State of Minnesota

11

her W. Youngdahl, Governor

Department of Conservation

Chester S. Wilson, Commissioner

Ninth Biennial Report

1947-1948



Section IV

Division of Lands and Minerals

STATE OF MINNESOTA

Ray D. Nolan, Director

January, 1949

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Section IV

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Ray D. Nolan, Director

This report is published in six sections as follows:

- I. Commissioner's Report, covering general departmental activities and summarizing the data and recommendations pertaining to the several divisions.
- II. Division of Forestry
- III. Division of Game and Fish
- IV. Division of Lands and Minerals
- V. Division of State Parks
- VI. Division of Water Resources

"All of our aims for better living will fail if we fall short in protecting our heritage of natural resources — from which, directly or indirectly, we draw all income, all tax revenue, and all means of existence. We rob the future by wasting today."

> From Inaugural Address of Governor Luther W. Youngdahl, to the Legislature of 1949.

EEGISLATIVE REFERENCE LIERARY STALLS VI

M64 12367 1947-48

To the Honorable Luther W. Youngdahl, Governor,

and

To the Legislature of the State of Minnesota:

I have the honor of transmitting herewith the biennial report of the Division of Lands and Minerals, of the Department of Conservation, for the biennium ending June 30, 1948, being Section IV of the Ninth Biennial Report for the entire department.

For the convenience of people interested only in certain parts of this material, the commissioner's report and the reports of the five divisions are published separately for this biennium, instead of in a single volume as formerly.

The last previous report (Eighth Biennial) was the first report after the close of the Second World War. In that report we included a complete review of the condition of the natural resources of the state — soil and minerals, forests, waters, and wild life — as affected by the war and other conditions. We also outlined a comprehensive program for the effective care and wise use of all these resources, to the end that the means of existence and the opportunity for a more abundant life may be preserved for present and future generations. The present report does not attempt to go over the same ground in detail, but is designed to include such additional material as is necessary to bring the conservation record and recommendations for future action up to date.

Respectfully submitted,

Chester S. Wilson Commissioner of Conservation

CSW/R

Mr. Chester S. Wilson Commissioner of Conservation

I have the honor of transmitting herewith the report of the Division of Lands and Minerals for the biennial period July 1, 1946 to June 30, 1948.

Respectfully submitted,

Ray D. Nolan, Director Division of Lands and Minerals

RDN:AP

DIVISION ADMINISTRATION PERSONNEL

St. Paul:

Ray D. Nolan	Director
F. B. Getchell	Deputy Director
Alice Killorin	Chief Clerk
W. F. Fleming	Chief Land Clerk
Vivian G. Gibson	Attorney

Hibbing:

H. A. Lever	Chief Mining Engineer
H. V. Reusswig	Assistant Chief Mining Engineer
Michael P. Walle	
William J. Dwyer	District Engineer
Joe McCullough	Chemist
O. I. Buckmaster	District Land Appraiser

Ironton:

Roy	С.	Pascoe	District	Engineer
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Bemidji:

George	W.	Morisset	District	Land	Appraiser
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Thief River Falls:

Elmer A. Andersen......District Land Appraiser

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Electric Drag Line removing surface stripping from South Agnew Open Pit Mine near Hibbing. Largest loading bucket in use in Minnesota — has a capacity of 25 cubic yards. Material is loaded into a hopper and transported by conveyor belt to storage dumps located almost a mile from the mine.

Division of Lands and Minerals

RAY D. NOLAN, Director

INTRODUCTION

Minnesota continued to furnish over two-thirds of the iron ore that is consumed in the United States. During 1947 and 1948 the iron mines of Minnesota produced 132,626,000 tons of iron ore for the nation's blast furnaces, which is about 68% of the country's total for this period. Twenty-two active state-owned mines, which are leased to the operating mining companies, contributed in a large measure to this total.

The division acts as agent for the public schools, the University and other educational and state institutions in selling or leasing state-owned lands and minerals. It also conducts research on low-grade iron ore and promotes the exploration and development of minerals in areas where iron ore and other minerals are not known to exist at the present time. Since 1943 when the legislature authorized the commissioner of conservation to lease minerals in tax-forfeited lands, the division also acts as agent for the taxing districts in issuing mineral permits and leases on tax-forfeited lands.

Our state lands and minerals business, which totaled \$7,706,945 for the biennium ending June 30, 1948, was originally established through the generosity of Congress in making the usual grants of land that were given to each state; but we have continued to stay in business due to the foresight of the early settlers who wrote our Minnesota constitution, and through the foresight of our legislators who first reserved to the state the mineral rights in state lands in some of our northern counties, and later extended this reservation to all of the counties of the state.

Since 1923 half of the occupation tax that is paid on iron ore is added annually to the public school and university trust funds; and according to the report of the state treasurer, as of June 30, 1948, the permanent trust funds totaled \$166,549,049, and are distributed as shown in Table 1 which follows:

Permanent School Fund Permanent University Fund Swamp Land Fund Internal Improvement Land Fund	$\$128,561,095\ 21,635,381\ 16,008,412\ 344,161$
Total Permanent Trust Funds	\$166,549,049

	TA	BLE 1			
Permanent	Trust	Funds,	June	30,	1948

These permanent trust funds yield an annual income of over \$4,000,000 which is distributed to the public schools, the State University and other state educational and charitable institutions.

Minnesota's record in accumulating permanent trust funds that exceed the total of any other state is principally due to the revenue derived from iron ore, as \$128,667,531 or 77% of the permanent trust funds have accumulated from this source. \$75,340,787 or 45% of the iron ore revenue was derived from royalties received from iron ore from state-owned mines. \$53,326,744 or 32% has accumulated from the occupation tax on iron ore; and the balance of the permanent trust funds was derived from the sale of timber and the sale or lease of state lands.

During the two years ending June 30, 1948 the revenue derived from the sale and lease of state lands and minerals totaled \$7,706,945, as shown in Table 2 which follows:

TABLE 2

Revenue Derived from Trust Fund and T Biennium Ending June 30,	ax Forfeited Lands 1948	
Revenue from Iron Ore and Other Mineral Permits and Leases Principal Payments on Land Contracts	Fiscal Year Ending June 30, 1947 \$3,454,819 367,524 64,108 32,350	Fiscal Year Ending June 30, 1948 \$3,353,137 344,329 59,707 30,971
Total Revenue	\$3,918,801	\$3,788,144

The expense of administering state lands and minerals as compared to total revenue received during the biennium amounts to less than four and one-half per cent, as indicated in Table 3 which follows:

TABLE 3Administration ExpenseBiennium Ending June 30, 1948

Salaries. Supplies and Expense. Testing Low Grade Ore. Furniture and Fixtures.	Fiscal Year Ending June 30, 1947 \$122,277 23,546 9,856	Fiscal Year Ending June 30, 1948 \$143,799 26,224 17,482 1,717
Total	\$155,679	\$189,222

The State of Minnesota, through its trust fund lands, is one of the largest owners of iron ore reserves in the state. Originally this state reserve consisted of three grades or classes of iron ore as follows:

Class (1) - 230 million tons of high grade ore which could be mined and shipped direct to the furnaces.

Class (2) - 145 million tons of low grade iron ore which contained certain impurities (such as silica or moisture) which could be removed by present commercial processing methods.

Class (3) — About 10 billion tons of iron formation or taconite containing 26% to 30% in iron, which is not being mined for commercial use at the present time.

Mineral lands which have forfeited to the state for taxes have increased the above state reserve by over 5 million tons of commercial ore and many millions of tons of taconite. The exploration that is being conducted under the "Wild Cat" law in Aitkin, Cass and Morrison counties will undoubtedly develop new reserves of state-owned iron ore which cannot be estimated at the present time.

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Since 1893, when the first state ore was shipped, fifty-four state-owned mines have been active in producing 263,798,308 tons of royalty iron ore. (See Table 20.)

It is hard to picture such a vast tonnage of iron ore, so let's convert it into a product that is still not too plentiful, but is familiar to all of us the automobile. It takes a ton and a half of steel, or about three tons of iron ore, to make a car. Automobiles were about as rare as the aeroplane in 1893, but if you can picture one and a half million cars rolling off the assembly line each and every year during the last 55 years, you will have some idea of the amount of iron ore that has been produced from state-owned mines.

Prior to 1941 the state received a royalty of 25c per ton on the crude ore as mined, with the exception of a half-million tons of ore which were produced under the 1921 and 1927 laws. In 1941 the legislature enacted our present iron ore lease law under which the royalty paid the state is based on the iron content of the ore when shipped. Passage of this act with its seven royalty schedules, one of which covers taconite, has resulted in the leasing of most of our known state iron ore reserves, and it has increased substantially the royalty per ton that the state receives under leases that have been issued since 1941. Table 4 shows the tonnage shipped under the 1941 law and average royalty paid the state under each lease.

	OPEN F	ΤIT				
~		~			A	/erage
Lease	Mine	Tons		Royalty	Re	oyalty
2001	Draper	247,417	\$	170,482.60	\$.6890
2002	Smith	8,360		5,403.32		.6463
2003	Alan	31,453		15,171.66		.4824
2004	Alan	18,638		8,998.18		.4828
2006	Martin	218,847		114,993.76		.5255
2008	Helen	19,028		9,467.29		.4975
2010	Margaret	101,537		54,519.78		.5369
2012	Buckeye	1,819,956	1,	115,713.47		.6130
2013	Buckeye	344,510		205,701.88		.5971
2014	Atkins	723.314		353.434.43		.4886
2016	Weggum	2.095.404	1	.131.993.65		.5402
2017	Buckeye	454.375		298.517.77		.6570
2018	Missabe Mountain	2.097.531	3	157.388.67	1	5053
2019	Missabe Mountain	3,419,014	4	628.733.76	i	3538
2020	Minnewas	5 027	_	6 060 37	1	2055
2025	Mesabi Chief	43 957		28,900,38		6575
2027	Mesabi Chief	134 199		91 804 63		6841
2028	Minnewas	135,636		167 618 50	j	2358
2020	Minnewas	132 438		167 666 35	- 1	2660
2026	Wegootab "B" "9	103,205		81 645 31		4994
2030	Sovillo	113 376		55,056,06		1856
2007	State Sagemone	7 022		2 282 86		4129
2040	Foresth	250,022		118 141 05		4545
2041	Torsyth	40,920		01 101 00		4026
2047	Filh	49,009		21,101.00		.4200
2049	Elbern	69,506		30,119.43		.5197
		12,744,563	\$12	,047,946.99	\$.9453
	UNDERGR	OUND				
2020	Minnewas	8,263	\$	4,190.36	\$.5071
2021	Minnewas	40.326		19.819.37		.4915
2028	Minnewas	70.322		31.911.23		4538
2029	Minnewas	49,691		22,349.79		.4498
17570	M and a second se	169 609		79 970 75		4649
	5 122	108,002	₽	10,210.15	. क	.4042
	Open Pit	12,744,563	\$12	,047,946.99	\$.9453
	Underground	168,602	-	78,270.75		.4642
EXEN.	TREATER STATES	12,913,165	\$12	,126,217.74	\$,9391

 TABLE 4

 Tonnage and Royalty Paid on Actual Shipments to December 31, 1948

 Under Laws 1941, Chapter 546, as Amended

DEPARTMENT OF CONSERVATION

Mining companies are seeking new reserves of iron ore to replenish the stocks that were depleted during the war, and the state has kept pace with this demand by enacting laws which make state-owned taconite lands available at a nominal rate; and through the passage of the "Wild Cat" law which makes available to the first applicant an iron ore prospecting permit on up to 160 acres of state-owned land, at the nominal fee of \$25.00 for a period of two years, in areas where iron ore is not known to exist. During the biennium the state has issued over 80 iron ore prospecting permits under this law on lands located in Aitkin, Cass and Morrison counties.

One of the Aitkin County wild cat permits has been converted into an iron sulphide lease which, if developed on a commercial scale, will bring a new industry to Minnesota.

Since 1941 several mining companies have explored the taconite formation by drilling and testpitting and have conducted an extensive program of research to determine the possibilities of concentrating this low grade iron ore material on a commercial basis.

The research program on taconite has been so successful that one of the large companies constructed a \$1,500,000 pilot plant on the eastern end of the Mesabi Range which will have a capacity of 200,000 tons of high grade taconite concentrates per year.

After the mechanical bugs have been ironed out in the pilot plant, this company plans to erect a commercial plant in the same vicinity, capable of producing 2½ million tons of high grade taconite concentrates per year.

Another company plans the construction of a large taconite concentrating plant at Beaver Bay on Lake Superior. This plant may ultimately be expanded to produce 10 million tons of concentrates per year, but the first unit will have a capacity of 2½ million tons.

The exploitation of iron ore properties in South America by some of the large steel companies, and the discovery of large deposits of iron ore in Labrador have resulted in much speculation as to the effect of these developments on the taconite concentration program. Officials of the two taconite companies referred to above have indicated that there has been no radical change in their plans for the concentration of taconite. Many of those in the mining industry agree with the following statement which was made by M. D. Harbaugh, Vice President of the Lake Superior Iron Ore Association, in his annual review and forecast on iron ore for 1949, which was published in the American Mining Congress Journal:

"Some observers have felt that the Labrador development may tend to slow down the program for concentration of Lake Superior taconite, but there seems little reason to anticipate that it will. By the time Labrador ore reaches its contemplated annual output, many millions of tons more will have been removed from Lake Superior reserves, so the Labrador ore may then ease the pressure upon the remaining reserves of high grade Lake Superior ore. With full realization that the United States can never allow

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itself to become actually dependent in times of emergency on sources of iron ore outside its borders, the Lake Superior district obviously remains the bulwark of our national strength in the production of steel — the basic defense material."



Weggum Mine Concentrating Plant at Hibbing.

FIELD ADMINISTRATION — STATE-OWNED MINERALS AND MINERAL LANDS

H. A. LEVER, Chief Mining Engineer

The Mines and Minerals office at Hibbing, under the supervision of the St. Paul office of the Division of Lands and Minerals, serves to represent the state in the field in matters pertaining to state-owned mines, minerals, and mining lands.

In addition to its engineering and accounting staff, the office at Hibbing maintains a chemical laboratory and a research section. The aims and activities of the research section are outlined elsewhere in this report by M. P. Walle, Chief Research Engineer.

A branch engineering office was established at Ironton, Minnesota, in October, 1947, to look after the Cuyuna Range work which has increased rapidly, due to the large amount of lake-bed surveying required of late. A summary of the lake-bed situation, prepared by Roy C. Pascoe, District Engineer and engineer in charge of lake surveys, is also included in this report.

On June 30, 1948, the state had 70 iron ore leases and 81 taconite leases in effect. For information on some of these properties see report prepared by H. V. Reusswig, Assistant Chief Mining Engineer.

DEPARTMENT OF CONSERVATION

State-Owned Mineral Lands

The state owns approximately 15,000 acres of land known to be located on iron formation. This figure does not include about 5,000 acres of lake-beds that are on iron formation, nor does it include lands and lake-beds located in areas that are known to be mineralized but are not sufficiently explored to definitely outline their extent.

The state trust fund lands were acquired by grant from the federal government through several acts of Congress. Under the provisions of the state constitution, all revenue received from these lands is deposited in permanent trust funds. All rights to minerals in the trust fund lands were reserved to the state by acts of the legislature in 1889 and 1901. The first law included only lands in Lake, Cook, and St. Louis counties, whereas the second law applied to all trust fund lands in the state.

State-Owned Iron Ore Reserves

The persistent demand for iron ore is reflected in the zealous search now under way for new deposits, and also in the efforts exhibited by the mining companies to add to their reserves the ore bodies which only three years ago were considered undesirable. This is apparent from the fact that the mining leases issued by the state in the last three years include 22 properties which were not of interest to mining companies in 1945 though they were known at that time to have estimated reserves of about 25,000,000 tons.

Table No. 5 shows the estimated tonnage of known state-owned ore remaining as of June 30, 1948. The tonnages are broken down into four classifications. Note that of the total known reserves, amounting to 105,-705,000 tons, only 371,000 tons are not under permit or lease.

1. Mines now in production. 2. Non-operating mines under permit or lease. 3. Reserve properties under permit or lease. 4. Properties not under permit or lease.	Tons . 52,175,000 . 19,377,000 . 33,782,000 . 371,000
Total	. 105,705,000

TABLE 5 Estimated Tonnages of Known State=Owned Ore

Note: The above total includes 6,136,000 tons in tax-forfeited properties

Table No. 6 is a statement of the lean materials in individual stockpiles that were not under lease; Table No. 7 furnishes the same statement for stockpiles that were under lease as of June 30, 1948.

Notes on State Mineral Laws

State-owned minerals are not sold. State lands containing minerals are leased for a period of years and a royalty is paid to the state for each ton of ore mined. The royalties vary for different mines due to the fact that some state-owned mines are still operating under the first mineral lease law passed by the legislature (Laws 1889, Chapter 22) while others are operating under more recent laws.

Tables No. 8 and 9 are set up as an aid to prospective bidders in computing royalties that will apply under Minnesota Statutes 1945, Section

DIVISION OF LANDS AND MINERALS

93.20. Table No. 8 quotes the minimum permissible iron ore royalty rate under each schedule for ore ranging from 25 to 65 per cent dried iron content. Table No. 9 is a compound interest table which may be used for the computation of royalty rates under any base royalty bid.

Under Laws of 1889, Chapter 22, the state auditor was authorized to issue iron ore prospecting permits and leases. A permit covered an area of 160 acres or less, and carried the right at any time within one year to a 50-year lease. The lease provided for a royalty rate of 25 cents per ton on crude ore as mined, with a minimum total payment of \$1,250 for any one year when less than 5,000 tons of such ore was mined. The lease provisions of this act were repealed in 1907.

Laws of 1917, Chapter 110, authorized the leasing of iron ore deposits located under the waters of any public lake or river within the state, at a minimum royalty rate of 50 cents per ton.

Laws of 1921, Chapter 412, was the first law to authorize the public sale of prospecting permits. The royalty rate was based on the iron content of the crude ore as mined, with a minimum royalty of \$1,250 the first year, and \$5,000 per year thereafter. The minimum royalty rate was the same as Schedule I of the present lease law.

Laws of 1937, Chapter 488, provided, under certain conditions and provisions, for an extension of the term and modification of the iron ore leases that were in effect at that time.

Laws of 1941, Chapter 546, was the first law providing royalty rates based on structure and method of mining (see Tables No. 8 and 9). Under this act seven minimum schedules are provided to cover three classes of open pit ore, three classes of underground ore and a special schedule for taconite concentrates.

The 1941 law was very influential in promoting the development and mining of state-owned low grade ores, the leasing of taconite lands, and the resulting taconite research work. This is apparent when we consider the fact that under the 1921 law as amended, in the 20-year period prior to 1941, only 12 leases were issued and of these 12 leases only four were developed to produce iron ore. In comparison, within seven years after the 1941 law was passed, more than 258 prospecting permits had been issued, 151 of which were converted into leases.

Laws of 1943, Chapter 233, amended Laws of 1941, Chapter 546, with reference to taconite. Under this act, a taconite lease may be converted into an iron mining lease and re-converted back to a taconite lease.

Laws of 1943, Chapter 208, authorizes the sale of prospecting permits providing for the leasing of iron ore deposits located in the bed of any public lake or river within the State of Minnesota. This act provides for royalty rates based on iron content under the seven schedules described above under Laws 1941, Chapter 546, and replaces the first Lake-Bed Law (1917). Under the 1917 law, a lake-bed could be leased to the first applicant at a flat minimum royalty rate of 50c per ton of crude ore as mined.

			LEAN ORE									
MINE	LOCATION	Tons	Iron	Sil.	Tons	Iron	Sil.	Total Tons				
Atkins. Barbara. SE SE, 4-58-18. Duncan Fay. Helen Majorca. Mesabi Chief	Kinney Calumet. Mt. Iron Chisholm Virginia Cooley. Calumet. Keewatin	47,077 5,306 24,765 9,224	42.05 51.79 46.93 45.00	17.63 15.15 25.13	2,295 49,568 72,111 25,661 35,312 163,020 2 644 356	35.32 32.85 35.75 34.31 37.55 35.50 37.32	39.88	$\begin{array}{r} 49,372\\ 49,568\\ 72,111\\ 5,306\\ 50,426\\ 35,312\\ 172,244\\ 2644356\end{array}$				
Morton Pool Shiras Smith Vernon. Wheeling	Hibbing. Hibbing. Buhl. Hibbing. Cooley. Mt. Iron.	18,200 6,478 19,020	40.68 51.05 45.72	25.55	$\begin{array}{c} 2,044,330\\ 36,712\\ 71,008\\ \hline \\ 22,926\\ 3,920\\ 110,755\\ \end{array}$	$\begin{array}{r} 42.53\\ 33.19\\ 33.19\\ 29.16\\ 40.81\end{array}$	27.97 46.52	2,044,030 36,712 71,008 18,200 29,404 3,920 129,775				
Totals		130,070	44.38		3,237,644	37.15		3,367,714				

LEAN ORE MATERIAL IN STOCKPILES NOT UNDER PERMIT OR LEASE

As of June 30, 1948

LEAN ORE MATERIAL IN STOCKPILES UNDER PERMIT OR LEASE

As of June 30, 1948

			LEAN ORE			TACONITE			PAINT ROCK		
MINE	LOCATION	Tons	Iron	Sil.	Tons	Iron	Sil.	Tons	Iron	Sil.	Total Tons
Alan Buckeye Coons Deacon Draper Embarrass Lake Grant Hill-Annex. Kevin Leonidas Margaret Margaret Margaret Mississippi #1 Mississippi #1 Mississippi #2 Prindle. Scranton Seville Stein Wacootah Weagum	Mt. Iron. Coleraine. Virginia. Calumet. Aurora. Buhl. Calumet. Cooley. Eveleth. Buhl. Crosby. Keewatin. Virginia. Keewatin. Virginia. Keewatin. Virginia. Keewatin. Mt. Iron. Crosby. Hibbing.	$\begin{array}{c} 7,006\\ 73,603\\ 79,298\\ 2,922\\ 17,153\\ 193,008\\ 314,045\\ 8,889,911\\ 4,014\\ 3,654,512\\ 46,395\\ 118,106\\ 293,969\\ 393,485\\ 4,255,006\\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\$	$\begin{array}{c} 45.30\\ 42.61\\ 40.49\\ 50.42\\ 44.83\\ 42.93\\ 43.60\\ 42.36\\ 42.16\\ 36.92\\ 44.68\\ 42.16\\ 36.92\\ 44.36\\ 43.48\\ \cdots\\ 45.74\\ 45.00\\ 47.13\\ 28.09\\ 44.83\\ 42.25\\ 42.25\\ \end{array}$	23.84 27.00 30.89 29.35 23.98 28.66 38.67 29.69 29.88 	$\begin{array}{c} 139,076\\ 49,072\\ 260,614\\ 269,320\\ 434,927\\ 3,550,172\\ 694,081\\ 113,694\\ 113,$	38.49 36.26 37.73 36.71 38.04 34.81 33.82 39.76 33.67 34.92 31.59 31.72 35.51 39.70 29.36 39.63 39.63	40.91 40.14 40.14 46.71 44.61 44.38 46.60 37.51 36.07 52.06 	349,915 18,443 520,540 1,487,653 26,222	43.57 42.31 39.37 36.69 45.65	18.68 29.94 29.56 25.62	$\begin{array}{c} 7,006\\ 212,679\\ 128,370\\ 2,922\\ 277,767\\ 462,328\\ 1,098,887\\ 12,458,526\\ 1,218,635\\ 3,654,512\\ 160,089\\ 118,106\\ 1,781,622\\ 2,160,655\\ 13,755,811\\ 4,355,849\\ 645,410\\ 831,430\\ 960,582\\ 8,230\\ 951,423\\ 62,452\\ 355,477\\ 1,510,308\\ \end{array}$
Totals		21,366,050	42.62	28.75	23,390,253	34.16	45.01	2,402,773	38.41	27.49	47,159,076

DIVISION OF LANDS AND MINERALS

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MINIMUM IRON ORE ROYALTY IN CENTS PER TON UNDER LAWS OF 1941, CHAPTER 546 AS AMENDED

DRIED IRON	Schedule 1 Open Pit Direct	Schedule 2 Open Pit Wash Concentrate	Schedule 3 Other Open Pit Concentrate	Schedule 4 Underground Direct	Schedule 5 Underground Wash Concentrate	Schedule 6 Other Underground Concentrate	Schedule 7 Taconite Concentrate
$\begin{array}{c} 25\% \\ 26\% \\ 26\% \\ 26\% \\ 27\% \\ 28\% \\ 29\% \\ 30\% \\ 31\% \\ 31\% \\ 31\% \\ 31\% \\ 33\% \\ 33\% \\ 34\% \\ 35\% \\ 38\% \\ 38\% \\ 39\% \\ 39\% \\ 39\% \\ 39\% \\ 39\% \\ 39\% \\ 39\% \\ 39\% \\ 30\% \\ 38$	$\begin{array}{c} 12.00\\ 12.60\\ 13.23\\ 13.89\\ 14.59\\ 15.32\\ 16.08\\ 16.08\\ 16.08\\ 17.73\\ 18.62\\ 19.55\\ 20.52\\ 21.55\\ 22.63\\ 23.76\\ 24.95\\ 22.63\\ 23.76\\ 24.95\\ 26.19\\ 27.50\\ 28.88\\ 30.32\\ 31.84\\ 33.43\\ 35.10\\ 36.86\\ 38.70\\ 40.64\\ 42.67\\ 44.80\\ 47.04\\ 49.39\\ 51.86\\ 54.46\\ 57.18\\ 60.04\\ 63.04\\ 63.04\\ 66.19\\ 69.50\\ 72.98\\ 76.63\\ 80.46\\ 84.48\\ \end{array}$	$\begin{array}{c} 12.00\\ 12.54\\ 13.10\\ 13.69\\ 14.31\\ 14.95\\ 15.63\\ 16.33\\ 17.07\\ 17.83\\ 18.64\\ 19.47\\ 20.35\\ 21.27\\ 22.22\\ 23.22\\ 24.27\\ 25.36\\ 26.50\\ 27.69\\ 28.94\\ 30.24\\ 27.69\\ 28.94\\ 30.24\\ 31.60\\ 33.03\\ 34.51\\ 36.06\\ 37.69\\ 39.38\\ 41.16\\ 43.01\\ 44.94\\ 46.97\\ 49.08\\ 51.29\\ 53.60\\ 56.01\\ 58.53\\ 61.16\\ 63.91\\ 66.79\\ 69.80\\ \end{array}$	$\begin{array}{c} 12.00\\ 12.48\\ 12.98\\ 12.98\\ 13.50\\ 14.04\\ 14.60\\ 15.18\\ 15.79\\ 16.42\\ 17.08\\ 17.76\\ 18.47\\ 19.98\\ 20.78\\ 21.61\\ 22.48\\ 23.37\\ 24.31\\ 25.28\\ 26.29\\ 27.35\\ 28.44\\ 29.58\\ 30.76\\ 31.99\\ 33.27\\ 34.60\\ 35.98\\ 37.42\\ 38.92\\ 40.48\\ 42.10\\ 43.78\\ 45.53\\ 47.35\\ 49.25\\ 51.22\\ 53.27\\ 55.40\\ 57.61\\ \end{array}$	$\begin{array}{c} 11.00\\ 11.39\\ 11.78\\ 12.20\\ 12.62\\ 13.06\\ 13.52\\ 14.00\\ 14.48\\ 14.99\\ 15.52\\ 16.06\\ 16.62\\ 17.20\\ 17.81\\ 18.43\\ 19.07\\ 19.74\\ 20.43\\ 21.15\\ 21.89\\ 22.65\\ 23.45\\ 24.27\\ 25.12\\ 26.5\\ 23.45\\ 24.27\\ 25.12\\ 26.91\\ 27.85\\ 28.82\\ 29.83\\ 30.87\\ 31.96\\ 33.07\\ 34.23\\ 35.43\\ 36.67\\ 37.95\\ 39.28\\ 40.66\\ 42.08\\ 43.55\\ \end{array}$	$\begin{array}{c} 11.00\\ 11.33\\ 11.67\\ 12.02\\ 12.38\\ 12.75\\ 13.14\\ 13.53\\ 14.35\\ 14.78\\ 15.23\\ 15.68\\ 16.15\\ 16.64\\ 17.14\\ 17.65\\ 18.18\\ 18.73\\ 19.29\\ 19.87\\ 20.46\\ 21.08\\ 21.71\\ 22.36\\ 23.03\\ 23.72\\ 24.43\\ 25.17\\ 25.92\\ 26.70\\ 27.50\\ 28.33\\ 29.18\\ 30.05\\ 30.95\\ 31.88\\ 32.84\\ 33.82\\ 34.84\\ 35.88\\ \end{array}$	$\begin{array}{c} 11.00\\ 11.22\\ 11.44\\ 11.67\\ 11.91\\ 12.15\\ 12.39\\ 12.64\\ 12.89\\ 13.15\\ 13.41\\ 13.68\\ 13.95\\ 14.23\\ 14.51\\ 14.80\\ 15.10\\ 15.40\\ 15.71\\ 14.80\\ 15.71\\ 14.80\\ 15.71\\ 16.02\\ 16.34\\ 16.67\\ 17.01\\ 17.35\\ 17.69\\ 18.05\\ 18.41\\ 18.78\\ 19.15\\ 19.53\\ 19.93\\ 20.32\\ 20.73\\ 21.14\\ 21.57\\ 22.00\\ 22.44\\ 22.89\\ 23.85\\ 23.81\\ 24.29\\ \end{array}$	$\begin{array}{c} & & & & & \\ & & & & & & \\ & & & & & & $

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DEPARTMENT OF CONSERVATION

TABLE FOR CALCULATING STATE IRON ORE LEASE ROYALTIES UNDER LAWS OF 1941, CHAPTER 546, AS AMENDED

To obtain the royalty rate per ton for any dried iron analysis, multiply the factor shown in table by the base royalty bid for 25% dried iron in Schedules 1 to 6, inclusive, and for 40% dried iron in Schedule 7.

Dried Iron Per Cent	${f Schedule} \ {f 1} \ {f 5\%}$	Schedule 2 $4\frac{1}{2}\%$	${f Schdeule}\ {f 3}\ {f 4\%}$	Schedule 4 $3\frac{1}{2}\%$	${\scriptstyle \begin{array}{c} { m Schedule}\ 5\ 3\% \end{array}}$	${{\rm Schedule} \atop { 6 \atop 2\%}}$	$\substack{\substack{\text{Schedule}\\ 7\\ 1\%}}$
25 26 27 28 29 30	$\begin{array}{c} 1.0000\\ 1.0500\\ 1.1025\\ 1.1576\\ 1.2155\\ 1.2763\end{array}$	$\begin{array}{c} 1.0000\\ 1.0450\\ 1.0920\\ 1.1412\\ 1.1925\\ 1.2462\end{array}$	$1.0000 \\ 1.0400 \\ 1.0816 \\ 1.1249 \\ 1.1699 \\ 1.2167$	$1.0000 \\ 1.0350 \\ 1.0712 \\ 1.1087 \\ 1.1475 \\ 1.1877$	$\begin{array}{c} 1.0000\\ 1.0300\\ 1.0609\\ 1.0927\\ 1.1255\\ 1.1593 \end{array}$	$\begin{array}{c} 1.0000\\ 1.0200\\ 1.0404\\ 1.0612\\ 1.0824\\ 1.1041 \end{array}$	· · · · · · · · · · · · · · · · · · ·
31 32 33 34 35	$\begin{array}{c} 1.3401 \\ 1.4071 \\ 1.4775 \\ 1.5513 \\ 1.6289 \end{array}$	$\begin{array}{c} 1.3023 \\ 1.3609 \\ 1.4221 \\ 1.4861 \\ 1.5530 \end{array}$	$1.2653 \\ 1.3159 \\ 1.3686 \\ 1.4233 \\ 1.4802$	$\begin{array}{c} 1.2293 \\ 1.2723 \\ 1.3168 \\ 1.3629 \\ 1.4106 \end{array}$	$\begin{array}{c} 1.1941 \\ 1.2299 \\ 1.2668 \\ 1.3048 \\ 1.3439 \end{array}$	$1.1262 \\ 1.1487 \\ 1.1717 \\ 1.1951 \\ 1.2190$	· · · · · · · · · · · · · · · · · · ·
36 37 38 39 40	$1.7103 \\ 1.7959 \\ 1.8856 \\ 1.9799 \\ 2.0789$	$\begin{array}{c} 1.6229 \\ 1.6959 \\ 1.7722 \\ 1.8519 \\ 1.9353 \end{array}$	$1.5395 \\ 1.6010 \\ 1.6651 \\ 1.7317 \\ 1.8009$	$1.4600 \\ 1.5111 \\ 1.5640 \\ 1.6187 \\ 1.6753$	$1.3842 \\ 1.4258 \\ 1.4685 \\ 1.5126 \\ 1.5580$	$\begin{array}{c} 1.2434 \\ 1.2682 \\ 1.2936 \\ 1.3195 \\ 1.3459 \end{array}$	1.0000
$\begin{array}{c} 41 \\ 42 \\ 43 \\ 44 \\ 45 \end{array}$	2.1829 2.2920 2.4066 2.5270 2.6533	2.0224 2.1134 2.2085 2.3079 2.4117	$\begin{array}{c} 1.8730 \\ 1.9479 \\ 2.0258 \\ 2.1068 \\ 2.1911 \end{array}$	$1.7340 \\ 1.7947 \\ 1.8575 \\ 1.9225 \\ 1.9898$	$1.6047 \\ 1.6528 \\ 1.7024 \\ 1.7535 \\ 1.8061$	$\begin{array}{c} 1.3728 \\ 1.4002 \\ 1.4282 \\ 1.4568 \\ 1.4859 \end{array}$	$1.0100 \\ 1.0201 \\ 1.0303 \\ 1.0406 \\ 1.0510$
46 47 48 49 50	2.7860 2.9253 3.0715 3.2251 3.3864	2.5202 2.6337 2.7522 2.8760 3.0054	2.2788 2.3699 2.4647 2.5633 2.6658	2.0594 2.1315 2.2061 2.2833 2.3632	$1.8603 \\ 1.9161 \\ 1.9736 \\ 2.0328 \\ 2.0938$	$1.5157 \\ 1.5460 \\ 1.5769 \\ 1.6084 \\ 1.6406$	$1.0615 \\ 1.0721 \\ 1.0829 \\ 1.0937 \\ 1.1046$
$51 \\ 52 \\ 53 \\ 54 \\ 55$	$3.5557 \\ 3.7335 \\ 3.9201 \\ 4.1161 \\ 4.3219$	3.1407 3.2820 3.4297 3.5840 3.7453	2.7725 2.8834 2.9987 3.1187 3.2434	2.4460 2.5316 2.6202 2.7119 2.8068	2.1566 2.2213 2.2879 2.3566 2.4273	$1.6734 \\ 1.7069 \\ 1.7410 \\ 1.7758 \\ 1.8114$	$1.1157 \\ 1.1268 \\ 1.1381 \\ 1.1495 \\ 1.1610$
56 57 58 59 60	$\begin{array}{r} 4.5380 \\ 4.7649 \\ 5.0032 \\ 5.2533 \\ 5.5160 \end{array}$	3.9139 4.0900 4.2740 4.4664 4.6673	$3.3731 \\ 3.5081 \\ 3.6484 \\ 3.7943 \\ 3.9461$	$2.9050 \\ 3.0067 \\ 3.1119 \\ 3.2209 \\ 3.3336$	2.5001 2.5751 2.6523 2.7319 2.8139	$1.8476 \\ 1.8845 \\ 1.9222 \\ 1.9607 \\ 1.9999$	$1.1726 \\ 1.1843 \\ 1.1961 \\ 1.2081 \\ 1.2202$
$ \begin{array}{c} 61 \\ 62 \\ 63 \\ 64 \\ 65 \end{array} $	5.7918 6.0814 6.3855 6.7048 7.0400	$\begin{array}{r} 4.8774 \\ 5.0969 \\ 5.3262 \\ 5.5659 \\ 5.8164 \end{array}$	$\begin{array}{r} 4.1039\\ 4.2681\\ 4.4388\\ 4.6164\\ 4.8010\end{array}$	$3.4503 \\ 3.5710 \\ 3.6960 \\ 3.8254 \\ 3.9593$	$\begin{array}{c} 2.8983 \\ 2.9852 \\ 3.0748 \\ 3.1670 \\ 3.2620 \end{array}$	2.0399 2.0807 2.1223 2.1647 2.2080	$\begin{array}{c} 1.2324 \\ 1.2447 \\ 1.2572 \\ 1.2697 \\ 1.2824 \end{array}$

Laws of 1943, Chapter 277, which is known as the "Wild Cat Law," was passed to encourage prospecting for iron ores in certain designated sections of the state not known to contain merchantable deposits of such ores.

Laws of 1943, Chapter 287 (Tax-Forfeited Law), is an act relating to the leasing of mineral rights becoming the property of the state under the tax laws, whether or not held in trust for the taxing districts.

Laws of 1945, Chapter 275, grants the power of eminent domain to certain corporations engaged in or proposing to engage in the business of mining and beneficiating taconite.

Laws of 1945, Chapter 342, is an act authorizing the commissioner of conservation to issue leases on stockpiled iron ore belonging to the state or in which the state has an interest.

Laws 1947, Chapter 96, amends Minnesota Statutes 1945, Section 93.24 (mining of ores other than iron), and relates to mining leases, principally valuable for sulphur ores. This act authorizes the establishment of terms and conditions under which sulphides on state lands may be mined under an iron ore lease and provides further that the iron or iron ore produced from such sulphides may be leased under the same royalty rates and provisions as those that apply to taconite.

Laws 1947, Chapter 111, provides for the conversion of iron ore mining leases into taconite leases after the commercial ore in an iron mining unit or lease has been exhausted.

Laws 1947, Chapter 409, is an act authorizing the issuance of leases for mining state iron ore in conjunction with the mining of adjacent ore. Under this law, the commissioner of conservation, with the approval of the Executive Council, may negotiate a lease on state-owned ore with the owner or lessee of adjacent ore, if it is impracticable to mine such state ore except in conjunction with the mining of the adjacent ore.

A new lease extension law (Laws 1947, Chapter 504) provided, under certain conditions and provisions, for an extension of the term and modification of the mining leases that were in effect at that time. Applications were received under this law by the state for the extension of 12 leases, covering 8 mines.

Iron Ore Leases

During the biennium ending June 30, 1948, the state issued 177 prospecting permits, 32 iron ore leases and 26 taconite leases. Table No. 10 shows the number of permits and leases under each law that were in effect as of June 30, 1948. Tables No. 11 to 19 inclusive, show detail information on the individual leases that were in effect as of June 30, 1948.

Iron Ore Shipments

During the biennium ending June 30, 1948, 22 state-owned mines and five stockpile units shipped iron ore. The total production of royalty ore from these 27 different operations amounted to 17,151,199 tons.

Laws-	-(Author	ity for leases)			
Year	Chapter		Permits	Iron Ore Leases	Taconite Leases
1889	22	First iron ore lease law		15	
1917	110	First lake-bed lease law		2	
1921	412	Royalty based on dried iron		0	
1937	488	Lease Extension Law		5	
1941	546	Seven schedule base royalty rate	29	36	64
1943	277	Wild Cat Law	81*	1**	Ō
1943	287	Leasing ta'x-forfeited lands	10	3	16
1945	342	Leasing stockpiles	ő	8	1
Total	in effect a	as of June 30, 1948	126	70	81

Number of Permits and Leases In Effect As of June 30, 1948

*67 permits on trust fund lands, 14 permits on tax-for feited lands. $** \rm Iron$ Sulphide.

The graph, Figure 1, shows the royalty ore tonnage produced from state-owned mines compared with total shipments from the Lake Superior District and from the State of Minnesota. Note how closely the trend of production follows that of the Lake Superior District and that of the state.

Table No. 20 shows the total royalty ore produced from each stateowned mine to June 30, 1948. Figure 2 is a graph showing the yearly production of royalty ore from state-owned mines from 1893 through 1947.

Royalties from the state-owned mines and stockpiles, together with receipts from non-operating iron ore and taconite leases added approximately \$6,800,000.00 to the state permanent trust funds during the biennium ending June 30, 1948.

Field Work Required in Mineral Administration

Some of the routine work that is necessary in looking after the state's interests in all matters pertaining to mining operations, permits and leases, and in general, field administration of the state mineral laws are listed as follows:

Inspection of mining operations and concentrating plants, mine surveying and mapping, property line surveys and field divisions, lake surveys, ore estimates, scale tests and inspection of ore weighing, setting up mining units, inspection of exploration work, classification and storage of drill samples, lease extension evaluation work, blue printing, chemical analysis, ore tests and research work on low grade ores.

IRON ORE LEASES ON STATE SCHOOL LANDS, JUNE 30, 1948

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, Name	Lease No.	Description	Expires	Lessee	Sub-Lessee or Operator
Buckeye Buckeye Duncan Elbern Embarrass Lake Mine	2012 2013 2017 2005 2049 Lake Bed	$\begin{array}{c} W_{\frac{1}{2}} & NE, \ 36-56-25. \\ E_{\frac{1}{2}}^{\frac{1}{2}} & NW, \ 36-56-25. \\ E_{\frac{1}{2}}^{\frac{1}{2}} & NE, \ 36-56-25. \\ SW SW, \ 26-58-20 \& SE SE, \ 27-58-20 \\ E_{\frac{1}{2}} & NW, \ 25-58-20. \\ L_{\frac{1}{2}} & NW, \ 25-58-20. \\ Ore beneath Syracuse Lake \\ SYracuse Lake \\ \end{array}$	1992 1992 1993 1992 1998	Hanna Coal & Ore Corp Hanna Coal & Ore Corp Hanna Coal & Ore Corp Hanna Coal & Ore Corp Haley-Young Mining Co	Hanna Ore Mining Co. Hanna Ore Mining Co. Hanna Ore Mining Co. Douglas Mining Co. Haley-Young Mining Co.
Forsyth Frantz *Grant	No. 1 2041 2032 174	NE NW, 21-58-19 NE NW, 21-58-19 NE NW, Sk NW SE, 11-58-19 NE NW, 21-58-19	$1968 \\ 1997 \\ 1996$	Lake Mining Company W. S. Moore Co Hanna Ore Mining Co	Pickands Mather & Co. W. S. Moore Co. Hanna Ore Mining Co.
Hanna Hill Annex Hill Annex Hill Annex Hill Annex *Leonidas *Leonidas Martin Minnewas Minnewas Missabe Mountain. Missabe Mountain.	$\begin{array}{c} 2047\\ 374\\ 375\\ 377\\ 221\\ 224\\ 2042\\ 2028\\ 2029\\ 2018\\ 2019$	$\begin{array}{c} 19 \\ 19 \\ NW SW, 2-58-18 \& NE SE, 3-58-18 \\ SE \frac{1}{2}, 16-56-23 \\ SW \frac{1}{2}, 16-56-23 \\ NW \frac{1}{2}, 16-56-23 \\ NE \frac{1}{2}, 36-58-18 \\ SE \frac{1}{2}, 36-58-18 \\ Lot 2 (NW NW), 16-46-29 \\ W \frac{1}{2} SW, 16-58-17 \\ W \frac{1}{2} NW, 16-58-17 \\ W \frac{1}{2} NE, 8-58-17 \\ E \frac{1}{2} NE, 8-58-17 \\ NE, 8-$	$1952 \\ 1997 \\ 1950 \\ 1950 \\ 1950 \\ 1950 \\ 1965 \\ 1965 \\ 1965 \\ 1997 \\ 1994 \\ 1994 \\ 1993 \\ 1993 \\ 1993$	Inter-State Iron Co. Inter-State Iron Co. Inter-State Iron Co. Inter-State Iron Co. Inter-State Iron Co. Inter-State Iron Co. Oliver Iron Mining Co. Oliver Iron Mining Co. W. S. Moore Co. Inter-Range Mining Co. Inter-Range Mining Co. Charleson Iron Mining Co. Charleson Iron Mining Co.	Inter-State Iron Co. W. S. Moore Co. Inter-State Iron Co. Inter-State Iron Co. Inter-State Iron Co. Oliver Iron Mining Co. Oliver Iron Mining Co. W. S. Moore Co. Inter-Range Mining Co. Inter-Range Mining Co. Charleson Iron Mining Co.
Morton	2035 480	SW SW, 11-57-21 & NW NW, 14- 57-21. SE NE, 9-58-18.	$\begin{array}{c}1996\\1952\end{array}$	Hanna Coal & Ore Corp Oliver Iron Mining Co	Hanna Coal & Ore Corp. Oliver Iron Mining Co.

*Lease extended under Laws 1937, Chapter 488.

DEPARTMENT OF CONSERVATION

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TABLE	11—(Continued))
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IRON ORE LEASES ON STATE SCHOOL LANDS, JUNE 30, 1948

Name	Lease No.	Description	Expires	Lessee	Sub-Lessee or Operator
Oliver Reserve Pilot. Prindle. Prindle. Rabbit Lake Mine	569 2046 2043 2044 Lake Bed	SE SE, 4-58-18 SW NE & NW SE, 2-58-18 S ¹ / ₂ NE, 36-59-18 W ¹ / ₂ SE, 36-59-18 Ore beneath part of Public Labert	1952 1997 1997 1997 1997	Oliver Iron Mining Co W. S. Moore Co. W. S. Moore Co. W. S. Moore Co.	Oliver Iron Mining Co. W. S. Moore Co. W. S. Moore Co. W. S. Moore Co.
Seville. Shiras Tioga 42 Reserve. Wacootah. Wacootah R2	Lease No. 2 2037 2048 671 387 2036	Raboli Jake, Sec. 20, 29 & 30-47-28 N ¹ / ₂ SE, 10-58-19 S ¹ / ₂ SW, 16-58-19 Lots 3, 4 & 6-26-55-26 SE SW & S ¹ / ₂ SE, 3-58-18 WW NW 11-58.18 & SW SW 22.	$1974 \\ 1996 \\ 1997 \\ 1956 \\ 1950 \\$	Youngstown Mines Corp Rhude & Fryberger Hanna Ore Mining Co Western Mining Co Wheeling Steel Corp	Pickands Mather & Co. Rhude & Fryberger Hanna Ore Mining Co. Pickands Mather & Co. Wheeling Steel Corp.
Wadeotan Berve Wanless. Woodbridge. Yates. Yates.	$\begin{array}{c} 2050\\ 2050\\ 2038\\ 2054\\ 2051\\ 2052\\ 2055\\ 2057\\ \end{array}$	$ \begin{array}{l} 8.5 \\ 58-18, \\ 58-18, \\ 8.5 $	$1996 \\1998 \\1996 \\1998$	Wheeling Steel Corp W. S. Moore Co Cleveland-Cliffs Iron Co W. S. Moore Co W. S. Moore Co Western Mining Co W. S. Moore Co Western Science Co W. S. Moore Co	Wheeling Steel Corp. W. S. Moore Co. Cleveland-Cliffs Iron Co. Cleveland-Cliffs Iron Co. W. S. Moore Co. W. S. Moore Co. Pickands Mather & Co. W. S. Moore Co.

*Lease extended under Laws 1937, Chapter 488.

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IRON ORE LEASES ON STATE SWAMP LANDS, JUNE 30, 1948

Name	Lease No.	Description	Expires	Lessee	Sub-Lessee or Operator
Carson Lake Reserve Northland. *Scranton. State Sagamore. Tioga No. 1 Reserve. *Warben. Wearne. Weggum.	$\begin{array}{c} 2039 \\ 2053 \\ 392 \\ 2040 \\ 675 \\ 752 \\ 775 \\ 2016 \end{array}$	$\begin{array}{l} NW \; SE,\; 10{\text{-}}57{\text{-}}21.\\ N\frac{1}{9}\; NW,\; 20{\text{-}}47{\text{-}}28\\ NW,\; 20{\text{-}}47{\text{-}}28\\ N\frac{1}{9}\; NE \;\& SW \; NE,\; 12{\text{-}}57{\text{-}}21.\\ SE \; SE,\; 24{\text{-}}46{\text{-}}30.\\ Lots\; 3\;\& 8\;, 34{\text{-}}55{\text{-}}26\\ SW \; SE\;\& 8\;, 84{\text{-}}55{\text{-}}26\\ SW \; SE\;\& 8\; SE\; SW,\; 4{\text{-}}63{\text{-}}9\\ SW \; SE\;\& SE\; SW,\; 4{\text{-}}63{\text{-}}9\\ SW \; SE\;\& 5E\; SW,\; 4{\text{-}}63{\text{-}}9\\ E\frac{1}{9}\; SE\;,\; 6{\text{-}}57{\text{-}}20.\\ \end{array}$	$1996 \\ 1998 \\ 1960 \\ 1996 \\ 1956 \\ 1965 \\ 1965 \\ 1957 \\ 1992$	Utica Mining Co. Hanna Coal & Ore Corp. Hoyt Mining Co. Syracuse Mining Co. Western Mining Co. Warben Land Co. Geo. H. Crosby, et al. Philbin Mining Co.	Pickands Mather & Co. Hanna Coal and Ore Corp. Pickands Mather & Co. Pickands Mather & Co. Pickands Mather & Co. Warben Land Co. Hanna Iron Ore Co. Butler Brothers

*Lease extended under Laws 1937, Chapter 488.

IRON ORE LEASES ON STATE UNIVERSITY LANDS, JUNE 30, 1948						
Name	Lease No.	Description	Expires	Lessee	Sub-Lessee or Operator	
Bennett Reserve. Kevin. Mesabi Chief. Mesabi Chief. Mississippi No. 1 Mississippi No. 2. *Stein. Sullivan No. 2 Reserve. Wyman Reserve.	$2033 \\ 376 \\ 2034 \\ 2025 \\ 2027 \\ 355 \\ 356 \\ 282 \\ 455 \\ 2011 \\ 1$	$\begin{array}{c} E_{\frac{1}{2}} & SE, 24\text{-}57\text{-}22 . \\ SE NW, N_{\frac{1}{2}} SW \&SW SW, 1\text{-}56\text{-}23 . \\ S_{\frac{1}{2}} SW, 9\text{-}56\text{-}23 . \\ W_{\frac{1}{2}} SW, 23\text{-}57\text{-}22 . \\ NE SW, 23\text{-}57\text{-}22 . \\ S_{\frac{1}{2}} NW, 24\text{-}57\text{-}22 . \\ S_{\frac{1}{2}} NW, 24\text{-}57\text{-}22 . \\ NE NW \&S_{\frac{1}{2}} NW, 23\text{-}57\text{-}22 . \\ NE NW \&S_{\frac{1}{2}} NW, 23\text{-}57\text{-}22 . \\ SW SW, 2\text{-}56\text{-}23 . \\ SE SW, 22\text{-}57\text{-}22 . \\ \end{array}$	$1996 \\1950 \\1996 \\1993 \\1994 \\1949 \\1949 \\1958 \\1952 \\1992$	Hanna Coal & Ore Corp. Butler Brothers. Hanna Coal & Ore Corp. Hanna Ore Mining Co. Butler Brothers.	Hanna Coal & Ore Corp. Butler Brothers Hanna Coal & Ore Corp. Hanna Ore Minning Co. Hanna Ore Mining Co. Hanna Ore Mining Co. Hanna Ore Mining Co. Inter-State Iron Co. Butler Brothers	

*Lease extended under Laws 1937, Chapter 488.

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Lease No.	Description	${f Trust}$ Fund	Lease Expires	Lessee	Operating Company
3001	W1 NE & SE1 14-59-14	University	1991	Erie Mining Co	Pickands Mather & Co.
3002	S_{1}^{2} NW 14-59-14	University	1991	Erie Mining Co	Pickands Mather & Co
3003	SW1 14-59-14	University	1991	Erie Mining Co	Pickands Mather & Co.
3004	SE NE E1 SE SW SE & S1 SW 15-59-14	University	1991	Erie Mining Co	Pickands Mather & Co.
3005	SE NW 15-59-14	University	1991	Erie Mining Co.	Pickands Mather & Co.
3006	$SW^{\frac{1}{2}}$ 16-59-14	School	1991	Erie Mining Co	Pickands Mather & Co.
3007	SE ⁺ 16-59-14	School	1991	Erie Mining Co.	Pickands Mather & Co.
3008	NE ¹ & NE SE 22-59-14	University	1991	Erie Mining Co	Pickands Mather & Co.
3009	E [±] NE. 21-59-14, NW [±] , 22-59-14	University	1991	Erie Mining Co.	Pickands Mather & Co.
3010	$NE^{\frac{1}{2}} \& E^{\frac{1}{2}} NW. 23-59-14.$	University	1991	Erie Mining Co	Pickands Mather & Co.
3011	W ¹ / ₁ NW & SW ¹ / ₂ 23-59-14	University	1991	Erie Mining Co	Pickands Mather & Co.
3012	SE ¹ . 36-60-14	School	1991	Erie Mining Co	Pickands Mather & Co.
3013	N ⁺ SW, 1-58-19	School	1991	Ontario Iron Co	Pickands Mather & Co.
3014	S ¹ / ₂ SW, 2-58-19	School	1991	Ontario Iron Co	Pickands Mather & Co.
3015	SW SE, 2-58-19	School	1991	Ontario Iron Co	Pickands Mather & Co.
3016	NE SE, 2-58-19	School	1991	Ontario Iron Co	Pickands Mather & Co.
3017	W ¹ / ₂ SW, 9-58-19	School	1991	Ontario Iron Co	Pickands Mather & Co.
3018	NÉ SW, 9-58-19	\mathbf{School}	1991	Ontario Iron Co	Pickands Mather & Co.
3019	$S_{\frac{1}{2}}$ SE, 9-58-19 (Eaton)	School	1991	Ontario Iron Co	Pickands Mather & Co.
3020	N ¹ / ₂ NE, 10-58-19	School	1991	Ontario Iron Co	Pickands Mather & Co.
3021	$S_{\frac{1}{2}}^{\frac{1}{2}}$ NE, 10-58-19	School	1991	Ontario Iron Co	Pickands Mather & Co.
3022	$S_{\frac{1}{2}}^{\frac{1}{2}}$ NW, 11-58-19	\mathbf{School}	1991	Ontario Iron Co	Pickands Mather & Co.
3023	$N_{\frac{1}{2}}^{\frac{1}{2}}$ NW, 11-58-19	\mathbf{School}	1991	Ontario Iron Co	Pikcands Mather & Co.
3024	$S_{\frac{1}{2}}$ NE, 11-58-19	\mathbf{School}	1991	Ontario Iron Co	Pickands Mather & Co.
3025	$ N_{\frac{1}{2}}^{1} NE, 11-58-19 $	\mathbf{School}	1991	Ontario Iron Co	Pickands Mather & Co.
3027	$E_{\frac{1}{2}}^{1}$ NW, 16-58-19	\mathbf{School}	1991	Ontario Iron Co	Pickands Mather & Co.
3028	$W_{\frac{1}{2}}$ NW, 16-58-19	School	1991	Ontario Iron Co	Pickands Mather & Co.
3029	NW NE, 8-57-21	Swamp	1991	Ontario Iron Co	Pickands Mather & Co.
3030	W ¹ / ₂ NE, 36-58-21 (Maderia)	School	1991	Ontario Iron Co	Pickands Mather & Co.
3031	E ¹ / ₂ NE, 36-58-21 (Maderia)	\mathbf{School}	1991	Ontario Iron Co	Pickands Mather & Co.

TACONITE	LEASES	ON	STATE	LANDS,	JUNE	30,	1948

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TABLE 14—Continued

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TACONITE LEASES ON STATE LANDS, JUNE 30, 1948

DIVISION OF LANDS AND MINERALS

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IRON ORE LEASES ON TAX FORFEITED LANDS, JUNE 30, 1948

Lease No.	Description	Trust Fund	Lease Expires	Lessee	Operating Company
I-5017	E NW, 27-58-20 (Bruce)	Special	1997	Inter-State Iron Co	Inter-State Iron Co.
I-5018	W1 NE, 14-58-19 (Jennings)	Speical	1998	W. S. Moore Co	W. S. Moore Co.
I-5019	NE NW, 15-58-19 (McGrath Res.) (1)	Special	1998	Rhude & Fryberger	Rhude & Fryberger

(1) Undivided 1/6 interest in mineral rights.

TABLE 16

TACONITE LEASES ON TAX FORFEITED LANDS, JUNE 30, 1948

Lease No.	Description	Trust Fund	Lease Expires	Lessee	Operating Company
$\begin{array}{c} T-5001\\ T-5002\\ T-5003\\ T-5004\\ T-5005\\ T-5006\\ T-5007\\ T-5008\\ T-5009\\ T-5010\\ T-5011\\ T-5012\\ \end{array}$	Description NW NW, 14-59-14. SW NE, 24-59-15. SW NW & SE NW, 23-59-15. SW SW, 34-59-15. SW SW, 33-59-17. N# SW, 33-59-17. N# SW, 29-59-14. Sł SE & SE SW, 13-59-15. SW SW, 28-59-15. SW SW, 28-59-15. SW SW, 28-59-15. SW SW, 28-59-15. SW SW, NW SE & SW NE, 15-59-14.	Special Special Special Special Special Special Special Special Special Special	1993 1994 1994 1994 1994 1994 1994 1994	Lessee Huron Land Co. Ontario Iron Co. Huron Land Co.	Pickands Mather & Co. Pickands Mather & Co.
T-5013 T-5014	SE SE, 22-59-15 (3)	Special Special	$1997 \\ 1997$	Erie Mining Co Oliver Iron Mining Co	Pickands Mather & Co. Oliver Iron Mining Co.
T-5015 T-5016	$\begin{array}{l} SE \ NW, \ Lot \ 2 \ (SW \ NW), \ Lot \ 3 \ (NW \ SW) \ \& \ Lot \ 4 \ (SW \ SW), \ 30-59-14 \ (5) \\ SE \ SE, \ 28-59-15 \ \& \ NE \ NW \ \& \ N\frac{1}{2} \ NE, \ 33-59-15 \ (6) \\ \end{array}$	Special Special	1997 1997	Oliver Iron Mining Co Oliver Iron Mining Co	Oliver Iron Mining Co. Oliver Iron Mining Co.

Undivided 7/8 interest in mineral rights.
 Undivided 14/15 interest in mineral rights.
 Undivided 3/16 interest in mineral rights.
 Undivided 3/16 interest in mineral rights.
 Undivided (11/18 int. NE NE), (14/27 int. NW NE), (68/72 int. SW NE), (17/72 int. SE NE), (7/8 int. NW SE & NE SW) in mineral rights.
 Undivided (3/4 int. SE NW), (7/8 int. Lot 2 (SW NW) and Lot 3 (NW SW)), (65/72 int. Lot 4 (SW SW)) in mineral rights.
 Undivided 34/40 interest in mineral rights.

IRON SULPHIDE LEASE, LAWS 1943, CHAPTER 277, (LAWS 1947, CHAPTER 96) JUNE 30, 1948

Lease No.	Description	${f Trust}$ Fund	Lease Expires	Lessee	Operating Company
I-9001	N ¹ / ₂ NE & E ¹ / ₂ NW, 28-46-25	School	1994	Glen Development Co	Glen Development Co.

TABLE 18

IRON ORE STOCKPILE LEASES, LAWS 1945, CHAPTER 342, JUNE 30, 1948

Lease No.	Description	${f Trust}\ {f Fund}$	Lease Expires	Lessee	Operating Company
ISP-201 ISP-204 ISP-205 ISP-206 ISP-207 ISP-208 ISP-209 ISP-210	NW NE & Portion of SW NE, 16-58-17 (Missabe Mt Minnewas) SW SE, 16-58-19 (Margaret). NÅ NE & SE NE, 8-58-17 (Missabe Mountain). SÅ SE, 36-59-18 (Prindle). SE SE & Part of SW SE, 26-57-22 (Mesabi Chief). NW SW, 2-57-22 (Mesabi Chief). SW SW, 2-58-18 (Wacoutah and Alan). NW SE, 16-58-19 (Margaret).	School School School University University School School	1996 1997 1997 1998 1998 1998 1998 1998	Charleson Iron Mining Co W. S. Moore Co	Charleson Iron Mng. Co. W. S. Moore Co.

TABLE 19

TACONITE STOCKPILE LEASE, LAWS 1945, CHAPTER 342, JUNE 30, 1948

Lease No.	Description	Trust Fund	Lease Expires	Lessee	Operating Company
TSP-301	E ¹ / ₂ NE, NE-SE, & Portion of SW NE, 16-58-17 (Mis- sabe Mountain—Minnewas)	School	1996	Charleson Iron Mining Co	Charleson Iron Mng. Co.

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DEPARTMENT OF CONSERVATION

New Mines and Minerals Building

The new Mines and Minerals Building was ready for occupancy on August 16, 1948.

This is a one-story structure occupying a site 183 feet wide and 315 feet deep on an improved tract of land in Bennett Park, which was donated to the state by the Village of Hibbing. The building, which is of brick and tile and steel construction, provides space on the ground floor for the general office and engineering section, the research laboratory, the chemical section, and a 10-car storage garage and repair shop for the state-owned automobiles used by the office personnel in the performance of essential work covering the three Minnesota Iron Ranges. The basement of the new building has, besides other facilities, a large fire-proof vault located directly under a similar vault on the ground floor, a shower and locker room, and a large storage space for the thousands of drill samples that have accumulated in the past 50 years.

This building furnishes ample fire-proof storage for the state records, many of which were without proper protection in the former building, and provides improved quarters for the engineering and office force, and for the chemistry and research sections, with efficient facilities for testing low grade ores.



New Mines and Minerals Building, Hibbing.

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DIVISION OF LANDS AND MINERALS



Drafting Room, Mines and Minerals Building, Hibbing.

REPORT ON INDIVIDUAL MINES

H. V. REUSSWIG, Assistant Chief Engineer

Following is a brief report on state-owned iron ore properties which were under lease during this biennium.

Detailed information in regard to lease holders, operators, production and the status of the various leases is tabulated elsewhere in this report.

Alan Stockpile - East of Mt. Iron, St. Louis County

This stockpile of lean ore was mined in 1942 and was not of commercial value at that time. A prospecting permit covering the stockpile, was granted in June, 1946, and converted to a mining lease in December, 1946. Direct shipments were made from the stockpile during the 1947 ore season. The lease was canceled in October, 1947.

Alberta Mine - Southeast of Virginia, St. Louis County

Under old lease (NE^{$\frac{1}{4}$} Sec. 16-58-17), Alberta Mine was operated by the Alberta Iron Co., 1907-1908, and by the Lily Mining Co., 1910-1913 as the Lily Mine. The W^{$\frac{1}{2}$} NE^{$\frac{1}{4}$} is now under taconite lease to the Oliver Iron Mining Company.

DEPARTMENT OF CONSERVATION

Atkins Mine - Northeast of Kinney, St. Louis County

During the second quarter of 1946, the Inland Steel Company completed their loading from stockpile and shortly thereafter canceled the lease. This ore which was shipped as direct merch, averaged 47.50% iron, 16.47% silica, and 6.50% alumina with 17.5% moisture. Ore of this quality is seldom sold on the open market. In this case, it was shipped directly to Inland Steel furnaces. A lean ore stockpile of lower grade material remains on the property.

Bennett Reserve - North of Keewatin, Itasca County

This property contains an open pit tonnage of merch and concentrating ores. It is now under lease to the Hanna Coal and Ore Corporation.

Buckeye Mine --- Northwest of Coleraine, Itasca County

The operators conducted a drilling program that has disclosed and outlined new ore in the northeast part of the property which is being developed and mined at the present time. The beneficiation plant has been improved each year and is now able to take all minus 5-inch material from the pit and improve it to present day commercial grades.

Carson Lake Mine — West of Hibbing, St. Louis County

Operated as an underground mine by the Oliver Iron Mining Company in 1919, with stockpile shipments in 1923. Now under lease to the Utica Mining Co.

Duncan Mine - Southeast of Chisholm, St. Louis County

Starting in 1947 and continuing to date, the lease holders have carried on a drilling program on this property which lies adjacent to one of their active open pits. It is quite possible that a large tonnage of wash ore can be proven in addition to the known direct merch. The combined tonnage will have to be large to warrant an open pit operation as the property carries a deep surface overburden.

Elbern Mine — East of Chisholm, St. Louis County

A mining lease became active on this unit in February, 1948, and an open pit is being developed on the property at this time. The mine is not fully explored. Present data indicate reserve of about 700,000 tons.

Embarrass Lake Mine - Between Aurora and Biwabik, St. Louis County

This property continued shipping about 500,000 tons of lake bed ore each season. The lake bed area is fully developed at this time and the operators are carrying on a heavy stripping program, enlarging the pit to the east. The surface screening and crushing plant was dismantled and re-erected in the pit and ore is belt-conveyed now from the pit bottom to the loading pocket on surface.

Forsyth Mine - Northeast of Kinney, St. Louis County

This mining unit covers part of the old Yates reserve, but lies outside

of the old mining area. The lease holders developed a small open pit over a known body of low grade ore and made their first shipments from the property in May, 1948. The pit is to be enlarged from time to time if the market for this type of ore holds up.

Frantz Mine - Northeast of Buhl, St. Louis County

The lease on this property was transferred to the Hanna Ore Mining Company. Early in 1948, the Hanna company submitted proposed plans for an open pit development on the property with a request for surface and lean material dumps on adjacent state-owned lands. So far, their drilling has disclosed ore and ore material which cannot be covered with dumps. Drilling is still in progress at the close of this biennium.

Grant Mine — West of Buhl, St. Louis County

This property continues shipping a fair tonnage of state ore each



FIGURE 1

Graph showing iron ore shipments for the Lake Superior district and Minnesota, as compared with royalty ore produced from state-owned mines from 1928 through 1947.

DEPARTMENT OF CONSERVATION

season. The loading agreement with the adjacent property owners is still in effect. This agreement allows for the development of the mine so that property line ores which normally would be tied up in pit slopes, can be mined at the present time. The washing plant is producing about one-half of the ore shipped from the property.

Hanna Mine - East of Mt. Iron, St. Louis County

The lease on this property was assigned to the W. S. Moore Company. Early in 1948, this company moved in equipment and enlarged the old open pit area a short distance to the north and east. The mine returned to the active shipping list during the second quarter of 1948.

Hill Annex Mine - North of Calumet, Itasca County

This open pit mine is one of the largest producers of crude wash ore from the western part of the Mesabi Range. It is the largest producer of tonnage and the second largest producer of royalty income of all the stateowned properties.

Kevin Mine - Southwest of Nashwauk, Itasca County

Improvements have been made in the beneficiation plant which serves this open pit, allowing the operator to work in a poorer grade and a lower recovery crude ore. This in turn, increases the life of the mine as a shipper of concentrates.

Leonidas Mine --- West of Eveleth, St. Louis County

The new shaft on the property was completed early in 1947. The pumping station in the old shaft is maintained, and underground workings are kept dry. Underground mining production has been suspended since 1942.

Leonidas Mine Stockpile -- West of Eveleth, St. Louis County

34,949 tons of crude ore were shipped from lean ore stockpiles for experimental purposes to the operating company's Trout Lake concentrating plant at Coleraine.

Majorca Mine (West Unit) - North of Calumet, Itasca County

This west unit has never been in production. Former Majorca Mine operations were in the east unit, which is now under taconite lease.

Margaret Mine — Northeast of Buhl, St. Louis County

Open pit merch and wash ore operation. Butler Bros., 1918-1934, C. W. Moore Co., Inc., 1943-1944.

Margaret Mine — Stockpiles

This stockpile unit was leased in 1947 and a portable washing plant was moved onto the property. A small tonnage of wash concentrates was shipped in 1947. The lease is still active.

DIVISION OF LANDS AND MINERALS

Martin Mine --- Southwest of Crosby, Crow Wing County

The Martin open pit mine was on the shipping list during the last half of 1946. The lease was canceled in December of that year, and another mining company bid in the property and took out a mining lease in 1947. Two drills are active at this time searching for additional ore which can be developed by open pit methods.

Mesabi Chief (West) Mine - West of Keewatin, Itasca County

The operators started developing the south side of the old pit which covers most of this unit. An enrichment in the upper part of the formation was encountered and direct shipments covering minimum royalty payments have been made during the past two seasons from this area.



Part of Hill Annex Open Pit Mine, Calumet — showing shovel, trucks and bulldozer. Looming up behind the shovel is a "rock horse" or block of taconite.

Mesabi Chief (East) Mine — West of Keewatin, Itasca County

This unit covers the east side of the old pit where additional development has uncovered a good tonnage of wash ore and at the same time, recovered between 50,000 and 60,000 tons of low grade merch ore. Some of this tonnage was put in stockpile and will be loaded out from time to time.

Minnewas Mine — Southeast of Virginia, St. Louis County

This property produces a high grade direct merch ore from both underground and open pit workings. New open pit ore is explored by drifting in from the open pit slopes to the shore or rock line. The ore area is then fully developed by stripping off the overburden, and the ore is truckhauled to cars.

Missabe Mt. Mine - East of Virginia, St. Louis County

This mine, producing a steady tonnage of high grade direct merch ore, earns more royalty money than any other state-owned property. The main part of the pit is nearly mined out. Most of the remaining tonnage is tied up in pit slopes where the main ore body enters and leaves the property. Two of these areas which are being developed at this time will release additional Missabe Mountain ore for future shipment.

Missabe Mt. Stockpiles - East of Virginia, St. Louis County

These lean ore stockpiles which were built up in the early days of the Missabe Mt. open pit operations were found to contain some ore of good quality. A stockpile lease was granted in August, 1947, and direct ore was shipped from the pile during the balance of the 1947 ore season.

Missabe Mt. and Minnewas Mines Stockpile — Southeast of Virginia, St. Louis County

Part of the ground which was covered in the old Alberta Mine lease is now occupied by a large lean ore stockpile. This stockpile was made up with material from the Missabe Mt. and Minnewas open pits as they were developed from year to year. This stockpile is now under a mining lease. The lease holder is constructing a wash and jig plant and expects to ship concentrates from the pile in the near future.

Mississippi No. 1 Mine - Northwest of Keewatin, Itasca County

The 1947 ore season was the last good year of royalty ore from this property. There is enough crude wash ore available within the open pit area to allow the operators to mine enough ore annually to cover their minimum royalties to the state during the life of the present lease.

Mississippi No. 2 Mine - Northeast of Keewatin, Itasca County

This property originally produced ore as an underground mine. During the latter part of 1946, the lease holders started winter operations to develop the west side of this mine as an extension from their Mississippi No. 3 open pit. No ore was produced during the biennium.

Morton Mine - West of Hibbing, St. Louis County

Underground operation by Tod-Stambaugh Co., Agent, 1912-1917, with stockpile shipments in 1920 and 1922. Now under lease to Hanna Coal and Ore Corp.

Mott Mine - South of Mt. Iron, St. Louis County

The state owns a 40-acre unit which will be partly within a new open pit development known as the Mott Mine. Work was started on a stripping contract in the second quarter of 1948. The mine will produce a direct shipping ore and a wash ore.

Oliver Reserve - South of Mt. Iron, St. Louis County

Under lease to Oliver Iron Mining Company.

Pilot Mine - East of Mt. Iron, St. Louis County

Hanna Ore Mining Co. open pit and underground operation 1919-1922. Stockpile lease shipments by W. S. Moore Co. in 1947. Property now under mining lease to W. S. Moore Company.

Pilot Mine Stockpile - East of Mt. Iron, St. Louis County

During 1947, the W. S. Moore Company held a mining lease on the lean ore stockpiled from the old Pilot Mine workings. A small tonnage was shipped from the stock pile in 1947.

Prindle Mine — Northwest of Virginia, St. Louis County

During 1947, two mining leases were taken out on this property. These leases cover the old Prindle open pit, previously operated by the Oliver Iron Mining Company. The lease holders are prospecting for new open pit ore by test pitting, bank sampling and driving in pit drifts. They have found several areas which may warrant development.

Rabbit Lake Mine - Northeast of Cuyuna, Crow Wing County

The east bay of Rabbit Lake has been dewatered and a contractor is removing overburden from the lake bed area with a floating dredge. Material is pumped from the dredge to storage areas.

Scranton Mine --- Northwest of Hibbing, St. Louis County

The working agreement is still in effect with the adjacent property owners whereby the operating company can load out ores other than the Scranton. This has resulted in a better development of the pit and a larger shipment of state ore. Ore is now belt-conveyed from the bottom of the pit to a loading pocket on surface and railroad haulage within the pit has been abandoned.

Seville Mine - Northwest of Kinney, St. Louis County

A mining lease became active on this property in July, 1946. A small pit was developed over old underground workings in the southwest part of the unit and the mine returned to the shipping list in 1947. The pit extends over the property line to the west and to the south and the operator loads adjoining ore for other owners.

Shiras Mine - Northeast of Buhl, St. Louis County

An active prospecting permit was held on this property during 1947. Drill holes put down under this permit warranted holding the property

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STATE OF MINNESOTA

under a mineral lease. This was executed in December, 1947, and is still active. An open pit located over the old underground workings, is to be developed in the near future.

Stein Mine --- Northwest of Keewatin, Itasca County

All known ore on this property has been fully developed within the present open pit. Some of the developed ore is very rocky and the operators have considerable trouble in cleaning up the crude ore sent to the washing plant. The concentrates made carry a very high silica.

Sullivan No. 2 Mine - Southwest of Nashwauk, Itasca County

This property carries an old 50-year lease but has never until recently been active as a shipper. The lease holders developed an open pit on the property in 1946 and put crude wash ore into stockpile during the winter and spring of 1947. This crude ore was washed through the Hill Annex washing plant during the 1947 ore season. The company now has in stockpile 105,000 tons of crude ore for future use.

Tioga No. 1 Reserve - Southwest of Grand Rapids, Itasca County

This reserve is located in the Pokegama Lake area. Now under lease to Western Mining Company.

Tioga No. 2 Reserve - Southwest of Grand Rapids, Itasca County

This reserve is located in the Pokegama Lake area. Now under lease to Western Mining Company.

Wacootah "A" Mine - East of Mt. Iron, St. Louis County

This open pit is one of the few mines on the Mesabi Range which has not converted to truck haulage. Its annual production has been steady over the past years. The reserve tonnage of the better grade ore will be loaded out during the life of the present lease.

Wacootah "B2" Mine — East of Mt. Iron, St. Louis County

This unit covers a new extension on the east side of the Wacootah "A" pit which was stripped by truck operation. The ore is hauled out through the Wacootah "A" track system. A possible 250,000 tons of direct merch ore was made available for shipping by the new development.

Wanless Mine - Northeast of Buhl, St. Louis County

This unit covers the old Wanless underground mine which was abandoned in 1935. A prospecting permit was granted in June, 1946, and subsequent drilling proved up ore which can be developed into an open pit operation. The property is now under lease, and it is expected that an open pit will be developed in the near future.

Warben Reserve --- Northeast of Ely, Lake County

Lease No. 752 to Warben Land Company was extended under Laws 1937, Chapter 488.

Wearne Mine - North of Crosby, Crow Wing County

This unit covers forty acres of state-owned land adjoining the present Portsmouth open pit mine. Production from the state unit depends on the general development of the whole pit and has not been very heavy during the biennium.

Weggum Mine - North of Hibbing, St. Louis County

Since the development of this property as an open pit, it has been a steady producer of ore each season. The operators were forced to change the location of their screening plant within the pit during the past year. The new location should be permanent now and allow for the full development of all ores within the open pit area. The operators continue to wash crude ore for adjacent property owners.

Woodbridge Mine --- Northeast of Buhl, St. Louis County

This unit covers the old Woodbridge underground mine which was abandoned in 1922. A prospecting permit was granted in June, 1947, and subsequent drilling proved up ore which can be developed into an open pit along with the Wanless unit to the south. The prospecting permit was converted to a mining lease which is active at this time.

Wyman Reserve — West of Keewatin, Itasca County

Explored property now under lease to Butler Brothers-Lease No. 2011.

DEPARTMENT OF CONSERVATION FIGURE 2



Graph showing yearly production of iron ore from state-owned mines — 1893-1947.

	Mine	Lease No.	Location	Tonnage
1	Alen	2003-2004	Mt. Iron	50 091
1.	Hanne (old)	364	Mt Iron	1 661 490
	Alan Stocknile	1SP-202	Mt Iron	25 273
2	Alberta (Lily)	655	Virginia	136,535
3	Atkine	2014	Kinney	723.314
4	Barbara	415-3046	Calumet	995,448
5	Buckeye	2012-2013-2017	Coleraine	2.301.665
<i>б</i> .	Carson Lake	443-2015-2039	Hibbing	5,131
7	Cavour	699	Kinney	177.964
8.	Deacon	404	Kinney	347,512
<u>9</u> .	Draper.	478-2001-3043	Calumet	296,141
10.	Duncan	65-2005	Chisholm	87,761
11.	Eaton	391-3019	Buhl	3,548
12.	Embarrass	Syracuse Lake Bed		
	<u></u>	Lease No. 1	Biwabik	2,843,259
13.	Fay	346-3064	Virginia	1,264,531
14.	Forsyth	2041	Kinney	95,650
15.	Frantz	365-2032	Buhl	744,474
16.	Grant	174	Buhl	9,433,739
17.	Hanna (new)	2047	Mt. Iron	32,700
18.	Helen	A1-2008	Cooley	1 260 221
19.	Helmer	402-2000	Columet	57 800 237
20. 91	Kovin	376	Cooley	12 813 768
21. 99	Loopidas	221-224	Eveleth	20,858,689
22.	Leonidas Stkn No 9	Sub-lease 221	Eveleth	80.010
	Leonidas Stkp. No. 1-4	221	Eveleth	34.949
23.	Maderia	558-3030-3031	Hibbing	195,495
24.	Majorca	456-2034-3041	Calumet	2,983,447
25.	Margaret	Part 363-2010	. Buhl	1,462,237
	Margaret Stockpile	ISP-204	Buhl	13,192
26.	Martin	776-2006-2042	Ironton	239,610
27.	Mesabi Chief	268-2025-2027	Keewatin	10,926,211
28.	Minnewas	218-219-2020-2021	· ·	
20	NC O	2028-2029	Virginia	12,155,850
29.	Minnewas-Coons	Part 218	Virginia	004,041
30.	Missabe Mt. Stlm	199-2010-2019 19D 205	Virginia	29 188
21	Mississippi No 1	355	Koowatin	4 871 670
39	Mississippi No. 2	356	Keewatin	296 467
33	Morton	468-2026-2035	Hibbing,	205,452
34	Pilot	353-2046	Mt. Iron	239,040
01.	Pilot Stkp	ISP-203	Mt. Iron	1,255
35.	Pool	85-2023-2024-3037	Hibbing	3,951,344
36.	Prindle	449-451-2043-2044	Virginia	2,593,232
37.	Scranton	392	Hibbing	14,986,750
38.	Section 17	477-3056-3057	Buhl	21,159
39.	Seville	371-2007	Kinney	171,819
40.	Shiras	362-2048	Buhl	1,051,718
41.	Sliver	618	Virginia	174,813
42.	Smith	384-A12-2002	Hibbing	971,800
45.	Stein	282 455	Creewatin	190 586
44.	Vornon	44-2022-3048	Cooley	26,160
40.	Wacootab ''A''	387	Mt. Iron	6.809,681
47	Wacootah "B"	388	Mt. Iron	112,965
48	Wacootah ''B-2''	2036	Mt. Iron	156,022
49.	Wanless	363-2038	Buhl	2,247,888
50.	Wearne	775	Crosby	2,592,158
51.	Weggum	2016	Hibbing	1,948,985
	Philbin	389	Hibbing	1,235,908
52.	Wheeling	. A6	Mt. Iron	223,685
53.	Woodbridge	370	Buhi	1,000,100
54.	Yates	300	Linney	078,090
	GRAND TOTAL			263,798,308
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TABLE 20

Total Ore Production from State Mines to June 30, 1948

DEPARTMENT OF CONSERVATION

ORES UNDERLYING LAKES AND RIVERS

ROY C. PASCOE, District Engineer

All iron ores and other minerals located beneath the waters of public lakes and rivers were reserved for the state by the legislature in 1909. There are literally thousands of acres of known and prospective iron ore lands underlying these lakes on the Mesabi, Cuyuna, Vermilion and Gunflint ranges.

The state's ownership of this lake bed ore had never been settled by the courts, and the Attorney General filed an action in 1945 in the District Court of St. Louis County to determine the title of the Syracuse Lake bed, which was considered more or less as a test case. The state based its claim on its ownership of public waters, while the riparian owner maintained that his riparian rights extended beneath the water adjacent to his land holdings.

The District Court's decision, handed down in April of 1946, held that the state is the owner of the lake bed below low water mark in its sovereign, governmental capacity, with the right to dispose of the lake bed iron ore by lease. The decision was appealed, but was upheld by the State Supreme Court in August of 1947. The case has now been appealed to the United States Supreme Court.



Control Dam on the Diversion Channel at Embarrass Mine near Biwabik.

A second case, covering Chain Lakes, located in Sections 1 and 2 of Township 55 North, Range 25 West, is being held in district court at the present time. The original lake bed mining law was passed in 1917 (Chapter 110). Under it, the state issued two lake bed leases. Lake-Bed Lease No. 1 was issued in 1918 and covered the bed of Syracuse Lake which is located on the Mesabi Range near Aurora. Lake-Bed Lease No. 2 was issued in 1924 and covers a portion of the east bowl of Rabbit Lake which is just north of Crosby on the Cuyuna Range. Both leases provided for a royalty of 50 cents per ton.

The Syracuse Lake bed is a part of the Embarrass Mine. The first iron ore mined under a lake bed lease in Minnesota was shipped from this mine in June 1944. In order to make this ore available, the largest water diversion channel in the state was created. We might mention here that ore had been mined from the Longyear Lake bed some years previous, but the mining was not done under a lease and resulted in the law-suit "State vs. Korrer."

On June 30, 1948, the production from the Syracuse Lake bed totaled 2,843,259 tons. Total shipments for this biennium were 1,054,428 tons.

The Syracuse Lake bed is operated as a part of the Embarrass Mine by Pickands Mather and Company. The original lessee was John R. Van Derlip, but the lease is now held by the Lake Mining Company.

The Rabbit Lake-Bed lease covering about 320 acres, was awarded to the Rogers-Brown Ore Company in 1924. It is now held by the Youngstown Mines Corporation, with Pickands Mather and Company as the operating agent.

The two bowls of the lake have been separated by a dike which was completed in June of 1945. Dewatering of the east bowl was started at once and was completed in 1947 except for a pond which will be used as a pump sump for natural drainage.

Early in the biennium a dredging contract was awarded to the Union Dredge Company to strip an area for mining the ore body. This area has been encompassed by a dike constructed under contract by Zontelli Brothers of Ironton. The ore limits cover an area about 900 feet in width and about 1400 feet in length, but the stripping limits are considerably greater.

The dredging contractors dismantled their equipment and shipped it by rail, overland from Lake Superior. Reassembling the 140 by 30 foot dredge with all its accessories was completed in May of 1948. In addition to the 1000 hp. dredge, a 1250 hp. booster pump installation has been built and housed, about 4800 feet of 20" hydraulic line has been laid to the dump site, and 3400 feet of ditch and flume have been constructed for the return water. Actual stripping operations were started in the latter part of May 1948.

Unlike the Syracuse Lake-Bed lease in which the shore line was agreed upon between the state and the riparian owners, the Rabbit Lake-Bed lease shore line must be determined by a mean low water determination which will be based partially upon the records of lake elevation readings taken by this Division since 1911. During the biennium considerable field work has been done in conjunction with making this determination. Since the de-

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termination of the mean low water elevation of a lake necessitates the establishing of a legal datum plane, interconnecting elevation courses are being run constantly to establish U. S. G. S. and U. S. C. & G. S. bench marks in a systematic plan which will eventually provide federal datum bench marks at each lake. Elevations are now being read on more than 100 lakes. Previously, these readings were taken semi-annually, but a new faster field method is being developed whereby they will be taken monthly. Monthly readings are already in effect on the 51 lakes on the Cuyuna Range.

In 1943, the legislature enacted our present lake-bed iron ore law (Chapter 208). It provides for the payment of royalty, based on the iron content of the ore when shipped. The minimum royalties are the same as those set forth in the regular iron ore lease law of 1941 (Chapter 546) as amended. No leases have been issued under this act, but 10 prospecting permits were awarded. Considerable lake-bed exploration has been conducted under these permits.

The court's decision on the ownership of lake bed ore has created a great deal of interest in the possibility of locating new reserves of iron ore. However, the low water mark of each lake will have to be determined by the state before iron ore prospecting permits or leases can be issued.

MINERAL RESEARCH SECTION

MICHAEL P. WALLE, Chief Research Engineer.

During the last world war, the lack of personnel and the difficulty in procuring supplies and equipment forced the Research Section to operate on a reduced basis. The work accomplished during that period was mainly the routine work in connection with exploration and the laboratory tests that were made to check the operations at state-owned properties.

Due to the enormous consumption of iron ore during the war years, the emphasis on low grade and intermediate or marginal types of ores has increased greatly. Experimental work conducted by the manufacturers of equipment, as well as by the mining companies, presages additional changes in future beneficiation processes.

During the last few years it became clear that, in treating the marginal ores, the coarser sizes, or material above $\frac{1}{2}$ inch size, had to be crushed finer than in the past. At the same time, the jigs have been slowly displaced by the heavy density separation.

The material below $\frac{1}{2}$ inch size has been tested by various methods and with many pieces of equipment. Many of these concentrating machines which appeared very promising two years ago have not worked out so well in the iron field. At present the treatment of the minus $\frac{1}{2}$ inch material is far from satisfactory but it is showing marked improvement.

The above facts have been kept in mind and the equipment which was





Patrick Concentrating Plant. Conveyor on the right transports crude ore to plant from state-owned Kevin Mine located at Cooley.

selected for the new research laboratory at Hibbing has been centered around the following processes:

- 1. Heavy density, or float and sink method for the plus ¹/₈ inch materials.
- 2. Double classification, new types of separators (mechanical and magnetic), as well as froth flotation (anionic and cationic) for the minus $\frac{1}{8}$ inch size material.
- 3. Methods of separating the plus and minus 1/2 inch sizes most efficiently.

The following brief outline of ore treatment will demonstrate how the above processes are employed in the modern concentrating plant.

Below a surge bin receiving the feed or raw material, a straight washing plant unit precedes the so-called retreating processes. In this unit the feed is scrubbed and washed on vibrator screens for separation into coarse and fines, the coarse being treated in log washers, while the fines are prepared in classifiers (of various designs). The material above a certain size, to be determined for each type of ore, is either rejected, or recrushed to a finer size and retreated with the regular size materials. This preliminary operation results in two types of feed for the retreating units which follow: The coarser sizes or material above ½ inch, and the finer sizes from which fine sands have been already removed in the washing plant.

In the retreating unit, either jigs of various types or the heavy density method are employed. The jigs have lost most of their original standing at the new plants, and are now gradually replaced by the float and sink or heavy density operation. This type of operation consists essentially in mixing the plus $\frac{1}{3}$ inch retreat feed with a fine suspension of minus 65 mesh ferrosilicon in water at a certain percentage of solids producing the desired specific gravity for the separation. The reason for the use of ferrosilicon (at 15% Silicon) is that this material is hard without being too brittle, and because of its magnetic properties, it is easily recovered for re-use.

The double classification method used for the minus $\frac{1}{6}$ inch feed to the retreating unit, consists essentially in the use of two classifiers in series (primary and secondary) with recirculation of a portion of one of the products of the secondary classifier in the primary, which result in a process approaching a heavy density separation without reaching its full efficiency. This is done by using ore particles as the heavy medium, because for such fine sizes the medium recovery would be practically impossible.

New Equipment

The new equipment for the research laboratory has been selected, as far as available funds will permit, in line with the latest developments in beneficiation. We list below the new equipment which, under the present plans, will be installed in the research laboratory by June 30, 1949.

1. A heavy medium unit with a capacity of 500 pounds of crude ore per hour, utilizing ferrosilicon in suspension as separating fluid, and equipped with two heavy density separators—one called the cone type, the other the screw conveyor type. This unit will be fed by a vibrating feeder followed by a wet vibrating screen for the separation at $\frac{1}{3}$ inch size.

2. A ferrosilicon recovery unit consisting essentially of a very modern magnetic separator which is equipped with new patented features making this unit more efficient than the ones now in use on the Mesabi Range. This unit is energized by a $1\frac{1}{2}$ KW AC-DC converter which has ample electrical characteristics so that an excess of DC current may be used in the testing laboratory while the separator is running. This particular magnetic separator can also be used for other magnetic separations than that of ferrosilicon.

3. A 1-inch circulating pump for the recirculation of the fine materials containing the ferrosilicon to be re-used, or the thickened pulps to be reprocessed later.

4. A new Differential type of crusher, built on the lines of the gyratory crushers, but especially adapted for laboratory testing. This new unit will recrush materials prepared by means of the present jaw type crusher to any desired finer size, by an easy adjustment.

5. Two classifiers for double classification of fine ores—the minus $\frac{1}{8}$ inch fraction of retreat ores. This unit will be essentially composed of a 9" classifier and a 16" classifier of the screw type to be used as primary and secondary classifiers in either the standard type of double classification or a new method of double classification developed jointly by the writer with a mining engineer of one of the mining companies.

This new development which is very flexible, has an automatic regulating feature, making it possible to set it in advance for the washing of minus 1% inch materials of all grades. The regulating feature, being automatic, makes it more efficient and more adaptable to various types of low grade materials of the marginal types than the standard double classification process now in use at various plants.

The fact that because of this new development it will be possible to have a pre-determined ratio of recirculating load, which is obtained by means of a splitting arrangement, makes it ideal for testing all kinds of materials from the true wash ores to the lowest grades. This process is now being used commercially on the western end of the Mesabi Range.

6. A laboratory size Humphrey's spiral installation. This unit possesses the general features of the Rheolaveur, but it has been made more efficient and more compact by using a combination of launder type classification with a centrifugal action. It is best described as a spiral rheolaveur type of machine. The laboratory unit is composed of only one set of spirals with pumps, tanks and accessories, arranged to imitate the plant units by passing the fine ores through the machine several times in series.

 Another unit to be purchased is one composed of tanks, measuring devices and pumps for recirculation to be used to complete the fundamental ^s data in connection with the study of the flow conditions of suspensions of

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solids in water. This unit will be adequately furnished with viscosimeters, flow meters of various types and specific gravity scales so that it can be used on materials in suspension ranging from small percentages of solids to above 80% by weight, and for solids varying in specific gravity from 2.65 (pure quartz) to 7.20 (pure ferrosilicon). (The study of the fundamental laws of flow of solids in water is discussed later.) The problems to be solved with this installation are vast, and will result in important conclusions which will affect pumping, transportation of fines in suspension, and gravity discharge from one piece of equipment to another.

8. Some tanks to be used as thickeners will be purchased later, which will make it possible to recover the fines from the testing units, as well as to recover the expensive medium, ferrosilicon, from the various circuits.



Experimental Jig Plant at Virginia — forerunner of plant now under construction which is designed to concentrate a stockpile containing 4,000,000 tons of lean ore.

9. A double deck vibrator screen is contemplated for the separation at either the $\frac{1}{8}$ inch size or a finer mesh size to be used in various flow-sheets for the scrubbing and washing of ores to be tested by the other methods reported above.

10. The laboratory is equipped with a scrubber and also with one 2,000 gram flotation cell. These units will be used in connection with the new equipment in the solution of problems of fine ore concentration. The scrubber which was developed by the writer in the past will be remodeled and equipped with wedge wire screens for more accurate sizing of the materials being•

fed to it. This scrubber will be used as an alternate for the vibrating screen and the vibrating feeder for treatment of the feed ahead of the testing units.

The present 2,000 gram flotation cell, and its complement, the pH determination electric machine, which were purchased previously, will adequately serve to study the new flotation circuits based on anionic and cationic reagents which have been developed in recent years. These circuits and reagents have been used on present tailings, tailing pond matrials, and on taconite previously ground to a size suitable for the flotation processes.

Geophysical and Geological Studies of the Various Ranges

The exploration work on state-owned mineral lands should be followed up after visual examination of the drill samples by interpretation and adaptation of the available geophysical and geological data.

The Aerial Magnetometer surveys already completed or now under completion should be supplemented by local geophysical observation on the ground by means of various methods in use here. All of this, when combined with the available geological data, would result in a better correlation between the various properties along the iron ore ranges.

As we have at our disposal in Hibbing two types of geophysical instruments, which have given positive results when compared with known data, or with magnetic surveying methods, and since we also have prepared general maps of the active iron ore ranges showing state ownerships and geological information, we now plan on completing the correlation which has already been started, and keeping it up to date as additional data is now obtained from new drilling. The general pattern of the known ore bodies is also being assembled by the engineering section with the same purpose of establishing the relative trends of ore deposits and aiding in the possible discovery of additional ore.

It will be noted from a rapid check of the various University of Minnesota Directories that during the last few years, in spite of a large output for the various mines, the resulting depletion has been partially offset by an increase in taxable reserves due to new discoveries of saleable ores by means of a thorough canvassing of the operated properties, and by the progress in methods of beneficiation. An interesting development is the great activity displayed by the small operators in old partly exhausted properties.

The data obtained from the extensive search for ore which resulted from the large number of exploration permits and leases have added some knowledge on the location of ore pockets and fractures, yielding definite patterns for future operations.

On the Cuyuna Range, where the magnetic surveys have been very successful in the past, we plan on testing our other geophysical methods on known ore bodies to see if they will work out as satisfactorily on that Range as on the Mesabi Range.

Study of the Fundamental Laws of Flow of Solids in Water

In the foregoing we mentioned some of the equipment we intend to requisition for the study of the fundamental laws of the flow of solids in water.

The writer, who started in 1931 to investigate some phases of this problem, is more convinced today of its great importance for the solution of many problems of concentration or other related phases of same. Some types of measuring devices were available in 1931, but few of the very accurate and modern types of flowmeters, viscosimeters, etc., were easy to obtain. At the present time, there are on the market numerous very good metering devices, and at a price favorable for research.

As the float and sink or heavy density method of ore concentration and the double classification system both rely upon maintenance of high percentages by weight of suspensions of solids in water, and, since all chutes, launders, pipes, and apparatus, as well as pumps, have to be designed accurately, it is imperative to obtain the most accurate type of information of all data obtainable on the laws of flow of these suspensions.

The range of specific gravity of solids will have to be from 2.65 to 7.20, while the percentage of solids in suspension (by weight) will have to be between about 5% and 80%.

The theoretical graphs showing the relation between friction factor and Reynolds number are found in the technical literature. These are very useful, but, in order to get more use of these in the solution of practical problems, tests will have to be performed where velocity, viscosity, specific gravity of pulp and temperature will be fully determined for various conditions of fluid flow. Each test will have to be performed under conditions as constant as possible, while the metering devices record the necessary factors in the problem.

In the last few years of experience in the Mesabi Range concentration plants, the writer noted that few manufacturers had the modern data for the solution of such problems, and consequently the various pieces of machinery used in the washing plants and heavy media plants were often out of proportion with the task they were supposed to perform.

When the program we suggest will be well on its way, some of the relations which have been partly incorporated in practical tables after the first attempts at solution in 1931 will be corrected by the newly accumulated data. Also for suspensions from 30% to 80% where no available data was considered even remotely accurate, this new series of experiments will settle controversial methods of computation which have been in use, for lack of better information.

General Conclusions

The equipment now being purchased, and that now available, combined with the equipment purchased later when funds are available, will aid in the solution of the most urgent problems of concentration of marginal ores,

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stockpile and tailing pond materials as well as magnetic and non-magnetic taconites.

The continuation and intensification of the geological research combined with the exploration by various methods will help in connecting the known ore bodies with the unknown ones in a large pattern. It will also be a guide towards new discoveries in the regions now being explored outside the known iron formation boundaries.

STATE LANDS

F. B. GETCHELL, Deputy Director

The land administration of the Division of Lands and Minerals has to do with the trust fund land granted to the state by act of Congress, taxforfeited lands in the Red Lake Game Preserve and Conservation Areas, established by Laws 1929, Chapter 258, Laws 1931, Chapter 407, Laws 1933, Chapter 402, and to Rural Credit Lands designated by Laws 1947, Chapter 278, the total areas of which are as follows:

TABLE 21

TRUST FUND LANDS

Fund	Acres
School.	2,974,455
Swamp University	1,882,746 91,524
Internal Improvement	496,482
Agricultural College	
 Total	5,565,194

TABLE 22 Tax Forfeited Lands Total Forfeited as of June 30, 1948

Red Lake Game Preserve 1,295,142.00 Conservation Areas 604,997.00 Rural Credit Lands 6,023.75	
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Of the permanent trust fund lands, title to 2,646,024 acres has passed to private ownership; 179,630 acres are under sale contract, leaving a balance of 2,739,540 acres classified as unsold permanent trust fund land under the control of the Department of Conservation. Approximately 1,200,000 acres of this land lies within state forests and 40,000 acres within a game reserve project in Roseau County, the remainder being under the supervision of the Division of Lands and Minerals.

On July 1, 1947, pursuant to the provisions of Laws 1947, Chapter 278, Section 4, 6,023.75 acres of unsold Rural Credit land situated in 15 counties of the state was turned over to the Division of Lands and Minerals for administration.

The law provides that these lands be held, appraised, sold and leased in the same manner as state public lands are under Minnesota Statutes 1945, Chapter 92.



Of the tax-forfeited lands in the Red Lake Game Preserve and Conservation Areas, approximately 193,340 acres have been sold, classified for sale, or otherwise disposed of, and other groups lie within state forests, but for the most part the remaining acreage is under the supervision of the Division of Lands and Minerals.

Tables showing acreages according to counties will be found elsewhere in this report.

The war and post-war years, which resulted in the shifting of industry and population, have caused the usual fluctuation of land values and usage during that period. This may continue for some years before returning to a more uniform and normal pattern.

However, the upward trend in the sale and leasing of state lands through the preceding biennium continued through the biennium ending June 30, 1948.

The high prices paid for certain farm products have caused many settlers to break up and use for crop purposes lands previously used for hay or grazing, and to lease additional lands for crop purposes in order to take advantage of the prevailing high prices.

This intensified production may eventually react to the detriment of the surplus land used, as much of it will be abandoned when prices decline and become weed-infested and thereafter constitute a problem for local settlers and officials.

In the pioneer days of the state there apparently was no long-term plan or policy in the sale or development of state-owned lands. Naturally, the sale of state lands was urged by local authorities in order that added tax revenue might be realized to assist in the maintenance of state and local governmental agencies.

Many of the tracts sold were in isolated areas and were purchased by speculators or misguided settlers and instead of benefiting local communities, eventually became burdensome by reason of the cost of providing roads, schools and other facilities needed by those who established themselves and families thereon. Many of the tracts sold under these conditions were abandoned and returned to the control of the state through default or tax forfeiture.

In some instances these lands were resold by the state several times and as often abandoned by the purchasers because of their inability to maintain themselves and their families under such conditions. This, of course, usually resulted in a loss to the purchaser each time through wasted effort and investment.

In later years, however, a more practical method of administering state land was adopted. Before sale, all state lands are carefully examined and classified as to the use to which they are best suited. Only those tracts best adapted to agricultural use, well situated in relationship to roads, schools and settlements, or needed in connection with established farm units, are offered for sale. Lands unsuited to sale are classified for various uses for which they may be suited.

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TABLE 23

Statement Showing Acres of Unsold and Reverted Trust Find Lands as of June 30, 1948

(Including 12,029.88 acres classified as Trust Fund Lands under Laws 1939, Chapter 343, and Laws 1941, Chapter 393, Section 8)

	Acres	Acres	Total
County	Unsold	Reverted	Acres
Aitkin	10,819.37	132,339.14	143,158.51
Becker	6.020.57	12.843.50	18.864.07
Beltrami	22,091.74	39,940.17	62,031.91
Benton.	• • • • • • • • • • •	140.00	140.00
Blue Earth		204.35 80.00	204.00
Carlton	3,295.78	17,771.08	21,066.86
Cass	84,853.34	57,543.83	142,397.17
Clay		1,448.02	1,448.02
Clearwater	11,021.33	13,888.55	24,909.88
Crow Wing	132,240.84	888.25 17.060.04	133,129.09
Dakota	8.28	130.44	138.72
Dodge		80.00	80.00
Fillmore	120.00	40.00	160.00
Goodhue		120.00	120.00
Grant		40.00	40.00
Hubbard	7.546.41	21.645.17	29.191.58
Isanti	80.00	524.00	604.00
Itasca	206,759.86	99,050.61	305,810.47 7 704 70
Kandiyohi	240.10	160.00	160.00
Kittson	3,327.02	34,501.18	37,828.20
Laka	782,816.43 167,623,31	68,913.17 462722	851,729.60
LeSueur.	80.00		80.00
Mahnomen	8,364.80	399.65	8,764.45
Martin	2,520.47	51.27	40,757.10
Meeker		80.00	80.00
Mille Lacs	40.00	11,356.44	11,396.44
Nobles		80.00	80.00
Norman		994.96	994.96
Pennington	528.86 120.00	2,004.03	3,093.49 4 063 22
Pine		27,684.84	27,684.84
Polk.	40.00	8,516.35	8,556.35
Red Lake	100.00	2.995.66	2.995.66
Redwood		80.00	80.00
Renville	•••••	40.00	40.00
Roseau.	28,089.84	99,504.82	127,594.66
St. Louis	401,860.65	104, 138.11	505,998.76
Scott	40.00 337 90	1.240.00	1.577.90
Sibley	.66	40.00	40.66
Stearns.		687.77	687.77
Todd	1.050.95	3,333,13	4.384.08
Traverse		120.00	120.00
Wadena	40.00	6,434.58 80.00	6,474.58 80.00
Wilkin		682.14	682.14
Winona	202.19	280.00	482.19
wright	•••••	00.00	00.00
Total	1,886,420.37	853,120.19	2,739,540,56

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Statement Showing Number of Acres of State Trust Fund Lands Under Sale Contract and the Amount of Unpaid Balance of the Purchase Price as of June 30, 1948

	No Contracto	Aanoo	Unneid
County	In Force	Under Cont	Balance
A 11-1-	11 10100	11 220 70	P 16 171 00
Antkin	272	11,329.79	a 00,070.00 9,420.70
Paalow	10	9 624 02	2,430.70
Decker	196	2,004.00	20.085.66
Benton	120	3,239,33	29,985.00
Big Stope	1	480.00	544.00
Blue Earth	1	120.00	4 841 60
Carlton	73	2 067 16	14 722 16
Case	187	4 106 92	43 882 80
Chisago	101	120.00	697.00
Clay	64	3 679 07	30.633.55
Clearwater	84	3 292 83	16,563,63
Cook	2	80.00	255.00
Crow Wing	81	3.167.27	17,914,42
Dakota	2	80.00	216.70
Douglas	3	120.00	1.122.00
Fillmore	3	120.00	748.00
Goodhue	5	226.40	1.030.60
Hubbard	64	2.600.25	14.386.36
Isanti	3	120.00	1,191,20
Itasca	467	19.142.88	103.377.53
Kanabec	12	859.00	4,240,09
Kandivohi.	10	109.80	1,273,30
Kittson	76	3.781.30	22.226.32
Koochiching.	299	12.379.46	66.831.14
Lake	32	1.342.68	7,175.89
Mahnomen	16	667.49	3,181.77
Marshall	292	13.125.09	72,429,28
Mille Lacs.		1.801.30	9,711.38
Morrison	59	2.516.82	16,525.15
Murray	1	80.00	1,033.60
Norman.		3,266.05	22,757.55
Otter Tail	75	3,187.28	16,026.84
Pennington	31	1,558.97	10,611.72
Pine	44	1,995.11	9,749.01
Pipestone	2	280.00	3,893.00
Polk	161	8,322.28	57,741.04
Pope	14	515.00	2,920.95
Red Lake	45	2,188.51	15,567.20
Renville	1	43.29	1,177.46
Roseau	906	38,534.98	262,026.75
St. Louis	415	15,843.80	101,014.10
Sherburne	8	320.00	1,721.80
Stearns	11	436.54	3,702.16
Stevens	<u>1</u>	40.00	176.80
Swift	3	160.00	2,210.00
Todd	38	1,743.90	12,520.07
Wadena	61	2,395.91	12,803.32
Wasnington	<u>I</u>	40.00	510.00
watonwan	1	10.00	400.00
W1lkin	33	2,499.82	27,599.35
Winona	2	80.00	476.00
wright	ð	80.00	774.95
Tatal	4 216	170 690 91	Ø 1 199 004 45
10tal	4,810	179,030.31	⊕ 1,155,204.45



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DEPARTMENT OF CONSERVATION

State lands may be grouped in five classes:

1. Agricultural lands classified for immediate sale.

2. Lands fit for agricultural use, but not selected for immediate sale and are available for some form of leasing on a temporary basis.

3. Land unfit for agricultural use.

4. Land suitable for some public or conservation use and withheld from sale for that purpose.

5. Lands bordering public waters and withdrawn from sale by legislative act, some of which are platted for cabin sites and leased for that purpose, others available for some public or conservation use, but the greater part of which are unclassified.

State Land Appraisal and Sale

The law requires that state land may be sold only at public auction at the county seat of the county in which it is situated. All lands offered for sale must first be appraised by bonded state appraisers and sold for not less than the appraised value, as established by the appraisers. The minimum value of appraisal and sale cannot be less than \$5.00 per acre.

There are three appraisal districts in the northern section of the state, as a large part of the state lands are located in the northern counties. The Western District, with headquarters and district office at Thief River Falls; the Central District, with headquarters and field office at Bemidji; and the Eastern District, with headquarters and field office at Hibbing, Minnesota. Each district is in charge of a district appraiser who is assisted by a land clerk.

The appraisers examine, classify, and appraise state land for sale and lease. Land and lease appraisal reports are submitted to the St. Paul office of the division where they are checked and reviewed. Lists of the tracts selected for sale are made up and prepared for public sales to be held at the county seats of the counties in which the lands are located.

Sales are held during the fall each year, and are conducted by the deputy director of the division and clerked by the county auditors, in counties where need of and demand for the land warrants.

Lands are sold to the highest bidder for cash or on terms. When sold for cash and payment in full is made at the time of sale, a patent is issued conveying title from the state to the purchaser. When sold on terms, at least 15% of the purchase price, plus any timber or improvement value listed, must be paid at the time of sale, and the balance of the purchase price to be paid in not to exceed twenty equal annual instalments, payable with interest at the rate of 4% on June 1st each year.

Sale certificates are issued to those who purchase on terms entitling them to a patent when the amounts due the state, and all unpaid taxes, have been paid in full.

County	Acres Sold	Amount of Sale	Paid for Timber and Improvements
Aitkin	1 198 49	\$ 9,855,13	\$ 2 941 75
Anoka	160.00	960.00	40.00
Beeker	862 18	6 177 05	1 175 75
Boltrami	880.00	10 060 00	1 660 80
Benton	160.00	2 120 00	27 50
Blue Forth	80.00	5,120.00	27.50
Conlton	1 1 5 1 20	0,440.00	1 460 15
Cariton	1,101.09	0,000.04	1,408.15
Cass	1,109.40	9,373.01	2,161.00
Clay	2,120.00	21,520.00	48.00
Clearwater	710.75	5,649.00	613.50
Crow Wing	1,316.29	11,090.28	1,703.25
Hubbard	400.00	4,760.00	702.50
Isanti	244.00	1,781.00	152.25
Itasca	3,546.00	34,413.67	7,898.75
Kanabec	400.00	2,320.00	121.20
Kittson	1,519.35	11,657,25	
Koochiching	1,821.06	13,619.96	1,538.05
Lake	119.00	831.00	173.75
Mahnomen	96.14	616.84	85.00
Marshall	2.641.40	18,985,83	471.25
Mille Lacs	520.00	2,920.00	741.60
Morrison	720.00	6,600,00	326.00
Norman	2 043 10	16,007,90	010100
Otter Tail	680.00	5 320 20	940.50
Pennington	640.00	8,020.20	330.00
Pine	855.15	4 810 90	1 247 65
Pollz	3 808 03	27 916 96	519 50
Popo	230.00	1 514 00	012.00
Pod Toko	1 400 00	11 080 00	285.00
Dessen	7 515 91		1 672 15
Roseau	7,010.01	80,738.73	1,070,10
St. Louis	2,097.00	28,195.89	3,024.03
Sherburne	240.00	3,060.00	70.50
Stearns	158.47	1,110.82	93.75
Todd	558.00	4,376.00	603.40
Wadena	480.00	4,360.00	614.00
Wilkin	1,170.36	20,494.52	
Wright	60.00	540.00	<u> </u>
	44,321.98	\$416,064,50	\$36,054.15

TABLE 25 Statement by Counties of Trust Fund Lands Sold During the Biennium Ending June 30, 1948

TABLE 26

Income Derived from Principal and Interest Payments on Trust Fund Lands Under Contract During Biennium Ending June 30, 1948

Fund Amount School
University
Internal Improvement
\$418,927.87

The payment of the purchase price at the time of sale, as well as subsequent instalments of principal and interest, are made to the county treasurer who reports collections to the office of the Division of Lands and Minerals at St. Paul.

All lands are sold subject to the regulations of any zoning ordinance in force or hereafter adopted by the county board of the county in which the land is situated.

The following is a summary of the state lands examined for classification, sale, lease, trespass, etc., in the three appraisal districts during the biennium ending June 30, 1948:

DIVISION OF LANDS AND MINERALS

	No. of Tracts	No. of Acres
Eastern Appraisal District	1,355	46,104
Central Appraisal District	1,893	75,403
Western Appraisal District	2,585	101,712
Total		223,219

State Land Leases

State lands are leased for temporary usage, based on field examinations and recommendations by state appraisers and for various purposes not inconsistent with the best interest of the state. Rentals are established according to the purpose for which they are leased.

Hay, farm and pasture leases are made on a seasonal basis and are sold at public auction in counties where land sales are held. In other counties bids are accepted by mail and leases issued to the highest bidder.

State lands bordering lakes and other public waters of the state were withdrawn from sale by legislative act, but in some instances where they have been platted for cabin sites they are leased for that purpose. The minimum rental for these lots is based on appraisers reports, but none are leased for less than \$12.00 per year.

Leases for gravel and other earth material used mainly in road construction are issued on a yardage basis, with a minimum annual rental when no material is removed.

Kind of Lease	No. of Leases	Amount
Hay, Farm and Pasture	1,697	\$29,256.79
House		6,693,25
Garden		551,50
Lakes		3,083,50
Sandpit		10,119.72
Billboard		258.00
Miscellaneous		7,219.70
Total		\$57,182.46

TABLE 27

Statement Showing Receipts from Rentals for Leases on State Trust Fund Lands During the Biennium Ending June 30, 1948

Leases for garden and dwelling sites on the Mesabi Range are issued on an annual basis, and for the most part to employees of mining companies operating mines in the locality.

Leases for power and telephone lines, roadways, rights-of-way, and other miscellaneous uses are issued after field investigation by state appraisers and for rates consistent with the purpose for which the land is to be used.

Tax-Forfeited Land in the Red Lake Game Preserve and Conservation Areas

The Red Lake Game Preserve in Beltrami, Koochiching and Lake of the Woods counties was created by Laws 1929, Chapter 258, Laws 1931, Chapter 407, created the Conservation Areas in Aitkin, Mahnomen and Roseau counties, and Laws 1933, Chapter 402, created the area in Marshall County.

Under the provisions of the above acts, land which forfeited for the non-payment of taxes becomes the absolute property of the state and the administration thereof was originally fully under the Commissioner of Conservation.

Red I	.ake Game Pre	eserve	
County	Total Area	Acres Tax Forfeited	Acres Sold
Beltrami Koochiching Lake of the Woods	. 661,619 . 318,009 . 754,188	$551,540 \\ 228,680 \\ 514,922$	28,086.57 3,282.34 63,664.80
Total	. 1,733,816	1,295,142	95,033.71
Co	nservation Are	as	
Aitkin. Mahnomen. Marshall. Roseau.	$\begin{array}{rrrr} .&455,288\\ .&41,073\\ .&425,850\\ .&480,520 \end{array}$	$253,960 \\ 22,940 \\ 128,497 \\ 199,600$	8,657.30 13,714.18 39,110.32 30,756.39
Total	.1,402,731	604,997	92,238.19
	Summary		
Red Lake Game Preserve Conservation Areas	Total Area . 1,733,816 . 1,402,731	Acres Tax Forfeited 1,295,142 604,997	Acres Sold 95,033.71 92,238.19
GRAND TOTAL	.3,136,547	1,900,139	187,271.90

TABLE 28 Statement Showing Tax Forfeited Lands in Red Lake Game Preserve and Conservation Areas to June 30, 1948 and Total Acreage Sold Under Laws 1935, Chapter 210, Laws 1939, Chapter 320, and Acts Supplemental or Amendatory Thereto

Laws 1935, Chapter 210, as amended, provides for the classification and sale of agricultural lands in the Red Lake Game Preserve. Laws 1939, Chapter 320, as amended, provides for the classification and sale of agricultural lands in the conservation areas. Under these acts, the classification, sale and timber valuations is a function of the county board and county auditor of the counties affected and in which the lands are situated. The classification, sale and also the timber valuations must, however, first be approved by the Commissioner of Conservation.

Lists of tax-forfeited lands, classified as agricultural land and appraised for sale by the county boards, are submitted by the county auditors to the Commissioner of Conservation for approval. These lists are referred to the Division of Lands and Minerals for field investigation and recommendation, and lands approved for sale are then offered for sale by the county auditor at public auction.

The sale and collections for lands sold are reported to the Commissioner of Conservation by the county auditor and the Commissioner of Conservation issues the conveyances for lands sold when the amounts due the state have been paid in full.

The leasing of lands in the Red Lake Game Preserve is administered by the Commissioner of Conservation.

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In the conservation areas, lands classified and approved as agricultural lands are leased by the county, while unclassified lands are subject to lease by the Commissioner of Conservation.

This results in something of a dual administration by the state and the counties, causing considerable duplication of activities and added expense for both. The revenue derived from these lands is paid into the state treasury and credited to the funds of the respective area. The Red Lake Game Preserve laws and the conservation area laws should be reviewed and coordinated to effect a more uniform procedure in all phases of administration.

Summary of Classification and Sale of Tax Forfeited Lands, in the Red Lake	
Game Preserve and Conservation Areas, During	
the Biennium Ending June 30, 1948	

	TABLE 29			_
Red Lak	e Game Pres	erve		
Acres Classified	Ac. Appr. By Comm. of Cons.	Acres Sold	Sale Price	Average Price Per A.
Beltrami	5,406.49 560.00 7,120.00	5,762.46 520.00 6,194.75	23,282.94 2,360.00 28,837.00	
Lots)		_ 1 Lot	125.00	· · · • • •
Total16,780.58	13,086.49	12,477.21	\$54,604.94	\$4.37
1	TABLE 30			
Conse	ervation Area	IS		
Aitkin 2,120.00 Aitkin (Platted Lots) 58 Lots Mahnomen 13,720.00 Marshall 19,320.00 Roseau 14,130.61 Roseau (Platted Lots 58 Lots	1,642.50 58 Lots 13,600.00 16,240.00 7,500.37	1,119.91 36 Lots 3,770.19 10,467.02 6,145.96 11 Lots	$5,655.00 \\ 3,085.00 \\ 12,096.00 \\ 39,341.00 \\ 40,735.26 \\ 119.00$	5.05 85.69 3.21 3.76 6.63 10.82
Total	$38,982.87 \\ 13,086.49$	$21,503.08 \\ 12,477.21$	$\$101,031.26\54,604.94$	\$4.55 4.37
Grand Total	52,069.36	33,980.29	\$155,636.20	\$4.48

Revenue Derived from Sale of Tax Forfeited Lands, in the Red Lake Game Preserve and Conservation Areas, During Biennium Ending June 30, 1948

	TABLE 31			
Red L	ake Game Pre	serve		
Principal Beltrami\$ 14,977.83 Koochiching4,663.36 Lake of the Woods34,339.53	Interest \$ 3,250.31 958.07 6,591.36	Rental \$1,775.25 32.00 62.00	Timber and Improvements \$ 2,634.80 472.00 2,920.75	Total \$ 22,638.19 6,125.43 43,913.64
Total\$ 53,980.72	\$10,799.74	\$1,869.25	\$ 6,027.55	\$ 72,677.26
	TABLE 32			
Cor	iservation Are	as		
Aitkin \$ 10,062.36 Mahnomen 12,651.00 Marshall 26,704.81 Roseau 36,491.78	$ \begin{array}{c} $		\$ 3,839.50 380.00 990.00	
Total\$ 85,909.95 R. L. G. P53,980.72		\$6,751.75 1,869.25	\$ 5,209.50 6,027.55	\$109,277.62 72,677.26
Grand Total	\$22,206.16	\$8,621.00	\$11,237.05	\$181,954.88

Tax-Forfeited Lands Held in Trust for Taxing Districts — Laws 1927, Chapter 119, Laws 1935, Chapter 386, and Kindred Laws

According to reports received from the county auditors of the state, up to July 1, 1948, some 6,459,690 acres of privately owned lands situated in 77 of the 87 counties of the state had forfeited for the non-payment of taxes and thereby held in trust for the taxing districts. No forfeitures were reported in 10 counties of the state.

Many of the forfeited tracts were repurchased by the former owner or resold by the counties and have returned to private ownership. Other tracts have been classified by the county board as conservation lands, released. from trust to the taxing districts and dedicated to and accepted for conservation use. Thus the total acreage of forfeited land has been considerably reduced.

TABLE 33 Tax Forfeited Lands Held in Trust for Taxing Districts Under Laws 1927, Chapter 119, Laws 1935, Chapter 386, and Acts Amendatory and Supplementary Thereto, Reported by County Auditors To Department of Conservation Division of Lands and Minerals To June 30, 1948

County	Acres	County	Acre
Aitkin	392,192	Marshall	69,93
Anoka	9.370	Meeker	24
Becker	163.658	Mille Lacs.	106.04
Beltrami	262.160	Morrison	128,66
Benton	4,200	Mower	1.45
Big Stone	145	Murray	1 52
Blue Earth	2.845	Nicollet	30
Brown	830	Nobles	44
Carlton	228 520	Norman	21 27
Carron	413 110	Olmsted	1 50
Chipmenno	527	Ottor Tail	2010
Chippewa	27 480	Poppington	58 06
Clay	104 160	Dine	240,40
Clearwater	194,100	Dalla	110.97
Cook	192,160	Demoses	110,87
Crow Wing	135,100	Ramsey	40
Dakota	2,387	Red Lake	24,34
Dodge	120	Reawood	1,30
Douglas	1,110	Renville	9,22
Faribault	165	Rice	21
Fillmore	981	Roseau	101,10
Freeborn	2,538	St. Louis	,702,41
Goodhue	198	Scott	28
Grant	4,950	Sherburne	18,50
Hennepin	2,641	Sibley	21
Hubbard	266,338	Stearns	3,01
Isanti	17,269	Steele	87
Itasca	496,000	Stevens	41
Jackson	420	Swift	20.04
Kanabec	73.400	Todd	25.06
Kandivohi	8,315	Traverse	2.08
Kittson	118 530	Wabasha	1 86
Koochiching	415,940	Wadena	41 24
Lee qui Parle	831	Wasaca	11,21
Lako	235 020	Washington	2 51
Lake of the Woods	13 310	Willsin	11 19
Lake of the Woods	559	Winone	11,12
Lucoueur	3 525	Wright	1 00
Шуоц	3,540	Vollow Medicine	1,20
McLeou	<u>∠</u> U	renow Medicine	07
Wannomen	00,300	6 450 600	
Total 77 Counties	· • · • • • • • •		

Tax-forfeited lands held in trust for the taxing districts are largely under the administration of the county board and county auditor of the county in which they are situated. When these lands are classified as nonconservation lands and sold by the county auditor, any timber of value thereon must be appraised separately and approved by the Commissioner of Conservation before sale. The approval of the timber valuations is the only authority vested in the Department of Conservation with these taxforfeited lands.

Each year copies of the lists of lands which have forfeited for the non-payment of taxes during the current year are submitted by the county auditor to the Commissioner of Conservation and are filed in the records of the Division of Lands and Minerals.

Lists of the tax-forfeited lands, which are classified as non-conservation lands by the county board and are to be offered for sale, are submitted to the Division of Lands and Minerals to be checked before sale to determine whether or not state-owned lands have inadvertently been included thereon. If any state lands are included in the list, the county auditors are notified and the state-owned tracts stricken therefrom so as not to be included in the county land sale list.

A statement showing the counties of the state in which tax-forfeited lands are situated and the acreage in each as reported to this office by the county auditors as of June 30, 1948 may be found elsewhere in this report.

Land Appraisers

Since 1944 the land appraisal staff of the division has been limited to three appraisers, who are now assisted with office work by a land clerk in each district.

With the ever increasing number of requests to purchase and lease state lands, and the large volume of other activities in the field work, it is hardly possible for the force to keep abreast with even the current requests.

In addition to the regular land appraisal work and relative activities, additional administrative duties in connection with the position of appraiser are increasing to the point where a large force is absolutely necessary to take care of the work load in each district.

The work of the appraisers makes it necessary for them to spend considerable time alone in remote areas where the possibility of accident is constantly present and chances for assistance in case of accident somewhat remote. They should not be required to work alone under these conditions, and each district appraiser should be furnished with an assistant appraiser to accompany and assist him on all field work.

To carry on the regular field work of the land section of the division and make the field investigation of state lands bordering public waters, the present appraisal staff should be supplemented with three Appraisers I or Junior Appraisers to work with the regular staff, and one Appraiser II or Senior Appraiser, assisted by an Appraiser I, to devote full time to the investigation and classification of tracts bordering public waters.

DEPARTMENT OF CONSERVATION

Land Exhibit at State Fair

For the first time since the pre-war period, an exhibit was put on at the Minnesota State Fair by the land section of the division.

The use of state-owned land in northern Minnesota was depicted in four miniature settings showing farming in one section, grazing in another, timber in the third, and recreation in the fourth. Each use was worked out in careful detail and the resulting exhibit seemed to meet with much public approbation.

One of the land appraisers was constantly in attendance to explain the exhibit and to give information relative to the sale and leasing of stateowned lands under the control of the division.

Bulletins giving general information relative to the state lands under the supervision of the Division of Lands and Minerals and also a schedule of land sales for 1947 were passed out to those expressing an interest in the sale of state lands.

Land Program for the Next Biennium

1. To investigate requests for purchase and leasing of state lands. To appraise and offer for sale those tracts suited to and needed for agricultural use. To appraise lands under contract where interest delinquency or default has occurred.

2. To complete a field examination and classification of all state-owned lakeshore lands under the supervision of the Division of Lands and Minerals to determine the use to which the lands are best suited. (Our records show about 4,673 tracts — 140,000 acres in 33 counties — 1,168 miles of water frontage including those tracts in state forests.)

3. To make field investigations of the tax-forfeited lands in the Aitkin, Mahnomen, Marshall and Roseau Conservation Areas and the Red Lake Game Preserve in Beltrami, Koochiching and Lake of the Woods counties, for the purpose of setting up areas where agricultural lands may be approved for sale. This to be done in cooperation with the county boards of the counties involved in order to facilitate the administration of tax-forfeited lands in those areas.

4. To obtain lists of unappropriated U. S. Government lands and make field investigations to determine the tracts suitable for selection as lieu lands for the deficiency in school land grants which is still due the state and amounting to approximately 20,000 acres.

5. To make a field investigation of all state lands under the supervision of this division in localities where there is a need for gravel for road construction and other purposes in order to determine the availability and location of gravel deposits which may be leased.

6. Make field checks of railroad rights-of-way over state-owned lands. In many instances where right-of-way deeds have been issued to railroads, the right-of-way has long since been abandoned but not reported, and are still carried on our records as active. Our records should be cleared in such instances so that proper disposition may be made of the tracts involved.

DIVISION OF LANDS AND MINERALS

SUMMARY OF LEGISLATIVE RECOMMENDATIONS AFFECTING LAND ADMINISTRATION

1. Amend Minnesota Statutes 1945, Section 222.02-03, relative to rightof-way for railroad over and across state land, requiring that application must be filed with and approved by the Commissioner of Conservation and right-of-way deed issued before cutting of right-of-way or construction is started.

2. Amend laws relative to the establishment of state aid, county and township road right-of-way over state lands, requiring that notice of proceeding be served on the Commissioner of Conservation and submit therewith a copy of a plat showing definite location of the right-of-way and acreage to be taken.

3. Amend Laws 1947, Chapter 484, to provide for cancellation of defaulted contracts covering lands sold under Laws 1935, Chapter 210, as amended, and Laws 1939, Chapter 320, as amended, not cancelled previous to the passage of Laws 1947, Chapter 484. The procedure for cancellation of these old contracts is complicated and a more simple and uniform method should be established for all contracts.

4. Amend and clarify Minnesota Statutes 1945, Section 84.027, with respect to the duties of the Commissioner of Conservation and the state auditor in the administration of trust fund land and tax-forfeited lands in the Red Lake Game Preserve and Conservation Areas.

5. Amend Minnesota Statutes 1945, Section 507.31, Subdivision 1, relative to certified list of railroad lands filed in counties; substitute Commissioner of Conservation in places where state auditor is used.

6. Amend Minnesota Statutes 1945, Section 6.16 and Section 84.027, Subdivisions 4, 5 and 6, to show that the records of state trust fund lands are with the Commissioner of Conservation instead of the state auditor.

7. Amend Minnesota Statutes 1945, Section 93.08, in order to simplify the procedure covering the removal of sand, gravel, and other earth material from under the waters of meandered lakes, streams or other public waters and for issuing leases for that purpose.

8. Require that assignment of state land contracts be recorded in the register of deeds office of the county in which the land is situated and also require that notice of assignment be filed with the Commissioner of Conservation. This should be done in order that we may keep more up-to-date records of outstanding contracts and a closer contact with contract holders.

9. Enact legislation to provide for the payment into the permanent trust funds for the value of any trust fund lands withdrawn from sale for special purposes, in order to reimburse the trust fund for the loss to the fund by reason of the taking.

10. Amend Minnesota Stautes 1945, Sections 282.221 to 282.226 inclusive, relating to the classification, appraisal and sale of tax-forfeited lands in the Red Lake Game Preserve; and Sections 282.14 to 282.22 inclusive, relative to the classification, appraisal and sale of tax-forfeited lands in the conservation areas, in order to coordinate the field work and procedure of the state and counties in the administration of tax-forfeited lands in those areas.

SUMMARY OF LEGISLATIVE RECOMMENDATIONS AFFECTING MINERAL ADMINISTRATION

1. That Minnesota Statutes 1945, Section 93.335, Subdivision 4, be amended to provide that rents and royalties received from tax-forfeited minerals and mineral rights be distributed to the state and the local taxing districts, instead of being held in trust by the state treasurer.

When this law was enacted in 1943 under Chapter 287, the state and the mineral counties could not agree on a distribution of this revenue, and it was decided to hold the revenue from tax-forfeited mineral lands in a special fund until such time as the legislature determined its disposition.

During the past year the county board officials in the northeastern counties have been contacted, and it appears at this time that the counties are agreeable to a distribution of this tax-forfeited mineral revenue on the basis of 20% to the state and 80% to the local taxing districts. It is our understanding that the counties are agreeable to having this 80% apportioned to the local taxing districts on the same basis as the existing law which deals with other tax-forfeited revenue.

2. That legislation be enacted to provide for the withdrawal from sale of the surface of tax-forfeited lands that are included in any mineral permit or lease which has been issued by the Commissioner of Conservation. Under Minnesota Statutes 1945, Section 93.335, the Commissioner of Conservation is authorized to group tax-forfeited lands into mining units and to issue permits to prospect for, or leases to mine, iron ore thereon.

However, there is no provision in the law covering the withdrawal from sale of the surface of these lands. The counties may sell the surface of taxforfeited lands even though it is under mineral permit or lease; and if this is done it will interfere with the exploration and development of the iron ore contained in these lands.

At the present time these withdrawals from sale are accomplished by resolution of the county boards in which the lands are located. In this connection, we now receive excellent cooperation from the county boards in Saint Louis, Itasca and Crow Wing counties. However from an administration angle, it would work out much better for the counties and the state if these withdrawals were provided for by law.

3. That legislation be enacted authorizing the Commissioner of Conservation to issue permits to prospect for, and leases to mine gold, silver, copper and other minerals except iron ore on tax-forfeited lands.

DIVISION OF LANDS AND MINERALS

Minnesota Statutes 1945, Section 93.335, authorizes the Commissioner of Conservation to issue permits to prospect for, or leases to mine iron ore on trust fund lands, but our present laws do not provide for the sale or lease of other minerals on tax-forfeited lands. This could probably be accomplished by amending Minnesota Statutes 1945, Section 93.25, so that this act includes tax-forfeited lands.

4. That Minnesota Statutes 1945, Section 93.15, be amended so that it is left to the discretion of the Commissioner of Conservation to determine which lands should be classified into minnig units. This act provides in part as follows: "The commissioner of conservation shall divide all lands belonging to the state, or in which the state has an interest, excepting lands situate under the waters of any public lake or river, into mining units . . ."

From an administration angle, many of our state-owned lands should not be classified into mining units as we have thousands of acres in areas where minerals are not known to exist. This act should also be amended so that the Commissioner of Conservation could enlarge the size of the units as outlined in the present law. This would be particularly desirable in re-leasing old mines that contain more than 80 acres and which should be operated under a new lease as one mining unit.

5. That Minnesota Statutes 1945, Section 93.20, be amended so that royalty payments could be made on the crude taconite as mined, in addition to the present plan which provides for the payment of royalty on taconite concentrates when shipped.

Most of the taconite concentrating plants will be processing taconite from various ownerships, including state-owned land; and from an administration angle, it will be impossible in these large central plants to identify the state ore after it has been concentrated.

For example, the Reserve Mining Company's quarry on the eastern end of the Mesabi Range will include a half-section of state land. Under their present plans they intend to mine the crude taconite and haul it by rail to Beaver Bay where it will be concentrated. This ore undoubtedly will be mixed at Beaver Bay with crude taconite from privately owned lands; and the royalty to be paid the state should be determined on the crude taconite as mined. The amendment should be written so that existing leases could be amended to provide for the payment of royalty on crude taconite as mined.

6. That Minnesota Statutes 1945, Section 93.18, be amended so that the Commissioner of Conservation may determine what analyses should be required from permittees in conducting exploration work on taconite lands. The present permit law provides for an analytical determination of iron, silica, phosphorus, alumina and manganese on all iron-bearing formation encountered. In cases where solid rock or taconite is encountered, this complete analysis is not necessary.

7. That Minnesota Statutes 1945, Section 93.285, Subdivision 3, which deals with permits to prospect for stockpiled iron ore, be amended to correct an error which was made in the 1945 act, which reads as follows: "No permit

for the same unit shall be issued to the same person for two six-month periods in succession."

This should be amended to read: "No permit for the same unit shall be issued to the same person for two one-year periods in succession."

8. That Minnesota Statutes 1945, Section 93.17, be amended so that in applying for permits to prospect for iron ore on state-owned lands, bidders be required to submit a uniform amount on each schedule if their bid exceeds the minimum. On tax-forfeited mining units or exhausted mines, the state does not always have sufficient information to determine the high bidder if the bids are not uniform on each schedule. This proposed amendment will make it possible to determine the high bidder as soon as the bids have been tabulated.

