 Legislature appropriated $75,000 for the erection of an Engineering and Research Building at Hibbing. However, this appropriation carried the provision that the money would not be available until the old building had been sold.

The mining companies who have been buying private property under the North Hibbing Purchase Plan were not interested in the purchase of public buildings, and a satisfactory sale of our present building could not be made.

Our present research and engineering quarters at Hibbing are inadequate, and provision should be made in the future for a new building. No request will be made for a new building appropriation during the present war emergency.

Mineral Reservations on Tax Forfeited Lands

Laws of 1935, Chapter 386, which is an act relating to the leasing and sale of tax forfeited lands, provides as follows: "Any sale of such forfeited lands shall be subject to exceptions and reservations in this state, in trust for the taxing districts of all minerals and mineral rights."

This means that minerals on certain tax forfeited land are held in reserve by the state, but no provision has been made for the sale or lease of these minerals.

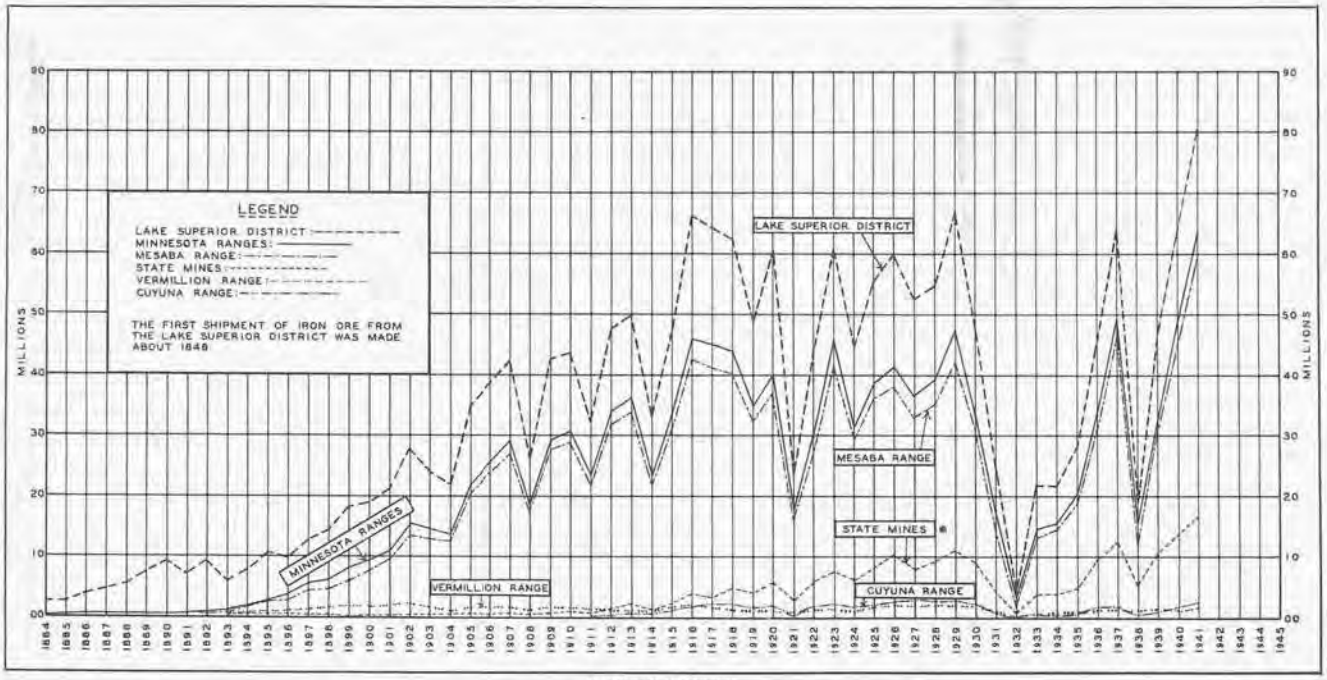
A bill authorizing the state to lease tax forfeited minerals was submitted to the last session of the legislature, but was not approved as some of the counties in which minerals are located were not in accord with the revenue distribution of this law.

A new bill should be submitted to the legislature which will be satisfactory to the state and to Saint Louis, Itasca, Crow Wing, Aitkin and other mineral counties.

Additional legislative recommendations will be found in the Land Section of this report.

This Statistical Report of the Division of Lands and Minerals has been divided into three sections: One on Lands by F. B. Getchell, Deputy Director; one on Minerals by Dick Mitchell, Chief Engineer; and one on Research by M. P. Walle, Chief Research Engineer.

FIG. 12



Graph Showing Comparison of Iron Ore Shipments from the Lake Superior District, Minnesota, the Three Minnesota Ranges and from State Owned Mines—1928-1942

MINERALS[1]

The first iron ore was shipped from Minnesota in 1884 from what is now known as the Soudan Mine on the Vermilion Range at Tower.

The first iron ore was discovered on the Mesabi Range on the 16th of November, 1890, where the Mountain Iron Mine is now located; and the first shipment from this Range was made from this property in October, 1892.

The first iron ore was shipped from the Cuyuna Range in 1911, and came from the Kennedy Mine.

When the first ore was shipped in 1884, no mineral lease law was in existence. As a result of this first shipment and of those that followed, interest was aroused to such an extent that the Legislature of 1889, Chapter 22, provided for the leasing of State lands for exploration and development. Under this law, 872 leases were executed before it was repealed in 1907. They provided for a flat royalty of 25 cents a long ton, and were to run for 50 years. Some of these leases are still in force.

For ten years no lease law was in existence, but in 1917 the legislature enacted the lake bed lease law. Leases under this law were to run for 50 years, and the minimum royalty was to be 50 cents a ton. Two leases have been executed, and the law is still in force.

In 1921 the legislature passed a law, Chapter 412, in which the royalty was based on the iron content of the ore produced. This law was amended in 1927 by Chapter 389. Only four mineral leases produced ore under these two laws.

In 1937, the legislature enacted the lease extension law whereby leases may be extended under certain conditions. One of the provisions stipulated that application for extensions must be made on or before October 26th, 1938, or within 18 months of the approval of the act. Under this law, 12 applications were filed by lease holders. Up to the present time three applications have been accepted and conditions agreed upon; three have been rejected and six are pending.

In 1941, the legislature enacted Chapter 546 which provides for issuing prospecting permits which later may be converted into leases. This law provides for a sliding scale royalty and that in the case of wash ores, the royalty is to be applied to the concentrates rather than the crude material. It also provides for issuing permits and leases on taconite under different and more favorable conditions. Several permits and leases have already been issued.

The first ore from a state mine was shipped from the Minnewas in 1893. At that time the administration of state lands rested with the State Auditor and remained there for forty years, or until 1933.

The Division of Lands and Minerals was established by the Laws of 1931, Chapter 186. It was to have administrative authority over all state trust fund lands not located in state forests, and all minerals in state trust fund lands, wherever located. Control of these lands did not pass to the Division until 1933.

---

[1]By Dick Mitchell, Chief Engineer

TABLE No. 74

IRON ORE LEASES ON STATE SCHOOL LANDS, JUNE 30, 1942

Mine	Lease No.	Description	Lease Expires	Lessee	Sub-Lessee or Mining Co.
Alan	2003	W½ SW 2-58-18	1992	E. W. Coons Co., Inc	E. W. Coons Co., Inc.
Alan	2004	N½ SE 3-58-18	1992	E. W. Coons Co., Inc	E. W. Coons Co., Inc.
Duncan	2005	SW SW 26-58-20, SE SE 27-58-20	1992	Evergreen Mines Co	Evergreen Mines Co.
*Grant	174	NE NW, S½ NW, NW SW, 20-58-19	1965	Inter-State Iron Co	Inter-State Iron Co.
Helen	2008	E½ SE 36-57-23	1992	Butler Brothers	Butler Brothers
Hill Annex	374	SE¼ 16-56-23	1950	Arthur Iron Mining Co	Inter-State Iron Co.
Hill Annex	375	SW¼ 16-56-23	1950	Arthur Iron Mining Co	Inter-State Iron Co.
Hill Annex	377	NW¼ 16-56-23	1950	Arthur Iron Mining Co	Inter-State Iron Co.
Hill Annex	378	NE¼ 16-56-23	1950	Arthur Iron Mining Co	Inter-State Iron Co.
*Leonidas	221	NE¼ 36-58-18	1965	Rathbun Iron Mining Co	Oliver Iron Mining Co.
*Leonidas	224	SE¼ 36-58-18	1965	Rathbun Iron Mining Co	Oliver Iron Mining Co.
Martin	2006	Lot 2 16-46-29	1992	Evergreen Mines Co	Evergreen Mines Co.
**Oliver Reserve	480	SE NE 9-58-18	1952	Neville Iron Mining Co	Oliver Iron Mining Co.
**Oliver Reserve	569	SE SE 4-58-18	1952	Neville Iron Mining Co	Oliver Iron Mining Co.
**Prindle	449	SE¼ 36-59-18	1951	Neville Iron Mining Co	Oliver Iron Mining Co.
**Prindle	451	NE¼ 36-59-18	1951	Neville Iron Mining Co	Oliver Iron Mining Co.
Rabbit Lake-Bed	2	Land underlying Rabbit Lake in Secs. 20, 29 and 30, Twp. 47, R.28	1974	Youngstown Mines Corp	Pickands-Mather & Co.
Seville	2007	N½ SE 10-58-19	1992	Evergreen Mines Co	Evergreen Mines Co.
Syracuse Lake-Bed	1	Portion of several lots in Secs. 5 and 6, T. 58, R. 15	1968	VanDerlip Estate et al	
Tioga No. 2 Res	671	Lots 3, 4 and 6 26-55-26	1956	W. C. Gilbert Estate	North Range Mining Co.
Wacoutah	387	SE SW, S½ SE 3-58-18	1950	Pitt Iron Mining Co	Wheeling Steel Corp.
	652	Lots 7 and 8 36-63-16	1955	Taussig et al	
	2009	S½ SE 5-58-18	1992	Rockwell and Strand	

*Lease extended under Laws of 1937, Chapter 488.
**Lease extension application pending under Laws of 1937, Chapter 488.

TABLE No. 75

IRON ORE LEASES ON STATE UNIVERSITY LANDS, JUNE 30, 1942

Mine	Lease No.	Description	Lease Expires	Lessee	Sub-Lessee or Mining Co.
Barbara	415	E½ SE 8-56-23	1961	Butler Brothers	Butler Brothers
Draper	2001	SW NW, NW SW 10-56-23	1991	Evergreen Mines Co.	Evergreen Mines Co.
Kevin	376	SE NW, N½ SW, SW SW 1-56-23	1950	Arthur Iron Mining Co.	Butler Brothers
Majorca	456	S½ S½ 9-56-23	1952	Hobart Iron Co.	Pickands-Mather & Co.
Mesabi Chief	268	N½ SW, SW SW 23-57-22	1942	Arthur Iron Mining Co.	Hanna Ore Mining Co.
Mississippi No. 1	355	W½ NE 23-57-22	1949	Arthur Iron Mining Co.	Hanna Ore Mining Co.
Mississippi No. 2	356	S½ NW 24-57-22	1949	Arthur Iron Mining Co.	Hanna Ore Mining Co.
**Stein	282	NE NW, S½ NW 23-57-22	1943	Jacob Stein et al.	Hanna Ore Mining Co.
Sullivan No. 2	455	SW SW 2-56-23	1952	Hale and Sullivan	Inter-State Iron Co.

**Lease extension application pending under Laws of 1937, Chapter 488.

TABLE No. 76

IRON ORE LEASES ON STATE SWAMP LANDS, JUNE 30, 1942

Mine	Lease No.	Description	Lease Expires	Lessee	Sub Lessee or Mining Co.
**Scranton	392	N½ NE, SW NE 12-57-21	1950	Hoyt Mining Co.	Pickands-Mather & Co.
Smith	2002	SW NW 2-57-21	1991	Warco Holdings, Inc.	Warco Holdings, Inc.
Tioga No. 1 Res.	675	Lots 3 and 8 34-55-26	1956	North Range Mining Co.	Ford Motor Co.
**Warben	752	SW SE, SE SW 4-63-9	1957	Warben Land Co.	
Wearne	775	SW SE 2-46-29	1957	Geo. H. Crosby et al.	Hanna Ore Mining Co.

**Lease extension application pending under Laws of 1937, Chapter 488.

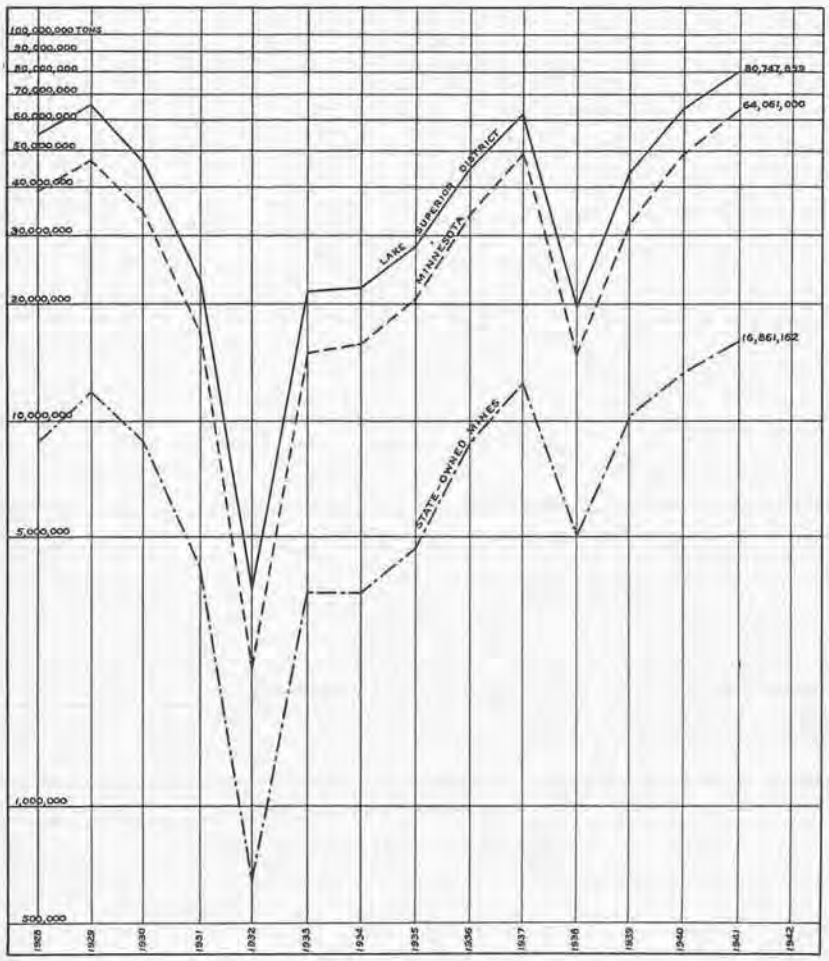
TABLE No. 77

TACONITE LEASES ON STATE LANDS, JUNE 30, 1942

Lease No.	Description	Trust Fund	Lease Expires	Lessee	Operating Company
3001	W½ NE and SE 14-59-14	University	1991	Erie Mining Co	Pickands-Mather & Co.
3002	S½ NW 14-59-14	University	1991	Erie Mining Co	Pickands-Mather & Co.
3003	SW¼ 14-59-14	University	1991	Erie Mining Co	Pickands-Mather & Co.
3004	SE NE, E½ SE, SW SE and S½ SW 15-59-14	University	1991	Erie Mining Co	Pickands-Mather & Co.
3005	SE NW 15-59-14	University	1991	Erie Mining Co	Pickands-Mather & Co.
3008	NE¼ and NE SE 22-59-14	University	1991	Erie Mining Co	Pickands-Mather & Co.
3009	E½ NE 21-59-14, NW¼ 22-59-14	University	1991	Erie Mining Co	Pickands-Mather & Co.
3010	NE¼ and E½ NW 23-59-14	University	1991	Erie Mining Co	Pickands-Mather & Co.
3011	W½ NW and SW¼ 23-59-14	University	1991	Erie Mining Co	Pickands-Mather & Co.
3006	SW¼ 16-59-14	School	1991	Erie Mining Co	Pickands-Mather & Co.
3007	SE¼ 16-59-14	School	1991	Erie Mining Co	Pickands-Mather & Co.
3012	SE¼ 36-60-14	School	1991	Erie Mining Co	Pickands-Mather & Co.
3013	N½ SW 1-58-19	School	1991	Ontario Iron Co	Pickands-Mather & Co.
3014	S½ SW 2-58-19	School	1991	Ontario Iron Co	Pickands-Mather & Co.
3015	SW SE 2-58-19	School	1991	Ontario Iron Co	Pickands-Mather & Co.
3016	NE SE 2-58-19	School	1991	Ontario Iron Co	Pickands-Mather & Co.
3017	W½ SW 9-58-19	School	1991	Ontario Iron Co	Pickands-Mather & Co.
3018	NE SW 9-58-19	School	1991	Ontario Iron Co	Pickands-Mather & Co.
3019	S½ SE 9-58-19	School	1991	Ontario Iron Co	Pickands-Mather & Co.
3020	N½ NE 10-58-19	School	1991	Ontario Iron Co	Pickands-Mather & Co.
3021	S½ NE 10-58-19	School	1991	Ontario Iron Co	Pickands-Mather & Co.
3022	S½ NW 11-58-19	School	1991	Ontario Iron Co	Pickands-Mather & Co.
3023	N½ NW 11-58-19	School	1991	Ontario Iron Co	Pickands-Mather & Co.
3024	S½ NE 11-58-19	School	1991	Ontario Iron Co	Pickands-Mather & Co.
3025	N½ NE 11-58-19	School	1991	Ontario Iron Co	Pickands-Mather & Co.
3027	E½ NW 16-58-19	School	1991	Ontario Iron Co	Pickands-Mather & Co.
3028	W½ NW 16-58-19	School	1991	Ontario Iron Co	Pickands-Mather & Co.
3029	NW NE 8-57-21	Swamp	1991	Ontario Iron Co	Pickands-Mather & Co.
3030	W½ NE 36-58-21	School	1991	Ontario Iron Co	Pickands-Mather & Co.
3031	E½ NE 36-58-21	School	1991	Ontario Iron Co	Pickands-Mather & Co.
3032	E½ SW 36-58-21	School	1991	Ontario Iron Co	Pickands-Mather & Co.
3033	W½ SW 36-58-21	School	1991	Ontario Iron Co	Pickands-Mather & Co.
3034	W½ NW 36-58-21	School	1991	Ontario Iron Co	Pickands-Mather & Co.
3035	E½ NW 36-58-21	School	1991	Ontario Iron Co	Pickands-Mather & Co.
3036	NW NW 12-58-19	School	1992	Ontario Iron Co	Pickands-Mather & Co.

These lands were given to the state by Congress for the support of public schools, a university, internal improvements and public buildings. In addition, the state was to receive all swamp and overflowed land. As a result of this legislation 8,512,149 acres were ceded to the state.

In 1903, a beginning was made towards giving local supervision to the operation of mining properties through the appointment of one man. Later, others were added as the work developed, until at this time there are 29 permanent employees. Seventeen ore weighers are also employed during the



Graph Showing Comparison of Iron Ore Shipments from the Lake Superior District, From Minnesota and From State Owned Mines 1884-1941

ore season. The permanent employees consist of engineers, assistants, chemists, inspectors, office force, mechanic and samplers who do the regular and detailed work in connection with research, surveying, inspection, mapping, estimating, office work, sampling and other duties incidental to the operation of state owned mining properties located from one end of the Mesabi Range to the other, as well as the Cuyuna Range, and operated by lessees. Some work is done, too, on the Vermilion Range in connection with lake elevations and in other parts of the state, in connection with research, leases, land, gravel pits and other matters.

An abbreviated outline of pertinent features in connection with leased mining properties that have produced iron ore during the biennium ending June 30, 1942, follows. The production figures are based on either crude concentratable ore or direct shipping ore, or both. Twenty mines produced 32,000,041 tons, as shown in Table 81.

Report on Individual Mines

ALAN MINE: Mountain Iron, Saint Louis County.

Biennial production 22,236 tons.

Operated by the E. W. Coons Company, Inc. This is the third mine to be opened up under our new 1941 royalty law. It contains a reserve of sub-standard ore and was formerly operated as the Hanna Mine by the M. A. Hanna Company.

Grant Mine Showing Conversion from Rail to Truck Operation

TABLE No. 78

IRON ORE PROSPECTING PERMITS

Issued Under Laws of 1941, Chapter 546

No.	Date	Permit Holder	Description	Property	Status	Fund
I-1036	6–12–41	David D. Haley	NW NW 21-58-19	Frantz	Surrendered	School
I-1037	6–12–41	Rockwell and Strand	S½ SE 5-58-18	W. of Mt. Iron	Lease #2009	School
I-1038	6–12–41	E. F. Remer	S½ SW 16-58-19	Portion Shiras	Surrendered	School
I-1039	6–12–41	Evergreen Mines Co.	SW SW 26-58-20, SE SE 27-58-20	Duncan	Lease #2005	School
I-1040	6–12–41	Evergreen Mines Co.	N½ NW 20-47-28	Northland		Swamp
I-1041	6–12–41	Evergreen Mines Co.	Lot 2 16-46-29	Martin	Lease #2006	School
I-1042	6–12–41	Evergreen Mines Co.	N½ SE 10-58-19	Portion Seville	Lease #2007	School
I-1043	6–12–41	Evergreen Mines Co.	SW NW, NW SW 10-56-23	Draper	Lease #2001	University
I-1044	6–12–41	Butler Brothers	E½ NE 16-58-19	Portion Woodbridge	Surrendered	School
I-1045	6–12–41	Butler Brothers	E½ SE 16-58-19	Wanless	Surrendered	School
I-1046	6–12–41	Butler Brothers	S½ SW 20-58-19	Wade Reserve	Surrendered	School
I-1047	6–12–41	Butler Brothers	E½ SE 36-57-23	Helen	Lease #2008	School
I-1048	6–12–41	Warco Holdings, Inc.	SW NW 2-57-21	Smith	Lease #2002	Swamp
I-1049	12– 9–41	Butler Brothers	SE SW 22-57-22	Congdon-Longyear	Application for lease	University
I-1050	12– 9–41	Charleson Iron Mng. Co.	NW SE 10-57-21	Carson Lake	Active	Swamp
I-1051	1–21–42	E. W. Coons Co., Inc.	W½ SW 2-58-18	Alan	Lease #2003	School
I-1052	1–21–42	E. W. Coons Co., Inc.	N½ SE 3-58-18	Alan	Lease #2004	School
I-1053	4– 2–42	Evergreen Mines Co.	E½ NE 36-56-25	Buckeye	Active	School
I-1054	4– 2–42	Evergreen Mines Co.	W½ NE 36-56-25	Buckeye	Active	School
I-1055	4– 2–42	Evergreen Mines Co.	E½ NW 36-56-25	Buckeye	Active	School
I-1056	4– 2–42	Evergreen Mines Co.	W½ NW 36-56-25	Buckeye	Active	School
I-1057	4– 2–42	Evergreen Mines Co.	W½ SW 36-56-25	Buckeye	Active	School
I-1058	4– 2–42	Evergreen Mines Co.	E½ SW 36-56-25	Buckeye	Active	School
I-1059	4– 2–42	Evergreen Mines Co.	W½ SE 36-56-25	Buckeye	Active	School
I-1060	4– 2–42	Evergreen Mines Co.	E½ SE 36-56-25	Buckeye	Active	School
I-1061	6– 8–42	Butler Brothers	E½ SE 6-57-20	Philbin	Active	Swamp
I-1062	6– 9–42	Bozich and Ranta	W½ SE 16-58-19	Margaret	Application for lease	School
I-1063	6– 9–42	Inland Steel Co.	SW NW 12-58-19	Part Woodbridge Res.	Active	School
I-1064	6– 9–42	Evergreen Mines Co.	Lot 6 18-58-16		Active	Swamp
I-1065	6– 9–42	Evergreen Mines Co.	NE NE 17-58-19	Section 17 Mine	Active	School
I-1066	6– 9–42	Evergreen Mines Co.	W½ NE 17-58-19	Section 17 Mine	Active	School

TABLE No. 78—Concluded

IRON ORE PROSPECTING PERMITS

Issued Under Laws of 1941, Chapter 546

No.	Date	Permit Holder	Description	Property	Status	Fund
I-1067	6- 9-42	Evergreen Mines Co	Lots 1 and 2 2-58-18	Pilot	Active	School
I-1068	6- 9-42	Evergreen Mines Co	SW NE, NW SE 2-58-18	Pilot	Active	School
I-1069	6- 9-42	Evergreen Mines Co	SE SE 20-59-14		Active	University
I-1070	6- 9-42	Evergreen Mines Co	Lots 1 and 2 15-56-23		Active	University
I-1071	6- 9-42	Evergreen Mines Co	Lot 2 2-56-23	Vernon	Active	University
I-1072	6- 9-42	Evergreen Mines Co	E½ SE 36-58-21	Pool	Active	School
I-1073	6- 9-42	Evergreen Mines Co	W½ SE 36-58-21	Pool	Active	School
I-1074	6- 9-42	Evergreen Mines Co	NW NW 11-56-23, NE NE 10-56-23		Active	University
I-1075	6- 9-42	Syracuse Mining Co	SE SE 24-46-30		Active	Swamp
I-1077	6-15-42	Charleson Iron Mng. Co	E½ NE 8-58-17	Missabe Mountain	Active	School
I-1078	6-15-42	Charleson Iron Mng. Co	W½ NE 8-58-17	Missabe Mountain	Active	School

TABLE No. 79

TACONITE PROSPECTING PERMITS

Issued Under Laws of 1941, Chapter 546

No.	Date	Permit Holder	Description	Status	Fund
T-1001	6-10-41	Erie Mining Co	W½ NE and SE¼ 14-59-14	Taconite Lease #3001	University
T-1002	6-10-41	Erie Mining Co	S½ NW 14-59-14	Taconite Lease #3002	University
T-1003	6-10-41	Erie Mining Co	SW¼ 14-59-14	Taconite Lease #3003	University
T-1004	6-10-41	Erie Mining Co	SE NE, E½ SE, SW SE and S½ SW 15-59-14	Taconite Lease #3004	University
T-1005	6-10-41	Erie Mining Co	SE NW 15-59-14	Taconite Lease #3005	University
T-1006	6-10-41	Erie Mining Co	SW¼ 16-59-14	Taconite Lease #3006	School
T-1007	6-10-41	Erie Mining Co	SE¼ 16-59-14	Taconite Lease #3007	School
T-1008	6-10-41	Erie Mining Co	NE¼ and NE SE 22-59-14	Taconite Lease #3008	University
T-1009	6-10-41	Erie Mining Co	E½ NE 21-59-14, NW¼ 22-59-14	Taconite Lease #3009	University
T-1010	6-10-41	Erie Mining Co	NE¼ and E½ NW¼ 23-59-14	Taconite Lease #3010	University
T-1011	6-10-41	Erie Mining Co	W½ NW and SW¼ 23-59-14	Taconite Lease #3011	University
T-1012	6-10-41	Erie Mining Co	SE¼ 36-60-14	Taconite Lease #3012	School
T-1013	6-10-41	Ontario Iron Co	N½ SW 1-58-19	Taconite Lease #3013	School
T-1014	6-10-41	Ontario Iron Co	S½ SW 2-58-19	Taconite Lease #3014	School
T-1015	6-10-41	Ontario Iron Co	SW SE 2-58-19	Taconite Lease #3015	School
T-1016	6-10-41	Ontario Iron Co	NE SE 2-58-19	Taconite Lease #3016	School
T-1017	6-10-41	Ontario Iron Co	W½ SW 9-58-19	Taconite Lease #3017	School
T-1018	6-10-41	Ontario Iron Co	NE SW 9-58-19	Taconite Lease #3018	School
T-1019	6-10-41	Ontario Iron Co	S½ SE 9-58-19	Taconite Lease #3019	School
T-1020	6-10-41	Ontario Iron Co	N½ NE 10-58-19	Taconite Lease #3020	School
T-1021	6-10-41	Ontario Iron Co	S½ NE 10-58-19	Taconite Lease #3021	School
T-1022	6-10-41	Ontario Iron Co	S½ NW 11-58-19	Taconite Lease #3022	School
T-1023	6-10-41	Ontario Iron Co	N½ NW 11-58-19	Taconite Lease #3023	School
T-1024	6-10-41	Ontario Iron Co	S½ NE 11-58-19	Taconite Lease #3024	School
T-1025	6-10-41	Ontario Iron Co	N½ NE 11-58-19	Taconite Lease #3025	School
T-1026	6-10-41	Ontario Iron Co	W½ NW 12-58-19	Surrendered	School
T-1027	6-10-41	Ontario Iron Co	E½ NW 16-58-19	Taconite Lease #3027	School
T-1028	6-10-41	Ontario Iron Co	W½ NW 16-58-19	Taconite Lease #3028	School
T-1029	6-10-41	Ontario Iron Co	NW NE 8-57-21	Taconite Lease #3029	Swamp
T-1030	6-10-41	Ontario Iron Co	W½ NE 36-58-21	Taconite Lease #3030	School
T-1031	6-10-41	Ontario Iron Co	E½ NE 36-58-21	Taconite Lease #3031	School
T-1032	6-10-41	Ontario Iron Co	E½ SW 36-58-21	Taconite Lease #3032	School
T-1033	6-10-41	Ontario Iron Co	W½ SW 36-58-21	Taconite Lease #3033	School
T-1034	6-10-41	Ontario Iron Co	W½ NW 36-58-21	Taconite Lease #3034	School
T-1035	6-10-41	Ontario Iron Co	E½ NW 36-58-21	Taconite Lease #3035	School
T-1076	6- 9-42	Ontario Iron Co	NW NW 12-58-19	Taconite Lease #3036	School

TABLE No. 80

GOLD ORE LEASE AND PROSPECTING PERMITS

Lease Number	LEASE HOLDER	DESCRIPTION	Expiration Date
B-17	Carl M. Hanson	NE ¼ NE¼ 33-66-17	April 16, 1962
Permit Number	**PERMIT HOLDER**	**DESCRIPTION**	**Expiration Date**
B-62	August Ketola	NE¼ SE¼, SE¼ NE¼ 25-64-21	June 18, 1941
B-63	Raymond J. Schwope and Leo Fall	NW¼ NW¼, SW¼ NW¼ 16-46-18	Sept. 15, 1941
B-64	Thos. Fick and Mrs. Laurie Courte	NW¼ NW¼ 20-158-44	Sept. 23, 1941

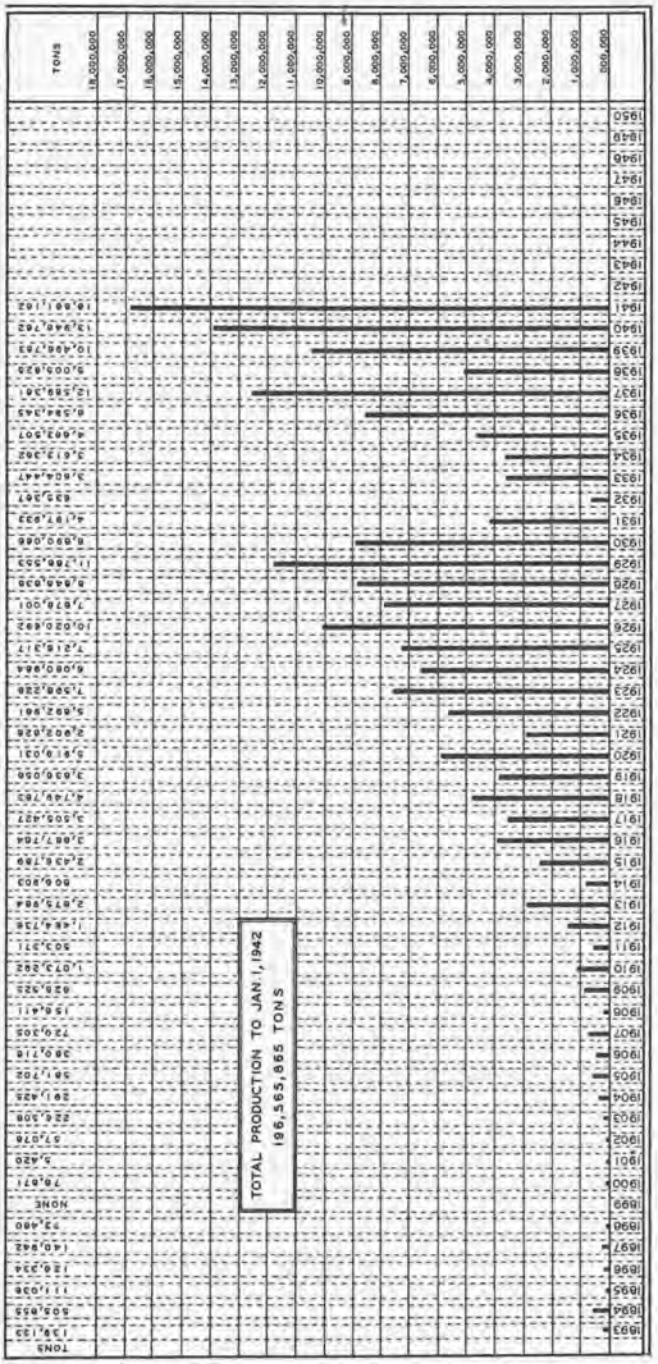


FIG. 13

Graph Showing Yearly Production of Iron Ore from State Owned Mines—1893-1941

BARBARA MINE: Calumet, Itasca County.

Biennial production 330,492 tons.

Operated by Butler Brothers who acquired it in 1941 from the Adgate Iron Company. Crude ore is concentrated by washing, and three ore weighers are employed.

DRAPER MINE: Calumet, Itasca County.

Biennial production 105,672 tons.

Operated by the Evergreen Mines Company. This is the first mine to operate under Laws of 1941, Chapter 546. This mine was originally opened by the Draper Iron Company.

GRANT MINE: Buhl, Saint Louis County.

Biennial production 633,485 tons.

Operated by the Inter-State Iron Company. In 1941 a crushing plant was constructed and the system of mining was changed from railroad haulage to a truck operation. The original lease on this property expired on May 14, 1942. A ten-year extension was issued under Laws of 1937, Chapter 48, and the royalty rate was increased from 25c to 60c per ton.

HILL ANNEX MINE: Calumet, Itasca County.

Biennial production 9,542,613 tons.

Operated by the Inter-State Iron Company. The crude ore is beneficiated by washing, screening and crushing. Until recently when a conveyor belt scale was installed, all crude ore at this mine was weighed in cars on a track scale. Both systems are now used, and three ore weighers are employed.

KEVIN MINE: Cooley, Itasca County.

Biennial production 3,040,166 tons.

Operated by Butler Brothers. Crude ore is concentrated by washing and screening, and three ore weighers are employed.

LEONIDAS MINE: Eveleth, Saint Louis County.

Biennial production 866,637 tons.

Operated by the Oliver Iron Mining Company in producing high grade ore by underground methods. The old lease expired on June 11, 1942, and was extended to January 1, 1965, under Laws of 1937, Chapter 488, at an increase in royalty from 25c to 50c per ton. A new shaft will be constructed to mine the remaining underground reserve.

LEONIDAS STOCKPILE No. 9.

Biennial production 54,488 tons.

Operated by the Evergreen Mines Company under a sub-lease from the Oliver Iron Mining Company, which expired in 1941.

MAJORCA MINE: Calumet, Itasca County.

Biennial production 724,457 tons.

Operated by the Hobart Iron Company (Pickands-Mather and Company). Crude ore is concentrated by washing, jigging and screening, and three ore weighers are employed.

MESABI CHIEF MINE: Keewatin, Itasca County.

Biennial production 1,473,156 tons.

Operated by the Hanna Ore Mining Company. Part of the tonnage here is shipped direct, and low grade ore is concentrated by screening and washing. Three ore weighers are employed. The lease expires on December 14, 1942, and most of the remaining ore will be mined prior to that date.

MINNEWAS MINE: Virginia, Saint Louis County.

Biennial production 1,549,657 tons.

Operated by the Oliver Iron Mining Company. Part of the ore from this mine required crushing, but shipments to date consisted of high grade merchantable ore. An application for a lease extension under Laws of 1937, Chapter 488, was filed with the state. No ore was shipped from this property in 1942 as the State did not extend the two Minnewas leases which expired on June 11, 1942. Bids on this mine, which contains two mining units, will be received by the Executive Council and the Commissioner of Conservation in December, 1942.

MINNEWAS-COONS MINE:

Biennial production 516,879 tons.

Operated by the E. W. Coons Company, Inc., under a sub-lease from the Oliver Iron Mining Company, which expired on December 31, 1941. A small tonnage of low grade ore was concentrated before being shipped.

Drilling on State Owned Lands

MISSABE MOUNTAIN MINE: Virginia, Saint Louis County.

Biennial Production 7,612,013 tons.

Operated by the Oliver Iron Mining Company. Ore from this mine required crushing, and shipments to date consisted of high grade merchantable ore. An application for a lease extension under Laws of 1937, Chapter 488, was filed with the state. This mine did not operate in 1942 as the State did not extend the lease which expired on March 3, 1942. Under Laws of 1941, Chapter 546, bids to prospect for iron ore on the two Missabe Mountain mining units were received in June, 1942, by the Executive Council and the Commissioner of Conservation. Prospecting permits were awarded on both mining units to the highest bidder, the Charleson Iron Mining Company of Hibbing, Minnesota.

MISSISSIPPI No. 1 MINE: Keewatin, Itasca County.

Biennial production 29,659 tons.

Operated by the Hanna Ore Mining Company. This is a new open pit mine which was opened in the fall of 1941. A screening plant is being constructed at the mine, and all low grade ore will be washed at the Mesabi Chief Mine washing plant.

MISSISSIPPI No. 2 MINE: Keewatin, Itasca County.

Biennial production 26,213 tons.

Operated by the Hanna Ore Mining Company. This is an underground mine which is not active at the present time. The production reported above consisted of low grade stockpiled ore which was washed in the Mesabi Chief plant.

POOL MINE: Hibbing, Saint Louis County.

Biennial production 140,321 tons.

Operated until the fall of 1941 by the Oliver Iron Mining Company. The lease expired on this open pit property on March 9, 1942, and the ore within the present pit limits has all been shipped. In June, 1942, under Laws of 1941, Chapter 546, the Evergreen Mines Company was awarded prospecting permits on the two Pool mining units.

SCRANTON MINE: Hibbing, Saint Louis County.

Biennial production 1,951,594 tons.

Operated by the Hoyt Mining Company (Pickands-Mather and Company). Part of the ore from this open pit operation requires crushing. An application for a lease extension has been filed with the state under Laws of 1937, Chapter 488. The lease expires in 1950.

SMITH MINE: Hibbing, Saint Louis County.

Biennial production 4,120 tons.

Operated by Warco Holdings, Inc. This mine was originally leased in 1900 and was surrendered in 1927. At that time the mine was supposed to be exhausted, but as a result of an E.R.A. and W.P.A. project in 1935 and 1936, about 75,000 tons of additional scram ore was located; and the mine, which is now practically exhausted, is being operated under Laws of 1941, Chapter 546.

STEIN MINE: Keewatin, Itasca County.

Biennial production 1,240,736 tons.

Operated by the Hanna Ore Mining Company. This is an open pit operation producing low grade ore which is concentrated in the Mesabi Chief washing plant. A lease extension application was filed with the state under Laws of 1937, Chapter 488. The present lease expires in January, 1943.

WACOUTAH MINE: Mountain Iron, Saint Louis County.

Biennial production 721,003 tons.

Operated by the Wheeling Steel Corporation. Ore from this open pit mine is shipped direct. A small tonnage of lean ore material, which has been stocked for 25 years, is being shipped in 1942. This material is low in iron and high in alumina.

WEARNE MINE: Crosby, Crow Wing County.

Biennial production 414,444 tons. Operated by the Evergreen Mines Company under contract for the M. A. Hanna Company. This open pit mine contains high moisture, manganiferous iron ore which is concentrated by sintering before being shipped. Two ore weighers are employed at this mine.

The first washing plant to treat state ore was constructed at the Majorca Mine 25 years ago. At the present time six concentration plants are in operation. A new one is being built now and two more will be, no doubt, within a year. This is an indication of the development of beneficiation processes and of the increase in the utilization of low grade ores. In some of the graphs and tables which follow, will be found the percentage of concentrates obtained from such low grade ores in comparison with higher grade materials shipped.

The total production for the biennium of 32,000,041 tons of direct shipping and crude ore upon which the royalty is based, has broken all state production records. It will mean the addition of some eight million dollars to the trust funds of the state.

Properties that have produced no ore during the biennium but still have required considerable atttention in one way or another are as follows:

PRINDLE MINE: Virginia, Saint Louis County.

Operated by the Oliver Iron Mining Company. A screening and washing plant are being constructed, and some ore will be shipped in 1942.

DUNCAN MINE: Chisholm, Saint Louis County.

Operated by the Evergreen Mines Company. A washing plant is to be constructed, and the property will produce ore in 1943. This was formerly operated as an underground mine by the Oliver Iron Mining Company.

MARTIN MINE: Crosby, Crow Wing County.

Operated by the Evergreen Mines Company. This mine contains iron ore and manganiferous iron ore and will be operated as an open pit mine in 1943. Was formerly under lease to the Whitmarsh Mining Company and was operated as an underground mine.

TABLE No. 81

PRODUCTION OF IRON ORE FROM STATE-OWNED MINES

For the Biennium July 1, 1940 to July 1, 1942

MINES	Total Production	Direct	Screened	Crushed	Crude Ore	Concentrates	% Recovery	Lease No.	Issued	Expires
Alan	22,236	22,236						2003 and 2004	1942	1992
Barbara	330,492				330,492	76,361	53.11***	415	1900	1950
Draper	105,672					105,672	*	2001	1941	1991
Grant	1,633,485	728,695		904,790				174	1892	1942-1952**
Hill Annex	9,542,613	1,047,899	747,401		7,747,313	5,366,455	69.3	374-375,377-378	1900	1950
Kevin	3,040,166				3,040,166	1,365,473	52.27***	376	1900	1950
Leonidas	866,637	866,637						221 and 224	1892	1942-1965**
Leonidas Stockpile #9	54,488	54,488						Sub-lease Part of 221	1892	1942-1965**
Majorca	724,457	14,184			710,273	317,550	48.5 ***	456	1902	1952
Mesabi Chief	1,473,156	141,816			1,331,340	580,172	60.08***	268	1892	1942
Minnewas	1,549,657	477,072		1,072,585				218 and 219	1892	1942-Expired
Minnewas-Coons	516,879	473,731			43,148	27,414	63 .5	Sub-lease Part of 218	1892	1942-Expired
Missabe Mt	7,612,013	174,329		7,437,684				59	1892	1942-Expired
Mississippi No. 1	29,659	29,659						355	1899	1949
Mississippi No. 2	26,213	12,200			14,013	9,127	65.1	356	1899	1949
Pool	140,321	140,321						85	1892	1942-Expired
Scranton	1,951,594	1,081,069		870,525				392	1900	1950
Smith	4,120	4,120						2002	1941	1991
Stein	1,240,736	5,053			1,235,683	758,304	61.4	282	1893	1943
Wacoutah	721,003	721,003						387	1900	1950
Wearne	414,444				414,444	341,470-(sinter)	82.4	775	1907	1957
Total	32,000,041	5,994,512	747,401	10,285,584	14,866,872	8,947,998				

*Leased under Chapter 546, Laws of 1941, which provides for the payment of royalty on the concentrates.

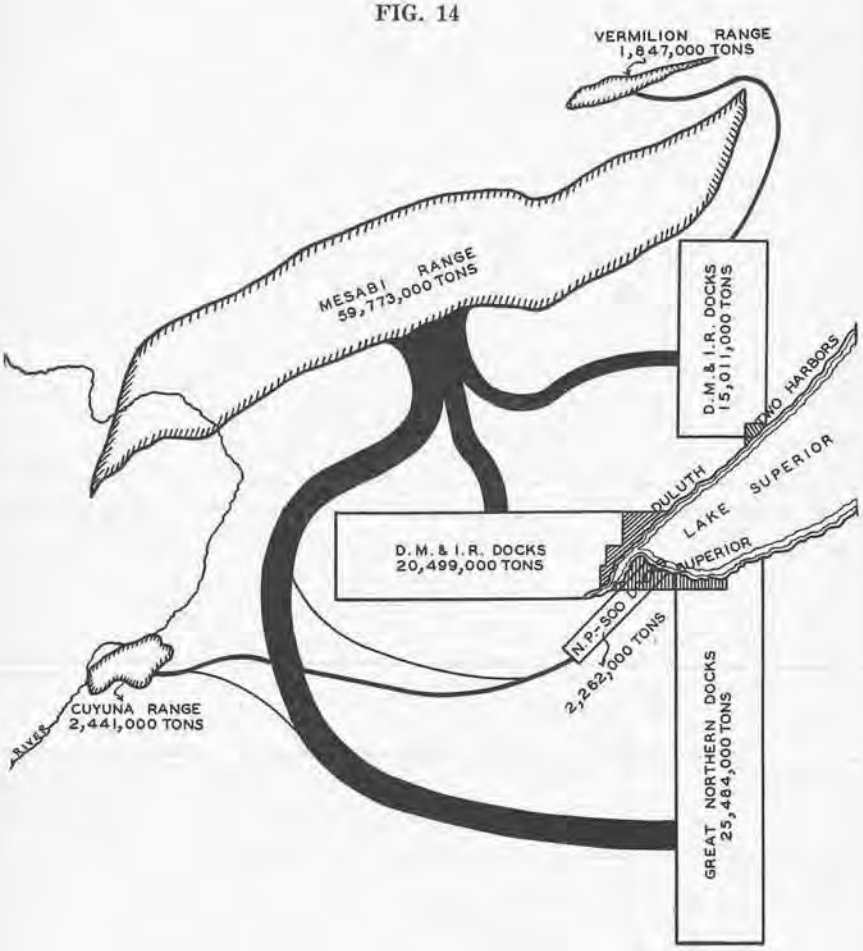
**Lease extended under Chapter 488, Laws of 1937.

***Percentages approximate because some concentrates stockpiled.

Total production of iron ore from state-owned mines amounted to 202,028,808 tons up to June 30, 1942. This production came from forty-six state-owned properties and twenty-seven of these mines are active at the present time. Leases on the other mines have been cancelled or the ore bodies have been exhausted.

Table 82 is a tabulation of the ore produced up to June 30, 1942, from each state-owned mine and a total for all.

FIG. 14



Graph Showing Distribution of Iron Ore Shipments from Mines to Docks

TABLE 82

Total Ore Production from State Mines to June 30, 1942

	Mine Mine	Lease No. Lease No.	Location Location	Tonnage Tonnage
1.	Alan	2003-2004	Mt. Iron	22,236
	Hanna	364	Mt. Iron	1,661,490
2.	Alberta	655	Virginia	136,535
3.	Barbara	415	Calumet	330,492
4.	Carson Lake	443	Hibbing	5,131
5.	Cavour	699	Kinney	177,964
6.	Deacon	404	Kinney	347,512
7.	Draper	478-2001	Calumet	154,394
8.	Duncan	65-2005	Chisholm	87,761
9.	Eaton	391	Buhl	3,548
10.	Fay	346	Virginia	1,264,531
11.	Frantz	365	Buhl	744,474
12.	Grant	174	Buhl	7,809,107
13.	Helen	A-1-2008	Cooley	224,597
14.	Helmer	402	Kinney	1,369,231
15.	Hill Annex	374-375 377-378	Calumet	37,863,121
16.	Kevin	376	Cooley	5,286,610
17.	Leonidas	221-224	Eveleth	20,734,836
	Leonidas Stock Pile No. 9	Sub Lease 221	Eveleth	80,010
18.	Madeira	558	Hibbing	195,495
19.	Majorca	456	Calumet	2,076,525
20.	Margaret	Part 363	Buhl	1,361,379
21.	Martin	776-2006	Ironton	20,764
22.	Mesabi Chief	268	Keewatin	10,585,171
23.	Minnewas	218-219	Virginia	11,795,711
	Minnewas-Coons	Part 218	Virginia	564,341
24.	Missabe Mt.	59	Virginia	66,419,037
25.	Mississippi No. 1	355	Keewatin	30,731
26.	Mississippi No. 2	356	Keewatin	296,467
27.	Morton	468	Hibbing	205,452
28.	Philbin	389	Hibbing	1,235,908
29.	Pilot	353	Mt. Iron	239,040
30.	Pool	85	Hibbing	3,951,344
31.	Prindle	449-451	Virginia	47,487
32.	Scranton	392	Hibbing	8,892,634
33.	Section 17	472	Buhl	21,158
34.	Seville	371-2007	Kinney	76,459
35.	Shiras	362	Buhl	1,051,718
36.	Sliver	618	Virginia	174,813
37.	Smith	384-A-12 2002	Hibbing	967,559
38.	Stein	282	Keewatin	1,240,735
39.	Vernon	A-4	Cooley	26,160
40.	Wacoutah "A"	387	Mt. Iron	5,276,009
41.	Wacoutah "B"	388	Mt. Iron	112,965
42.	Wanless	363	Buhl	2,247,888
43.	Wearne	775	Crosby	2,054,748
44.	Wheeling	A-6	Mt. Iron	223,685
45.	Woodbridge	370	Buhl	1,655,155
46.	Yates	366	Kinney	678,690
	GRAND TOTAL			202,028,808

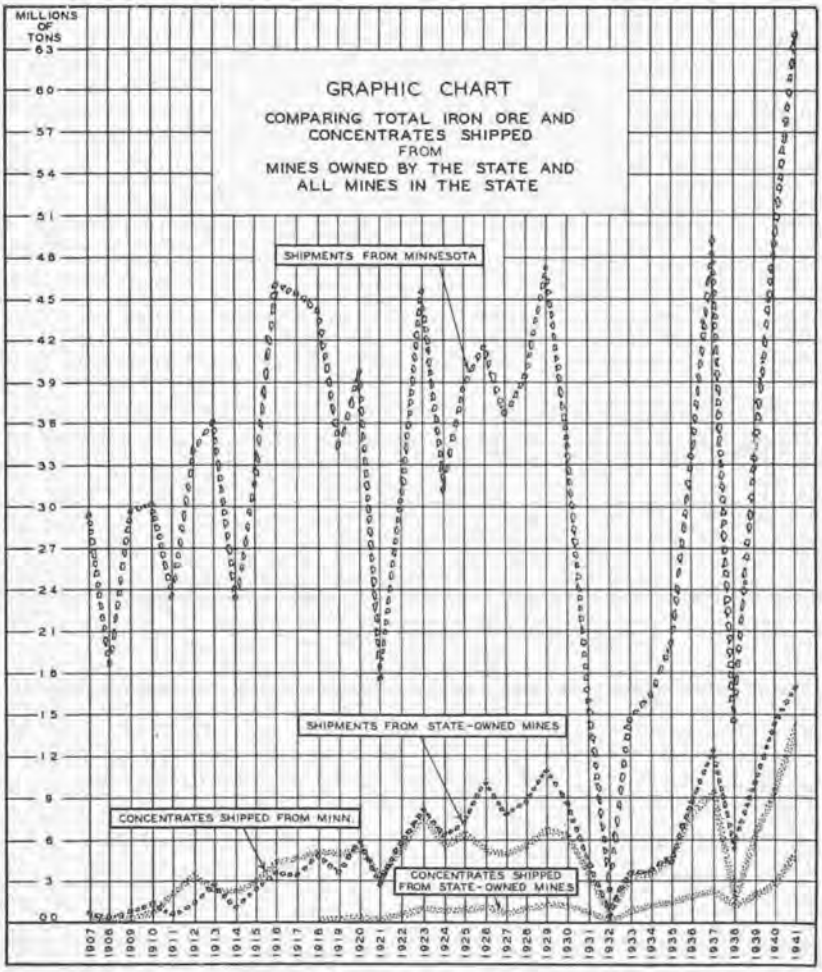
Note: 2000 Series of lease numbers shown in this statement are new leases under Law of 1941, Chapter 546.

There has also been considerable field and office work necessary in connection with prospecting permits or leases on the Wade Reserve, Margaret, Shiras, Wanless, Woodbridge, Woodbridge Reserve, Seville, Philbin, Carson Lake Reserve, Sullivan No. 2 Reserve, Congdon-Longyear, Northland, Helen, Buckeye and other properties.

KELLY LAKE LOTS:

One project that required considerable time, both in the field and office, was the subdivision of the E½ SE¼, SW¼ SE¼ and SE¼ NE¼ of Sec. 16, Twp. 57 N., R. 21 W., into village lots as authorized by Laws 1941, Chapter 222. As a result, 86 lots were sold in Duluth at a public land sale for $12,682.00.

FIG. 15



MODEL WASHING PLANT:

This model was designed and constructed by men in this Division at Hibbing, and exhibited at the State Fair in 1941. It was rated the most outstanding exhibit in the Conservation Building by the Superintendent of the Exhibits.

LAKE ELEVATIONS:

Lake elevations have been taken for the past 30 years on all three iron ranges. The number has increased, and in 1941, 87 lakes were recorded twice, as follows: Vermillion 14, Mesabi 36, and Cuyuna 37.

MINERAL RESEARCH[1]

The Research Section was especially concerned during the last two years with the proper classification, re-evaluation and a better correlation of the areas under new permits and leases, with the now active properties.

The great expansion of exploration activity due to the emergency situation, and the resulting drilling and sampling campaign offered our Research Section a varied set of samples of all types of materials, and opened up a series of questions of local correlations which required numerous tests, and the use of various methods of investigation to be answered properly. Some of the samples from the old drilling explorations had to be re-examined in the light of technical progress made in the field of beneficiation of iron ores, and new types of maps had to be set up for a better understanding of the connections between known and unknown forties.

[1]By Michael P. Walle, Chief Research Engineer

Majorca Beneficiation Plant

The detail of all this work can not be set up in a report of this type, but by choosing some examples, it is possible to give a picture of the type of work being done and of the results obtained for a few areas under consideration.

Tests made on the operations from the leases now active consist mainly in checking tests of structure and quality of the various products, either resulting from the mining or the beneficiation of the various grades of ores and rejects of all types. In addition to these routine tests a large number of investigations were conducted, which, for the sake of brevity, will be reviewed in separate chapters, with one main example for each type of test or investigation described.

The routine tests referred to consisted mainly of the following types:

1. Dry and wet screen tests on doubtful ore materials.
2. Dry and wet screen tests on low grade materials going to stockpiles.
3. Classification, magnetic separation and wash tests on test pit and drill hole samples from mining operations.
4. Tests to check the operations of the washing units in operation.

The above routine tests were made in collaboration with the Inspection, Sampling, Chemical and Engineering Sections.

Special Types of Investigations:

Special tests which have engaged the facilities of the research division are described briefly under the following captions.

Classification and Wash Tests Made for the Re-estimation of Inactive State-owned Lands

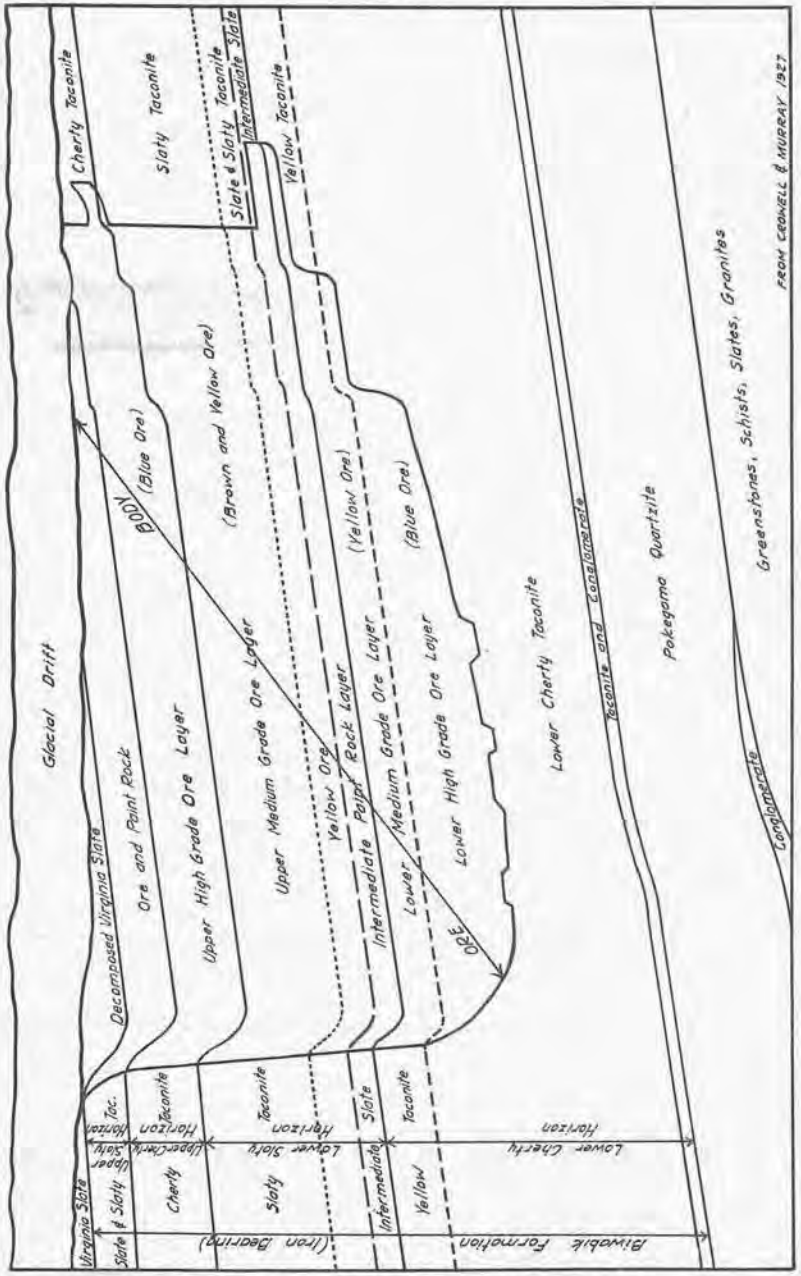
Many of the properties offered for permits or leases were re-examined, so as to show the value of some of the low grade materials which were not considered as ores when the drilling was made in the past. The tests were made by visual classification, wash tests (for painty wash ores), magnetic characteristics, and others. Some correlation work also provided a better cross-section when operations in the neighborhood had yielded new information.

Special Classification and Magnetic Characteristics for the Establishment of Dump Site Areas

Many state-owned properties which had been inactive, were subjected to intensive investigation for the location of dump sites for stripping, taconites and lean ores proposed stockpiles, when new operations were planned. The introduction of truck haulage instead of the railroad transportation in the mines, demands the location of these dump sites closer to the pit areas than in the past. This economic consideration conflicts in some cases with the future value of the land on which these rejects are placed.

The best example of this type is that of the Coons Mine, operated by the E. W. Coons Company on one forty from the Minnewas lease, where three dump sites had to be located, for stripping, lean ore, and taconite, respectively, from the 500,000-ton operation. The investigation was first

FIG. 16



Typical Cross-section of Mesabi Ore Body

made from old drill holes, and completed later by the examination of blast holes made in the pit, and by means of two geophysical surveys, and perspective mapping of results.

At the end of the mining operations a careful check was made by classification and wash tests of the taconites and lean ore materials found in the test pits, drifts and drill holes over the whole pit area, the latter for the determination of the bottom of the pit.

Other properties where the same type of work was done included the Mississippi, Stein, Alan and Prindle mines.

Wash Tests for the Checking of Beneficiation Operations:

Two cases will be chosen as examples of this type of work.

Coons Wash Ores

While mining the ore at the Coons Mine, the operators uncovered a small tonnage of high grade wash ore which they washed at their Union Mine washing plant. This washing operation required the establishment of a scale at the mine for the weighing of crude ore, and a long truck haulage between mine and washing plant. Tests were made to check the washing operation which resulted in a high recovery, and the results of the checks between wash tests and actual operation at the plant were remarkable. The tonnages involved were:

	Tonnage	Wt.%	Iron	Phos.	Sil.	Mn.	Al.
Crude	43,147	100.00	53.32	.040	18.07	.39	1.18
Concentrate	27,413	63.53	61.30	.042	6.82	.96	1.17

The iron recovery was 73.03%.

Draper Mine

Tailing Pond Tests: A certain amount of fine ore was lost by the washing plant during the first season of operation. A check of tailing pond material was carefully made which showed that a small tonnage of high grade and fine ore was lost, but could be easily recovered in the future, or by modifications in the present flow-sheet. Other tests of the same type were made which showed special characteristics for the basal taconites which at this particular mine, were found to be sufficiently oxidized to make ore here.

The tonnages involved were:

	Tonnage	Wt.%	Iron	Pros.	Sil.	Mn.	Al.
Crude	65,208	100.00	51.69	.....	21.62	.....	.....
Concentrate	39,125	60.00	58.58	.026	12.71	.42	.71

Special Classification Work in Connection with Taconite Program: Erie Mining Company and Ontario Iron Company

Pickands Mather & Company took 35 permits along the Mesabi Range for exploration of the taconites (magnetic and non-magnetic). These permits were taken in accordance with the law which was passed in 1941, and which favors the low grade materials. The original permits were converted later into leases.

Several drill sections, Nos. 2, 3, 9, 10 and 11 have already been drilled, and the samples from the various drill holes along these sections were examined by the Research Section before the samples were crushed or shipped to the University of Minnesota Experiment Station. Fractions from each five-foot sample, crushed to pass a ¼ inch mesh screen are received at our Hibbing office for reference, and for any tests that may be required in the future. The classification is made to determine the structure, the various geologic horizons, as well as the degree of richness of the various taconites encountered during this exploration. The University Experiment Station performs a number of magnetic and other tests on each fraction, and these combined with the general analyses, will be the basis for future beneficiation operations. Pickands Mather & Company has assembled many scientists and practical men in the field of beneficiation for the development of the work, in a newly equipped research laboratory.

Iron Ore and Taconite Samples are Classified and Filed

Many other drill sections which do not pass through state-owned lands have also been investigated by the same company, for the same purpose.

Geophysics:

Two methods of investigation of geophysics have been in use for the past few years at our Hibbing Research Section. They are the resistivity method and the induction method. The first one registers variations in resistivity between electrodes planted in the ground at definite intervals from one another. The other registers variations of an electromagnetic balanced circuit between a transmitter and a receiver when this electromagnetic field is distorted by the presence of a conductor below the surface under investigation.

These two methods have been in use mainly for the two following purposes:

1. The location of rock formation for the establishment of dump sites.
2. The location of local zones of oxidation, or concentration, indicating probable ore bodies under forties where the results of former drilling or other type of exploration has not been sufficient. The results of these surveys permit the planning of new exploration by drilling on these insufficiently explored lands.

Several types of such tests are referred to as examples:

1a. **Coons Mine:**

As shown under a previous paragraph, the forty under consideration and adjacent territory have been subjected to many geophysical surveys with the preliminary aim at checking the zones for dump sites of the various reject materials. While this work was in progress, it was found interesting to also locate the direction of the main concentration area, which was to become the Coons Mine, and in doing so guide the operators in their mining operations.

1b. **Stein Mine:**

The area of the various Stein forties had not been drilled intensively, so that when the time came for the establishment of dumping areas, it was found necessary to re-classify the old drill holes and locate new drill holes in an area which had shown possible ore material, on the one hand, and magnetic taconites on the other. This work resulted in refusing the dumping of any reject material of a lower grade than that found under the surface, in the whole area covered by the three forties.

This work in particular, suggested the combination plan map and cross section method of correlation referred to in another paragraph.

1c. **Prindle Mine:**

The operating mining company had been working with the dip needle for geophysical investigations of their own on this property. This permitted our Research Section to compare the results of their work with that made by our resistivity method of investigation. This comparison which has been started, looks very promising.

2a. **Leonidas Mine: Underground and Surface Surveys:**

The resistivity method has been in use at this mine both in an underground area and on surface, for the determination of concentration areas.

The mining operations underground show how closely the probable fractures indicated by geophysics have been located by actual operations. The area in which this work was done, was located between rock drifts where little ore could be found.

The surface work has not as yet been confirmed by drilling, but if it is, this will prove some ore which had not been discovered in the past.

2b. **Grant Mine:**

South of the Grant Mine proper, a shallow body indicated by drilling on three forties, two of which were on state-owned land, has been indicated clearly by geophysics. This body, which is a body of cretaceous low grade ore, is without great economic importance, but its presence was clearly indicated by the comparisons between drilling and geophysical work, and as a result a dump site on the Grant Mine will not be extended over it until it has been proved that the ore body in question cannot be mined by open pit methods.

2c. **Area West of Eveleth:**

A large area west of Eveleth and north of the area where Prof. G. M. Schwartz of the Minnesota Geological Survey is now investigating by dip needle work the possibilities of other ore south of the present Mesabi Range operations, has been investigated by means of our resistivity method. This

Research Engineer Adjusts the Antenna for Ore Location by Radio

resulted in the location of a system of probable fractures in line with the Eveleth Anticline which may result in the discovery of ore material in the future.

If ore is discovered in this area, many state forties will be involved and some phenomena of general geology will have to be revised.

A few drill holes on state-owned lands in this district would furnish clues.

Correlation Work Between Adjacent Forties:

Plan Map and Cross-Section Combinations on Two Areas

A new type of map was prepared for two interesting areas where some of the work mentioned above had indicated connections between certain known troughs of ore and unknown ore bodies.

One of these areas was around Keewatin, and covered a large territory shown on one of the two maps included in this report. The connections discovered gave clues as to the presence of secondary fractures in this district. This map covered many state-owned forties, as, for example, the Mesabi Chief, the Mississippi Mines and the Stein. This map is called "Mesabi Chief Mine and Vicinity."

The other map showed the position of the shallow cretaceous body of ore located south of the Grant Mine and under two other forties located near the south limit of the ore formation. This map is called "Grant Mine and Vicinity." These maps are not included in this report.

This type of work, started at the end of 1940, should be continued for most of the districts, because it will result in a better understanding of the various forties under lease or permit, and of their inter-relation in the general pattern of fractures existing in the Mesabi Iron Range formation. This pattern, when examined closely, appears to be very simple, for the three main probable fractures which are suggested by theoretical reasoning, seem to exist practically all over our productive district, and the present open pits are on either one of these three directions.

Independently, Dr. J. W. Gruner and others pointed out in the past, a triple set of fractures for the most probable ones for concentration possibilities. Dr. Gruner mentions this in his Bulletin No. 19, published by the University Press.

Special Research:

Precious Metals

In addition to the activities reported under the previous headings, which were all mainly concerned with the iron ore program in general, much work has been accomplished in more special research.

Search for precious metals was conducted in various state-owned forties, as on Lease No. B-17 on the NE¼ NE¼ Sec. 33, Twp. 66 N., R. 17 W., of Carl Hanson, et al., where traces or small amounts of gold were found to exist in a contact metamorphic zone between granite and a Knife Lake

slate, while other minerals were examined showing manganese and iron oxides, carbonates and sulphides, as well as garnets, epidotes and other interesting species.

On another gold permit of R. J. Schwope and Leo Fall, called Permit No. B-63 and located on the W½ NW¼ of Sec. 16, Twp. 46 N., R. 18 W., where a possible placer had been anticipated, no gold or silver was found after very intensive tests of various samples carefully taken in the area.

In a district on the north shore of Lake Superior, near Schroeder, where silver had been reported, several samples were taken proving the fact that amygdaloids of the same type as those found in the basic formations existed; also proving that the vugs in the formation showed only thomsonite fillings and that no silver or other valuable metals were present.

A sample from the Ely district, showed platinum and gold, but the exact location of the material sample could not be obtained.

Trips made into Canada and in the neighborhood of the international boundary, gave information on some interesting connections between the formations on both sides of the border, which resulted in a better understanding of general geologic features.

Magnetic, Bog Ores and Other Iron Ore Possibilities

The trips made along the Rainy River district showed that some magnetic iron ores found in islands on the Canadian side, could be followed into the United States near International Falls, and further west along the Rainy River bend in northern Koochiching County, where some drilling was done in the past.

Bog ores of low iron content, but with extremely low silica, were investigated when samples were brought in from Carlton County. These ores could be used in mixtures with higher iron content material.

Geophysical work done, after some theoretical reasoning had shown possibilities of iron ore oxidation or concentration in a district west of the Eveleth anticline, resulted in indications of fracturing which might in the future be used as a guide for iron ore exploration in that district.

The district in question is just north of that in which search for iron formation is being made by magnetometric methods by Prof. G. M. Schwartz and his associates, under the sponsorship of the Minnesota Resources and Iron Range Rehabilitation Committee.

In order to visualize some of the technical features of the manganese and low grade iron ore programs now being developed, fundamental research in chemical and analytical work has been done on the iron group of metals and possible associates of this group.

Some samples from the Paul Bunyan State Forest and others from east of the Vermilion district located on state-owned lands were also examined and reported on.

The research in rare elements, found in some portions of the ore formation, has been continued by means of spectroscopic and other methods, confirming the existence of traces of vanadium, chromium and other elements in the ore formation.

Bulletin on Geophysics:

A bulletin explaining the two methods of investigation, that of resistivity and that of induction, with illustrations of some of the results obtained and a proposed plan for future work has been prepared by this section.

LANDS[1]

Trust Fund Lands

The land administration of the Division of Lands and Minerals has to do with state trust fund lands situated in 75 counties of the state, and with tax forfeited lands located in the Red Lake Game Preserve in Beltrami, Koochiching and Lake of the Woods counties, and in the four Conservation Areas within Aitkin, Mahnomen, Marshall and Roseau counties.

The original acreage of trust fund land totaled 5,564,779 acres, of which 91,524 acres were classed as University land, 119,986 acres as Agricultural College land, 496,482 acres as Internal Improvement land, 1,882,333 acres as Swamp land, and 2,974,454 acres as School land.

Of the lands included in the original classification, there remains 3,073,529.85 acres; the balance having passed to private ownership.

These trust fund lands are sold only at public auction, as provided by law. The revenue derived from the sale of the land is incorporated in a permanent trust fund which is to remain inviolate.

[1]By F. B. Getchell, Deputy Director

Farm in Cut Over Region of Northern Minnesota

The interest from the investment of this fund is being used for the support of the public schools, the university, state teachers' colleges and charitable institutions of the state.

On June 30, 1942, the permanent trust fund totaled $115,387,307 as reported by the State Treasurer. These funds have accumulated from the sale of state trust fund land and timber, leases, royalties on iron ore, profits on the sale of bonds, and the occupational tax on iron ore.

Land Appraisal and Sale

The law requires that state trust fund lands be appraised by bonded state appraisers before they are offered for sale, and that they cannot be sold for less than the appraised value as established by the appraiser. The minimum value for which any of these lands may be appraised or sold is $5.00 per acre.

In the administration of the trust fund lands, the State is divided into three appraisal districts, with district headquarters at Bemidji and Hibbing.

The Eastern District includes the counties of Aitkin, Carlton, Cook, Itasca, Kanabec, Lake, Mille Lacs, Pine and St. Louis.

The Central District includes Beltrami, Benton, Cass, Clearwater, Crow Wing, Hubbard, Koochiching, Morrison, Stearns, Wadena and Todd counties.

TABLE 83
Status of Trust Fund Lands
(As of June 30, 1942)

County	Acres Unsold Incl. Reverted and Forfeited Lands	Acres Under Contract	Total Acres
Aitkin	136,978.02	25,960.56	162,938.58
Anoka	561.82	914.80	1,476.62
Becker	19,833.33	8,116.62	27,949.95
Beltrami	63,525.09	8,712.04	72,237.13
Benton	160.00	660.00	820.00
Big Stone	515.75	102.50	618.25
Blue Earth	80.00	40.00	120.00
Brown	.....	80.00	80.00
Carlton	20,576.01	5,658.50	26,234.51
Cass	142,371.70	14,536.91	156,908.61
Chippewa	.....	5.00	5.00
Chisago	.....	740.18	740.18
Clay	3,521.65	4,029.78	7,551.43
Clearwater	26,957.29	5,881.19	32,838.48
Cook	132,166.53	1,114.05	133,280.58
Crow Wing	20,210.56	7,486.44	27,697.00
Dakota	129.40	230.25	359.65
Dodge	80.00	160.00	240.00
Douglas	160.00	357.65	517.65
Faribault	.....	2.50	2.50
Fillmore	.....	240.00	240.00
Goodhue	117.00	266.40	383.40
Grant	40.00	240.00	280.00
Houston	554.83	80.00	634.83
Hubbard	29,258.77	5,205.53	34,464.30
Isanti	564.00	417.13	981.13
Itasca	300,854.70	33,883.86	334,738.56

County	Acres Unsold Incl. Reverted and Forfeited Lands	Acres Under Contract	Total Acres
Jackson	.....	40.00	40.00
Kanabec	8,061.73	1,337.52	9,399.25
Kandiyohi	196.10	153.70	349.80
Kittson	39,031.72	6,468.25	45,499.97
Koochiching	847,297.96	19,286.22	866,584.18
Lac qui Parle	.....	46.80	46.80
Lake	169,428.39	4,344.93	173,773.32
LeSueur	80.00	.....	80.00
Lincoln	.....	160.00	160.00
Mahnomen	9,686.01	731.11	10,417.12
Marshall	45,113.48	18,792.15	63,905.63
Martin	.....	51.27	51.27
Meeker	.....	178.00	178.00
Mille Lacs	11,159.97	4,549.09	15,709.06
Morrison	6,715.10	6,877.74	13,592.84
Murray	.....	80.00	80.00
Nobles	40.00	40.00	80.00
Norman	2,523.50	3,973.83	6,497.33
Olmsted	.....	10.00	10.00
Otter Tail	2,974.40	8,162.57	11,136.97
Pennington	4,653.01	2,180.69	6,833.70
Pine	27,072.30	5,072.66	32,144.96
Pipestone	.....	280.00	280.00
Polk	11,465.94	10,487.70	21,953.64
Pope	674.25	754.60	1,428.85
Red Lake	4,381.25	2,306.09	6,687.34
Redwood	80.00	.....	80.00
Renville	40.00	340.14	380.14
Rice	40.00	.....	40.00
Rock	.....	160.00	160.00
Roseau	139,591.90	53,440.83	193,032.73
St. Louis	498,123.54	35,147.87	533,271.41
Scott	40.00	10.00	50.00
Sherburne	1,497.90	470.74	1,968.64
Sibley	80.66	40.00	120.66
Stearns	1,126.87	1,614.68	2,741.55
Stevens	.....	40.00	40.00
Swift	280.00	667.06	947.06
Todd	4,754.86	3,273.44	8,028.30
Traverse	279.99	200.00	479.99
Wadena	6,700.92	6,158.13	12,859.05
Waseca	80.00	.....	80.00
Washington	.....	40.00	40.00
Watonwan	.....	144.60	144.60
Wilkin	3,371.49	3,413.67	6,785.16
Winona	482.19	160.00	642.19
Wright	60.00	120.00	180.00
Yellow Medicine	.....	200.00	200.00
	2,746,401.88	327,127.97	3,073,529.85

Total number acres Unsold, including Reverted and Forfeited Lands 2,746,401.88

Total number acres under Sale Contract 327,127.97

Total 3,073,529.85

Note: Table 83 includes 12,029.88 acres situated in Koochiching, Lake and St. Louis counties which were accepted by the state legislature in lieu of damage to other trust fund lands from the construction of the International Falls and Kettle Falls power dams. These are classified as trust fund lands under Laws of 1939, Chapter 343, and Laws of 1941, Chapter 393, Section 8.

Trust fund lands located within state forests are under the management of the Division of Forestry.

1,618 acres Public Building Land, under sale contract in Kandiyohi County, are not included in Table 83 as they are not classified as trust fund land.

The Western District includes Becker, Clay, Kittson, Mahnomen, Marshall, Norman, Otter Tail, Pennington, Polk, Red Lake, Roseau and Wilkin counties.

Most of the trust fund lands lie in the districts outlined above with scattering areas in other counties of the state. Each district is in charge of a permanent district appraiser who is assisted during the regular appraisal season, May 1st to November 1st each year, by an assistant appraiser.

The work of the appraisers includes the investigation, examination, mapping, classification of tracts requested for sale or lease, as well as the appraisal or valuation of the land, and of the improvements and timber found thereon. They are also required to investigate trespass on state-owned land, contact delinquent contract holders and county officials relative to state land.

The appraisers' reports covering lands requested for sale and other lands examined are sent to the St. Paul office where they are checked and reviewed and consideration is given to the recommendations of the appraisers. These reports are then classified and filed, and a list of the lands to be offered at public sale is prepared from the tracts recommended by the appraisers.

TABLE 84

Statement Showing Number of Acres of State Trust Fund Land Under Sale Contract and the Amount of the Unpaid Balance of the Purchase Price as of June 30, 1942

County	Acres	Unpaid Balance
Aitkin	25,960.56	$ 134,450.71
Anoka	914.80	5,320.00
Becker	8,116.62	46,009.39
Beltrami	8,712.04	47,602.61
Benton	660.00	4,359.00
Big Stone	102.50	936.00
Blue Earth	40.00	680.00
Brown	80.00	340.00
Carlton	5,658.50	30,532.88
Cass	14,536.91	79,768.53
Chippewa	5.00	42.00
Chisago	740.18	5,128.00
Clay	4,029.78	40,391.25
Clearwater	5,881.19	31,209.99
Cook	1,114.05	5,869.23
Crow Wing	7,486.44	43,234.83
Dakota	230.25	1,105.00
Dodge	160.00	952.00
Douglas	357.65	2,577.00
Faribault	2.50	70.00
Fillmore	240.00	1,258.00
Goodhue	266.40	1,365.20
Grant	240.00	1,500.00
Houston	80.00	408.00
Hubbard	5,205.53	27,940.37

County	Acres	Unpaid Balance
Isanti	417.13	3,359.00
Itasca	33,883.86	189,275.64
Jackson	40.00	552.00
Kanabec	1,337.52	6,722.70
Kandiyohi	153.70	2,289.90
Kittson	6,468.25	43,824.07
Koochiching	19,286.22	113,078.48
Lac qui Parle	46.80	258.00
Lake	4,344.93	20,870.20
Lincoln	160.00	1,632.00
Mahnomen	731.11	4,841.57
Marshall	18,792.15	114,931.68
Martin	51.27	336.00
Meeker	178.00	1,581.00
Mille Lacs	4,549.09	25,705.66
Morrison	6,877.74	41,599.91
Murray	80.00	340.00
Nobles	40.00	170.00
Norman	3,973.83	36,103.21
Olmsted	10.00	170.00
Otter Tail	8,162.57	51,565.88
Pennington	2,180.69	14,167.10
Pine	5,072.66	30,525.10
Pipestone	280.00	3,893.00
Polk	10,487.70	76,986.82
Pope	754.60	4,127.75
Red Lake	2,306.09	17,565.00
Renville	340.14	3,897.98
Rock	160.00	1,520.00
Roseau	53,440.83	338,712.80
St. Louis	35,147.87	240,689.95
Scott	10.00	51.00
Sherburne	470.74	2,844.00
Sibley	40.00	340.00
Stearns	1,614.68	9,302.43
Stevens	40.00	246.00
Swift	667.06	5,053.00
Todd	3,273.44	23,474.32
Traverse	200.00	1,955.00
Wadena	6,158.13	36,389.03
Washington	40.00	510.00
Watonwan	144.60	3,381.94
Wilkin	3,413.67	31,570.64
Winona	160.00	764.00
Wright	120.00	1,248.00
Yellow Medicine	200.00	1,020.00
Total	327,127.97	$2,022,491.75

Total number acres under active sale contract 327,127.97

Total amount of unpaid balance of purchase price $2,022,491.75

Note: Interest at the rate of 4% per annum is charged on unpaid balances. This, on the basis of Table 84, means an annual income of $80,900.00 upon the outstanding trust fund land contracts.

1,618 acres, with an unpaid balance of $24,982.00, of public building lands under sale contract in Kandiyohi County, is not included in this tabulation as it is not classified as trust fund land.

TABLE 85

State Trust Fund Land Sold During the Biennium

Sales June 30, 1940, to June 30, 1941

County	Acres Sold	Amount of Sale	Paid for Timber and Improvements
Aitkin	1,249.67	$ 8,093.26	$ 129.25
Beltrami	112.41	674.46	36.00
Carlton	280.00	1,700.00	33.75
Cass	361.76	3,113.91	205.00
Clay	983.45	14,309.00	.....
Clearwater	206.78	1,577.46	73.50
Crow Wing	237.06	1,736.48	304.00
Faribault	9.50	462.50	35.00
Fillmore	120.00	880.00	130.00
Goodhue	119.20	872.00	65.00
Houston	40.00	280.00	30.00
Hubbard	40.00	240.00	115.00
Itasca	844.70	5,407.00	399.50
Kanabec	320.00	1,980.00	.....
Kittson	360.00	4,860.00	.....
Koochiching	380.95	2,193.17	234.25
Lincoln	120.00	2,080.00	.....
Marshall	1,576.28	11,471.40	200.00
Mille Lacs	240.00	1,400.00	127.50
Morrison	160.00	880.00	.....
Norman	223.10	2,802.70	.....
Otter Tail	120.00	680.00	100.00
Pine	440.00	4,180.00	93.75
Pipestone	280.00	4,580.00	.....
Polk	559.75	4,757.75	.....
Red Lake	40.00	200.00	.....
Renville	140.00	3,580.00	.....
Roseau	4,852.28	43,908.05	141.00
St. Louis	444.80	3,357.98	195.50
Sibley	80.00	800.00	40.00
Stearns	120.00	680.00	20.00
Watonwan	144.60	3,978.75	22.50
Wilkin	586.89	10,471.58	298.00
Winona	120.00	840.00	.....
Total	15,913.18	$149,027.45	$3,028.50

TABLE 86

Trust Fund Land Sales, June 30, 1941, to June 30, 1942

County	Acres Sold	Amount of Sale	Paid for Timber and Improvements
Aitkin	916.86	$ 5,951.16	$ 265.75
Becker	437.31	2,766.55	95.00
Beltrami	398.92	3,427.04	205.50
Cass	558.54	4,325.40	168.00
Clay	480.00	11,240.00	.....
Crow Wing	280.00	2,160.00	322.50
Hubbard	244.15	1,542.90	25.00
Itasca	633.95	4,143.03	613.25
Kittson	200.00	1,160.00	16.00
Marshall	520.42	3,322.52	190.00
Norman	80.00	800.00	.....
Otter Tail	229.70	1,697.60	24.00
Pennington	280.00	1,800.00	.....
Pine	80.00	520.00	15.00
Polk	120.00	800.00	.....
Red Lake	160.00	1,320.00	.....
Roseau	3,280.21	24,883.70	88.25
St. Louis	(86 platted lots	(12,682.00	(15.00
	(441.13 acres	(2,829.16	(354.00
Todd	440.00	3,100.00	205.00
Wadena	118.54	909.78	24.00
Wilkin	361.00	4,985.00	24.00
Total	10,260.73	$96,365.84	$2,650.25

TABLE 87

Summary for Biennium of Trust Fund Land Sold at Public Auction From Tables 85 and 86

Acres Sold	26,173.91
Paid for Timber and Improvements	$ 5,678.75
Amount of Sale	245,393.29
Average Price Per Acre	9.38

TABLE 88

Income Derived from Principal and Interest Payments on Trust Fund Lands Under Contract

Biennium Ending June 30, 1942

Fund	Fiscal Year Ending June 30, 1941	Fiscal Year Ending June 30, 1942
Internal Improvement	$ 6,610.00	$ 9,791.01
Swamp	35,782.19	44,278.37
State Land Improvement	319.91	26.10
School	99,309.62	123,514.42
University	4,449.69	4,046.68
Total	$146,471.41*	$181,656.58**

*Included in the amount shown above is $2,508.33 received in payment for condemnations of Rights-of-Way, Gravel Pits, Flowage, etc.

**Included in the amount shown above is $623.98 received in payment for condemnations of Rights-of-Way, Gravel Pits, etc.

Land sales are duly advertised, as required by law, and the lands are offered at public sales held at the county seat of the county in which the land is situated, usually during the fall of each year. Only such tracts are offered as are well situated in relation to roads, schools and settlements and are needed for agricultural use or as additional acreage to already established farms.

These lands are sold at public auction to the highest bidder. At least 15 per cent of the purchase price must be paid at the time of sale, exclusive of timber, and the balance in not to exceed twenty equal annual installments, payable June 1st each year following that in which the purchase was made, with interest at 4% per annum on the balance remaining from time to time unpaid, payable with the installment of principal.

The purchaser shall pay in cash at the time of sale the total appraised value of all timber. Interest payments on trust fund lands under contract are made to the county treasurer and he, in turn, forwards these payments to the state auditor.

Leasing

Leases for hay, farm, pasture, lakeshore, rights-of-way and other special uses are based upon appraisals and rental values determined by the appraisers and cleared through the St. Paul office, with the exception of occupancy leases on the Iron Range which are administered through the Hibbing office of the Division.

TABLE 89

Rental Collections for Leases on State Trust Fund Lands During the Biennium Ending June 30, 1942

July 1, 1940, to June 30, 1941

Kind of Lease	No. Leases	Amount
Hay, Farm and Pasture	946 (in 44 counties)	$21,261.91
House	388	5,825.40
Garden	212	503.40
Lakes	87	1,227.50
Sandpit	7	2,265.96
Billboard	11	523.00
Miscellaneous	114	2,787.65
Total	1,765	$34,394.82

July 1, 1941, to June 30, 1942

Kind of Lease	No. Leases	Amount
Hay, Farm and Pasture	728 (in 45 counties)	$18,902.45
House	308	5,602.10
Garden	227	703.88
Lakes	77	953.00
Sandpit	5	1,380.73
Billboard	12	234.00
Miscellaneous	112	3,969.46
Total	1,469	$31,745.62
	No. Leases	Amount
Total for Biennium	3,234	$66,140.44

In counties where trust fund land sales are held, leases for hay, farm and pasture on lands not sold, and upon lands with lease appraisals, are offered at public auction and sold to the highest bidder. In counties where no sales are held, these leases are sold through the mail to the highest bidder.

Land Exchange

Laws 1941, Chapter 393, provides for a Land Exchange Commission and authorizes the exchange of state land, or land which may be acquired by the state and under the control of the Commissioner of Conservation, for land owned by the United States or land of private ownership.

This law sets up two classifications of state land designated as Class A and Class B lands.

Class A land includes School, Swamp, Internal Improvement, and other land granted to the state by Congress, state forest land, tax forfeited land held by the state free from any trust in favor of a taxing district, and other land acquired by the state in any manner and controlled or administered by the Commissioner of Conservation.

Class B land includes all land heretofore or hereafter acquired by the state through tax forfeiture, held subject to a trust in favor of a taxing district, and under the control of the county authorities for classification, appraisal and sale.

The administration of exchanges of Class A land is by the state through the Land Exchange Commission, the Commissioner of Conservation and the Attorney General's office. The administration of exchanges of Class B land is largely with the county boards, with the approval of the Land Exchange Commission and the Commissioner of Conservation.

At one of the early meetings of the Land Exchange Commission, the Division of Lands and Minerals was designated the central agency through which exchanges of Class A lands should clear. At this meeting it was also decided that exchanges were to be considered only where the lands to be received in exchange by the state were situated in an area where a plan or program of some conservation project has been established or is contemplated.

The procedure under this arrangement works out as follows. Inquiries and requests for exchange are received by the Division of Lands and Minerals. Lists are made up of the legal descriptions of the lands offered and submitted to each division of the Department of Conservation for consideration. The lists are reviewed by each Division, and if there are any tracts included thereon which any of the divisions are interested in acquiring in connection with its plan or program, such tracts are designated thereon. The lists are then returned to the Division of Lands and Minerals and the owners of the tracts selected are requested to make formal application, giving information pertaining to the tracts they wish to exchange and also giving the legal description of the state land they desire in exchange.

Upon approval of the commissioner, the tracts offered in exchange and selected for investigation are examined and appraised by the appraisers of this Division. After final consideration by the Land Exchange Commission,

the Attorney General's office and the Commissioner of Conservation, the transaction proceeds to completion, in accordance with the provisions of Laws 1941, Chapter 393.

Up to this time one land exchange project, between the state and the federal government, involving trust fund lands in the Superior National Forest and lands under acquisition by the federal government known as the Nerstrand Woods in Rice County, is under negotiation and, no doubt, will soon be completed.

Many tracts owned by individuals in the northern counties have been selected by the several divisions of the Department of Conservation for acquisition, and negotiations are proceeding toward their acquisition.

In view of the fact that the funds appropriated for the administration of land exchange by the last legislature are insufficient to permit the employment of full-time appraisers to make the field investigations and appraisals, it has been necessary for this Division to use the permanently employed appraisers of the Division, and field investigations on the land exchange proposals are made only when the regular field work of the Division will permit.

Due to the very limited field personnel of the Division for regular appraisal work and investigations, it has been very difficult to give the proper attention to land exchange investigations, and some provision must be made to insure proper field administration of the Land Exchange Program by employment of at least two full-time appraisers.

Farm in Southern Minnesota

TABLE 90

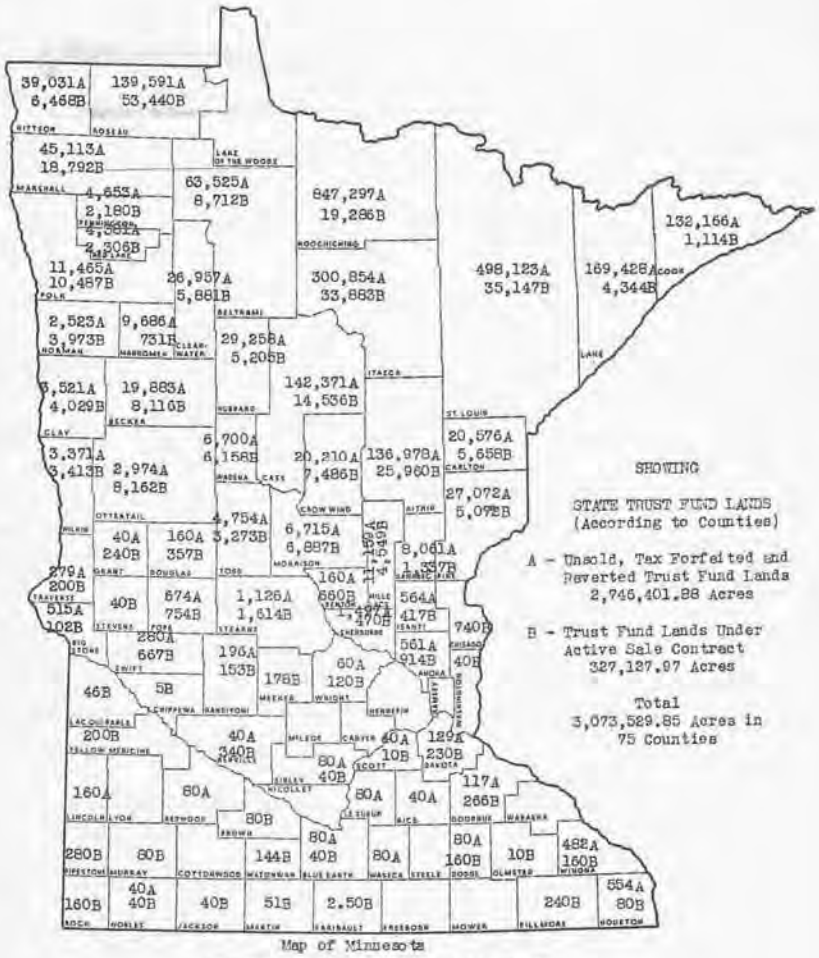
State Land Examinations Made for Sale, Lease, Exchange, Classification, Trespass, Etc.

Biennium Ending June 30, 1942

County	Number of Tracts	Acreage
Aitkin	507	20,542.72
Beltrami	412	16,454.65
Becker	66	2,640.00
Blue Earth	2	80.00
Brown	2	80.00
Carlton	3	120.00
Cass	196	8,025.85
Clearwater	34	1,343.68
Crow Wing	47	1,849.24
Clay	67	3,071.17
Cook	3	120.00
Faribault	2	80.00
Fillmore	3	120.00
Goodhue	1	40.00
Hubbard	96	3,802.00
Houston	8	320.00
Itasca	156	6,186.81
Kanabec	16	640.00
Koochiching	12	484.71
Kittson	248	9,920.00
Lake	107	6,011.29
Lake of the Woods	234	9,360.00
Mahnomen	568	22,730.34
Martin	2	80.00
Marshall	576	23,224.38
Mille Lacs	8	320.00
Morrison	23	937.17
Norman	51	2,580.00
Olmsted	1	40.00
Otter Tail	77	3,080.00
Pennington	79	3,160.00
Pine	39	1,660.00
Polk	40	1,600.00
Red Lake	61	2,240.00
Rice	117	798.11
Roseau	1,279	51,090.36
Scott	2	50.00
Sibley	2	80.00
St. Louis	216	3,812.76
Stearns	6	240.00
Todd	17	759.00
Wadena	51	2,045.32
Waseca	2	80.00
Watonwan	10	144.60
Wilkin	92	3,680.00
Winona	16	640.00
Total	5,557	216,364.16
Special Assignments	532	4,746.01
Total for Biennium	6,089	221,110.17

Miscellaneous

Abstracts, records and status maps of all state trust fund lands are kept in the St. Paul office. All reports from the appraisers are checked and filed and become a part of the permanent records. Interest notices are sent out each year to interest delinquent contract holders. Land sales lists are made up for all state land sales and lists are mailed to delinquent contract holders and all interested parties.



Map of Minnesota

TRUST FUND LANDS ACCORDING TO COUNTIES

(Figures on map indicate number of acres in each County)

Tax Forfeited Lands

Up to May 1, 1942, 6,965,901.66 acres of privately-owned lands and 811,896 acres of trust fund lands, under sale contract, had forfeited to the state for the non-payment of taxes in 76 counties.

Under the present laws, the administration of the privately-owned tax forfeited lands is largely the responsibility of the county boards and county auditors, with the exception of those lands situated within the Red Lake Game Preserve, created by Laws of 1929, Chapter 258, and within conservation areas, created by Laws 1931, Chapter 407, and Laws 1933, Chapter 402.

The Red Lake Game Preserve and the conservation areas embrace an area of 3,136,547 acres. Of this acreage 1,802,317 acres have forfeited to the state for the non-payment of taxes.

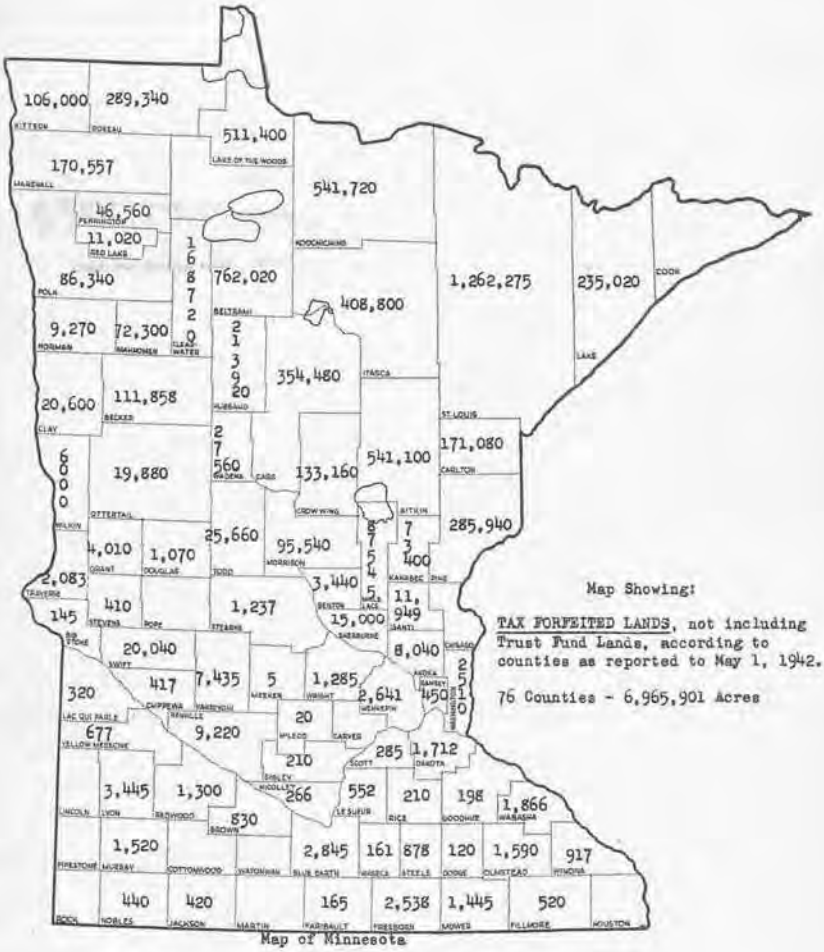
The administration of tax forfeited lands in these areas is under the jurisdiction of the Department of Conservation, with the exception of the classification and sale by the county provided in Laws of 1935, Chapter 210, and Laws of 1939, Chapter 320.

Under these laws, the lands are classified as agricultural and non-agricultural by the county boards of the counties in which they are situated and sold by the county auditors. The classification of the lands must be approved by the Commissioner of Conservation before any of the lands are sold.

Lists of lands classified and selected for sale are submitted by the county auditors and county boards to the Commissioner of Conservation for consideration and approval. These lists are cleared through the Division of Lands and Minerals. When received, copies are made and sent to the several divisions of the Department of Conservation for consideration and approval. Lists are also sent to the fieldmen of the Division of Lands and Minerals, and they are requested to make an investigation of the classification and to submit reports and make recommendations as to such classification, and as to the advisability of selling the lands.

After the investigations have been completed, reports and recommendations are placed before the Commissioner of Conservation for consideration. Lands classified as agricultural lands, and approved as such by the commissioner, are offered for sale by the counties.

The leasing of tax forfeited lands in the Red Lake Game Preserve is administered by the Division of Lands and Minerals, and until they have been classified as agricultural lands by the county boards and such classifications have been approved by the commissioner, the leasing of tax forfeited lands in conservation areas is likewise under the administration of the Division.



Map of Minnesota

Map Showing:

TAX FORFEITED LANDS, not including Trust Fund Lands, according to counties as reported to May 1, 1942.

76 Counties - 6,965,901 Acres

Tax Forfeited Lands, not including Trust Fund Lands
(Figures indicate number of acres in each county)

TABLE 91

Statement of Tax Forfeited Lands as of May 1, 1942

(Trust Fund Lands Not Included)

	County	Acres		County	Acres
1.	Aitkin	541,100	39.	Marshall	170,557
2.	Anoka	8,040	40.	Meeker	5
3.	Becker	111,858	41.	Mille Lacs	87,545
4.	Beltrami	762,020	42.	Morrison	95,540
5.	Benton	3,440	43.	Mower	1,445
6.	Big Stone	145	44.	Murray	1,520
7.	Blue Earth	2,845	45.	Nicollet	266
8.	Brown	830	46.	Nobles	440
9.	Carlton	171,080	47.	Norman	9,270
10.	Cass	354,480	48.	Olmsted	1,590
11.	Chippewa	417	49.	Otter Tail	19,880
12.	Clay	20,600	50.	Pennington	46,560
13.	Clearwater	168,720	51.	Pine	285,940
14.	Crow Wing	133,160	52.	Polk	86,340
15.	Dakota	1,712	53.	Ramsey	450
16.	Dodge	120	54.	Red Lake	11,020
17.	Douglas	1,070	55.	Redwood	1,300
18.	Faribault	165	56.	Renville	9,220
19.	Fillmore	520	57.	Rice	210
20.	Freeborn	2,538	58.	Roseau	289,340
21.	Goodhue	197	59.	St. Louis	1,262,275
22.	Grant	4,010	60.	Scott	285
23.	Hennepin	2,641	61.	Sherburne	15,000
24.	Hubbard	213,920	62.	Sibley	210
25.	Isanti	11,949	63.	Stearns	1,237
26.	Itasca	408,800	64.	Steele	878
27.	Jackson	420	65.	Stevens	410
28.	Kanabec	73,400	66.	Swift	20,040
29.	Kandiyohi	7,435	67.	Todd	25,660
30.	Kittson	106,000	68.	Traverse	2,083
31.	Koochiching	541,720	69.	Wabasha	1,866
32.	Lac qui Parle	320	70.	Wadena	27,560
33.	Lake of the Woods	511,400	71.	Waseca	161
34.	Lake	235,020	72.	Washington	2,510
35.	Le Sueur	552	73.	Wilkin	6,000
36.	Lyon	3,445	74.	Winona	917
37.	McLeod	20	75.	Wright	1,285
38.	Mahnomen	72,300	76.	Yellow Medicine	677

Note: Total number acres of private-owned lands which have forfeited to the state for the non-payment of taxes as reported by the counties up to 5-1-42 in

76 counties 6,965,901

Many of these lands have, since forfeiture, been classified as non-conservation lands and sold in accordance with the provisions of Chapter 386, Laws 1935, as amended, and thus restored to the tax rolls.

TABLE 92

Statement of Tax Forfeited Lands in the Red Lake Game Preserve and Conservation Areas

As of June 30, 1942

Red Lake Game Preserve

County	Total Area	Private and Trust Fund Lands	Tax For. Lands
Beltrami	661,619	126,519	535,100
Koochiching	318,009	103,089	214,920
Lake of the Woods	745,188	246,348	498,840
	1,733,816	484,956	1,248,860

Conservation Areas

Aitkin	455,288	232,868	222,420
Mahnomen	41,073	20,013	21,060
Marshall	425,850	312,893	112,957
Roseau	480,520	283,500	197,020
	1,402,731	849,274	553,457
	1,733,816	484,956	1,248,860
Total	3,136,547	1,334,230	1,802,317

Total Area of Red Lake Game Preserve and Conservation Areas

Privately owned, not forfeited, and Trust Fund Lands	1,334,230 Acres
Privately owned lands which have forfeited	1,802,317 Acres
Total Acreage	3,136,547 Acres

Since forfeiture, many of the tax forfeited tracts listed in Table 85 have been classified as agricultural lands and sold to settlers and thus restored to the tax rolls. The following is a summary of such sales as reported to June 30, 1942:

Red Lake Game Preserve

Beltrami County	344 Tracts	13,760 Acres Sold
Koochiching County	40 Tracts	1,600 Acres Sold
Lake of the Woods Co.	1,304 Tracts	52,160 Acres Sold
	1,688 Tracts	67,520 Acres Sold

Conservation Areas

Aitkin, Mahnomen } Marshall & Roseau }	726 Tracts	29,040 Acres Sold
	1,688 Tracts	67,520 Acres Sold
Total Acreage Sold	2,414 Tracts	96,560 Acres Sold

TABLE 93

Summary of Classification and Sale of Tax Forfeited Lands in the Red Lake Game Preserve and Conservation Areas Since They Were Established as Reported to June 30, 1942

Red Lake Game Preserve

County	Classified Tracts	Classified Acres	Approved by Commissioner of Conservation Tracts	Approved by Commissioner of Conservation Acres	Tracts Sold	Acres Sold
Beltrami	884	35,360	627	25,080	344	13,760
Koochiching	66	2,640	59	2,360	40	1,600
Lake of the Woods	1,950	78,000	1,608	64,320	1,304	52,160
Total	2,900	116,000	2,294	91,760	1,688	67,520

Conservation Areas

Aitkin	612	24,480	281	11,240	81	3,240
Mahnomen	1,038	41,520	723	28,920	26	1,040
Marsahll	1,521	60,840	652	26,080	206	8,240
Roseau	775	31,000	683	27,320	413	16,520
	3,946	157,840	2,339	93,560	726	29,040
R.L.G.P.	2,900	116,000	2,294	91,760	1,688	67,520
Grand Total	6,846	273,840	4,633	185,320	2,414	96,560
Total Number Acres Classified						273,840
Total No. Acres Approved						185,320
Total No. Acres Sold						96,560

TABLE 94

Rental Collections for Leases on Conservation Area Lands

Fiscal Year 1940

County	No. Leases	Amount
Aitkin	103	$1,652.23
Mahnomen	19	297.05
Mahnomen, remitted by County Treasurer	.....	381.38
Marshall	96	1,817.55
Roseau	62	950.51
Total	280	$5,098.72

Fiscal Year 1941

County	No. Leases	Amount
Aitkin	52	$ 887.30
Mahnomen	11	127.00
Mahnomen, remitted by County Treasurer	.....	776.72
Marshall	62	1,084.00
Roseau	46	576.00
Total	171	$3,451.62
Total Collections for Biennium		$8,550.34

Note: In addition to the above total, $1,979.81 was credited to the Reforestation and Flood Control Fund for various condemnations in the Aitkin and Roseau County Conservation Areas.

TABLE 95

Rental Collections for Leases on Red Lake Game Preserve Lands

Fiscal Year 1940

County	No. Leases	Amount
Beltrami	153	$1,293.75
Koochiching	3	30.00
Lake of the Woods	7	66.00
Total	163	$1,389.75

Fiscal Year 1941

County	No. Leases	Amount
Beltrami	105	$1,070.00
Lake of the Woods	7	64.50
Total	112	$1,134.50
Total Collections for Biennium		$2,524.25

TABLE 96

Summary of Tax Forfeited Lands Classified as Conservation Lands and, by Resolution of the County Boards and Acceptance by the Commissioner of Conservation, Dedicated to Conservation Use as Provided Under Laws 1941, Chapter 511

As of June 30, 1942

County	Tracts	Acres
Carlton	140	5,350
Cass	21	840
Koochiching	31	1,240
Pine	721	28,840
St. Louis	56	2,100
Total	969	38,370

Total Set Aside for Conservation Use:

969 Tracts, 38,370 Acres

Land Policy

A complete inventory of trust fund land is being prepared showing the classification and the use to which each parcel is best suited.

Hay and farm leases are sold at public auction where State land sales are held, and through the mail to the highest bidder in counties where no land sales are to be held. The purpose of this policy is to give all prospective lessees due notice of sales and to encourage the sale rather than the leasing of the land. Leasing of the agricultural lands suitable for sale will be limited, and lessees will be encouraged to purchase this type of land. From time to time a survey is made of trust fund lands bordering lakeshores. Desirable tracts will be platted and made available to the public for certain sites and other purposes.

Recommendations

Sub-marginal and non-agricultural land suitable for parks, game refuges and other public purposes should be withdrawn from sale and transferred to the proper division of the department.

Long term leases should be provided for non-agricultural lands which are not subject to sale and are suitable for grazing or pasture. Many inquiries are being received from individuals desiring to lease grazing land for large herds of sheep and cattle.

There are many tracts of trust fund lands which are best adapted to the reproduction of timber or reforestation. These should be withdrawn from sale and transferred to the Division of Forestry.

Only such of the trust fund lands are offered for sale as are well situated in relation to roads, schools and settlements are needed for agricultural use or as additional acreage to established farms.

Zoned areas of trust fund land are being set up in cooperation with the counties and other state and federal agencies working on a land use program for the State of Minnesota.

Legislation

The Legislature of 1941 enacted legislation affecting state trust fund lands which covers many of the recommendations contained in the 1939-1940 Statistical Report. These laws made important changes in previous laws and these changes have aided the division materially in land administration.

Important changes were made in the terms of sale in Laws 1941, Chapter 374. Prior to enactment of this law, the terms of sale provided for the payment of 15 per cent of the purchase price of the land on the date of sale. In addition, the purchaser paid in cash the appraised value of all timber. The balance of the purchase price was payable in forty years, with interest at the rate of 4 per cent payable on June 1st each year.

Laws 1941, Chapter 374, became effective on May 1st of that year and applies to all state trust fund land sold thereafter. This act provides for the following terms of payment:

1. The purchaser shall pay in cash at the time of sale the appraised value of all timber.

2. At least 15 per cent of the purchase price of the land, exclusive of timber, shall be paid in cash at the time of sale, and the balance in not to exceed twenty equal annual installments, payable on June 1st each year following that in which the purchase was made, with interest at 4 per cent per annum on the balance remaining from time to time unpaid, payable with the installments of the principal.

3. In case there are any buildings or other improvements on the land, the value thereof shall be appraised separately and included in the purchase price. No person shall remove, injure or destroy any such building or other improvements until an amount equal to such appraised value has been paid on the purchase price of the premises, in addition to the payment required for timber, if any. Violation of this provision shall be a gross misdemeanor.

4. If interest and installment of principal due on June 1st are not paid within 60 days thereafter, the certificate of sale shall be deemed cancelled without the doing by the state of any act or thing whatever.

5. Provisions are made for the payment of unpaid principal on land certificates on which the 40-year period has expired, if such payments are made before December 31, 1943.

6. Where purchasers default in interest payments on state lands sold prior to January 5, 1934, and redemption is not made within six months after the lands have been reoffered, all rights to redeem are lost and absolute title revests in the state. This provision applies to any lands reoffered but not sold after May 1, 1941.

7. On lands sold prior to January 5, 1934, and reoffered prior to May 1, 1941, the certificate holder was allowed to redeem up to December 31, 1941. If no redemption was made within that time, absolute title revests in the state.

8. In every case where the rights of a purchaser of state trust fund land have been or hereafter shall be absolutely terminated in any manner, all unpaid taxes or assessments against the land at the date of such termination shall be cancelled and the County Auditor shall make entry thereof upon his records of such lands.

9. The County Treasurer shall issue receipts in quadruplicate for payments of interest and principal on state trust fund lands under contract, specifying the name and address of the person making the payment, the date and amount thereof, and shall deliver one copy to the holder of the certificate, one copy to the County Auditor, one copy to the Commissioner of Conservation, and shall retain one copy for his records.

Legislative Recommendations

It is recommended—

1. That the Commissioner of Conservation be authorized to sell at public or private sale buildings on isolated tracts of trust fund lands, or upon tax forfeited lands in the Red Lake Game Preserve or Conservation Areas, where the appraised salvage value of such buildings, as established by the appraisers of the Division of Lands and Minerals on any one tract, does not exceed $100.00, and where such lands are not to be sold as agricultural lands, but are to be reserved for conservation or other use.

2. That provision be made for the cancellation of the improvement valuations assessed against state trust fund lands improved under Laws 1917, Chapter 164, on such of these lands as have not been sold, or where contracts have defaulted, and where the improvements or clearing have grown up to brush, trees and other vegetation and are of no value to the land and constitute a barrier to the sale of the same; and to authorize the sale of such lands in accordance with the provisions and terms for the sale of State lands under Laws 1941, Chapter 374.

3. That legislation be enacted requiring that before exploration for sand and gravel on state trust fund lands, or tax forfeited lands in the Red Lake Game Preserve and conservation areas, may be undertaken, a permit must first be secured from the Commissioner of Conservation for such exploration, and that a complete report of such explorations shall be filed with the commissioner.

4. That State trust fund lands, and tax forfeited lands in the Red Lake Game Preserve and conservation areas, where such lands contain deposits of sand, gravel or peat, which are more valuable for use of these deposits than for agricultural purposes be withdrawn from sale, and provide for the sale or lease of these deposits upon a per cubic yard unit basis, with a fixed minimum value for each type of material to be displaced or removed.

5. That legislation be enacted authorizing withdrawal from sale of all tax forfeited lands in the Red Lake Game Preserve and Conservation Areas bordering lakes or other public waters, and provide for their development for conservation use or their leasing to the public for cabin sites or recreational purposes.

6. That provision be made for the withdrawal from sale of trust fund lands, and tax forfeited lands in the Red Lake Game Preserve or Conservation Areas, which are more suitable for parks, forests, game refuges and other public purposes, than for agricultural or other private use, and transfer the administration thereof to the proper division of the Department of Conservation.

7. That provision be made for the payment of trust fund lands in the Thief Lake Game Refuge, acquired by the Division of Game and Fish through condemnation, in order to reimburse the trust funds for the value of such lands.

Division of State Parks

HAROLD W. LATHROP, *Director*

General

The state legislature, more than fifty years ago, began the establishment of state parks to provide public places to which the rank and file of the people could go to seek outdoor recreation. The administration of state parks as one unit or system began in 1935, with the creation of a Division of State Parks in the Department of Conservation. This report for the fiscal years 1941 and 1942 covers the division's sixth and seventh years of state park operation and maintenance in Minnesota.

Changes in laws during the early years of operation have been necessary and have resulted in changes in procedures. The Legislatures of 1939 and 1941 made blanket appropriations for the maintenance of all the parks in addition to providing funds for administrative salaries and administration expense. Capital improvements and additions have been expanded through the sponsoring of federal work relief projects, the sponsor's share of the costs having been provided by allotments made by the Legislative Emergency Committee and the Legislative Advisory Committee.

The Legislature of 1939, Chapter 435, declared that all receipts from revenue producing facilities should be paid into the general revenue fund making it necessary to change the system of operations from those which prevailed under previous legislation. The Legislature of 1941 appropriated a $7,500 revolving fund with authority for the Division to operate as a state activity, all revenue producing facilities with future receipts credited to such operations. The bill, however, stipulates that at the end of each fiscal year, any cash balance in excess of $7,500 is to be transferred into the general revenue fund.

The Legislature of 1941, Chapter 291, authorized the Division to rent state-owned buildings to employees and the revenues derived therefrom were to be credited to the maintenance fund.

Receipts from the Douglas Lodge lease and from land rentals and sale of hay stumpage are paid directly into the general revenue fund.

The statutory changes affecting as they do, the last year of the previous biennium and the first year of this biennium, are reflected in this report by separate accountings for each year's operation.

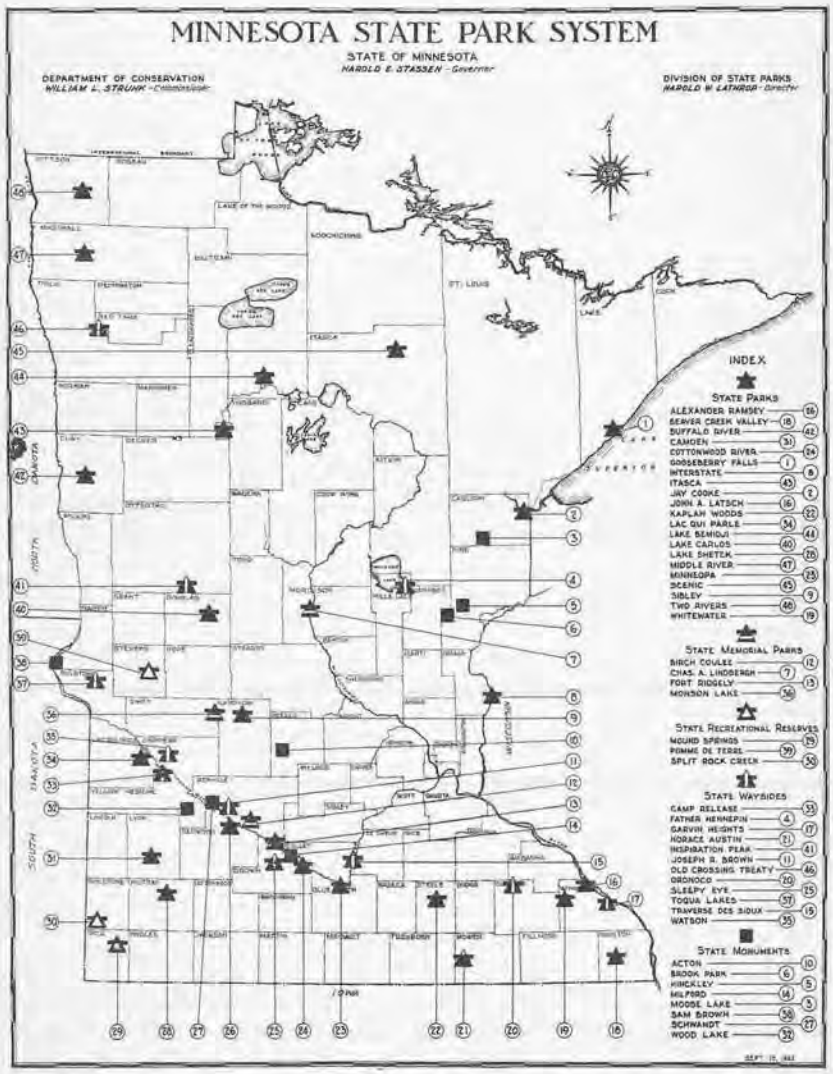
The State Park System

The State Park system as of June 30, 1942, consists of forty-eight units aggregating 50,605.29 acres. The units have been classified into five groups to more fully indicate the type and character of each group as well as the nature of the general facilities offered.

State Parks, twenty-one in number, embrace areas of considerable extent which combine superlative scenery and which offer a varied and extensive opportunity for recreation, in each case distinctive in character for the section of the state in which the park is located.

State Memorial Parks, four in number, comprise areas which have been dedicated primarily to emphasize and perpetuate some outstanding historical event or to memorialize outstanding personages. They are of sufficient size to offer extensive opportunities for recreation.

FIG. 19



State Recreational Reserves, three in number, are relatively large areas which, although lacking in some of the scenic attractions for which other areas are noted, nevertheless, supply extensive opportunities for active recreation.

State Waysides, twelve in number, are the smaller areas maintained by the Division, for some scenic, historic or scientific significance and offer limited facilities for active recreation, but serving a distinct purpose in the state-wide recreational pattern.

State Monuments, eight in number, are the small tracts or structures which commemorate pioneers or events of state-wide historic significance. They are not suited for recreational activities.

Locations. The map of the State Park System, Figure 19, shows the location of each of the forty-eight areas and lists each within its classification group. A study of such map shows the uneven distribution of the present park areas and where additional parks should and might well be established, to provide the people reasonable and equitable recreational opportunities in state parks.

Characteristics and Facilities. The Index of Characteristics and Facilities, Figure 20, shows considerable information relative to each of the units in the system except the monuments. From a study of this chart, it will be noted that:

Ramsey Falls, Alexander Ramsey State Park

FIG. 20

Index of Characteristics and Facilities of State Park Areas

NAME OF AREA	DATE EST.	COUNTY	ACRES	CHARACTERISTICS: Botanical	Geological	Scenic	Historical	Wildlife	River	Lake	Falls	ACTIVITIES: Bathing	Boating	Camping	Fishing	Golf	Hiking	Horseback.	Nature Study	Picnicking	WINTER SPORTS: Skating	Skiing	Tobogganning	TRAILS: Foot	Horse	CAMPING: Tent	Trailer	Group	CAMP GROUNDS: Tent Sites	Trailer Sites	Showers	Kitchen	OTHER FACILITIES: Amphitheater	Bathhouse	Boat Docks	Housekeeping Cabins	Golf Course	Excursion Boat	Lodge & Cabins	Picnic Shelter	Playfield	Nature Trails	Museum	Refectory	Swimming Beach	Swimming Pool
STATE PARKS																																														
Alexander Ramsey	1911	Redwood	185.38	●	●	●			●		●						●		●	●				●																	●	●			●		
Beaver Creek Valley	1937	Houston	325.17	●		●			●						UNDEVELOPED																																
Buffalo River	1937	Clay	241.86	●		●		●	●			●		●			●			●				●		●			●																	
Camden	1935	Lyon	469.96	●		●	●	●	●			●		●			●		●	●		●	●	●		●		●					●	●						●	●	●			●	●	
Cottonwood River	1937	Brown	836.48			●				●		●	●	●	●		●			●	●	●	●	●				●				●		●						●	●	●	●			
Gooseberry Falls	1937	Lake	637.63	●	●	●		●	●	●	●			●	●		●			●				●		●	●		●	●	●	●								●	●	●				
Interstate	1895	Chisago	154.00	●	●	●			●				●	●	●		●			●				●		●	●		●	●	●	●						●			●					
Itasca	1891	Clear, Hubb, Becker	31,814.00	●			●	●	●	●		●	●	●	●		●	●	●	●				●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●		
Jay Cooke	1915	Carlton	8,186.57	●	●	●	●	●	●				●				●	●	●	●				●	●	●	●		●	●										●		●				
John A. Latch	1925	Winona	358.20	●	●	●			●					●	●		●			●				●		●	●		●												●					
Kaplan Woods	1935	Steele	160.00	●					●						●		●			●				●																	●					
Lac Qui Parle	1941	Chipp & Lac Qui Parle	457.49	●		●	●		●	●			●		●		●			●				●																●		●	●				
Lake Bemidji	1923	Beltrami	205.48	●		●				●		●	●	●	●		●			●				●		●	●		●	●		●		●	●						●		●	●		
Lake Carlos	1936	Douglas	403.56	●		●				●		●	●	●	●		●			●				●		●		●	●					●	●						●		●	●		
Lake Shetek	1937	Murray	186.62	●		●	●			●		●	●	●	●		●			●				●		●		●	●			●		●	●						●		●	●		
Middle River	1937	Marshall	285.00	●		●	●		●			●					●			●				●		●							●	●						●	●	●			●	
Minneopa	1905	Blue Earth	110.24	●		●			●		●						●			●				●					●											●		●				
Scenic	1921	Itasca	2,121.30	●		●		●		●		●	●	●	●		●			●				●		●	●		●	●	●	●		●		●					●		●	●		
Sibley	1919	Kandiyohi	378.83	●		●		●		●		●	●	●	●		●			●				●		●	●	●	●	●	●	●	●	●	●						●	●	●			
Two Rivers	1937	Kittson	711.76	●		●			●	●		●	●	●	●		●			●				●		●	●		●					●	●						●	●	●			
Whitewater	1919	Winona	688.28	●	●	●		●	●			●		●	●	●	●			●	●	●	●	●		●	●	●	●	●	●	●	●	●			●	●			●	●			●	
STATE MEMORIAL PARKS																																														
Birch Coulee	1895	Renville	82.00	●			●										●			●				●																●					
Chas A. Lindbergh	1931	Morrison	110.42	●			●	●		●				●	●		●			●				●		●	●		●												●		●	●	●	
Fort Ridgely	1911	Nicollet	224.80	●			●	●								●	●			●				●																●	●	●	●	●		
Monson Lake	1937	Swift	198.95	●				●			●						●			●				●																	●					
STATE RECREATIONAL RESERVES																																														
Mound Springs	1937	Rock	194.90	●	●	●				●					●		●			●						●																				
Pomme de Terre	1937	Stevens	363.51						●	●		●	●		●		●			●														●								●	●			
Split Rock Creek	1937	Pipestone	227.64																																											
STATE WAYSIDES																																														
Camp Release	1889	Lac Qui Parle	17.80					●												●																										
Father Hennepin	1941	Mille Lacs	129.75	●				●		●					UNDEVELOPED																																
Garvin Heights	1922	Winona	17.00				●													●																										
Horace Austin	1913	Mower	50.00				●		●				●							●						●																				
Inspiration Peak	1931	Otter tail	82.00	●			●										●			●				●																						
Joseph R. Brown	1937	Renville	3.00					●							UNDEVELOPED																																
Old Crossing Treaty	1931	Red Lake	6.00				●	●		●										●																										
Oronoco	1937	Olmstead	105.00				●				●				●					●																										
Sleepy Eye	1921	Brown	40.00				●	●			●				●					●																										
Toqua Lakes	1919	Big Stone	40.00				●				●									●																										
Traverse des Sioux	1905	Nicollet	2.27					●												●																										
Watson	1938	Chippewa	12.00				●			●										●																										

Bathing is provided in 13 areas on 9 beaches and in 4 pools;

Boating may be enjoyed in 11 areas;

Camping can be done in 17 areas, in 7 of which excellent accommodations are provided, such as kitchen, showers, laundry, shelter and modern toilets;

Fishing is available in 19 areas;

Golf courses are provided in 2 areas;

Hiking and picnicking are universally provided for in all areas;

Museums of historical interest exist in 2 areas;

Refectories serving refreshments are operated in 20 areas.

The rapid expansion of improvements to increase the general usefulness of the parks, was due largely to the federal work relief programs under the CCC and WPA organizations. The National Park Service cooperation in directing the CCC work proved of inestimable value in such activities. Such extensive improvements fully explain the reason why the state park system attracted an estimated attendance of 1,350,000 in 1941, compared with 650,000 in 1937.

Major Betterments. Numerous improvements of both structural and landscape nature have been completed during the past two years and all have been of direct benefit to the state park visitors. The following list indicates the more important of such improvements.

Lac qui Parle Mission Restoration—Lac qui Parle State Park

Alexander Ramsey—Modern Rest Rooms, Picnic Shelter, Parking Area;

Buffalo River—Swimming Pool, Bathhouse and Refectory, Service Buildings;

Camden—River Ford, Channel Change;

Cottonwood River—Picnic Kitchen, Custodian's Dwelling, Boathouses and Docks, Entrance Road Oiling, Parking Area;

Gooseberry Falls—Contact Station, Ice House, Sewage Disposal System, Helps Quarters, Entrance Road and Portals, Parking Area;

Interstate—Remodeled Men's and Women's Rest Rooms, Camp Ground Service Building;

Itasca—New Forest Inn at Douglas Lodge, Sewage Disposal System Extension, Superintendent's Residence, Modern Rest Room in Douglas Lodge Area, Park Office, Parking Areas, Water Tower, Refectory at Headwaters, Warehouses, Equipment Garage;

Jay Cooke—Widening and Oiling One Mile of Park Drive, Parking Area, Remodelled Swinging Bridge, Water System, Picnic Ground Shelter Including Rest Rooms and Refectory;

Lac qui Parle—Shelter, Restoration of Mission, Parking Area;

Lake Carlos—Group Camp Recreation Building, Group Camp Mess Hall, Road to Group Camp, Parking Area, Bathhouse and Refectory, Sewage Disposal System, Water System;

Lake Shetek—Causeway to Loon Island, Picnic Kitchen, Parking Area, Sewage Disposal System, Group Camp Recreation Building;

Middle River—Suspension Footbridge, Picnic Shelter;

Mound Springs—Rest Rooms, Well, Entrance Road;

Two Rivers—Group Camp Mess Hall;

The landscape work consisted of extensive plantings of native trees and shrubs to assist in the improvement of shade and cover and adjacent to structural improvements to make them harmonize with natural surroundings.

Such list does not include numerous minor jobs which also helped materially to satisfy the needs of the public such as picnic tables, camp stoves, drinking fountains, settees, docks, foot trails, beaches and other appurtenances:

Cost of the System—The valuation of the state park system is shown in Table 97. It has been determined by appraising the probable worth of the lands at the time each area was acquired and adding thereto the estimated value of the permanent improvements made by the state and by the various federal relief agencies under work relief program as these improvements have been completed and added from time to time. The valuation of the park system has been increased by $563,205.65, during the biennium ending June 30, 1942, over that shown as of June 30, 1940. It is to be noted that by placing conservative estimates to the value of improvements constructed by federal unemployment relief agencies, such are greater than the total value of lands purchased and improvements authorized by the state during the 53 years that state parks have existed in Minnesota.

TABLE 97

INVENTORY VALUE OF STATE PARK LANDS AND IMPROVEMENTS

As of June 30, 1942

PARK NAME	LAND		IMPROVEMENTS		Total
	Purchase	Donations	State	Federal	
Acton	$25.00		$2,500.00		$2,525.00
Alexander Ramsey	14,409.53	$3,317.00	25,947.44	$19,902.56	63,576.53
Beaver Creek Valley	9,532.13				9,532.13
Birch Coulee	7,252.00	1,376.00	10,852.29	21,896.21	41,376.50
Brook Park		100.00	2,500.00		2,600.00
Buffalo River	15,890.87		10,561.50	64,657.50	91,109.87
Camden	21,627.00	600.00	11,304.59	139,706.41	173,238.00
Camp Release	330.00		5,400.00	150.00	5,880.00
Chas. A. Lindbergh		9,000.00	32,417.13	32,622.84	74,039.97
Cottonwood River	77,107.47		76,859.55	237,864.21	391,831.23
Father Hennepin		3,243.75			3,243.75
Fort Ridgely	17,391.21		17,276.87	109,417.13	144,085.21
Garvin Heights		1,020.00	1,037.82	162.18	2,220.00
Gooseberry Falls	25,000.00		2,847.08	283,147.92	310,995.00
Hinckley		100.00	2,500.00		2,600.00
Horace Austin	5,000.00		12,725.00		17,725.00
Inspiration Peak	2,000.00		1,325.00		3,325.00
Interstate	3,651.00	23,300.00	22,858.67	59,336.83	109,146.50
Itasca	1,180,560.00	582,340.00	152,706.26	570,930.74	2,486,537.00
Jay Cooke	113,048.61	48,300.00	69,126.86	178,272.14	408,747.61
John A. Latsch		26,265.00	1,665.00	150.00	28,080.00
Joseph R. Brown		60.00			60.00
Kaplan Woods	15,505.25		650.00	150.00	16,305.25
Lac qui Parle	15,221.00		4,646.14	26,738.86	46,606.00
Lake Bemidji	43,050.54		7,470.72	15,439.28	65,960.54
Lake Carlos	8,838.59		12,454.10	27,678.68	48,971.37
Lake Shetek	27,854.20		34,827.75	128,377.25	191,059.20
Middle River	8,996.56		11,687.03	44,161.97	64,845.56
Milford		100.00	2,688.00		2,788.00
Minneopa	9,359.00	160.11	24,344.04	18,316.00	52,170.15
Monson Lake	16,110.00		3,906.04	32,423.96	52,440.00
Moose Lake		150.00	2,500.00		2,650.00
Mound Springs	15,623.13		6,506.33	23,043.82	45,173.28
Old Crossing Treaty		900.00	500.00	1,820.00	3,220.00
Oronoco	7,500.00		1,279.65	9,933.10	18,712.75
Pomme de Terre	18,097.81		15,887.16	48,163.84	82,148.81
Sam Brown	2,500.00		2,500.00		5,000.00
Scenic	58,195.00		775.00	92,018.00	150,988.00
Schwandt		10.00	275.00		285.00
Sibley	24,800.00		222.15	162,608.85	187,631.00
Sleepy Eye	1,296.50	6,704.00	4,050.00	480.00	12,530.50
Split Rock Creek	12,951.22		3,202.92	20,637.08	36,791.22
Toqua Lakes	2,733.00		1,440.00	6,600.00	10,773.00
Traverse des Sioux	250.00	250.00	1,225.00	150.00	1,875.00
Two Rivers	16,996.26		19,789.89	53,897.26	90,683.41
Watson	336.00		903.51	8,236.49	9,476.00
Whitewater	9,491.58	4,713.20	18,499.27	186,787.73	219,491.78
Wood Lake	250.00		2,500.00		2,750.00
Total	$1,808,777.46	$712,009.06	$647,140.76	$2,625,878.84	$5,793,806.12

Land Acquisition—Three land areas have been acquired during the biennium. One, the Father Hennepin State Memorial Wayside, comprising 129.75 acres is a new unit in the park system. The other two acquisitions embrace 4,751.57 acres as an addition to Jay Cooke State Park and 2.2 acres additional to Lac qui Parle State Park.

The Father Hennepin Wayside was authorized by the 1941 Legislature, Chapter 520, which dedicated some heavily wooded, tax-forfeited lands on the west shore of Isle Bay at the southeast side of Mille Lacs Lake, for park purposes.

Likewise the addition to Jay Cooke State Park comprised tax-forfeited lands contiguous to the existing park. The greater portion of this acquisition lies on the south side of the St. Louis River and contains some excellent terrain suitable for winter sports.

The addition to Lac qui Parle State Park included the site of the historically important Renville Stockade, on the east bank of the Lac qui Parle Lake. The area was donated to the state by Chippewa County at the request of the Chippewa County Historical Society.

Tools and Equipment—Table 98, lists the valuation of tools and equipment in each of the units of the system. The Division is seriously handicapped in the most efficient operation of the parks because of the shortage of mobile equipment. However, as soon as normal conditions return, trucks which cannot be obtained under existing emergencies should be provided.

New Refectory at Headwaters Parking Area—Itasca State Park

In the report for the biennium ending June 30, 1940, the valuation of tools and equipment was shown as $51,766.63. The increase of $46,860.03 is due to several reasons. A large amount of equipment which was formerly the property of the Division of Social Welfare for use in camps, or loaned to WPA, was turned over to this Division for use in group camps in the parks. The Division of Public Property added numerous items by their thorough inventory of all parks. Several pieces of heavy equipment purchased for state park work relief projects by SERA control were added. A large number of small tools were purchased for the maintenance of the newer operations. Additional equipment purchased for use in the revenue producing operations including boats and cash registers are included in this new inventory.

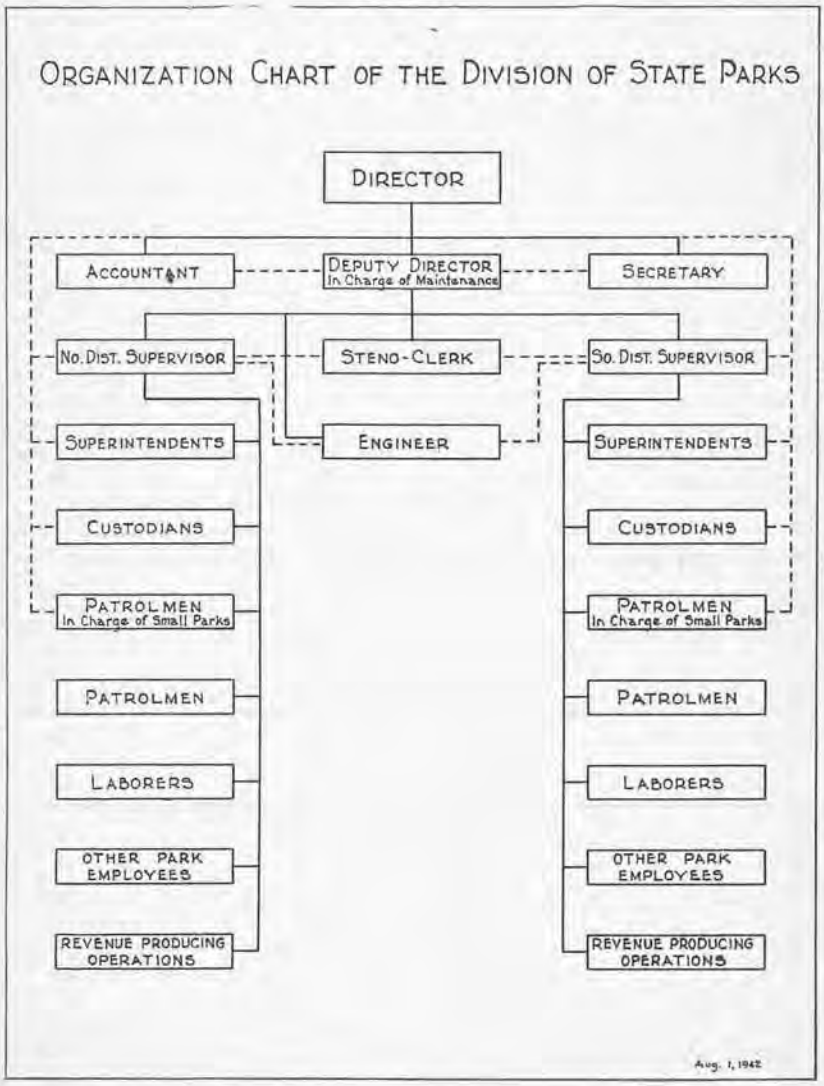
TABLE 98

Valuation of Tools and Equipment in Each of the State Parks

Alexander Ramsey	$ 1,157.61
Birch Coulee	456.20
Buffalo River	995.25
Camden	2,568.24
Cottonwood River	6,207.89
Camp Release	98.03
Chas. A. Lindbergh	988.03
Fort Ridgely	2,621.59
Garvin Heights	44.73
Gooseberry Falls	2,941.63
Horace Austin	432.53
Inspiration Peak	115.90
Interstate	4,832.13
Itasca	38,827.66
Jay Cooke	3,681.05
John A. Latsch	863.30
Kaplan Woods	114.20
Lac qui Parle	84.58
Lake Bemidji	1,498.84
Lake Carlos	3,845.04
Lake Shetek	3,909.51
Middle River	1,149.54
Milford Monument	36.50
Minneopa	1,095.03
Monson Lake	272.15
Moose Lake	30.12
Mound Springs	258.11
Old Crossing Treaty	148.15
Oronoco	175.96
Pomme de Terre	619.70
Scenic	4,927.10
Sibley	3,124.47
Sleepy Eye	262.84
Split Rock Creek	.....
Toqua Lakes	443.75
Traverse des Sioux	178.00
Two Rivers	2,726.44
Whitewater	6,097.14
Wood Lake Monument	36.50
	$98,626.66

Organization—The operation, maintenance and general administration of the state park system to meet the heavy demands and expectations of the visiting public calls for a closely knit, efficient organization, the establishment of a uniform policy applicable throughout the entire system and short period checks by members of the administrative staff. The present plan of employing two district supervisors, one for the northern and one for the southern section, has proven very satisfactory. The general line of authority of the entire organization is shown on Figure 21.

FIG. 21



The opening up during the biennium of several new units in the system and the return to state operation of revenue producing facilities made it necessary to increase the number of employees over previous years.

The classifications and number in each classification on the payrolls of the Division as of June 30, 1942, were as follows:

Director	1
District Park Supervisors	3
Park Superintendent II	1
Park Superintendents I	13
Park Custodians	12
Account Clerk II	1
Clerk-Stenographers II	2
Clerk I	1
Engineering Aide III	1
Laborers II	5
Laborers I	12
Refectory Clerks	3
Custodial Helpers I	4
Lifeguards	11
Laborers I (part time)	12
Custodial Helpers I (part time)	55

State park operations are particularly seasonal in character, and call for a wide variation in the number of personnel required to properly perform such services. The problem of large turnovers in temporary personnel, especially in the part time jobs, concerned with operations of refectories cannot be overcome. Thus, the number of employees shown each month in Table 99 is somewhat misleading. The tabulation, however, shows the actual number of persons employed full or part time during each month indicated and the total payroll for each month of the fiscal years 1941 and 1942.

TABLE 99

Number of Personnel and Salary Expenditures by Months

Fiscal Years 1941 and 1942

	1941				1942		
Month	Perm.	Temp.	Amount	Month	Perm.	Temp.	Amount
July	53	21	$ 6,211.85	July	47	76	$ 8,373.10
August	52	24	6,207.85	August	49	70	8,030.21
September	52	24	5,941.55	September	49	49	6,891.90
October	39	3	4,502.55	October	38	12	4,719.50
November	30	1	3,751.65	November	30	1	3,747.25
December	30	2	3,362.90	December	29	1	3,328.25
January	30	....	3,104.15	January	28	4	2,827.05
February	29	....	2,646.65	February	28	5	3,705.65
March	29	....	2,696.65	March	29	4	4,077.31
April	33	2	3,856.94	April	30	8	4,200.20
May	50	54	6,321.10	May	43	47	6,056.45
June	51	66	7,353.07	June	38	88	7,639.75
Total			$55,956.91	Total			$63,596.62

Financial Reports

Fiscal Year Ending June 30, 1941—All balances in legislative appropriations as of June 30, 1940, were cancelled into the general revenue fund. Unexpended balances of the Legislative Emergency Committee allotments for work relief projects as of the same date were carried forward. The Department of Administration withheld 10 per cent of the legislative appropriations for reserve. On July 1, 1941, this reserve was slightly in excess of the percentage required, but all was transferred into the general revenue fund.

The revolving fund for operating revenue producing facilities became available April 28, 1941, and thereafter all receipts from such operations were deposited to such fund and operating expenditures were made therefrom for the remainder of the 1941 fiscal year. A summary of all receipts and expenditures for the fiscal year 1941, are shown on Table 100.

TABLE 100

Summary of Receipts and Expenditures

Fiscal Year 1941

RECEIPTS			
Balance B.F. in Work Project Fund	$ 5,075.70		
L. E. C. Allotments	20,086.00	$ 25,161.70	
Balance B.F. Comm. Cont. Fund	$ 254.98		
Approp. for Maintenance	70,000.00		
Approp. for Admin. Salaries	9,200.00		
Approp. for Admin. Expense	2,500.00	$ 81,954.98	
Approp. for Revolving Fund	$ 7,500.00		
Receipts Cr. to Revolving Fund	5,102.30	$ 12,602.30	$119,718.98
Receipts Cr. to General Revenue Fund		$ 17,026.93	
EXPENDITURES			
Work Projects	$21,785.04		
Commissioners Contingent Fund	246.67		
Maintenance Fund	61,847.09		
Administration Salaries	8,973.91		
Administrative Expense	2,497.09		
Revolving Fund	14,082.77	$109,432.57	
Balance C.F. in Work Project Fund	$ 3,376.66		
Balance C.F. in Revolving Fund—OD	(1,480.47)		
Reserve Tr. to Gen. Rev. Fund	8,381.91		
Comm. Cont. Fund Balance Cancelled	8.31	$ 10,286.41	$119,718.98

For detailed information on sources of revenues from facility operations, see Tables 102 and 103.

TABLE 101

Summary of Receipts and Expenditures

Fiscal Year 1942

RECEIPTS

Balance B.F. in Work Project Fund	$ 3,376.66		
L. A. C. Allotments	10,000.00	$ 13,376.66	
Approp. for Maintenance	$65,000.00		
Receipts from Rents	2,978.35		
Approp. for Admin. Salaries	9,200.00		
Approp. for Admin. Expense	2,100.00	$ 79,278.35	
Balance C.F. in Revolving Fund	OD($ 1,480.47)		
Receipts Cr. to Revolving Fund	34,383.44		
Receipts on hand June 30, to be credited to Revenue Fund	1,708.31	$ 34,611.28	$127,266.29
Receipts Cr. to Gen. Rev. Fund		$ 5,587.72	

EXPENDITURES[1]

Work Projects	$11,908.45		
Maintenance Fund	65,456.76		
Administration Salaries	8,288.67		
Administration Expense	1,810.56		
Revolving Fund	32,670.21	$120,134.65	
Balance C.F. in Work Project Fund	$ 1,468.21		
Balance C.F. in Revolving Fund	1,406.88		
Revolving Fund Excess Cash Balance transferred to Gen. Rev. Fund	534.19		
Estimated reserve to G.R.F.	3,722.36	$ 7,131.64	$127,266.29[1]

[1]Expenditure amounts include unexpended encumbrances and may be subject to minor changes.

Fiscal Year Ending June 30, 1942—The unexpended balances from the legislative appropriations as of June 30, 1941, were again cancelled into the general revenue fund. The unexpended balances in the Legislative Emergency Committee allotments for work relief projects as of the same date were carried forward and additional allotments were made by the Legislative Advisory Committee. The Department of Administration withheld 5 per cent for reserve from the legislative appropriations for the fiscal year 1942. There remained a balance at the close of the year of $3,722.36. Receipts from employee rentals were credited into the maintenance fund and thus increased this fund by $2,978.35.

All receipts from state operated revenue producing facilities were credited to the revolving fund, except receipts from the Douglas Lodge lease and from the rental of land or sale of hay stumpage, which by law, are payable into the general revenue fund. A summary of all receipts and expenditures for the 1942 fiscal year is shown in Table 101.

For detailed information on sources of revenues from facility operations see Table 103.

The breakdown of expenditures from legislative appropriations for administrative salaries, administrative expense, and park maintenance and operation are shown in Table 104. The breakdown of expenditures by areas and items in the work project fund and the revolving fund are shown respectively in Tables 105 and 106.

TABLE 102

STATE PARKS RECEIPTS CREDITED TO GENERAL REVENUE FUND—FISCAL YEARS 1941 AND 1942

	Bathhouse and Boats	Cabins, Camping and and Group Camps	Refectory and Ice Sales	Telephone and Electricity	Golf, Boat Permits, Phonograph and Miscellaneous	Hay and Land Rental, Sale of Buildings, and Douglas Lodge Rental		Remittance Costs Deduct	NET TOTALS	
	1941	1941	1941	1941	1941	1941	1942	1941	1941	1942
Administration					$1.00				$1.00	
Alexander Ramsey										
Birch Coulee					.94	$118.75	$95.00	$ (1.00)	118.69	$95.00
Buffalo River										
Camden	$67.93	$10.75	$140.88		204.45			(1.00)	423.01	
Chas. A. Lindbergh		8.00	87.92					(1.64)	94.28	
Cottonwood River	68.94		448.35		.84	80.00	106.00	(1.62)	596.51	106.00
Fort Ridgely			66.80		158.00				224.80	
Gooseberry Falls		418.50	563.08		49.17				1,030.75	
Inspiration Peak							30.00			30.00
Interstate		280.00	251.12		1,267.24			(2.82)	1,795.54	
Itasca	602.35	1,893.00	530.57	$2,245.74	27.67	3,492.20	4,978.91	(32.55)	8,758.98	4,978.91
Jay Cooke			104.25					(.90)	103.35	
John A. Latsch		6.00						(.36)	5.64	
Lac qui Parle			3.48		13.72				17.20	
Lake Bemidji	.43	49.60	25.75				20.10	(1.10)	74.68	20.10
Lake Carlos						5.00	20.00		5.00	20.00
Lake Shetek	36.03	2.88	117.99		238.05		21.00		394.95	21.00
Middle River						1.00	21.00		1.00	21.00
Minneopa			98.07		1.50	20.00	33.03		119.57	33.03
Monson Lake			42.45						42.45	
Mound Springs						40.00	40.00		40.00	40.00
Old Crossing Treaty							6.00			6.00
Pomme de Terre	13.30		13.76			10.00	62.40		37.06	62.40
Scenic	265.25	840.50	99.80			198.00			1,403.55	
Sibley	3.52	43.25	48.97		108.85			(2.32)	202.27	
Sleepy Eye		33.00				22.50	22.50	(.46)	55.04	22.50
Split Rock Creek						14.00	78.00		14.00	78.00
Toqua Lakes						45.00	26.00		45.00	26.00
Traverse des Sioux							8.18			8.18
Two Rivers	26.71	1.00	94.19				19.00	(1.76)	120.14	19.00
Whitewater	86.53	367.00	218.44		630.50				1,302.47	
Totals	$1,170.99	$3,953.48	$2,955.87	$2,245.74	$2,701.93	$4,046.45	$5,587.72	$(47.53)	$17,026.93	$5,587.72

TABLE 103

RECEIPTS CREDITED TO STATE PARKS REVOLVING FUND—FISCAL YEARS 1941 AND 1942

	Bathhouse, Boats and Linen Rentals		Cabins, Camping and Group Camping		Refectory, Minnows, Ice Sales and Merchandise Refunds		Telephone and Electricity		Golf, Boat Permits, Phonograph and Miscellaneous		Net Totals	
	1941	1942	1941	1942	1941	1942	1941	1942	1941	1942	1941	1942
Alexander Ramsey					$92.75	$488.20					$92.75	$488.20
Buffalo River	$19.55	$138.80		$5.75	128.45	509.66					148.00	654.21
Camden	83.70	374.00	$14.25	127.05	337.30	1,164.62					435.25	1,665.67
Chas. A. Lindbergh			1.50	5.00	263.20	1,206.42					264.70	1,211.42
Cottonwood River	117.80	435.80		50.00	221.10	901.66		$1.25	$30.00	$138.90	368.90	1,527.61
Fort Ridgely					610.15	856.06			345.50	204.00	955.65	1,060.06
Gooseberry Falls			105.50	374.00	729.30	3,260.31	$10.45	18.95	10.34	45.50	855.59	3,698.76
Interstate			55.25	439.00	837.60	2,828.49				1,250.00	892.85	4,517.49
Itasca	181.85	685.50	507.65	2,250.65	388.48	2,069.40	290.55	2,448.10	67.40	33.76	1,434.48	7,487.41
Jay Cooke			33.00	187.48	54.00	183.14			1.00	2.00	88.00	372.62
John A. Latsch			.50	6.75							.50	6.75
Lac qui Parle									5.27	5.02	5.27	5.02
Lake Bemidji	3.50	29.95	9.50	58.75	54.60	191.45					67.60	280.15
Lake Carlos		4.40				147.29						151.69
Lake Shetek	6.95	106.90		76.75	193.05	730.97				.38	200.00	915.00
Middle River	35.20	164.15		.50	281.60	749.77					316.80	914.42
Minneopa					544.70	1,266.40					544.70	1,266.40
Monson Lake						53.92						53.92
Pomme de Terre	27.10	69.15			106.05	289.55					133.15	358.70
Scenic	110.75	394.15	170.50	1,040.25	233.05	1,393.65			6.50	16.50	520.80	2,844.55
Sibley	50.50	134.10	92.95	323.25	366.05	912.73					509.44	1,370.08
Toqua Lakes					20.00						20.00	
Two Rivers	99.55	392.65	1.00	48.30	183.55	815.07			56.05	94.55	340.15	1,350.57
Whitewater	104.10	373.75	133.00	591.00	1,008.15	2,332.65		.15	448.00	593.50	1,693.25	3,891.05
Totals 1941	$840.55		$1,124.60		$6,653.13		$301.00		$970.06		*$9,887.83	
Totals 1942	[illegible]	$3,303.30		$5,584.48		$22,328.41		$2,468.45		$2,375.75		$36,091.75

*Remittance Costs of $1.51 deducted.

TABLE No. 104
EXPENDITURES BY DIVISION OF STATE PARKS FOR ADMINISTRATIVE SALARIES, ADMINISTRATIVE EXPENSE AND MAINTENANCE AND OPERATION OF PARKS—Fiscal Years 1941 and 1942

AREA	Salaries		Other Services		Supplies and Materials Miscellaneous		Acquisition of Property		Merchandise for Resale		Totals	
	1941	1942	1941	1942	1941	1942	1941	1942	1941	1942	1941	1942
Administration	$11,093.27	$12,951.09	$3,850.98	$2,896.57	$1,849.96	$1,276.66	$169.61	$118.98			$16,962.92	$17,243.30
Alexander Ramsey	1,540.00	1,540.00	58.91	199.08	115.36	109.98					1,714.27	1,849.06
Birch Coulee	457.20	415.00	3.00	1.00	24.16	18.88					484.36	434.88
Brook Park			15.00	40.00							15.00	40.00
Buffalo River	224.23	376.94	19.05	39.27	297.36	187.27	203.12	20.00			743.76	623.48
Camden	1,601.50	1,800.00	283.61	269.34	141.00	103.07		138.34			2,026.11	2,310.75
Camp Release	83.20	113.20	23.35	21.25	5.00						111.55	134.45
Chas. A. Lindbergh	1,107.50	1,245.15	116.75	123.35	132.01	95.31					1,356.26	1,464 41
Cottonwood River	1,453 60	1,594.10	361.80	417.67	751.49	1,206.00	269.18	12.02			2,836.07	3,229.79
Fort Ridgeley	1,262.50	1,615.10	283.61	331.95	230.75	305.30	487.50	102.72			2,264.36	2,355.07
Garvin Heights	58.80	48.80		5.00		1.32					58.80	55.12
Gooseberry Falls	994.10	1,415.20	225.93	625.65	672.17	359.58	234.65	55.76			2,126.85	2,456.19
Horace Austin	522.00	495.00		2.00	19.18	31.40					541.18	528.40
Inspiration Peak	96.80	88.00		4.00							96.80	92.00
Interstate	1,849.20	1,904.05	80.30	85.01	185.77	181.20	20.00	54.34			2,115.27	2,224.60
Itasca	8,984.80	6,772.50	529.88	341.59	3,973.74	2,618.39		1,022.34	$160.62		14,212.39	10,754.82
Jay Cooke	2,200.00	2,281.60	289.00	1,660.98	424.83	1,766.22	563.35				2,923.56	5,708.80
John A. Latsch	488.00	450.00	83.90	72.25	20.33	28.39	9.73				592.23	550.54
Kaplan Woods	360.00	360.00			21.19	10.51					381.19	370.51
Lac qui Parle	459.60	413.80	46.76	53.45	45.21	23.50					551.57	490.75
Lake Bemidji	659.95	660.00	81.31	62.35	99.63	9.51					840.89	731.86
Lake Carlos	280 00	440.00		65.52	78.32	93.57		185.00			358.32	784.09
Lake Shetek	238.60	714.40	36.47	175.62	195.30	107.29		19.60			470.37	1,016.91
Middle River	149.00	425.32	23.11	68.35	231.88	35.57	157.15	85.00			561.14	614.24
Milford	33.20	20.00		16.60		2.25					33.20	38.85
Minneopa	1,450.00	1,660 00	126.23	132.03	110.87	53.55	157.25	12.00			1,844.35	1,857.58
Monson Lake	450.00	311.40		10.00							450.00	321.40
Moose Lake			36.00	36.00							36.00	36.00
Mound Springs		120.00		6.50		65.75						192.25
Old Crossing Treaty	80.00	80.80	15.00		2.84						97.85	80.80
Oronoco	117.67	180.00			20.13	20.87					137.80	200.87
Pomme de Terre	450.00	405.00	45.87	9.05	67.62	33.37					563.49	447.42
Scenic	1,682.20	1,930.00	204.00	165.18	363.56	476.83	151.71				2,402.07	2,572.01
Sibley	1,000.00	1,400.00	343.93	342.99	244.60	154.26		7.50			1,588.53	1,904.75
Sleepy Eye	372.80	280.00	1.25	14.43	15.93	23.82					389.98	318.25
Split Rock Creek			15.00		2.45	7.78					17.45	7.78
Toqua Lakes	525.00	525.00	26.00	2.50	5.76	9.83					556.76	537.33
Traverse des Sioux	61.20	92.40		13.25	2.45						63.65	105.65
Two Rivers	819.60	1,415.20	309.66	252.97	166.27	192.64	286.22				1,581.75	1,860.81
Whitewater	1,741.48	1,640.80	313.78	317.78	230.19	214.18					2,285.45	2,172.76
Wood Lake			14.00	35.00	6.00						20.00	35.00
District Supervisors	5,141.53	5,059.92	2,009.69	1,742.54							7,151.22	6,802.46
Totals 1941	$50,088.53		$9,872.83		$10,733.31		$2,709.47		$160.62		$73,564.76	
Totals 1942		$53,239.77		$10,655.07		$9,827.55		$1,833.60				[1]75,555.99

TABLE 105

EXPENDITURES BY DIVISION OF STATE PARKS FOR SPONSORING C. C. C., W. P. A., AND N. Y. A. WORK RELIEF PROJECTS

FISCAL YEARS 1941 AND 1942

AREA	Salaries		Other Services		Supplies and Materials		Acquisition of Property		Totals	
	1941	1942	1941	1942	1941	1942	1941	1942	1941	1942
Administration	$3,030.00		$70.85		$90.62	$234.68			$3,191.47	$ 234.68
Alexander Ramsey							$1,095 65		1,095.65	
Buffalo River					68.60		1,247.24		1,315.84	
Camden			414.80		78.66		22.46	$225.94	515.92	225.94
Camp Release							124.65		124.65	
Cottonwood River		$584.60		$5.00	34.95	585.65	1,165.34	831.24	1,200.29	2,006.49
Gooseberry Falls							393.62	49.71	393.62	49.71
Interstate		300.00	525.00	52.00		364.43	1,635.02	28.03	2,160.02	744.46
Itasca				196.00		391.29	1,728.62	1,579.58	1,728.62	2,166.87
Jay Cooke	625.00	557.40		101.70	20.40	581.84	544.07	1,074.02	1,189.47	2,314.96
Lac qui Parle				20.00		149.67	17.11	126.00	17.11	295.67
Lake Carlos						602.00	925.28	1,519.79	925.28	2,121.79
Lake Shetek			111.60				4,365.14	73.17	4,476.74	73.17
Middle River							575.66	20.48	575.66	20.48
Mound Springs				207.60		157.49	82.87	1,055.11	82.87	1,420.20
N. Y. A. Statewide Projects						32.91	660.04	129.63	660.04	162.54
Split Rock Creek					236.10		833.91		1,070.01	
Two Rivers							670.49		670.49	
Whitewater							397.29		397.29	
W. P. A. Certified Projects						71.49				71.49
1941 Totals	$3,655.00		$1,122.25		$529.33		$16,484.46		$21,791.04	
1942 Totals		$1,442.00		$582.30		$3,171.45		$6,712.70		$11,908.45

TABLE No. 106

EXPENDITURES BY DIVISION OF STATE PARKS FOR OPERATION OF REVENUE PRODUCING FACILITIES UNDER REVOLVING FUND

Fiscal Years 1941 and 1942

AREA	Salaries		Other Services		Supplies and Materials		Acquisition of Property		Merchandise for Resale		Totals	
	(3 months) 1941	(12 months) 1942	1941	1942	1941	1942	1941	1942	1941	1942	1941	1942
Administration		$160.00	$0.55	$257.45	$41.35	$334.89	$5.88	$88.00			$47.78	$840.34
Alexander Ramsey	$3.90	31.35	3.50	3.50	11.79	10.00	48.75		$112.73	$315.46	180.67	360.31
Buffalo River	34.05	182.79	3.50	46.50	65.02	14.25	41.50		157.28	419.95	301.35	663.49
Camden	97.05	309.42	21.67	117.07	58.95	21.25			473.57	862.84	651.24	1,310.58
Chas. A. Lindbergh	42.00	186.60	9.80	42.91	2.00	8.49	43.75		602.47	683.05	700.00	921.05
Cottonwood River	238.08	560.88	53.15	147.99	53.83	8.94	387.80		233.79	514.18	966.65	1,231.99
Fort Ridgely	134.15	414.00	46.67	84.80	21.32	.49	2.75	1.11	573.36	734.22	778.25	1,234.62
Gooseberry Falls	247.09	966.97	55.65	230.80	165.57	51.09	316.38	357.30	898.50	2,398.61	1,683.19	4,004.77
Interstate	199.88	562.75	24.37	153.55	20.19	69.85	162.36	5.11	963.51	2,002.60	1,370.31	2,793.86
Itasca	500.00	2,453.50	35.17	1,756.14	31.20	206.82	589.50	233.44	565.86	1,776.56	1,721.73	6,426.46
Jay Cooke	10.50	85.55	11.92	51.02		10.15	41.50	76.11	92.38	258.35	156.30	481.18
Lac qui Parle						.49						.49
Lake Bemidji	11.40	137.20	3.50	3.50	35.03	20.00	205.90	1.15	81.38	169.24	337.21	331.09
Lake Carlos		68.85		11.94				332.07		212.39		625.25
Lake Shetek	47.40	273.43	20.17	87.20	73.17	16.73	294.20		146.47	694.96	581.41	1,072.32
Middle River	63.10	246.02	10.50	27.79	36.03	19.16	41.50	24.00	267.41	589.98	418.54	906.95
Minneopa	31.05	130.20	11.50	42.41	3.66	18.00	50.00		436.01	1,119.05	532.22	1,309.66
Pomme de Terre	29.00	178.73	3.50	3.50	14.92	18.49	164.40		56.36	134.10	268.18	334.82
Scenic	22.20	227.50	60.41	103.99		32.51	164.40	1.15	416.02	1,061.79	663.03	1,426.94
Sibley	85.50	284.93	5.00	63.23	66.29	15.23	164.40	26.11	280.46	813.89	602.65	1,203.39
Two Rivers	52.10	223.46	18.50	54.80	25.03	15.00	395.80	130.15	151.62	632.62	643.05	1,056.03
Whitewater	364.93	1,230.72	27.52	157.18	23.87	47.00	82.25	845.86	980.42	1,853.86	1,478.99	4,134.62
Totals 1941	$2,213.38		$427.55		$749.22		$3,203.02		$7,489.00		$14,082.77	
Totals 1942		$8,914.85		$3,447.27		$938.83		$2,121.56		$17,247.70		$32,670.21

Revenue Producing Operations

Numerous public services have been provided in state parks since the inception of the Division and the overhead costs of such operations were paid from park maintenance funds. Previous to the approval of Laws of 1941, Chapter 548, Section 37, Subsection E, Item 4, receipts from the special services were paid into the general revenue fund. With the passage of this new law, operation overhead costs, such as salaries, golf course maintenance, operators for telephone systems, caretakers of camp grounds and boat liveries, were charged directly to the revolving fund. Electric power used in refectories, camp grounds, cabins, and on bathing beaches was also paid from the revolving fund. It is emphasized that a comparison of net receipts from revenue producing facilities for the years 1941 and 1942, does not present a true picture, because the receipts which were credited to the general revenue fund in 1941, other than those from leased concessions, do not include any overhead expense.

Table 107 is a statement of operation of the State Parks Revolving Fund from April 29, 1941, through June 30, 1942. This operation yielded a net profit of $9,727.92, or 21 per cent of the gross receipts. When it is kept in mind that salaries of lifeguards, golf course caretakers, camp ground and boat livery attendants, refectory help and telephone operators are included in the personal service account, the item of $11,128.23, or 28 per cent of gross receipts expended for such services reflects an economical and conservative cost of operations.

New Forest Inn, Douglas Lodge Area—Itasca State Park

The purchase of considerable equipment such as boats, cash registers, coolers and bathhouse supplies necessary to start operation, was a considerable item of expense.

TABLE 107

Statement of Operation of State Parks Revolving Fund

(During Period April 29, 1941, to June 30, 1942)

Revenues from sale of merchandise			$29,004.54	
Revenues from Other Sources				
Bathhouses	$ 1,954.35			
Electricity	1,572.59			
Telephone	1,196.86			
Boat Rentals	2,168.85			
Cabin Rentals	4,108.48			
Camping Permits	1,598.10			
Golf Course Fees	1,591.00			
Group Camp Rentals	1,002.50			
Phonograph Commissions	90.04			
Boat Permits and Leases	1,591.47			
Other (less remittance fees)	114.15			
Linen	20.65	16,975.04		
Total Revenue				$45,979.58
Cost of Operations				
Stores for Resale	24,737.30			
Less Inventory 6/30/42	5,199.74	$19,537.56		
Operation Costs				
Personal Services	11,128.23			
Other Services	3,874.82			
Materials and Supplies	1,688.05	16,691.10		
Total Cost of Operations			36,228.66	
Net Profit from Operations				$ 9,750.92

Balance Sheet as of June 30, 1942

Cash balance 6/30/42	7,500.00		
Cash deposit in transit	1,373.32		
Petty Cash fund	340.00		
Equipment purchased	5,324.58		
Inventory — Merchandise on hand 6/30/42	5,199.74		
Appropriation $7,500.00			
Less cancellation 534.19			$ 6,965.81
Accounts Payable (Unliq-Encum)			3,020.91
Surplus (Operation Profit)			9,750.92
	$19,737.64		$19,737.64

The results of the first fifteen months of refectory operation by the Division, justifies the continuance of such service under state operation, with the conviction that the public can be assured a higher degree of service than can be expected under leased operations.

During the early years picnicking was the only substantial activity for which facilities were provided in state parks. It was a simple and uniform service. As the public became acquainted with the state park system, greater demands and expectations brought about extensions of facilities and services to permit a wider utilization of the parks for special types of recreation. It is logical, therefore, that since the public wants these additional facilities and services that they should be provided and the costs borne by the users. Such a policy has been adopted and the breakdown of the sources of revenues as to parks and types are shown in detail in Table 103.

COOPERATION OF FEDERAL AGENCIES

Table 105 lists the parks and nature of expenditures for projects sponsored before work relief organizations during the biennium. Only seventeen parks benefited as compared to the twenty-nine areas during the previous biennium.

Table 108, shows a complete list of parks in which improvements have been made by federal relief agencies since the creation of the Division of State Parks. While expenditures for work relief were made largely as an aid to relieve economic distress and to prevent social maladjustments, a great amount of very fine work has been done which merits just public recognition.

Headwaters of Mississippi River—Itasca State Park

TABLE 108

Parks Benefiting from Federal Relief Projects

Park	NPS-ERA	CCC	WPA	NYA
Alexander Ramsey	....	....	X	....
Beaver Creek Valley	....	....	X	....
Birch Coulee	....	....	X	....
Buffalo River	....	....	X	....
Camden	....	X	X	....
Charles A. Lindbergh	....	....	X	....
Cottonwood River	X	X	X	....
Fort Ridgely	....	X	....	....
Gooseberry Falls	....	X	....	....
Interstate	....	....	X	....
Itasca	X	X	X	....
Jay Cooke	....	X	X	....
Lac qui Parle	....	....	X	....
Lake Bemidji	....	....	X	X
Lake Carlos	....	....	X	....
Lake Shetek	X	....	X	....
Middle River	....	....	X	....
Minneopa	....	....	X	....
Monson Lake	....	X	X	....
Mound Springs	....	....	X	....
Oronoco	....	....	X	....
Pomme de Terre	....	....	X	....
Scenic	....	X	X	....
Sleepy Eye	....	....	X	....
Split Rock Creek	....	....	X	....
Toqua Lakes	....	....	X	....
Two Rivers	....	....	X	....
Watson Wayside	....	....	X	....
Whitewater	X	X	X	....

Minnesota has been fortunate in having been able to derive such extensive benefits in state park improvements through cooperation with CCC, WPA and NYA. Without this aid and resulting improvements, most of the state parks would still provide only meager facilities for satisfying the outdoor recreation needs of the people of Minnesota.

Much credit is due the National Park Service in setting high standards for improvements made by CCC under their supervision. It was the policy of that organization to "build well rather than many." The manner in which such improvements were carried out has already proven the theory that well designed and well constructed improvements are the least costly to maintain.

HIGHLIGHTS OF THE BIENNIUM

An estimated attendance of 1,350,000 visited the Minnesota State Parks in 1941. With the nation at war, the attendance for the 1942 season through June 30, was 64% of the 1941 attendance through the same date.

A five color state park map distributed to hotels, tourist bureaus, conservation organizations, public schools and libraries has done much to publicize the state parks.

The successful operation of state park refectories proved that the public can best be served by state operation.

The increase in number of deer in the southern portion of the state can be attributed in a large measure to wild life sanctuaries provided in state parks.

The first Superintendents' and Custodians' Conference held in Itasca State Park in the spring of 1942, proved invaluable for increasing the efficiency of state park maintenance.

The increased use of group camps by organizations is encouraging.

The receipts from revenue producing facilities through June 30, 1942, were 77% of the 1941 receipts through the same date, reflecting limitations to travel due to war restrictions.

A tablet was dedicated to Mr. Robert Fechner, first Director of the CCC, by World War veterans of the Itasca camp, in July, 1940.

The restoration of the Mission at Lac qui Parle State Park was dedicated in July, 1942.

Regular operations were begun during the biennium at the newly developed state parks of Buffalo River, Lake Carlos, Lake Shetek, Middle River and Mound Springs.

The new Forest Inn in the Douglas Lodge area at Itasca State Park, the finest building of its type in the Minnesota system, was completed in 1940, and is truly a monument to the CCC.

Personnel of Division at Superintendents' and Custodians' Conference Itasca State Park

The new building at Jay Cooke completed in 1942, housing a shelter, rest rooms and refectory, provided much needed facilities in the second largest of Minnesota state parks.

The appointment of an Advisory Committee of fifteen public spirited citizens interested in the development and operation program for Itasca State Park, merits recognition.

New boat rental operations were opened at Cottonwood River, Lake Shetek, Two Rivers and Pomme de Terre.

The location and construction of nature trails and the placing of markers with names of the principal species of plants, shrubs and trees growing along the trails, under a WPA project in Camden, Gooseberry Falls, Itasca, Jay Cooke, Lake Bemidji, Scenic, Sibley and Whitewater State Parks, brought much favorable comment.

Competent superintendents and custodians were obtained for a number of the parks from an eligible list established by a civil service examination.

The commendable interest indicated by Boards of County Commissioners relative to State Aid Parkways in Beaver Creek Valley, Camden and Sibley State Parks is acknowledged.

State park lifeguards were assigned, for the first time, to all regularly operating bathing beaches.

Recognition was given to Mr. George M. Palmer, who served for many years on the Minneopa State Park Advisory Committee, by the dedication of a plaque in the park on May 17, 1942.

The acquisition of land in the Nerstrand Woods area through the cooperation of the United States Forest Service, under the Land Exchange Act, brings closer to a realization the aims of public spirited citizens to preserve a bit of what was once the "Big Woods" of southeastern Minnesota.

LEGISLATIVE RECOMMENDATIONS

In connection with the future operation and maintenance of state parks, it is recommended:

Operation

1. That the Division be authorized to purchase the equipment now owned by the lessee of Douglas Lodge in Itasca State Park and that the Division operate this state-owned resort in the future.
2. That a revolving fund to finance the staging of state park pageants in Itasca and other state parks upon the termination of the war be created.
3. That receipts from revenue producing facilities be dedicated for new construction or improvements where needed to provide more equitably, facilities in all units.

Wild Life

1. That seining of minnows in any stream or lake within a state park unit be prohibited.
2. That some means of reducing the deer herd in Itasca State Park be devised.

Land Acquisition

That the following areas be designated as state parks:

1. Nerstrand Woods.
2. Cascade River area, now under control of the Department of Highways, including contiguous tax-forfeited lands.
3. Shakopee area, now under control of the Department of Highways.
4. Area near Cambridge, which has been declared conservation lands after tax forfeiture.
5. The O. H. Kelley farmstead near Elk River, the birthplace of the National Grange.

It is recommended that a lease be entered into with the federal government, covering the public use area within the St. Croix Recreational area and that the same be operated as a state park under the revolving fund.

Tourist Bureau

VICTOR A. JOHNSTON, *Director*

MINNESOTA'S TOURIST INDUSTRY — A GROWING OPPORTUNITY IN WAR OR PEACE

What is the effect of world war on the tourist industry in Minnesota?

This question, since the Japanese attack on Pearl Harbor on December 7, 1941, has been the major consideration of the Minnesota Tourist Bureau. Now, after nearly a full calendar year of war involving the United States of America at the time of writing this report, many aspects of this question have been answered.

The answers are not pessimistic. This is not a report of gloom. As fact after fact presents itself, it becomes increasingly apparent that the tourist industry of Minnesota not only is making important comparative gains during wartime, but more than ever before is being presented with a growing opportunity for the years of peace to come.

These answers help set the future course in our work of promoting the wartime and peacetime interests of one of Minnesota's great industries.

THIRD LARGEST STATE INDUSTRY

A review of the place of the tourist industry in Minnesota is in order at this time. As a source of wealth to the State of Minnesota, the tourist industry ranks third, exceeded only by agriculture and mining. United States government reports show that recreational travelers have brought into Minnesota nearly $150,000,000 in a single year. This tremendous income from the tourist industry is new money. It was produced elsewhere and is spent here. In the spending it turns over an average of 20 times and benefits nearly all lines of business and employment.

Large sums come directly into the state treasury through the collection of gasoline taxes and the sale of licenses for fishing and hunting.

Thousands of Minnesota citizens obtain their sole income through employment in connection with tourist activities.

The retail and wholesale establishments of our state benefit from extra dollars.

Farmers secure a profitable market near at home for the sale of extra produce. In addition, one or more members of nearly 20 per cent of Minnesota farm families, according to statewide surveys,

FIGURE No. 22

A typical day's mail at the Minnesota Tourist Bureau in St. Paul. New visitors by the thousands came to Minnesota during 1942 as a result of wartime advantages of vacations in this state. The Minnesota Tourist Bureau helped many to plan their trips by supplying booklets, maps and other helpful information.

derive part of their income from employment directly connected with the tourist trade.

A large percentage of regular summer visitors ultimately buy property in Minnesota, helping maintain land prices and reducing the tax burden to the farmer.

Studies have shown that in some townships as high as 65 per cent of the real estate tax is paid by non-resident owners.

All in all, the tourist business benefits people in all walks of life in Minnesota. Previous studies by the Minnesota Tourist Bureau and others have shown that business activity in Minnesota gains during the summer months at a time when farm and other income hits a seasonal slump.[1] The reason for this gain is apparent from other studies which show that the average tourist visitor to Minnesota spends $132 in the state during an average visit of 13 days.

[1]Minnesota Department of Conservation Statistical report, Biennium Ending June 30, 1940. P. 262.

FIGURE No. 23

Minnesota publicity and advertising appeared in these leading magazines during 1942. Using leading publications, Minnesota appeals to people of all income groups who love the outdoors.

A WARTIME PROMOTION PROGRAM FOR MINNESOTA

As the State of Minnesota entered the first wartime tourist season during 1942, it was in an extremely fortunate position to carry on aggressively. The special needs of wartime were soon met by adapting previous plans. Results have been more than satisfactory. Many individual resorts in 1942 reported better business than the year before, although tourists did not travel about from point to point within the state as much as formerly and some resort towns showed a decline in business for the year. The comparative situation has been favorable to Minnesota in the light of reports from such other leading resort and travel states as Florida, California, Wisconsin and others. Principal changes in the promotion plan for the year were made with the idea of concentrating publicity and advertising in more nearby territories while at the same time not forgetting the over-all, long time aim to publicize the advantages of Minnesota throughout the United States and—whenever economically possible — even throughout the world. How both immediate and long term programs were combined is explained in detail in the following sections of this report.

FIGURE No. 24

The Minnesota Tourist Bureau display exhibit at the International Sportsmen's Show, Chicago. Thousands of visitors saw this Minnesota display as it was shown in various leading cities of the country. The display features fishing and the outdoors—fun for all the family in Minnesota.

MOTION PICTURES THROUGHOUT THE WORLD

First achievement of the season was one that brought Minnesota world-wide publicity under most favorable circumstances in motion pictures. This was the technicolor picture, "Minnesota — Land of Plenty," produced by James Fitzpatrick of the Metro-Goldwyn-Mayer Studios in Hollywood. This was a regular, commercial picture. It had its premier showing in the Capitol Theater, New York, early in 1942, and subsequently was shown throughout the nation and in many foreign countries. The total audience seeing this two-reel color picture depicting many of Minnesota's vacation lands cannot be known exactly. However, officials of the Minnesota Amusement Company estimate that the picture will be shown to more than 100,000,000 people in all parts of the world during its commercial life of two and a half years. This world-wide publicity for Minnesota was achieved without cost to the State of Minnesota or the Minnesota Tourist Bureau. Cooperation of the bureau, however, was instrumental in obtaining Mr. Fitzpatrick's choice of Minnesota as one of two state subjects covered in his travel films during the 1942 year.

MINNESOTA PICTURED TO MILLIONS

In addition to the travelogue released by Metro-Goldwyn-Mayer, the beauty of Minnesota and its facilities as a vacationland were pictured to millions of people throughout the principal trade territory by means of a 16 mm. film which was produced by the State Tourist Bureau.

This film was used at travel and sports shows throughout the United States. It was shown before service clubs such as Rotary, Kiwanis, Lions, and other groups in principal cities. It was used by many civic organizations in obtaining future conventions for the State of Minnesota, and it was exhibited to hundreds of convention groups holding meetings within the state.

In addition, due to wartime conditions which cut down travel to some extent, the State Tourist Bureau used this film to stimulate travel within the State and showed it to large numbers of groups in the Twin Cities and in Southern Minnesota with the purpose of encouraging travel within the state itself.

The film is now being shown at army camps throughout the nation.

SHOWS IN LEADING CITIES

During each of the past several years the Minnesota Tourist Bureau has been a successful participant in numerous sportsmen's and travel shows conducted in leading cities of the country. These shows reach the so-called "first market" of sportsmen and vacation travelers. While the future of these shows is uncertain for the coming year, 1942 proved successful from the standpoint of attendance and interest. An extensive Minnesota display was used at these shows and the results from inquiries received have been more than justified. The Minnesota Tourist Bureau participated in the International Sportsmen's Show, Chicago; Daily News Travel Show, Chicago; Southwest Sportsmen's Show, St. Louis; Western Sportsmen's Show, San Francisco; Sentinel Travel Show, Milwaukee; Midwest Sportsmen's Show,

MINNESOTA · *Current National Advertising*

TIME April 27

VACATIONS

Minnesota Preparing

This week in the heart of the continent, Minnesota was preparing for its biggest influx of vacationists. In this fabulous country, land of 10,000 lakes (actual count: 11,007), resort owners were looking forward to a myriad of new faces.

That Minnesota was aware of her opportunity as the vacation heart of the continent, was evidenced when lucky, red-headed Governor Harold E. Stassen stated: "Minnesota welcomes the people of a united America to the unsurpassable charm of her marvelous vacation land. Five months are no eight

10,000 LAKES TEMPT FAMOUS INDIAN
Scenes of this kind abound in Minnesota

to three days Godmanship underscores with their countrymen as they are ready to defend them against aggression, whatever the cost."

Unknown to many vacationists is the fact that parts of Minnesota have the ruggedness of New England. That many of Minnesota's streams rival the picturesque rivers of the mountain states.

Sky Blue Waters

Unrivalled, however, is Minnesota's Indian fabled land of sky blue waters. Millions of timbered acres studded with crystal clear lakes that are restocked each year with seven-hundred-and-eighty million pike, bass, muskies, trout and pan fish of all varieties.

Safe, gently sloping beaches and golf courses with watered greens and fair-

VACATIONS IN MINNESOTA
Something to keep them all busy

ways will tempt thousands of families to come inland this year. Try a vacation in Minnesota and have something to keep about all year.

Illustrated booklet and travel chart, titled PIKE FISH TRIPS, sent by FREE to those interested in vacations. Write Minnesota Tourist Bureau, 1806 State Capitol, St. Paul, Minnesota.

TIME May 18

FAMILY FUN

VACATIONS

All Eyes on Minnesota

This week, with vacation thoughts rigidly occupying the waking hours of hard-working America, all eyes were on Minnesota. For, May 15 the pike season opened in the North Star State.

With the most favorable non-resident fishing license in the history of the state, Minnesota resort owners were preparing for a steady influx of vacationists who this year are bringing their families inland.

Famous as the land of 10,000 lakes, Minnesota needs no press agentry ex-

PIKE SEASON OPENS
Pull fishing is only part of family fun

aggeration. It has 11,007 charted lakes. State owned fish hatcheries yearly pour 180,000,000 fry and fingerlings (official figures) into Minnesota lakes. Thousands of modern vacation retreats spread throughout the State, offer vacationists sleek power boats and expert guides whose knowledge of finny habits is a practical guarantee of fine fishing.

But, fishing is only part of the family fun offered to vacationists. Gently sloping sandy beaches give the youngsters many hours of carefree castle building. Cozy, modern cabins right on

TAKING—MAKES YOU FEEL FIRST TIME
Minnesota needs no press agentry

the shores of cool lakes offer relaxation to work-weary mothers and fathers.

Additional attractions include open pit iron mining (largest hole ever dug by man); the sacred Indian Pipestone Quarries; two national forests; thirty-seven state parks; and nine Indian reservations or tribal settlements.

As a service to the vacation minded, the Minnesota Tourist Bureau has cleverly issued an official Guide and also a booklet showing what FREE FISH TRIPS. A postcard-sized composition of Minnesota's best fishing areas, the back one only gives the kind of fish native to each lake, the season restrictions as to the land bag limit. Write for your copy to Minnesota Tourist Bureau, 1806 State Capitol, St. Paul, Minnesota.

TIME June 8

LAKES

Not 10,000 but 11,007

Sensations new to thousands of vacation-hungry families were experienced this week as the expected inland trek to Minnesota got under way.

Many vacationists seeing for the first time this fabled home of Hiawatha, famous land of sky-blue waters, were amazed to find that Minnesota has not 10,000 lakes, but actually 11,007 of them, and to mention 25,000 miles of rivers and streams and more than 100 cascades and water falls.

From the sibilant big sea water (Lake Superior) to the shores of Minnetonka, Minnesota Lakes occupy one-fourteenth of the surface of the state. Red Lake, the largest fresh water body within any state, covers 294,304 acres.

Over 1,000 Minnesota lakes are nameless. Just last year, an aerial survey

FOR YOUR OWN VACATION
If nothing else stands refreshing

revealed 400 new, uncharted lakes. Of more immediate interest to vacationists, however, is the fact that Minnesota resorts with modern log cabins nestle right on the shores of these spring-fed lakes. Gently sloping, sandy beaches make safe playgrounds for youngsters. And, anglers out for scrappy bass or hard-hitting pike have the unique experience of watching their quarry strike at their lure through ten or fifteen feet of clear water.

MINNESOTA
A challenge to outdoor enjoyment

Wherever the vacationist goes in Minnesota, there is the illusion of being in a world of his own. For, in Minnesota, there is breathing space. Chains of lakes—like beads on a string—challenge amateur explorers, while rocking-chair vacationists find real peace and comfort on a cool cabin porch watching lazy clouds reflecting their progress on the mirror-like surface of the lake.

Official Guide and Fishing Booklet titled PIKE FISH TRIPS, both are FREE to interested vacationists. Write Minnesota Tourist Bureau, 1806 State Capitol, St. Paul, Minnesota.

FIGURE No. 25

Three of a series of Minnesota Tourist Bureau advertisements which appeared in Time magazine during 1942. These advertisements told the story of Minnesota vacations and lakes to one of America's highest income magazine audiences. Returns from these advertisements were received from throughout the country.

MAPS SHOWING YOU THE MINNESOTA STATE TOURIST BUREAU ADVERTISING FOR THE JULY-AUGUST SEASON PEAK

Advertising and Publicity in these Leading Midwest Newspapers

Chicago Tribune
Chicago Daily News
Chicago Sun
Chicago Journal of Commerce
Chicago Herald American
Fargo Forum
Grand Forks Herald
Sioux Falls Argus Leader
Aberdeen American
Oklahoma City Oklahoman
St. Louis Post Dispatch
St. Louis Globe Democrat
Sioux City Journal
Cincinnati Times Star
Cincinnati Enquirer
Indianapolis Star
Kansas City Star
Omaha World Herald
Des Moines Register Tribune

Advertising and Publicity on these Powerful Midwest Radio Stations

WGN—Chicago
WMAQ—Chicago
WLW—Cincinnati
KOIL—Omaha
KFAB—Lincoln, Neb.
WHO—Des Moines
KMBC—Kansas City
WDAF—Kansas City
WIBW—Topeka, Kan.
KVOO—Tulsa, Okla.
WKY—Oklahoma City
KSD—St. Louis
KXOK—St. Louis

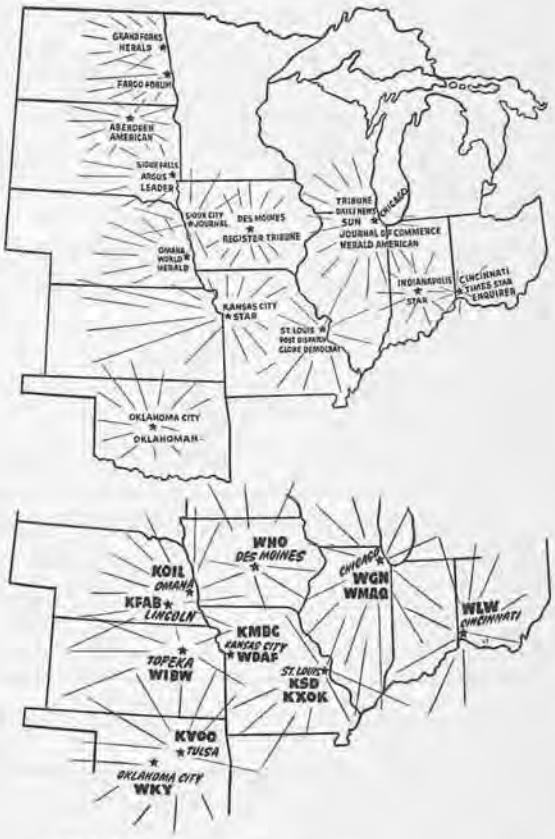


FIGURE No. 26

This Minnesota Tourist Bureau bulletin was sent to leaders in the industry, resorts and chambers of commerce during 1942, enabling others to tie in with state advertising. The maps show the extent of Minnesota promotion used in a peak-season campaign in Minnesota's "natural" tourist territory.

St. Paul; Northwest Sportsmen's Show, Minneapolis; Iowa Sports and Travel Show, Des Moines, and Nebraska Sports and Travel Show, Omaha. These exhibits were seen by crowds exceeding a million sports and travel-minded individuals. In addition, thousands of visitors to Minnesota at national conventions of various organizations were made better acquainted with the attractions of this state by Minnesota Tourist Bureau displays at conventions in Minneapolis, St. Paul and Duluth.

MINNESOTA FEATURED IN OUTSTANDING MAGAZINES

Publicity and advertising on a national scale were carried on within limits. Publications were chosen with care in order to reach highly selected audiences. Such magazines as Life and Time and Woman's Home Companion stood high on the list while the sportsmen's magazines were used to reach their highly concentrated audiences of outdoor enthusiasts. During 1941, canoe trips in Minnesota had been well publicized in Life magazine. A different wartime message in 1942 was used in a highly successful series in Time magazine. These advertisements for the State of Minnesota reached the largest news magazine audience in America at a time when interest in the news was at a record high. The Time series was read by a large, able-to-buy audience throughout America. This was one definite advantage. Another, almost equally important, was that these advertisements were released early in the spring at a time to be particularly useful within the state itself. Many of those connected with the tourist industry in Minnesota were discouraged by the uncertainties of wartime. These advertisements undoubtedly encouraged many in the industry to raise their sights and look forward to the year as one of opportunity. Results have borne this out in the success of the 1942 tourist season.

PUBLICITY AND ADVERTISING IN NEWSPAPERS AND RADIO

The concentrated job for the Minnesota Tourist Bureau during 1942 was in the use of publicity and advertising in a selected cross section of the leading newspapers and radio stations in nearby, midwest territory. This area is that roughly of the upper Mississippi Valley, reaching down into certain of the southwest states. Newspaper advertising was carried on continuously in this area throughout the early part of the season. Then, seeking a major impact at the time of the July-August season peak for tourist business in Minnesota, both newspapers and radio were used in an intensive summer campaign. Figure 26 is a map showing newspapers and radio stations used in this campaign. The effects of this campaign were noteworthy and the lowest inquiry costs in the history of the bureau were recorded at this time. This was indicative of a wide interest in Minnesota in these neighboring states as well as of the effectiveness of Tourist Bureau publicity and advertising.

THE NEED FOR WARTIME PROMOTION FOR THE YEARS OF PEACE TO COME

Promotion of tourist travel is continuous in its benefits. Increased travel in any area as the result of promotion is an accruing benefit over a period of years. This is well demonstrated by the record of summer travel in Southern California. In that state there was little if any summer travel 21 years ago. Since then summer travel has been built up until it now exceeds winter travel in that state. The change has been the result of aggressive, continuous promotion by the All-Year Club of Southern California, which at the present time is launching new campaigns in spite of the fact that California travel has been dealt a most severe blow by wartime conditions.

Looked upon in the light of wartime conditions, it would seem from the experience of Southern California and our own Minnesota and others that it is advisable to continue promotion of an area during unusual times because of the benefits to be gained in the years to come. This is particularly true because of the special stress of such times under which the travel-buying publics are more apt than usual to "forget" certain areas.

There is an important additional factor that applies in the case of Minnesota in favor of continued support now for this industry. Under wartime restrictions, thousands of vacationists in sections adjacent to Minnesota are in a sense brand new prospects. Thousands in these territories have in the past driven to west or east coasts on their vacations. Such vacations are now out for the duration in most cases and these vacationists are new Minnesota prospects. In addition, Minnesota, "The Vacation Heart of the Continent," is particularly favored by its secluded, inland location. This advantage should well be exploited now, to win visitors who will not only come once, but will be Minnesota visitors year after year once they have sampled the pleasures of our state. Many capable observers declare that the tourist industry in Minnesota received its first real impetus during the years of World War I. This can be true to an even greater extent now, if the advantages of the state are properly told. Telling this story is the great wartime opportunity of the Minnesota Tourist Bureau.

WHY WARTIME PROMOTION IS NECESSARY

Excerpts from a speech by Joyce Swan, business manager of the Minneapolis Star Journal and Tribune, on why it pays to advertise the tourist industry of Minnesota during the present war years.

"No business can afford the luxury of silence. This rule applies to the tourist industry of Minnesota just as it does to every other product or business. It applies particularly during difficult years such as those brought on by the war.

"Case histories of business that stopped advertising and of those that continued advertising—even of those that became heavy advertisers for the very first time—during the years of the first World War prove the advantages of advertising in war time.

"Raymond Moley, in a recent series of articles in Newsweek, told what happened to seventeen businesses which decided in the last war to discontinue advertising for the duration. Of the seventeen, six sold out or were absorbed by competitors. One failed and went out of business. One was deflated 97 per cent in terms of personnel. One lost 81 per cent of its sales volume. One ended with only two customers. Three lost their leadership in their fields. One was operated by the banks for five years. Two found that competitors had grown at their expense.

"The point of all this is that wartime is no time to stop advertising. It is a time to continue advertising, and—according to the experience of the companies in many different lines we have just listed—it is a time to start advertising.

"Wars in themselves are nothing new. There have been 800 wars, not counting minor insurrections, in the past 3,941 years. The pattern has almost always been the same. People continue to do business with somebody in time of war; they continue to do business with somebody AFTER a war. Merchants who forget their customers during the war are going to be forgotten by their customers after the war.

"No person in authority has said that it is unpatriotic to advertise during the war. In fact, the opposite is true so far as the tourist industry is concerned. There have been numerous favorable statements for tourist advertising. The following by Donald Nelson, head of the war production board, pretty well sums them up.

" 'Experiences here and abroad,' Mr. Nelson said, 'indicate that the worker, even when stimulated by the urgency of the Allied war situation, cannot work long hours and maintain peak output indefinitely. We know that he benefits in peacetime from an annual vacation. After the extensive overtime, and the added emotional strain of the war effort, we can be sure some rest period is going to prove doubly effective in the restoration of his energy and determination.' "