



3 0307 00009 6449

BIENNIAL REPORT

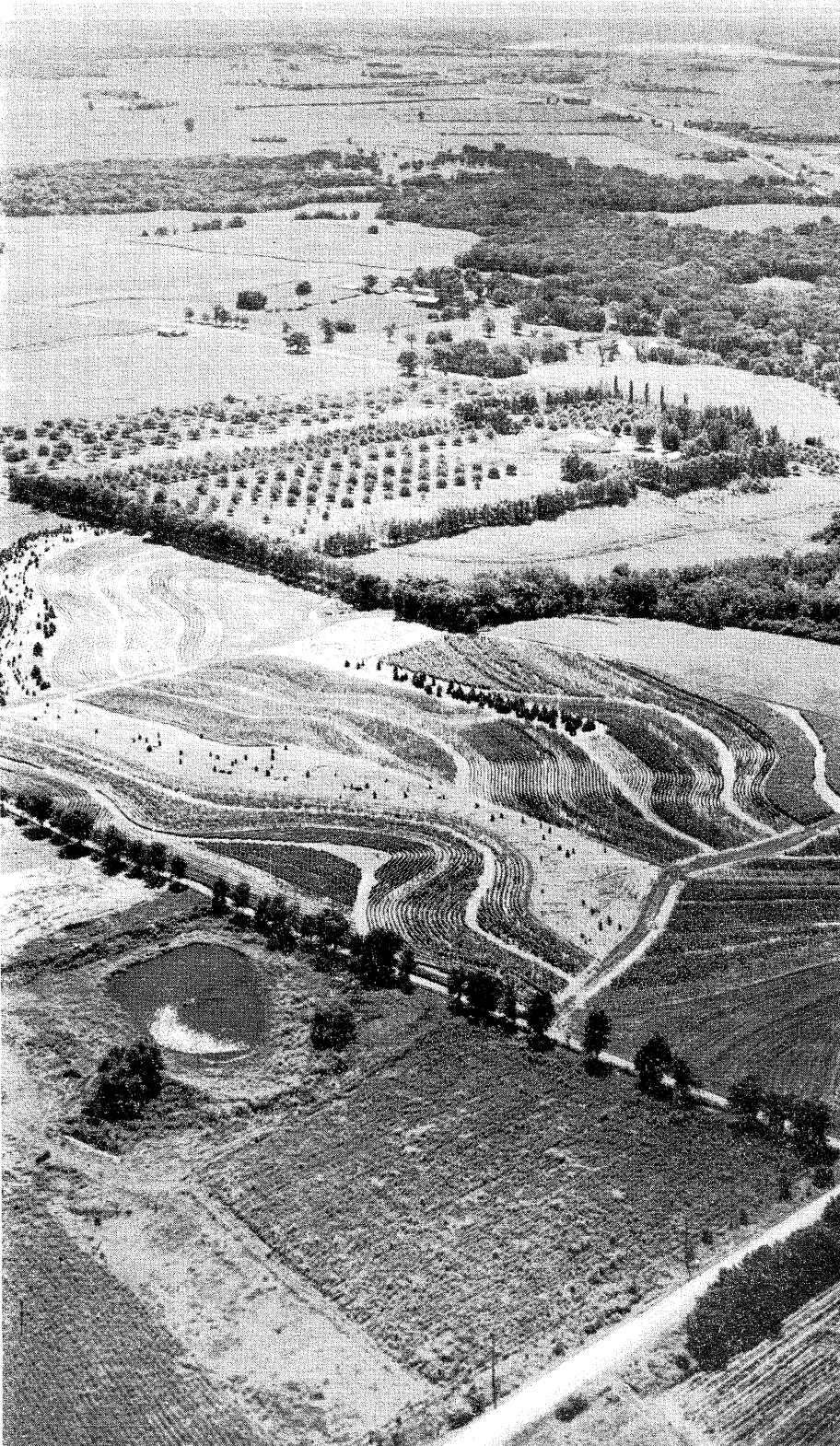
1956
—
1958MINNESOTA
DEPARTMENT
OF
CONSERVATION

Conservation Through Education

This document is made available electronically by the Minnesota Legislative Reference Library as part of an ongoing digital archiving project: <http://www.leg.state.mn.us/lrl/lrl.asp>

(Funding for document digitization was provided, in part, by a grant from the Minnesota Historical & Cultural Heritage Program.)

HC
107
.M6
A335
1956/58



*In this our Centennial year of
statehood the Department of Con-
servation wishes to dedicate this
biennial report to our Minnesota
farmer, partner in conservation,
friend to wildlife, tiller of the soil
and benefactor to all mankind.*

*George A. Selke
Commissioner of Conservation*



CONSERVATION DEPARTMENT, Board of Directors — seated, left to right: James W. Kimball, Game and Fish; Ray D. Nolan, Lands and Minerals; Clarence Prout, Deputy Commissioner; George A. Selke, Commissioner; E. L. Lawson, Forestry; Sidney A. Frellsen, Waters, U. W. Hella, State Parks; and Wayne Olson, Deputy Attorney General, standing.

Looking to the Future

It is with pride and humility that this biennial report of the Department of Conservation is presented to Orville L. Freeman, Governor of the State of Minnesota, and to the members of the 1959 Legislature. The pride comes from the sense of achievement in the conservation of our natural resources, and the humility stems from an awareness that man can do so little and nature so much in terms of abundance and scarcity, of feast and famine.

The recognition of our Centennial Year of Statehood during this biennium is a reminder that time is one of our most priceless possessions. It is the measurement of history and the evaluation of the plans for the future. The justification of this report is that from a review of our experiences we gain perspective, strength and wisdom needed to plan the conservation program for the future.

Dedication

The dedication of this report to the farmers of our state was prompted by a deep-seated conviction that the members of no other group contributed as much individually or collectively, nor have the opportunity to do so, as the farmers of Minnesota. The conservationists, including our fine sportsmen,

will agree. It is a sincere expression of our confidence in wholesome and co-operative Farmer-Sportsmen relationships. In the broader sense it is true that all of us depend more or less directly upon the harvest of the products provided by our natural resources.

Acknowledgment

It is always a pleasure to acknowledge the indebtedness for the efficient help that has come from many willing hands and to pay tribute to the unselfish public-spirited people in all walks of life who have furthered our conservation programs. Commendations are extended to the press, radio and television, to the sportsmen of our state, to many cooperative civic groups of youth, men and women, to our veterans and their organizations, and to a host of local, state and federal agencies. One would indeed be derelict not to include the personnel of the Department who serve the public with zeal and devotion. Even their efforts could not produce success were it not for the understanding and support of so many of our good citizens in all parts of the state.

The Department

The concept of "conservation" has evolved from the limiting concept of "preservation" to the modern understanding of "wise use" and "renewal" of

our natural resources. On this broader concept the Department of Conservation was established in 1931. Its essential assignment is to care for the vital resources on which the economy and welfare of the people of the state depends—lands and minerals, water, forests and wildlife—and to manage the state park system. The working force of the department totals 1,200 regular employees and about 600 seasonal and part-time personnel, a total of approximately 1,800 at peak employment periods. The total department budget for each year of the biennium exceeds ten million dollars, including appropriations and federal aids.

The achievement reports of the divisions and bureaus mean much more than facts, figures and statements for the record. They represent the faithful performance of all of the employees of the department, past and present. They indicate loyalty, industry, cooperation, frequently personal sacrifice, and the operation of team work.

To our staff bureaus I can say, a job well-done. Our Bureau of Operational Services is responsible for "good housekeeping"; the Bureau of Information for our official magazine, "The Conservation Volunteer"; and the Legal Bureau my everlasting gratitude for the careful scrutiny of the legal problems of my office.

And to the Minnesota Boat and Water Safety Committee working on boating recommendations for action by the 1959 legislature my many thanks. Human values in conservation are often overlooked. Outdoor safety is an obligation and a duty.

CONSERVATION EDUCATION AWARD presented by National Association on Conservation Information to Minnesota Department of Conservation, George A. Selke, Commissioner. Pictured center is H. Nat Johnson, Conservation Education Advisor, and Dean M. Schweickhard, Commissioner of Education.



On behalf of the National Association of Conservation Information, Governor Orville L. Freeman presenting awards in outdoor writing (left to right): James W. Kimball, Director, Division of Game and Fish; John B. Moyle, Supervisor, Bureau of Research and Planning; and Van Lawrence, Assistant Director, Bureau of Information.

FORESTRY

In this report I can touch only briefly on the history of Forestry and bring it up-to-date by reporting to you that Minnesota is 25 years, possibly 50 years, behind schedule in our forest planting program. In the past ten years nursery production has increased seven-fold and seed planting 12-fold with 18,600,000 trees produced in 1958 and seed planting this fall expected to exceed the total of 41,500,000 planted last year.

Our 19,344,000 acres of forest land constitutes one of the greatest assets of our state. Of this total more than 18 million acres or 35% of the gross area of the state is commercial forest land; more than 10 million acres or 56% of Minnesota's commercial forest land is publicly owned; and only three states, all in the far west, have a greater acreage of their commercial forest land in public ownership.

State and county ownership of commercial forest land in Minnesota totals 7,100,000 acres. This is 25% of the total state and county ownership in the United States. No other state has nearly as large an ownership of combined state and county forest lands as Minnesota. Federal ownership of commercial forest in Minnesota is 3,055,000 acres. About 8,000,000 acres are in private ownership.

Forestry by its very nature requires a long-range program. It takes three years to produce a seedling. We must set an immediate goal of 50,000,000 trees yearly. Our long range goal may exceed 100,000,000 trees. We must

expand our forest management program to provide marketing and technical assistance for the small producer. We must develop new outlets for forest products and establish new wood-using industries. We must improve our fire protection and suppression on all forest lands.

WILDLIFE

The growth and popularity of hunting and fishing continues to create new and unprecedented demands on our wildlife resources. Only one hundred years removed from a wild and primitive territory, Minnesotans now find themselves deeply concerned with the future of free public hunting and fishing. We are witnessing a breakdown in our traditional American concept that hunting and fishing is where you find it. We are becoming mindful that access to the out-of-doors is becoming increasingly restricted.

Stewardship

"The earth is the Lord's," says the Psalmist, and all that therein is." The trackless forests, the rivers that wind across our continent, the marsh lands, the prairies and the deserts—all were made by Him.

Man did not create the riches that are spread before him. All of these have been loaned to him as a trust. None of it really belongs to him. His days are as grass and when the span of his life is over he is the owner of nothing on earth. For a time he is called to be a steward of the riches of the earth, leaving them as a goodly inheritance to his children. He is given dominion over the works of his Creator, but such dominion is a frightening responsibility. One look at a dust bowl, or at a poisoned stream, or at a landscape blackened by fire shows how grave the responsibility can be.

Conservation teaches the principles of wise stewardship. It counsels foresight in place of selfishness, vision in place of greed, reverence in place of destructiveness. Conservation involves concern for other generations. It sees beyond the immediate and the temporary. It takes into consideration not only our own generation but future generations as well. It recognizes the rights of people who are not yet born, citizens who will inherit this land a thousand years from now. It reminds us that they too have the right to enjoy what we enjoy, to profit from the same things, to be inspired by them as we are inspired and to love them as we love them today. Conservation is designed to preserve the riches of the earth for human happiness and welfare to the end of time.

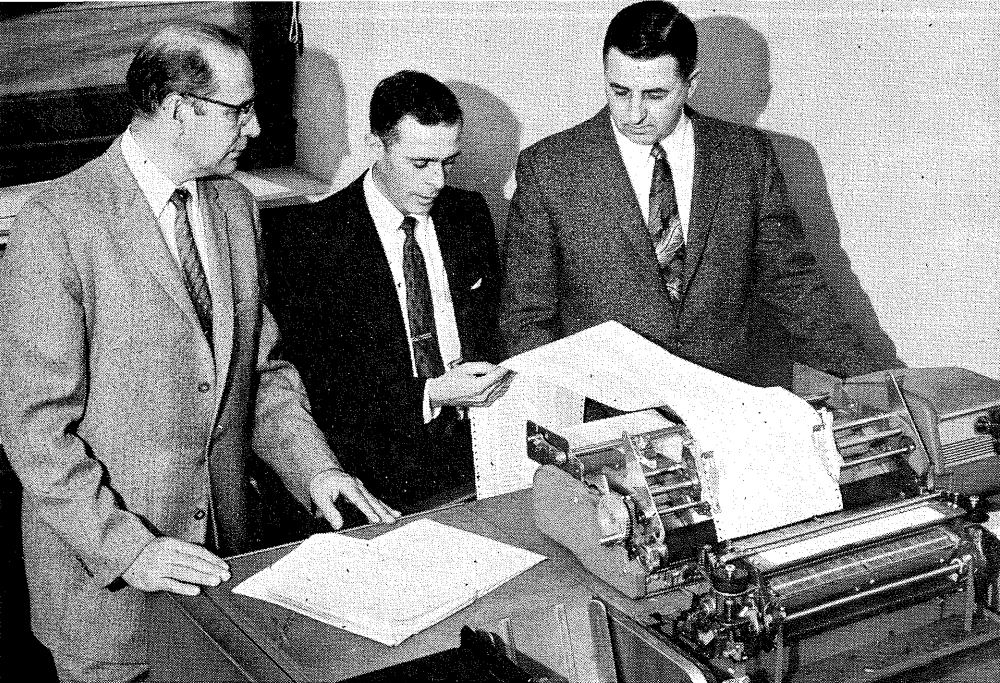
—Robert M. Hatch.

Fish and wildlife management today is concerned with the acquisition of public access, wetlands habitat, public hunting grounds and natural spawning areas, and a stepped-up program of research and enforcement. Our game and fish managers are in the paradoxical situation of providing more fish and game for more sportsmen on an ever-shrinking land and water area. Complicating the picture is the further hindrance of conflicting opinion of various groups in the proper management and use of our wildlife resources.

In this changing environment scientific game and fish management has become a necessity. We seek to substitute facts for guess work. We seek also



CENTENNIAL TREE PLANTING — Governor Orville L. Freeman, left, plants a Minnesota State Tree, The Norway Pine, on the Capitol Approach. Assisting left to right is E. L. Lawson, Director of Forestry; Representative Alf Larson, Hayfield, Minnesota; and Milton Maxwell, President of the Minnesota Soil Conservation Districts. Soil from 48 states and each of the 2,750 soil conservation districts in the United States was used in the planting.



Left to right, Howard Munson, Director of Operational Services; Robert Aitkinson, IBM Supervisor; and L. V. Nelson, Supervisor of Finance inspect new electronic equipment.

to provide leadership to meet the challenge of an expanding economy and a growing population. This leadership is compelled to exercise vision in long range planning. This leadership has the further responsibility of acquainting our people with the proper role of wildlife in our future economy.

If hunting and fishing is to continue as a rightful heritage of our people it must assert itself as an integral and essential part of our economy. With an understanding of the importance of hunting and fishing as a recreational resource I am convinced that adequate support will be forthcoming for an enlightened program of game and fish management.

MINERALS

Iron ore is our most important non-renewable resource. Serious inroads, however, have been made on our high grade ores. The future of iron ore production must be based on our huge reserves of low grade or taconite ores. Direct iron ore shipments of the past are gradually being replaced by concentrated ores. Production of high grade iron ore pellets by the two large commercial plants that are processing magnetic taconite will aid Minnesota in competing with iron ore produced from other areas, but new methods for processing the non-magnetic marginal iron ore and taconite will have to be found in order to assure Minnesota a continuation of its place in the iron ore market.

The future of mining in Minnesota is not based on taconite alone. I am happy to report to you that two major mining companies are exploring the possibilities of developing copper and nickel in Cook, Lake and Saint Louis

Counties; the state has a large reserve of low grade manganese and a partially-explored reserve of iron sulphides on the Cuyuna Range; and in addition to copper and nickel in northeastern Minnesota, there are known reserves of titaniferous magnetite and aluminum-bearing anorthosite which may be of commercial interest in the future.

The state has large deposits of marl and of limestone, which may be used in manufacturing Portland cement. Minnesota has the largest known reserve of peat in the United States and the experimental work that is being conducted on peat may result in the commercial use of these extensive deposits. Commercial production of peat for horticultural purposes has already been started on a large acreage of state owned land in Carlton County.

STATE PARKS

State Parks must keep pace with increased population and leisure time. Our State Park system consisting of 66 park units aggregating 97,405 acres is taxed to capacity today. It will not be adequate to meet the recreational needs of tomorrow with the population of our country increasing from 175 million to 230 million in 1975.

This, coupled with increased mobility, more leisure time, more spendable income and the shift from spectator amusements to individual participation, is reflected in the phenomenal increase in family camping in Minnesota State Parks of over 550% in the last four years. Much of the future economy of America will be built upon leisure time spending. Our State Parks are an important factor in our 4th largest industry — the tourist business.

We must expand our state park system now, for acquisition of new areas of high recreational potential is becoming increasingly difficult. We must keep pace with the increasing demand for outdoor recreation and preserve the natural features of a portion of our wilderness heritage for the enjoyment and use of future generations. Support for our state park system must not be neglected.

WATERS

It is to be expected that during the second century of its statehood Minnesota will experience a greater demand for water by an increasing population, expanding industry and a more productive agriculture. Not only has total water use increased year by year, but a higher standard of living is imposing a constantly increasing per capita use of water.

Minnesota is unusually fortunate in the abundance and purity of its water resources. It is also the opinion of our engineers that increased demands need not necessarily over-tax our available supplies of water. However, this somewhat optimistic appraisal of our water resources does not discount the necessity of a planned and intelligent program of conservation of water resources.

An unavoidable consequence of industrial and municipal expansion will be the greatly enhanced possibility of pollution of lakes, streams and underground waters. While the state has made commendable progress in the treatment of municipal and industrial sewage, the pollution control program must not only be continued, but substantially increased if the quality of our waters is to be adequately protected.

Further if our presently abundant water resources are to be further utilized without over-taxing supply, particularly when usage is concentrated in some areas and water wasted in others, our program of hydrologic studies and data collection must be continued uninterrupted. As new needs are made known, our program of water conservation must be adapted accordingly.

Conflicts of interest will arise in the future much as they have in the past. A classic example is the clash of recreational interests with other water users where the fluctuation of reservoirs used for storage detracts from the pleasure of those who desire stable water levels for boating, fishing and shoreline beautification.

Improved water management practices and increased public awareness of the importance of water will be major factors in providing an efficient water management program for the future. Consolidation of the many uncoordinated water agencies today may prove advisable for an improved water conservation program tomorrow.

Of greatest urgency is the encouragement of the watershed approach to the management of our water resources. Integrated at the state level this program has infinite potential in the field of water conservation. "Water for Tomorrow" is our obligation to future generations.

CONCLUSION

Looking to the future is a challenge to all mankind. We recognize that public understanding and support is a necessity to any program of conservation of natural resources; that public information is essential; that public service is an obligation; that science is the only intelligent approach to game and fish management; that planning and programming are fundamental; that resource management to encourage and maintain industry is our mandate; that research is our instrument of progress; that administration is measured in terms of good housekeeping; that leadership is our duty; and that STEWARDSHIP of our natural resources our one and only goal. Conservation is looking to the FUTURE!

CONSERVATION FIELD DAY — Typical of the many high school conservation field days is this outdoor workshop conducted by technically trained men for high school students.



Forestry

E. L. LAWSON, Director

The reorganization of the Division of Forestry completed February, 1957, was an important step in the Division history. By this reorganization the Division's functional staff structure was replaced by a modified line-and-staff organization.

The new organization defines the responsibilities and centralizes control and field authority for all functions of field operation at a regional and area level. The Division's staff has been regrouped into two sections, (1) State Land Management, and (2) Cooperative Forestry. The field operating group is now composed of four Regions and eighteen Administrative Areas.

Fire Protection

The Division of Forestry provides fire protection for 17,771,000 acres of public and private forest lands. In this biennium three critical fire seasons were experienced. The fall season of 1956 was probably one of the most serious experienced in more than 20 years. During the month of October nearly 10,000 acres were burned by 317 fires, and the season did not end until in November. A total of 871 fires burned 23,851 acres during the year, and damage estimates totaled \$73,599. Of the total acres burned, 5,616 acres were forest land, the balance was grass and deforested. During 1957, 681 fires burned 17,815 acres, with damage estimated totaling \$48,582.

The spring season of 1958 was undoubtedly the most extensive and critical ever experienced. Lack of winter snows, an abnormally high number of days of low humidity, high winds and absence of spring precipitation created a serious situation from January into June. There were 998 fires which burned 45,844 acres, causing damages of \$161,543. Of these acres, 7,606 were timbered lands, the balance grass and deforested lands.

Facilities for radio communication, improved fire fighting techniques, efforts of the forestry personnel and a daily fire weather forecasting service materially increased the efficiency of fire protection. This is shown in the following tabulation:

CALENDAR YEAR	NUMBER OF FIRES	FOREST LAND BURNED	TOTAL AREA BURNED	% PROTECTED AREA BURNED
1956	871	6,621 A.	23,851 A.	0.13%
1957	681	4,186 A.	17,815 A.	0.10%

International Cooperation

Since 1947 the Division of Forestry has had an agreement with the Province of Ontario for cooperative action on forest fires along the international boundary. A similar agreement has been in effect between Minnesota and the Province of Manitoba since 1956. The agreements establish a common zone of approximately two miles on either side of the border, in which the agency discovering or being notified first of the fire, will take im-

mediate action until the responsible agency can reach the fire and take charge.

Timber Sales

Since 1931 the Division has had the important responsibility of the management of all state forest lands. During the fiscal year 1957 timber sale receipts were greater than for any prior year exceeding \$1,209,000. The volume of timber cut that year amounted to 362,000 cords. Small timber sales were increased to 3,083 permits.

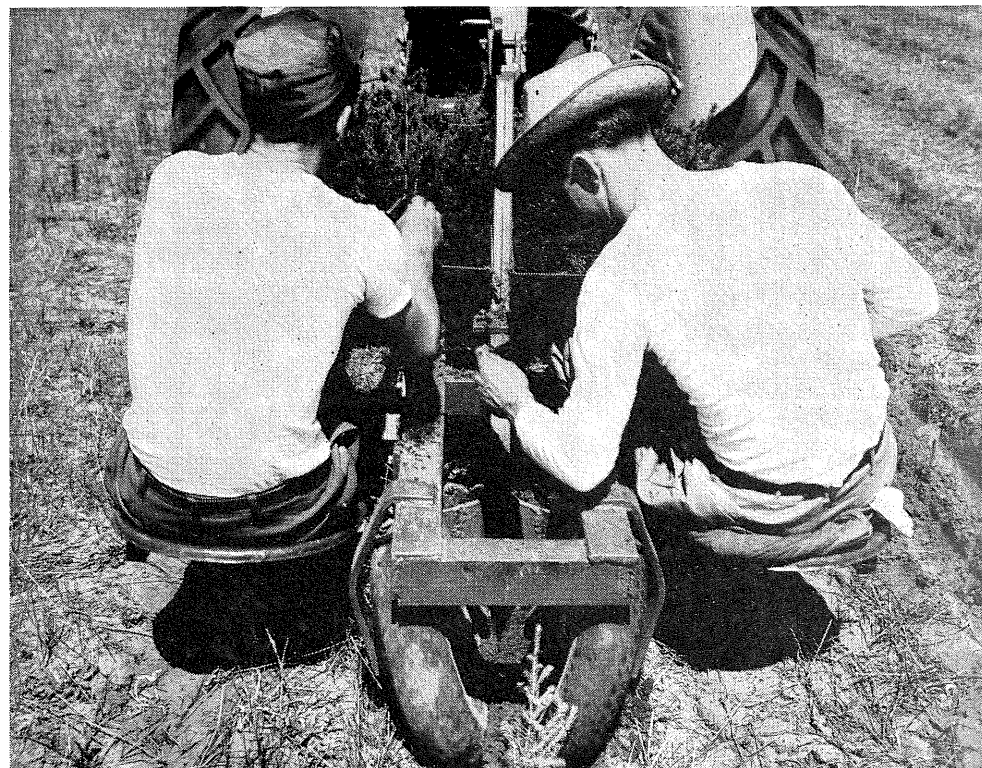
Due to a slow timber market in the fiscal year 1958, there were 2,398 small timber sales, or 22 per cent less than the record high of the previous fiscal year. Timber sales revenue for the fiscal year 1958 dropped to \$853,000, which was 29 per cent less than the previous year. The volume of timber cut on state lands was 261,000 cords, which was 100,000 cords less than the previous year.

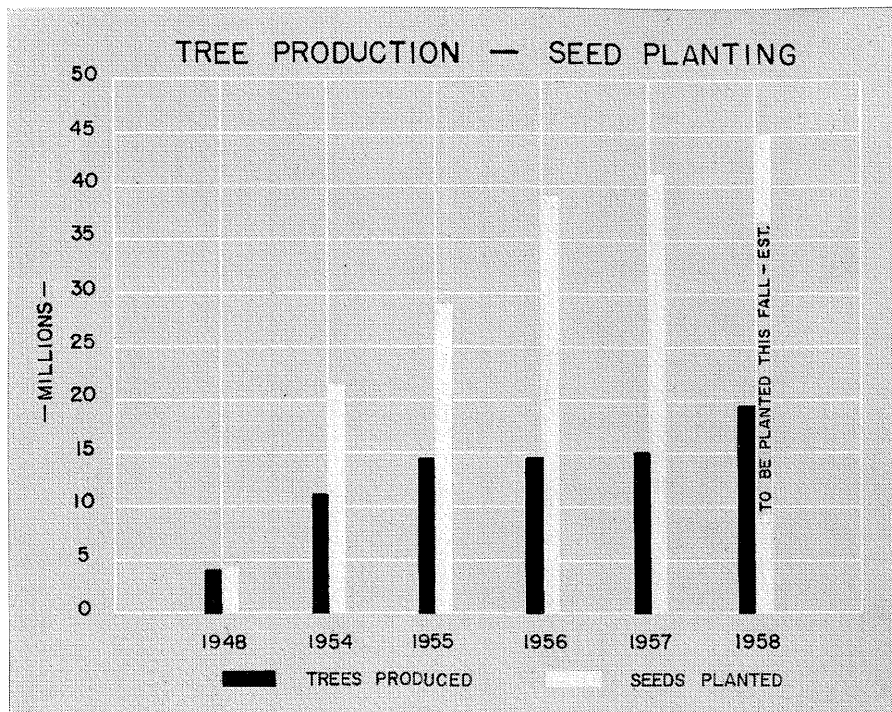
State Nurseries

The Division of Forestry operates three nurseries to produce tree planting stock for state, county, school, and other public lands, and for sale to private landowners for windbreak, shelterbelt, and conservation plantations.

Tree production and distribution increased during the biennium over

Tree Planting Machine





preceding years. During the fiscal year 1957, approximately 15 million trees were distributed. Receipts from the sale of tree stock to private landowners amounted to \$89,785. About 19½ million trees were distributed during the fiscal year 1958 and receipts from sales for private land planting amounted to \$106,259.

Steps have been taken to greatly increase the production of the three state nurseries. In the fall of 1956 an agreement for nursery expansion and development was entered into with the U. S. Forest Service to furnish planting stock for the Soil Bank Conservation Reserve Program. The Division of Forestry is committed to grow and distribute 18 million 3-year-old seedlings each year starting 1960.

In line with this expansion, seeding for 38,600,000 conifer trees was accomplished during the fall of 1956 and 41,500,000 in the fall of 1957. This stock will be available for distribution during the spring of 1960 and 1961.

State Land Tree Planting

The Division of Forestry planted 9,361,000 trees on 6,376 acres of state land during the biennium. This was accomplished by the use of 34 tree planting machines owned by the Division. Under Title IV of the Soil Bank Act, the Division of Forestry received matching funds for this tree planting program during 1958.

State Forests

There are 4,750,000 acres of state land in the forest region of Minnesota, of which 2,248,000 acres are within 34 State Forests. These State Forest lands are classified as follows: Trust fund lands, 1,366,000 acres; Conservation Area Land, 576,000 acres; and Acquired land, 306,000 acres. Eight hundred thirty-four summer homesites are leased on lakeshore lands within these State Forests. Such leases were for one year until an act was passed in 1957 which provides for 10-year leases and increased the rate of \$10 per year to \$25.

Lands Added to State Forests

During the biennium (under provisions of MSA 89.034) over 23,400 acres of tax-forfeited lands—under county jurisdiction, but located within the boundaries of existing state forests—were turned over to the state for administration. Such lands are now classified as State Forest lands, but 50 per cent of the gross receipts are returned to the county and the local taxing units.

Forest Management

Starting July 1, 1957, the ranger district was made the basic administrative unit for the planning and control of cutting and all other forest management operations. This change clearly fixed field personnel responsibility in

Boy Scouts Planting Trees





Pulp Wood Industry is Big Business

forest management and greatly simplified management control. In order to effect this important change, extensive timber surveys, based primarily on aerial photograph interpretation, were completed for each ranger district. This provided each district ranger with information to guide the timber cutting program and assure an annual sustained timber yield for the future.

"Lieu Lands" Received from Federal Government

During the biennium the state received from the federal government 13,616.76 acres of lands in partial payment of a shortage which goes back to 1857 and 1858. At that time the government gave to the state two sections of each township for school purposes. When these sections were surveyed it was found that there was a shortage of some 26,000 acres. Negotiations are pending for the balance of these so-called "lieu lands."

Land Exchange

Under the land exchange laws, state owned lands may be exchanged for federal and privately owned lands with the unanimous approval of the Land Exchange Commission. During the biennium, 12 state-private Class A exchanges, involving 860 acres of state land and 989 acres of private land, were completed; one state-private Class C exchange, involving 1.31 acres of state land and .46 acre of private land; one state-federal Class A exchange involving 1,068 acres of federal land and 1,575 acres of state land; and five county tax-forfeited-private Class B exchanges which involved 72 acres of

Eight

Crow Wing County tax-forfeited land and 60 acres of private land as well as 320 acres of Itasca County tax-forfeited land. Nine land exchange proposals are pending.

Cooperative Land Management

Among the cooperative accomplishments were the completion of surveys and forest and game management plans for the Rum River State Forest—Mille Lacs Refuge and Public Hunting Ground, and the Whitewater Game Refuge. Because state lands in these areas are primarily dedicated to game production, it is important that timber management be adjusted accordingly.

The Division of Forestry also completed a forest management plan for all classes of ownerships in Mahnomen County. This is a part of a multiple use management plan which is being developed by the Conservation Department for Mahnomen County as a pilot area and the forthcoming report will serve as a guide for the management of natural resources in this area.

Forest Management Assistance

Technical assistance and advice is free to owners of less than 1,000 acres of forest land. This program consists of aid in the management and protection of timber, reforestation, selection and marking of timber cut, measurement of products, and marketing of harvested products.

During the fiscal year 1957, assistance was given to 395 small woodland owners on almost 8,000 acres of forest land. In the fiscal year 1958 about 2,000 farm and other small woodland owners, involving about 35,000 acres of forest land, were given assistance. Aid was given in the selection and pro-

Headquarters Building at Cloquet





Processing Christmas Trees at Duluth

curement of tree stock for planting on more than 8,000 acres of land by small private owners.

Three additional foresters were hired during the biennium to work in the southeastern part of the state. Federal funds for such employment are made available through the Soil Bank Technical Assistance Program. The total number of Service Foresters working on the Private Forest Management Program at the end of the biennium was ten.

The Watershed Program

The Division of Forestry is obligated through a working agreement with the U. S. Forest Service to participate and provide forestry assistance on watershed projects when corrective forestry measures are needed on problem areas.

Forestry assistance provided by the Division consists of furnishing tree stock, assistance and guidance in tree planting to retire slopes from cultivation, technical assistance in woodlot management, and control of fires to prevent destruction of vegetative cover and plant roots holding the top soil.

Presently there are 23 proposed watersheds, comprising an area of 1 $\frac{3}{4}$ million acres in Minnesota. There are two pilot or demonstration watersheds, namely the East Willow and the Chippewa River tributaries, approved by the state committee.

Cooperative Agreements — Soil Conservation Districts

In 1958 a Memorandum of Understanding between the Division of Forestry and the Soil Conservation Districts was agreed upon. The purpose of the agreement was mainly to encourage better woodland management and reforestation practices. To-date, memorandums of understanding have been received from 33 of the 76 Soil Conservation Districts.

Forest Marketing Survey

In 1957 a cooperative survey conducted by the Division of Forestry and the Lake States Forest Experiment Station canvassed 337 wood-using industries of the Twin Cities. Information obtained from seven major industrial classifications disclosed that about half of the industry uses wood, either in production or for shipping purposes. The major purpose of the survey was to locate existing or potential markets for the lower grades of lumber and the lower value species of timber.

Building Construction

The construction of a new office building at Cloquet will serve jointly as the regional Forestry headquarters and Area headquarters for Division of Forestry personnel and Area Game Manager and Game Warden headquarters of the Game and Fish Division. Additional buildings constructed include one other Area headquarters office, two modern residences, 4 combination office-warehouses, one standard Area headquarters warehouse, and the remodeling of a residence and two warehouses.

Spruce Budworm Spraying on Kabetogama Peninsula



Forest Pest Control

Serious consideration is given to the protection of our forests against harmful insects and diseases, and the Division of Forestry has cooperated actively with the State Entomologist, the University of Minnesota and the Lake States Forest Experiment Station.

In the control of the jack pine budworm infestation in Cass, Wadena and Hubbard counties, 1,362 acres were sprayed. The spruce budworm epidemic increased in severity and it is estimated that 660,000 acres have been moderately to heavily defoliated. In the Cloquet-Duluth-Cotton area the forest tent caterpillar maintained a fairly severe attack. The larch sawfly epidemic is in its ninth year and causing considerable mortality. In the Brainerd Area the introduced pine sawfly infestation became serious.

Auxiliary Forests

The primary purpose of the auxiliary forest law which was enacted by the legislature of 1927 is to encourage good forest practices on private lands by a more equitable method of taxation and the enforcement of desirable timber management and cutting practices. During the biennium eight new auxiliary forests were established, comprising 7,340 acres of land, and bringing the total number of auxiliary forests established to 60 and the total acreage to 227,556 acres.

Cooperation with Youth Conservation Commission

The Willow River YCC Forestry Camp, created by the legislature of 1951, is operated at the General Andrews State Nursery at Willow River, Minnesota by the Youth Conservation Commission, with the Division of Forestry providing work projects for the wards. Wards assigned to this camp are principally employed in nursery work, seeding, weeding, transplanting, lifting and packing planting stock. Other projects to which wards were assigned during the biennium included timber stand improvement, sawmill work, making snow fence, cement blocks, and clearing land for nursery expansion.

The Thistledew Lake YCC Camp was created by the Legislature of 1955. It is located at Thistledew Lake, 33 miles north of Nashwauk. Work programs during the biennium included tree planting, timber stand improvement, pruning and thinning.

Keep Minnesota Green

The Keep Minnesota Green, Inc., organization has given outstanding public service through a fire prevention campaign, by the use of radio, television and newspapers for educating the public. There are now 13 county committees which work with schools, 4-H Clubs, Future Farmers of America, Boy Scouts, and other conservation projects. Keep Minnesota Green, Inc., also sponsors the Minnesota Tree Farm system.

The Division of Forestry is cooperating with Keep Minnesota Green, Inc., and the American Forest Products Industries, Inc., in the establishment of Tree Farms in this state. During the biennium the number of Tree Farms increased from 489 to 644, and the acreage increased from 438,563 acres to 482,864 acres.

Game and Fish

JAMES W. KIMBALL, Director

Hunting and fishing "American Style" is at the crossroads of survival and only an aggressive, and admittedly expensive program of acquisition and free public accesses, can save them for tomorrow's sportsmen. Stepped-up statewide action programs designed to insure for the sportsmen of the State, areas where they can hunt, fish, and generally enjoy wildlife in their natural haunts, have been one of the major accomplishments of the Division of Game and Fish in the past biennium. These programs are the result of a philosophy, "acquire now and develop later," which has been adopted by many resource agencies across the nation in the face of a mushrooming human population with its attendant demand for more outdoor recreational opportunities.

These programs, in brief, are as follows:

1. *"Save Minnesota's Wetlands"*—This is a truly visionary multi-purpose program which benefits waterfowl, upland game and furbearers; provides public hunting areas and conserves precious water. Over 50,000 acres of valuable wildlife lands, particularly irreplaceable wetlands, have already been brought into State ownership. The goal is 250,000 acres and the cost will be great, but the preservation of our water, wildlife and public hunting is worthy of our sacrifice.

2. *Free Public Accesses*—Public access to waters is in jeopardy. This is a growing statewide problem that can be expected to grow more acute in the near future. Many Minnesota lakes are denied fishery management under law because they have no public access. To meet this challenge the Division is seeking to acquire public accesses as fast as possible and its statewide program has brought 56 areas under Game and Fish ownership during the biennium. Additional funds must be secured for this important work.

3. *Game Refuges and Public Hunting Grounds*—Expansion of these areas is proceeding concurrently with the wetlands program. During the biennium 5,802 acres in 17 counties were added.

4. *Natural Spawning Areas*—One of the most serious problems facing the northern pike fishery is the loss of natural spawning grounds through drainage of sloughs and development of private property adjacent to lakes and streams. Acquisition of important areas is difficult and condemnation proceedings are sometimes needed.

Law Enforcement

Few of the millions of people who annually hunt, fish and otherwise use our State's wildlife resources ever meet or talk with the top officials in the department, but a great many of them meet the department's principal field representative—the Game Warden. Many and varied are his duties, but none is more important than that of assisting the public in properly enjoying the great outdoors.

Responsible for enforcement of the laws relating to game and fish is the Section of Warden Service. Administered by a Chief Warden and an Assis-

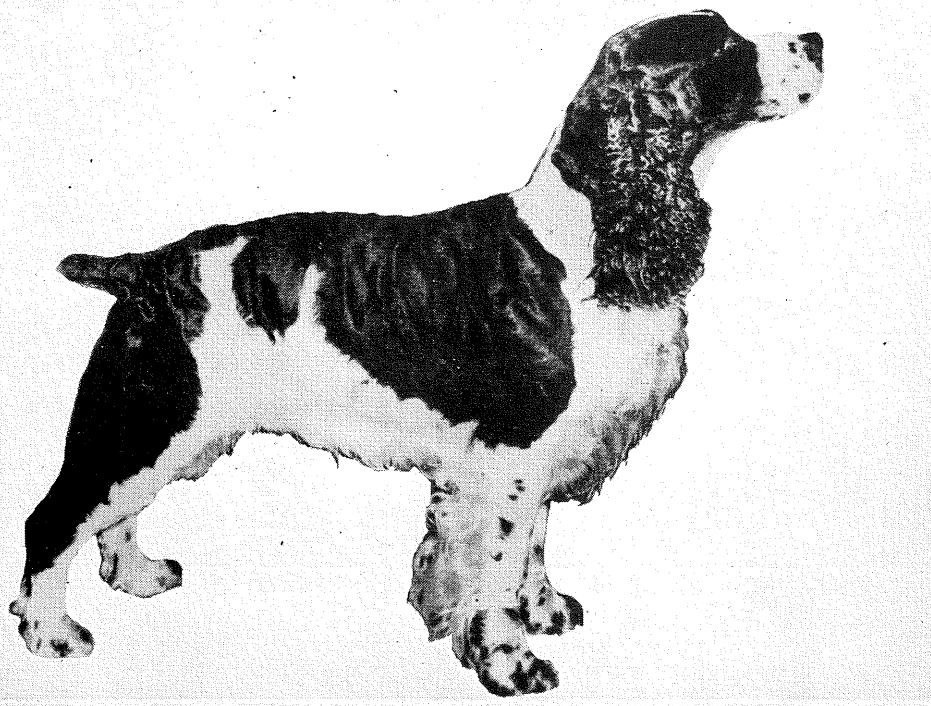
tant Chief, the section is authorized a complement of 151 officers strategically stationed around the state. Ten supervisory districts provide the organizational structure necessary to carry on the many farflung operations of the section. Each Area Supervisor is directly responsible for law enforcement within his district.

Reorganization of the section was instituted during the previous biennium. Consolidation of these administrative improvements was achieved during the present biennium and plans for further improvement are scheduled.

Public relations aspects of the wardens manifold duties were strengthened with the purchase of 35 mm slide projectors and screens for use in each of the 10 districts. Public speaking at both adult and youth conservation gatherings continues to be an ever increasing part of a warden's job. Always considered by the public as the last word on game and fish activities, the warden must constantly keep abreast of the rapidly developing changes in the State's resource picture.

Wardens attended two schools during the biennium. Panel discussions directed by state and federal wildlife officials provided for a two-way exchange of information. Recommendations for improving the service and the division were submitted and acted upon by the administration. Wardens attended refresher courses in Red Cross First Aid, and equipment consisting of a first aid kit and heavy woolen blanket was issued to each officer. Continued participation in the State firearms safety training program, has resulted in a

An English Springer Spaniel owned by Tom Harkins of St. Paul. Hunting with a dog is good conservation.



A recently acquired and improved public access.

better awareness of good conservation practices and habits on the part of the youth instructed by the wardens.

During the biennium new warden's uniforms and badges were furnished all officers, with provision for partial replacement each year.

Communication equipment was strengthened during the biennium with the replacement of 16 old mobile radios with new 100 watt sets. Construction of 33 boat trailers has added greater mobility to wardens having a great deal of water area to patrol.

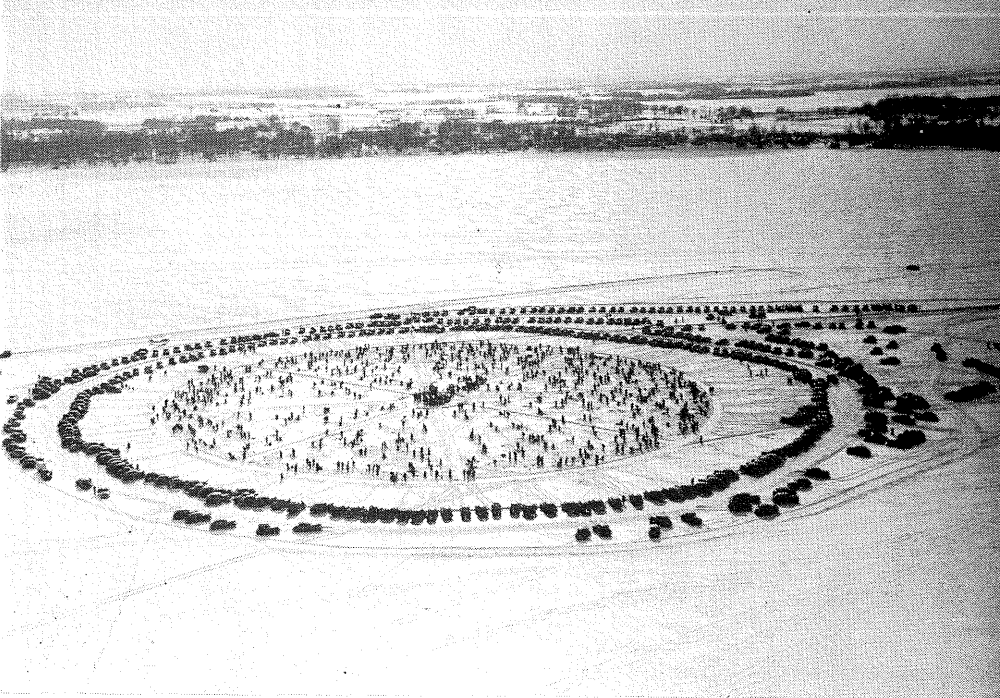
The section's three airplanes flew a total of 2,579 hours on patrol, game censuses, locating lost persons, aiding traffic control, and cooperation with other divisions. New techniques to apprehend violators by use of the airplane were employed during the biennium with promising results.

Arrests for the biennium totaled 7,830 as compared to 6,241 in the previous biennial period. Confiscations for the biennium totaled 3,636 and included firearms, fishing equipment, nets, fur, fish and game.

Desirable improvements in the service center around the continued acquisition of better equipment to meet the demands imposed by a rapidly increasing sporting public. Better in-service training for new wardens is needed in order that they can more quickly handle the many duties given them.

Fish Management

The Section of Fisheries has the responsibility for carrying out a statewide fish management program, in accordance with law, department policies and



A typical Minnesota ice fishing contest.

brood stock is being built up in Spider Lake, Itasca County, for spawn taking in the future.

A short angling season on grayling in Twin Lake, Lake County, in 1957 reflects the success of this introduction.

Ponds near centers of heavy population continued to receive supplies of bullheads and panfish, removed as surplus from other waters.

Fish rescue operations on lakes subject to winterkill were at a minimum during the biennium owing to the mild winters.

Management of natural spawning and rearing areas for northern pike consists of acquisition of shallow marshy areas, tributary or adjacent to lakes; improvement to or construction of channels between lake and spawning area; installation of control structures; and, operation of control structures during spawning, incubation, and rearing periods. During 1956, 127 northern pike spawning areas were managed; 117 in 1957.

Lake improvement projects during the biennium totaled 54 and included eight water-control dams, five water-and-carp-control dams, four carp-control dams, eight carp-control screens, and many channel and other miscellaneous improvements, together with repair jobs. For the same period, stream improvement projects totaled 23 and consisted of improvement to and maintenance of trout streams, including spawning areas. Total outlay for these projects including allied services, amounted to \$333,261.

Eleven lake reclamation projects, approximating 225 acres, were carried out during 1956 and 1957. Excellent fishing has been provided in these reclaimed trout lakes. Up to and including 1957, 29 lakes have been reclaimed

available funds. The objective is to provide a maximum sustained yield of fish from the waters of the State and the maximum number of satisfactory sport-fishing hours.

Fish management activities include habitat improvement; management of natural spawning areas; propagation and distribution of fish; rescue of fish subject to winterkill; rough fish control; lake rehabilitation through the use of fish toxicants; administration of licensed commercial fishing; and, formulation of regulations governing the harvest of fish.

Improvements have been made in operational techniques and equipment, and fisheries workers have gained valuable experience which will further improve the program in the future. With the increasing knowledge and experience being acquired, the fisheries section is forging ahead in its efforts to gain the greatest benefits from the effort and funds expended.

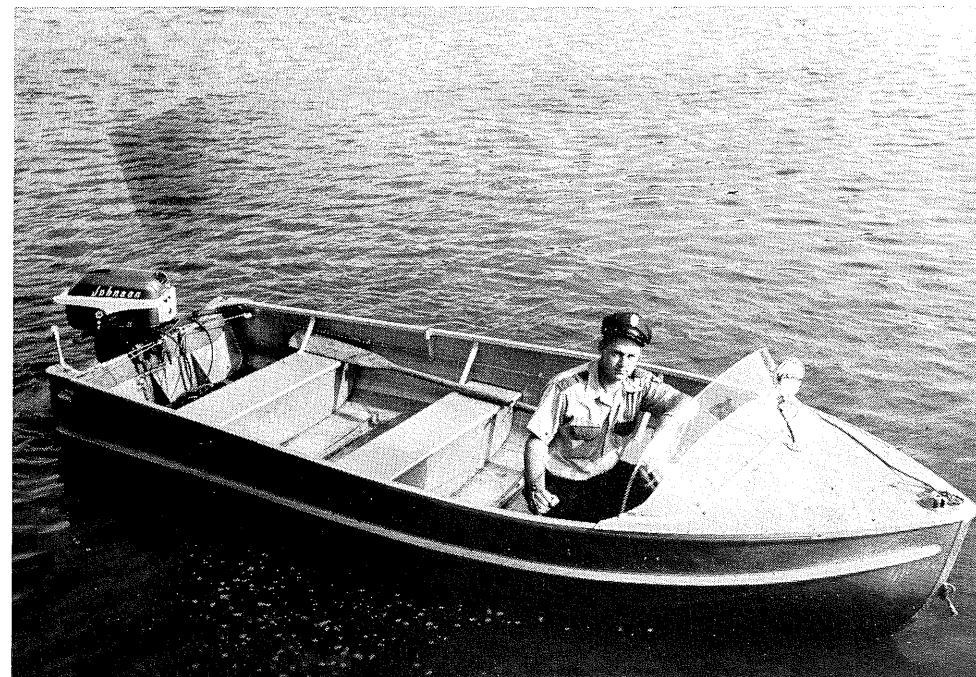
Stocking is recognized as an important tool in fish management when properly used to offset inadequate natural reproduction. Total distribution including fry, fingerlings, yearlings, and adults of all species from hatcheries, rearing ponds and rescue operations is as follows:

1956		1957	
NUMBER	POUNDS	NUMBER	POUNDS
259,980,195	541,332	148,975,082	406,139

Muskellunge production is currently restricted to the amount of spawn that can be taken from Shoepack Lake, St. Louis County, but a supply of

Twelve

Warden Service Patrol Boat



—26 for trout, one for grayling, one for northern pike and panfish, and one for bass and panfish.

Rough fish removal operations — State crew, contract, bullhead project, and permit — resulted in the removal of 16,702,109 pounds of rough fish during the biennium.

During the calendar years 1956 and 1957 private fish hatchery operators raised 38,934,833 minnows of various species, and this continues to be an apparently profitable business.

Commercial fisheries were active during the biennium on Lake of the Woods, Rainy Lake, Lake Namakan, Lake Superior and the Minnesota portions of the Mississippi and the St. Croix Rivers. A total of 11,061,870 pounds was removed at an approximate value of \$756,285. The commercial fishery at Redby on Lower Red Lake, operated by the Red Lake Fisheries Association as a cooperative venture of the Red Lake Chippewa Tribe, took 2,243,173 pounds during the biennium.

There is a need for expansion in all phases of the State's fishery management activities to meet the unprecedented demands of an increasing sport fishing public.

Game Management

The Section of Game is charged with the responsibility of administering the State's wildlife resources, most of which are managed primarily for recreational purposes. This obligates the section to plan, develop and promote a comprehensive state-wide game management program.

A Full Blooded Chippewa Indian Harvesting Wild Rice



In the Research Lab is Dr. Arnold Erickson, left, in charge of Game Research and John B. Moyle, Chief of the Research and Planning Section.

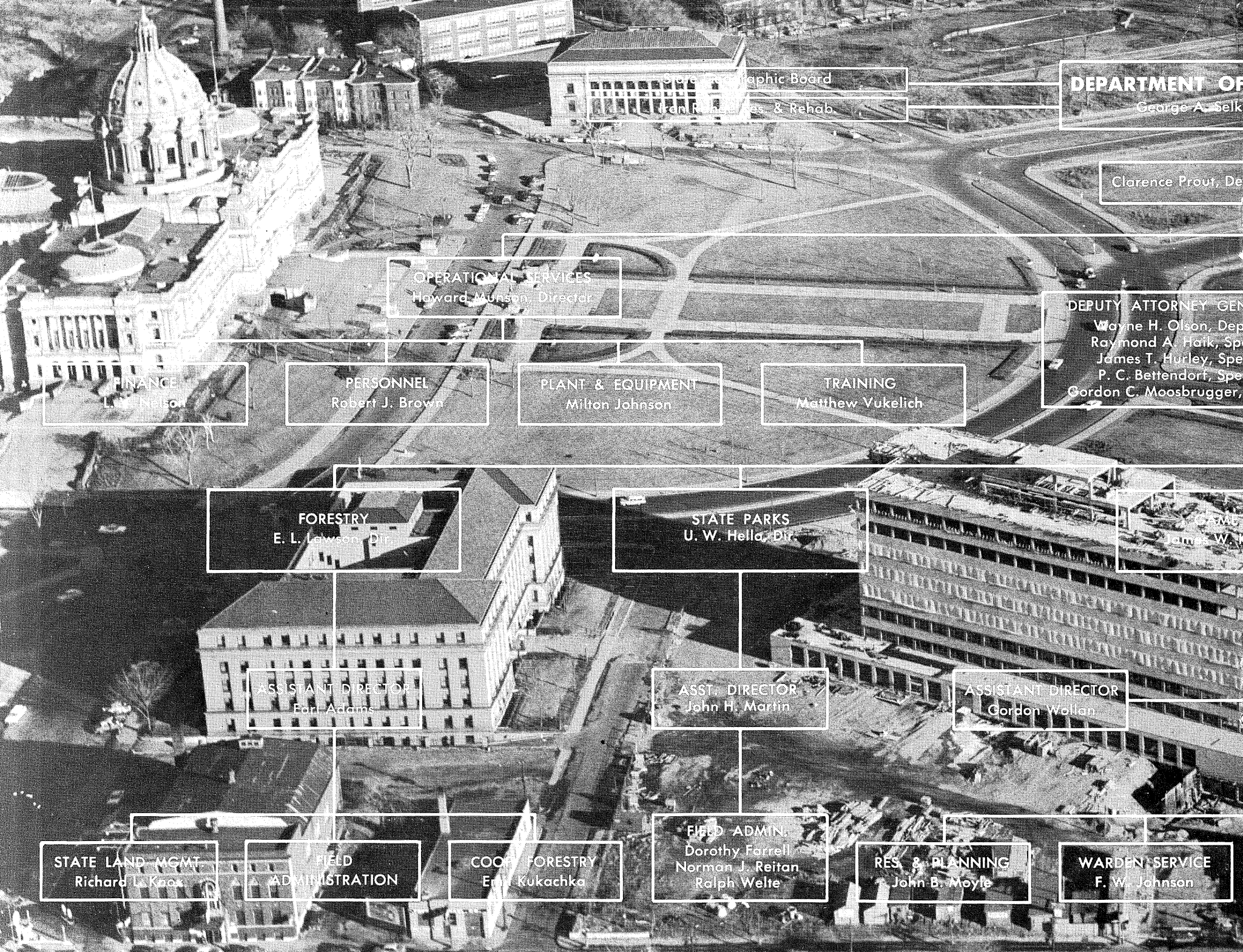
During the biennium a rapid expansion in all types of outdoor recreation took place. Section personnel handled a heavier work load as a result of the growing popularity of hunting, fishing, and boating, along with unprecedented demands being made upon wildlife and their habitat by a growing industrial, urban and rural economy.

The regional and area game management plan of organization, initiated during the previous biennium, has worked out exceptionally well. Operations have been carried out smoothly and local problems expeditiously handled by field men at the local level.

Perhaps the most important activity of the Section during the biennium has been the acquisition of wildlife lands under the "Save Minnesota's Wetlands" program. This program has been vigorously prosecuted by all personnel. Drainage of valuable surface water areas continues at an alarming rate and indications are that current drainage practices will continue as long as drainable areas remain in agricultural regions of the State.

Progress of Wetlands Acquisition Program

DATES	NO. OF COUNTIES	NO. OF UNITS	NO. OF OPTIONS	NO. ACRES OPTIONED	COST
1956 - 1958	60	129	279	23,698	\$ 705,213
Prior to 1956	48	130	157	27,263	775,034
Total	108	259	436	50,961	\$1,480,247



DEPARTMENT OF
George A. Selk

Clarence Prout, De

DEPUTY ATTORNEY GEN
Wayne H. Olson, Dep
Raymond A. Haik, Sp
James T. Hurley, Spe
P. C. Bettendorf, Spe
Gordon C. Moosbrugger,

State Geographic Board

State Park & Rehab

OPERATIONAL SERVICES
Howard Munson, Director

FINANCE
L. W. Nelson

PERSONNEL
Robert J. Brown

PLANT & EQUIPMENT
Milton Johnson

TRAINING
Matthew Vukelich

FORESTRY
E. L. Lawson, Dir.

STATE PARKS
U. W. Hella, Dir.

CAMP
James W. W.

ASSISTANT DIRECTOR
Earl Adams

ASST. DIRECTOR
John H. Martin

ASSISTANT DIRECTOR
Gordon Wallan

STATE LAND MGMT
Richard L. Knox

FIELD
ADMINISTRATION

COO. FORESTRY
Earl Kukachka

FIELD ADMIN.
Dorothy Farrell
Norman J. Reitan
Ralph Welte

RES. & PLANNING
John B. Moyle

WARDEN SERVICE
F. W. Johnson

CONSERVATION
Commissioner

Deputy Commissioner

GENERAL - CONSERVATION
Deputy Attorney General
Asst. Att'y General
Asst. Att'y General
Spec. Asst. Att'y General

Water Pollution Control

State Soil Cons. Committee

BUREAU OF INFORMATION
Carl W. Moen, Director

Von Lawrence, Deputy

PUBLICATIONS
Alfred L. Nelson

NEWS
SERVICES

EDUCATION
H. Nat. Johnson

PHOTOGRAPHY
Walter Wettchreck

FISH
Simboli, Dir.

WATERS
Sidney A. Frellsen, Dir.

LANDS & MINERALS
Ray D. Nolan, Dir.

DEPUTY DIRECTOR
Kenneth W. Pederson

TECHNICAL ASST.
Jamel A. Lee

ASSISTANT
DIRECTOR

ADMINISTRATION
PUBLIC WATERS

GAME
David B. Vesall

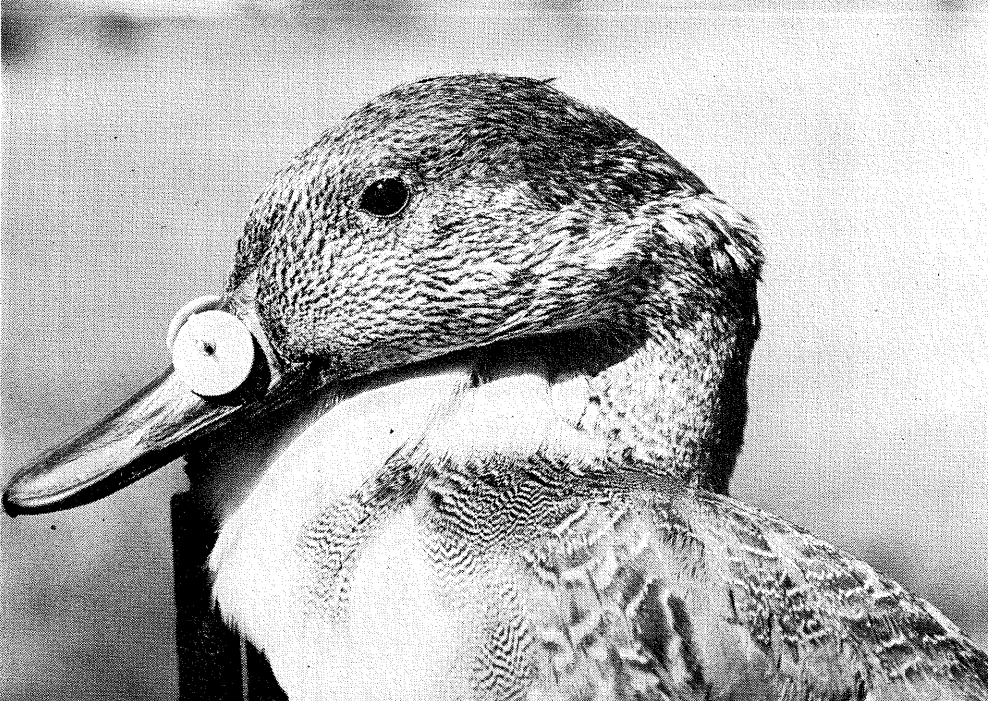
SHERIFFS
Hjalmar O. Swenson

ENGINEERING
SERVICE

STATE LAND ADMIN.
R. D. Hultengren

FIELD
ADMINISTRATION

MINERALS ADMIN.
H. A. Lever



A Bill Marker for Ducks

Maps showing the location of wildlife management units including wetlands were prepared and distributed to sportsmen in 1956 and 1957.

Funds used to acquire wildlife lands come from license receipts, Federal Aid (Pittman-Robertson), gifts and donations, and a one dollar surcharge on small game hunting licenses.

The expansion of State-owned refuges and public hunting grounds has been carried on simultaneously with the wetlands program. During the biennium 5,802 acres were acquired in 10 refuges.

The Lac qui Parle Game Refuge and Public Hunting Grounds adjacent to the Minnesota River, consisting of 22,865 acres, were turned over to the Conservation Department during the biennium by the Legislature following fifteen years of administrative control by the Executive Council. Plans for this project call for its primary development as a goose shooting area.

An important phase of the section's activities has been the acquisition of public access sites to State fishing and hunting waters. Fifty-six accesses were purchased during the biennium, making 151 such areas acquired to-date.

Wildlife food and cover planting activities during the biennium resulted in 1,434,475 pieces of planting stock placed on State-owned and private co-operators lands.

Fencing and posting of State-owned wildlife areas was stepped-up during the biennium, with excellent cooperation extended by the Minnesota Highway Department in the posting of signs indicating public access sites.

Development activities on State-owned refuges and public hunting grounds included removal of 10,884 rods of old fence; erection of 1,260 rods of new fence; construction of 13 new water control structures; 51 waterfowl nesting islands built; seven access bridges built; 24,080 rods of new dike constructed to impound 480 acres of water; 160 miles of refuge roads repaired or improved, and controlled burning carried out on 566 acres to improve wildlife habitat.

Future plans center around a continuation of the "Save Minnesota's Wetlands" program; stepped-up development on wildlife management units; continued acquisition of lands on the larger refuge and public hunting ground areas; securing additional funds for the public access acquisition program; and increased local public service through the regional and area game managers.

Research and Planning

The basic assignment of the Section of Research and Planning is fact finding, development, and recommendation of better methods for game and fish management. Activities are of four general types: (1) basic research; (2) applied research and technical operations; (3) technical and informational services; and (4) conservation planning. About one-third of the Section's activities can be classified as basic research,—that is, finding new information for future application to fish and game management.

Central offices and laboratories are at St. Paul, but biologists are stationed strategically throughout the State,—at field headquarters, and at game research centers. Facilities include a biological, microbiological, and chemistry laboratories in St. Paul; experimental fishery laboratory at Mound Park; an upland game research station at Madelia; a research center (under construc-

Rotenone in Fisheries Management





Wetlands Exhibit at the State Fair

tion) for other game species at Carlos Avery; 10 experimental fish ponds at Waterville, and a technical library of 20,000 acquisitions at St. Paul. Work on ruffed grouse is underway at the Cloquet Forest Experiment Station using facilities of the University.

The Section has four units: (1) Game Research; (2) Fishery Research; (3) Biological Surveys and Inventories; and, (4) Biological Services. The Game Research and Biological Survey Units are financed with the aid of Federal Aid funds. The Fisheries Research and Biological Services Units are financed from license receipts.

Work of the Section during the biennium has been reported in 8 game research quarterly reports, 17 fishery investigational reports, 2 printed bulletins and 62 published articles. In addition, 373 survey reports and a number of special reports were prepared.

Continued research on the white-tailed deer included an evaluation of zoning for hunting purposes; controlled burning of habitat; orchard depredations; movement and longevity; nutrition, and an improved method of determining total hunter take.

During the biennium the furbearers taken in greatest number were muskrat, mink, beaver, weasel and raccoon. Trapping harvest in 1956 was 264,000 pelts having a value of \$1,122,000, and in 1957, 290,000 pelts having a value of \$996,000. If decline in fur prices and trapper interests continues, control of many furbearers may be necessary owing to their doing damage. Predator control and the effectiveness of bounty payments for predator control was studied and a bulletin on this subject prepared.

Pheasant research centered around the establishment of research facilities at Madelia. A Midwest Pheasant Council was organized for exchange of information on pheasant management. Research into population dynamics will receive the greatest attention in the immediate future.

Ruffed grouse during the biennium began the upward swing in their population cycle; 330,000 birds taken in 1956 and 409,000 in 1957. Grouse and woodcock research will be aimed largely at the effects of forest management practices on the population of these birds.

Detailed waterfowl research included the relationship of agricultural practices to success of nesting and production; re-establishment of Canada geese, and greater knowledge of intra and inter-state movements of waterfowl. Serious declines in the diving duck populations were noted during the biennium.

Studies indicated the harvest of northern pike is heavy in some waters—as much as a third of the adult population each year—and that in some southern lakes the bulk of the catch is of two-year old fish. This heavy cropping emphasizes the necessity for acquiring and developing pike spawning areas.

Detailed studies of walleyes in Many Point Lake, Becker County, indicated that 27 per cent of the catchable population was taken annually by anglers, while death from other causes was only about four per cent. Numbers of adult walleyes in the population ranged from 6.7 to 10.7 per acre during the 1955-57 period. Studies of the food habits of walleyes and associated fishes in Lake Vermillion are revealing information on the extent of inter-specific relationships.

Thus far there is no evidence that the earlier opening of the bass season in 1957 had any deleterious effects on bass populations. Other warm water fisheries studies included factors affecting natural production of bass; evaluation of population sampling equipment; development of portable electro-fishing gear; effect of extensive destruction of water plants by herbicides on fish populations; growth rates of stunted bluegills after transfer to new waters, and use of fish toxicants for sampling populations.

Work continued on development of better hatchery diets for trout, and incorporating disease controlling drugs in hatchery diets. Evaluations of spring and fall trout stockings in streams were made along with long term evaluations of stream improvement devices on fish and fishing. An artificial spawning reef for lake trout was constructed in Grindstone Lake, Pine County.

An economic survey of the value of sport fishing in Minnesota showed that in 1956, 100 million dollars was spent to take fish; 30 million by non-residents and 70 million by residents.

During the biennium detailed surveys of biological, physical and chemical conditions were made on 214 fish lakes totalling 166,051 acres, and 159 game habitat areas, mostly shallow water areas.

Creel census studies reveal the annual yield of sport fish from Minnesota is estimated at about 50 million fish weighing 25 million pounds.

Future plans stress consolidation of the fisheries research staff in order that problems requiring multi-scientific treatment can be effectively handled.

Lands and Minerals

RAY D. NOLAN, Director

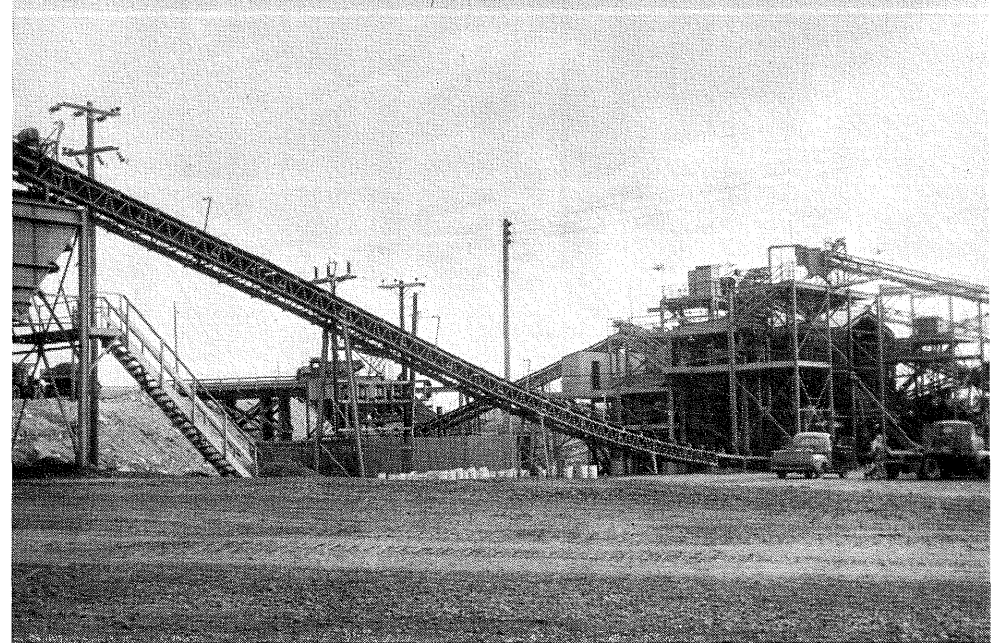
Under the Commissioner of Conservation, the Division of Lands and Minerals has administrative authority over approximately 2,300,000 acres of mineral, agricultural, non-agricultural and lakeshore lands; acts as agent for the public schools, the University and other educational and state institutions in selling or leasing state-owned lands and minerals; acts as agent for counties and local taxing districts in exploiting and leasing iron ore and other minerals located in tax forfeited lands; conducts research on low grade minerals; and promotes the exploration and development of minerals in areas where iron ore and other minerals are not known to exist.

The Division work is divided into two sections — one covering land, the other minerals, with headquarters for both in Saint Paul. The Minerals Section, under supervision of a Chief Mining Engineer, has an engineering research and chemical building at Hibbing, and an engineering office on the Cuyuna Range at Ironton. The Land Section, under the supervision of a Land Administrator, has land appraisal offices located at Bemidji, Hibbing and Thief River Falls.

Revenue and Activities

Lands and Minerals revenue for the biennium ending June 30, 1958 totaled \$9,574,975, which is an increase of about a quarter of a million dollars over the previous biennium. \$9,091,714 of this was derived from iron

SMALL OPEN PIT OPERATION — EASTERN MESABI RANGE — W. S. Moore Company produces, from this former underground mine, low grade ore which requires concentration.



WASHING AND HEAVY MEDIA CONCENTRATING PLANT — EASTERN MESABI RANGE —
Operated by W. S. Moore Company for concentrating low grade ore from several small mining properties.

ore and other minerals; and the balance, \$483,261, 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 \$294,705,258 on June 30, 1958.

During the biennium, 38 state-owned mining units were active in producing 14,190,268 tons of royalty ore. Thirty-one units were regular mines, 3 were stockpile units, 2 were lake bed mines, 2 were taconite quarries operated by Reserve Mining Company and Erie Mining Company. The Erie (Hoyt Lakes) commercial plant started producing taconite pellets in August, 1957 and processed 3,821,635 tons of state-owned crude taconite during the biennium. Both taconite plants produced 5,464,657 tons of royalty taconite, and the remainder of the royalty ore, 8,725,611 tons, consisted of iron ore and concentrates produced by other state mining units.

Land appraisers survey and locate trust fund land to determine its value for sale and lease purposes, and to recommend the proper use of land which is unsuitable for agricultural purposes or is isolated from schools, roads and settlements. They also appraise and classify lakeshore land and tax forfeited lands in Conservation Areas and the Red Lake Game Preserve. During the biennium 9,770 acres of trust fund lands were sold for \$123,600. Receipts from the 1,654 surface leases which were issued totaled \$117,600. Included in the tax forfeited land investigated in Conservation Areas and the Red Lake Game Preserve, were 13,575 acres approved for sale by the Commissioner of Conservation, of which about 11,000 acres were sold.

Lake Bed Minerals — Lakeshore Lands

The 1909 legislature reserved to the state, all minerals located beneath the waters of public lakes and rivers, which includes thousands of acres of mineral lands. However, state ownership of such minerals, in each case, must be established by court action, in which the state has to prove ownership under the federal rule of navigability.

During the biennium the Lake Bed Section continued the field examinations and investigations which were necessary in preparing the engineering data used by the Attorney General's Office in litigating the ownership of minerals in the Rabbit Lake Chain which includes five other lakes located on the Cuyuna Range, Old Mesaba Lake and O'Brian Lake, both located on the Mesabi Range. Investigations were also made on the Little Pine River Course near Emily on the Cuyuna Range, Tibbetts Creek which is near Mille Lacs Lake, and Bear Lake near Ironton.

In the Rabbit River Court Case which involved millions of tons of iron ore, the District Court in 1954 rendered a decision adverse to the state except for one of the six lakes, Little Rabbit Lake, which was included in this water course. The State Supreme Court confirmed the District Court's decision in June of 1957 and a petition for a reconsideration of the decision was denied by the Supreme Court in May, 1958. Prior to the end of the biennium the state presented an appeal to the U. S. Supreme Court to have the Rabbit Lake

decision reviewed. The District Court rendered a decision adverse to the state in 1957 in the Old Mesaba Lake Case which involved several million tons of iron ore. The O'Brian Lake Case which covers the ownership of a large tonnage of iron ore tailings deposited in the lake in addition to the lake bed is still being considered by the District Court in Itasca County.

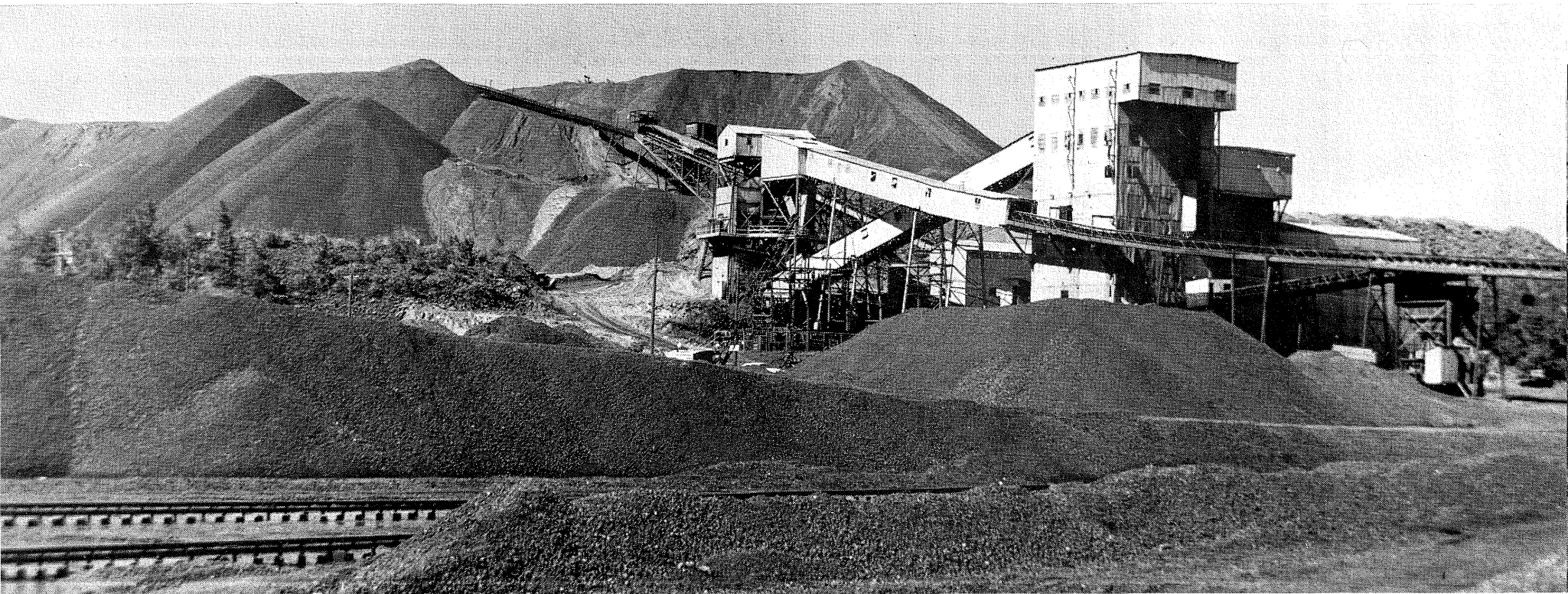
As a result of the withdrawal from sale by the 1923 legislature of all lands bordering on public lakes and streams, the state still owns about 140,000 acres of land located on lakes, with a water frontage of 1,100 miles in 37 counties. During the biennium lakeshore lots were surveyed and platted on five additional lakes in Cass, Crow Wing, Hubbard and Koochiching Counties.

Mineral Development

Direct iron ore shipments from Minnesota are gradually being replaced by concentrated ore. During the 10 year period beginning in 1943 the percentage of concentrates shipped from all Minnesota mines gradually increased from 22.1% (15.4 million tons), to 30.4% (19.6 million tons) in 1952. In 1953 when shipments totaled 81½ million tons, the largest in Minnesota's history, the percentage of concentrates increased to 33.1% (27 million tons). This included one million tons of taconite concentrates. By 1957 the percentage of concentrates shipped increased to 45% or 30.8 million tons out of a total of 68.3 million tons. The large percentage of increase over 1953 was mainly due to the 6.3 million tons of taconite concentrates shipped in 1957

BUTLER BROTHERS' WASHING AND HEAVY MEDIA CONCENTRATING PLANT — WESTERN MESABI RANGE — Coarse tailings stockpiled around the plant consist of marginal non-magnetic

ore and taconite which will require roasting, flotation or some other concentrating process to extract the iron from this material.





STATE-OWNED OPEN PIT MINE AT HIBBING — Operated by Morton Ore Company (The M. A. Hanna Company, Agents). Haulage incline, concentrating plant, shops and tailings pond to the right, and waste material stockpiles in the background.

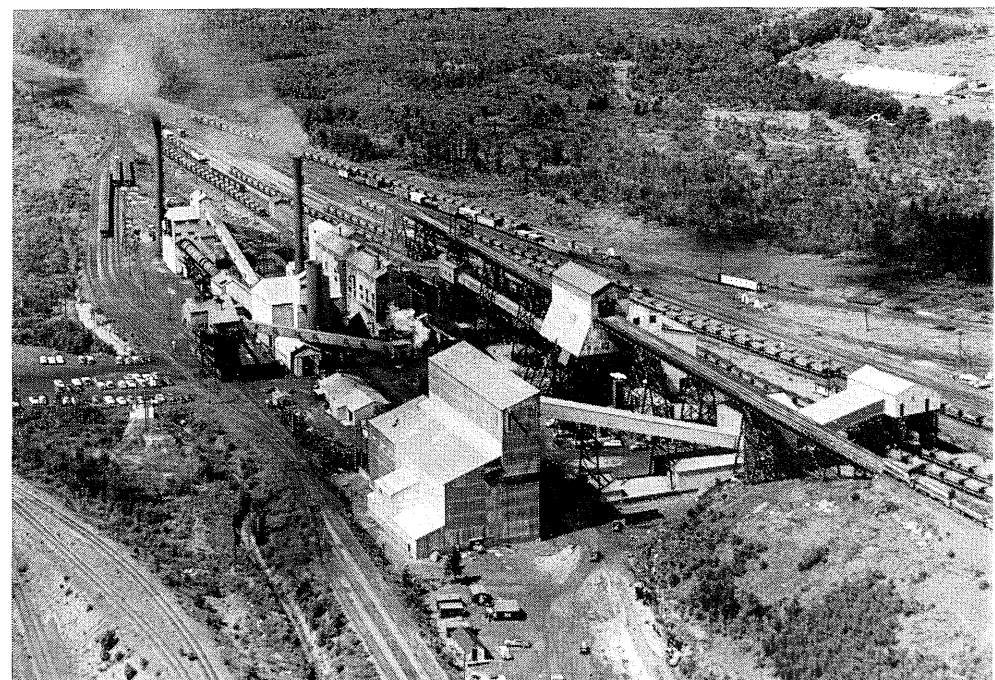
which represented over 20% of the total. The percentage of iron ore concentrates shipped from state-owned mines has followed this same pattern, for in 1941, 24% of the ore shipped from state-owned mines consisted of concentrates and this percentage increased to 65% in 1957. One serious problem has developed in connection with the concentration of Minnesota iron ore for while the percentage of concentrates shipped is constantly increasing, the grade of the concentrates has fallen off to a point where much of the concentrated ore is not considered high grade as the blast furnace operators for many years have considered 10% as the limiting point of silica and in many of the concentrating plants silica exceeds this limit. In 1957 only 5 of the 23 state-owned mines processing low grade ore produced concentrates that would average under 10% in silica. The experience of Minnesota independent mining operators in not being able to market iron ore that was formerly accepted by the steel industry bears out the published reports that blast furnace owners are demanding higher iron, lower silica, and better physical structure in the iron ore that is being consumed by the blast furnaces. Iron ore producers claim that this development is based on the experience furnace operators have had in using high grade foreign ore and taconite pellets. In order to compete with the iron ore that is being shipped from other areas, Minnesota industry will have to find new methods for processing the marginal low grade ores as the present concentrating methods will not produce a suitable competitive grade of ore.

The Research Section processed and classified about 29,000 feet of drill hole exploration samples. Approximately 380 laboratory tests were made on samples of low grade ore, iron ore tailings, taconite, and samples that were taken from the copper-nickel area in Lake and Saint Louis Counties. Scintillation and geiger counter tests were made on samples that were taken from uranium permits and leases in Koochiching and Saint Louis Counties. The Chemical Laboratory completed over 19,000 analytical determinations on samples from iron ore shipments, lean ore dumps and samples from tests that were conducted in the Research Laboratory.

In cooperation with the Legal Bureau of the Department, rules and regulations were prepared covering the exploring and mining of copper-nickel and associated minerals in state-owned lands and in the beds of public waters so that a public sale of leases to mine these minerals in Cook, Lake and Saint Louis Counties could be held prior to the end of 1958.

The sulphide-bearing gabbro which contains deposits of copper and nickel extends north from Duluth in the general direction of Babbitt and then northeast along the south of the Kawishiwi River through the Superior National Forest into Lake and Cook Counties. The International Nickel Company, Inc., of Canada, the largest producer of nickel in the world started drilling in the area under private and federal permits in the spring of 1954 and continued these drilling operations for several years. The Bear Creek Mining Company, a subsidiary of Kennecott Copper Company of New York, the largest producer of copper in the United States has also been exploring the area and has conducted some diamond drilling in Cook County along

AERIAL VIEW OF ORE SIZING PLANT AND AGGLOMERATION PLANT AT VIRGINIA — Fine ore from Oliver Iron Mining Division's sizing plant and taconite concentrates from their Mountain Iron plant are sintered or nodulized in the agglomeration plant shown in the background.





TRAINLOAD OF HIGH GRADE IRON ORE PELLETS — On its way from Hoyt Lakes Taconite Plant to North Shore Taconite Harbor over Erie Mining Company's 74-mile railroad.

the Gunflint Trail. Both of these companies and the M. A. Hanna Company of Cleveland who are now operating a commercial nickel plant on the west coast are interested in obtaining mining leases from the state. The 100,000 acres of state land and water mineral areas that will be offered for sale are located outside of the Roadless Area in the Superior National Forest and are included in a 25 mile strip along the Gunflint Trail in Cook County, a 7 mile strip along the Gabbro Contact line in Lake County, and a 60 mile strip in Saint Louis County that extends from Duluth to a point 10 miles southeast of Ely.

During the past three years the state administration has actively supported federal legislation leading to the establishment of an experimental research laboratory in Minnesota. The 85th Session of Congress appropriated \$1,718,000 for the construction of a Bureau of Mines Research Laboratory at Fort Snelling. This will include mining, metallurgical and chemical laboratories, pilot plant, crushing plant, drill core storage, shop facilities and administrative headquarters to serve laboratory and field operations throughout this north central area. Construction on these facilities was started on July 23, 1958, and the contract calls for completion on October 21, 1959. Establishment of these facilities in Minnesota will expedite the exploration and research that should be conducted in order to promote the development of the large deposits of low grade manganese that are located on the Cuyuna Range, the iron sulphides of Aitkin County, the titaniferous magnetites, copper-nickel and associated minerals that are located in northeastern Minnesota, the non-

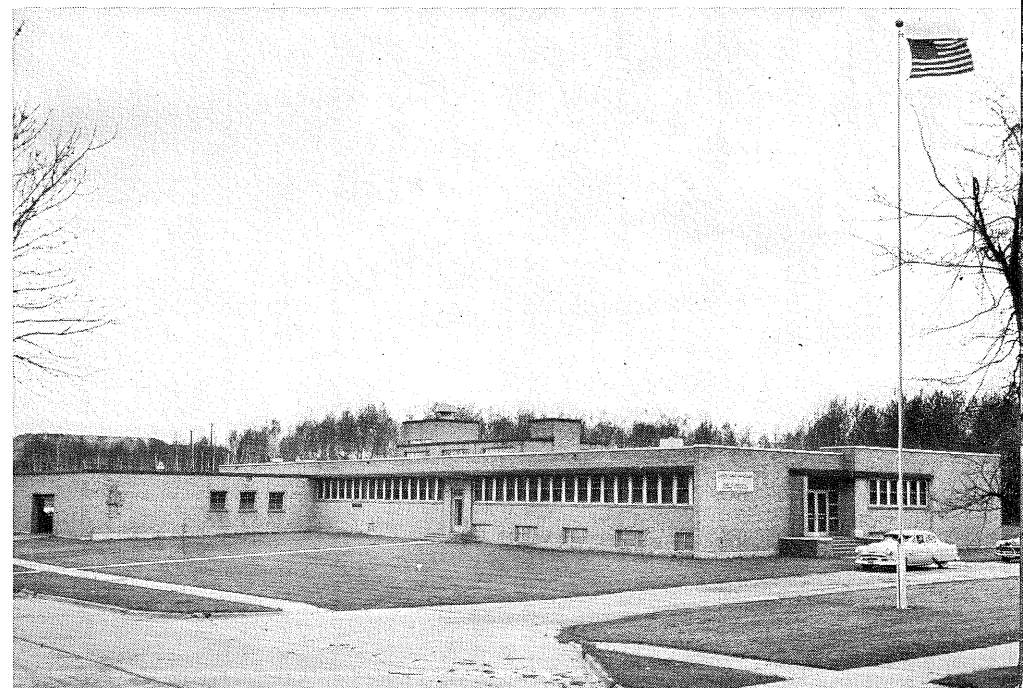
magnetic marginal iron ore and taconites that are located on the Mesabi Range and other low grade minerals.

Taconite Development

Erie Mining Company's Hoyt Lakes Taconite Plant which is located near Aurora, Minnesota, started producing taconite pellets in the fall of 1957. This 300 million dollar project included quarries, crushing, concentrating and pelletizing facilities located near the new Town of Hoyt Lakes, a 74 mile railroad which hauls the finished pellets to Taconite Harbor located on the north shore of Lake Superior, and which in addition to the loading dock and harbor contains a power plant and a new town for the Erie employees. The capacity of the present plant is 7½ million tons of high grade taconite pellets, containing about 64% iron. About one-half of the crude taconite that will be processed in this plant is owned by the state. In December 1957, the plant started working on a three shift per day, seven day per week basis and in addition to other crude taconite processed, about 3,800,000 tons of state-owned crude taconite was concentrated in this plant up to June 30, 1958. Present plans call for the expansion of this plant to 10½ million tons of high grade iron ore pellets per year.

The Reserve Mining Company Taconite Plant, located at Silver Bay, started producing taconite pellets in October 1955, and, while the original production capacity was rated at 3¾ million tons of pellets per year, over 5 million tons of taconite pellets were produced in this plant in 1957. Eventually, this plant will be expanded to an annual capacity of 10 million tons.

LANDS AND MINERALS BUILDING, BENNETT PARK, HIBBING — Includes general office and engineering section, chemical and research laboratories, repair shop and garage for state-owned vehicles, and a large storage library for the thousands of exploration samples that have been taken from state-owned mineral lands.



Since 1953, Oliver Iron Mining Division of the United States Steel Corporation has had a taconite pilot plant in operation near Mountain Iron with a rated capacity of ½ million tons of taconite concentrates per year. Concentrates are shipped to Virginia for agglomeration, and shipments from this plant during the last three years have exceeded 600 thousand tons. No definite announcement has been made by officials of the United States Steel Corporation in regard to the construction of a large commercial taconite plant in Minnesota.

Laws 1957, Chapter 722, authorized the Commissioner of Conservation, with the approval of the State Executive Council, to extend the term of state taconite leases for an additional period of 25 years under terms and conditions that are to be negotiated by the owners of taconite leases and the Commissioner of Conservation, if applications for such extensions were made within 18 months from April 26, 1957, when the act was approved. Two Cleveland companies presented applications under this act: Erie Mining Company covering 30 taconite leases, and Ontario Iron Company covering 33 taconite leases. The mining units included in these leases contain a reserve of crude taconite that will eventually yield about 1½ billion tons of high grade iron ore concentrates. Negotiations under these applications have been carried on with officers of Pickands-Mather and Company, acting as Agents for Erie and Ontario. The leases described above cover about one-half of the taconite leases that have been issued, and other companies, including the United States Steel Corporation, which holds 30 taconite leases, will undoubtedly apply for extensions.

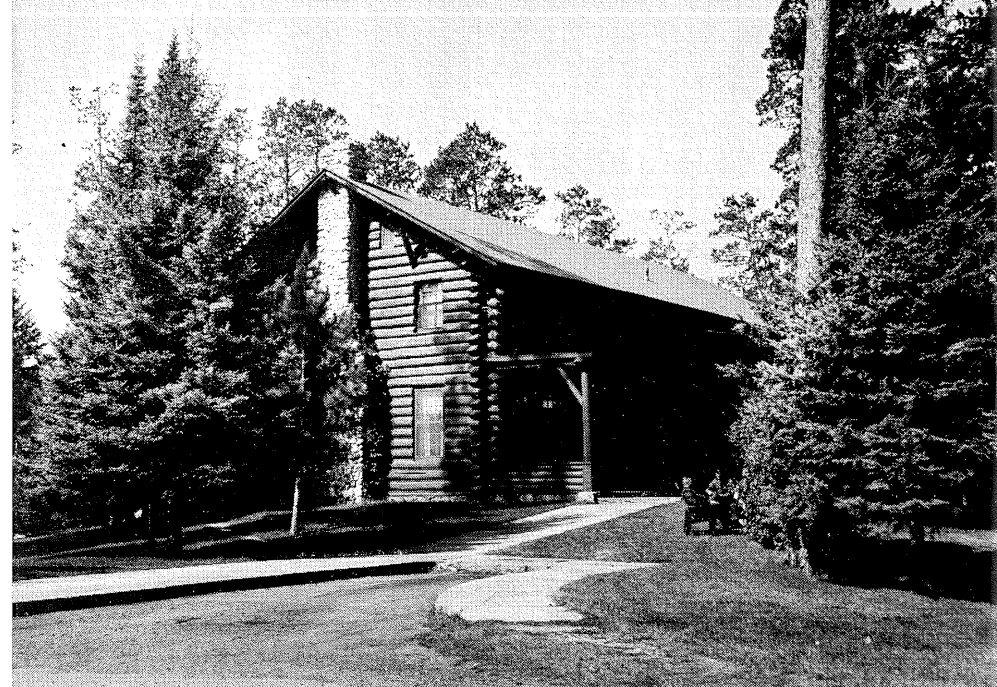
Estimates of the taconite that is located in state-owned lands would indicate a crude taconite reserve of about 15 billion tons. Three billion tons of this total is slaty taconite which is not considered as a reserve at the present time. Eight billion tons of this reserve is classified as magnetic taconite 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. Based on these taconite reserve estimates, the state's future royalty yield from this source will eventually amount to several hundred million dollars.

State Parks

U. W. HELLA, Director

The first unit of the State Park system was established in 1889. Through the years since, it has experienced steady growth. The 1955 legislature eliminated one unit by transferring Alexander Ramsey State Park to the jurisdiction of the City of Redwood Falls and authorized five new State Parks as follows: Bois Brule, Cascade and Temperance in Cook County; Mille Lacs Kathio in Mille Lacs County and Frontenac in Goodhue County. These newly authorized areas together with acreage additions at Mound Springs, Kilen Woods, Nerstrand Woods, Itasca, Gooseberry Falls, Helmer Myre, William O'Brien, Jay Cooke, and Father Hennepin has increased total park acreage from 87,787 to 97,404 as of the close of the 1957 fiscal year. Worthy of

Twenty-two



Douglas Lodge, Itasca State Park

particular note is a gift of 66.4 acres as an addition to William O'Brien State Park.

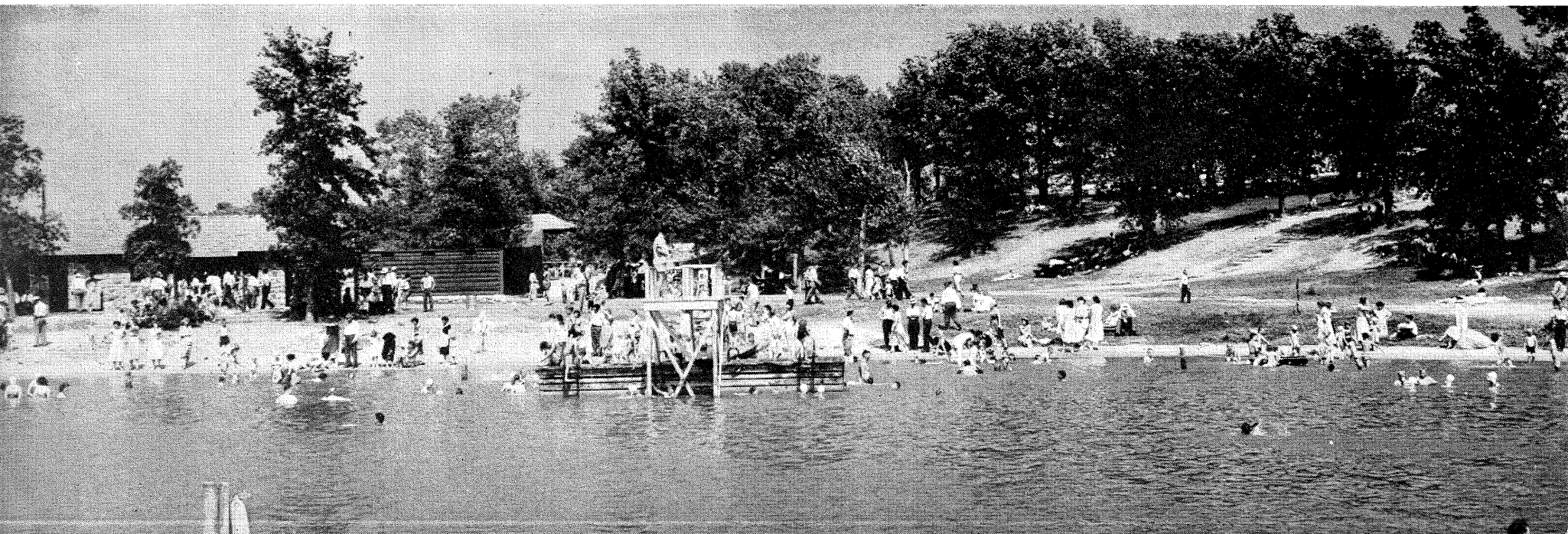
Park Land Inventory — 1957

PARK	DATE ESTABLISHMENT	COUNTY	AREA ACRES	TOTAL
Developed State Parks				
Beaver Creek Valley	1937	Houston	340.0	
Birch Coulee	1893	Renville	82.0	
Buffalo River	1937	Clay	247.0	
Camden	1935	Lyon	469.96	
Charles A. Lindbergh	1931	Morrison	110.0	
Flandrau	1937	Brown	836.48	
Fort Ridgely	1911	Nicollet	224.8	
Gooseberry Falls	1937	Lake	637.83	
Helmer Myre	1947	Freeborn	119.75	
Interstate	1895	Chisago	167.0	
Itasca	1891	Becker	3,720.0	
		Clearwater	22,734.0	
		Hubbard	5,600.0	
Jay Cooke	1915	Carlton	8,920.2	
John A. Latsch	1925	Winona	350.2	
Kaplan Woods	1935	Steele	180.0	
Kilen Woods	1945	Jackson	178.41	

PARK	DATE ESTABLISHMENT	COUNTY	AREA ACRES	TOTAL
Lac qui Parle Mission	1931	Chippewa	17.2	
Lake Bemidji	1925	Beltrami	365.0	
Lake Bronson	1937	Kittson	745.62	
Lake Carlos	1937	Douglas	404.0	
Lake Shetek	1937	Murray	263.0	
McCarthy Beach	1945	St. Louis	135.0	
Minneopa	1905	Blue Earth	116.24	
Monson Lake	1936	Swift	198.95	
Mound Springs	1937	Rock	194.90	
Nerstrand Woods	1945	Rice	563.0	
Old Mill	1937	Marshall	285.0	
Pomme de Terre	1937	Stevens	363.5	
St. Croix	1943	Pine	30,557.4	
Scenic	1921	Itasca	2,121.5	
Sibley	1919	Kandiyohi	421.1	
Split Rock Creek	1937	Pipestone	227.64	
Whitewater	1919	Winona	688.28	
William O'Brien	1945	Washington	191.0	
Total				82,775.96

PARK	DATE ESTABLISHMENT	COUNTY	AREA ACRES	TOTAL
Developed Waysides				
Father Hennepin	1941	Mille Lacs	182.75	
Garvin Heights	1925	Winona	13.7	
Horace Austin	1913	Mower	40.0	
Joseph R. Brown	1937	Renville	3.0	
Inspiration Peak	1931	Ottertail	82.0	
Old Crossing Treaty	1931	Red Lake	111.0	
Oronoco	1937	Olmsted	105.0	
Pine Tree	1947	Beltrami	31.55	
Sleepy Eye	1921	Brown	40.0	
Split Rock State Scenic	1945	Lake	35.0	
Toqua Lakes	1919	Bigstone	40.0	
Total				684.0
Undeveloped Parks and Waysides				
Baptism River State Park	1945	Lake	744.0	
Brule River State Park	1957	Cook	160.0	
Caribou Falls State Park	1947	Lake	92.0	
Cascade River State Park	1957	Cook	2,300.0	

Swimming Favorite Pastime at Old Mill State Park



PARK	DATE ESTABLISHMENT	COUNTY	AREA ACRES	TOTAL
Frontenac State Park	1957	Goodhue	210.0	
George Crosby-Manitou State Park	1955	Lake	3,300.0	
James A. Carley S. P.	1949	Wabasha	211.0	
Kodonce River State Park	1947	Cook	127.8	
Mille Lacs Kathio	1957	Mille Lacs	6,600.0	(Stat. Limit 9,000)
Ray Berglund State Memorial Wayside	1931	Cook	39.0	
St. Croix Islands	1943	Washington	39.34	
Temperance River S. P.	1957	Cook	112.0	
Total				13,935.14
Monuments				
Acton	1909	Meeker	.1	
Brook Park	1915	Pine	.25	
Count Beltrami	1945	Beltrami	1.0	
Hinckley	1899	Pine	.1	
Milford	1929	Brown	1.0	
Moose Lake	1929	Carlton	.1	
Sam Brown	1929	Traverse	6.0	
Schwandt	1915	Renville	.1	
Wood Lake	1907	Yellow Medicine	1.0	
Total				9.65
Grand Total				97,404.75

Utilization

	(Calendar Year)	
	1956	1957
Visitations	2,302,000	2,414,000
Sticker Sales	114,465	125,400

A decrease in visitations approximately one-tenth of 1% was experienced in 1956 over the previous 1955 calendar year because of inclement weather—an experience which was common throughout the northern tier of states. The 1956 estimated visitations increased 4.9% over 1955 while sticker receipts indicate a 9.6% increase.

Most important, however, from the standpoint of facility needs and increase in operational burden is the increase in specific types of use that the park system is subjected to. These are reflected in the chart of revenue receipts from specific types of activities over a span of years in the Revenue Operations section of this report. Of particular note in this regard is the tremendous increase in Tourist Camping. In the calendar years of this report on the basis of fees collected it has increased as follows:

1956—\$14,115 an increase of 29% over 1955

1957—\$33,082 an increase of 134% over 1956

Twenty-four

The Naturalist Program, which is cooperatively sponsored with the University of Minnesota's Museum of Natural History, served in each year of this report over 200,000 park visitors. This program is administered by two Naturalists at Itasca and one each at Gooseberry Falls and Whitewater. In addition, self-guiding nature trails at seven other parks provided an indeterminate amount of use to the park visitor. This program has been highly commended by those participating.

Budget

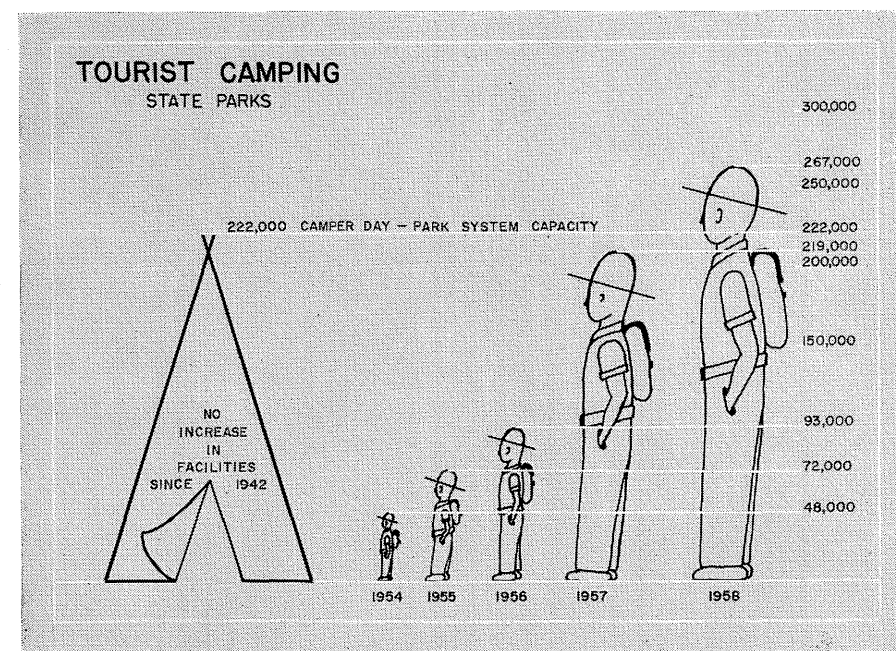
Source of Operating, Maintenance and Improvement Funds in the 1955-57 fiscal year were as follows:

Gross Funds

From General Revenue	\$ 428,262.00
Anticipated Sticker Receipts	236,000.00
Authorized Sale of Certificates of Indebtedness	525,000.00
Reappropriated Receipts	17,000.00
	<u>\$1,206,262.00</u>

Liabilities

Repayment of Game and Fish Loan	\$ 236,000.00
Net Funds Available	<u>\$ 970,262.00</u>



Source of Funds in 1957-59

Gross Funds

From General Revenue for Operation and Maintenance	\$ 615,886.00
From General Revenue for Capital Improvements	254,000.00
Anticipated Sticker Receipts	250,000.00
Reappropriated Receipts	17,000.00

Total \$1,136,886.00

Liabilities

Payment on Principal and Interest of C.I.'s	100,000.00
---	------------

Net Funds Available \$1,036,886.00

Spending Plans for the calendar years of this report were as follows:

1956 — \$534,114.00

*1957 — 453,699.86

*Funds for Capital Improvements were separately appropriated in the 1957-59 biennium and \$64,687.00 of this amount represents Capital Improvements budgeted for in the 1957 calendar year.

Working Capital Fund

Constitutes a revolving fund to which receipts from all State Park revenue operations are credited and from which disbursements for the cost of such operations are made. Authorized costs include payment of salaries, repairs, construction, purchase of equipment, and purchase of merchandise for resale.

Following Chart of Receipts by activities reflects total volume of business conducted and specific types of use growth.

Working Capital Income

Fiscal Years

June 30 — July 1

FISCAL YEAR	TOTAL INCOME	REFECTORY	CAMPING	HOUSING	BOATS	MISCEL.
1954	\$191,292.52	\$133,273.31	\$ 7,274.70	\$22,848.00	\$ 7,582.00	\$20,314.51
1955	218,623.05	147,975.32	10,941.80	29,677.85	9,461.85	20,566.23
1956	221,559.01	146,859.25	14,115.30	26,910.30	8,222.65	25,451.51
1957	222,917.15	139,078.95	17,705.50	31,122.75	10,054.00	24,955.95
1958	310,699.96	185,707.59	34,554.36	40,107.55	10,163.00	40,167.46
1959	264,688.35	132,488.70	35,465.95	32,450.05	9,775.55	54,508.10

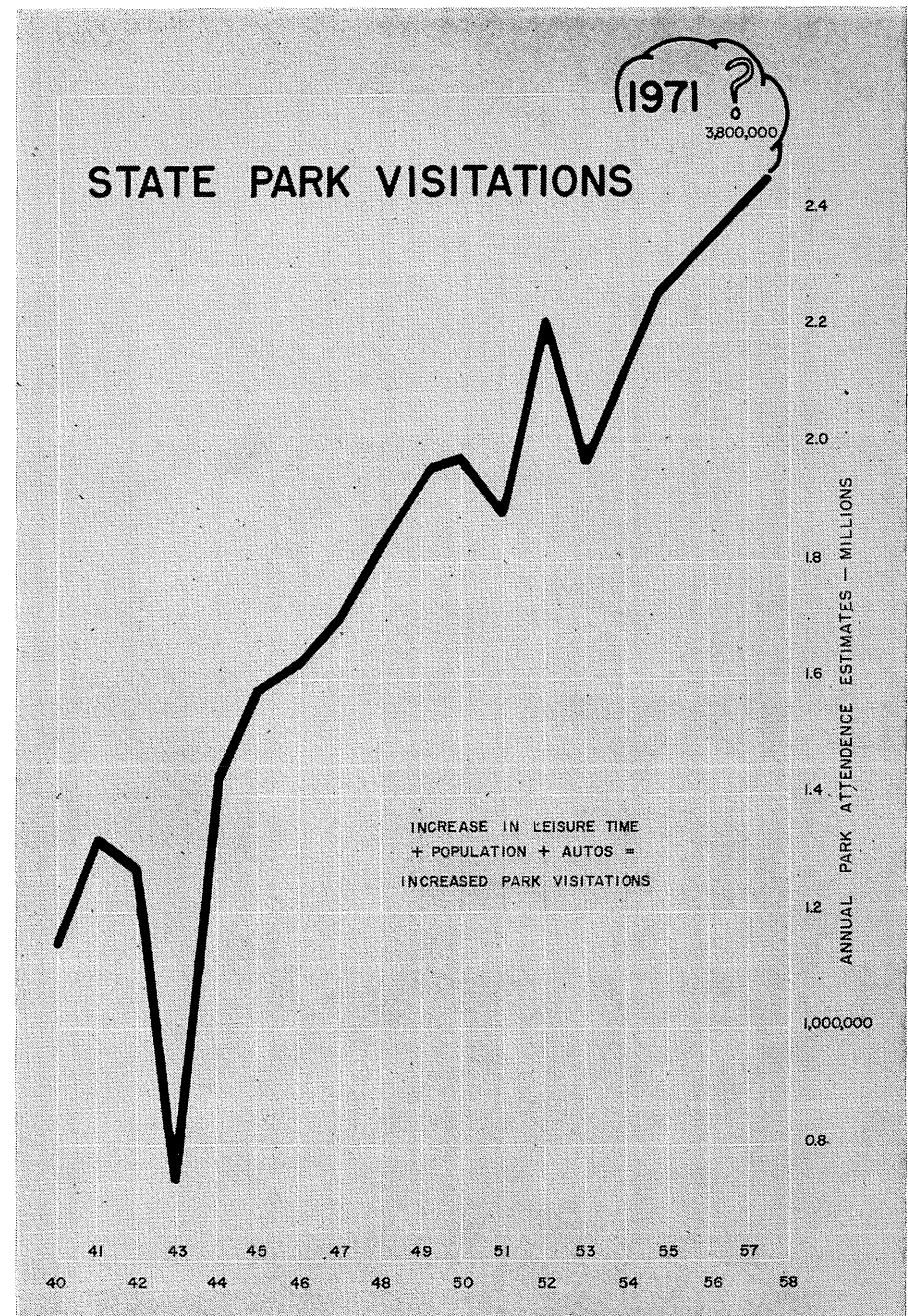
July, August

Sept. 15.

9 Full Time Employees, 143 Seasonal Employees (19 lifeguards—balance Cooks, Custodial Workers, Clerks and one executive.)

1958 — \$124,548.50 Budgeted for labor.

Above table shows monetary growth in major activities, which is in direct relation to the increased use figures. The column headed "Miscellaneous" includes group camps, launch, bathhouse, utilities and all special services.



Waters

SIDNEY A. FRELLSEN, Director

The Commissioner of Conservation is vested with authority under MSA, Chapter 105, to control insofar as practicable the use and allocation of the public waters of the state. For this reason the activities of the Division of Waters are directed toward the protection of our lakes, streams, ground waters, and the public interest in these water resources.

Some regulation of waters is provided under certain sections of MSA, Chapter 105, which require that a permit be obtained from the Commissioner before any work is done which changes the course, current, or cross-section of any public water, or, with certain exceptions, for the appropriation of surface or ground water. The Division of Waters receives, investigates, and processes all applications for permits, and prepares them for final action by the Commissioner.

An additional and valuable check on operations which might adversely affect our water resources is the examination, as required by the statutes, of all plans for proposed county and judicial ditches. While the function of the director in matters of public drainage is advisory only, an opportunity is provided to bring about the modification of objectionable features of drainage projects where lakes or water courses may be adversely affected. Reports were made on 149 drainage projects during the biennium, including 7 preliminary plans for drainage proposals, as requested by the County Board or District Court.

Summary of Permits Issued

	F.Y. 1957	F.Y. 1958	TOTAL
Lakes and Stream Improvement	134	297	431
Highway Construction	100	127	227
Mining	3	3	6
Appropriation of Surface Water	65	42	107
Appropriation of Ground Water	12	25	37
Public Utilities Crossings	23	37	60
Others	12	7	19
Total Issued	349	538	887

Water Levels and Property Rights

Flooding of lowlands adjacent to lakes, due to temporary high water, which may or may not be abnormal or unusual, frequently results in attempts by the owners of such land to lower the elevation of the lake outlet. Owners of recreational lakeshore property are often tempted to lower or obstruct the lake outlet in the interest of lower or higher lake levels. An orderly procedure, with proper safeguards, is provided by the statutes for obtaining relief from flooding of private lands.

Whenever actions are reported or proposed which might adversely affect any public body of water, the division makes the necessary field surveys and

hydrologic investigations and takes appropriate action. Where controversial situations exist public hearings are held by the Commissioner of Conservation at which all interested persons are given opportunity to present their views. When other means fail, legal remedies are used to enforce compliance with the statutes.

Hydrologic Studies

Systematic investigation and study of Minnesota's water resources started in 1909 with the initiation of a stream and lake gaging program financed jointly by the state and federal governments. A state-wide ground water program was added in 1950. From rather meager beginnings both programs have now grown to substantial proportions. These investigations furnish the basic water facts required for economical development and best use of the state's water resources, and for effective control, prevention or reduction of the harmful or destructive effects of water.

The 1957 legislature, recognizing the need for a well-rounded water resources program and for a better general understanding of our water problems, appropriated \$25,000 for each year of the biennium to be used to prepare a hydrologic report. Work was begun in 1957 on assembling and compiling data for a comprehensive factual report on the water resources and water problems of the state. The report will also include general hydrologic data pertaining to the 39 watershed units into which the entire state has been divided. The report, to be designated "Hydrologic Atlas of Minnesota", is designed for general distribution, in order to make available to the general public factual information on the relative quantity and quality of our water supply, its geographic, seasonal and annual distribution and variability, and other pertinent data.

Well Records

Compliance with the 1955 statute requiring the filing of well logs with the Division of Waters for all water wells constructed, with certain exceptions, has not been entirely satisfactory. Many such records have been received, however, and are filed as part of the permanent records of the division. Pumping records are required annually of permittees who appropriate water for irrigation or any other purpose. These sources will eventually provide valuable sources of information on our ground-water resources.

Inventory of Public Waters

Measurement of the areas of all lakes over 10 acres in size has continued. Compilation of this data in the form of county lists showing name, location, area, and an identification number has been completed for 43 counties. When complete, this material together with information on the streams of the state will be published as a gazetteer of Minnesota Waters.

Additional progress has been made on the compilation by counties of maps showing the boundaries and areas in square miles of the watersheds of all streams in the state. This work has been completed for 38 counties, and the entire state is estimated to be 60% complete on June 30, 1958.

Stream-gaging Program

As of June 30, 1958, 114 discharge stations on streams and 37 stage stations on lakes and streams, were operated in Minnesota.

Funds, from all sources, expended for the stream-gaging program in Minnesota during the biennium totaled \$237,658. The following table shows the agencies contributing funds and the amounts contributed.

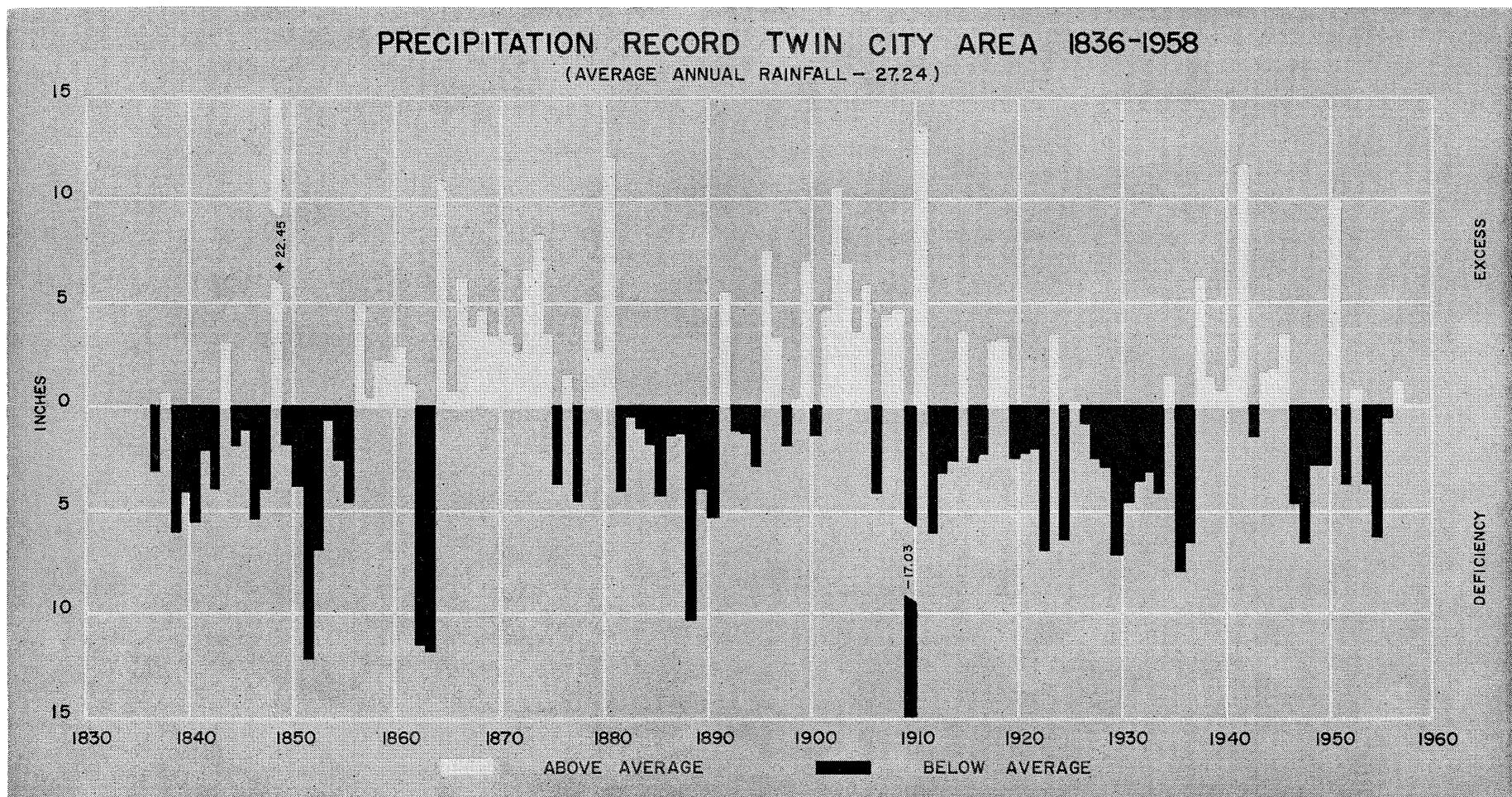
AGENCY	AMOUNT
Division of Waters	\$ 47,083
I.R.R.C.	18,086
Municipal Cooperation	863
County Cooperation	1,192
Federal Cooperative Funds	67,224

AGENCY

AGENCY	AMOUNT
Corps of Engineers, U. S. Army	37,021
U. S. Geological Survey	10,137
Federal Power Commission Licensees	4,152
Special Federal Expenditures for Compilation Report	33,513
Total	\$219,271

Ground Water Investigations

The state-wide Ground Water Program, which was started in 1950, continued on an expanded scale during the period July 1, 1956 - June 30, 1958. It is a cooperative program, conducted and financed in a manner similar to the surface water investigations.



As of June 30, 1958, 49 wells were included in the observation well program. Recording gages, which are installed on 24 observation wells, provide a continuous record of water levels showing fluctuations in response to natural changes in storage in aquifers and the effects of pumping wells. Other wells, which are not suitable or desirable for gage installations, are measured periodically with tapes. The observation wells are located in 15 counties throughout the state as shown in the following table.

COUNTY	NO. OF WELLS	COUNTY	NO. OF WELLS
Brown	1	Lyon	4
Carlton	2	Marshall	2
Carver	1	Morrison	1
Clay	5	Nobles	4
Dakota	1	Olmsted	1
Freeborn	1	Redwood	4
Hennepin	14	St. Louis	7
Kittson	1		

Planning and Development

Since enactment of Chapter 799, Laws of 1955, provided for the creation of watershed districts, this division has been required to assume certain responsibilities relating to the establishment and operation of districts.

During the biennium, nominating petitions for the following districts were filed:

DISTRICT	COUNTIES	DATE OF FILING
1. Two River	Kittson and Roseau	May 28, 1957
2. Roseau River	Kittson, Roseau, Lake of the Woods, Marshall, Beltrami	July 22, 1957
3. Warroad River	Roseau, Lake of the Woods	July 22, 1957
4. Joe River	Kittson	September 6, 1957
5. Okabena-Ocheda	Nobles	November 27, 1957

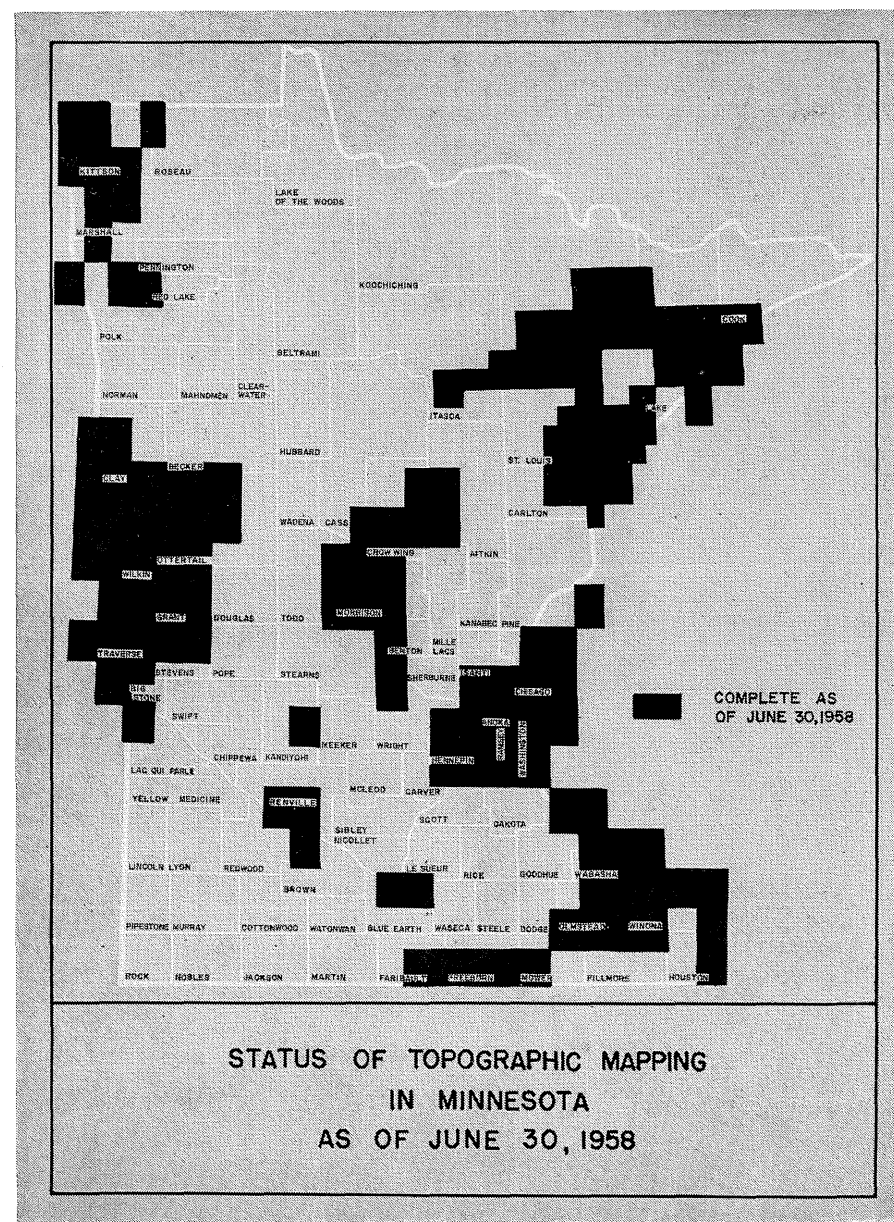
Director's preliminary reports were prepared during the biennium for the Two River and Joe River districts. Hearings on the other three districts before the Water Resources Board were not scheduled before the close of the biennium.

Two other districts have been in the process of establishment. The High Island Creek district was initiated as a Drainage and Conservancy District but transferred to the Water Resources Board by order of the district court under the provisions of Chapter 799, Section 42. A director's preliminary report was prepared and filed August 31, 1956. The Lower Minnesota River district was petitioned for and a director's preliminary report was prepared during the preceding biennium.

Topographic Mapping

Topographic maps are essential in the study of problems bearing on all phases of conservation activity as well as other works of man. Much time and

Twenty-eight





Soil Conservation is Water Conservation at Its Best

money can be saved by being able to make preliminary studies of problems from an overall map showing the topography of the areas which aids in establishing from the outset the practicability of a proposed project.

The U. S. Geological Survey, in cooperation with the states or from all-federal funds, has been making topographic maps of the states for more than 60 years. Much of the work has been finished by the states and federal government on a 50-50 division of cost. Specifically, the cooperative work has been confined to states which have made appropriations of their own to qualify them for participation in federal funds.

There are 460-15 minute quadrangles partially or wholly in Minnesota, excluding those in Lake Superior which have no Minnesota land area. By June 30, 1958, 225 maps, including 2-30 minute quadrangles, and 120-7½ minute quadrangles, have been published. Of the 225 maps, 34-7½ minute and 1-15 minute maps were of areas previously mapped or were duplicate maps on different scales. The net area for which maps have been published is thus equivalent to 131½-15 minute quadrangles and approximately 28.6 per cent of the state is mapped.

During the biennium, 22-15 minute quadrangles and 28-7½ minute quadrangles were published. Of these, 1-15 minute quadrangle and 11-7½ minute maps were of areas previously mapped or were duplicate maps on different scales. The net area for which maps were published during the biennium

was thus equivalent to 25¼-15 minute quadrangles, or 5.5 per cent of the area of the state.

Engineering Services

The Division of Waters furnishes all engineering services required by the Divisions of Game and Fish, State Parks, and Forestry. More than half of the fulltime personnel of the division are assigned to this work. The acquisition of wetland units, spawning areas and public accesses which require field surveys, as well as the preparation of plats and legal land descriptions, has greatly increased the demand for engineering services. Thirteen per cent of all surveys made during the biennium were done under contract with private engineers and paid for from funds accumulated through savings. Had this contract service not been available, 48 requisitions for engineering service could not have been fulfilled.

Future Outlook

Of immediate interest it is expected that a bureau of engineering will be established in the Commissioner's office to provide greater efficiency and better coordination of technical services needed by the respective divisions of the Department of Conservation. The division has planned increased activity in the protection of public waters against public and private encroachment. As indicated basic data collection will be expanded to keep pace with increasing population and greater and more diversified water use. It is anticipated that the most pronounced development of the years ahead will be the state-wide adoption of the watershed approach to the management of our water resources.

Control Dam at Flandrau State Park



