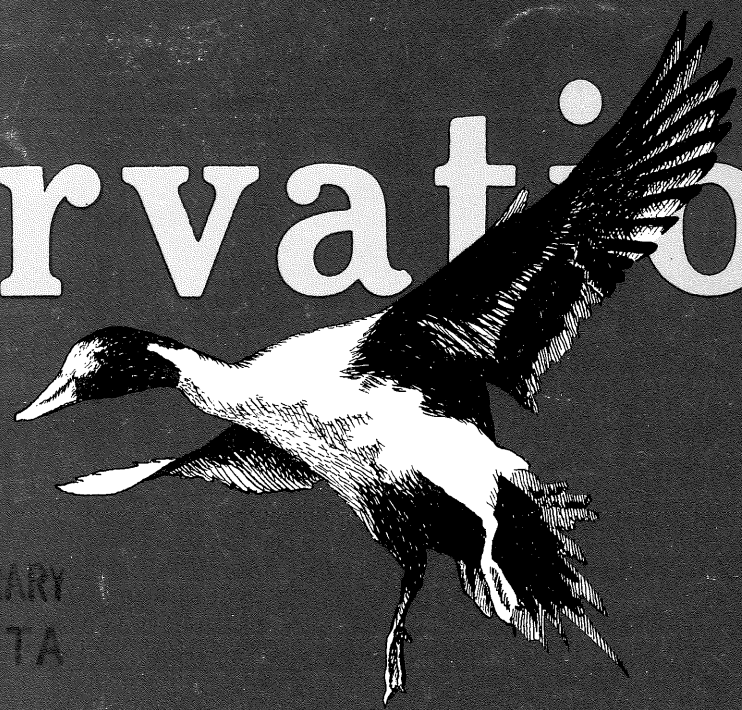
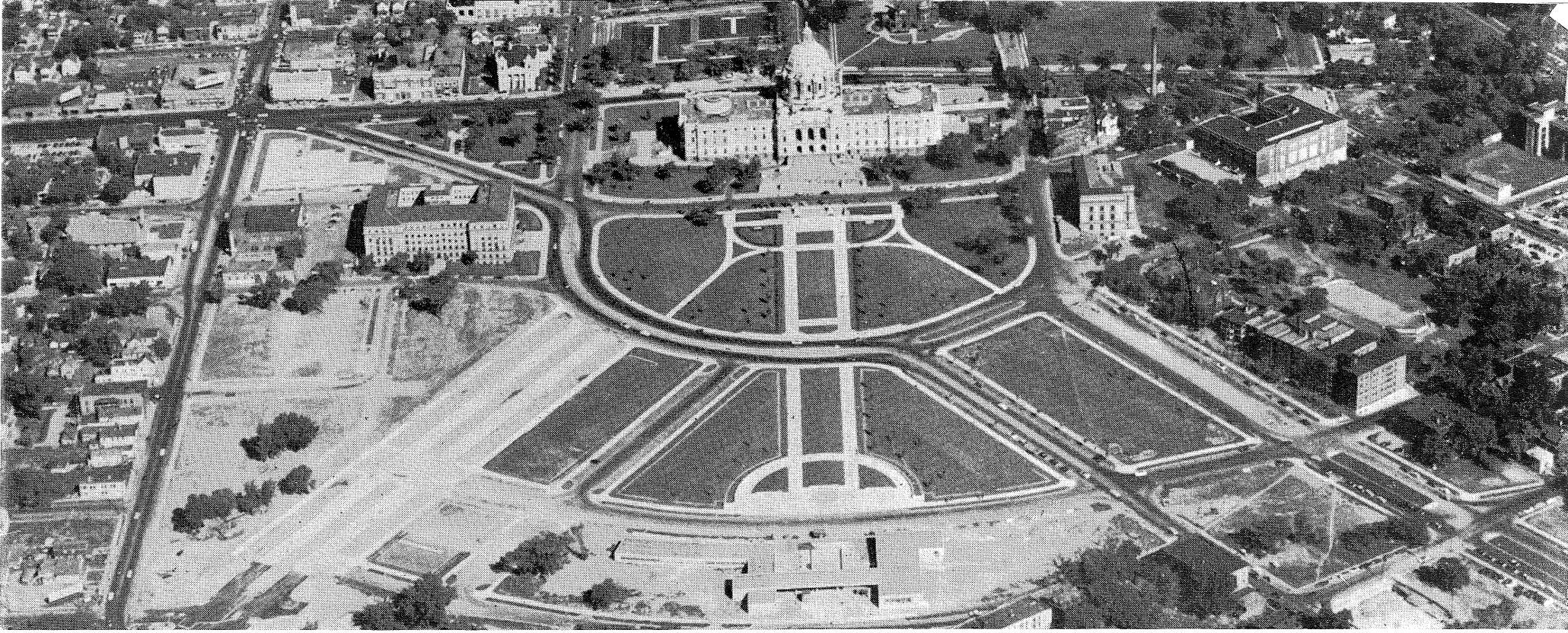
Biennial Report July 1, 1954 - June 30, 1956

minnesota conservation



The Minnesota Department of Conservation wishes to dedicate this Biennial Report—July 1, 1954 - June 30, 1956—to our Minnesota Centennial of Statehood in 1958. Our Centennial is a monument to a hardy, determined, pioneer people. It is a reminder that time is the only true measure of conservation of natural resources.

George A. Selke
Commissioner of Conservation



BUILDING A GREATER MINNESOTA

"For today we need a sound program of conservation of natural resources. We need public understanding. We need public support. Together we will build the GREATER MINNESOTA."

Orville L. Freeman
Governor

Conservation of natural resources is our best assurance for a better Minnesota, a strong nation, and a free world. Conservation in Minnesota has traveled the gamut of neglect and exploitation to a progressive program of wise use of these resources. Conservation today has become an integral part in planning and programming in all our activities. Without it there would be no lasting progress. Minnesota is building through a state-wide program of conservation of natural resources.

In the report to follow my purpose will be to present some of the forward steps in conservation during the biennium based on our 10-point program of conservation of natural resources. The report is further amplified by sections on Forestry, Game and Fish, Lands and Minerals, State Parks, and Waters by the directors of the respective divisions.

I. SOIL AND WATER

Soil and Water are the twin supports of all existence.

- Activation of Chapter 523, Laws 1955, which requires filing of well-drilling data.
- Redoubled scrutiny of all water cases by the Bureau of Legal Affairs to protect the public interest.
- Maintenance of engineering services to furnish hydrological data, provide testimony in court cases, conduct water surveys, etc.

II. EDUCATION

Public support through education is the key to progress in conservation.

- Expansion of informational services to the public through appropriate public relations media.
- Development of a program of conservation education with the Department of Education that has been recognized by national award.

III. MINERALS

Iron ore is our most important non-renewable resource. Mining for the future is assured through taconite development.

- Of major importance is the preparation of engineering data in support of litigation affecting ownership of ore located beneath certain lakes and waterways.

- Gross Receipts during the biennium totaled $9,305,119 of which over 95% was credited to the Permanent Trust Funds of the state. $8,845,483 of this was derived from iron ore and other minerals.
- An inventory of the mineral resources of Minnesota was compiled.
- A permit system was devised for marl and uranium prospecting and mining.

IV. FORESTRY

Forests are essential to wildlife, recreation and industry.

- A forest inventory was completed for the first time on 4,750,000 acres of state-owned forest lands.
- Nursery production of more than 15,000,000 trees for planting this past year.
- Small timber sales increased from 1,865 to 2,543 in the fiscal year 1955, an increase of 36%.
- Largest salvage operation of "blowdown" timber in the history of Minnesota was completed, totaling 70,000 cords.
- Fire protection was provided for 17,000,000 acres of forest land.

V. RESEARCH

Research provides the factual basis for scientific management.

- Research in forestry is concerned with protection from fire, insects and disease; silvicultural methods; wood utilization; marketing; and forest tree improvement.
- In mining, laboratory tests are being made for the evaluation of taconite, copper, nickel and radioactive ores.
- Wildlife investigations are being continued and expanded on game and fish management problems and methods.

VI. LAND ACQUISITION

Areas for conservation purposes are increasingly difficult to acquire.

- Eighteen public access areas have been acquired since January 1, 1955, with an additional 20 optioned for purchase.
- Land acquisition for water conservation totals 9,244 acres since January 1, 1955.
- Land acquisition represented by deficiencies in the original Federal Land Grant, when completed, will total 26,144 acres.

VII. RECREATION

State Parks must keep pace with increased population and leisure time.

- Rehabilitation of Douglas Lodge, Itasca Park, to meet American Automobile Association standards substantially completed.
- Naturalist programs in cooperation with the University of Minnesota have been instituted at four state parks, namely Itasca, Gooseberry Falls, Whitewater, and Lake Shetek.
- Use of state parks by campers more than doubled during the biennium.

VIII. WILDLIFE

The growth and popularity of hunting and fishing has created new demands upon our wildlife resources. Scientific game and fish management is a necessity.

- Scientific wildlife management and planning have been advanced by the establishment of a Bureau of Research and Planning.
- A fisheries policy and program has been prepared and published.
- The Game Warden Force has been reorganized for efficiency and economy.
- Nurseries for raising trees and shrubs for wildlife have been consolidated at the Carlos Avery Game Farm, to be operated by the Division of Forestry.
- An expanded habitat improvement program has made possible a curtailment of game farm operation.
- Rough fish removal approximates 10,000,000 lbs. annually.

IX. OUTDOOR SAFETY

Human values in conservation are sometimes overlooked. Outdoor safety is an obligation and a duty.

- A Small Boat Safety Act was enacted for motorboat regulation.
- Under the Gun Safety Instruction Act young hunters have been instructed in the safe handling of firearms.
- The Conservation Department was awarded the state department safety plaque, 1955, by the Minnesota Safety Council.

X. ADMINISTRATION

Office administration of the Department of Conservation is primarily concerned with such operations as accounting, personnel management, license sales, and the management of the physical plant. Good-housekeeping is essential.

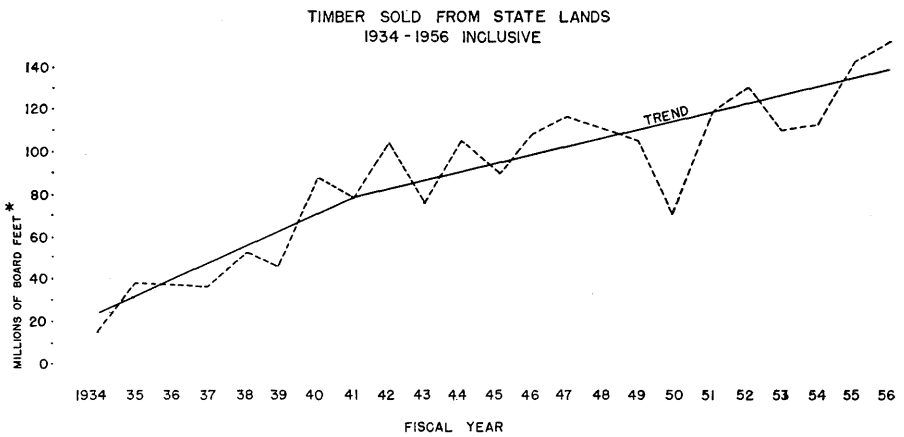
- Standard inspection adopted and inventory completed for all equipment, buildings and supplies.
- A department sign shop was established at New Ulm.
- Use of electronic office equipment for routine tabulation and analysis of data has been expanded.
- A personnel manual has been prepared setting forth rules and regulations affecting departmental employees.
- A classification survey of all department personnel has been completed for the first time since 1940.
- A personnel training program has been established with a Chief Training Officer in charge.

Selective Cutting in a Black Spruce Swamp

Forestry

E. L. LAWSON, Director

A major accomplishment in forest management was the completion and publication of a forest inventory report covering the 4,750,484 acres of state land owned or administered by the Department of Conservation in the forested area of Minnesota. These lands presently support an estimated 12 million cords and 1.3 billion board feet of merchantable timber.



* ALL PRODUCTS CONVERTED

Intensive management plans have now been completed and put into operation on 2,400,000 acres, or roughly half of the state owned land in the forest area. Of this total, 400,000 acres were completed during the biennium. Use of electronic (IBM) equipment has materially improved inventory techniques.

The combined income from the sale of state timber by small private sales and auction sales reached an all-time high during the biennium. Receipts were as follows:

Fiscal Year	Auction Sales	Private Sales	Trespass	Total
1954-55	$547,299	$403,084	$2,648	$953,031
1955-56	$514,232	$433,068	$2,901	$950,201

Small private sales are an important source of supplemental income to farmers and provide year-round employment to small operators.

Forest Fire Prevention and Suppression

The Division of Forestry gives protection from fire to approximately 17 million acres of forest land, both public and private. Control of forest fires was successfully accomplished during the biennium as shown in the following tabulation:

Calendar Year	Number Of Fires	Forest Land Burned	Total Area Burned	% Protected Area Burned
1954	474	3,902	13,297	0.08
1955	998	17,386	38,202	0.22

It will be noted that the largest portion of the acreage burned each year was non-forest land such as marsh and meadow. Of the forest land burned over the major portion was in brush and grass. New and better equipment such as field radio and improved fire fighting techniques have materially increased the efficiency of the fire control organization.

During the spring of 1956 representatives of the Manitoba Forest Service and Minnesota Division of Forestry met and developed a cooperative agreement outlining the course of immediate action to be taken in the suppression of forest fires that might occur along the international boundary between the Province of Manitoba and State of Minnesota.

Fire statistical information for the first time was compiled and tabulated electronically. This permitted the rapid accumulation of statistics of great value to field men in fire fighting.

Forest Tree Nurseries

There is an ever increasing interest in tree planting by private land owners and managers of public land. In fiscal year 1954-55 approximately 13½ million trees were distributed from state nurseries. About 7 million were planted on public lands and 6½ million on private lands. In fiscal year 1955-56 some 15 million trees were distributed. The increase went to private lands where 8 million trees were planted. Returns to the

General C. C. Andrews Nursery

state treasury for sales to private owners amounted to $62,474 in fiscal year 1954-55 and $77,000 in 1955-56.

In 1956 a cooperative agreement was consummated between the U. S. Forest Service and the Division of Forestry under Section 4 of the Clark-McNary Act. A federal allotment of $10,900 was provided for 1956 for tree stock production. It is anticipated that the allotment for 1957 will be $29,000.

During the biennium the Carlos Avery Nursery near Forest Lake was transferred from the administration of the Game and Fish Division to the Division of Forestry. This move consolidated all forest tree production of the Conservation Department in the Division of Forestry.

Tree Planting on State Land

Reforestation of 420,000 acres of the present million acres of deforested state land can be accomplished using techniques and equipment now available. Of this area 330,000 acres are in need of planting and will require some 300 million trees.

Nursery production and the nursery sales program limits the extent of planting on public lands. While planting on all public lands has been approximately 7 million trees per year for the past four years, planting on state forest lands increased by 20 percent over the same period.

It is estimated by the Forest Industries Information Committee that Minnesota's production of Christmas trees totalled 5,800,000 trees in 1954 and the same number in 1955. Placing a unit price of $1.15 on these trees makes a total valuation of $6,670,000 per year. In these same two years almost 2 million Christmas trees were sold from state lands providing a revenue in stumpage of $51,497.

State Forest Recreational Development

Never before in the history of the division has there been such a demand by the public for summer homesites on state-owned lakeshore. During the past biennium 157 new homesites were leased bringing the total homesite leases on state forest lands to 787. More sites are being platted on suitable lakes but demand still far exceeds the number available. Funds are needed for road building to make additional lakeshore available for platting.

Leases are also made on state forest lands for hay, gravel, grazing and rights-of-way. The following tabulation shows the number of special use permits in effect:

	1954-55		1955-56	
Type of Permit	**Number**	**Revenue**	**Number**	**Revenue**
Homesites	663	$ 6,791	787	$ 7,860
Commercial	35	1,240	51	1,340
Hay and Farm	73	624	87	592
Right-of-way	135	1,250	169	1,517
Gravel	12	1,320	7	3,477
Miscellaneous	6	168	4	1,030
Total	924	$11,393	1,105	$15,816

In the spring of 1955 the new office building at the Grand Rapids Supply Depot was completed. This building which has been appraised at $125,000 was constructed at a **total** cost of $64,593. This is an outstanding example of good management. Additional buildings constructed include one area headquarters office, three modern residences and five storage buildings.

Consolidated Conservation Areas

The money made available to the division from the Consolidated Conservation Area Fund was expended for construction and maintenance of forest roads and firebreaks, tree planting, site preparation and other miscellaneous forest development work.

New construction of forest roads amounted to 119 miles. This makes a total of 545 miles of road requiring maintenance. Nine miles of firebreak were constructed and 73 miles are presently maintained. Almost 3 million trees were planted on the Consolidated Conservation Areas.

During the biennium the division furnished forestry assistance to 1,144 forest land owners. Total forest products harvested under the assistance program amounted to 5,760,000 board feet with a stumpage return to the woodland owners of $99,500.

The purpose of this program is to maintain and improve the productivity of private forest lands and is designed to assist owners of 1,000 acres or less. It is in this group of forest owners that forest lands of marginal productivity exist. The present staff of six foresters assigned to this program is inadequate.

Six new auxiliary forest contracts were consummated during the biennium bringing to 52 the number of contracts in effect. These contracts are located in nine of the northern counties and cover 220,195.68 acres. There are six new contracts pending.

Land Exchange

Land exchange is regarded as one of the more important programs contributing to better land use. Through the exchange of land, scattered holdings may be consolidated for more efficient and economical management. Small private owners are able to exchange isolated lands for lands in developed areas.

State-federal exchanges completed during the biennium are as follows:

1. U. S. Fish and Wildlife Service—804.94 acres of federal land within the Talcott Lake State Refuge for 1,289.78 acres of state trust fund lands within the federal Tamarac Refuge.

2. U. S. Forest Service—9,556.21 acres of federal land within the George Washington and Finland state forests for 8,592.43 acres of state trust fund lands within the Superior National Forest.

3. U. S. Forest Service—7,991.20 acres of federal lands within the Finland State Forest for 8,086.37 acres of state trust fund land within the Superior National Forest. There were 9 state-private exchanges completed during the biennium involving 652 acres of private lands and 571 acres of state land.

Cooperation with the Youth Conservation Commission

YCC forestry camp No. 1 is located at the General C. C. Andrews Nursery at Willow River. The projects assigned at this camp consist of all types of nursery work from weeding, digging and packing seedlings and planting stock, to the production of concrete blocks for building construction.

YCC forestry camp No. 2 was started in 1955 at Thistledew Lake. The Division of Forestry cooperated with the Youth Conservation Commission in the establishment of this camp by furnishing equipment and man-power and in giving assistance in setting up the camp. The wards at the camp are engaged in forestry work, such as tree planting, road repair and maintenance, repair of telephone lines, cutting and piling brush along right of way, timber stand improvement work on CCC plantations, and related projects.

White Pine Blister Rust Control

White pine blister rust control work is conducted by the Division of Plant Industry, Minnesota State Department of Agriculture, in cooperation with the U. S. Forest Service. During the fiscal years 1954-55 and 1955-56, 4,940 acres of whitepine lands, including state forests, state parks, municipal and privately-owned lands were treated.

Forest Insect Control

The Division of Forestry cooperated with the Division of Entomology, University of Minnesota and the State Entomologist, State Department of Agriculture in reporting and combatting insect infestations. During the biennium the larch sawfly, jack pine budworm and spruce budworm were of increasing concern. Detection surveys were carried out to chart the progress of various infestations and proposed control measures were worked out for future action.

Future Needs and Goals

- Continued and improved fire prevention and suppression on all forest lands.
- Intensified forest management on all state lands. Full utilization of useful timber products from state lands.
- Expanded state forest tree nurseries to meet the ever increasing demand for planting stock.
- Continued expansion of the state forest recreational program—especially summer homesites.
- Intensified forest development to bring into productivity the large acreage of state-owned deforested land.
- Expansion of the private forest management service to meet the needs and goals in this vitally important field.
- Encourage widespread use of the Auxiliary Forest Law. Work toward other measures of more equitable taxation on lands dedicated to forest management.
- Encourage the establishment of more school and municipal forests and provide the technical assistance necessary for this program.

Grand Rapids Supply Depot

- Continuation of the long range land exchange program with the U. S. Forest Service.
- Continued land exchanges with private land owners in isolated forest areas for state lands in developed areas.
- Continued cooperation with the YCC, KMG, School of Forestry, University of Minnesota, Extension Service, Lake States Forest Experiment Station, State Entomologist, U. S. Forest Service, Agricultural Conservation Program Service, Soil Conservation Service and all other agencies with interests in the field of forestry.

Game and Fish JAMES W. KIMBALL, Director

Reorganization has been the most important step taken in the Division of Game and Fish in the past biennium. The purposes of this reorganization are as follows:

1. To improve efficiency . . .
2. To raise morale . . .
3. To provide better service to the public . . .

A few of the specific steps taken in order to accomplish these broad objectives are as follows:

1. The Bureau of Wildlife Development was abolished. This Bureau was a catch-all which dealt in both fish and game matters and worked on both research and management projects. Its objectives were not, and could not be, clearly defined and there was considerable overlapping with other Bureaus.

Aerial View of Moose

2. Research, which was formerly carried on in three separate Bureaus, has been pulled together in the newly created Bureau of Research and Planning. Besides giving Research unity, this move raised the status of this important function to Bureau level and made it responsible directly to the top administrators. This is in line with the position of Research in all modern industry.

3. In the Warden Service the chain of command was shortened and strengthened by eliminating one echelon of supervision (the Regional Supervisors) and reducing the number of Area Supervisors to ten, who have increased authority and responsibility and operate as a counsel for this Bureau.

4. Research was, of course, eliminated from the Bureau of Fisheries but there has been little other change to date because this Bureau had already been regionalized and operating quite efficiently.

5. The Bureau of Game, whose former functions were primarily operation of game farms, nurseries and refuges, has been materially reoriented. Game farm operations have been substantially reduced, nursery operations have been turned over to the State Forest Service, and refuge management will be handled from the field. In order to bring this Bureau closer to the people and to function in the field of environmental controls the State has been divided into four regions, each in charge of a Regional Game Manager and his staff.

RESEARCH

The Bureau of Research and Planning is charged with conducting both basic and applied research on the state's wildlife and fisheries. The aim of this research is to provide management methods best suited to assuring sustained yields of our wildlife and fisheries resources. In addition, it must provide the technical and scientific foundation upon which long range plans to meet future conditions can be established. As in all modern business, research is essential to continuing good administration and progress.

The white-tailed deer has been the subject of research into population dynamics, habitat influences, predator relationships and harvest success. Roadside checking stations during the hunting seasons have provided information on the condition and makeup of the herd. The deer themselves tell us a great deal about the range on which they live, the food they eat, diseases and parasites affecting them, the status of reproduction and the rate of survival from year to year. The deer will continue to be the subject of research, in order that Minnesota's principal big game species can continue to provide enjoyment for hunter and nature lover alike.

Population inventories of ruffed and sharptail grouse show them to have been at a low during the biennium. Indications point to an increase in ruffed grouse at the close of the biennial period while sharptails continue at a low level. Changing patterns of land use have been unfavorable to the prairie chicken, which are now found in scattered locations around the state.

Pheasants continue to receive attention, principally in the field of population dynamics. Investigations reveal an under-harvest of male birds,

reflected by one cock to three hens in post hunting season counts. Optimum reproduction is accomplished by a ratio of five hens to one cock. Careful check is made on breeding birds to ascertain the success of reproduction which is the basis for setting seasons and bag limits. Basic research into starvation processes indicate that pheasants have enough reserve to carry them through stormy periods, without food, if cover is available.

Close cooperation between the game and fish division and the U. S. Fish and Wildlife Service is necessary in "keeping up" with the waterfowl. A four phase population inventory allows the setting of seasons and bag limits by the federal agency on the basis of up-to-the-minute state data. Banding has been important in delineating intra-state waterfowl movements; homing instinct on the part of resident species; degree of harvest within the state and other similar information.

Furbearers have been extensively inventoried, especially muskrat and beaver. Aerial censuses have been widely used in this work. It is anticipated that more intensive research will be conducted on problems connected with our furbearers, which in the biennium accounted for $3,948,960 in trappers' take.

Walleyes, for which about half of our fishing water is managed, have been subjected to a variety of researching. Proper lake management has its basis in maintaining the correct population balance. Inter-specific competition, carrying capacity of various lake types, food chains, reproduction requisites, are only a few of the subjects studied in connection with the walleye. Minnesota continues to pioneer in the management of this sport fish.

A study of factors affecting spawning success of northern pike in small sloughs is being carried out by the University of Minnesota to supplement the program of spawning area acquisition being carried on by the bureau of fisheries. Studies on the effects of water level manipulation on spawning success is pointing the way toward better management.

The role of panfish in the total fishery complex is under investigation. Being extremely prolific they quickly become overabundant, resulting in stunted fish having no sport value, unless properly managed.

Lake trout-sea lamprey relationships have been studied. The percentage of lamprey-damaged trout in Lake Superior has increased in recent years to about 15 percent in 1955. Joint state-federal control of lampreys is currently underway.

Stream trout studies have been aimed at two principal problems: (1) preservation and restoration of trout streams; and (2) rearing and planting trout so that a maximum catch is obtained commensurate with expenditures made. Studies are in progress on evaluation of habitat improvement in streams; on loss of trout by migration and on beaver-trout relationships in northern streams.

Because fishing use of larger warm-water streams is increasing, greater emphasis has been placed on smallmouth bass investigations. Creel censuses on bass water, stream evaluation, and a study of factors affecting reproduction are underway.

Commercial fishery statistics are being compiled, and the development of nets and trawls for harvest of smelt and other commercial and rough fish is proceeding.

Better Fishing Through Research

The St. Paul Fisheries headquarters is having an experimental laboratory installed where eventually studies of diseases, insecticides, herbicides and pollutants can be carried out.

Aquatic nuisance control is handled by the Biological Services Unit who issued 243 permits to control aquatic plants, algae, snails and leeches during the biennium. One hundred and forty-nine waterways were treated during this period.

Twenty-two investigations of pollution affecting fish and wildlife were carried out in cooperation with the Department of Health during 1954-56.

Better management of our waters requires detailed information on fish lakes and streams and on present waterfowl and furbearer habitat. To get this information the program of biological surveys and mapping was continued. Biological surveys of 509 fish lakes, fish streams and game lakes were made during the biennium.

Creel censuses to record angler success were conducted on 43 scattered lakes during the biennial period. It has been found that the average fish harvest from Minnesota lakes is about 30 fish weighing 16 pounds from an acre of water per year, and the yield varies as much as 1.7 to 80 pounds per acre depending on the lake type, species caught and fishing pressure. Lake trout lakes were found least productive, northern pike-bass-panfish lakes most productive and walleye lakes intermediate.

LAW ENFORCEMENT

The Bureau of Warden Service is the law enforcement arm of the game and fish division, and while this function is the primary purpose of the bureau, the list of duties and activities is manifold, and the bureau's contributions are of vital importance to good wildlife administration.

Reorganization of the bureau during the past biennium resulted in the elimination of the regional supervisor positions. Area supervisors were decreased from thirteen to ten. The present complement of the bureau is 147 wardens and two secretary-stenographers.

Public relations is an integral part of the warden's daily work and additional emphasis has been placed on this aspect during the biennium. Red Cross training, which all wardens are required to take, has resulted in their performing valuable service during emergencies. Instructing in the safe use of firearms has been part of the warden's on and off duty assignments. Wardens have utilized these opportunities to sell the youth of the state on good conservation practices and habits.

Wardens attended two schools during the biennium during which panel discussions provided each man with an up-to-the-minute picture of game

Law Enforcement Through Communication

and fish activities. Recommendations for improving the service and the division were submitted and acted upon by the administration.

The warden service has been constantly improving its equipment and techniques. The use of two-way radios, tied in with the State Highway patrol and Civilian Defense has faciliated efficient handling of mutual law enforcement and emergency problems. Warden Service planes, equipped with radios, have assisted in locating lost persons, apprehending violators, flying errands of mercy and cooperating on holiday traffic problems. Service planes flew 2,785 hours during the biennium.

"Law enforcement is no better than its communications" is axiomatic with all enforcement personnel. The Service is constantly striving to improve its communication set-up and the walkie-talkie two-way radio sets allow fast coordination of personnel and equipment. Success in apprehending "deer shiners" is due in large measure to better communication.

Arrests for the biennium totaled 6,241 as compared to 4,473 in the previous biennial period. Seventeen convictions for resisting a game warden were obtained. Confiscations for the biennium totaled 1,470 as compared to 1,003 in the previous biennium. Confiscated articles included game, fish, fishing equipment, furs, wild rice, nets and eight automobiles.

GAME MANAGEMENT

The Bureau of Game is charged with the responsibility of administering the state's wildlife resources. This obligates the bureau to protect desirable species, to build up and maintain their numbers at harvestable levels, and to recommend regulations for harvests to insure sustained hunting opportunities.

In the face of an ever expanding army of hunters and land use changes which often are not beneficial to the production of wildlife, the bureau is struggling to expand public hunting grounds and access to public waters.

The close of this biennium finds 200 tracts secured as public access to waters and an additional 10 tracts under option. Furthermore, a survey has been initiated to determine the number and location of all state holdings adjacent to meandered waters and in the proximity of highways, that could be used for access purposes.

Minnesota still is losing water areas through drainage at rate of five percent each year. Consequently, the Game and Fish Division inaugurated a Save Minnesota's Wetlands program for the purpose of acquiring 209,000 acres of small water areas at an estimated cost of $6,500,000.

Although saving wetlands has top priority among the bureau's many activities, land acquisition for purposes of creating game management areas and public hunting grounds is receiving careful attention. During the biennium 40,095 acres were purchased or optioned.

Wildlife food and cover planting projects have resulted in 3,497,871 pieces of stock being planted during the biennium. Survival checks on previous plantings were made in 29 counties and 87 cover planting signs erected.

Game bird production at the Carlos Avery Farm has been limited to 50,000 day old chicks per year for distribution to sportsmen's clubs, and 5,000 release-age pheasants for experimental purposes. During the biennium 197,019 pheasants, quail and Hungarian partridge were raised and distributed.

The biennium saw the Talcot Lake and Whitewater Nurseries abandoned and the Carlos Avery Nursery placed under the jurisdiction of the Division of Forestry, with the understanding that this latter nursery would furnish the bureau's future planting stock. Farmsteads, wetland tracts,

game refuges and other public lands received 2,108,102 pieces of planting stock from the nurseries during the biennial period.

The bureau is evaluating its predator control program with a view to the initiation of a statewide directed predator control program. Promiscuous predator control, as heretofore practiced, is not even remotely commensurate with the expenditures involved.

During the biennium initial plans for reorganizing the bureau were started. In order to provide better service to the public, the state was divided into four regions, each of which has three sub-areas. These units will be under the supervision of game managers. It is expected that this decentralization program will be complete by January 1, 1957.

FISH MANAGEMENT

The Bureau of Fisheries has the responsibility of carrying out the fish management program of the State of Minnesota in accordance with law, department policies and regulations, and available funds. The aim is to provide the maximum sustained annual yield of fish from the waters of the state and the maximum of fishing opportunities.

The principal activities, in addition to general administration, include propagation and distribution of fish, management of propagation areas, lake and stream improvement, licensed commercial fishing, and rough fish control. The state is divided into seven fish management districts for the purpose of carrying out the fisheries program effectively.

Fish Stocking

Fish stocking is an important and useful tool of fish management when it has been determined through test netting and other means that natural reproduction is inadequate. Total distribution including fry, fingerlings, yearlings, and adults of all species from hatcheries, rearing ponds and rescue operations is as follows:

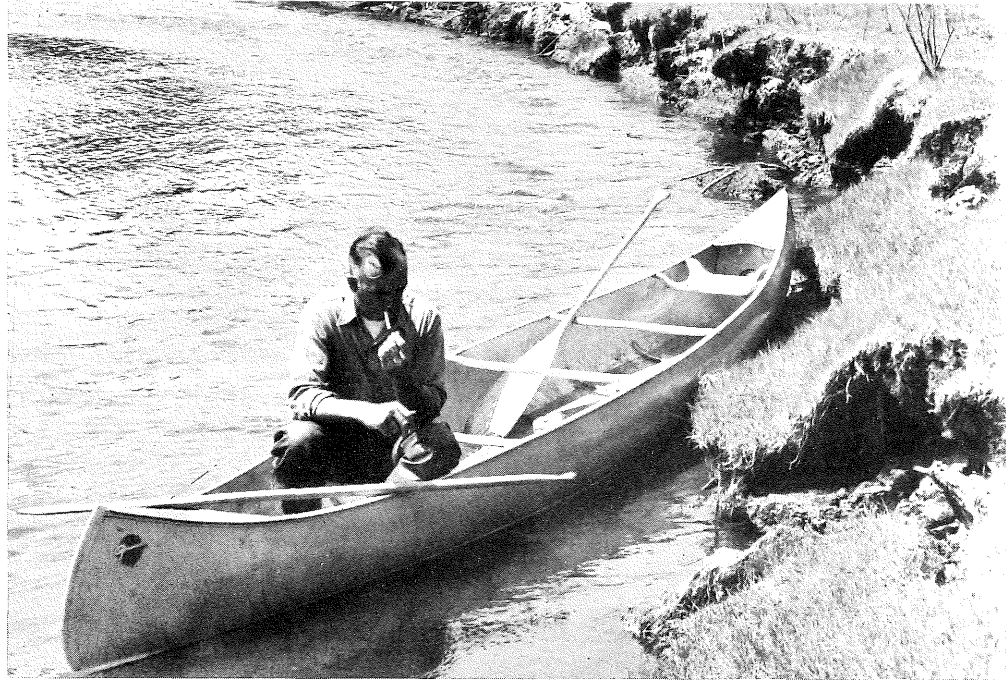
1954		1955	
Number	Pounds	Number	Pounds
148,983,841	501,530	215,356,179	602,117

The removal of up to 30 pounds of panfish per acre from some lakes with overpopulations is a comparatively new activity and is reflected in more rapid growth of the remaining fish. Fish removed are used for stocking in lakes with inadequate reproduction.

Natural Propagation

The natural propagation phase of the fisheries program is becoming more important each year. It consists of selecting and posting areas where there is a concentration of large—and smallmouth bass during the spawning season and good northern pike spawning areas which are for the most part shallow, marshy tributary streams or sloughs. These are posted to prohibit fishing during the early spring season. Temporary dams are built to retard the surface runoff so as to maintain a better condition for spawning, hatching, and rearing.

The rescue of fish from shallow lakes in which they are in danger of winterkill due to lack of oxygen is also an important part of the program.

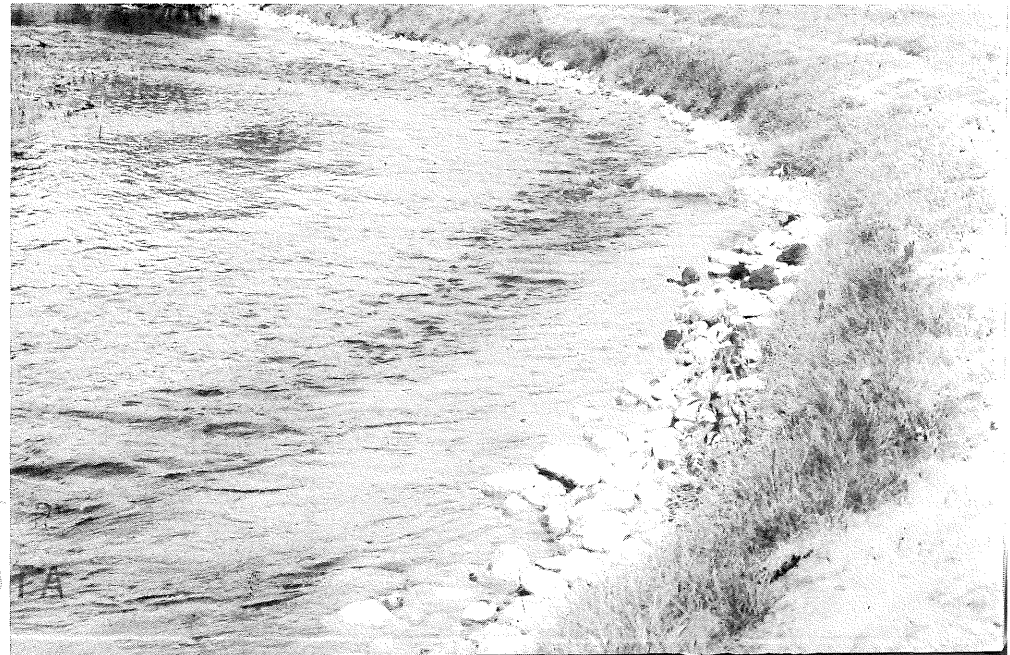


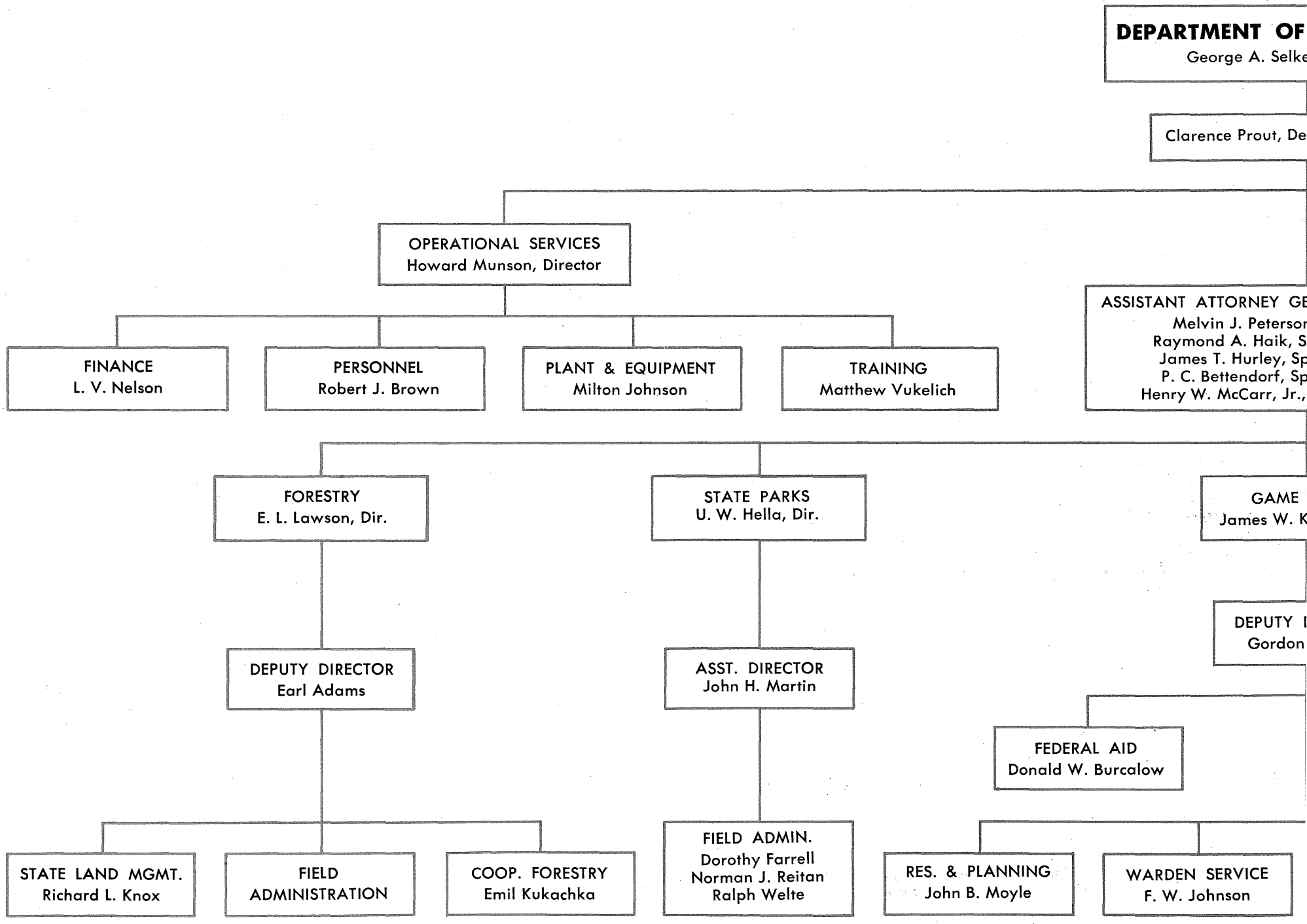
Stream Bank Badly Eroded

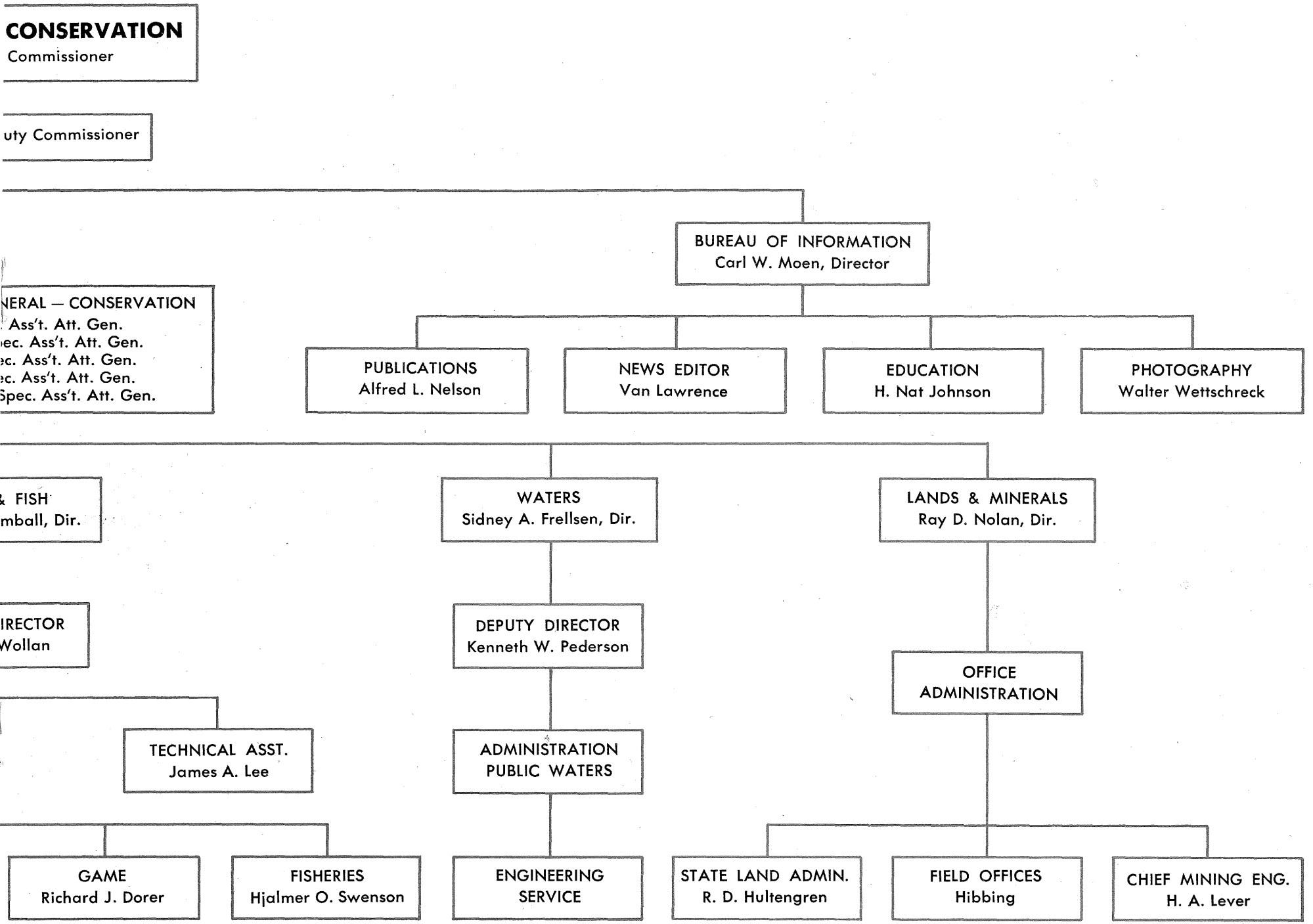
During the biennium the following fish of all species were rescued or transferred:

1954		1955	
Number	Pounds	Number	Pounds
4,079,185	308,313	4,419,023	592,034

Stream Bank Fenced and Riprapped




DEPARTMENT OF
George A. Selke
Clarence Prout, De
OPERATIONAL SERVICES
Howard Munson, Director
ASSISTANT ATTORNEY GE
Melvin J. Peterson
Raymond A. Haik, S
James T. Hurley, Sp
P. C. Bettendorf, Sp
Henry W. McCarr, Jr.,
FINANCE
L. V. Nelson
PERSONNEL
Robert J. Brown
PLANT & EQUIPMENT
Milton Johnson
TRAINING
Matthew Vukelich
FORESTRY
E. L. Lawson, Dir.
STATE PARKS
U. W. Hella, Dir.
GAME
James W. K
DEPUTY I
Gordon
DEPUTY DIRECTOR
Earl Adams
ASST. DIRECTOR
John H. Martin
FEDERAL AID
Donald W. Burcalow
STATE LAND MGMT.
Richard L. Knox
FIELD
ADMINISTRATION
COOP. FORESTRY
Emil Kukachka
FIELD ADMIN.
Dorothy Farrell
Norman J. Reitan
Ralph Welte
RES. & PLANNING
John B. Moyle
WARDEN SERVICE
F. W. Johnson


CONSERVATION
Commissioner
uty Commissioner
BUREAU OF INFORMATION
Carl W. Moen, Director
NERAL — CONSERVATION
Ass't. Att. Gen.
ec. Ass't. Att. Gen.
c. Ass't. Att. Gen.
c. Ass't. Att. Gen.
Spec. Ass't. Att. Gen.
PUBLICATIONS
Alfred L. Nelson
NEWS EDITOR
Van Lawrence
EDUCATION
H. Nat Johnson
PHOTOGRAPHY
Walter Wettschreck
& FISH
mball, Dir.
WATERS
Sidney A. Frellsen, Dir.
LANDS & MINERALS
Ray D. Nolan, Dir.
IRECTOR
Wollan
DEPUTY DIRECTOR
Kenneth W. Pederson
OFFICE
ADMINISTRATION
TECHNICAL ASST.
James A. Lee
ADMINISTRATION
PUBLIC WATERS
GAME
Richard J. Dorer
FISHERIES
Hjalmer O. Swenson
ENGINEERING
SERVICE
STATE LAND ADMIN.
R. D. Hultengren
FIELD OFFICES
Hibbing
CHIEF MINING ENG.
H. A. Lever

Lake and Stream Improvement

Improvement of the natural fish habitat to promote the maximum of natural reproduction of the most desirable species of game fish is the most important phase of this program. Such improvements consist of channel work between the main lakes and their tributaries, the installation of culverts under roads and the construction of small water-control dams and carp-control dams. Trout stream improvement consists of bank stabilization, construction of small dams to create pools, tree planting, and the procurement of easements for public access and improvement work.

The fish populations were removed from fourteen small lakes by poisoning with rotenone. Thirteen of these lakes are desirable for trout and have been stocked with brook, brown, or rainbow trout. This is a comparatively new technique in fish management and is proving to be profitable in providing more trout fishing opportunities.

Private Fish Hatchery Operations

The rearing of fish, principally trout and minnows, in private fish hatcheries continues to be a popular and apparently profitable business. The rearing of minnows and suckers for bait relieves fishing waters of some commercial minnow seining.

The commercial fishery at Redby on Lower Red Lake is operated by the Red Lake Indian Agency under agreement between the Office of Indian Affairs of the U. S. Department of the Interior and the State Conservation Department. Commercial fishing is permitted only in those portions of the Red Lakes lying within the Reservation, which include all of Lower Red Lake and approximately the western-half of Upper Red Lake. The fishery is a cooperative venture of the Red Lake Chippewa Tribe.

Licensed Commercial Fisheries

Management of licensed commercial fisheries requires reliable statistics on the catch from waters in which such fishing is permitted. During the biennium, licensed commercial fishermen were required to report their daily catch in pounds by species, together with the amount of gear used. This report contains statistics of commercial fishing in Lake of the Woods, Rainy Lake, Lake Namakan, Lake Superior, and the Minnesota portion of the interstate waters of the Mississippi River and the St. Croix River.

The control of rough fish is becoming more important in fish management and should be continued and expanded in order to obtain the maximum annual yield of game fish in the sport fishery.

OUTLOOK FOR THE FUTURE

The one commodity in this country which is in truly short supply is opportunity for outdoor recreation. Meeting the ever increasing demand for hunting and fishing, and the continuing loss of fish and game habitat to agriculture and industry, can be accomplished only through long-range planning. Technological advancements have produced abundance in agriculture and industry. We can keep abreast of the increasing demand for game and fish by following a course of action outlined in the following three statements:

1. Acquire knowledge
2. Apply this knowledge in management of our wildlife resources.
3. Manage the Division of Game and Fish according to the best known practices of managing big business.

Lands and Minerals

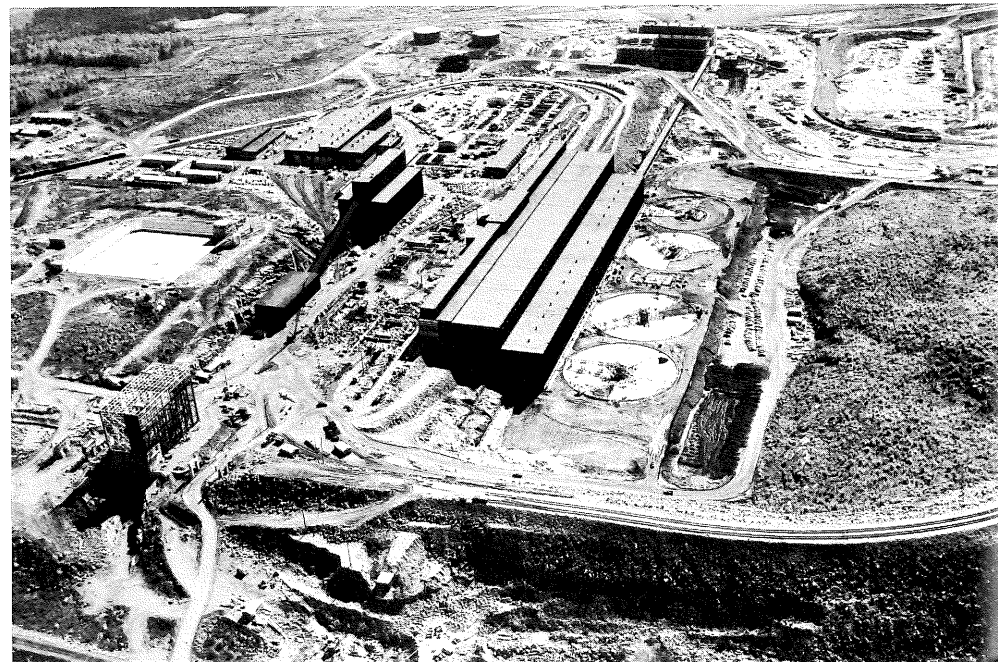
RAY D. NOLAN, Director

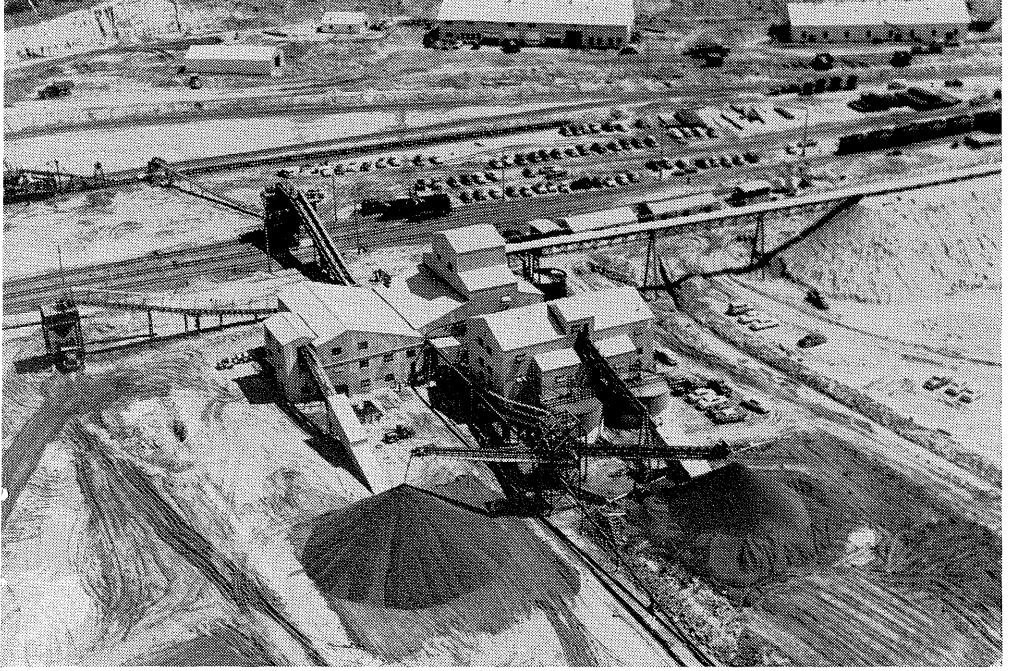
Lands and Minerals revenue for the biennium ending June 30, 1956, as compared with the previous biennium, was increased over 1½ million dollars, for a total of $9,305,119. $8,845,483, or 95% of this revenue was derived from iron ore and other minerals, and the balance was received from the sale of state land and timber and the rental of state lands. Over 95% of the total receipts was paid into the Permanent Trust Funds of the state, which totaled $283,459,685 as of June 30, 1956.

Forty-nine state-owned mining units were active during the biennium in producing 14,209,496 tons of royalty ore. Forty of these units were regular mines, six were stockpile units, two were lake bed mines, and one was the Reserve Mining Company taconite quarry, which started producing the first state-owned taconite concentrates in 1952.

Since 1893 when the first state-owned ore was shipped, 90 state mines have been active in producing 318 million tons of royalty ore. The present known commercial reserve of state-owned ore totals about 80 million tons. In addition, the state has a reserve of 100 million tons of stockpiled material, of which 25 million tons consists of lean ore and paint

Erie Taconite Plant — Aurora





Western Concentrating Plant — Grand Rapids

rock, and the balance is taconite that was removed during the last 60 years in making the commercial ore available.

Prior to the passage of the 1941 iron ore lease law which provided for seven schedules of royalty, including one on taconite, the amount of direct shipping ore produced from state-owned mines always exceeded the tonnage of concentrates.

In 1941 about 24% of the ore shipped from state-owned mines consisted of concentrates, and this percentage increased to about 69% in 1955. This means that about two-thirds of the ore that is shipped at the present time from state-owned mines consists of concentrates produced from low grade ore. Despite the fact that state iron ore reserves consist mainly of low grade ore, the royalty yield per ton has been constantly increasing since 1941.

In 1941, 16,847,245 tons of state-owned royalty ore produced a royalty yield of 4¼ million dollars. In 1955 when the tonnage was less than half that of 1941, or 7,826,698 tons, the royalty yield was 5¼ million dollars.

Royalty rates varied during 1955 from 25¢ a ton for ore produced from the Wearne Mine at Crosby, which is the only state mine that is still operating under the terms of the old 1889 law, to a maximum of $3.50 a ton for ore shipped from the Missabe Mountain Mine at Virginia.

LAND MANAGEMENT

The division acts as agent for the public schools and the University in selling or leasing state-owned trust fund lands and minerals. It also conducts research on low grade iron ore and promotes the exploration and development of minerals under public waters and in areas where iron ore and other minerals are now known to exist at the present time. Since 1943, when the legislature authorized the Commissioner of Conservation to lease minerals located in tax forfeited lands, the division has acted as agent for the taxing districts in issuing mineral permits and leases on tax forfeited lands.

The Land Section is engaged in the administration of 1,291,000 acres of State Trust Fund land and 1,101,000 acres of tax forfeited lands located in the Red Lake Game Preserve and Conservation Areas and lying outside of State Forests. State land sales during the biennium ending June 30, 1956, totaled 12,762 acres, which sold for $144,100, including timber and improvements. 1,829 leases were issued and receipts from this source totaled $83,000. Included in the land investigated in the Red Lake Game Preserve and Conservation Areas were 11,960 acres approved for sale by the Commissioner of Conservation of which 8,500 acres were sold.

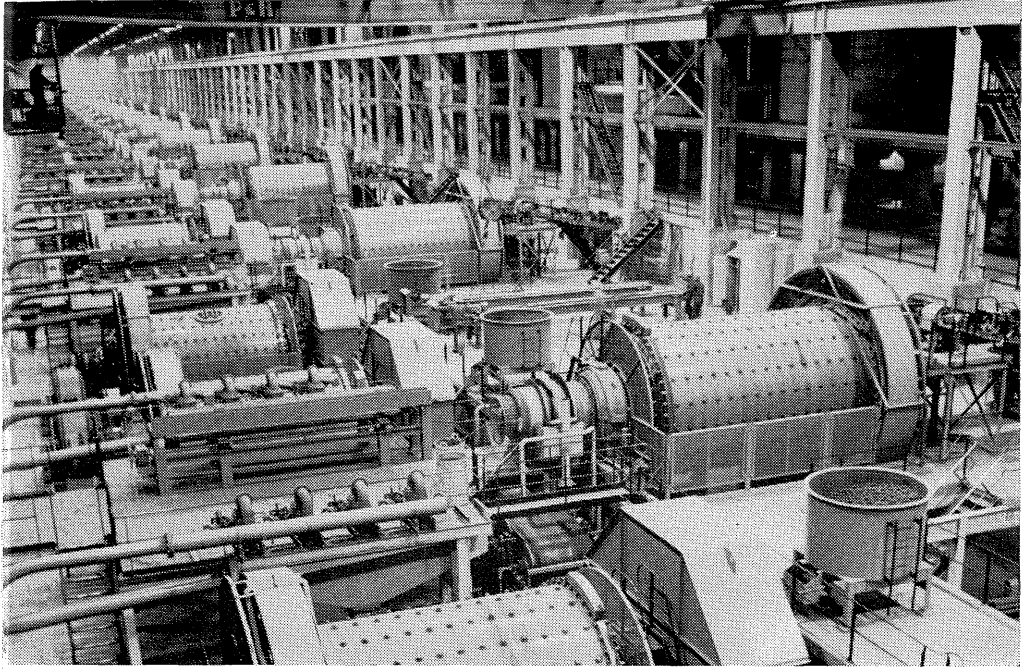
The 1909 legislature reserved to the state all minerals located beneath the waters of all public lakes and rivers, which includes thousands of acres of mineral lands. The Lake Bed Section has been preparing the engineering data which is being used by the Attorney General in determining the ownership of under water minerals through court action. Shipments of iron ore through 1956, from the two active lake bed leases, Syracuse Lake and Rabbit Lake, totaled about 5 million tons.

RESEARCH

During the biennium the Research Section conducted over 400 important concentration tests in addition to the current tests that are made in connection with the operation of state mines. Samples received from over 40,000 feet of drilling were classified and filed and samples were also received, processed, and filed from the copper-nickel areas in the northeastern section of the State; the iron-sulphide areas in Aitkin and Carlton counties; the lean iron ore areas in Aitkin and Crow Wing counties; and the source material areas in the northern part of the State. About 20,000 analytical determinations were made by the Chemical Laboratory, which is a part of the Research Section.

After an inactive period of five years, interest in the iron sulphide area of Aitkin County is being revived. Exploration work is now being conducted by one of the large mining companies on state lands under 17 wild cat permits which were issued beginning in December, 1955. The original exploration work in this area was started with the idea of developing sulphur that could be used in the concentration of low grade manganese, in the event that a commercial manganese plant was constructed on the Cuyuna Range.

During the biennium the state administration actively supported federal legislation leading to the establishment of a metals research laboratory in Minnesota. A bill authorizing an appropriation of $1,350,000 for the construction of such a laboratory, and $250,000 a year for its operation by the United States Bureau of Mines, passed the United States Senate but failed to pass in the House. However, since Congress adjourned, the Secretary of the Interior has decided that the establishment of this laboratory in Minnesota can be justified by the Department, and the necessary appropriations will be included in the Bureau of Mines' budget that is to be



Reserve Mining Taconite Mill

presented to Congress in January, 1957. Establishment of this laboratory in Minnesota will expedite the research that should be conducted in order to develop, on a commercial basis, the large deposits of low grade manganese that are located on the Cuyuna Range, the iron sulphides of Aitkin County and other Minnesota minerals.

The discovery in March, 1955 of uranium in the Province of Ontario, Canada, northeast of International Falls, created a great deal of interest in the possibility of uranium being discovered south of the border in Minnesota. Rules and regulations covering the exploring and mining of uranium on state-owned lands were prepared; and during the biennium, 155 permits were issued to prospect for uranium and other source materials. Many of these permits have been converted into leases; and while traces of radioactive material have been found, no commercial deposits of source material have been discovered.

Due to the shortage of Portland cement and to the fact that most of Minnesota's limestones are dolomitic, there is a great deal of interest in the possibility of developing marl as a source of raw material for producing Portland cement. Tentative rules and regulations have been prepared covering the exploring and mining of marl on state-owned lands and in the beds of public waters so that state marl may be made available for a cement industry in Minnesota.

Prospects seem favorable for developing low grade copper and nickel in the sulphide-bearing gabbro along the contact of the Duluth gabbro, which extends north from Duluth in the general direction of Babbit, Minnesota, and then northeast along the South Kawishiwi River through the Superior National Forest into Lake and Cook Counties.

The largest producer of nickel has conducted some drilling in the area, and a major producer of copper has been conducting field and geophysical surveys in this northeastern Minnesota area during the biennium.

The State of Minnesota has scattered tracts of state-owned lands all along the contact of the Duluth gabbro. These lands, together with beds of public waters, are being classified into mining units so that a public sale of permits to prospect for copper-nickel may be held in the near future under Minnesota Statutes 1953, Section 93.08 and Section 93.25.

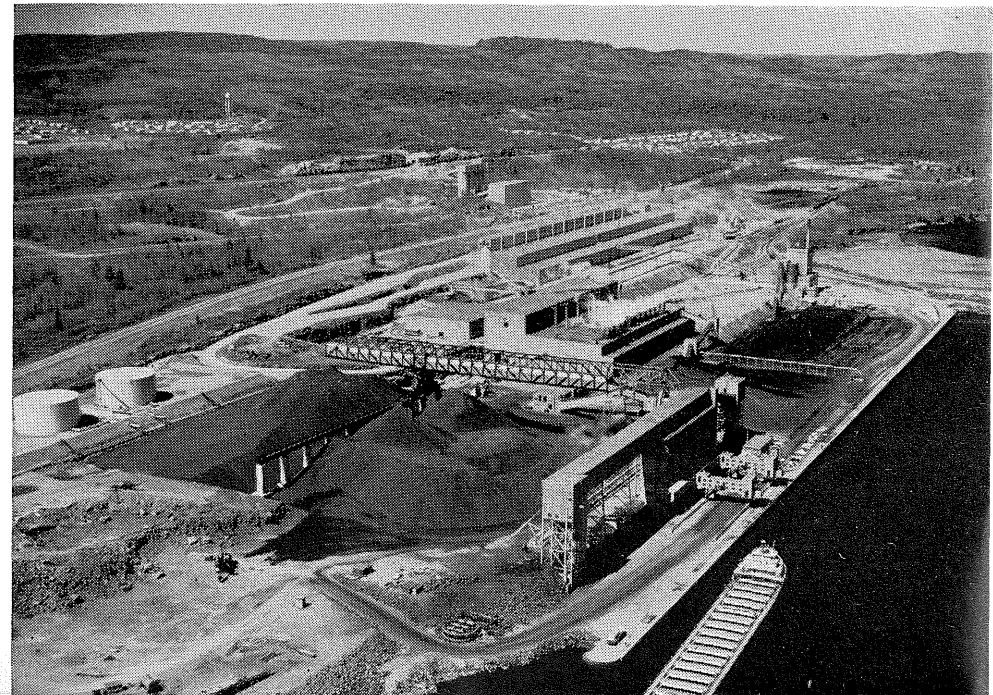
TACONITE DEVELOPMENT

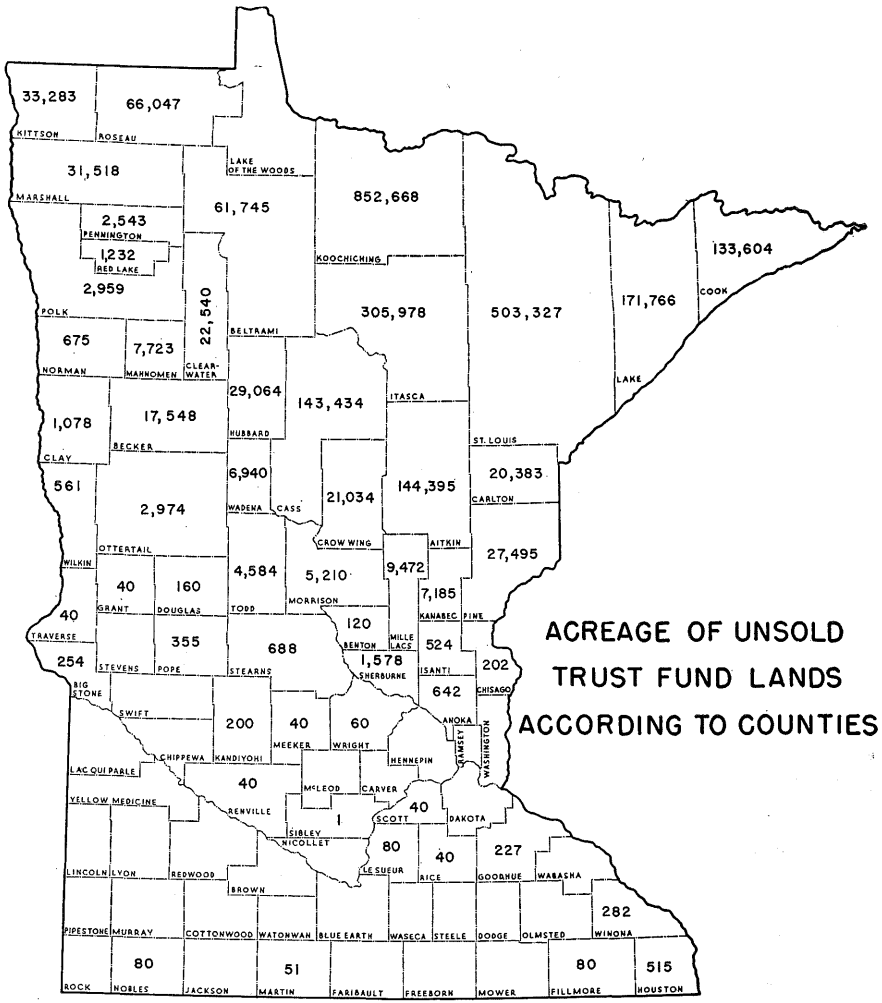
The most interesting development of the mining industry during the biennium, occurred in October, 1955, when Reserve Mining Company started producing taconite concentrates from the first large commercial plant to be constructed in Minnesota.

This Silver Bay Plant, which is known as the E. W. Davis Works, is located on the North Shore of Lake Superior, has an annual capacity of 3,750,000 tons, and eventually will be expanded to produce 10 million tons of high grade taconite concentrates annually.

The Erie Mining Company's plant, which is being constructed near Aurora at the present time, will be producing 7½ million tons of taconite concentrates annually beginning in 1957, and this plant will be expanded later to a capacity of 10½ million tons.

Reserve Mining Taconite Project





ACREAGE OF UNSOLD TRUST FUND LANDS ACCORDING TO COUNTIES

Estimates as high as 90 billion tons have been made of all of the crude taconite that is located in Minnesota's Mesabi Range iron formation north of the Virginia slate. This includes the slaty taconite which is not amenable to concentration, non-magnetic taconite which will probably be concentrated on a commercial basis at some time in the future, and the magnetic taconite which is being concentrated on a commercial basis at the present time.

Recent estimates of the taconite that is located in state-owned lands would indicate a crude taconite reserve of about 15 billion tons. Three billion tons of this total is slaty taconite which is not considered as a reserve at the present time. Eight billion tons of this reserve is classified as magnetic taconite and 4 billion as non-magnetic taconite which undoubtedly will be commercially concentrated at some future date as methods for concentrating it have already been developed, but not on a commercial basis. Non-magnetic iron-bearing material somewhat similar in structure is now being concentrated on a commercial basis in Michigan.

In this connection, the Research Section of the division during the next biennium will concentrate on a project to develop a flotation reagent by laboratory tests conducted on the sap of plants and trees that are native to Minnesota. Finland has produced a flotation reagent from this source; and if a similar supply of raw material could be developed in Minnesota, it would mean the establishment of a new industry in the state, and would expedite the production of high grade iron ore from the large reserve of Minnesota non-magnetic taconite that is not being processed commercially at the present time.

The establishment of a large commercial taconite processing plant at Silver Bay, and the opening of a larger commercial taconite plant near Aurora in 1957, will mean an entirely new source of royalty revenue for the Permanent Trust Funds and the taxing districts in which the taconite is located. The state tonnage processed in the Silver Bay Plant will be small; but it is anticipated that half of the production from the Aurora Plant, which ultimately will have an annual capacity of 10,500,000 tons, will come from state-owned lands. Based on the known state-owned reserves of this material, the state's future royalty yield from this source will eventually amount to several hundred million dollars.

State Parks

U. W. HELLA, Director

The Minnesota State Park system dates from the establishment of Camp Release Wayside in 1889. By the outset of World War II, it had grown to 48 units aggregating 50,000 acres. The system has since increased to 63 units comprising 88,000 acres.

Development dates from the construction of Douglas Lodge in Itasca State Park in 1905. The bulk of existing development was, however, realized from the relief programs of the 1930's ending with the outset of World War II. These improvements at today's dollar value have an estimate worth of over six and one-half million dollars.

In the period from 1942 to 1952, appropriated funds (the only source of moneys) were insufficient to an adequate job of preventative maintenance. Annual appropriation varied from $150,000 to $240,000.

A major rehabilitation program was accordingly necessary and made possible by the 1953 legislature through the enactment of the State Park Sticker Act and the authorization of a $450,000 loan of Game and Fish funds with which to begin this program and to meet increased operating and maintenance costs. Repayment of this loan will be completed by July, 1957 from sticker receipts. The 1955 legislature in turn authorized the issuance of Certificates of Indebtedness in the amount of $525,000 with

which to continue the program of rehabilitation, limited improvements, increased operating costs necessitated by increased attendance and phenomenal increases in specific types of use such as tourist camping.

Utilization

	1954	1955
Visitations	2,005,400	2,350,000
Sticker Sales	96,451	115,435

Total visitation increase to the park system percentage-wise for 1955 over 1954 was 17.2%. This increase is reflected in the 19.6% increase in sticker sales.

The annual average increase since 1944 has been approximately 6%.

Increases in specific types of use, i.e., picnicking or casual visitation, tourist camping and group camping are reflected in the following receipts:

	1955	1956
Gross Total Receipts	$218,623.05	$221,559.01
Tourist (Family) Camping	10,941.80	14,115.30
Group Camping	7,095.70	7,637.18

Gross receipts increased 1.3% indicating little, if any, increase in casual visitations.

Tourist (Family) camping, however, increased over 29%—representing a trend being experienced by other northern states and the National Park system.

The 7% increase in organized group camping is limited by facility capacity. Further increase is only possible thru extending the seasons in the spring and fall or by the addition of further group camp accommodations.

Budget

The period of report features a continued program of physical facilities, rehabilitation and limited capital improvements.

Source of funds in the 1953-55 fiscal years were as follows:

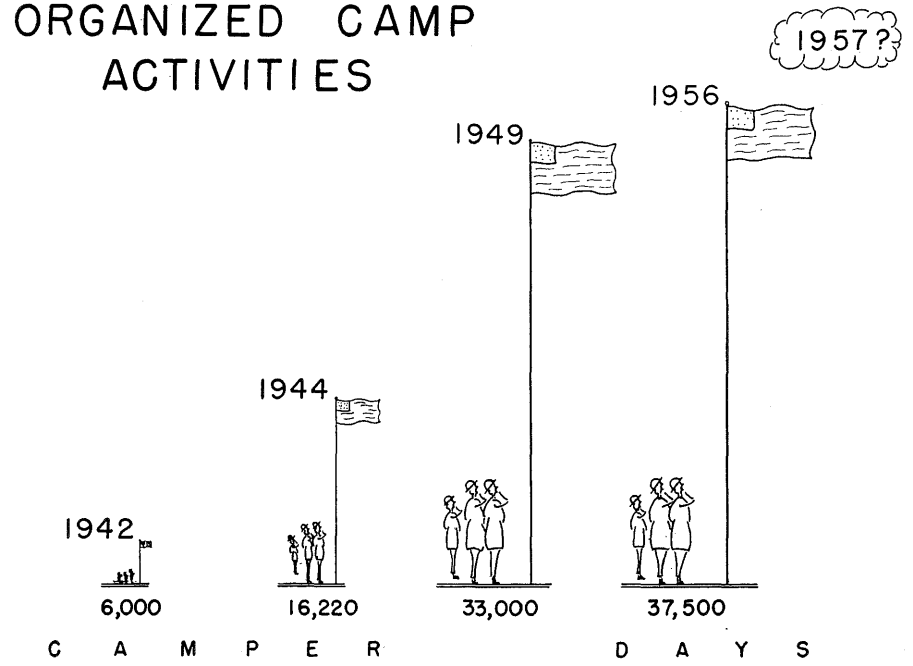
Gross Funds

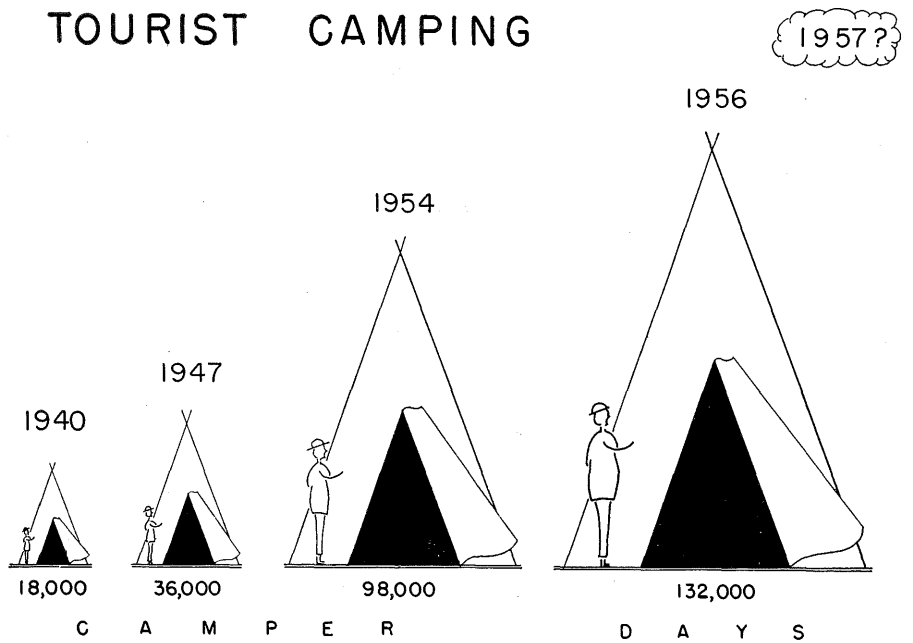
From General Revenue	$ 440,588.00
Authorized Loan of $450,000 in Game and Fish Funds	450,000.00
Receipts from Sticker Sales	214,000.00
Reappropriated Receipts	17,000.00
	$1,121,588.00

Liabilities

Repayment to Game and Fish	214,000.00
Net Available	$ 907,588.00

Governor Orville L. Freeman takes time out to visit the Conservation building at the Minnesota State Fair. Over 500,000 people pass through this building each year.





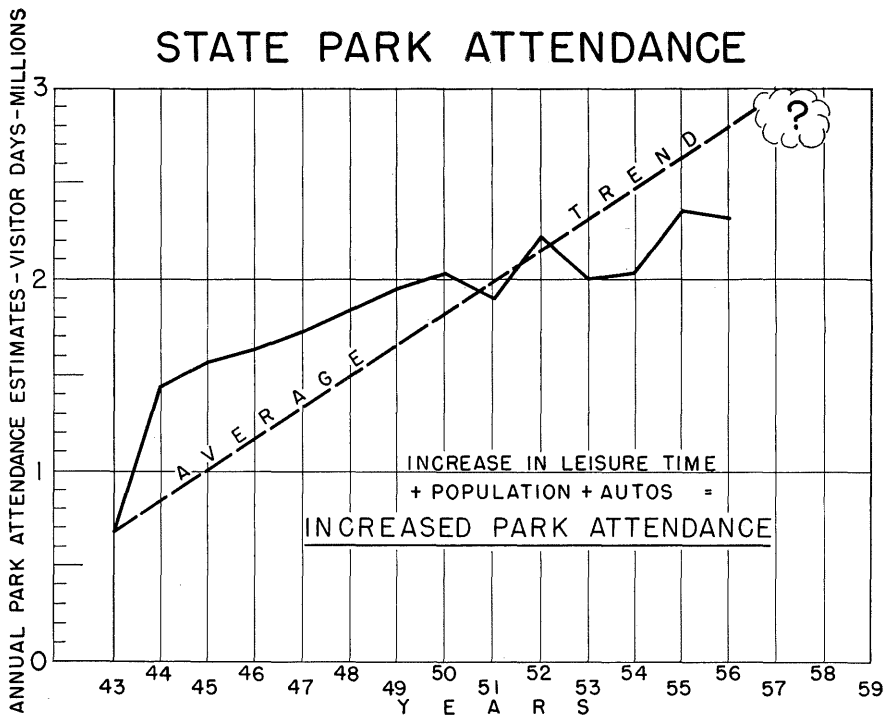
Source of funds in the 1955-57 fiscal years were:

Gross Funds

From General Revenue	$ 428,262.00
Anticipated Sticker Receipts	236,000.00
Certificates of Indebtedness	525,000.00
Reappropriated Receipts	17,000.00
	$1,206,262.00

Liabilities

Repayment of Game and Fish Loan	$ 236,000.00
Net Funds Available	$ 970,262.00



Annual spending plans were correspondingly as follows:

1954-55	**$356,353.00**
1955-56	**$501,047.00**

Working Capital Fund

The special services afforded in our developed parks are self-supporting in that the fees and charges for services are dedicated to the State Parks Working Capital Fund, which is used to provide personnel, mainte-

Gooseberry Falls State Park

nance, improvement and replacement of the equipment, furniture and fixtures involved in rendering park services.

The income producing facilities which support this fund are: family and group camping, boating, swimming, housing, food service, golf, sale of souvenirs, soft drinks, ice cream and other confections.

The constant increase in park use reflects a proportionate increase in the income to this fund, which during the 1956 fiscal year totaled $221,550.01 and the 1957 budget is predicted on an anticipated income of $250,000. Although a large portion of this increased income is absorbed in increased personnel costs, we have been able to expand our lifeguard program in both manpower and hours, start a replacement program for boats, pop coolers and ice cream freezers. This fund has and will assume the complete cost of furniture and fixtures for modernization of Douglas Lodge and the guest rooms and cabins throughout the park system.

Accomplishments

Tourist Camping—Modern campground combination buildings were built at Lake Bemidji, Lake Carlos and McCarthy Beach. Camp ground expansion is in progress at Jay Cooke, Scenic and Lake Bronson. Facilities are expanded at Itasca.

Organized Children's Group Camp—At Whitewater a new camp at a new location has been completed to entrance road with bridged river crossing, 4 barracks, a mess hall, central latrine and washhouse, a well and water distribution system and a sewage collection and treatment system.

Lodge Accommodation—The Annex at Douglas Lodge was rebuilt to provide 18 modern rooms with bath—complete to heating system.

Picnicking—A picnic shelter was built at Mound Springs. Parking areas improved at McCarthy Beach. Log guard rails replaced with concrete curb at Lake Shetek.

Utilities—Primary emphasis was given to adequate water supplies and sanitary facilities at many of our state parks. Purchase of equipment such as trucks, mowers, etc., for maintenance and operation totaled over $40,000.00.

Historic and Scientific Informational Programs—Highly popular Naturalist program sponsored jointly with the University of Minnesota, Museum of Natural History has expanded to four Naturalists working at Itasca, Gooseberry Falls, Lake Shetek and Whitewater and assisting in establishing and maintaining self-guided nature trails at Kilen Woods, Fort Ridgely, Interstate, Scenic and St. Croix. Under a new program, the Minnesota Historical Society is cooperating by furnishing professional lecturers at Fort Ridgely, Itasca, and Jay Cooke.

Field Employee Housing and Offices—In the interest of employee morale, availability and service to the public an extensive program of housing has materially improved residential and office quarters in state parks.

Swimming—In 1955 there were over 200,000 incidents of use of State Park beaches. Nineteen instances of State Park lifeguards effecting rescue were reported.

State Aid Parkways—Grading, base improvement, realignment improvement and paving projects accomplished in 28 major areas under County jurisdiction.

Cooperation of National Park Service—A Park-Forest policy report on Itasca—essential to a comprehensive Forest Management Plan incorporating divergent interests of biologists, foresters, and park authorities—was prepared by the National Park Service.

Winter Activities—Skiing, tobogganing, snowshoeing and winter picnicking are on the increase.

Waters

SIDNEY A. FRELLSEN, Director

Minnesota's water resources are constantly subject to the threat of encroachment by private interests and by public agencies; they are often endangered by unwise planning of projects. In the general administration of the water laws of the state, it is one of the functions of the Division of Waters to protect these water resources from all encroachments, public or private, which may adversely affect the public interest, restrict the free use of such waters by the general public, or create a hazard to life, health or property.

Present statutes forbid the construction or removal of any obstruction in any waterway, or any action which will change the course, current or cross-section of any public waters, except by permit issued by the Com-

missioner of Conservation. Permits are also required, with certain exceptions, for the appropriation of water, either surface or underground. The Division of Waters receives, investigates and processes all applications for such permits, and prepares permits for final action by the Commissioner.

Wherever the proposed use of public waters appears to be controversial in nature, due to possible conflict between public and private interests, or between various private interests, it is the policy of the department to hold a public hearing at which evidence may be presented and all interested parties may be heard.

The need for providing adequate outlets for farm drainage systems is sometimes a threat to our lakes and streams. Wherever the plans for establishing or extending public drainage systems indicate that bodies of public water may be adversely affected, the department is insisting that the petitioners secure special authority from the Commissioner of Conservation and provide the necessary safeguards. Private ditching not covered by the public drainage statutes has created a similar problem. Reported violations of the statutes are investigated and in some instances legal action is required to protect the public interests.

Planning and Development

While the Division of Waters, under present statutes, is charged with the responsibility of developing and carrying out water conservation projects, it is not ordinarily supplied with funds to be used for construction. However, it does have a significant part in the planning and development of such projects initiated by other units of government. Complete engineering services, including surveys, mapping, drafting, specifications, and design of structure, are furnished for all projects of the Divisions of Game and Fish, State Parks and Forestry.

Chapter 799, Laws 1955, known as the Minnesota Watershed Act, now offers an opportunity for water planning on a watershed basis and the Minnesota Water Resources Board was created by Chapter 664, Laws 1955, for the purpose of formulating general water policies and making recommendations to the legislature relative thereto. The Division of Waters acts as advisor to the Water Resources Board, and the director reports to the Board on each nominating petition for the establishment of watershed districts.

The Great Lakes Commission on water use and rights is created by the Great Lakes Compact which has now been ratified by a majority of the eight states bordering the Great Lakes. The 1955 Legislature ratified the compact for Minnesota, (M.S.A., Section 1.22) and the state is represented on the Great Lakes Commission by four members, two from the House of Representatives and two from the Senate.

The Division of Waters is charged by statute with the duty of reporting on the plans proposed by engineers under public drainage proceedings to the County Board, in the case of county ditch systems, and to the Clerk of District Court in judicial systems where the drainage system lies in more than one county. The report of the Director of Waters relates to the hydraulic features **only** and having been read at the final hearing, may thereafter be disregarded since it is advisory **only**.

State-wide Ground-water Investigation***

The program consists of the compilation and evaluation of all available data on known ground-water supplies, including information relative to its availability, use, quality, and recharge.

The investigation includes the measurement of water levels and artesian pressures in selected observation wells. As of December 31, 1955, 29 observation wells were being measured, 13 of which were equipped with recording gages to provide a continuous record of water-level fluctuations. Their geographic distribution is as follows:

County	No. of Wells
Brown	1
Carlton	3
Carver	1
Clay	5
Dakota	1
Hennepin	13
Morrison	1
Redwood	1
St. Louis	3

As a result of the mining and beneficiation of taconite on the Mesabi Range, the economy in this area is generally expanding and larger amounts of ground water are needed to meet present and future demands. Extensive studies are now being made in this area by the U. S. Geological Survey in cooperation with the Iron Range Resources and Rehabilitation Commission.

Sources of Funds—Cooperative Ground Water Studies.

	July 1, 1954 to June 30, 1955	July 1, 1955 to June 30, 1956
Minnesota Division of Waters	$ 5,667.	$ 17,851.*
Board of County Commissioners of Hennepin County	1,750.	1,750.
Iron Range Resources and Rehabilitation Commission	51,227.	47,640.**
U. S. Geological Survey Cooperative Funds	55,096.	67,241.**
U. S. Geological Survey non-Cooperative Funds	600.	800.
	$114,340.	$135,282.

*Includes gifts to Commissioner of Conservation for this purpose.

**Includes funds encumbered by contract for test drilling which is not as yet completed. These figures may be reduced.

***Note: Partially abstracted from report prepared by Robert Schneider, Dist. Geol., U. S. Geological Survey, St. Paul, Minn.

Filing of Well Logs

Under M.S.A., Section 105.51 as amended by Chapter 523, Laws 1955, well drillers and others providing the means for appropriation of ground water, are required to file the well log and test data for each well drilled by them with the Director of the Division of Waters.

Stream Gaging*

The purpose of the stream gaging program in Minnesota is to provide the data needed for the wise use and orderly development of the state's surface-water resources. Not only is it necessary that quantities available at various points on streams be known to assure adequate supplies for planned uses, but also a knowledge of flood hazards is needed so that structures along streams may be designed to withstand floods or to minimize their damaging effects.

The processing of taconite ore, the refining of petroleum, and rapidly developing chemical and plastics industries use large quantities of water. With the trend of industry toward less congested areas, Minnesota has many advantages to offer industrial expansion. Sixteen gaging stations are now being operated in cooperation with the Iron Range Resources and Rehabilitation Commission in the area where taconite development appears most likely, or where the records will provide indices of runoff for other streams. Records of stream flow are being collected at 124 gaging stations.

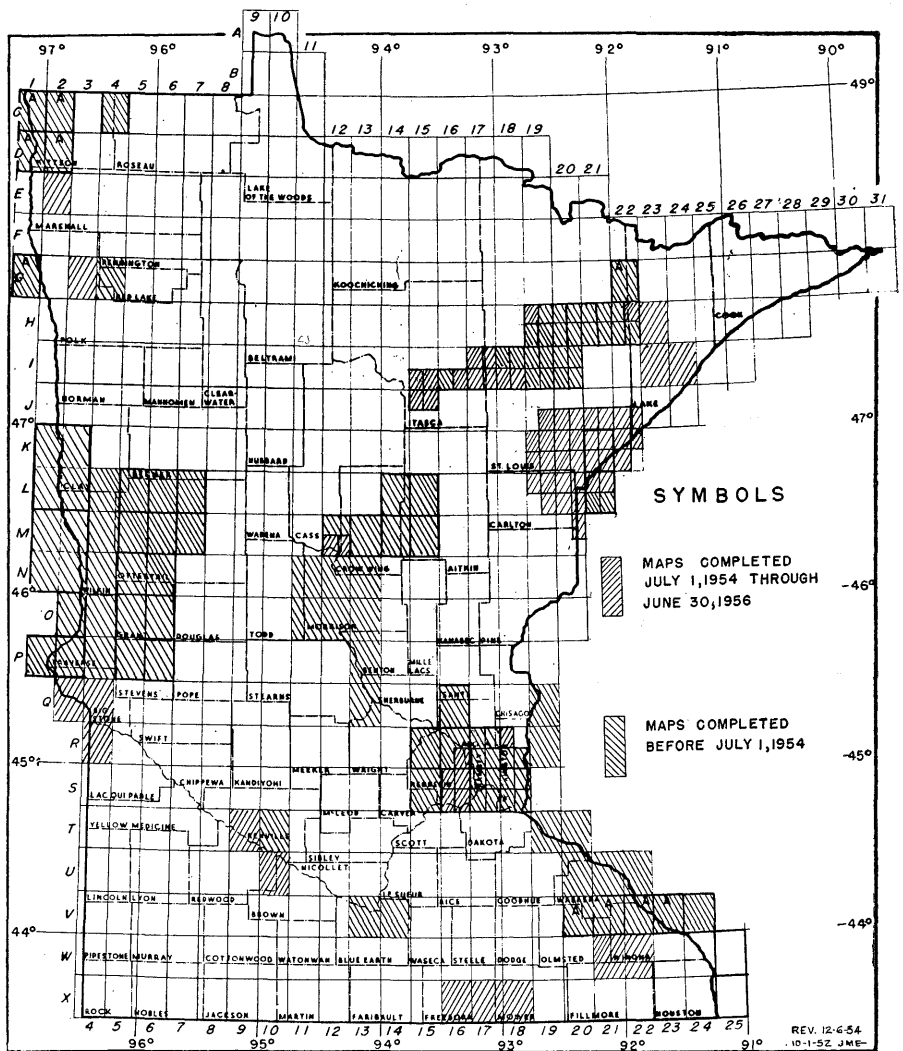
Funds Spent in State During the Biennium July 1, 1954 to June 30, 1956, for Streamflow Studies Except Those for Main Stem Stations on Red River of the North.

Division of Waters	$ 36,703.93
Iron Range Resources and Rehabilitation Commission	26,601.72
City Cooperation	248.66
Municipal Cooperation	374.89
County Cooperation	1,054.45
Federal Cooperative Funds	63,361.70
Corps of Engineers, U. S. Army	40,968.85
U. S. Department of State	16,879.86
U. S. Geological Survey	41,295.35
Federal Power Commission Licenses	3,225.96
	$230,715.37

*This portion of report prepared by L. R. Sawyer, Dist. Engr., U. S. Geological Survey, St. Paul, Minn.

Watershed Maps

The Division of Waters has been engaged in outlining the watershed boundaries of the streams of the state. All available sources of information, such as U. S. Geological Survey quadrangle maps, U. S. Department of Agriculture Soil Survey Report, airphotos, public drainage system plans, and records of the Department of Conservation are used as sources of information so that streams and divides may be correctly located.



STATUS OF TOPOGRAPHIC MAPPING
IN MINNESOTA
THROUGH JUNE 30, 1956

DIVISION OF WATERS
DEPARTMENT OF CONSERVATION — STATE OF MINNESOTA

To date 38 of the 87 counties in Minnesota have been completed and will be revised from time to time as additional information becomes available. In addition, an inventory of the waters of the state is being made and it is anticipated that a "Gazetteer of Waters" will ultimately replace the "Gazeteer of Meandered Lakes of Minnesota," published by the former Department of Drainage and Waters in 1928.

Topographic Mapping

The U. S. Geological Survey, in cooperation with the states or from all-federal funds, has been making topographic maps of the states of the nation for more than 60 years. By and large, the work has been financed by the states and federal government equally. Specifically, the cooperative work has been confined to states which have made appropriations to qualify them for participation in this program.

The following tabulation outlines the activities of the topographic mapping program in Minnesota for the period July 1, 1954 to June 30, 1956.

Source of Funds for Topographic Mapping

I.	Department of Conservation:	
	State appropriation, fiscal year 1955	$ 50,000.00
	State appropriation, fiscal year 1956	36,000.00
	Federal allotment, fiscal year 1955	50,000.00
	Federal allotment, fiscal year 1956	36,000.00
II.	Iron Range Resources and Rehabilitation Commission:	
	State appropriation, fiscal year 1955	54,000.00
	State appropriation, fiscal year 1956	50,000.00
	Federal allotment, fiscal year 1955	54,000.00
	Federal allotment, fiscal year 1956	50,000.00
III.	Federal Mapping Program:	
	Fiscal year 1955	177,749.61
	Fiscal year 1956	139,511.67

Water Erosion Near Stillwater

Red River Valley in Flood

FUTURE OUTLOOK

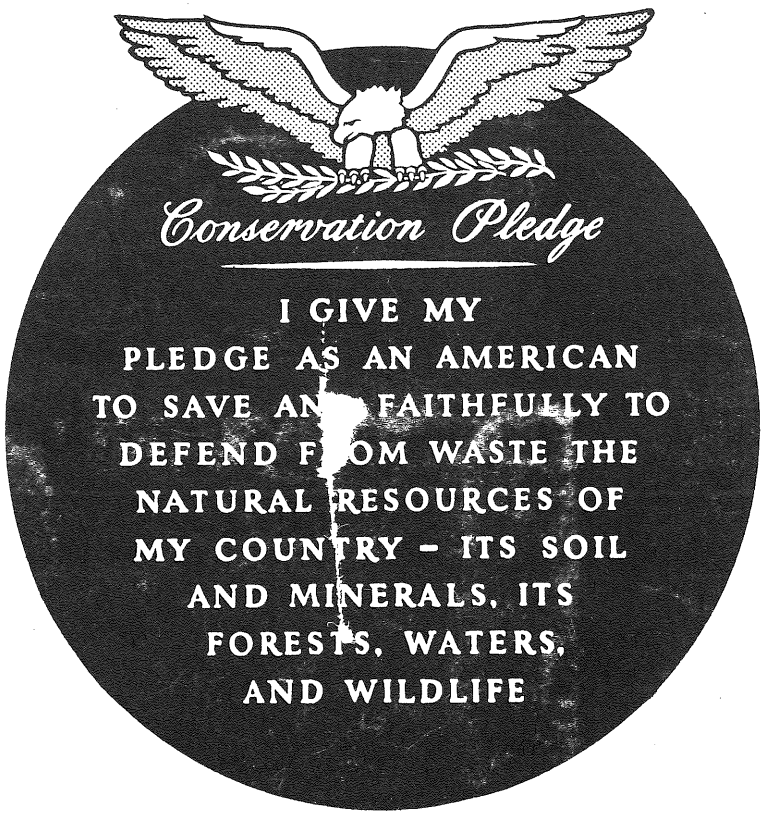
In addition to its routine duties which will be continued, the division anticipates greater activity in the protection of the public waters against public and private encroachment and closer watchfulness of developments relating to the Great Lakes and the boundary waters.

Work has already been started on an inventory of the lakes and streams of the state looking toward the publication of a "Gazetteer of Waters."

Progress has been made on watershed mapping in the southern counties of the state and will be continued as rapidly as funds and personnel permit.

It is expected that the "watershed idea" will meet with widespread acceptance. The division necessarily will require additional personnel to care for the increased work load that will result.

Basic data collection will need to be expanded to keep pace with increasing population and greater and more diversified water use. Increased appropriations will be necessary for this purpose.


Conservation Pledge
I GIVE MY
PLEDGE AS AN AMERICAN
TO SAVE AN FAITHFULLY TO
DEFEND FROM WASTE THE
NATURAL RESOURCES OF
MY COUNTRY - ITS SOIL
AND MINERALS, ITS
FORESTS, WATERS,
AND WILDLIFE