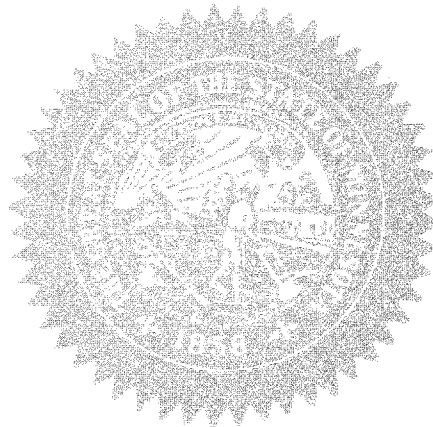


Department of Iron Range Resources and Rehabilitation

STATE OF MINNESOTA



BIENNIAL REPORT 1968-1970



STATE OF MINNESOTA
DEPARTMENT OF
IRON RANGE RESOURCES AND REHABILITATION
200 MTA OFFICE BUILDING
55 SHERBURNE AVENUE
SAINT PAUL, MINNESOTA 55103

January 4, 1971

To the Governor and the Legislature
of the State of Minnesota:

It is my pleasure to submit the fourteenth Biennial Report
of the Department of Iron Range Resources and Rehabilitation in
compliance with Minnesota Statutes 1969, Section 298.22, Subd. 2.

This is the report for the Sixty-seventh Legislature of the
State of Minnesota, including the fiscal years ending June 30, 1969,
and June 30, 1970.

Copies of this report are available for members of the State
Legislature and all State departments as well as Federal, County,
and local agencies interested. Schools and libraries may obtain
copies upon request. A limited supply will be available to the
general public.

Respectfully submitted,


A. M. DeYoung, Commissioner

ORGANIZATION CHART 1968-1970
DEPARTMENT OF IRON RANGE RESOURCES & REHABILITATION
 MINNESOTA STATUTES, SECTION 298.22

COMMISSIONER
 ST. PAUL OFFICE

ATTORNEY GENERAL

1- SPECIAL ASS'T. ATT'Y. GENERAL

LEGISLATURE

COMMISSION MEMBERS (ADVISORY)
 3- SENATORS
 3- REPRESENTATIVES
 1- COMMISSIONER OF CONSERVATION

ASSISTANT COMMISSIONER
 HIBBING OFFICE

ADMINISTRATIVE

1-ACCOUNTANT
 1-CLERK-STENO
 (1-CLERK-STENO)
 PART TIME

FORESTRY DIVISION

1- CONSERVATION MGR. IV (SUPVR.)
 4- CONSERVATION MANAGER III
 3- CONSERVATION MANAGER II
 8- CONSERVATION MGR. I *
 1- FORESTRY ED. CONSULTANT

MINERAL RESEARCH

1- MINING ENGINEER (SUPVR.)
 2- MINING AIDE
 1- DIAMOND DRILL OPERATOR
 1- LABORER I (MONTHLY)
 1- LABORER I (HOURLY)

FIELD OPERATIONS

84- LABORER I (HOURLY)
 4- CLERK - TYPIST
 (TEMPORARY & SEASONAL)

WILDERNESS VALLEY FARMS

1- CONS. MGR. I 1- LABORER I (MONTHLY)
 1- WATCHMAN 1- LABORER I (HOURLY)

U. S. DEPT. OF INTERIOR (CONTRACT)

F. W. P. C. - PEAT RESEARCH *
 1- PROJECT DIRECTOR
 1- PLANT MANAGER
 8- LABORER I (SEASONAL)

**U. S. DEPT. OF LABOR (CONTRACT)
 NEIGHBORHOOD YOUTH CORPS ***

4- CREW LEADERS
 52- ENROLLEES

(12 NORTHEASTERN MINNESOTA COUNTIES)

* REIMBURSED BY FEDERAL GOVERNMENT

** ASSIGNED TO COUNTY MANAGEMENT PROGRAM

LEGISLATIVE REFERENCE LIBRARY
 STATE OF MINNESOTA

TABLE OF CONTENTS

	Page
Letter of Presentation	Inside Front Cover
Organization Chart	1
Commission Membership	3
Foreword	4
Is there Still a Need for IRR&R?	5
Iron Ore Occupation Tax Receipts.....	7
Map of Counties Served by IRR&R.....	8-9
Map of State Mineral Lease Sales.....	10
Mining and Mineral Research.....	11
Mineral Resources Research Center, Photo.....	13
Keewatin Demonstration Plant	14
Table of Data by Counties—1969.....	16
Forestry	17
Map of Tax-Forfeited Lands.....	18
Summary of Expenses and Income on Tax-Forfeited Land.....	21
Map of Timber Inventory	22
Peat Research	23
Map of Location of Peat Deposits in Northern Minnesota.....	24
Wild Rice Research	29
Map of Nett Lake Wild Rice Project.....	31
Map of Wild Rice Project at Upper Rice Lake.....	34
Table of Harvester, Dealer Licenses, Supply—Green Rice.....	35
Other Services	36
Land Ownership Maps	37
Participating Agency Projects.....	38
Cooperative Projects with Private Industry.....	39
Financial Statements	43-44
Topographic Mapping	Outside Back Cover

DEPARTMENT OF IRON RANGE RESOURCES AND REHABILITATION

206 MEA Office Bldg., 55 Sherburne Ave., St. Paul, Minn. 55103

St. Louis County Court House, Hibbing, Minnesota 55746

A. M. DeYOANNES, Commissioner

Virginia, Minnesota

IRR&R COMMISSION MEMBERS

Rep. Duane Rappana, Chairman Duluth, Minnesota	Sen. Donald O. Wright Minneapolis, Minnesota
Rep. Howard E. Smith, Vice Chairman Crosby, Minnesota	Sen. Arne C. Wanvick Duluth, Minnesota
Sen. Carl A. Jensen, Secretary Sleepy Eye, Minnesota	Rep. Raymond O. Wolcott Minneapolis, Minnesota
Jarle Leirfallom, Commissioner Conservation Department	

IRR&R COMMISSIONERS

Herbert J. Miller, Mpls.*	July 1, 1941 to June 30, 1942
Robert E. Wilson, Mpls.	July 1, 1942 to May 1, 1949
Ben P. Constantine, Eveleth	May 1, 1949 to November 20, 1950
Edward G. Bayuk, Eveleth	November 21, 1950 to April 30, 1955
Kaarlo J. Otava, Mountain Iron	May 1, 1955 to January 4, 1961
Hyrom S. Sorenson, Bagley**	January 5, 1961 to February 2, 1961
A. M. DeYoannes, Virginia	February 3, 1961 to January 4, 1971

*Director from July 1, 1941 to April 18, 1942

**Acting Commissioner

IRR&R COMMISSION MEMBERS

Senator Robert O. Ashbach, St. Paul	July 1, 1967 to June 30, 1969
Senator C. A. Dable, Duluth	May 1, 1943 to August, 1949
Senator M. J. Galvin, Winona	May 1, 1943 to February 4, 1947
Senator K. F. Grittner, St. Paul	April 21, 1955 to April 21, 1959
Senator Carl A. Jensen, Sleepy Eye	July 1, 1969 to January 4, 1971
Senator Leo J. Lauerman, Olivia	July 1, 1959 to January 30, 1963
Senator Michael E. McGuire, Montgomery	January 30, 1963 to June 30, 1965
Senator George O'Brien, Grand Rapids	May 1, 1943 to July, 1959
Senator Benjamin Patterson, Deer River	January 30, 1963 to June 30, 1967
Senator Elmer Peterson, Hibbing	April 19, 1951 to January 30, 1963
Senator Herbert Rogers, Duluth	April 19, 1951 to July 1, 1959
Senator Chas. W. Root, Minneapolis	July 1, 1959 to June 8, 1961
Senator Thos. D. Vukelich, Gilbert	April 19, 1945 to April 19, 1951
Senator Arne Wanvick, Duluth	July 1, 1965 to January 4, 1971
Senator Donald O. Wright, Minneapolis	June 8, 1961 to January 4, 1971
Representative Elmer E. Berglund, Bemidji	April 21, 1959 to April 17, 1961
Representative Luke F. Burns, Virginia	May 1, 1943 to April 19, 1945
Representative Joseph J. Daun, St. Peter	May 1, 1943 to January, 1949
Representative Emil C. Ernst, Lester Prairie	April 21, 1949 to April 21, 1955
Representative Alfred France, Duluth	January 29, 1963 to June 30, 1965
Representative Art Frick, Sr., Grand Rapids	January 29, 1963 to June 30, 1969
Representative Peter X. Fugina, Virginia	April 21, 1955 to April 17, 1961
Representative Charles L. Halsted, Brainerd	April 21, 1955 to April 21, 1959
" " " " "	April 17, 1961 to June 30, 1967
Representative Warren S. Moore, Duluth	April 19, 1951 to April 21, 1955
Representative Willard M. Munger, Duluth	April 21, 1959 to April 17, 1961
Representative Duane Rappana, Duluth	July 1, 1965 to January 4, 1971
Representative Chas. W. Root, Minneapolis	April 24, 1947 to April 19, 1951
Representative Loren S. Rutter, Kinney	April 17, 1961 to January 29, 1963
Representative Howard E. Smith, Crosby	July 1, 1967 to January 4, 1971
Representative Fred Schwanke, Deerwood	May 1, 1943 to April, 1955
Representative Arne C. Wanvick, Duluth	April 17, 1961 to January 29, 1963
Representative Raymond O. Wolcott, Minneapolis	July 1, 1969 to January 4, 1971
Commissioner Robert L. Herbst, Conservation*	July 20, 1966 to January 20, 1967
Commissioner Jarle Leirfallom, Conservation	January 20, 1967 to January 4, 1971
Commissioner Wayne Olson, Conservation	July 1, 1963 to July 19, 1966
Commissioner Clarence Prout, Conservation	January 4, 1961 to June 30, 1963
Commissioner George A. Selke, Conservation	May 1, 1955 to January 4, 1961
Commissioner Chester S. Wilson, Conservation	March 15, 1943 to May 1, 1955



*Acting Commissioner of Conservation.

FOREWORD

The Office of the Commissioner of Iron Range Resources and Rehabilitation was created by the 1941 Legislature. Its purpose is to offset economic conditions where distress and unemployment exist or may exist in the future by reason of the removal of natural resources or a possibly limited use thereof.

Despite the economic boost in Northeastern Minnesota with the tremendous financial investment by the taconite industry, there are still very serious economic problems. One of these is the shift of the tax load from industry to the homeowner. The taconite industry has saved Northeastern Minnesota from an economic depression, but the area is still plagued by inadequate employment, job migration, and a lack of industrial diversity which is aggravated by new methods used in the mining and timber industries. The taconite industry is highly automated and requires considerably less manpower to operate than the mining and direct shipping methods for highgrade natural ores.

Changes in the timber industry likewise have affected the type and number of employees required. As a result, there is a definite need to develop other resources, creating new employment possibilities.

Economic conditions for new industry and job opportunities for many displaced mine and timber employees and their families are imperative to the economic health of Northeastern Minnesota.

These facts point out the need for a continuation of IRR&R's program. Yet, one phase of the Department's program, helping private industry and establishing new industries for diversification, will have to be eliminated for the next biennium because of lack of funds.

Another phase of the program, forestry and land management, which for the first 20 years of the Department received the largest percentage of available funds, is being greatly reduced. Approximately 75% of our budget for permanent personnel was appropriated for this program. With the decrease in funds, it has been necessary to cut back on this program, resulting in the need on the part of the counties benefiting to share in its cost.

Unless legislation is passed to allow the department to share in taconite tax revenue, this program will be completely eliminated in the next biennium and the Department limited to a small cadre of foresters, a small mineral research division, and an administrative staff.

The financial base of the Department of Iron Range Resources and Rehabilitation comes from a percentage of the iron ore occupation tax on natural iron ore. These receipts have dropped from a high of \$1,379,095 in 1954 to an estimated \$500,000 for the 1970 shipping season.

The Department receives no funds from taxes on taconite and less than the normal share of the occupation tax on concentrates other than taconite because of certain tax credits not applicable to natural ores. With the increase in taconite production there is a corresponding decrease in natural ore shipments, which experts predict will be all but completely phased out by 1975.

This Biennial Report will attempt to show that the Department of Iron Range Resources and Rehabilitation, despite its declining financial base, is continuing operations according to the intent of the law.

Commissioner
Iron Range Resources and Rehabilitation
January, 1971

IS THERE STILL A NEED FOR IRR&R?

When the Department of Iron Range Resources and Rehabilitation was established in 1941 the residents of Duluth and the Iron Range were concerned that the mining industry was about to phase out. This would result in a dramatic decline in economic conditions in the area.

The Range communities especially, including the Mesabi, Vermilion, and Cuyuna Ranges, had thrived under a one-industry economy for more than fifty years. The first shipment of ore came from the new Soudan Mine on the Vermilion Range on July 31, 1884. The mining industry's activity in Northeastern Minnesota increased steadily until the threat of foreign ores moved in to create a serious problem of competition.

World War II, however, required an increase in United States ore production. In the early 1950s the prospects for Minnesota iron ore continued to improve because of the Korean War and the consumer's demand for postwar conveniences.

This demand for natural ores continued until 1955. But by then the high-grade natural ores were being depleted. The steel mills were demanding high-quality ore; world-wide exploration was encouraged to discover new sources of iron ore.

By 1960 Minnesota, once the nation's major source of iron ore, encountered serious competition from foreign ores, especially from Canada and South America. In that year, iron ore imports increased to 34,500,000 tons. The answer to this competition was a magic word — taconite. Passage of the Taconite Amendment in 1964 paved the way for huge investments in Northeastern Minnesota in the mining and manufacturing of taconite pellets. By 1970, new taconite investments exceeded one billion dollars.

Some people concluded that IRR&R had thus fulfilled its purpose, which was to provide job opportunities for residents in the areas suffering distress and unemployment because of the loss of the natural ore industry.

However, though IRR&R funds came from mining industry taxes, the Department was also committed to helping the people in the cutover timber area of Northeastern Minnesota. The early exploitation of timber resources, unwise methods of farming, and introduction of new machinery in farming and logging, contributed to unemployment and other economic problems in these areas outside the Iron Range mining communities.

In 1949 the Minnesota Attorney General ruled that the IRR&R Commissioner had the legal right

to initiate a Land Use Program and hire forestry personnel to carry it out in areas suffering distress and unemployment by reason of the removal of natural timber resources. IRR&R has invested approximately \$4,000,000 in this program. Another \$3,000,000 has been transferred to the State Conservation Department for forestry projects.

Thus, in spite of the revival of the iron ore industry through taconite and the growth and expansion of the timber industry, there is still a viable need for the IRR&R and its programs.

IRR&R was helpful in the development of the taconite industry. Almost \$3,000,000 has been appropriated for the University of Minnesota Mineral Resources Research Center (formerly the Mines Experiment Station), which played an important role in developing the technique necessary to make our taconite industry possible.

IRR&R also contributed large sums to a program, in cooperation with private industry, to establish new plants to develop the use of timber in the cutover area. Most of this timber apparently had no value for the original logging firms which harvested the virgin timbers in Northeastern Minnesota.

With the authority vested in the Commissioner, working with a seven-member advisory commission, IRR&R funds can still be directed to meaningful projects necessary to the economy of the area. The Commissioner has authority to use these funds to rehabilitate the unemployed, to encourage the use of natural resources which at present are not considered commercially feasible, and to encourage new industry in order to create new employment opportunities.

Following are the areas of service which IRR&R has entered and which should be continued. These projects, directly or indirectly, result in increasing employment and improvements in the general economy in Northeastern Minnesota:

1. Forestry and conservation projects.
2. Peat research.
3. Wild rice research and development.
4. Provision of funds for —
 - a. Iron ore research
 - b. Copper-nickel mapping
 - c. Vocational training programs
 - d. Economic Development Administration and Small Business Administration co-

operative programs to help new industry and encourage expansion of existing industries.

- e. Administration of U.S. Department of Labor Neighborhood Youth Corps conservation-oriented projects.
5. Matching of federal funds (under the U.S. Department of the Interior Geological Survey) for water surveys of Northeastern Minnesota.
6. Matching of funds with the U.S. Geological Survey for topographic mapping of Northeastern Minnesota, including interim mapping of areas originally funded with federal and IRR&R funds.

The record indicates that IRR&R is doing more research in peat and wild rice than any other state agency. These are two of Minnesota's most important natural resources. More than 50% of the nation's supply of peat is located in Northeastern Minnesota. Minnesota produces 60% of the world's supply of wild rice as a commercial crop.

EDA and SBA officials acknowledge that, because of immediate available participating funds from IRR&R, many major industrial loans have been approved for Northeastern Minnesota.

University of Minnesota officials acknowledge that because of participating IRR&R funds they have been able to greatly expand research in minerals, peat, forestry, and agriculture.

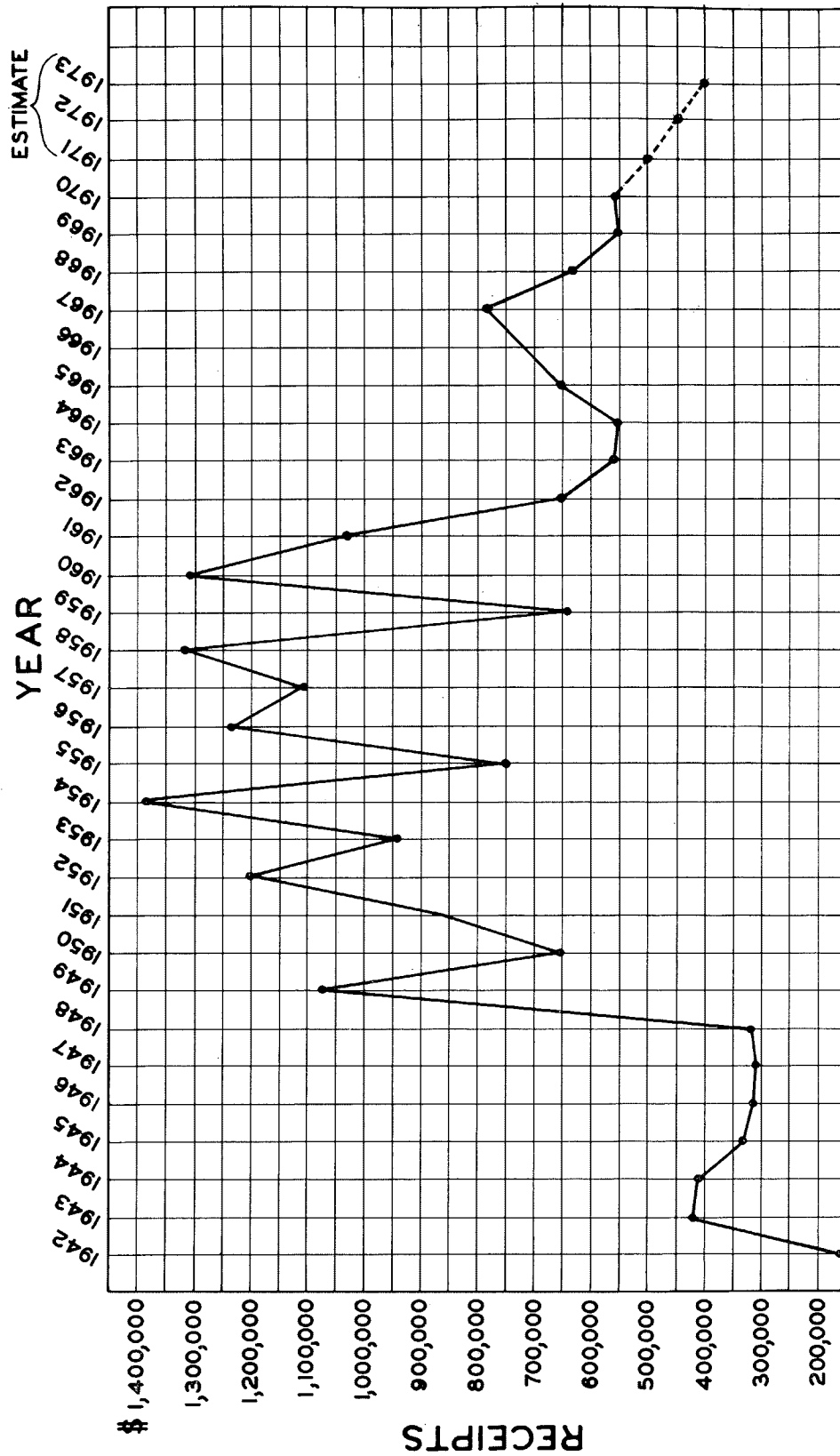
Occupational Tax Receipts and Funds Transferred to University of Minnesota

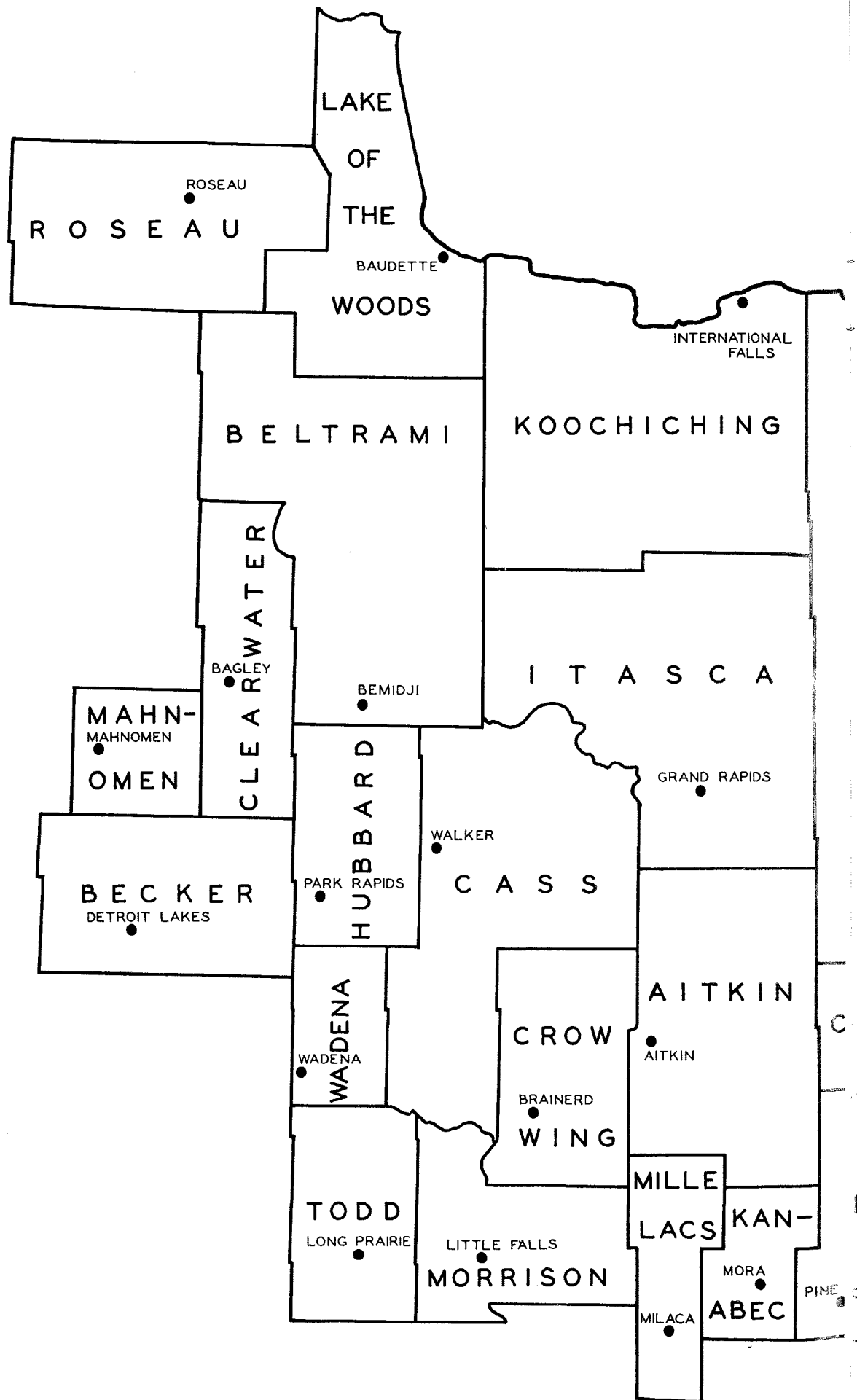
Fiscal Year	Occupational Tax Receipts	University of Minnesota Legislative Transfer to Mines Experiment Station
1941-42	\$ 159,680.50	\$ —
1942-43	419,981.34	—
1943-44	411,622.60	22,000
1944-45	335,490.76	22,000
1945-46	316,799.53	50,000
1946-47	313,723.85	50,000
1947-48	318,620.65	60,000
1948-49	1,071,179.89	60,000
1949-50	651,873.36	75,000
1950-51	855,568.32	75,000
1951-52	1,199,834.72	80,000
1952-53	942,199.88	80,000
1953-54	1,379,095.05	83,050
1954-55	750,611.40	83,050
1955-56	1,233,214.65	87,500
1956-57	1,106,298.85	87,500
1957-58	1,314,442.06	100,000
1958-59	648,369.29	100,000
1959-60	1,300,865.62	150,000
1960-61	1,032,719.16	150,000
1961-62	652,548.38	159,000
1962-63	563,883.99	165,000
1963-64	555,749.37	190,298
1964-65	654,807.68	197,686
1965-66	784,015.37	80,000
1966-67	783,982.82	80,000
1967-68	635,161.69	150,000
1968-69	550,474.23	150,000
1969-70	560,305.03	150,000
*1970-71 Estimate	**500,000.00	150,000
	<u>\$22,003,120.04</u>	<u>\$2,887,084</u>

*Effective July 1, 1970 the title of the Mines Experiment Station was changed to Mineral Resources Research Center.

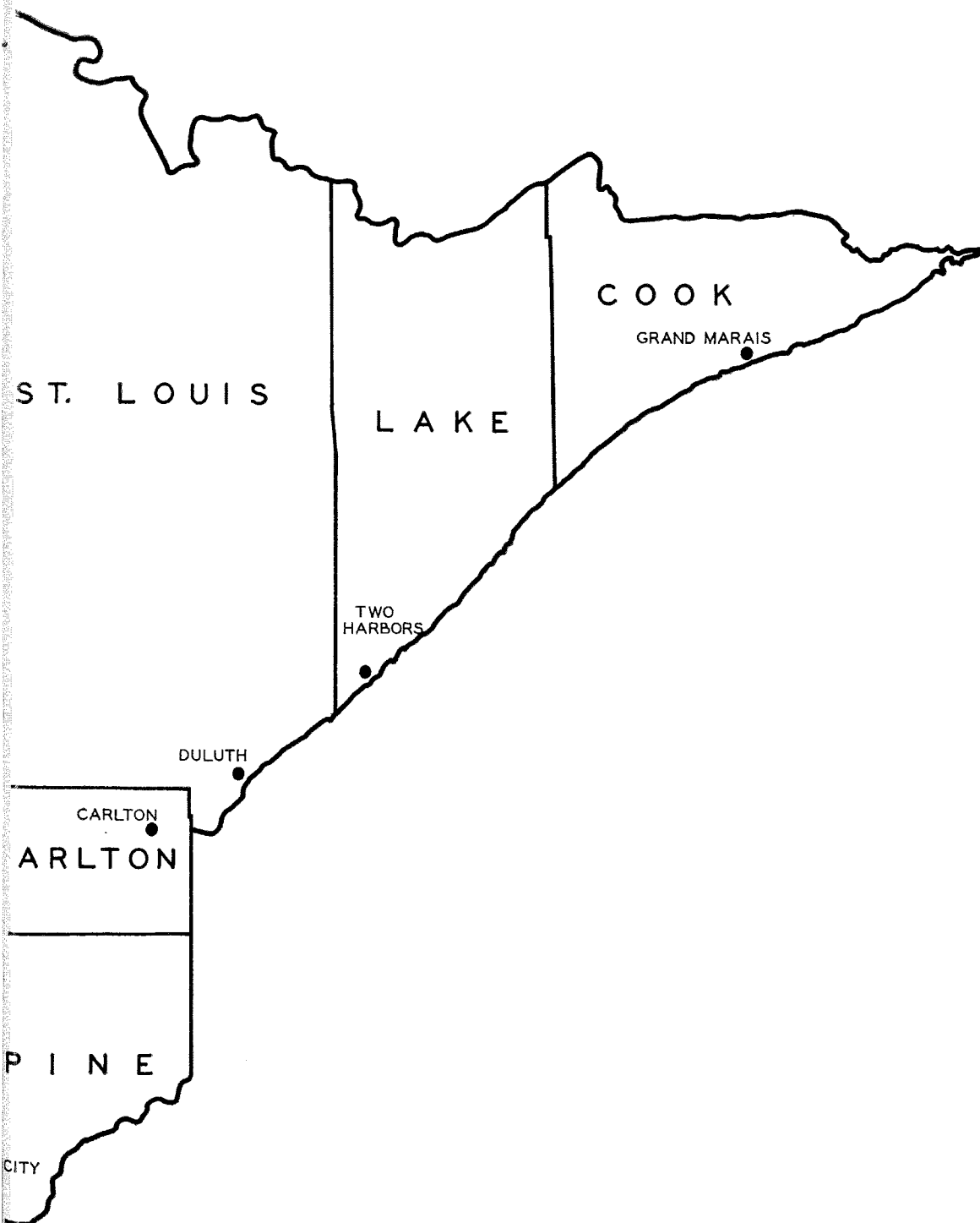
**Exact receipts not available until June 30, 1971, determined by the occupational tax receipts based on the 1970 shipping season.

I. R. R. & R. IRON ORE OCCUPATION TAX RECEIPTS





**COUNTIES SERVED BY IRON RANGE
RESOURCES AND REHABILITATION
PROGRAMS AND PERSONNEL**



STATE MINERAL LEASE SALES



AREA OF 1966 COPPER-NICKEL SALE IN THE
DULUTH GABBRO COMPLEX



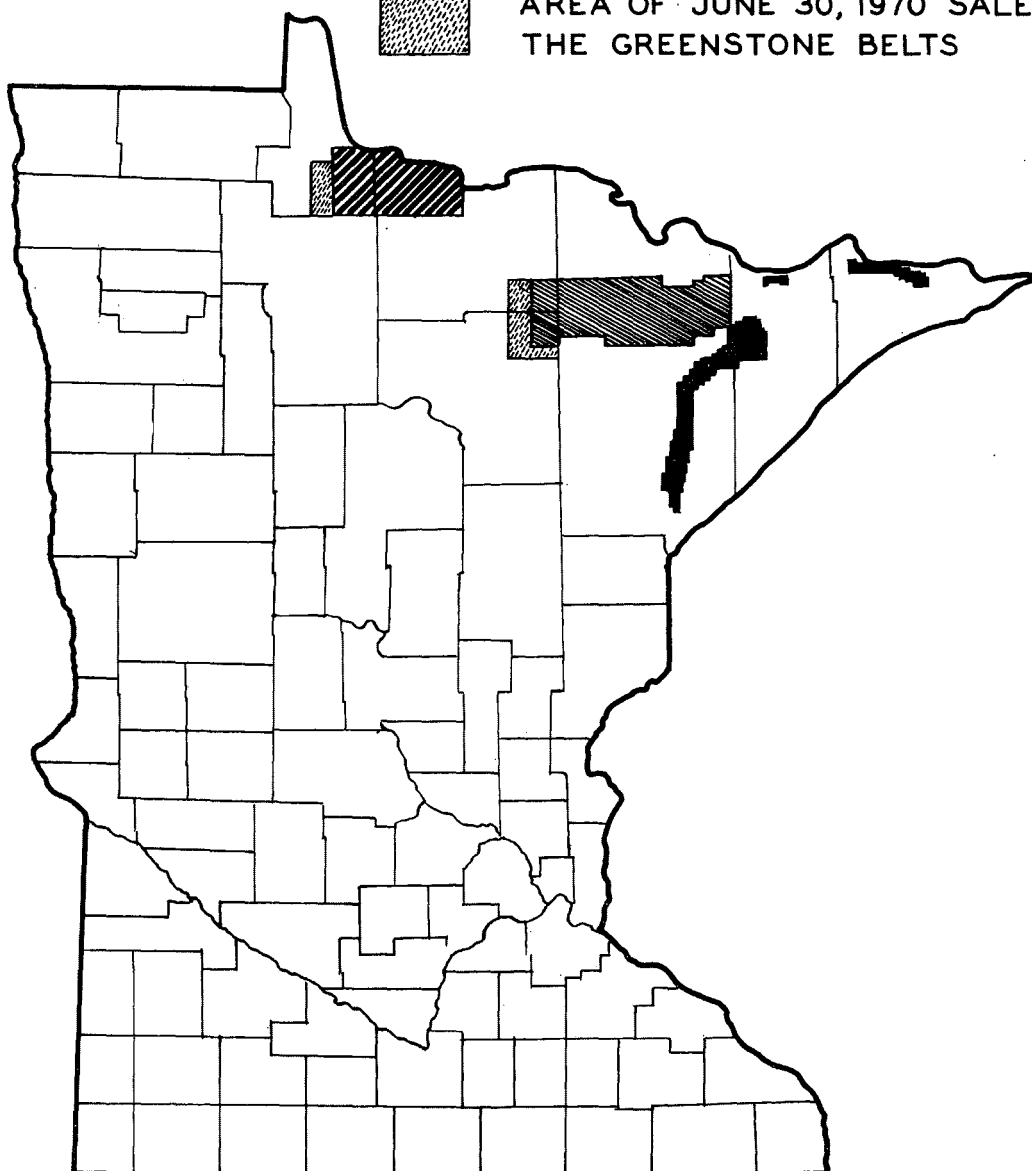
AREA OF AUGUST 15, 1968 SALE IN THE
GREENSTONE BELTS



AREA OF DECEMBER 11, 1968 SALE IN THE
GREENSTONE BELTS



AREA OF JUNE 30, 1970 SALE IN
THE GREENSTONE BELTS



MINING AND MINERAL RESEARCH

Iron Mining Research

Iron mining has undergone a degree of recovery in Minnesota. Since the passage of Minnesota's Taconite Amendment in 1964, over \$1 billion has been invested in the state in taconite mining and pelletizing facilities.

Minnesota's six taconite plants in 1970 had a production capacity of 31.5 million tons. This is expected to peak out at about 60 million tons by 1985-1990. Taconite presently brings to Minnesota an annual payroll of \$78 million, plus an annual investment of over \$100 million in goods and services purchased. Various state and local taconite taxes paid through 1970 exceed \$90 million.

While the number of men employed in taconite production is low—about 10,000—taconite brings the advantage of year-round employment. Also, many thousands of workers are employed in the many satellite industries which serve our taconite facilities.

Taconite has been a big help to Northeastern Minnesota, but our iron ranges have no monopoly on supplying our nation's iron ore needs, and we can expect growing competition from other states and nations as previously neglected ore reserves are developed. Canada's 13 operating taconite plants actually produce more pellets than does Minnesota, and most of these pellets are sold to U.S. mills. Some 20 million tons of pellets are also produced each year in other states, notably Michigan and Missouri, and significant unworked ore reserves have been found in 25 other states. Development of cheap ocean travel will serve to enhance competition from abroad. Minnesota even now supplies only 37.5 percent of our country's iron ore requirement.

Many of IRR&R's recent research efforts, in cooperation with the U.S. Bureau of Mines, the University of Minnesota, and private investigators, are designed to help make Minnesota's iron ore more competitive in the marketplace of the future.

The Economic Significance of Iron Ore

During the past biennium, IRR&R authorized a grant of \$16,000 to the University of Minnesota's School of Mineral & Metallurgical Research, for the completion of a study to define the exact role played by the iron ore industry in the economy of our state. The study, begun in June, 1970, and scheduled for completion in June, 1971, is under the direction of Dr. Eugene P. Pfeider, professor of mineral engineering in the School. \$6,000 was a direct grant from IRR&R; the Upper Great

Lakes Regional Commission supplied the balance through our agency.

The information developed in this study will be of critical importance in the years ahead. Most earlier data on Minnesota's iron mining industry has not taken a broad enough overview to measure up against the more sophisticated needs of the U.S. Mineral Policy Bill of 1969. This bill enjoined the federal government to obtain comprehensive data from all mineral sources regarding supply, demand, competition, cost-benefits, etc. Important policy decisions relative to tariffs, quotas, premium-price contracts, stockpiling and other domestic minerals programs will be predicated on the information gathered under this federal program, designed to assure that our nation will be able to meet its critical need for minerals and energy fuels in the decades ahead.

The value of Minnesota's input into this federal program will depend upon the extent and sophistication of the data at the state's disposal. It is essential that our state, with its large iron ore industry, should develop the same kind of information on its own mineral resources as the federal government is gathering on our resources nationally. From this data, the state will be in a position to establish wiser policies relative to taxation, leasing of state-owned minerals, exchange of land, etc. This in turn will encourage our state's mineral development in those areas which will have the most benefit. A state possessing a good grasp of the problems that confront its mineral industries can do a more effective job in furthering its economic goals. (For example, Minnesota could possibly provide compelling arguments in favor of the federal government subsidizing the construction of lake freighters, so that Minnesota ores could compete more favorably with Canadian ores carried on subsidized ships.)

Past research studies (including the biennial reports of the Interim Iron Ore Taxation Committees; the study by James McComb on iron mining taxes (1961; revised in 1963); and studies by the Minnesota Natural Resources Council (1962) have proven helpful but do not provide a sufficient overview. Nor do they constitute an action program of steps that should be taken in order to achieve optimum development of Minnesota's iron ore resources.

By closely evaluating the benefits accruing to a) local governments and communities; b) counties; c) the state and d) the nation, of a dynamic and growing industry, a better policy can be established for future local, state and federal action

helping to reduce our nation's growing reliance on foreign imports, now at 40 percent. The report will:

- Relate data from earlier studies (particularly the Stanford Research Institute 1970 taconite study) to the question of cost-benefit relationships.
- Develop current estimates of capital investments, wages, taxes, etc., for our iron mining industry itself and for satellite industries (including rail transportation, lake transportation, power companies, etc.) and extend these data for future expected production levels.
- Estimate the impact of subsidized shipping, special investment credits, low interest borrowing, and other such encouragements offered by foreign governments to their iron ore industries.
- Analyze the effect of unemployment and balance-of-exchange problems on the U.S. economy if foreign imports capture an additional 20-30 percent of the market.
- Cooperate with economists of the U.S. Bureau of Mines, The U.S. Department of Commerce, the Upper Midwest Study Group, the Federal Reserve District, Resources for the Future, and the various mining companies in the collection and analysis of data.
- Recommend an action program for local, state and federal agencies.

As noted, there are innumerable high grade iron ore deposits throughout the world that can compete favorably in cost and quality with Minnesota pellets and natural ores. This has become increasingly true with the advent of cheap ocean transportation and the desire of foreign nations to develop their natural resources. Minnesota must evaluate this competition and remind our government on all levels of the benefits that accrue to the state and the nation by reason of our taconite operations. The IRR&R University of Minnesota study should help force a shift of thinking by our federal government as to shipping restrictions and other limitations placed upon our iron mining industry in Minnesota.

Custom Pelletizing Plant Study

A \$205,000 project was carried out during the past biennium to determine the feasibility of a custom pelletizing plant utilizing iron-ore-bearing materials that are now being bypassed. The study was carried out by Hallett Harrison, Wayzata, Minnesota (a joint venture of Hallett, Inc. and Harrison, Inc.). IRR&R put up \$50,000 and Upper

Great Lakes Regional Commission \$155,000 of the total cost.

The spectrum of custom pelletizing feed materials studied in the report included natural ores, stocked natural ore wastes, steel plant wastes, iron residues from the exploitation of iron sulfide deposits, and magnetic taconite concentrates. A total of 77 prospective sources of iron and maniferous materials were subjected to review, of which 51 were found to be of sufficient interest to warrant further study. These consisted of 40 Mesabi-Cuyuna natural ore properties and 11 steel plant waste sources.

Studies into the use of steel plant wastes as a supplemental source of pellet plant feed indicated that more efficient pollution control, through the use of more efficient collection equipment, was resulting in increased tonnages of such materials being recovered at steel plants. Studies indicated that the disposal of these solid iron-bearing wastes was becoming a problem to the steel industry and that substantial quantities of recovered iron bearing materials were not being returned to the blast furnace. The studies identified potentially valuable iron units within the variety of wastes investigated and, from test work, concluded that it was technically feasible to produce about 1 million long tons per year of physically competent oxide pellets. However, the economic feasibility of this was not established because acquisition costs could not be determined.

Investigations also searched out other pelletizing feed materials. With respect to Aitkin County sulfide deposits, these proved to require extensive evaluation beyond the scope of this study. Magnetic taconite concentrates from several undeveloped Minnesota and Wisconsin reserves were considered as potential additive sources for upgrading and supplementing available natural ore pelletizing feeds. So was the possibility of purchasing and admixing high grade Canadian ore fines. Costs involved proved prohibitive.

Availability studies showed that a Duluth-based custom pelletizing plant would require the mining, by open pit shovel and truck methods, of widely scattered, low reserve tonnages on both the Cuyuna and Mesabi ranges. Stripping requirements would be met through shovel and truck as well as dragline cast operations. Upgrading of pelletizing feed would be done at the source. Numerous plant flow sheets suiting each orebody were drawn up, though no scheme of concentration beyond that of customary gravity concentration was projected.

All of the 40 Mesabi and Cuyuna natural ore properties considered of interest were subjected

to detailed original engineering estimates. In addition to source product evaluation, the quantities of surface development, mine rock wastes and crude ore required to be mined and moved were computed.

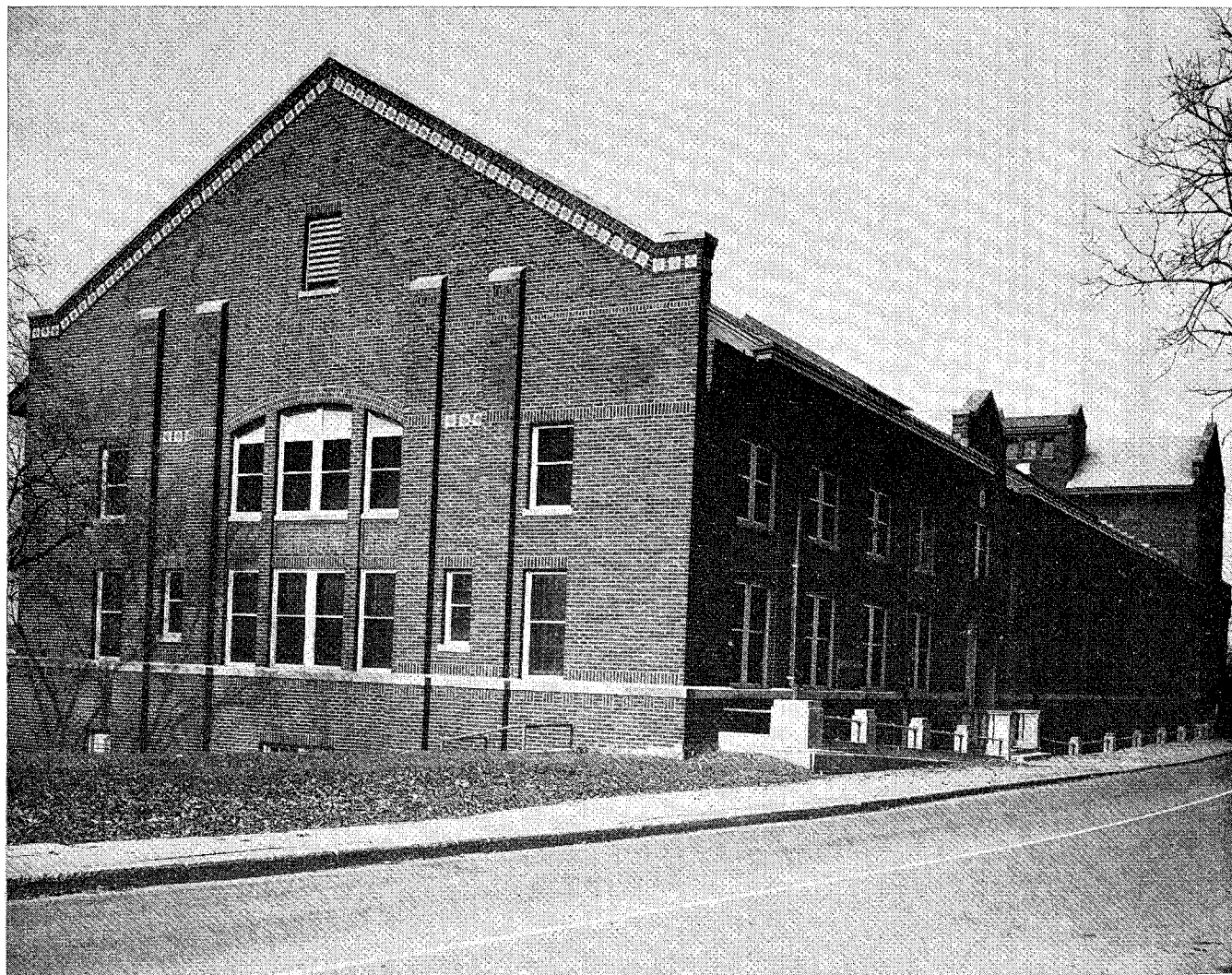
As a result of these studies, Hallett Harrison concluded that it was technically and economically feasible to produce 20 million tons of oxide pellets with commercially competent physical characteristics from Minnesota natural ores and natural ore concentrates. The construction of such a pelletizing operation did not, however, appear feasible at the present time because of inadequate assurance of market and profitability to justify financing at today's high interest rates. Studies also indicated that pellets of this analysis were not of sufficient interest to the steel mills to justify long-term purchase contracts. Data in the report will benefit further investigation and does not undertake to

evaluate all the alternative development opportunities that may exist.

Copies of the summary report may be obtained without charge from IRR&R. Interested parties may arrange to examine a detailed two-volume supplement available on loan through IRR&R offices in St. Paul and Hibbing, and at offices of the Upper Great Lakes Regional Commission.

Mineral Resources Research Center

IRR&R is the major financing agent for iron ore research conducted by the University of Minnesota's Mineral Resources Research Center (formerly the Mines Experiment Station). Research continues at the Center on the concentration of semi-taconites and oxidized taconite at the pilot plant level. Research on magnetic taconite includes magnetic separation, hydrosizer investigation, cyclone classification and pelletizing.



IRR&R is the major supporter of research at the University of Minnesota's Mineral Resources Research Center (formerly the Mines Experiment Station), Minneapolis.

KEEWATIN DEMONSTRATION PLANT

As part of its minerals research program, IRR&R in 1969 took over maintenance of the unfinished U.S. Bureau of Mines experimental pellet plant near Keewatin.

Building of the plant was undertaken by the Bureau in 1967. The plant was to demonstrate the use of scrap metal in converting Minnesota's vast deposits of non-magnetic taconite into high grade iron ore pellets. Work was discontinued in February 1969, when the plant was 40 percent completed. Economic unfeasibility of the use of scrap iron for this purpose was cited as the reason.

The plant was turned over to the General Services Administration, for sale. Bids opened in May, 1969, indicated however that only ten cents on the dollar could be realized by public sale of the buildings and equipment, which would have to be removed from the land, which was not for sale.

At this time the state asked for an opportunity to sell or lease the plant to private investors who would complete and operate it. IRR&R agreed to keep the plant open at an approximate cost of \$2,000 a month. Under this arrangement, the plant would be operated as a cooperative effort by government and private industry to search for new iron ore processes.

Studies undertaken by the Warren S. Moore Company, Duluth, under a grant from the Upper Great Lakes Regional Commission, have indicated that the Keewatin plant could be used to make pre-reduced iron ore pellets, using low-cost sub-bituminous coal. Pre-reduced pellets are made by taking high grade ore and heating it in the presence of carbon. The carbon removes the oxygen from the ore, leaving a high concentration of iron with a very small balance of silica. The pre-reduced pellets can be fed with scrap iron directly into electric ovens at a steel plant, eliminating the need to convert raw ore first into pig iron and then into steel.

This would however require that the plant first be completed, at an estimated cost of \$3 million; and this would require the interest of a considerable number of private investors.

Until these investors come forward, IRR&R has offered the Keewatin plant to the University of Minnesota for use as a training facility. If the University leases the plant, it will be for a term of not more than four years. At that time, when the present land lease with the Hanna Mining Company expires, a permanent owner would have

to be found or the buildings and equipment sold for removal.

If the University does not find use for the facilities, they may be made available for use by Range vocational schools.

The facilities include an administration building, a crusher system, a 250-foot rotary kiln and related equipment.

Copper and Nickel Exploration

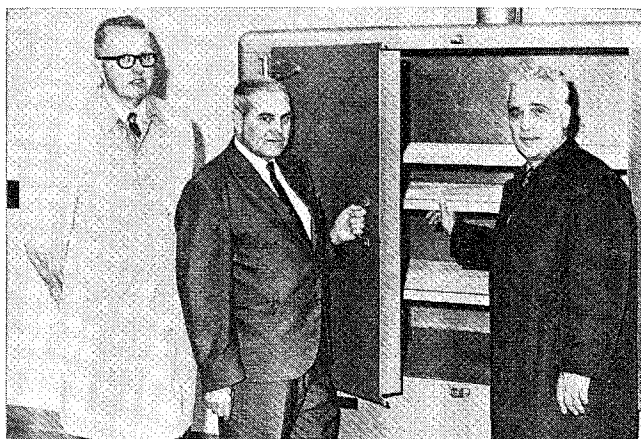
While a major copper-nickel boom in Minnesota is not yet in sight, many experts feel that it is only a matter of time before the copper-nickel age arrives in our state. Minnesota's deposits are marginal at today's prices and today's technology, but further exploration, technological developments, changing market conditions and favorable state policies will eventually result in Minnesota becoming an important producer of both metals.

Present explorations are at a record high on thousands of acres which have been leased by the state to mining interests. IRR&R has helped facilitate this leasing through its participation with the Minnesota Geological Survey in completing the geological map of our region.

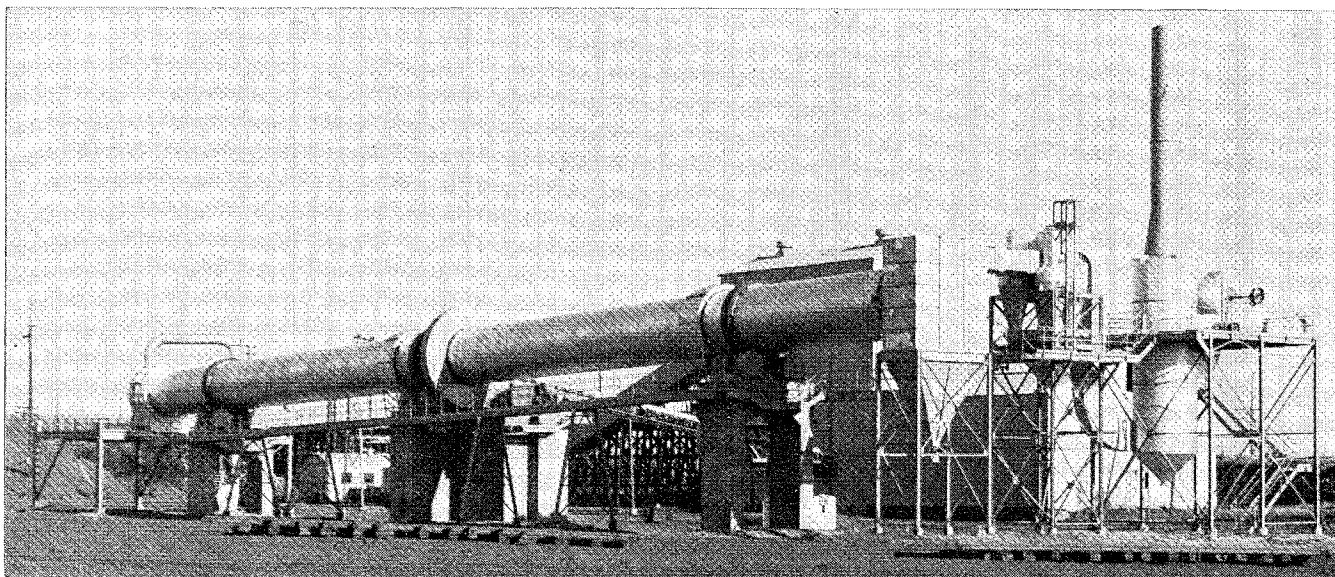
Approximately \$600,000 in rental fees and bid deposits will have accrued to the state as a result of existing mineral leases, by June 30, 1971. Although substantial, this amount is small when compared to the royalty income prospect if an operation is finally developed.

During the past biennium, IRR&R has funded a \$100,000 accelerated copper-nickel evaluation program involving studies of copper nickel deposits within the Duluth Gabbro in eastern St. Louis, Lake and Cook Counties, and copper, zinc, silver and gold deposits in greenstone belts in St. Louis, Itasca and Koochiching counties. Some 15 major companies are actively exploring in these regions.

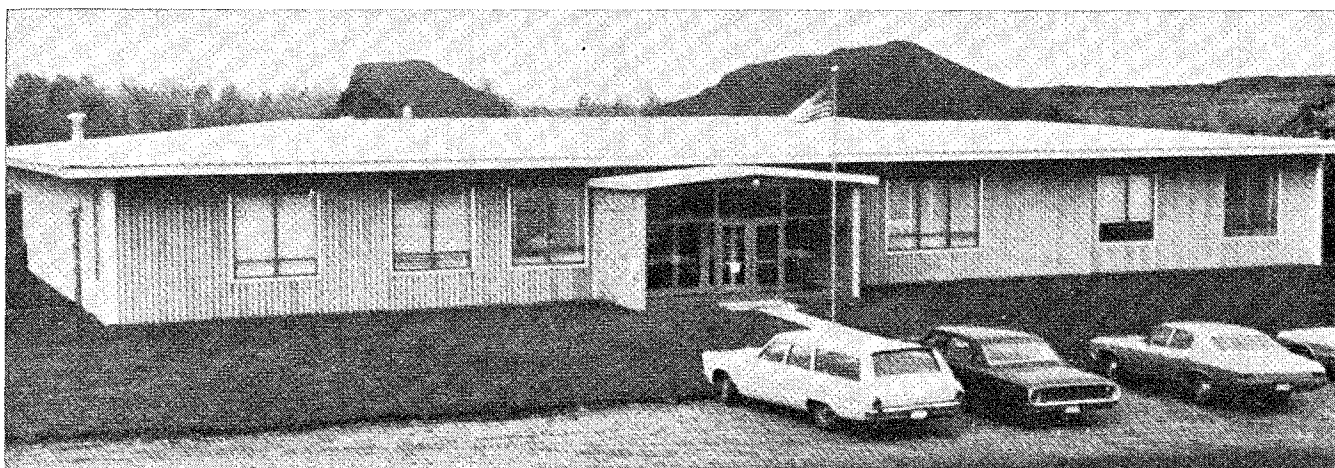
IRR&R-supported geological mapping provides the Conservation Department with the geological information needed to lease additional state-owned lands for exploration, and to classify state-owned lands as to mineral potential. Availability of geological maps stimulate exploration by industry, since these maps are basic to the search for mineral deposits and provide industry with target areas for exploration. As such, completion of the geological mapping of Northern Minnesota is considered an urgent need.



A laboratory oven at the Keewatin demonstration plant is investigated by Ronald Wiegel, University of Minnesota Mineral Resources Research Center; Warren Mahan, U.S. Bureau of Mines; and A. M. DeYoannes, Commissioner.



A 250-foot rotary kiln and office structure are part of the equipment available for lease, sale or educational use at the Keewatin facility.



DATA BY COUNTIES—1969

INCOME—1969	Aitkin ¹	Becker	Beltrami	Carlton	Cass	Clear-water	Crow Wing	Hubbard	Itasca	Koochi-ching	Lak	Mahno-men	Pine	St. Louis	Wadena	TOTAL
TIMBER INCOME.....	\$26,459	\$7,985	\$27,728	\$2,537	\$28,521	\$18,738	\$15,352	\$31,422	\$66,685	\$106,863	\$8,226	\$139	\$1,557	\$66,221	\$344	\$408,777
TOTAL INCOME.....	\$109,173	\$47,417	\$78,310	\$40,810	\$57,687	\$47,739	\$100,066	\$61,019	\$295,193	\$160,592	\$9,920	\$6,077	\$99,408	\$592,007	\$10,299	\$1,715,717
Tax-Forfeited Acreage.....	230,372	87,000	155,062	115,000	266,876	106,000	105,000	150,000	322,000	290,000	158,000	26,000	87,000	951,000	4,400	3,053,710
Park Commission.....	Yes	No	No	Yes	No	Yes	Yes	No	No	Yes	No	No	No	No	Yes	6-Yes 9-No
Acre in County Parks.....	11,665	366	2,950	0	6,500 ²	14	50	0	0	0	0	0	0	0	400	15,445
No. County Developed Public Accesses.....	3	16	1	2	0	12	8	4	64	13	0	0	0	5	2	130
No. County Developed Camp Sites.....	3	16	1	2	0	2	2	1	9	9	0	0	0	2	11	58
No. Trees Planted to Date ³	2,723,000	1,300,000	2,760,000	826,000	2,028,000	1,957,000	1,456,000	1,936,000	10,248,000	4,708,000	297,000	360,000	95,000	7,882,000	1,693,000	40,269,000
Acre in Memorial Forest.....	116,058	58,800	24,000	1,640	144,252	81,487	5,000	30,305	160,000	0	30,320	989	0	531,242	0	1,184,093
Timber Drain (Cords) ⁴	14,227	3,792	10,861	2,820	10,677	10,163	3,529	12,784	19,939	58,939	7,022	40	0	30,301	192	185,286
Average No. Active Timber Permits Carried.....	275	10	90	41	36	76	25	52	297	320	40	3	0	472	5	1,742
Miles of Access Roads Constructed to Date.....	49	5	0	0	30	25	0	0	58	15	6	0	0	12	0	194
Financial Aid ⁵																
ACP.....	\$14,770	\$10,220	\$17,716	0	\$10,000	\$8,410	\$3,158	\$15,000	0	\$9,371	0	\$8,398	0	\$19,941	\$22,500	\$139,484
Title IV.....	\$20,151	0	0	0	0	\$5,300	0	0	\$24,890	\$24,142	0	0	0	\$113,218	0	\$190,701
IRR&R Projects ⁶	\$5,974	\$1,025	0	0	0	0	0	0	\$230,805	\$36,894	\$4,000	0	0	\$299,318	0	\$578,016
No. County Employees in Land Department.....	4	1¼	3	0	4	2½	2	2	5	7	0	0	0	15	0	45¼
No. IRR&R Personnel Assigned to County.....	1	¼	1	0	1	¼	1	½	2	0	1	0	0	1	0	9

1—Operate Long Lake Conservation Center

2—Proposed

3—With IRR&R assistance.

4—All volume converted to cords.

5—Total received to July 1, 1970.

6—Summer Work Program, Section Corner Program, and Long Lake Camp.

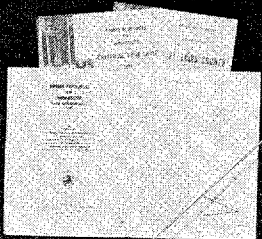
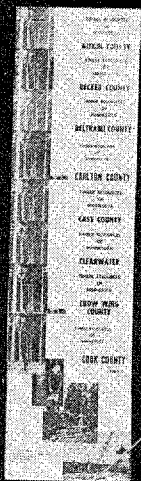
FOREST MANAGEMENT

IN COOPERATION WITH COUNTIES

TIMBER
RESOURCES
OF
MINNESOTA

3,173,000 ACRES
OF
TAX-FORFEITED
LANDS

PROPER
MANAGEMENT
FOR

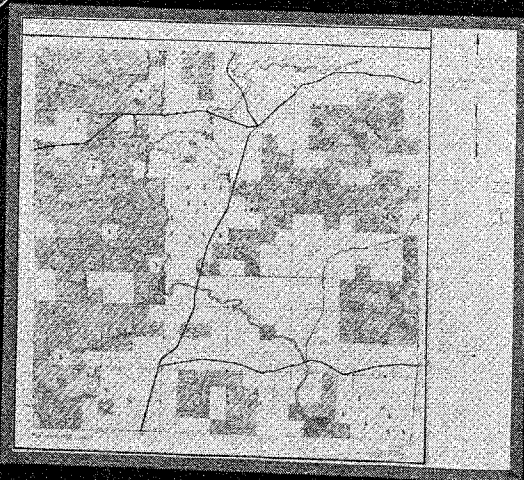


MOST RECENT DATA

RESURVEYS MADE EACH DECADE



TIMBER
INVENTORY



WILDLIFE



PURE AIR



MAN

ENVIRONMENT

ECOLOGY



TIMBER IMPROVEMENT



40,000,000
TREES PLANTED



WOOD UTILIZATION



GROWTH



MEASURING



CLEAN WATER



RECREATION



MAPPING



MARKING



FUTURE

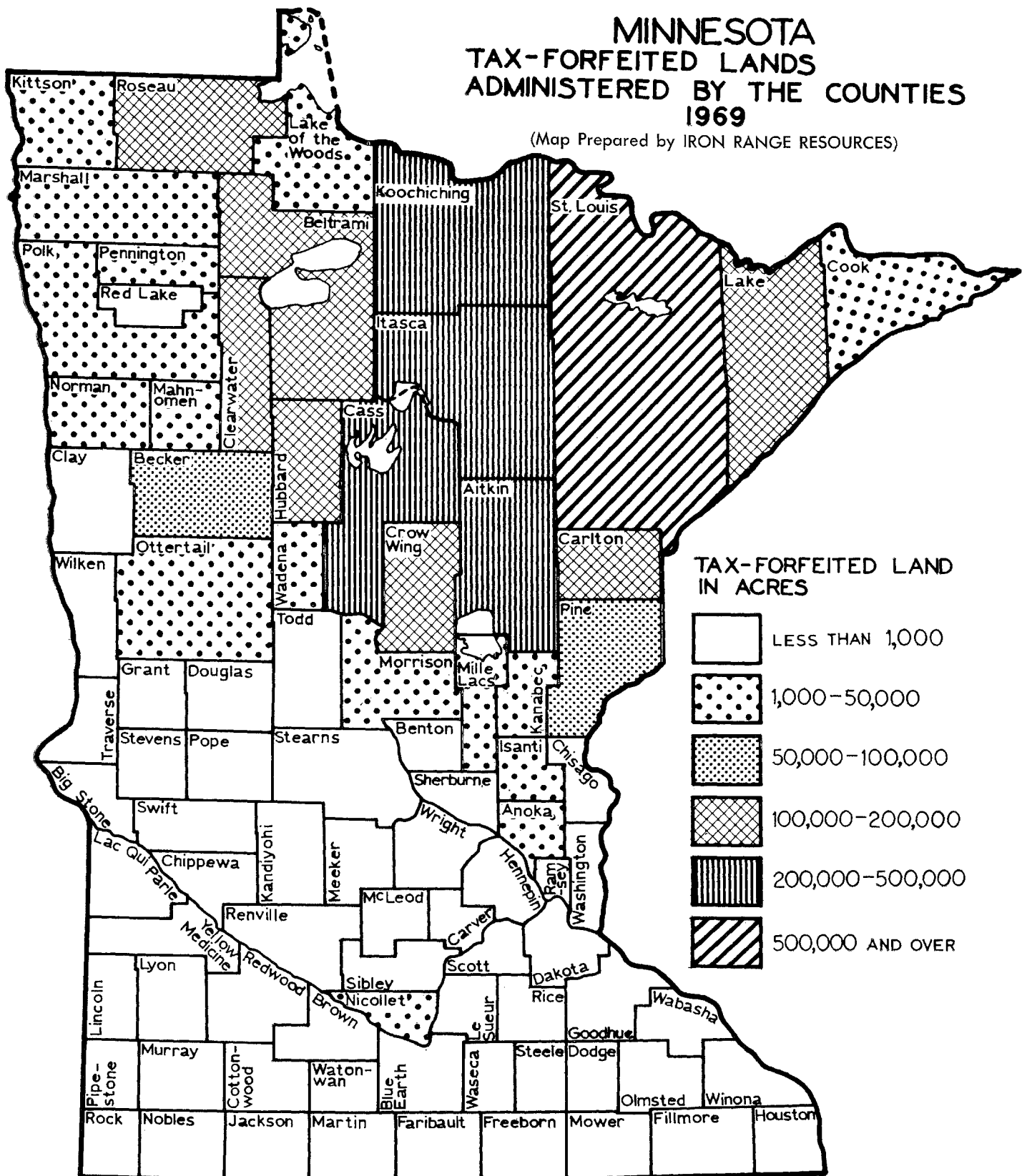


MARKETING
BULLETIN



MINNESOTA TAX-FORFEITED LANDS ADMINISTERED BY THE COUNTIES 1969

(Map Prepared by IRON RANGE RESOURCES)



FORESTRY

Environment

Proper management of our natural resources is vital if we are to continue to have the quality of life which we enjoy. Ignorance, poor management and misuse of our environment have forced us to a point where we must either learn to live in harmony with our environment or suffer the consequences.

The Forestry Division of the Department of Iron Range Resources and Rehabilitation has been working to improve the environment of Northern Minnesota for almost thirty years. This organization was created by the state legislature in 1941 for "the development of the natural resources of the State of Minnesota." Since that time IRR&R's Forestry Division has been actively engaged in promoting good forest management on millions of acres of tax-forfeited land in Northern Minnesota. Our forests are a renewable resource and by applying good forestry principles we can use our forests and yet always have them.

Since the beginning of the forfeitures laws in Minnesota (1935), over 9,000,000 acres of land have reverted to the taxing districts for the non-payment of taxes, to be held in trust by the State of Minnesota. This land is then administered by the county in which it lies. Most of these forfeitures occurred on either marginal farm lands or cutover lands in Northern Minnesota. The counties tried in many ways to reduce the forfeiture rate and to get this huge acreage of land back on the tax rolls but they had little success.

By the early 1940's the counties with the largest acreages of tax-forfeited lands realized that they were not accomplishing the desired results by their land policies. They decided to face the fact that they were in the land management business. At about this same time, IRR&R was established. Financial support from IRR&R enabled several counties to develop land departments. In addition to this, technical advisors paid by IRR&R worked with the counties, encouraging them to practice proper forest management. Through the years, the counties and IRR&R foresters have worked together developing sound management practices for this land.

In the early years, IRR&R's Forestry Division had as many as 17 forestry personnel assigned to 13 different counties. These men were supported or assisted by a staff of ten. They supervised and coordinated the county management unit, assisted in inventory and land sales work, in tree planting programs and on other special problems.

County Forestry Programs

Today our county assistance program has 9 forestry personnel assigned to 10 different counties: Aitkin, Becker, Beltrami, Cass, Clearwater, Crow Wing, Hubbard, Itasca, Lake and St. Louis. These men are on a 50 - 50 salary basis with the participating counties (half of the salary of each man being paid by IRR&R, the other half by the cooperating county or counties.) They are assisted and supervised by an IRR&R staff of 4 men who work out of our headquarters in Hibbing. These men also assist Koochiching and Wadena Counties on a regular basis as requested by the counties; this same assistance is available to other counties as the need arises.

In the past, the major part of our job was the sale of land the management and sale of timber. The importance of the work being done by IRR&R foresters and county land department personnel has increased through the years due to the increasing demands placed upon the land. Land and timber sales have increased; easements, leases, public access, campgrounds and parks have all become a part of the management of these lands.

These lands now have:

- 2,300 hunting cabin leases
- 500 lake shore leases
- 120 public accesses provided
- 60 campgrounds

The 3,100,000 acres of tax-forfeited land in Minnesota is open to free public use for hunting, fishing, snowmobiling, hiking, etc. Because of the added responsibilities, there is a need for more assistance to these counties.

The county land departments, the Conservation Department and IRR&R are presently working together in a land classification program on state and county lands, which will help to determine the best use of each description of land for the good of the most people. This program is, at the present time, about half complete.

For the year 1969, 62,000 acres of tax-forfeited land were sold. Our forestry staff assisted in the appraisal of 20,000 of these acres. In the spring of 1969, 1,609,000 trees were planted. Since 1948, a total of 40,000,000 trees have been planted by the counties in cooperation with IRR&R.

During 1969, 186,000 cords of wood valued at \$408,800 were harvested from tax-forfeited lands. This income is of considerable economic importance to Northern Minnesota. The net incomes from the departments are apportioned as follows:

10% — state; 20% — city, township and village; 30% — county; 40% — schools. Since 1940, these apportionments have amounted to \$17,000,000. A breakdown of this shows the state receiving \$1,500,000, the cities, townships and villages \$3,000,000, the county (county share includes county memorial forest funds) \$6,500,000, and the schools \$6,000,000.

Forest Inventory

In any business, you must know what you have and where it is before you can properly manage your business. For this reason, IRR&R has through the years placed a great deal of emphasis upon forest inventory.

During the last biennium, an inventory and management plan was completed for 3,500 acres of white pine area in St. Louis County. In addition to this, the Becker County inventory was completed (80,000 acres). This inventory has been mapped on a township basis (see map) showing timber types on county lands. These maps are in addition to the inventory cards which list the volumes of timber by individual description. The Vermilion inventory (76,000 acres) in St. Louis County which was completed in 1964 was also mapped in this same way.

We are at present in the beginning stages of the same type of inventory in Hubbard County (150,000 acres). This we hope to complete in a year or two. Several other counties have expressed their interest in new inventories or in updating old inventories using this same method.

Land Ownership Maps

The Forestry Division of IRR&R has the responsibility for determining the county (tax-forfeited and county fee), state and federal (national forest, Bureau of Indian Affairs) ownership that is shown in the maps published by IRR&R. This information is updated before each new map is published. (More information on these maps is available in another section of this report.)

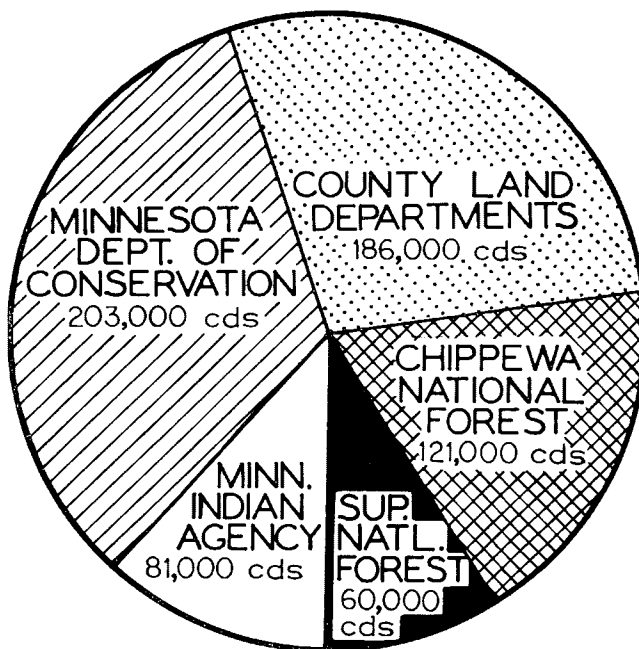
Marketing Report

Since 1958 the Forestry Division has published "Minnesota Forest Products Marketing and Pricing Review." This biennial bulletin gives the range of prices and the average price paid for stumpage, wood products and lumber. Producers, dealers and government agencies contribute the information used to prepare the report. The report is available for distribution to interested individuals.

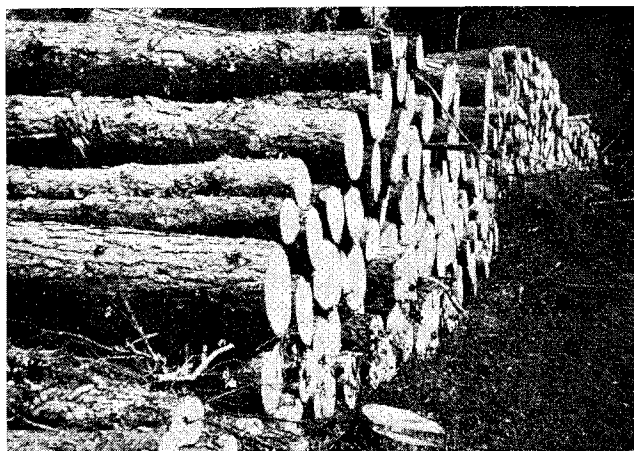
Forest Survey

Every 10 years a forest survey is conducted in Minnesota to determine the present supply of wood. In the last two surveys, IRR&R's Forestry Department has been a major cooperater with the North Central Forest Experiment Station, United States Department of Agriculture. The last survey was completed in 1963; the next will begin in 1973.

TIMBER HARVESTED FROM PUBLIC LANDS 1969



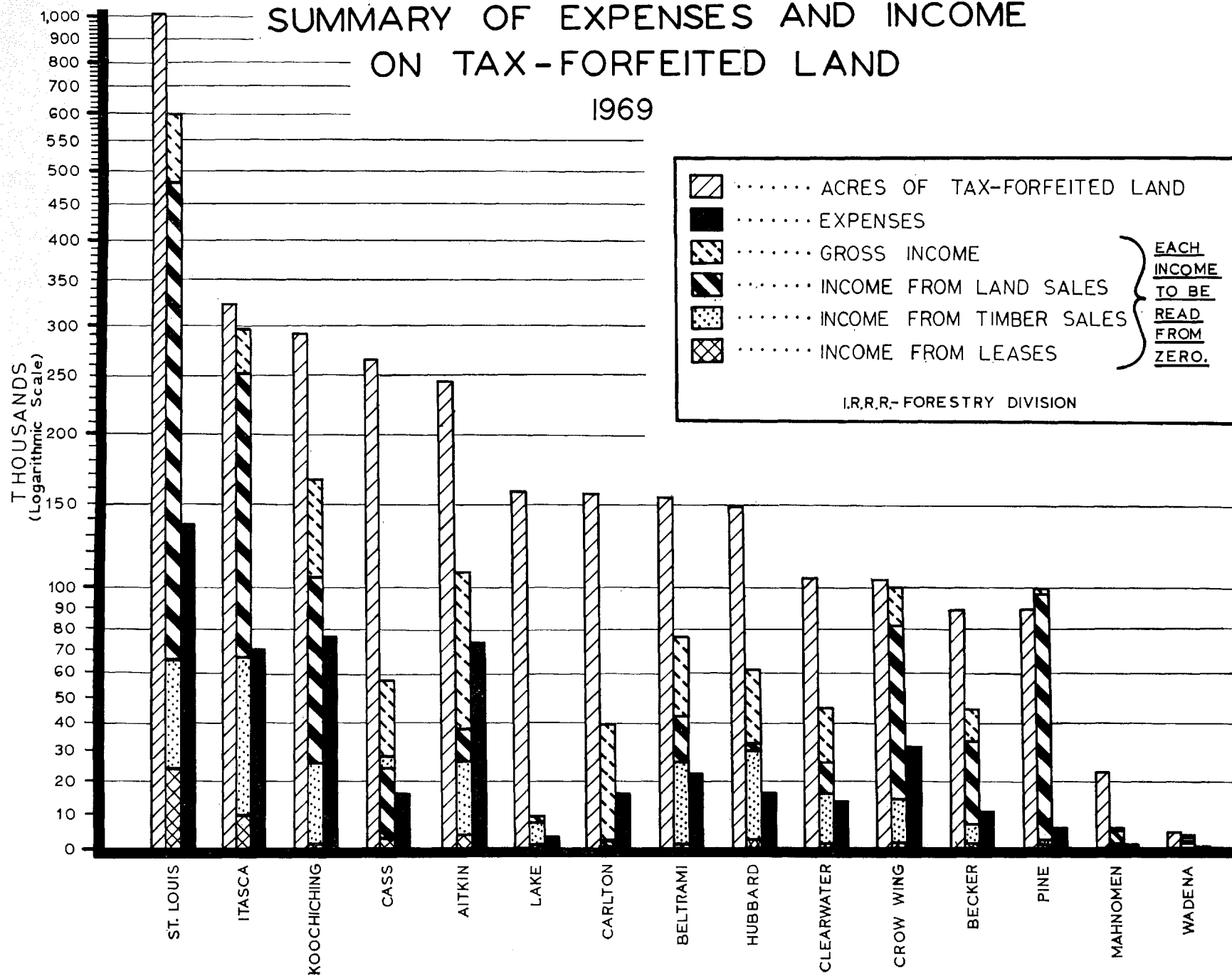
TOTAL: 651,000 cds



The estimated value of all forest products harvested in Minnesota in 1969 was \$360,000,000. This is the third largest industry in the State of Minnesota.

SUMMARY OF EXPENSES AND INCOME ON TAX-FORFEITED LAND

1969



Section Corner Post Relocation

IRR&R has been instrumental in a section corner post relocation program in Itasca, St. Louis, Koochiching, Cook, Lake, Aitkin, Becker, Crow Wing and Wadena counties.

This program is important to all land-holders, particularly when the sale or exchange of public land is involved in the relocation of industrial plants.

Section corner posts are equivalent to street signs in the cities. In Northeastern Minnesota many of the section corner posts were installed years ago in the depths of wilderness resulting in many inaccuracies.

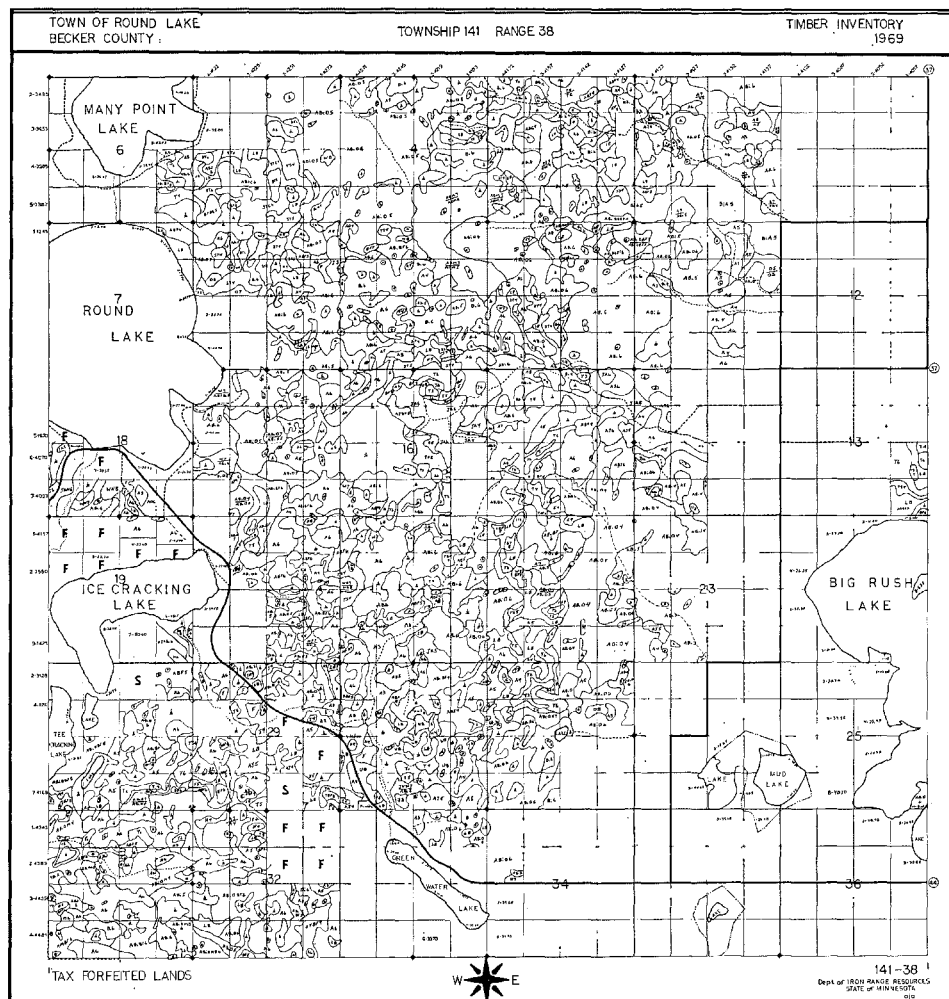
The object of the project is to correct, improve and update the posts with reliable and durable markers. Location and restoration of the markers, first placed between 1856 and 1903, will save the taxpayer millions of dollars in future survey costs.

Table of Appropriations by Counties, 1951-1971

Aitkin (1962-69)	\$ 8,689.39
Becker (1951-55)	956.92
Cook (1958-71)	14,179.07
Crow Wing (1951-56, 1970-71)	5,602.50
Itasca (1951-71)	258,227.33
Koochiching (1951-71)	42,512.80
Lake (1951-71)	9,800.76
St. Louis (1951-71)	279,317.95
Wadena (1953-62)	29.50
Total through 1971	\$619,316.22

Public Information

An additional service of IRR&R's Forestry Division is in the area of public education. Articles by staff foresters appear regularly in state Department of Conservation publications, familiarizing readers with the value of a healthy forest and ways to keep it that way.



Typical Timber Inventory Map.

PEAT RESEARCH

IN COOPERATION WITH U. OF M. SOILS DEPT.

FEDERALLY FUNDED PROJECTS

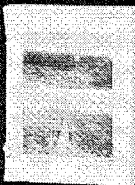
E.D.A. \$115,400



NATURAL BOG



PREPARED BOG



CONVERGING DITCHES



PEAT STOCKPILE

POLLUTION
F.W.P.C.A. \$208,506



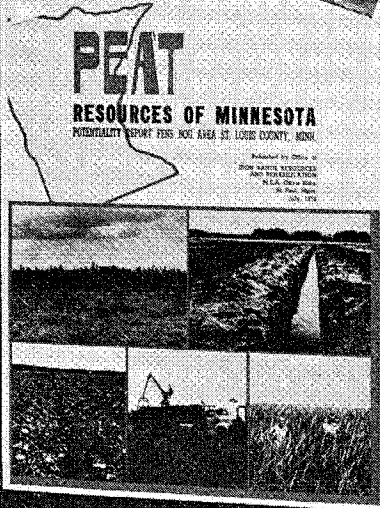
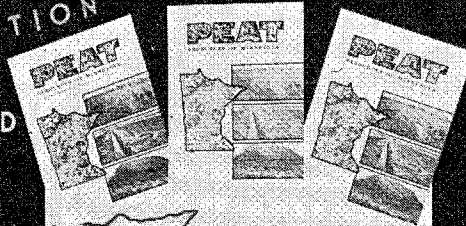
BOG USED FOR FILTRATION OF WASTE WATER



LABORATORY



FILTER BEDS



SURVEY EQUIPMENT

BASIC PEAT TYPES

SPHAGNUM

REED-SEDGE

DECOMPOSED

WILDERNESS VALLEY FARMS
AG. RESEARCH



WILD RICE



FARM



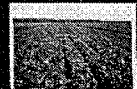
CELERY



POTATOES



WILD RICE



CELERY



HAY



PEAT HARVEST



CARROTS



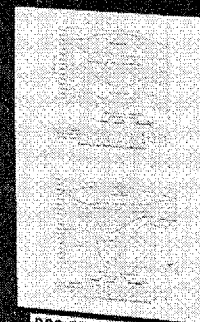
SOD



RADISHES

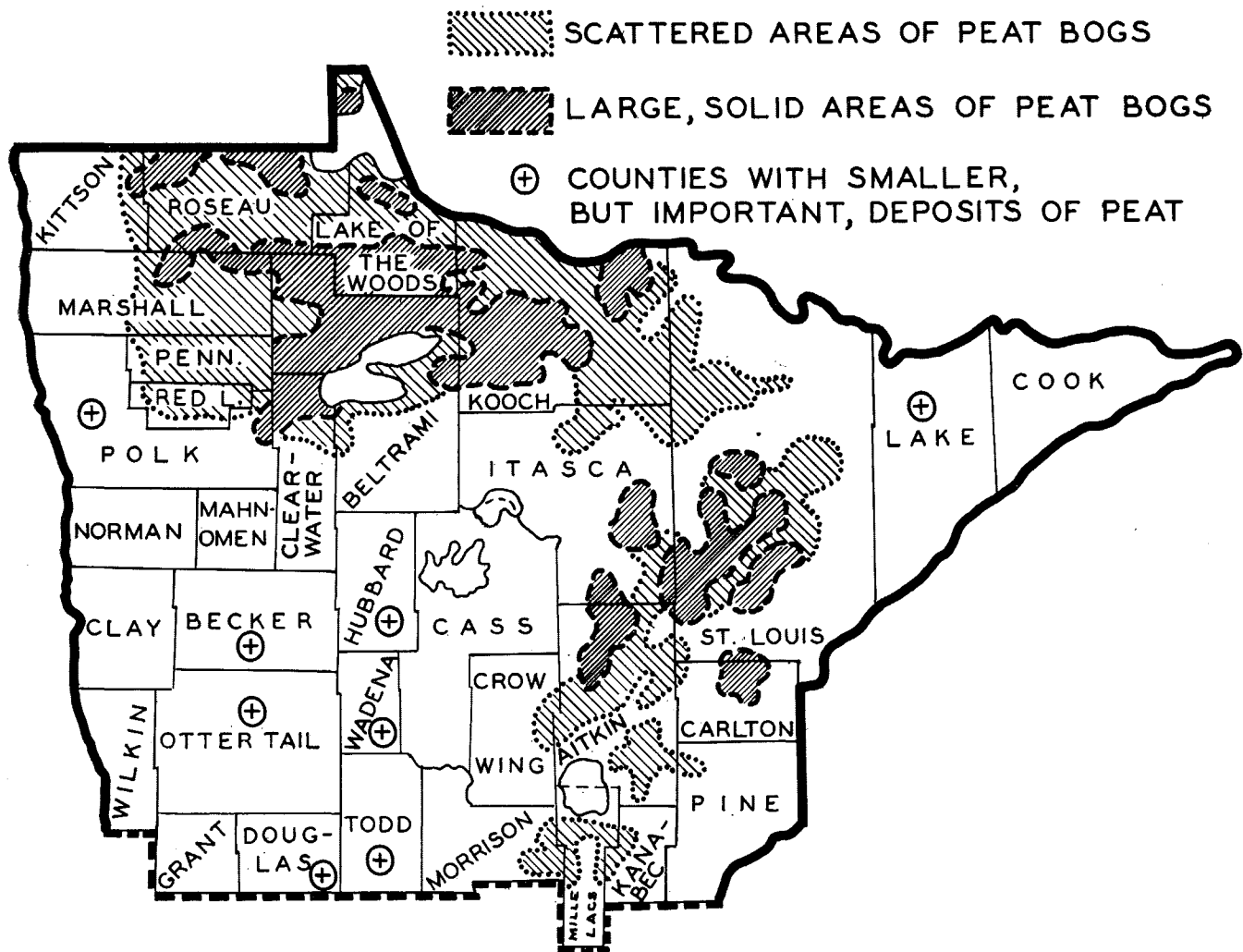


BEANS



BOG CROSS SECTIONS

LOCATION OF PEAT DEPOSITS IN NORTHERN MINNESOTA



PEAT

Minnesota has 50 percent of the nation's known peat supply yet only 3 percent of the market. Obviously, peat has a long way to go, but could become a major money and job producer for our state.

There are nearly 7 million tons of peat reserves in Minnesota available for commercial development. Still, only five Minnesota companies have ventured into peat production. (Michigan, with only 1 million tons, supplies 38 percent of the national market.)

Aitkin, Beltrami, Koochiching and St. Louis counties each have more than a million acres of peat. There are 7.5 million acres overall in the state. Fens Bog in St. Louis County alone has a production potential of 750 million bags.

Of several varieties of peat found in the United States, only two types, sphagnum moss and reed-sedge peat, are commonly harvested. At the present time most of the marketed peat is of the reed-sedge type. Most Minnesota peat is of the sphagnum moss type; Minnesota contains nearly all of the sphagnum moss peat reserves in the U.S. IRR&R research indicates that sphagnum moss peat contains important qualities of coverage and compressibility, and is economical to transport. Its use is expected to increase.

A study conducted by IRR&R in 1968 and available under the title "Feasibility of Reducing Production and Distribution Costs of Minnesota Peat to a Competitive Level," documents how Minnesota can easily increase its peat marketing by 7 to 9 times. Peat could become a \$1.5 million a year industry and still not scratch the surface.

Our report shows that Minnesota could compete favorably in the peat market in 19 states, selling 176,000 tons a year within two years of a concerted program. A ton of peat is worth more than a ton of crude taconite and does not require such costly processing before it is marketable.

Considerable site preparation is necessary before peat harvesting can begin, however. A harvesting area of 120 acres can require as much as half a million dollars to develop. This and the fact that only 100 days per year are suitable for harvesting peat in Northern Minnesota, is the principal reason why peat production in Minnesota has lagged behind that in other states.

The key to further peat development in Minnesota lies with private investment. The industry's success will depend on a coordinated strategy involving production, marketing, research, adver-

tising and promotion. Demand for peat is increasing steadily. Peat is primarily used for horticultural and agricultural purposes, but is also used increasingly as a sod for golf courses and landscaping.

Continuing peat research will lead to a growing economic importance for this product. Knowing this, IRR&R has carried out a number of peat research projects in cooperation with such agencies as the Federal Water Pollution Control Administration and the Department of Soil Science of the University of Minnesota.

Waste Stabilization Study

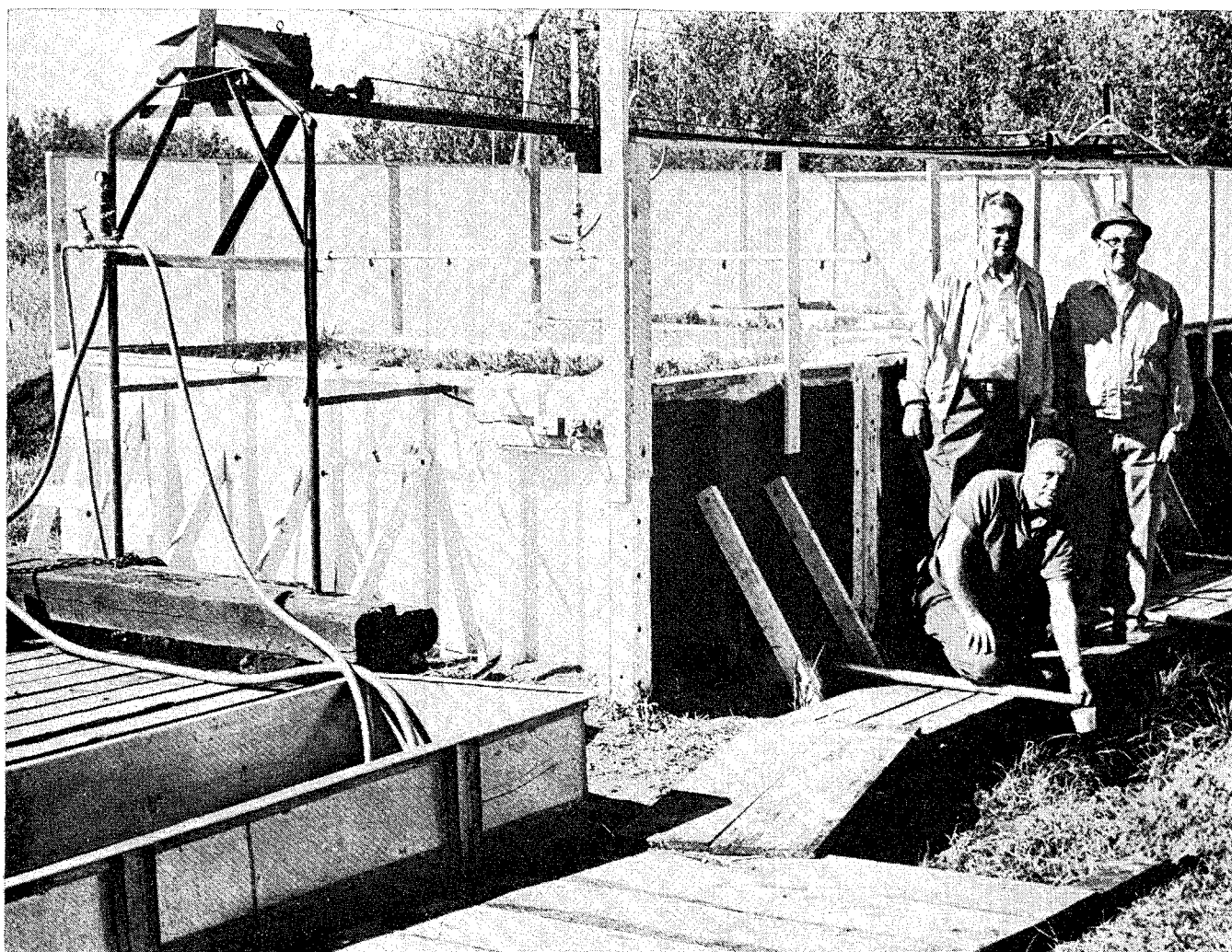
This study was undertaken in 1967, 1968, 1969 and 1970 to determine the role Minnesota peat might play in combating water pollution. The study was funded by the Federal Water Pollution Control Agency with total grants of \$202,365.

The first two years of study were undertaken at our Wilderness Valley Farms research center at Zim, and at the St. Paul laboratories of the University of Minnesota Department of Soil Science. Ruble & Kaple of Duluth participated in this research. The third year of research was carried out at the City of Virginia sewage treatment facility, under the direction of Dr. R. S. Farnham of the University's Department of Soil Science. Of the most recent research, Dr. Farnham writes:

"A research grant entitled 'Treatment of Wastes Using Peat and Peat in Combination with Soil' was approved by the Federal Water Quality Administration, U.S. Department of Interior and began July 1, 1969. Lysimeter plots using peat over sand in several combinations were constructed at the Virginia, Minnesota Sewage Disposal Plant and additional basic studies were initiated both at Wilderness Valley Farms and the laboratories of the Soil Science Department, University of Minnesota, St. Paul.

"The objectives of this research were to reduce the organic content (B.O.D.) and phosphate levels in waste water using peat and peat-sand mixtures. Generally, the research objectives have been to maximize the filtering capability of peat media using municipal sewage.

"Experiments with various peat types and sand substrates have shown that this type of system works well under carefully controlled conditions using automatic overhead sprinklers. Evaluations are being made so that research findings on these laboratory and lysimeter plots may be applied to a larger scale city disposal system of several acres.



A project to study the efficiency of peat as a waste stabilizer used this lysimeter installed at the City of Virginia's sewage distreatment facility. Standing are Dr. R. S. Farnham, project director, and Mayor J. Edward Pearsall of Virginia. Kneeling is Harold Bergquist, IRR&R mineral researcher.

"Experiments are continuing on reactivation of the filtering media so it can be used time and again for organic and phosphate removal. An annual progress report was submitted to the F.W.P.C.A. in January, 1970 and the final report is due July 1, 1971.

"Mineral Research personnel of the IRR&R Hibbing office under the direction of Donald N. Grubich have been assigned to this project since July 1, 1969 and personnel and equipment of the Soil Science Department, University of Minnesota have been used."

The present grant and experiments are continuing with favorable results and will be run seven days a week until March 31, 1971.

Interested parties in State and local governments have been shown and explained the principles of the experiments. Interest was indicated

by Canadian peat producers and they have been conducted on a tour of the facilities and provided information. As this would be an asset to their market, they indicate possible work in Canada. Numerous charts, graphs and drawings have been prepared for the reports by IRR&R personnel.

Peat Bog Inventory Program

In this cooperative effort between IRR&R and the Department of Soil Science, information is gathered each year for analysis and classification.

The IRR&R peat bog inventory was continued during the past biennium but on a reduced scale because of department personnel being involved in federal projects.

The inventories and supplementary peat research projects have been made cooperatively with the Soil Science Department, University of Minne-

sota. The program has continued completely on University funds as they have not received any IRR&R funding in the past two years.

The main objectives of these inventories has been to locate peat bogs containing commercial-type peat of sufficient size and quality for a prospective development of the peat industry; to survey and sample selected bogs with some potential and analyze and classify the samples. The latter objectives aid in evaluating the peat at each sampling site as to its suitability for commercial development.

Our inventories have proven essential in identifying commercially valuable peat lands involved in land sales and exchanges. Minnesota state law protects commercial peat land, prohibiting its sale. (Leasing for development, of course, is permitted.) IRR&R's published inventories are distributed to state and federal agencies, county officials, and interested parties in private industry.

The four reports published to date include:

Inventory Number One—West Central Lakes Bog, St. Louis County, Minnesota.

Inventory Number Two—Cook Bog, St. Louis County, Minnesota.

Inventory Number Three—Red Lake Bog, Beltrami County, Minnesota.

Inventory Number Four—Fens Bog Area, St. Louis County, Minnesota.

These reports include survey maps, ownership maps and site location maps, as well as complete analytical data on the collected samples. In addition, they include a discussion of the quality of the peat in each bog and diagrams showing several cross sections of the peat deposits. Reports such as these are very helpful to companies desirous of developing a commercial peat operation.

Preliminary Reports

Preliminary reports of several bogs sampled and analyzed over the past two years have been prepared and distributed to the state and governmental agencies in need of this information. Many of these will be prepared for eventual publication so as to have sufficient information when needed on selected Northern Minnesota bogs with the greatest potential for development by industry. In Canada and in Europe, it has been shown that before commercial operation becomes a reality, a systematic survey, sampling and research program conducted by a governmental agency must be made prior to capital outlay by the interested developer. Peat production is a risky business unless the potential producer obtains sufficient reserves of high quality peat suitable for large-scale, economical production methods. Northern Minnesota has extensive peat reserves meeting these qualifications but until recently the detailed information on location, size and character of the peat deposits has not been known. A continuing survey program such as this should provide the potential developers with the information needed for commercial production of horticultural-type peat and help assure the success and growth of the peat industry in the State.

Surveys and Analyses

A survey of the very large Toivola Bog was started during the biennium. Due to heavy snow cover during the winter, operations were discontinued and the equipment overhauled. Shortly after the sampling was resumed, the crew was assigned to another project. Since July, 1969, the sampling crew and office personnel from Hibbing have been assigned to the cooperative peat project with the Federal Water Pollution Control Administration as the State's in-kind contribution to this pollution research. Completion of the survey of the Toivola Bog is planned for the winter of 1970-71.

Location, number of samples and acreage of bogs surveyed:

Location of Samples	No. Samples	Acreage
Toivola Bog—St. Louis County (Incomp.)	582	5,500

Analysis of samples at the University of Minnesota, Soil Science Department:

Location	No. Samples
Arlberg Bog —St. Louis County	124
Toivola Bob — St. Louis County	582
Total	706

Other Activities

Third International Peat Congress. The Mineral Research Supervisor attended the Third International Peat Congress in Quebec City, Canada in August, 1968. Technical papers were presented by delegates from throughout the world, including papers by Drs. R. S. Farnham and H. R. Finney of the University of Minnesota. Many present methods, new ideas and research results were presented which provided a wealth of information for the Department. The importance of this Congress was indicated by the presence of delegates from almost all U. S. states, Canadian and European, as well as representatives of other major peat countries of the world including the U.S.S.R. The technical sessions of the Congress were followed by tours of peat-producing plants in Quebec and New Brunswick. These tours provided first-hand information on peat production methods, problems and work being done to increase production. Invitations were extended to the Department to visit many of the other peat operations in the United States and Canada.

Commissioner A. M. DeYoannes also attended the Congress.

In communications with officials of the Province of New Brunswick, it was learned that they are undertaking an inventory program of their peat areas. Due to their vast roadless areas, it is on a smaller scale than the IRR&R program. Copies of IRR&R inventory reports were sent to them for possible ideas in their work.

A.S.T.M. and I.P.S. The Mineral Research Supervisor became a member of the American Society for Testing Materials, Committee D-29, in June, 1970, attending its meeting in New York and also the organizational meeting of the United States National Committee of the International Peat Society, of which he is a charter member. These committees are for the promotion and development of peat and research in the North American continent and the world.

Western Peat, Vancouver, British Columbia. In July, 1969, the Mineral Research Supervisor visited, at his own expense, the Western Peat Moss, Ltd. operations near Vancouver, B.C. They are located on a very large bog and have various types of operations on different areas. The methods used included hydro harvesting, mechanical harvesting using vacuum harvesters and a sod peat operation. All phases of the various operations were seen, which provided a wealth of information for the department.

Hyper Humus Company, New Jersey. Dr. R. S. Farnham and the Mineral Research Supervisor visited the peat operations of the Hyper Humus

Company in Newton, New Jersey in June, 1970, examining the operations of this company and observing and collecting representative peat samples in the bog. Suggestions for improving this operation were made.

Inquiries on Peat and Peat Bogs. Many inquiries are received from peat producers, prospective producers, organizations and individuals interested in peat and its uses. Reports, information and personal visits are furnished to accommodate all inquiries.

The Mineral Development Engineer of the Burlington Northern Railroad was furnished reports, maps and information on the peat and peat bogs in the state. Two trips were made into numerous bogs to acquaint him with the bogs and types of peat available.

Two peat producers in the area were given advice and assistance in operation procedures and harvesting methods. Information regarding their peat, plus analyses, were provided.

Aid was also provided to an individual interested in entering peat production in Minnesota. Reports, data, harvesting information and assistance in selecting sites were provided. A peat lease has been applied for but has not been acted on.

Conservation Department and Land Department. Assistance was provided to the Lands and Forestry Division and the St. Louis County Land Department in determining areas of commercial peat on tax-forfeited lands up for sale. Information was also provided on peat areas for wild rice development.

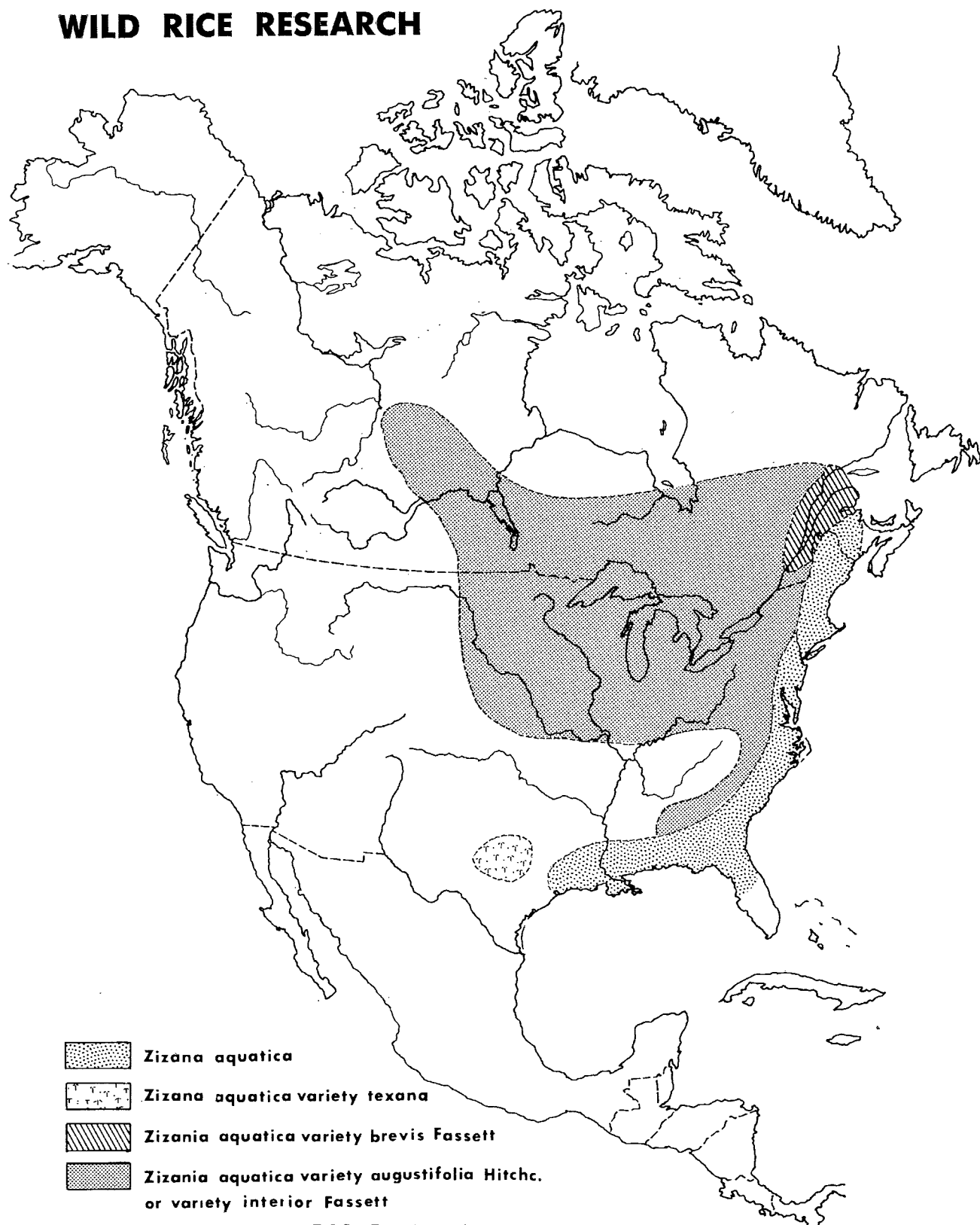
Additional Needs

More peat research is needed before the full commercial potential of Minnesota's peat resources can be realized. This research can only be implemented by a greater interest in peat by our state's private investors.

On the harvesting and processing end, new equipment and technology need to be developed. Such as:

- Techniques and machines for field drying.
- Machinery that can harvest a high quality, rot-free product.
- Elimination of heating problems in the storage of raw peat.
- A new products laboratory that could develop formulas for special soils, peat growing containers, aggregated peat, mulches, "enriched" fertilizer peat and other commercially valuable innovations.

WILD RICE RESEARCH



DISTRIBUTION OF WILD RICE IN NORTH AMERICA *

*Adapted from U.S.Department of Agriculture, Technical Bulletin 634.

WILD RICE

Minnesota produces 60 percent of the wild rice crop in North America. (Canada produces 35 percent and Wisconsin 5 percent.)

The state has thousands of acres of natural wild rice beds and thousands more acres of adjacent lands suitable for wild rice production. Yet, the present supply has never been adequate to permit the kind of advertising and promotion needed for economic growth and expansion.

Even so, wild rice has great economic potential for the state. As the one natural resource that is uniquely the property of the Minnesota Indian, it is particularly important that this crop be encouraged and made profitable.

Research, technological improvements and adjustment in production, marketing and processing techniques could make ricing a stable industry for the Indians and a good source of supply for the consumer.

Indian rice paddies need:

1. Stand control (thinning and supplementary seeding).
2. Weed control.
3. Bird and insect controls.
4. Discovery of the nutritive needs of wild rice.
5. Improved harvesting techniques and machinery.
6. Development of shatter resistant strains.
7. Water management controls such as dams and levees.
8. Improved marketing and processing techniques.

Surveys should be undertaken to determine what beds can be added to Indian lands and which can be developed for public use or private leasing. Costs for development of public ricing lands could be borne by fees paid by harvesters and processors.

Studies should also determine:

- Why rice areas once productive are now unproductive.
- What water bodies could support wild rice crops.
- Which county and state owned lands could be converted to rice lakes.

Minnesota must develop rice corporations that will pay not only harvest wages but will hire year-round help. Until the Indians are allowed to share in a major portion of the crop's value, ricing time for the Indians will continue to provide only an annual spending spree rather than full time support.

Wild Rice Research and Development

The IRR&R is involved in a number of wild rice research projects. These include:

Nett Lake — In April, 1969, the Upper Great Lakes Regional Commission granted IRR&R \$112,240 in federal funds for a two-year program to produce paddy-grown wild rice on the Nett Lake Reservation in St. Louis County.

The Mineral Research crew located the area from the closest section corner (approximately 1½ miles) and set in iron pins for use in future surveys. Two complete topographic surveys were made; the first before paddy construction was started and the second after one year of operation and more work was needed. The paddies were then staked out for final construction work and technical assistance was provided as needed.



Ira Isham right, director of the Nett Lake wild rice paddy project examines rice in a drained paddy with Dan Morrison, secretary-treasurer of the Nett Lake business committee, and Frank Villebrun, paddy project manager.

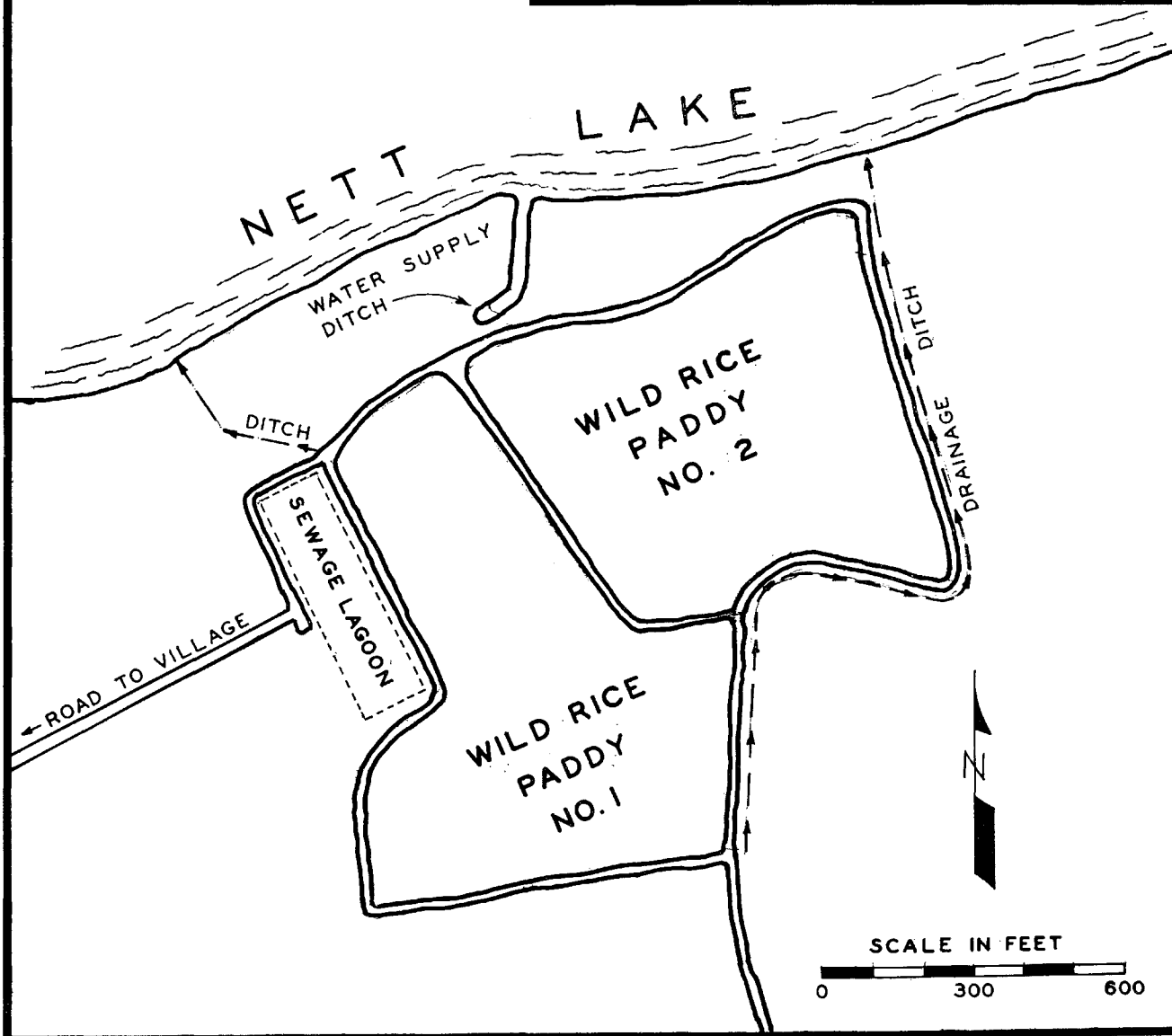
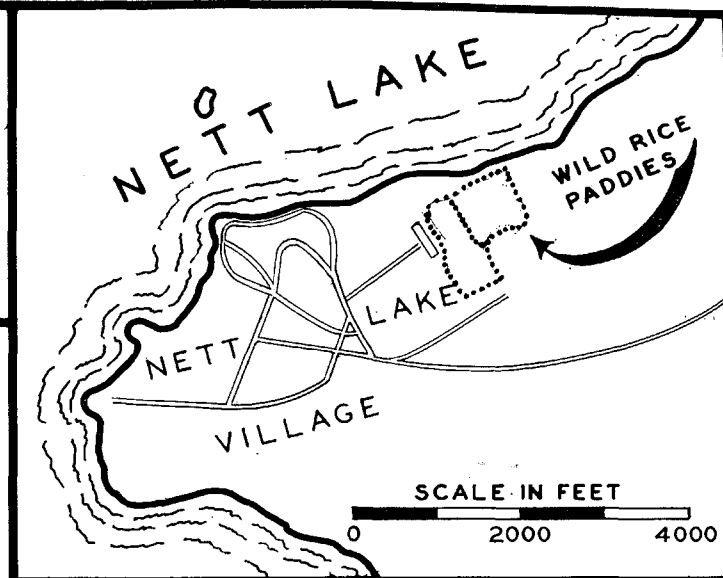


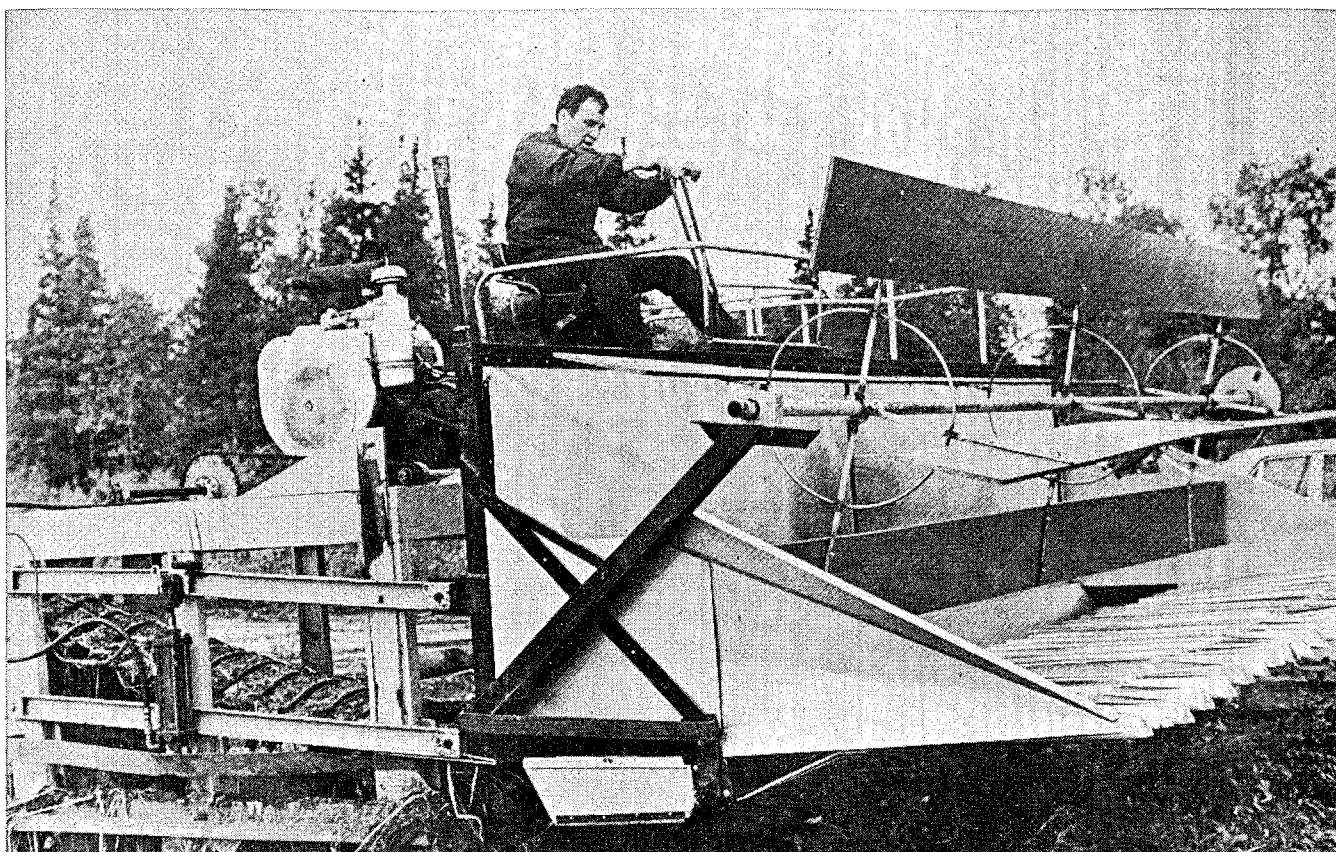
NETT LAKE WILD RICE
PADDY DEVELOPMENT
PROJECT

GRANTEE - DEPT. OF I. R. R. & R.

GRANTOR - U. G. L. R. C.

7-1-69 TO 11-1-70





Nett Lake rice paddy project manager Frank Villebrun drives a wild rice harvester designed to mechanically harvest the rice in drained rice paddies.

Forty acres of paddies are planned in the two year study; of these, 20 were readied for planting in June, 1970. About 50 pounds of rice was planted per acre, from which a total yield of only 400 pounds was achieved. The project is designed to show that unproductive lands can be brought to a high level of production under controlled conditions in an engineered paddy area.

In spring, 1971, the paddy acreage will be increased to 40 and made more level to facilitate mechanical harvesting. Much greater per-acre yield is anticipated from the 1971 crop.

A key to the commercial value of the Nett Lake study will be the degree of effectiveness of mechanical harvesting. A harvester made by Fureseth & Nelson, Inc., of Thief River Falls, was tried out in 1970 with good results, even though all of the paddies were not perfectly level. This machine moves through a stand of rice in a drained paddy while a paddle wheel knocks off only the ripe grains, leaving the stalks unbroken and free to pass under the harvester as it moves on.

State law prevents mechanical harvesting of wild rice grown naturally on lakes in Indian Res-

ervations; this would be impractical in any event. But the use of machines is not prohibited on man-made paddies and bogs. Experiments indicate that mechanical harvesting can collect up to 400 pounds of rice per acre, as opposed to only 100 pounds by traditional methods.

Because of the high interest on the part of major food processors to market wild rice products for the home and institutional food markets, Minnesota's ability to produce a consistent crop, without wide fluctuations in price, can be extremely significant. Such development on our reservations will also forestall the development of rice paddies by these processors themselves, keeping rice harvesting in the hands of our native Indians.

The capriciousness of our wild rice crop is largely due to our inability to control water levels in the natural rice fields. On paddies where the water level can be raised or lowered at will, a more dependable crop results. The ability to drain these paddies also facilitates mechanical harvesting. This takes much of the risk out of the marketing of wild rice on a national basis.

Upper Rice Lake — In 1967, IRR&R appropriated \$49,000.00 to the Minnesota Conservation Department for a dam and water channel project at Upper Rice Lake in Clearwater County. The project involved a formerly good wild rice lake which, because of adverse water conditions, had lost its wild rice productivity. Purpose of the project was to create water conditions to revive the lake's wild rice potential. In addition to restoring wild rice, the project was expected to produce benefits to waterfowl production and hunting and the possibility of a site for rearing and winter rescue of northern pike for stocking purposes.

Upper Rice Lake is a shallow, circular lake with a meandered area of 1,700 acres in Clearwater County (T. 145, R. 36-37). It is located about 10 miles southeast of Bagley. During the drought of the 1930s and early 1940s, this lake contained a fine stand of wild rice and at this time looked much like a grain field. It was estimated in 1940 that the lake contained 800 acres of wild rice and in 1941, when water levels were higher, 500 acres.

In recent years, however, the water level of the lake has been too high for substantial wild rice production and in 1966 there were only about 50 acres, most of which were along the northeastern shore. Wild rice, which is a self-seeding annual grain, grows best in water 1 to 4 feet deep, although it will grow on moist soil and sometimes grows as scattered plants in water deeper than 4 feet.

Results of the project were reported to the IRR&R in 1970. John B. Moyle, technical assistant to the director of the Game and Fish Division of the Conservation Department, reported that in 1969, the first growing season after the dam was in operation, 120 acres of rice came up from seed dormant in the bottom mud. In 1970 there were at least 640 acres, partly encouraged by aerial seeding done by the Division of Game and Fish in the fall of 1969. The department expected this stand to expand somewhat more and said it would be open to wild rice harvesting in fall, 1970. This is especially significant since, before the installa-

tion of this dam, the lake had no crop of wild rice for approximately 20 years.

Roger Lehmann, Game Manager at Bemidji, stated in a report on the Upper Rice Lake Project that between 3,500 and 4,000 wild ducks were spotted at the lake in the rice areas in the summer of 1970: "Most of the lake is now covered by emergent vegetation and there should be some excellent hunting this season." These observations were made on a reconnaissance tour on Upper Rice Lake by canoe for the purpose of viewing this year's rice crop and the wild duck population.

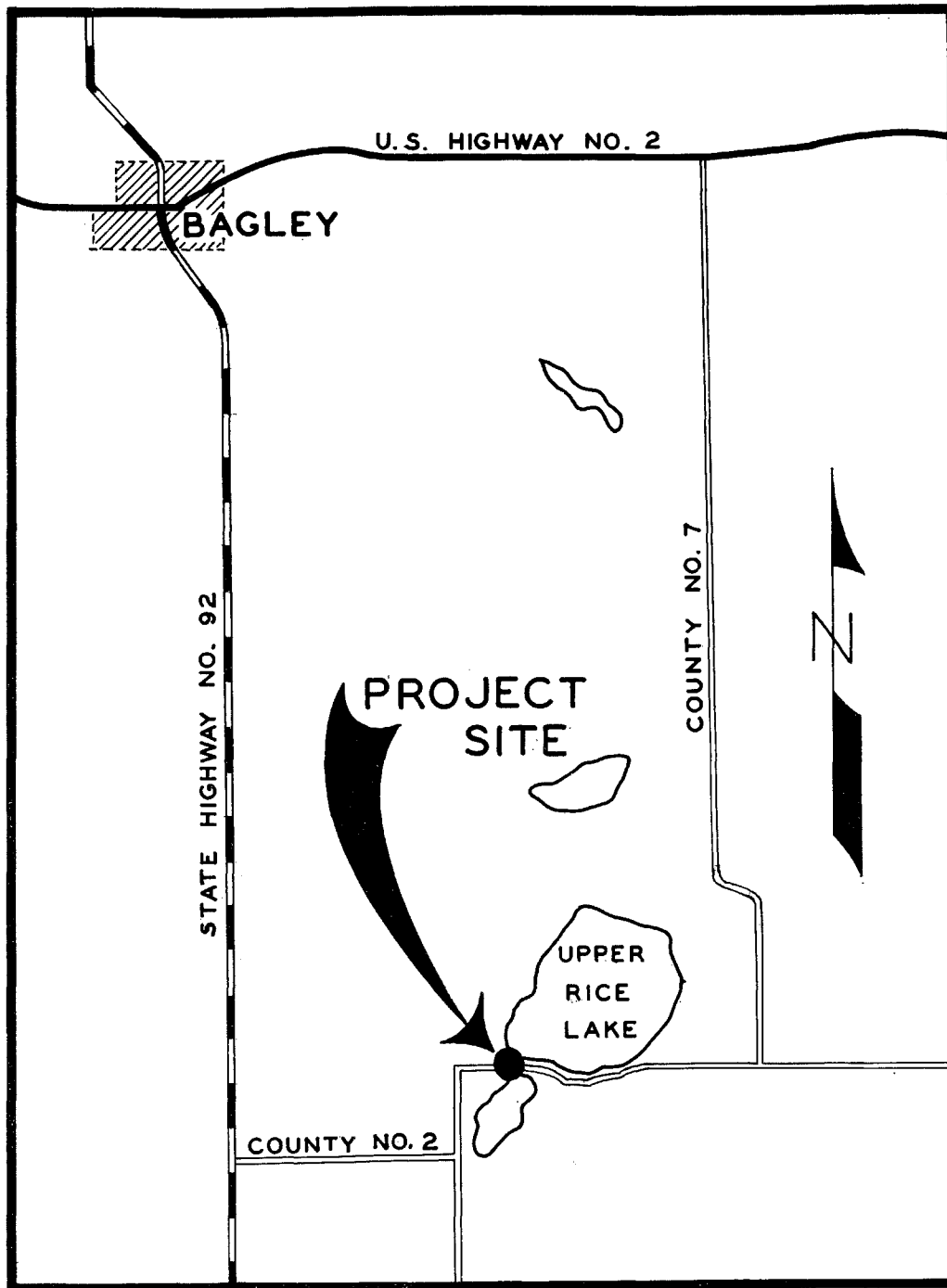
This report is very significant in that it indicates the importance of restoring wild rice in areas that at one time were abundant and productive but for some reason have been allowed to gradually disappear. The State's immediate wild rice problem is in restoring the many thousands of acres that have been lost to production but can be revived in projects similar to the Upper Rice Lake program recently completed by the Conservation Department with IRR&R funds.

Aase Farms — The IRR&R-sponsored research program on the breeding and growing of non-shattering wild rice continues at the Aase Evergreen farm near Gilbert. The program is directed by H. T. Aase, a retired county agent, and Dr. Paul Vagyu, formerly of the University of Minnesota. The goal is a 100-percent non-shedding line with no commercially adverse characteristics. Its development could be a positive factor in Minnesota wild rice production in coming years.

Wilderness Farms — IRR&R also owns the Wilderness Farms at Zim, donated in 1964 by Chun King Corp. This complex includes peat bogs, wild rice fields and cultured sod harvesting areas. The farm also boasts an excellent wild rice research library, and its cross-dyked paddies, research plots and buildings will fit into future IRR&R wild rice research and management programs. Present research conducted at Wilderness Farms involves the growing of wild rice on peat soil.

WILD RICE PROJECT

CLEARWATER COUNTY



Harvester and Dealer Licenses and Supply of Green Rice in Minnesota, 1939 to 1969

Year	Harvester Licenses		Dealer Licenses		Number Pounds Wild Rice Harvested
	No. Sold	Amount (\$)	No. Sold	Amount (\$)	
1939	2,514	1,257	55	275	
1940	2,389	1,195	52	260	1,586,000
1941	652	326	25	125	20,000
1942	1,071	535			337,000
1943	292	146			34,000
1944	734	367			400,000
1945	1,461	1,461			240,000
1946	2,222	2,222			400,000
1947	1,666	1,666		2,750	540,175
1948	1,834	1,834		2,650	1,038,355
1949	888	888		2,550	683,508
1950	1,383	1,383		3,150	552,775
1951	2,299	2,299		3,175	532,308
1952	2,274	2,274	114	2,725	445,875
1953	2,384	2,381		2,395	1,340,297
1954	4,487	4,485	182	4,715	3,109,858
1955	4,996	4,693	211	5,175	1,235,103
1956	6,842	6,456	274	6,880	3,941,669
1957	7,500	5,752	218	7,350	1,036,749
1958	9,702	9,198	333	8,315	3,224,100
1959	9,322	26,439	256	11,975	2,067,018
1960	10,486	29,671	285	11,150	2,300,685
1961	14,183	39,890	284	11,620	2,771,585
1962	9,832	27,849	210	8,135	1,324,346
1963	11,874	33,403	259	11,030	3,215,674
1964	9,192	25,742	241	9,850	1,285,082
1965	9,855	27,472	251	7,950	1,086,710
1966	8,947	24,959	200	6,215	924,000
1967	15,700	42,390	356	10,535	2,628,700
1968	16,455	44,869	258	9,645	1,194,671
1969	11,184	40,267	149	11,955	980,851

Source: Department of Conservation, State of Minnesota.

OTHER SERVICES

Land Ownership Maps

IRR&R's land ownership maps show state, county, federal and private land holdings. Demand for the maps, which are printed in color, is heavy and some maps are in their third printing.

The accompanying map shows the current status of the map program. The table shows the counties covered and the number of times each map has been reprinted.

Because of the small amount of public owner-

ship in the other counties in the state, no new counties were covered during the past biennium. The original 21 counties were revised as they were reprinted because of exhausted supplies and large ownership changes.

These maps have been very popular and have resulted in favorable comments from all who have had the occasion to use them. They are a valuable reference to state, county and federal agencies as well as others who work with public ownership.

Land Ownership Map Program

Aitkin — 1963, 1969

Becker — 1964, 1967

Beltrami — 1963, 1969

Cook — 1963, 1967

Crow Wing — 1963, 1967

Koochiching — 1963, 1966, 1969

Lake — 1964, 1965, 1968, 1969

Lake of the Woods — 1966

Mille Lacs — 1966

Pine — 1964, 1969

Roseau — 1967

Carlton — 1964, 1969

Cass — 1963, 1966, 1970

Clearwater — 1964, 1968

St. Louis — 1963, 1966, 1967, 1970

Todd — 1966

Hubbard — 1965, 1969

Itasca — 1962, 1964, 1967, 1969, 1970

Kanabec — 1966, 1970

Wadena — 1964, 1966

Mahnomen — 1967

Land Classification Records

IRR&R personnel assigned to the Department of Conservation, Lands and Forestry Division, have aided in that department's land classification program.

Ownership records on state-owned lands in the region have been completely coded for data processing. A coded listing was printed and distributed to field personnel in September, 1970. The listing contains legal description, acreage, ownership, status, class of land, method of acquisition, managing division, management unit and mineral code for 9,400,250 acres contained in 242,217 entries. These records will be permanently maintained and up-dated.

Ditching

Since IRR&R has one of the few backhoe-equipped bog vehicles in the area, numerous re-

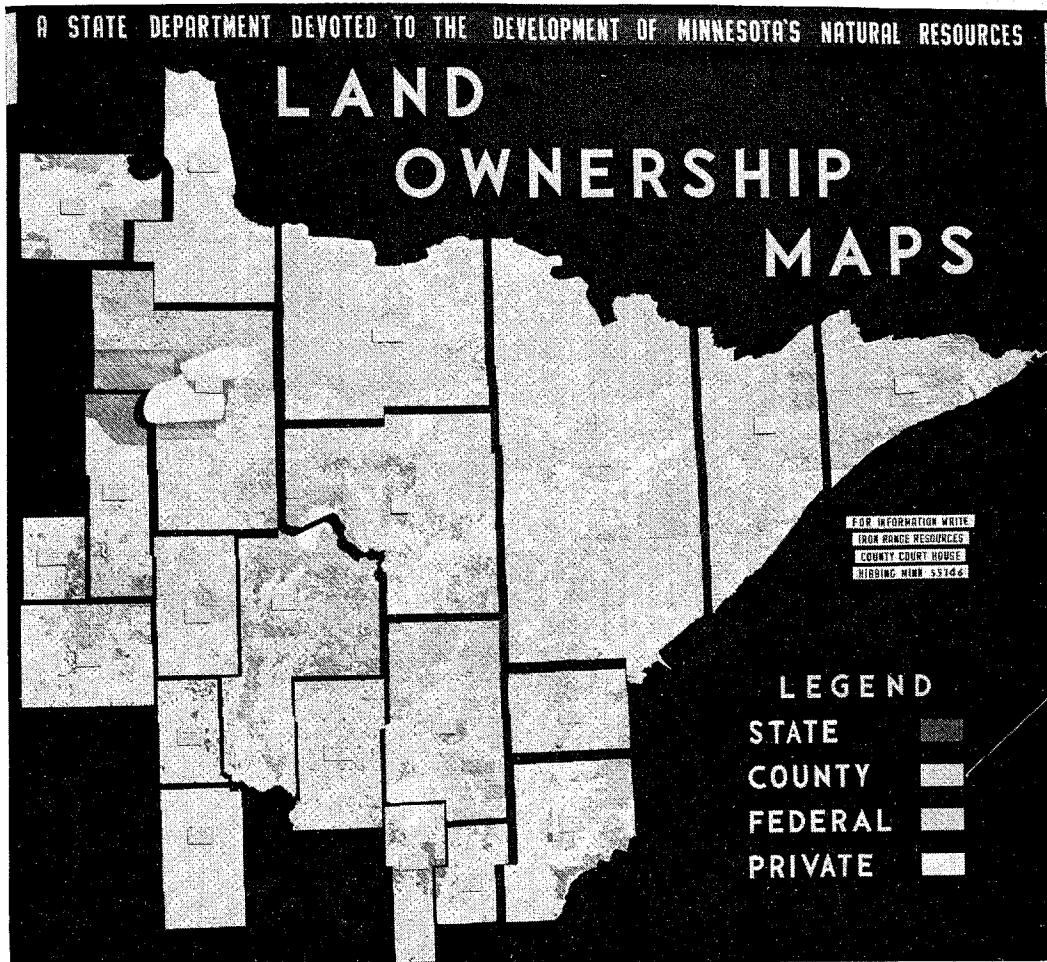
quests are received from government agencies to aid in ditch construction and maintenance in wet areas. The City of Virginia was aided at the golf course and in a storm sewer ditch maintenance program. The Nett Lake paddies, St. Louis County peat producers and the Cladwood Plant were all aided during the biennium.

Tornado Assistance

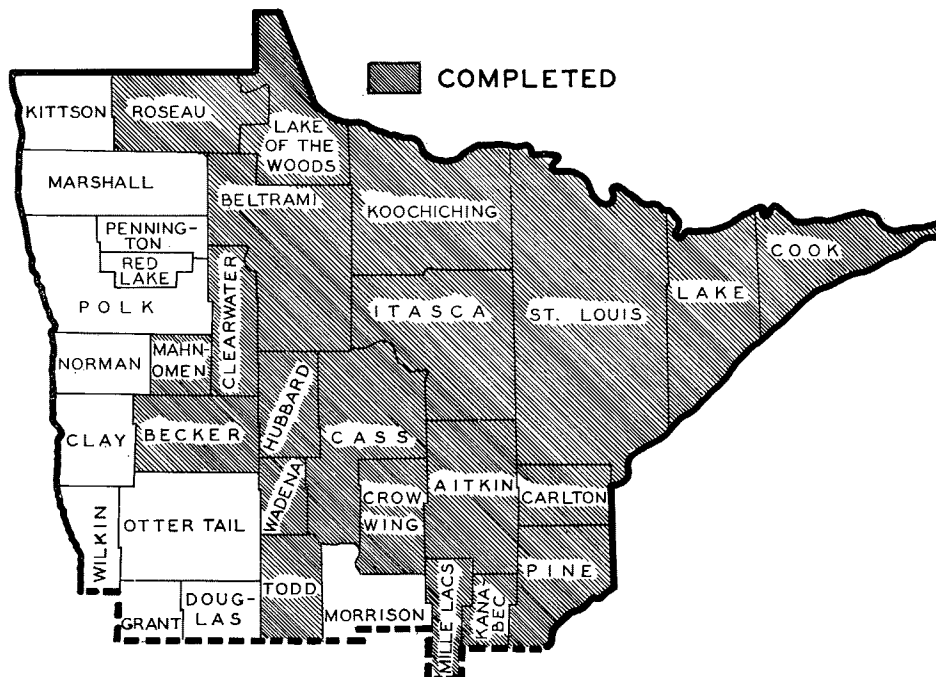
Personnel was assigned to aid in clearing roads in the large tornado-struck Dark Lake area. As this was a disaster area, as much help as possible was needed.

Sod Proposal

A proposal was compiled to show the value to the department and state if the IRR&R was allowed to operate the sod fields at Wilderness Valley Farms and sell sod to state agencies. This program would be beneficial to all involved.



LAND OWNERSHIP MAPS



PARTICIPATING AGENCY PROJECTS

Most IRR&R projects are operated and financed in conjunction with federal, state or local agencies. Among projects discussed elsewhere under separate headings are:

- A \$205,000 joint project with the Upper Great Lakes Regional Commission for research on a custom pelletizing plant on our iron range.
- A \$202,365 grant from the Federal Water Pollution Control Administration (U.S. Department of the Interior) for research on the use of peat in waste stabilization. (This supplemented an earlier two-year grant.)
- A \$115,400 project with the Economic Development Administration (U.S. Department of Commerce) for research in the feasibility of reducing production and distribution costs of Minnesota peat.
- A \$112,240 grant from the Upper Great Lakes Regional Commission for research on cultivation of wild rice in man-made paddies on the Nett Lake Indian Reservation.
- A \$16,000 cooperative project with the University of Minnesota to research the economic importance of the iron ore industry to Minnesota.

Additional participating agency projects undertaken, continued or completed during the past biennium include the following:

Neighborhood Youth Corps. In cooperation with the U.S. Department of Labor's Neighborhood Youth Corps, several youths from ghetto areas were employed on conservation projects in Northeastern Minnesota. This forestry-oriented program was operated in Aitkin, Becker, Beltrami, Clearwater, Crow Wing, Hubbard, Itasca, Koochiching, Mahnommen, St. Louis and Wadena counties.

Arrowhead Economic Development District, Inc. In cooperation with the Minnesota Department of Economic Development, IRR&R helped set up a federal multi-county agency in Northeastern Minnesota called the Arrowhead Economic Development District, Inc., with headquarters in Duluth. The existence of this entity has made Minnesota eligible for about \$160,000 of federal money to administer its business development program. The counties included are Carlton, Cook, Koochiching, Itasca, Lake and St. Louis.

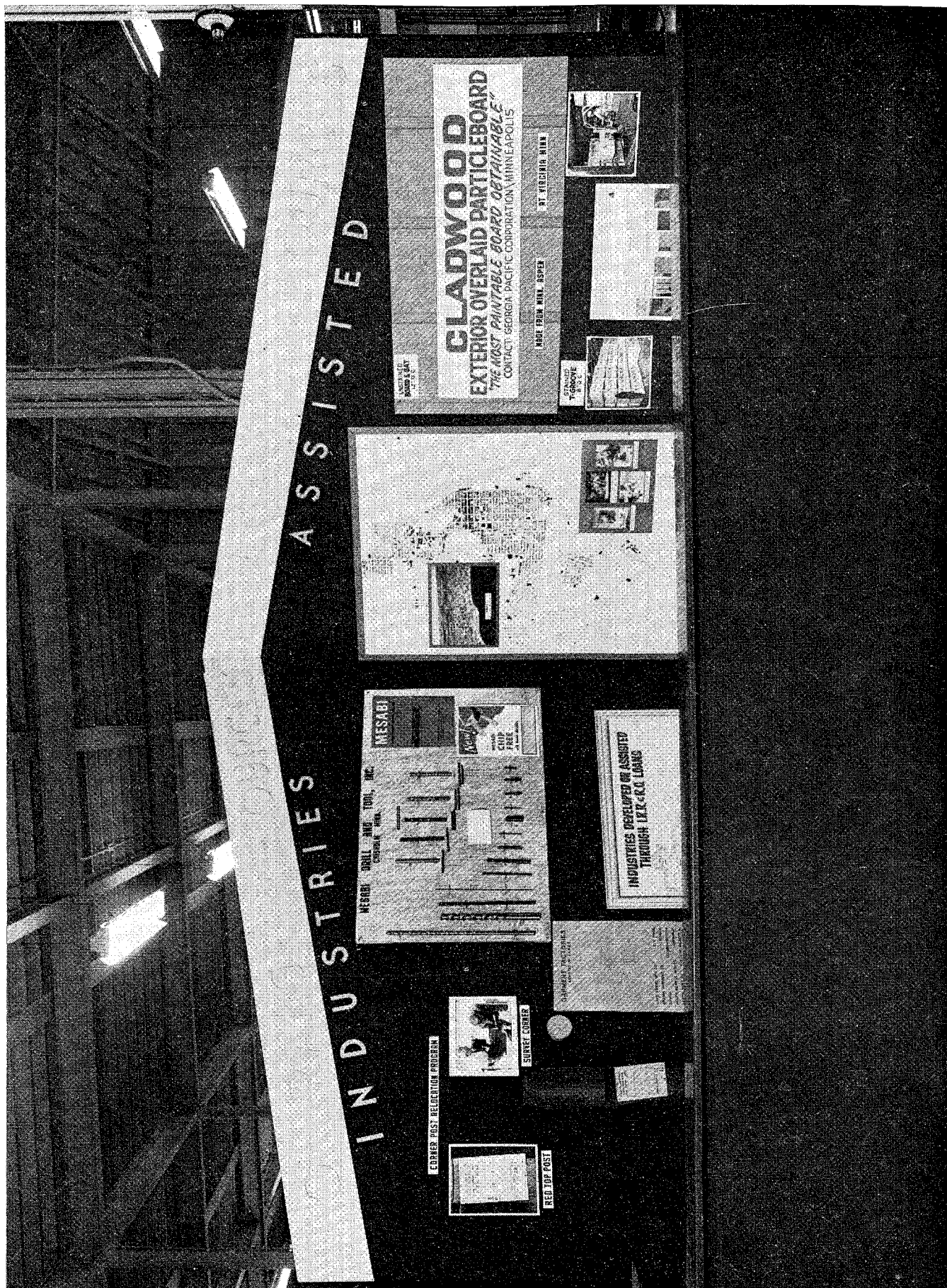
Topographical Mapping. IRR&R is engaged with the U.S. Geological Survey (U.S. Department of the Interior) on a topographic mapping of 32 quads in Northeastern Minnesota from Grand Rapids to Babbitt, and of 13 additional quads in the

Duluth/North Shore region. Most of these quads have not been mapped for over 20 years and are not scheduled for remapping under the State's long-term topographical mapping program until mapping has been completed of areas not previously mapped — about a ten year wait. IRR&R's remapping began in December, 1969, and should be completed about the time this report is printed. The extensive mining and timber operations in this area make up-to-date maps very important, and it is desirable that the Range and North Shore areas be mapped at the same time. Major users of the maps include our mining and timber industries and various government agencies. IRR&R will pay 50 percent of this \$36,000 program. Records of mapping progress and availability are maintained in the Hibbing office and master files of all the available coverage are kept in the St. Paul and Hibbing offices. An inventory of the maps covering Northern Minnesota is maintained with availability to public and governmental agencies.

Blue Line Prints. During 1969, blue line prints made from high altitude aerial photos and blown up to a scale equal to the U.S.G.S. topographic maps were made available through the State Planning Agency. A complete set was purchased for the northern half of Minnesota and section corners are being marked on these from available information. These also cover areas that are not covered by the topographic maps, providing information not otherwise available. They have already been very valuable to the Department. The complete set is on file in the Hibbing office and is available for reference to any interested party.

Shannon River Dam. IRR&R contributed \$10,000 towards the construction of a dam at the confluence of the Shannon and Sturgeon Rivers in St. Louis County, to help control water and serve as a spawning and brooding ground for northern pike and water birds. This project was in cooperation with the Game and Fish Division of the Minnesota Conservation Department, and was partly financed through the Department's federal lands and water funds.

U.S. Geological Water Survey. IRR&R contributed matching funds of \$5,000 for the continuation of the Iron Range Water Study by the U.S. Geological Survey. The study of the Grand Rapids area, completed during the last biennium, completed the study of individual municipalities. The information in these studies is used by iron mining companies and city governments in developing sources of industrial water supply.



COOPERATIVE PROJECTS WITH PRIVATE INDUSTRY

Because of a declining budget, IRR&R is no longer able to participate to a great extent in the appropriation of funds for machinery and buildings to encourage new industry to the area. Our limited funds are now used in cooperation with the Small Business Administration and state and federal EDA industrial loans.

Even within these limitations, IRR&R's industrial loan program has brought many new businesses to our iron range, producing over 1,500 new jobs in northeastern Minnesota.

Under the industrial loan program, IRR&R purchases the buildings and machinery and makes them available to the private operator on a lease-purchase contract. The advantage of this procedure is that the buildings and machinery are owned by IRR&R until paid for. Thus if a firm fails, the equipment can be leased to another firm, or sold. In case of success, the firm pays off the contract over a period of years.

During the past biennium, IRR&R has concentrated on assisting firms in which earlier IRR&R investments had been made.

Allan Merrill Manufacturing Co., Chisholm. This firm manufactures Great Western men's winter and summer outerwear, recently adding a snow suit for skiing and other outdoor sports. Allan Merrill employs the equivalent of 140 full-time employees, with employment peaking to 200 during the period August to September. Payroll in 1970 reached an estimated \$624,000.



Cladwood Corporation's exterior siding board is being successfully marketed throughout the Midwest. The firm also makes particleboard. Cladwood operates the former Multi-Ply plant at Virginia under lease from IRR&R.

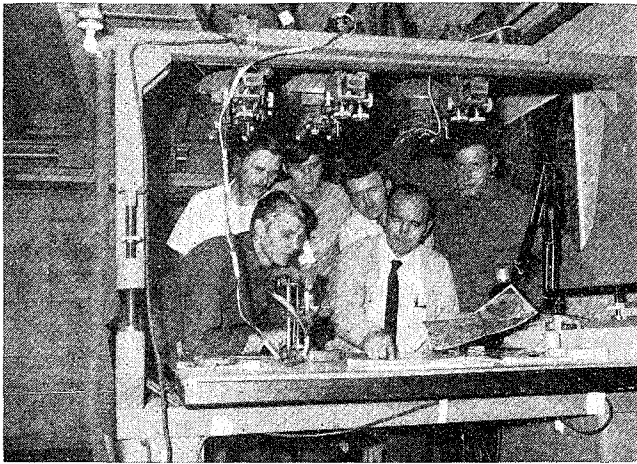
Cladwood Corporation, Virginia. Cladwood Company in Minnesota, a branch of a successful Oregon firm, operates the IRR&R-owned Multi-Ply plant under lease. This plant had been idle for several years because of marketing problems with the original product produced. Three members of IRR&R's Mineral Research Department worked full time for two months to get the storage yard cleaned, ditched and graveled, before turning the plant over to its new operators. Cladwood makes exterior siding board and particleboard, both of which are being successfully marketed throughout the Midwest. Cladwood's 1970 employment reached 27, with a payroll of \$159,000.

Duluth Filter Co., Duluth. This firm manufactures lube oil, fuel oil and hydraulic oil filters for industrial use. Duluth Filter saw a 25% increase in sales during 1970, and is under contract to install rod and ball mill filters at the expanded U.S. Steel Corp. Minntac Plant in Mountain Iron in 1971. Duluth Filter is also soliciting the over-the-road trucking industry. 1970 employment fluctuated between 4 and 9 full time employees. Payroll was about \$40,000. Duluth Filter operates \$26,000 worth of machinery under lease from IRR&R.

C. J. Fortman Manufacturing Company, Iron. IRR&R is in negotiations with this firm to take over the IRR&R-owned facilities in Northome formerly operated by Minnesota Cedar Company. The firm intends to manufacture hard maple cutting boards and has already received commitments from wood suppliers and prospective buyers. These cutting boards, which are used on kitchen countertops, are in large demand.

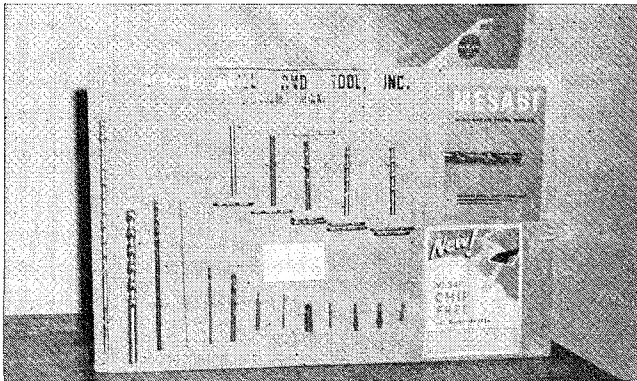
Mills Cash Sales, Inc., Grand Rapids. This firm is using the former IRR&R rutabaga warehouse for storage. It employs 14 persons and is current on repayment of its IRR&R contract. Mills Cash Sales payroll in 1970 will reach almost \$67,000.

Power O Peat Company, Gilbert and Central Lakes. IRR&R in 1962 provided impetus for the establishment of this company through a \$50,000 equipment appropriation. Power O Peat (formerly Mesabi Grow, Inc., but now under new management) in 1970 employed three full-time and 12 part-time employees for a total payroll of \$31,000. The firm produces blended and unblended peat moss, golf course mix and potting soil (including African violet soil). It was awarded a General Services Administration contract to supply that federal agency's 1970 peat needs in Illinois, Indiana, Kentucky, Michigan, Ohio and Wisconsin, and recently shipped its second multi-carload lot of golfcourse peat to Mexico.



Trainees at Mark Hurd Aerial Survey's Bemidji school learn the use of highly specialized equipment employed in engineering mapping.

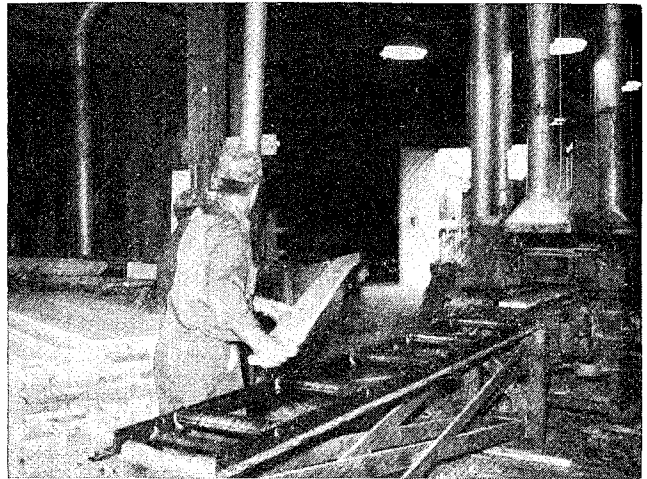
Mark Hurd Aerial Surveys, Inc., Bemidji. The Minneapolis-based mapping firm, with IRR&R help, in 1970 opened a Bemidji facility to supervise and train qualified trainees in the skills of engineering mapping. The program, carried out in cooperation with the City of Bemidji and the State Department of Economic Development, is aimed at turning out proficient photogrammetric technicians in a two-to-three year course of on-the-job study. IRR&R has granted Mark Hurd Aerial Surveys \$10,000 towards the cost of the first two years of this program. Mark Hurd Aerial Surveys provides the instructor, all necessary equipment and facilities (including classroom space) and pays the trainees an hourly wage starting at \$1.90.



Shown is a display on which are mounted a selection of Mesabi Drill & Tool Co.'s industrial twist drills.

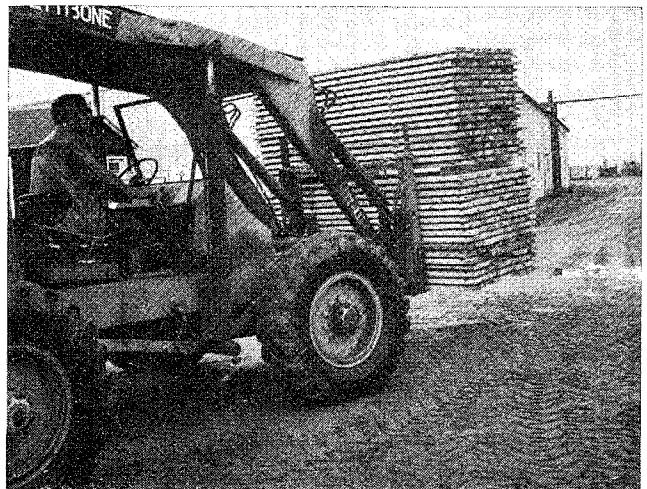
Mesabi Drill & Tool Co., Chisholm. This firm is located in buildings abandoned in 1965 by D. W. Onan & Sons Co. of Minneapolis. The plant is leased to Mesabi Drill & Tool by the Chisholm Development Corp. IRR&R has about \$120,000 of

machinery in the plant, which employs 28 persons in the manufacture of twist drills for aircraft and auto manufacture. 1970 payroll totaled over \$188,000.



A plank of aspen is removed from the planer at Rajala Lumber Co., Deer River.

Rajala Lumber Company, Deer River. This wood processing plant is under lease from IRR&R. The plant is operated as a dry kiln/surfacing facility and processes lumber from sawmills throughout northern Minnesota. During 1970, employment varied from five to ten; 1970 payroll was \$40,000.

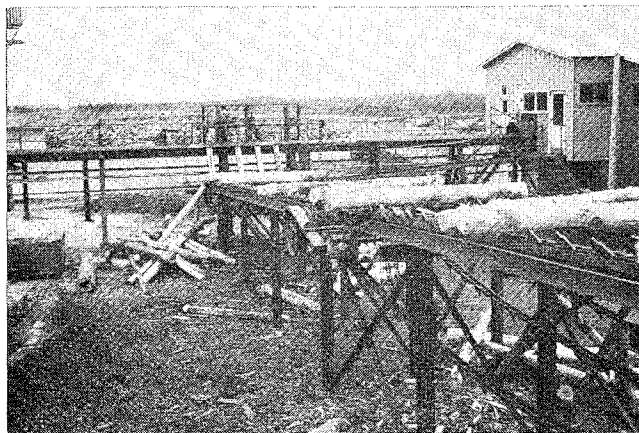


Rough lumber is removed from the dry kiln at Rajala Lumber Co., Deer River.

Products from the plant consist of precut framing lumber for mobile home manufacture, pallet and crating lumber, and lumber for furniture and window manufacturer. These products are marketed throughout the Upper Midwest.

Rajala Timber Company, Deer River. This firm received \$69,934.30 from IRR&R, \$50,000 from Minnesota ARA and \$390,000 from EDA, to build

a sawmill-chip plant designed to utilize second growth timber, chiefly aspen. IRR&R's contribution was in the form of leased equipment, consisting of a de-barker, chipper, chip screen and bin,



Debarked logs are shown traveling up conveyor to special chip-and-saw machine at Rajala Timber Company. IRR&R owns and leases this equipment to the timber producer. The machine converts logs to lumber while the chips are blown under great pressure to waiting boxcars for shipment to paper mills.

and air equipment. Lumber is the principal product, with wood chips for paper manufacturing a major byproduct. The firm represents a total \$600,000 investment, employs 20 men and creates about 25 directly-related jobs in the surrounding logging area. Payroll in 1970 exceeded \$100,000. The firm's products are already being successfully marketed throughout the Upper Midwest.

Samco Sportswear, Crosby. The Crosby plant of this St. Paul-based firm in 1970 employed 30 persons, with an estimated payroll of \$130,000. Samco is located in the Crosby National Guard Armory under arrangement with that city and utilizes equipment owned by IRR&R. The firm manufactures snowmobile suits.

Zen Ely Corporation, Ely. This plant was set up in cooperation with the federal government and the Ely Redevelopment Agency, to manufacture bedding for laboratory animals and poultry. IRR&R personnel made up plans and drawings for equipment construction and plant layout, and aided in setting up the equipment. IRR&R has about \$15,000 in machinery and equipment in this plant.

Cohn-Feldman Company, Onamia. This St. Paul-based garment manufacturer assumed the financial obligations of Onamia Garment Company in 1968 and presently operates the Onamia plant at full capacity in the manufacture of tailored, styled men's outerwear and sportswear. This merchandise is sold under private label by better men's

stores and department stores nationally. The plant employs 65 persons (up from 40 two years ago) and has plans for expansion. Payroll in 1970 was approximately \$338,000.



The Cluett-Peabody/Arrow Shirt Company plant at Virginia opened in 1947, with IRR&R paying the instructors required to set up the plant. Other successful IRR&R-supported garment plants include Samco Sportswear in Crosby and the Cohn & Feldman plant in Onamia.

Hill City Building. The Commissioner is negotiating with Hill Lake Forest Products Inc. of Hill City, Minnesota, which is interested in making use of the facility on a lease-purchase contract.

The firm plans to produce posts and poles to be treated for use as fence posts and in pole barn construction. The men of this firm have had considerable experience in logging and with the abundant timber supply available they suggest timber processing is most applicable. They have thoroughly investigated marketing aspects, production set up, costs, stumpage fees, etc., and feel that with funding aid through the Lakes and Pines Community Action Council and a State of Minnesota lease for the Iron Range Resources and Rehabilitation Department property, they can begin work immediately.

Additional cooperative projects with industry mentioned in other sections of this report are the study of a custom pelletizing plant undertaken in cooperation with Hallett Harrison Inc., and the study of potential uses for the Keewatin Demonstration Plant of the U.S. Bureau of Mines, undertaken with Warren S. Moore Co. (for reports on both projects see Mining and Mineral Research section). The Nett Lake Wild Rice Project was also undertaken in cooperation with the Nett Lake Indian Reservation Business Committee (see Wild Rice section of this report).

FINANCIAL REPORT

Receipts, Transfers, and Expenditures

RECEIPTS:	1968-1969	1969-1970
Balance brought forward July 1.....	\$ 992,610.10	\$ 806,495.55
Receipts from IRR&R Revolving Fund.....	33,665.49	25,963.86
Misc. refunds from prior years' expenditures.....		1,064.35
Reimbursement from 10 counties for IRR&R foresters.....		13,730.34
Reimbursements from Federal Government:		
U. S. Dept. of Commerce, EDA (Peat Research Project)	7,480.00	
U. S. Dept. of the Interior, Water Pollution Control Admin. (Peat Research Project).....	46,500.00	24,235.17
U. S. Dept. of Labor, Manpower Admin., Bureau of Work Programs (NYC Project)	134,975.00	70,134.00
U. S. Dept. of Commerce, Upper Great Lakes Regional Comm. (Hallett Harrison feasibility study on a custom pelletizing plant)		120,000.00
U. S. Dept. of Commerce, Upper Great Lakes Regional Comm. (Nett Lake wild rice research project).....		73,086.41
Transfers In from State Departments:		
Dept. of Economic Development (Restore unused balance of funds for Arrowhead Economic Dev. Dist., Inc.)	1,249.05	
Dept. of Conservation (Restore unused balance of funds for restoration and improvement of Upper Rice Lake)	14,384.81	
Total Receipts	<u>\$1,230,864.45</u>	<u>\$1,134,709.68</u>
EXPENDITURES:		
Transfers Out (Legislative and *Commission Action):		
University of Minnesota (Beneficiation of low-grade ores)	150,000.00	\$ 150,000.00
Commission on Taxation and Production of Iron Ore.....		25,000.00
Dept. of Administration (Utilities).....	255.59	259.25
Dept. of Taxation (Refund on 1967 occupation tax).....		125.61
*Dept. of Economic Development (Arrowhead Econ. Dev. Dist., Inc.)	20,000.00	
*Dept. of Conservation, Div. of Game and Fish (Coho salmon)		9,600.00
*Dept. of Conservation, Div. of Waters, Soils, and Minerals (Geological, copper-nickel, mapping).....		50,000.00
Total Transfers Out	\$ 170,255.59	\$ 234,984.86
Projects:		
Administration	71,521.31	71,988.85
Forestry Development	184,107.99	181,488.66
Mineral Research	49,409.44	47,245.00
Conservation-type Work Projects	52,637.89	36,491.82
County Summer Conservation Work Programs.....	20,000.00	24,704.70
Long Lake Conservation Center.....	960.00	1,540.00
Maple Syrup Plant	122.98	
Mark Hurd Aerial Surveys, Inc.....		5,749.98
Mesabi Drill & Tool Co.....	29,950.00	36.00
Multiply Plant	21,959.34	2.00
Northome Plant	4.24	665.84
Rajala Lumber Co.		15,990.00
Rajala Timber Co.	68,491.60	1,442.70
Samco Sportswear, Inc.	20,975.64	7,347.43
Section Corner Post Relocation.....	25,934.24	32,747.30
U. S. Geological Survey, Water Surveys.....	4,987.96	5,000.00
University of Minnesota:		
Minnesota Geological Survey (copper-nickel mapping)	2,485.55	
Dept. of Soil Science (peat research).....	590.06	
Wild Rice Research at Aase's Evergreen Farm.....	5,080.21	3,853.12
Wilderness Valley Farms.....	29,764.94	20,806.50

Continued on next page

FINANCIAL REPORT—Continued

Federal-State Contracts:

U. S. Dept. of Labor, Manpower Admin. (Neighborhood Youth Corps project).....	122,968.42	74,704.25
U.S. Dept. of Commerce, EDA (Peat Research).....	2,799.79	
U. S. Dept. of the Interior, FWPCA (Peat Research)....	27,625.13	40,630.61
U. S. Dept. of the Interior, Bureau of Mines (Keewatin Iron Range Demonstration Plant).....		18,263.87
U. S. Dept. of Commerce, Upper Great Lakes Regional Comm. (Univ. of Minnesota iron ore industry study)		1,266.43
U. S. Dept. of Commerce, UGLRC, (Hallett Harrison feasibility study on a custom pelletizing plant).....	62,097.21	142,902.79
U. S. Dept. of Commerce, UGLRC (Wild Rice Research at Nett Lake Indian Reservation).....	113.60	112,436.95
Total Project Expenditures.....	\$ 804,587.54	\$ 847,304.80
Total Transfers Out and Project Expenditures.....	974,843.13	1,082,289.66
Balance June 30	256,021.32	52,420.02
	<u>\$1,230,864.45</u>	<u>\$1,134,709.68</u>
Receipts from 5% of the Occup. Tax on Iron Ore, June 30..	550,474.23	560,805.03
Unexpended Balance June 30.....	256,021.32	52,420.02
Brought forward July 1.....	<u>\$ 806,495.55</u>	<u>\$ 612,725.05</u>

PROJECTS FOR WHICH IRR&R RECEIVED FEDERAL FUNDS


PROJECT	DATES	FEDERAL AGENCY INVOLVED	AMOUNT OF FEDERAL FUNDS	PARTICIPATING AGENCIES
Neighborhood Youth Corps (Conservation type projects)	July 1, 1965 thru July 19, 1970	U. S. Dept. of Labor, Manpower Admin.	\$906,374	N.E. Minn. Counties; IRR&R—In-kind funds
Feasibility of a Custom Pelletizing Plant	April, 1969 thru June 30, 1970	Upper Great Lakes Regional Commission	155,000	Hallett Harrison Co.; IRR&R—\$50,000 (\$205,000 total)
Demonstration of Native Wild Rice Production	May, 1969 thru Nov. 15, 1970	UGLRC	112,240	Nett Lake Indian Reservation; Bois Forte Reservation Business Comm.; IRR&R—In-kind funds
Economic Importance of the Iron Ore Industry to Minn.	June 15, 1970 thru June 15, 1971	UGLRC	10,667	Univ. of Minn.—School of Mineral & Metal. Engrng.; IRR&R—\$5,333 (\$16,000 total)
Testing of Metallized Pellet Production by SL/RN Process	Dec., 1970 thru March 1, 1971	UGLRC	14,000	Lurgi Canada Ltd.; IRR&R—no funds
Feasibility of Reducing Production and Distribution Costs of Minn. peat to a Competitive Level	June, 1965 thru Feb. 28, 1968	U. S. Dept. of Commerce-ARA/EDA	115,400	W. B. Saunders & Co.; Univ. of Minnesota; IRR&R—In-kind
Peat Bog Waste Stabilization	March 1, 1967 thru Feb. 28, 1969	U. S. Dept. of the Interior, Federal Water Pollution Control Admin.	122,635	Ruble & Kaple, Duluth; Univ. of Minn.; IRR&R—In-kind
Treatment of Wastes using Peat and Peat in combination with soil	April 1, 1969 thru March 31, 1971	" " "	79,730	Univ. of Minn.; IRR&R—In-kind
TOTAL—All Federal Funds received			<u>\$1,516,046</u>	


U. S. G. S. INTERIM TOPOGRAPHIC MAPPING
QUADS IN N.E. MINN.

I. R. R. & R. MATCHING FUNDS WITH U. S. G. S.
1969-70

 ORIGINAL PROPOSAL OF JULY 25, 1969

 ADDED QUADS OF AUGUST 29, 1969

 ADDED ALL-FEDERAL QUADS OF
OCTOBER 15, 1969

 ADJACENT PRE-1960 QUADS FOR
FUTURE CONSIDERATIONS

