STATE OF MINNESOTA

ON RANGE RESOURCES
ND REHABILITATION

REPORT TO THE GOVERNOR
AND THE LEGISLATURE
FOR THE TWENTY-SECOND BIENNIUM

July 1, 1948 to July 1, 1950

EDWARD G. BAYUK
Acting Commissioner
St. Paul, Minn.

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December 21, 1950

To the Honorable Luther W. Youngdahl, Governor,
and the Legislature of the State of Minnesota:

I have the honor of submitting to you the Biennial Report of the Iron Range Resources and Rehabilitation Commissioner.

This is the report for the twenty-second biennium and the third report prepared by the Commissioner. It covers the period beginning July 1, 1948, and ending June 30, 1950.

Respectfully submitted,

Edward G. Bayuk
Acting Commissioner

Members of the Iron Range Resources and Rehabilitation Commission

Senator George O'Brien, Chairman
Grand Rapids, Minnesota

Senator Thomas Vukelich, Secretary
Gilbert, Minnesota

Senator Herbert Rogers
Duluth, Minnesota

Representative Fred Schwanke
Deerwood, Minnesota

Representative Emil Ernst
Lester Prairie, Minnesota

Representative Charles Root
Minneapolis, Minnesota

Chester S. Wilson
Commissioner of the Department of Conservation

The Commission was created by the 1943 Legislature to advise and guide the Commissioner in his development program of the resources of Minnesota. The projects described in this report have all been approved by the Commission.

To understand the functions and duties of the Commissioner and Commission of Iron Range Resources and Rehabilitation, one must necessarily examine the situation and circumstances which gave rise to the creation of these offices.

Before 1941 there had been considerable clamor for the further gradual limitation of taxes levied by political subdivisions located in the Mesabi, Vermillion, and Cuyuna Ranges. Criticism was leveled against cities, villages, school districts, and townships in these areas where the greatest share of the taxes were paid by mining companies. The companies contended the levies were too high and further limitation was necessary. The ad valorem tax was involved. The state legislature prior to the 1941 session created a legislative tax interim committee to investigate the circumstances and at the 1941 session this committee recommended a further limitation. Levies in these areas by political subdivisions located therein were based on per capita of population. Cities had been limited to levies at $70.00 per capita of population and school districts at $60.00 per capita of population. At the 1941 session a law was enacted further limiting the tax levies, reducing the levies of cities over a period of 10 years from $70.00 per capita to $50.00 per capita of population and school districts from $60.00 per capita to $40.00 per capita. When this reduction was recommended by this legislative committee the then governor of the state, Governor Harold E. Stassen, in a talk to the legislature, March, 1941, recommended that the occupation tax (a tax based on iron ore **mined**) be increased simultaneously with the reduction in ad valorem taxes in the range districts. He recommended that a certain amount of this occupation tax be set aside for the development of a rehabilitation program in the range areas. He recommended that ten (10) per cent of the fifty (50) per cent of the occupation tax paid into the state general revenue fund go to promote and develop such a rehabilitation program. At that time he pointed out that there were 10,000 unemployed in St. Louis and Itasca Counties; twelve per cent of the people in St. Louis County were receiving some kind of public assistance or relief; that employment in the iron mines had decreased in 20 years from 12,000 to 4,500 men. The mining of iron ore did not offer its many former opportunities for employment. Technological improvements materially diminished chances for employ-

ment. Exploitation of timber resources, unwise methods of farming, introduction of machinery in the mining of iron ore and other factors contributed to unemployment and created problems in the iron range areas. At the 1941 session, therefore, the office of Commissioner of Iron Range Resources and Rehabilitation was created by M.S.A., Section 298.22. The office was created to promote vocational training, develop low grade iron ore, expand tourist facilities and attractions, develop farming, promote a long range forestry program in the 16 "cutover" counties, promote processing of wood products, establish paper mills, develop peat and other remaining natural resources in the stricken areas, and to generally develop a program of rehabilitating the people in the areas affected.

It might be well to mention here that the proceeds of the occupation tax on iron ore are allocated to various state funds as follows: 45 per cent to the state general revenue fund; 40 per cent to the permanent school trust fund; 10 per cent to the permanent university trust fund; and five (5) per cent to the Iron Range Resources and Rehabilitation Commission.

The Commissioner is vested with rather broad powers and his duties can best be summarized by quoting the law pertaining thereto. In 1943, the legislature by Laws 1943, Chapter 590, created the Iron Range Resources and Rehabilitation Commission. The membership of the Commission is made up of three Senators, three Representatives and the Commissioner of Conservation. The senate members are appointed by the Senate Committee on Committees and the House of Representatives members by the Speaker of the House. They serve for terms of two years or until their successors are appointed and qualify.

The powers of the Commissioner appears as follows, quoting from the law relevant thereto:

> "When the commissioner shall determine that distress and unemployment exists or may exist in the future in any county by reason of the removal of natural resources or a possibly limited use thereof in the future and the decrease in employment resulting therefrom, now or hereafter, he may use such amounts of the appropriation made to him in this section as he may determine to be necessary and proper in the development of the remaining resources of said county and in the vocational training and rehabilitation of its residents."

The law further provides that all proposed expenditures and projects made by the Commissioner shall first be submitted to the Commission for its recommendation as to approval, disapproval, or modification. This is largely accomplished by Commission action at its meetings or by correspondence and otherwise with the Commissioner, on allotment proposals made by the Commissioner, and through Commission action on budgets submitted in regular course to the State Commissioner of Administration.

With the recognition of the problems confronting the areas affected, a program of action was initiated whereby through research and development remaining resources could be utilized, high grade ore reserves conserved by discovering new methods of utilizing taconite and low grade ores, and reviving lumbering on an efficient basis of operation bearing in mind the remaining amount of timber resources. The promotion of new methods of farming, and encouragment of agricultural activities as well as the development of new industries from unused remaining resources.

Though this department is unique in its operation, it has always functioned under the Reorganization Act, with the Attorney General and the Department of Administration handling the contracts concerning our various projects. It must also be borne in mind, however, that the Governor of the state, as Chief Executive, is constantly interested in the program of the Commissioner. The Governor is the appointing power and the Commissioner is primarily responsible to him.

Projects initiated by the Commissioner may be temporary in nature. Others are permanent in nature. Employees with projects temporary in nature do not come within the preview of the Civil Service Law because such employees are employed only as long as the project continues. In every case, however, the Civil Service Department is consulted to avoid any violations of the Civil Service Law or Regulations.

In order to reduce the reading portion of this report to a minimum, I am going to briefly outline each program or project undertaken during the biennium ending June 30, 1950:

ADMINISTRATION

1. The Administrative office of the Commissioner of Iron Range Resources and Rehabilitation is located in St. Paul, Minnesota. The Commissioner is appointed by the governor, with the advice and consent of the Senate, for a term of two years. He is the chief administrative officer who controls and directs the administration of the department's affairs. Mr. R. E. Wilson was Commissioner during the first part of the period covered by this report. He was Commissioner until April 30, 1949. Mr. Ben P. Constantine was appointed Commissioner by Governor Youngdahl May 1, 1949, and he served the latter part of this biennium. Administrative costs reflected in this report cover the salary of the Commissioner, and salaries of all other employees directly responsible to the St. Paul office as well as expenses for maintenance of the office and for purchases of supplies, materials and other miscellaneous expenses necessary to operate said office.

AERIAL PHOTOGRAPHY

2. During the biennium $11,113.65 was expended in the procurement of new aerial photographs for forest inventory purposes. The photography was made especially for preparing an estimate of the forest areas, species of trees, and the size and density of timber stands for the areas covered. Pairs of adjacent photographs viewed under special stereoscopic instruments permit a trained observer to interpret all of these features without going into the field. Checks by means of on the ground examinations are made however, to insure accuracy of interpretation.

Standard ground methods of timber estimating cost approximately 18 cents per acre. New methods based on the use of aerial photography cut that cost to about 7½ cents per acre.

Areas covered include: Becker Co., 459 square miles; Beltrami Co., 36 square miles; Cass Co., 582 square miles; Hubbard Co., 654 square miles; Lake of the Woods Co., 606 square miles; Pine Co., 540 square miles; Roseau Co., 108 square miles; Wadena Co., 180 square miles.

All photography except Pine County was on infra-red film with a minus blue filter. Pine County was photographed on panchromatic film during late September and the same results

obtained at slightly lower cost. All photographs have a scale of four inches to the mile.

The photographs are being used for two specific purposes as well as many others of lesser importance:

1. An intensive inventory of state and tax forfeited land and timber as the basis for establishing better forest management practices. Involved are more than one million acres and an estimated four million dollars of timber values.

2. An extensive survey of other ownerships to complete the overall picture of Minnesota's forest resources.

The saving in manpower by the state, counties, and private industry foresters is many times the initial cost of the photography.

AGRICULTURAL PROJECTS

3. The agricultural projects were under the direction of Mr. Ernest P. Gibson. The expenditures for this program represent his salary and expenses. He carried on an extensive program in the field of agriculture in the "cutover" section of Minnesota until his death. Since that time this program has been discontinued.

COW TESTING

4. Cow Testing Programs provide an opportunity to check the production of each cow. Improvement and scientific advancement of dairying applied to a herd of cattle is ineffective unless performance records are kept to see the progress made. The knowledge gained by having such records aids the dairyman to cull intelligently, feed properly and breed constructively.

FARM FORESTRY

5. This program was initiated in 1943 to educate and train farmers in the broad concepts of conservation problems and wood-lot management. Woodlots on farms can be made to be a valuable source of income.

FOREST SURVEY

8. The Forest Survey was started early in 1947 and will cover each individual county in the 16 counties of Northeastern

Minnesota. It is designed to improve existing conditions, show how forests can be recreated, protected and safeguarded for future generations. It reveals how much timber is available in each county, what kind of timber, where it is located and to whom it belongs. This is essential information to encourage new wood working industries into Minnesota. A printed report is published after each county survey is completed.

HARDBOARD PROJECT

9. This project began in 1947 and is now completed. It is utilizing waste aspen into a suitable commercial hardboard which also results in a new industry for Minnesota. There is a huge amount of aspen available in Minnesota and science has recently revealed ways and means of utilizing it into useful products. Here we are utilizing an otherwise dormant resource. The plant is located at Duluth, Minnesota.

IRON POWDER PROJECT

10. The iron powder project was begun in the summer of 1946 utilizing a method developed by the late C. V. Firth of the Mines Experiment Station at the University of Minnesota, of producing iron powder with a purity of 99% by a chemical process from iron carbonate slate. Carbonate slate is a highly siliceous ore found on the Mesabi Range in great abundance. This ore is worthless in the regular production of iron. The late Mr. Firth developed the process which renders carbonate slate amenable to processing by chemical means to an iron powder of high purity.

Tests performed with iron powder indicated that it was ideal in forming compacts. The Iron Range Resources and Rehabilitation established the pilot plant to prove the commercial value of iron powder. The benefits derived from the five ton per day pilot plant could be three-fold: 1. Proving the commercial feasibility of the process proven in the laboratory at the University of Minnesota, 2. Utilizing a dormant natural resource, 3. Creating a new industry as well as job opportunities for the people.

The selection of the plant site near Aurora, Minnesota, was influenced by the unlimited source of raw material as well as the water resources available. The site included a steep bluff on

which a primary crusher was mounted and below which a stockpile could be bed into the plant thus permitting year around operation.

Unfortunately, Mr. Firth died shortly after the site of the plant was selected and before the furnace, he was especially designing, was completely blueprinted. Therefore, others had to visualize the plans Mr. Firth wanted incorporated into the furnace which was the last phase of the operation. When the plant was completed, the trial run indicated that the entire process was satisfactory but the furnace did not work and thus halted the operation of the plant. The unforeseen failure in the furnace had to be analyzed and corrected which resulted in the entire furnace having to be redesigned and rebuilt. The Iron Range Resources and Rehabilitation Commission voted another $40,000 to assist Continental Machines, Inc., with the redesigning and construction of the new furnace. Unfortunately, this led to a legal entanglement which stopped the entire project and thus no progress was made pending a claim bill introduced during the 1949 Session of the Legislature. When the bill was passed and signed, Continental Machines was allocated $116,000.00 to assist with the new furnace and other experiments necessary for the ultimate success of the iron powder project. A heavy duty rotating discharge table and a water cooled screw with variable speeds were also installed. A total of $766,000.00 of the Department's funds were expended on this project.

Before concluding the iron powder project, it might be well to explain that iron powder is just what the name implies. The ore is crushed and ball milled to a fine sand, which is then dissolved in acid to separate the iron from the impurities (largely silica). From this solution, relatively pure crystals of iron sulphate is prepared by a series of filtering, evaporating and crystallizing operations. These crystals are further purified by a selective roasting operation which changes the iron sulphate into red oxide but leaves the impurities in such form that they may be washed out of the iron oxide. The red oxide, over 99% pure, is then fed through the furnace in which it is reduced to pure iron by contact with gas made in the plant from coke. A series of milling and sizing operations bring the pure iron to a uniform standard of physical characteristics so necessary for successful use. The powder can be formed directly into finished machine parts simply by pressing the cold powder in a properly formed

die and then heating the briquet to a suitable temperature for a short time. The final product has a strength lying between that of cast iron and steel and requires no machining to finish. Iron powder can be used for such parts as bearings, pinions, cams and many other machine parts used in the construction of automobiles, farm equipment and household appliances. The powder is compacted to shape under great pressure in a die emerging smooth and true to dimension without further machining necessary. This results in a great saving especially when the part is intricate in shape and would otherwise require much skilled machining to produce by conventional methods.

LAND USE PROGRAM

11. In the Land Use Program we cooperate with the following counties: Aitkin, Beltrami, Cass, Clearwater, Crow Wing, Itasca, Koochiching, Milaca and St. Louis. The program was started in 1942 and men assigned to these projects are not only responsible for land classification and appraisals but are undertaking a comprehensive inventory of tax forfeited lands as a basis for future development as well as a rural zoning program. As the counties programs become self-supporting, they are removed from our financial obligation.

MINN.-NO. DAK. RESOURCES DEVELOPMENT COMMISSION

12. This department has been vitally interested in the experiment whereby hydrogen gas is extracted from North Dakota lignite with the possible utilization in concentrating low grade ores.

PEAT RESEARCH (CHISHOLM)

14. The Iron Range Resources and Rehabilitation has been conducting a research laboratory at the Balkan Bog near Chisholm, Minnesota, since early in 1946, in an effort to develop peat as a fuel. If successful, peat may possibly be used to generate electricity which is expected to be in great demand for development of our vast deposits of low grade ores. The U. S. Bureau of Mines concluded in a report in 1928 that the low cost of high quality coal, the high freight rate on peat and the remoteness of the market, did not justify exploitation of peat resources. Since that date, there has been a substantial increase

in the price of coal which consequently has placed peat in a better competitive position. The shortages of fuel during World War I is too fresh in our minds to ignore the vital importance of exploring local fuel sources to soften the impact of another national coal or oil deficiency. A printed report is available on the progress of this research project.

PEAT PROCESSING PLANT

15. After evaluating the knowledge that was available concerning Minnesota's huge peat deposits, the Iron Range Resources and Rehabilitation undertook to construct an experimental plant to prove that commercial utilization of our vast peat resources was possible, as a peat moss for horticultural purposes and for poultry and stable litter. The experimental plant was constructed four miles west of Floodwood, Minnesota, with a production capacity of 750 bales per day (weighing from 70 to 80 pounds per bale). This plant is the only one of its kind in the world with specially designed machinery to process the peat.

The plant is 252 feet long and 50 feet wide. The peat moss is removed from the bog by means of hydraulic pressure, is floated through small trenches to a pump which forces it through a two block long pipe into a washroom. Here it is purified by washing and leaves this room free from all foreign materials. It then enters the plant, going first through a fordinear. It is carried by a conveyor belt into the 135 foot tunnel over where it is dried to about 25% moisture. It is then shredded in the hammermill and finally goes to the baler.

The value of peat in the soil is its organic content, its moisture holding ability and its value as a soil conditioner. The only fertilizer carried by peat is nitrogen and it only contains about 3% of that. Therefore, the value of peat is not so much from an agricultural standpoint as from other commercial angles. However, since it retains 20 times its weight in moisture, any sandy soil or dry climate can use peat to hold the moisture so necessary in making vegetation grow.

Research is being conducted to find other useful products utilizing peat. It is possible that eventually peat will be used for wallboard, waxes, chemicals, pressed logs for fireplaces and for city gardens and parks.

SEED POTATOES

16. In 1920, 102 carloads of potatoes were shipped from Embarrass, Minnesota, but since that time the potato industry has gradually slipped. 500 bushels of registered foundation stock Green Mountain seed potatoes were purchased in 1942 as a seed pool to assist the farmers in raising a better crop of potatoes. A quality potato program was originated whereby disease control, dusting, spraying and cultural information was made available to the farmers. A potato sprayer was also purchased to assist the farmers in raising blight free potatoes.

Irish Cobbler seed potato acreages were increased with the financial and supervisional contribution as well as the purchase of 1,000 bushels of foundation stock certified seeds. The program was aimed at promoting ways and means of producing disease-free, high quality seed potatoes and secure reliable, steady market outlet.

SMALL FRUIT

17. Development and expansion of the Raspberry, Strawberry and fruit trees has been underway since 1942. The agricultural fieldman has aided berry growers to increase crop production and marketing of their product.

SULPHITE DRILLING

18. Test drilling was conducted in Aitkin County during the summer of 1949 to determine if there exists a source of sulphuric acid. This drilling has just been completed and the published report will be available within the next few months. The project cost approximately $27,500.

TITANIUM DRILLING

19. Test drilling was carried on in Cook County during the summer of 1947 to determine the existence of titaniferous ore which is very rare. The published reports on the findings is now available for distribution. The project cost approximately $26,000.

TOPOGRAPHIC MAPPING

20. Since 1944 this department has recommended that a topographic mapping project be undertaken. One of the most

direct and widespread aids to the development of Northeastern Minnesota, particularly the Mesabi Range, would be the provision of satisfactory maps for planning the extensive development that is certain to take place with the establishing of taconite concentration plants. It will provide a means whereby the resources and other physical features of the state may be presented to prospective commercial interests. In fact, these maps will serve as the base data for all preliminary planning, reconnaissance and examination of industrial, engineering and scientific projects. This work will be done in cooperation with the U. S. Geological Survey, who will do the work and furnish 50 per cent of the funds. We have allocated $30,000 for this project.

Topographic surveys and maps of 11 quadrangles of land in the Isaac Lake, Graceville, Embarrass, Aurora, Allen, Lake Elmo, and Hudson, Minnesota-Wisconsin areas have been completed. The maps of the six quadrangles in the Little Falls area are based on aerial surveys made by the U. S. Army Engineers and completed by the Topographic branch, Geological Survey in the U. S. Department of Interior. The charts are one inch to the mile in scale and each covers 207 square miles of approximately 132,480 acres of land.

The four maps of land in the Aurora area cover about 33,120 acres and are at a scale of two and a half inches to the mile. This area is part of the Mesabi Iron Range region, all of which is to be eventually surveyed.

The one quadrangle surveyed in the Graceville area covers about 207 square miles and is scaled at one inch to the mile.

Each map shows ground and water elevations, locations of communities, streams, lakes and other features. They are now available and may be obtained from the U. S. Geological Survey, Washington 25, D. C. or the Federal Center, Denver, Colorado, at 20 cents each.

WATER SURVEY

21. The water project has been carried on in cooperation with the U. S. Geological Survey since 1943. The object of this project is to determine the public water supply available on the range and the best utilization thereof. Projected plans for the development and expansion of the resources in the area has emphasized the need for large quanities of processing water. We allocate approximately $1,625 per year for this project.

VOCATIONAL TRAINING

22. In view of the labor saving machinery which has reduced employment in the mines to a minimum and with an eye to the future, when there is a possibility that high grade ore will be depleted, the Iron Range Resources has been diligently pursuing ways and means of utilizing our human resources by providing employment opportunities to the people of the area. When the Cluett Peabody Company of Troy, New York, moved to Eveleth in 1946, it was necessary to train 350 local people to cut and operate power sewing machines for employment in the plant. The Iron Range Resources and Rehabilitation set up a training center for the personnel.

WOOD PROCESSING PLANT

23. This experimental plant is attempting to prove that small lumber producers in Northeastern Minnesota can produce again and market as fine a quality and true grade lumber as any other area. The plant was built in 1947 and is now ready for operation.

EXPENDITURES BY PROJECTS

IRON RANGE RESOURCES AND REHABILITATION

	Project	7/1/48-49	7/1/49-50
1.	Administration	$ 21,387.61	$ 34,317.32
2.	Aerial Photography	.....	11,113.65*
3.	Agricultural Projects	3,633.64	3,836.26
4.	Cow Testing	5,400.00	4,195.15
5.	Farm Forest Education	3,422.00	3,398.00
6.	Fish Canning Project	24.62	.....
7.	Flax Program	.....	207.34
8.	Forest Survey	36,787.27	58,451.36
9.	Hardboard Project	222,167.10	57,500.00
10.	Iron Powder Plant	116,311.56	191.95
11.	Land Use Program	28,193.66	10,310.64
12.	Minn.-N. D. Resources Dev. Commission	100.00	165.43
13.	Motion Picture	7,449.89	.....
14.	Peat Research (Chisholm)	21,760.09	14,901.33
15.	Peat Processing Plant	47,601.42	82.12
16.	Seed Potatoes	43.48	.....
17.	Small Fruit	3,994.19	3,788.75
18.	Sulphite Drilling	19,960.60	8,139.88
19.	Titanium Drilling	3,297.02	30.65
20.	Topographic Mapping	.....	30,000.00**
21.	Water Survey	1,575.00	1,625.00
22.	Vocational Training	.....	6,059.10
23.	Wood Processing Plant	11,867.65	1,964.82
	GRAND TOTALS	$554,976.80	$250,278.75
	Transfers (out)		
	University of Minnesota	60,000.00	75,000.00
	Lands and Minerals	30,467.00	34,600.00
	Lands and Minerals (deficiency)	190.00	.....
		$645,633.80	$359,878.75

*$1,884.60 still to be liquidated.
**$8,548.30 still to be liquidated.

RECEIPTS

		7/1/48-49	7/1/49-50
1	TAXES		
	Occupational Tax on Iron Ore	$479,086.55	$651,873.36
7	STORES FOR RESALE		
	Stores for Resale	11,231.16	709.20
8	REIMBURSEMENTS AND REFUNDS		
	80 Red. of Exp. (pr. yrs.)	84.25	9.14
9	TRANSFERS (IN)		
	90 Transfers (in)	6,403.37	2,867.27
		$496,805.33	$655,458.97