DRAFT SUPPLEMENTAL ENVIRONMENTAL IMPACT STATEMENT

OGLEBAY NORTON EXPANSION PROJECT

APRIL 1980

① Natural Resources Department

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SUPPLEMENT TO
DRAFT ENVIRONMENTAL IMPACT STATEMENT
ON OGLEBAY NORTON'S
PLANNED EXPANSION PROJECT

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S U M M A R Y

Proposed Action

Oglebay Norton's mine expansion plan originally included the placement of waste rock and surface overburden in commingled stockpiles. It was subsequently decided that dilution of ore-bearing rock with surface materials could prevent future use of the resource. Therefore, Oglebay Norton decided to stockpile waste rock and surface overburden in separate areas. To provide for the stockpiling volume necessary Oglebay Norton proposed the use of some additional stockpile areas to the west of their Expansion Mine. The proposed stockpile areas contain 160 acres of State Trust Fund and approximately 326 acres of Tax Forfeited lands which Oglebay Norton proposes to acquire by land exchange with the State.

In 1978 Oglebay Norton constructed a diversion ditch for conveying mine water from the Expansion Mine. The diversion structure and ditch are located on three State Trust Fund forty acre parcels in Section 24-57-18. Oglebay Norton proposes that this diversion be retained and that the State Trust Fund Lands be included in the land exchange. Finally, Oglebay Norton proposes to obtain 40 acres of State Trust Land in Section 36-57-18 down-stream of the above mentioned diversion. This reach of the water-course is replete with dead falls and natural debris and must be periodically cleaned to restore flow capacity.

Impacts

Impacts resulting from the construction and operation of

stockpiles are varied. Hauling and dumping of overburden and rock will cause an increase in suspended particulate matter. Winds will also generate dust. The former can be controlled by watering roads, the latter by prompt revegetation of completed areas. Noise will result from the construction activities. The impacts of noise can be diminished by constructing those portions of the stockpiles nearest West Eveleth first. Subsequent construction noise will then be buffered by the completed portions of the stockpile. Erosion of the stockpiles by runoff can be reduced by revegetation and the use of slopes which will be equal to or more conservative than the sloping requirement of the State's Mineland Reclamation Rules.

The proposed stockpiling lands provide wildlife habitat and contain some timber. Loss of timber and wildlife habitat should not be permanent. Ultimately the stockpiles will be revegetated resulting in the replacement of the existing timber and habitat with a more upland habitat type.

The stockpiles will result in a visual/aesthetic impact as they will add more relief to the vicinity. They will be contoured and designed to avoid the appearance of the familiar old stockpiles of the Iron Range. Portions will incorporate, and thereby reclaim, several old mines, stockpiles, and tailings ponds. The overall effect should be an improvement in the appearance of the older, unreclaimed mining areas west and southwest of Eveleth.

The stockpile construction as proposed will require the

relocation of some four families. Oglebay Norton employs 1400 persons. Access to resource and stockpile lands are essential to continued operation by the Company.

Although energy consumption in the transportation of mine wastes is great, the short-haul stockpile locations are as energy efficient as possible. The large stockpiles proposed may make possible the future use of electrical conveyor systems. The construction of the diversion ditch for the Expansion Mine dewatering has resulted in the conversion of a brush and woodland habitat to a stream. The temporary impacts of added sedimentation and erosion due to construction activities are past. The bordering area has been revegetated and should gradually return to timber production.

Alternatives

Alternative stockpiling locations have been identified adjacent to both the preferred stockpile areas. Use of the alternative areas would result in a greater number of smaller stockpiles with higher elevations being constructed. Other impacts include the relocation of a railroad, diversion of another creek and relocation of additional homes. A possible advantage of the alternative sites is that they are closer to the mines and could result in energy savings for transportation.

The principal alternative to the continued use of the diversion ditch for mine dewatering would be to refill the diversion and widen and deepen the original channel. The original channel would then have the capacity to carry the mine

pumpage. Other alternatives would be to shift the entire flow to the diversion ditch or to shift all flow to the original channel without additional widening or deepening.

Alternatives to securing the 40 acres of State Trust Fund Land in Section 36-17-18 through the proposed land exchange include less extensive means of conveyance which would still give Oglebay Norton the rights it desires. This could be done through long term or renewable leases, or the granting of flowage and channel maintenance rights.

Permits

Outstanding state permits include a Minnesota Department of Natural Resources permit for the diversion of Snowden Creek around the South Stockpile. An application for this permit is pending and will require detailed construction plans before work on the diversion commences. The action will also require a Permit to Mine pursuant to Minnesota Statutes 1979 §93.48. Need for this permit is dependent upon the promulgation of the Rules for Mineland Reclamation. Promulgation is expected to take place this summer.

Organizations Consulted

The Draft Supplemental EIS was prepared through a cooperative effort between Oglebay Norton and the Minnesota Department of Natural Resources. The Minnesota Pollution Control Agency was consulted along with state and local government and civic officials of Eveleth, West Eveleth, Leonidas and the West Side Civic League, Inc.

I. DESCRIPTION OF THE ACTION.

A. Introduction

Oglebay Norton Company is the Manager of and through a wholly-owned subsidiary is one of the partners in Eveleth Expansion Company, and is also the Manager of and one of the owners of Eveleth Taconite Company. Eveleth Taconite Company has been producing taconite pellets from the Thunderbird Mine west of Eveleth, Minnesota and the Fairlane Plant near Forbes, Minnesota, since 1965 at the rate of 2.4 million tons per year. Eveleth Expansion Company was formed in 1974 to develop and operate the Expansion Mine south of Eveleth and additions to the Fairlane Plant, designed to produce taconite pellets at the rate of 3.6 million tons per year. Oglebay Norton Company, Eveleth Expansion Company and Eveleth Taconite Company are collectively referred to herein as the Company.

Eveleth Expansion Company's facilities have been in full operation since May 1977, except for the period of the 1977 iron ore strike. The Expansion Company facilities consist of the Expansion Pit and the South Crusher in the Eveleth area, and fine crushing, grinding, magnetic separation, balling and pelletizing facilities at the Fairlane Plant. Eveleth Taconite Company has similar facilities at the Thunderbird Mine and Fairlane Plant.

The Minnesota Department of Natural Resources and the Minnesota Pollution Control Agency co-authored an Environmental

Impact Statement on the Expansion Company development entitled "Oglebay Norton's Planned Expansion Project", which was submitted to the Environmental Quality Board (then EQC) in February 1976. The Final Environmental Impact Statement noted that following the preparation of the Draft EIS, Oglebay Norton Company had determined that certain modifications could be made in the Project to help minimize environmental effects. The original proposal to place waste rock and surface overburden in commingled stockpiles had been abandoned, and to provide the additional stockpile volume required as a result, the Company proposed to expand a stockpile area west of the Expansion Pit. Some of the lands added to the proposed stockpile area are state lands, which the Company proposes to acquire by a land exchange. The Final EIS stated that a thorough investigation of any impacts involving the exchange should be added to the Final EIS by addendum.

In apparent response, the EQB in its resolution accepting the Final EIS included, among other things, a proviso that:

> "A supplemental EIS is written on the environmental impact of the use of additional land which will be incorporated into the Expansion Project through a proposed land exchange between the Oglebay Norton Company and the Department of Natural Resources or by other means. This Supplemental EIS would be the responsibility of the DNR."

This document is the Supplemental EIS required by that resolution. It deals with the impacts of the use of additional lands which were not a part of the Project as originally proposed. As these lands are to be used for surface overburden and iron formation

stockpiles and to carry a watercourse, these two aspects of the Project are considered in this document. The description and analysis of Oglebay Norton's Eveleth Expansion Taconite Project as a whole is contained in the 1975 Draft and 1976 Final Environmental Impact Statements and will not be repeated in this document.

B. Project Stockpile Areas

1. Overview.

The mining of taconite requires the removal and stockpiling of extensive quantities of surface overburden and rock containing less than the minimum iron content required for economically feasible beneficiation in approximate ratios of one cubic yard of overburden and four cubic yards of rock for each twelve tons of crude ore mined and processed. The Company plans to stockpile the overburden and rock removed from the Expansion Pit in the following three major areas: The pit footwall area, the Alice Fayal-Fayal No. 3 area, and the South Stockpile Area which consists of the Section 7, Coons-Pacific, and West Portion areas. These areas are shown on Figure 1. The Section Seven Area and the Alice-Fayal Area are currently in use. An old stockpile was moved from the Expansion Pit to the West Portion in 1979.

Stockpiling of the overburden and waste rock from the Thunderbird Mine is planned principally for the Spruce-Hull-Nelson pits, the North Stockpile, and the Thunderbird Mine footwall. Smaller quantities of material will be used to complete

the sound berm and for landscaping the Adams Hill area facing the west side of Eveleth, and to construct a public mine observation point east of the present Thunderbird Pit. These areas are also shown on Figure 1.

Additional areas shown on Figure 6 are possible alternative areas.

2. Proposed Stockpile Areas.

a. South Stockpile Area.

(i) West Portion

Expansion of the stockpile area west of the Expansion Pit is the modification of the action proposed following preparation of the Draft EIS, and includes the bulk of the state owned lands the Company proposes to acquire. The Company's original proposal included a stockpile in the South Half of Section 1-57-18, as shown in Figure 6 of the 1975 Draft EIS. The revised proposal expanded this stockpile area to the west and southwest. As now planned, it includes the south part of the South Half of the Northeast Quarter of Section 2-57-18 and the south part of the Southwest Quarter of Northwest Quarter of Section 1-57-18, that part of the Southeast Quarter of Section 2-57-18 lying east of the Duluth, Winnipeg and Pacific Railway, that part of Section 11-57-18 lying east of the Duluth Winnipeg and Pacific Railway, part of the Southwest Quarter of Section 1-57-18, and that part of Section 12-57-18 lying northwest of Highway 7. The West Portion of the South Stockpile Area is shown on Figure 1.

The lands in the West Portion of the South Stockpile

Area include 80 acres of State Trust Lands and approximately 326 acres of tax forfeited lands, making a total of approximately 406 acres in this area which the company seeks to acquire from the state. The area also includes 45 acres owned by the City of Eveleth and approximately 143 acres of private lands. The remaining lands are owned by mining companies. These acreages do not include seventeen acres of City of Eveleth lands in the Northwest Quarter of the Northeast Quarter of Section 1-57-18 which is not part of the stockpile area but which is needed for the Project because of its nearness to the Expansion Pit limits.

(ii) Section Seven

Presently in use as a rock and overburden stockpile area is the Southwest Quarter of Section 7-57-17 and the North Half of the Northwest Quarter of Section 18-57-17. This area will be filled in approximately three years, but will thereafter be connected to the Coons Pacific area to the west, and extended into the Southwest Quarter of Northwest Quarter of Section 7-57-17. The Company owns all the land in this portion of the South Stockpile.

(iii) Coons-Pacific

The third segment of the South Stockpile Area, labeled Coons-Pacific on Figure 1, is located in Section 12-57-18, southeast of present Highway 7, and in the northern 160 acres of Section 13-57-18. Pittsburgh Pacific Company owns this area, except for approximately 25 acres which is privately owned and 40 acres owned by the Duluth, Missabe and Iron Range Railway. The inactive Coons-Pacific natural ore processing plant, coarse

tailings pile and three-cell fine tailings pond are located on this property, which lies between the Section Seven and the West Portion of the South Stockpile area. Use of the three areas of the South Stockpile are not dependent upon each other, but their use in conjunction with each other offers the advantages of a large landform.

b. Alice Fayal Area and Fayal No. 3 Area.

A surface overburden stockpile has been constructed in the North Half of Northeast Quarter of Section 6-57-17, the Northwest Quarter of Northwest Quarter of Section 5-57-17, and the northern part of the old Fayal 3 Mine in the Northeast Quarter of Northwest Quarter of Section 5-57-17. These areas were shown as a stockpile area in the 1976 Final EIS. Additional overburden will be added to this stockpile in 1980-83, first on the west and then on the north. After mining in the Southeast Quarter of the Northwest Quarter of Section 5-57-17 and adjacent areas, this stockpile will be extended easterly, and additional material will be added along the length of the south side of this area. See Figure 1. The Company owns or leases all parts of this area.

c. North Stockpile.

This stockpile area was a part of the Project as described in the 1975 Draft and 1976 Final EIS's; and thus does not involve additional land as contemplated by the quoted EQB Resolution. The state lands in the North stockpile area consist of two State Trust Land forty acre parcels in the Southeast Quarter of Section 26-58-18, and a 3-acre tax forfeited triangle

northwest of the Duluth, Missabe and Iron Range railway tracks in the Northwest Quarter of the Southeast Quarter of Section 35-58-18. All other lands in this stockpile area are owned or leased by the Company, except for a fractional interest in a twenty-acre parcel. The North Stockpile Area is shown in Figure 1.

d. Spruce-Hull-Nelson Pit Area.

The easterly area of the pit formed by these old interconnected natural ore mines has been used for the stockpiling of overburden and rock from the Thunderbird Mine beginning in the 1960's. This area was a part of the Project as described in the 1975 Draft and 1976 Final EIS, but the Company's present plans do not include the state-owned Leonidas Pit and the stockpile elevations will be lower than previously described. The Company owns or leases all land in this stockpile area. This area is also shown on Figure 1.

e. Footwall Areas.

Use of the mined out footwall area in the northeast area of the Thunderbird Mine for stockpile purposes will start in 1980 as shown on Figure 2. Use of the future footwall area of the Expansion Pit adjacent to the Alice Fayal Area for stockpile purpose will start in approximately 1995, as shown on Figure 4. The Thunderbird and Expansion in-pit stockpiles will not reach elevations above that of the original topography.

f. Adams Hill Landscaping.

As discussed at page 6 of the 1976 Final EIS, the Company has been constructing and vegetating a berm along the

east edge of the old Spruce Pit to screen the sounds and sights of the inter-mine road from the City of Eveleth. The Adams Hill landscaping fill will be an extension of this berm northeastward across the Southeast Quarter of the Southeast Quarter of Section 30-58-17 and into the Southwest Quarter of the Southwest Quarter of Section 29-58-17. In the latter section the "squatter" residences have been removed because of their proximity to the Thunderbird Mine limits. The Adams Hill area now constitutes a low pocket beneath the toe of the inter-mine road. The fill will make possible the sloping, contouring and revegetation, with grass and trees, of the side of this area which faces the City. This is expected to be fully completed in 1980. The Company holds mining leases of this area.

g. Viewpoint.

This stockpile will cover approximately 50 acres extending in a north-south direction just west of and below the crest of the hill which lies east of the Thunderbird Mine. Included are lands in the Northwest Quarter of Section 29-58-17 and the Southeast Quarter of the Southwest Quarter of Section 20-58-17. The fill will be an approximate maximum of 50 feet deep and will make possible the development of access to and an overlook from the highest natural peak in the immediate area. The Company holds leases of the area.

As stated in the 1975 Draft EIS, plans for the development of mines and stockpiles are necessarily subject to modification from time to time as the action progresses. Unlike

a facility which once built remains static for its useful life, the mining process is continuous over the full life of the operation. Accordingly, the stockpile elevations and configurations given in this document as of any given year reflect the Company's plans at the present date and are necessarily subject to some modification over the years. However, the Company will construct the stockpile face toward West Eveleth and the stockpile face south of Eveleth in accordance with the present plans described in Section I.F.1.d.

C. Watercourse Lands

1. Overview

As the means of conveying mine water pumped from the Expansion Mine to the St. Louis River, the Company is using the partly ditched small creek shown on Figure 1. This creek runs from the old, inactive, natural ore Pearsall Mine in Section 7-57-17 southwesterly into Section 13-57-18, and then southerly through Sections 24, 25 and 36 (Township 57-18) to the St. Louis River. Following the acceptance of the 1976 Final EIS, the Department of Natural Resources issued water appropriation permits for the dewatering of the Fayal No. 3 and Expansion Pit into this watercourse. The Minnesota Pollution Control Agency issued an NPDES Permit (No. 0044482) for the discharge. Pursuant to those permits, the Company has been discharging mine water to this watercourse since June 1978.

2. Additional Project Lands

In June 1978, the Company constructed a diversion of the above watercourse. This construction included a diversion

structure designed to allow a continuation of flow, approximately equal to the unimproved channel capacity, down the old channel but direct additional flows through the diversion. This diversion was not considered in the 1975 Draft and 1976 Final EIS, and is located on three State Trust Land forty acre parcels in Section 24-57-18.

The EQB, by Resolution adopted May 18, 1978, authorized the DNR to lease portions of these three parcels to the Company, pending the completion of this Supplemental EIS. A conditon of the use was that if, based upon this Supplemental EIS, the state determines that other uses should be made of these lands, the Company would restore the land to its pre-existing condition. A short term lease was issued on that basis. The DNR authorized the construction of the diversion, and other improvements of the watercourse, by Permit No. 78-2165. The purpose of this diversion was to prevent an increase in the flow across certain parcels riparian to the pre-existing channel, the owners of which refused to grant flowage and channel improvement rights to the Company.

The Company proposes that this diversion be left in place and in use, and has proposed the inclusion of the three forty acre parcels in the state land exchange. Widening and deepening of the old channel would be desirable if the diversion were closed and the mine water redirected to the old channel. However, although the Company has acquired flowage easements it would need to obtain additional rights for widening and deepening the original channel.

The proposed state land exchange also includes the Northwest Quarter of the Southeast Quarter of Section 36-57-18 which the watercourse crosses further downstream. There is no change in the action as described in the 1975 Draft EIS with respect to this parcel.

D. Changes in the Mining Sequence

1. Expansion Mine - West Area

The Company's original plan for development of the Expansion Mine is discussed at Pages 30-33 and shown in Figures 5-8 and 13-16 of the 1975 Draft EIS. Originally the mine was to be developed easterly from the initial Expansion Mine limits toward Highway 53 in the years from 1978 to 1998 and, thereafter, westerly across the pre-existing right-of-way of County-State Aid Highway 7. Based upon additional drilling of the mineral deposit, the Company has concluded that it would be advantageous to develop the western part of the mine first because of the more favorable stripping ratios of the western as compared to the eastern mine area. It was also decided that the higher quality, lower silica, upper cherty ore from the western area would be needed in the 1980's to blend with the upper cherty ore from the central Expansion Pit area in order to maintain product quality. In future years when production will come from the lower cherty horizon the eastern ore can be utilized more effectively. In 1977 the Company relocated Highway 7 west of and roughly parallel to its original location. To fully develop the mine and utilize the West Dump area will require the abandonment of Highway 7 in Section 1-57-18 and Section 6-57-17,

and the construction of a replacement highway in approximately four years.

In order to minimize the impacts of blasting on West Eveleth residences, the Company has revised its plans to maintain a greater distance from the blasting area to the residences.

Mining in the Northwest Quarter of Section 6-57-17 will require the relocation of the residents of Spruce Location as indicated in the 1975 Draft EIS (Page 220). It is now planned that relocation will be necessary prior to January 1, 1986. The planned mine limit in the Northwest Quarter of Northwest Quarter has been extended northerly almost to the northern boundary of Section Six. However, the vacation of Spruce Location would be necessary even if this change had not been made.

2. Expansion Mine - Pearsall Mine Area

Further delineation of the Expansion Mine, by means of more extensive drilling of the ore body, has shown that the desired southern limits will not break into the old Pearsall Mine. Thus the Pearsall Mine will serve as a settling basin and the new settling basin, originally planned southeast of the crusher, will not be required.

E. Description of Lands

1. Physical Characteristics

The physical characteristics of the additional lands needed for the Eveleth Taconite Expansion are described in this section. The principal source of this information is the Minnesota Department of Natural Resources' Computerized Iron

Range Information System (IRIS). The characteristics discussed are: bedrock geology, soil associations, hydrology and watersheds, mining land use, vegetation, recreational, historical and archeological features, utilities and roads, urban and rural development, and wildlife and natural areas. The appendix provides additional discussion on IRIS along with maps and tables describing the proposed action.

a. Bedrock Geology

The proposed North Stockpile and South Stockpile areas, their alternatives, and all of the lands proposed for exchange are underlain by the Virginia Formation (Figure A-2 and Table A-1). This geological formation was formerly known as the Virginia slate and consists of argilite, argrillaceous siltstone, very fine graywacke and lesser amounts of limestone, dolomite, chert, and cherty sideritic. The stockpiles are generally located 1/4 to 1/2 of a mile west and southwest of the contact with the Biwabik Iron Formation. All of the tax forfeited lands to be acquired by the Company are underlain by the Virginia Formation. (See Table A-1 for further information).

In Figure A-3, the ultimate pit limit was designated by Dr. Ralph Marsden and based on the regional taconite resource estimate. This generally conforms to the maps submitted by Eveleth Taconite Company. However, from their drilling and other geological information, the Company feels that the stockpiles will not encroach the area to be mined as shown in Figure 5, Development of Open Pit and Stockpile Area-Ultimate.

b. Soil Associations

The soil associations and soil series in the study area were determined by examining geophysical characteristics visible on aerial photographs. Characteristics used were profile, color, structure, consistency, sequence of horizons, conditions of relief and drainage, and origin and mode of formation. The accuracy of the soil mapping is considered to be unreliable below 40-acre blocks.

Soil associations found in the area were mines and mine wastes from previous mining, peat and muck, undifferentiated gravelly eskers and outwash areas, and undulating clay-moraines and level clayey ground moraines (see Figure A-4).

Although a considerable area of peat is indicated, it is not in one contiguous area. Because much of it is located totally within the stockpile area, it can be contained by proper stockpile design and construction.

IRIS data indicate that the predominant soil type in the proposed stockpile areas is clay soils, followed by mines and mine wastes and peat. The south alternative stockpile would be constructed on an area of undulating sand soils-outwash plains and sandy moraines in addition to soils prevalent in the other stockpile areas. The most common soil types in the state lands, proposed to be acquired by the Company are undulating clays followed by peat, level clay soils, and undifferentiated eskers and outwash plains. The soil associations are tabulated in Table A-2.

c. Hydrology and Watersheds

The term "surface hydrology" is used in the IRIS system to describe the surface water resources for the Iron Range. The hydrology of each watershed was classified by identifying each lake and each segment of stream hierarchy. Streams were segmented wherever they were intercepted by a tributary, marsh, gaging station, or other unique feature.

In the IRIS, primary designates the main stream, whereas secondary and tertiary are terms designating smaller streams, which feed the main or primary stream.

The predominant hydrological feature in the proposed and alternative stockpile areas is wood marshes, followed by swamp lands, tertiary streams and secondary streams. In the tax forfeited state lands, proposed to be acquired by the Company, the predominant hydrological feature is wooded marsh, followed by tertiary streams, swamps and secondary streams (see Figure A-5). This information is tabulated in Table A-3.

Watersheds with drainage areas of over 5 square miles are identified in the IRIS system. Watershed boundaries are defined by topographic highlands which surround the basins and separate them from neighboring watersheds. There are five watersheds in the area covered in this report - Manganika-Mashkenode Lakes, East Two Rivers, Snowden (Elbow Creek), Long Lake Creek, and Ely-St. Mary's Lake (see Figure A-6). The Manganika-Mashkenode watershed consists of that portion of the East Two Rivers watershed above the confluence of the outlets

of the Manganika and Mashkenode Lakes.

The largest area to be affected by the proposed stockpiles is within the Snowden Creek watershed, followed by the East Two Rivers, Manganika-Mashkenode Lakes and the Long Lake Creek watershed. A small portion of the Ely-St. Mary's Lake watershed would be affected by the south alternative stockpile. The major portion of the lands proposed for land exchange are within the Snowden Creek watershed, followed by the East Two Rivers, the Long Lake and the Manganika-Mashkenode Lakes watersheds. Further watershed information is presented in Table A-4.

Since IRIS was compiled, several water diversions have been constructed for the Eveleth Taconite operation.

d. Mining Land Use

The primary mining land use encountered in the proposed stockpile areas was overburden, building sites, layered stockpiles (stockpiles with layered waste material), paint rock stockpiles, and unknown materials and tailing (see Figure A-7). There is little evidence of prior mining in the proposed north stockpile area. In the south stockpile area, the predominant mining use is the Coons Pacific tailing disposal area, followed by layered stockpiles and other miscellaneous uses.

There is no evidence of prior mining activity on the state lands, proposed to be acquired by the Company. Details of mining land use in the study area are presented in Table A-5.

e. Vegetation

Vegetation in the study area was identified using aerial photographs. Six forest cover types were delineated by tree type, size, and density. They are pines, upland spruce-balsam, aspen-birch, northern hardwoods, lowland hardwoods and swamp conifers. Open areas were identified as cultivated areas, open fields and pasture, swamps and industrial land (see Figure A-8).

The largest acreage of the proposed stockpile areas is presently in industrial use, shown as Non-Veg. in Table A-6. Much of this lies within the Coons Pacific tailing disposal area and various stockpiles. There are approximately 130 acres of forested land classified as industrial. The predominant timber types in the stockpile areas are aspen-birch, with less amounts of bottomland hardwoods, and swamp conifers. The largest commercial pole timber type is aspen-birch followed by bottomland hardwoods and swamp conifers. Remaining lands in the stockpile areas are comprised of swamps or open, non-productive wetland areas. There are proportionately more open fields in the north and south alternatives than in the proposed north and south stockpile areas. Other vegetation types are very comparable.

In the state lands, proposed to be acquired by the Company, the largest timber or vegetative cover type is the aspen-birch, followed by swamp conifers and bottomland hardwoods. There are also substantial areas of swamps and lands committed to industrial uses within these lands. Further detail about the

vegetative cover is presented in Table A-6.

f. Recreational, Historical and Archeological Features

The recreational, historical and archeological features found in the study area are mainly features of early transportation systems (see Figure A-9). These uses comprised early roads, historic railroads still in use, ghost towns, and "early roads/historic railroads still in use". None of these features appear in the IRIS data for the north stockpile area. Historic railroads, still in use, cross the south stockpile area. An early road also crosses the south stockpile area. The site of the early community of Spruce is within this area. The only historical feature present in the alternative areas is an historic railroad; which is still in use, and crosses the north alternate.

In the lands proposed for exchange, an historic railroad, still in use, is also the major early land use feature. Greater detail on prior recreational, historical and archeological land use features is presented in Table A-7.

g. Utilities and Roads

There are several roads, railroads and powerlines presently in use within the study area (see Figures A-10, 11). There is an MP&L powerline crossing the north stockpile area and a DM&IR multi-track railroad which delineates the east boundary of this stockpile area. There is a single-track DM&IR railroad and the Coons Pacific railroad siding in the proposed south stockpile area. This south stockpile area is also crossed

by the Peary Road, various gravel roads, and an MP&L powerline and a Northwestern Bell telephone line running parallel to County Highway No. 7, and a telephone line parallel to the Peary Road.

The roads affected by the north stockpile consist of a county road on the north edge of the stockpile. The Company intends to request that the road on the north side of the stockpile be vacated.

A gravel road crosses the south alternate area and a power line crosses the north alternate area. There are a number of utilities and roads crossing the state lands, proposed to be acquired by the Company. A number of forty-acre blocks are crossed by the DM&IR Railroad and county gravel roads. Two are crossed by County Highway No. 7 and one is crossed by an MP&L powerline. More detailed information on utilities and roads is presented in Table A-8.

h. Urban and Rural Development

The urban and rural development category shows the location of residential and commercial areas within the study area (see Figure A-12). All the land areas considered in this development are presently classified as undeveloped in the IRIS system.

All of the proposed north stockpile area is classified as an undeveloped portion of Mountain Iron. The south stockpile area is located in undeveloped portions of the City of Eveleth and the Towns of Clinton and Fayal. Part of the north alternative is within the undeveloped portion of Leonidas. All

of the south alternative is within Fayal township.

Approximately 80% of the lands proposed for land exchange are classified as unorganized. Small areas are also classified as Mountain Iron-undeveloped and Eveleth-undeveloped. Further information is presented in Table A-9.

i. Wildlife and Natural Areas

This map shows the location of wildlife and natural areas in the study area (see Figure A-13). A warm water stream borders the Fayal Number 3 stockpile area and divides the south alternative area. No other unique wildlife areas are known within any of the stockpile locations. This does not mean that various forms of wildlife do not exist in these areas. However, the study area does not contain any known colonial bird nesting sites, or other unique habitat for other types of wildlife.

No natural areas such as waterfalls, rapids, virgin timber, etc. are identified in the study area. Further information is presented in Table A-10.

NW¼-SE¼, Section 36, 57-18 - This forty-acre block is to be acquired through land exchange. The area is underlain by the Virginia Formation and is several miles from the geological contact with the Biwabik Iron Formation. The land is within the Long Lake Creek watershed and it is bisected by this creek. The western portion of the area is generally flat and there is a small swamp area on the western boundary. Most of the land is forested, primarily jack pine, mixed spruce-balsam and hardwoods.

No roads transverse the land, but one powerline does cross the area. There is no urban or rural development on the land; it is classified as unorganized.

2. Proximity of West Eveleth.

West Eveleth is situated northwest of the Expansion Open Pit and north of the South Stockpile area. The crest of the Expansion open pit would be approximately 1000 feet from the closest house in West Eveleth and the drilling, blasting and ore removal operations would occur further away. The South Stockpile area, as planned by the Company, will be 1250 feet from the nearest existing house in West Eveleth and will be 500 feet from the nearest potential homesites. The Thunderbird Mine, the North Stockpile and the Spruce Pit area all are more than 3000 feet from the existing houses in Leonidas.

F. Detailed Description of Proposed Use of Lands

1. Stockpile Areas.

a. The progression of the Expansion Open Pit and the Thunderbird Mine and the stockpiles are shown graphically on Figures 1-5. Figure 1 shows the mines and stockpiles as of January 1, 1980. The pits are the large white areas, and the stockpiles are the shaded areas. The future pit limits are shown by heavy lines, and the future stockpile areas are delineated by thin lines. The same means of designation are used on the succeeding figures to show the mine and stockpile development as of five years from the present, Figure 2, 1985;

ten years from the present, Figure 3, 1990; thirty years from the present, Figure 4, 2010, and the ultimate mine development now planned, sixty-five years from the present or 2045. The diversion ditch in Section 24-57-18 appears in the lower portion of each of these Figures. Figure 6 shows by line outline the locations of the Alternate North Stockpile Area and the Alternate South Stockpile Area.

b. South Stockpile Area - West Portion.

This area lies immediately south of West Eveleth and the proposed Snowden Creek Diversion. The proposed location allows the diversion to flow between two existing stockpiles, following the natural contour of the ground. The diversion will be located within the 500 foot setback provided by the proposed Mineland Reclamation Rules. Stockpiling in this area will commence in 1985 when it will be necessary to strip the west portion of the Expansion Mine. Care will be taken to place surface materials on the north end of the stockpile, facing West Eveleth, and also to develop the northwest corner of the stockpile with surface overburden in order to provide an aesthetically pleasing profile. The surface will be placed west of the existing surface and lean ore stockpile which is located in the Northwest Quarter of the Southwest Quarter of Section 1-57-18 in the years 1985 to 1990, reaching an elevation of 1525. The north face of this stockpile then will be inactive from 1990 to 2005. Old lean ore stockpiles encountered in stripping will be placed in the South Half of the Southwest Quarter of

Section 1, southwest of the existing surface and lean ore stockpile. This area will reach an elevation of 1585 in 1987. Oxidized materials encountered in mining will be placed on the eastern or mine side of this stockpile to form a base for save rock. Thus the oxidized materials, along with waste rock which will be stockpiled in the remainder of the pile, will be out of sight of West Eveleth behind the surface stockpile. A view of the West Portion of the South Stockpile area as of January 1, 1990 is shown on Figure 3. The view illustrates the construction of the initial lift to enclose and stabilize the area. Natural drainage courses will be left open to avoid the entrapment of of runoff.

During the next fifteen years (1990-2005) the bulk of the material stocked will be waste rock, with a small amount of save rock. The stockpile will start taking its ultimate form with the 1670 and 1700 benches completed as shown on Figure 4. During the next five years (2005-2010) surface stripping will be resumed and will be stockpiled to the north, without disturbing the vegetation established in 1990, to an ultimate elevation of 1645 feet. For all practical purposes the West Portion of the South Stockpile landform will be completed by the year 2010. Revegetation will then be permanently completed, allowing the area to return to forest habitat.

c. South Stockpile Area - Section 7.

The Section 7 stockpile will consist of surface waste rock and save rock. It is presently in use and is shown on Figure 1. In its ultimate form, it will include the road systems shown on Figure 2. The lateral dimensions of the Section 7 stockpile are limited by the Duluth, Missabe and Iron Range Railway spur track to the Expansion Mine crusher on the north and east and the Duluth, Missabe and Iron Range Railway mainline on the south. The Peary Road will be a constraint on the west until mid-1982, at which time it will be necessary to extend the Section 7 stockpile westerly across the Peary Road into the Coons Pacific portion. At that time the elevation will be at 1650 which will remain unchanged for the following approximately 30 years as shown on Figure 4. The final top portion of this stockpile will be made up of rock benches and road systems in a gently rising plane forming a part of the final landform. Residents of the area and travelers on Highway 53 will see a smoothly rounded landform that rises gently from the natural landscape. The rock benches will be vegetated with trees, and the top of the stockpile will be similar in appearance to surrounding hills.

d. South Stockpile Area - Coons Pacific.

The Coons Pacific portion of the South Stockpile Area is located between the West and Section 7 Portions of the South Stockpile Area, and is bounded by the Peary Road on the east, the Duluth, Missabe and Iron Range Railway mainline on the south, and present County State Aid Highway 7 on the northwest.

Stockpiling in the Coons Pacific will commence in 1982 progressing westerly from Section 7. Waste rock will be segregated to the south and on lower benches. Save rock will be stockpiled to the north and on higher benches as shown on Figure 2 and Figure 3. Beginning in about 2005 surface overburden will be stockpiled in the southeast part of the Coons Pacific as shown on Figure 4. The stockpiling of waste rock on the Coons Pacific will also commence in approximately 2005. Figure 4 also shows the progression of waste rock stockpiling across present Highway 7. Careful planning will be necessary to allow the continued use of the Coons Pacific facilities after 2005. Such use can continue until approximately 2010 when the stockpile will progress into the plant and tailings areas. The stockpile deployment will be done in such a manner as to enclose the existing tailings ponds and coarse rejects pile. After the initial stockpiling, most of the stockpile construction will be below and behind the previously completed portions of the South Stockpile Area. The stockpile will reach its ultimate form about the year 2036, as shown on Figure 5. The landform will have an elevation of 1750 and will be revegetated to blend with the surrounding natural landforms.

e. North Stockpile.

Stockpiling in this area will commence after January 1, 1986. Stockpiling will proceed slowly. After four years the stockpile will only be one lift high at an elevation of 1445 feet, and will be composed of waste rock. Figure 3 shows the area

which the stockpile will cover as of January 1, 1990. During the next fifteen years the waste rock portion of the stockpile will reach an elevation of 1565 feet. During the same period surface overburden will be stockpiled three lifts high to an elevation of 1505 feet to the west of the waste rock area. During the next five years, or until 2010, the stockpile will be inactive. After January 1, 2010, the stockpile will be expanded slowly. Surface stripping will extend to the west limit, occupying the lower three lifts. The upper lifts will be of waste rock. The only exception will be the southern corner which will have six lifts of surface to produce a flatter profile. The west stockpile face toward Highway 19 will have a gentle surface slope on its lower lifts. The upper lifts will be of rock. Ultimately, this stockpile will reach an elevation of 1725 feet as shown on Figure 5. In the year 2045 the revegetation will be completed and the stockpile returned to use for forest habitat.

f. Slopes and Benches.

All surface stockpile slopes in all the stockpile areas have been designed with 3:1 slopes, thirty foot wide benches and thirty-foot high lifts. All rock stockpile areas have been designed with slopes at the angle of repose, thirty foot lifts and benches which are a minimum of thirty feet in width. The Mineland Reclamation Rules, when adopted, will impose mandatory slope, bench and lift limitations which will be met or exceeded in all instances. The Company plans to adhere

to its design of the stockpile facing West Eveleth and the Alice-Fayal Area stockpile south of Eveleth, even if the Mineland Reclamation Rules, as finally adopted, are less stringent.

g. Means of Construction.

The stockpiles will be constructed by the current truck-haulage method to the extent feasible. Smaller trucks and special earth moving equipment may be required for bench and slope construction. It is anticipated that after 1990 conveyor systems may become economical for the North Stockpile and South Stockpile Area as the mine-to-stockpile distances increase and mines become deeper.

h. Reclamation.

The east side of the Spruce Mine stockpile will be completed between 1981 and 1990. Completed portions will be reclaimed each year. Similarly, the Alice-Fayal Area will be completed in 1985 and then revegetated, except for the easterly portion which will remain active. The West Portion and Section 7 part of the South Stockpile Area will be finally completed in 2010. The West Portion of the South Stockpile Area facing West Eveleth will be constructed in 1985-1987 and permanent reclamation will be started in each year on the part completed in that year. Commencing in 2005 additional surface lifts will be placed to the ultimate bench elevation of 1645 feet as above stated, but the previously reclaimed lifts and benches facing West Eveleth will not be disturbed. The reclamation will consist of establishing grass cover and planting trees in appropriate areas.

2. Watercourse

a. Section 24 Lands.

The diversion ditch constructed pursuant to DNR Permit No. 78-2165 departs from the natural channel of the watercourse in the Northeast Quarter of the Northeast Quarter of Section 24-57-18, which is a Company owned parcel of land, and runs in a southwesterly direction to the eastern boundary of the requested state lands (see Figure 1). The diversion then continues in the same direction across the Northwest Quarter of the Northeast Quarter, and into the Northeast Quarter of the Northwest Quarter, turns south and crosses the Southeast Quarter of the Northwest Quarter of Section 24-57-18. Upon leaving the state lands the diversion continues across portions of two other Company owned parcels reconnecting with the pre-existing channel in the Southwest Quarter of the Southeast Quarter of Section 24-57-18. The total length of the diversion is approximately 5,700 feet, of which approximately 3,000 feet is on the State lands.

The diversion was designed to have an 8 foot wide bottom with 2:1 side slopes. The diverting structure was designed to pass a flow equal to the normal capacity of the pre-existing channel and to direct the excess flow into the diversion ditch. The grade of the diversion was designed at 0.10 per cent, with the necessary additional drop in elevation accomplished by a drop culvert structure protected by rip-rap. Excavated material was deposited alongside the ditch, and internal drainage out-

lets were provided to maintain the areas drainage patterns.

The diversion permit required the Company to protect exposed soil from erosion by rip-rap, sod and/or seed on banks and slopes, and the construction included fine grading and seeding. Nevertheless, considerable erosion occurred following the construction, perhaps attributable in part to heavy rains; and the Company arranged for reseeding and mulching in late 1978. The diversion area is now stable and revegetated, and the ditch bottom is also stable. The improvements have been in place for from sixteen to twenty-one months.

b. Section 36 Land.

The watercourse in its natural state crosses the Northwest Quarter of the Southeast Quarter of Section 36-57-18. This reach of the watercourse is replete with deadfalls and natural debris which must be cleaned out periodically to restore and maintain the flow capacity of the natural channel. No deepening or widening of this reach of the channel is contemplated.

3. Permits

a. Permit to Mine.

The Action will require a Permit to Mine pursuant to Minn. Stats. 1979, §§93.48, the minelands reclamation statute. The proposed regulations, upon adoption, will regulate the setbacks, bench width, lift height and slope and other characteristics of the stockpiles described above. Public hearings on the proposed rules have been completed, and the Department of

Natural Resources expects to adopt rules on or before June 30, 1980.

b. Snowden Diversion Permit

The diversion of Snowden Creek along the north edge of the Expansion Pit in Section 1-57-18 and along the north edge of the South Stockpile Area in Sections 1 and 2, 57-18 will require a Department of Natural Resources, Division of Waters, permit pursuant to Minn. Stats. 1978, §105.41, et seq. An application for this permit is pending. The permit is expected to require the submission and approval of detailed construction plans before work on the diversion commences.

Preliminary design of the Snowden diversion specifies that the diversion will have a 12 foot bottom with 3:1 side slopes and a minimum depth of 7 feet in Section 1 and 8 feet in Sections 2 and 17. To control erosion the diversion will consist of a .3% grade through surface material and 3% grades through rip rap spillways. The spillways will have appropriately sized rip rap and filter blanket. Flumes to allow drainage into the diversion from surrounding areas will be provided where necessary. The diversion side slopes and the areas disturbed during the construction will be seeded and mulched. A service road will be constructed along the south side of the diversion. A strip of land approximately 150 feet in width is required for the diversion channel and service road.

II. ENVIRONMENTAL IMPACTS OF THE ACTION.

A. Physical/Biological Impacts of Stockpiles.

1. Dust.

The hauling and dumping of overburden and rock will cause an increase in suspended particulate matter as the stockpiles are constructed. High winds may occasionally cause dusty conditions, but as required by the proposed reclamation rules revegetation activities will minimize this problem.

2. Noise.

Noise similar to that resulting from road construction will be produced by the trucks and other equipment. As the stockpiling progresses away from the residential areas of Eveleth and West Eveleth, the noise will diminish with distance and the completed portions of the stockpiles themselves will serve as sound barriers.

3. Erosion.

Some erosion of surface overburden will result during periods of rainfall during construction but, as required by the Proposed Mineland Reclamation Rules, the stockpiles have been designed to minimize erosion.

Stream No. 1 has already been diverted around the Section Seven Stockpile and the diversion was constructed with a berm to prevent the direct inflow of stockpile runoff. Similar preventive measures can be taken in the construction of the Snowden Diversion. The Proposed Mineland Reclamation Rules require provision for settling or treatment of runoff which is likely to cause water quality violations.

4. Stability.

Small areas of possibly unstable soils exists in the North Stockpile and in the West portion and along the southerly edge of the South Stockpile areas. These areas appear to be of insignifcant size, and can be contained by proper construction methods or excavated if necessary.

5. Timber.

The stockpile construction necessarily requires the removal or covering of existing vegetation which includes some merchantable timber. It is the Company's policy to salvage the timber. Eventually the timber resource will be restored in substantial part through the reclamation of the stockpile areas and the natural progression of forest growth.

6. Wildlife.

As in the case of timber, the stockpile construction will displace wildlife habitat during the times that the stockpiles are active. Upon completion and revegetation, the stockpile areas will provide habitat once again.

7. Stream Diversion.

The proposed diversion of Snowden Creek will cause a temporary increase during construction of total suspended solids and turbidity in the creek waters in the diversion and in the downstream reaches of the creek. Revegetation of the banks of the diversion above the ordinary water level will create an aesthetically pleasing watercourse and will reduce future erosion of the banks.

B. Aesthetic Impacts of Stockpiles.

The stockpile areas have been contoured and designed to avoid the appearance of the familiar old natural ore operations. It is believed that the planned large landforms will, when revegetated, have the general appearance of the natural hills and slopes of the Giants Range and will blend into the natural landscape. The stockpiles will, in fact, surround and incorporate and thereby reclaim several old mines, stockpiles and tailings ponds in the areas west and southwest of Eveleth in accordance with the goals of the Proposed Mineland Reclamation Rules.

C. Land Use Impacts.

1. Stockpiles.

Approximately 447 acres in the North Stockpile and approximately 874 acres in the West Section of the South Stockpile Area which, as of January 1, 1980, were rural residential, wooded or swamp areas will be used for rock or surface stockpiles as the Action progresses. The stockpile areas will be revegetated as they are completed and will ultimately be restored to use as woodlands, wildlife habitat and open space.

2. Watercourse.

The construction of the diversion ditch in Section 24-57-18 has resulted in the permanent conversion of approximately 3.2 acres of land from brush and woodland to a watercourse and the temporary clearing of approximately 7 additional acres of brush and timber. The Department of Natural Resources estimated the value of the timber on the entire 24.5 acres leased in 1978

at $1,177. The disturbed area not occupied by the watercourse will gradually return naturally to timber production, and all of the area continues to provide wildlife habitat. The temporary impacts of added sedimentation and erosion resulting from the ditch construction are past. The long term impact, the existence of the new watercourse area, is considered beneficial except for the loss of timber production.

The environmental impact of cleaning the deadfalls and debris from the watercourse channel in the Northwest Quarter of the Southeast Quarter of Section 36-57-18 is negligible.

D. Socio-Economic Impacts.

1. Residents Displaced.

The Company has already purchased the homes of six of the ten resident families which are to be relocated from the stockpile areas. The dwellings will be offered for sale and removal to other locations. The four dwellings not yet acquired are in the West Portion of the South Stockpile area.

2. There are no industrial, commercial or farming operations which will be relocated because of the stockpile construction, except one farm and the Coons Pacific natural ore processing facilities. The Coons Pacific plant last operated several years ago.

3. Future Development of West Eveleth Residential Areas.

There are 151 houses in the platted portions of Eveleth known as West Eveleth and 4 houses located in the unplatted north ten acres of the Southeast Quarter of the Northwest Quarter of

Section 1, T-57N, R-18W. The five (5) plats in West Eveleth occupy a total of 200 acres. The five platted areas are: Volcansek Addition No. 1, Volcansek Addition No. 2, Carlson Addition No. 1, Carlson Addition No. 2, and State Addition.

Volcansek Addition No. 1 (NE¼ of NW¼) - Contains 175 lots approximately 50' x 125' in size. The abandoned D.M.&I.R. railroad right-of-way goes through the plat. The right-of-way occupies land equivalent to twenty-four 50' x 125' lots. There are 40 houses occupying 81 of the platted lots. Houses occupy from one to six lots each. There are 13 houses on one lot each, 6 houses on 1½ lots each, 12 houses on 2 lots each, 4 houses on 3 lots each, 3 houses on 4 lots each, one house on 5 lots, and one house on 6 lots. Five 21-unit apartment buildings occupy 68 lots. Of the 26 vacant lots, 7 are owned by the Company, 9 are owned by the City of Eveleth, and 10 are privately owned.

Volcansek Addition No. 2 (NW¼ of NE¼) - Contains 202 lots approximately 45' x 125' in size. There are 46 houses occupying 80 lots. There are 18 houses located on 1 lot each, 24 houses located on 2 lots each, 2 houses located on 3 lots each, and 2 houses located on 4 lots each. Of the 122 vacant lots, 83 are owned by the City, 27 are owned by the Company and 12 are privately owned.

Carlson Addition No. 1 (NW¼ of NW¼) - Contains 44 lots approximately 50' x 125' in size and 54 lots approximately 109' x 200' in size. There are 20 houses occupying 36 of the smaller lots;

8 houses on 1 lot each, 6 houses on 2 lots each, 2 houses on 1½ lots each, 3 houses on 3 lots each, and 1 house on 4 lots. There are 39 houses occupying 38 of the larger lots, eleven houses on half-lots, 21 houses on single lots and 8 houses on approximately 1½ lots each. There are 8 vacant small lots, all of which are privately owned. Of the 18 vacant larger lots, 16 are privately owned and 2 are owned by the City.

Carlson Addition No. 2 (SW¼ of NW¼) - Contains 68 lots approximately 109' x 200' in size. There are two houses occupying 4 of the lots. Of the 64 vacant lots, 4 are privately owned and 60 are owned by the City.

State Addition (NE¼ of NE¼, Section 2) - Contains 76 lots approximately 100' x 200' in size. There are 4 houses each occupying 2 lots. Two of the houses are on land leased from the State. Of the 68 vacant lots, 62 are owned by the State of Minnesota, 4 are privately owned and 2 are owned by the City.

For the diversion of Snowden Creek and for the South Stockpile, the Company will need approximately 24 lots in Carlson Addition No. 2, and 20 acres of land in the Southeast Quarter of the Northwest Quarter of Section 1, 10 acres of which is owned by the City and 10 acres of which is privately owned.

In addition, the Company needs 15 acres owned by the State of Minnesota in the Southeast Quarter of the Northeast Quarter, Section 2, and 20 acres in the Northeast Quarter of the Southeast Quarter, Section 2, owned by the City. To provide

the necessary buffer from the mining operation, the Company will also acquire 82 lots in Volcansek Addition No. 2 and 10 acres of privately owned land in the Southeast of the Northwest of Section 1. This is all of the West Eveleth land within the City limits which is required by the Company.

Eveleth Mines will use 12 of the lots it owns in Volcansek Addition No. 1 and No. 2 for the relocation of houses from Spruce Hill and from Chicken Town.

The platted portions of West Eveleth have room for 168 more single family dwellings which would double the present number of dwellings. By replatting State Addition and Carlson Addition into smaller lots, approximately 90' x 130' in size, an additional 63 home sites could be obtained. The Company's operations will not affect the northern 820 feet of the SE-NE, Section 2. This land can also be made available for residential use and would provide 70 more home sites. Thus the proposed stockpile, stream diversion and buffer land acquisitions should have no effect on the future growth of West Eveleth.

There are 21 single family dwellings, 2 triplexes and one duplex in Leonidas. The houses occupy only 1½ blocks of the 8 blocks in the 40 acre Leonidas Plat located in the SE-SW of Section 36, T-58N, R-18W. The Company's operations will not interfere with further residential construction in this platted area. Eveleth Mines does not own any of the undeveloped platted area in Leonidas.

4. Employment Consequences.

Fourteen hundred people are presently employed by the Company. The stockpiling of material is essential to the operation of Eveleth Mines. Not having enough land for stockpiling or major restrictions on stockpiling could cause a reduction in production and a corresponding reduction in employment.

5. Energy.

Stockpiling of as much material as possible on the pit footwalls and in old pits, and using a few larger rather than numerous smaller stockpiles will minimize the consumption of energy in stockpile construction. The mine footwall areas and old pits involve short haul distances and the larger stockpiles will make possible the use of energy-efficient conveyors.

III. UNAVOIDABLE EFFECTS.

A. Environmental Effects.

As discussed in Section II, the construction of the stockpiles will have the unavoidable effects of producing dust and noise, and will result in the loss of woodlands and wildlife habitat. These effects, although adverse, are not expected to be of serious concern, and will be temporary. The noise will be of decreasing concern as the activity progresses away from populated areas, and after revegetation the lands will again become woodlands and provide wildlife habitat.

The dust effects can be minimized by watering or the treatment of mine haul roads, and by curtailing the handling of material during unusually dry periods. Noise effects will be minimized by constructing first the part of the stockpiles closest to residential areas so that the stockpiles thereafter function as sound barriers. The loss of woodlands and wildlife habitat will be minimized by promptly revegetating parts of the stockpiles as soon as those parts have been completed.

B. Socio-Economic Effects.

The stockpiling of overburden and rock is a necessity if the Company's mining operations are to continue. Some four families will have to be relocated. As stated above the Company provides employment for 1400 persons. Access to the resource and stockpile lands are essential to continued operation of the Company.

C. Energy Effects.

Although the consumption of energy in the transportation of the mine wastes is great, the production of crude taconite ore is deemed a necessity to our national, state and local economy and fully justifies the energy consumption. Short-haul stockpile locations make the operations more energy efficient. The larger stockpile areas should make possible the future use of electrical conveyor systems.

D. Mineland Reclamation Rules.

The Mineland Reclamation Rules will, when adopted, make mandatory the establishment of setback areas, the compliance with certain slope, bench, and lift height limitations, and the prompt revegetation of completed stockpile and other mining areas. All of these measures will mitigate the visual and environmental effects of the stockpile construction. The Proposed Rules will also ensure the continuing review of the Company's plans and operations by the Department of Natural Resources.

IV. IRREVERSIBLE COMMITMENTS.

The use of the areas shown as stockpiles on Figures 1-5 necessarily involves the permanent commitment to mine waste storage. However, subsequent to reclamation the stockpile lands can serve purposes such as wildlife habitat and forest preserve. Such uses are not substantially different from the present use of these lands. Thus, the irreversible commitment of these lands for mining is in a sense only a partial commitment.

V. ALTERNATIVES AND IMPACTS OF ALTERNATIVES.

A. If the Coons Pacific portion is not available, the remaining parts of the South Stockpile Area will be used nevertheless. In approximately the year 2005 the Alternate South Stockpile Area shown on Figure 6 would be used. This Alternate Area lies in the Southwest Quarter of Section 8, the Northwest Quarter and North Half of Southwest Quarter of Section Seventeen, and the Northeast Quarter and East Half of Northwest Quarter of Section Eighteen, all in Township 57-17. The advantages and disadvantages of this alternative for stockpile purposes are as follows:

1. Disadvantages.

a. Three smaller landforms (the alternate South, West Portion and Section Seven) would replace one larger landform resulting in steeper slopes, a higher elevation in the West Portion and more stockpile perimeter with resultant adverse

visual impacts.

b. The relocation of the watercourse which leads from Fayal Pond to Mud Lake, referred to in the 1975 Draft EIS as Stream No. 2, would be necessary.

c. Four additional residences, two of which are on farms, would have to be relocated.

d. A height variance from the Eveleth-Virginia Airport Zoning Ordinance would be required.

e. The construction of an overpass over the Duluth, Missabe and Iron Range Railway tracks would be required to provide access to the Alternate South Area for the mine trucks.

f. Conversion of marginal farmland to stockpile use instead of the use of the Coons Pacific property, most of which is already devoted to mining use.

2. Advantages.

There are no substantial advantages, although this area is closer to the eastern portion of the Expansion Pit than is the Coons Pacific land. It is possible that a part, but not all, of the Coons Pacific land would be available to the Company. The consequences of unavailability of a part would be the same as described, but the stockpile elevations in both the West Portion and Alternate South Area would be lower.

B. If the State Lands in Sections 2 and 11 are not available, the remaining parts of the South Stockpile Area will be used. Again, the Alternate South Area would have to be used beginning in about the year 2005. Also, the remainder of the South Stockpile Area would be constructed to an elevation of

1750 feet over as wide an area as permitted, and the overall slopes of the southerly and westerly sides of the stockpile would be made steeper by reducing the bench width to the minimum permitted thirty foot width.

1. Disadvantages.

a. Two rather than one landform will result, with the same characteristics of smaller landforms previously mentioned.

b. The watercourse relocation described previously would be required.

c. The four residences mentioned above would be relocated.

d. The overpass over the railway would be necessary to provide access.

e. A substantially greater acreage in the South Alternate Area would be converted to mining use, as compared to full use of the West Portion of the South Stockpile Area.

2. Advantages.

There is no substantial advantage in the use of the South Alternate Area although the haul distance from the eastern portion of the Expansion Pit is less.

C. Existing stockpiles in the southwest quarter of Section 1-57-18 necessitate the location of the proposed stream diversion on City of Eveleth lands in the northwest quarter of Section 1-57-18. The westward construction of the diversion channel across state lands in Section 2-57-18 continues the course of

the diversion as determined by the existing stockpiles. If the state owned south half of the Northeast Quarter of Section 2-57-18 is not available so that its southerly 500 feet cannot be used for the proposed Snowden Creek diversion, the diversion would have to be moved south into the southeast quarter. To allow this, the north toe of the west portion of the South Stockpile Area would have to be relocated 150 feet south of the quarter line. This would reduce the volume of the South Stockpile Area by more than two million cubic yards. This change would not of itself require the use of an alternate stockpile area, but to compensate for the loss of volume, the presently planned 1645 bench would have to be raised to an elevation of 1670, and the presently planned 1700 bench would be extended 300 feet to the north. These benches are shown in Figures 4 and 5.

The use of the southerly 500 feet of the state owned south half of the Northeast Quarter for the proposed Snowden Creek diversion thus will make possible a stockpile elevation which is twenty-five feet lower in most the east half of the Southeast Quarter of Section 2 and most of the West Half of the Southwest Quarter of Section 1-57-18.

D. If the proposed diversion of Snowden Creek along the north toe of the South Stockpile Area is not possible because of unavailability of lands or because of the denial of necessary permits, the obvious alternative is the maintenance of the

stream in its present natural channel through the West Portion of the South Stockpile Area. This would require use of the Alternate South Stockpile Area, which would have the disadvantage of creating three smaller landforms with steeper slopes and more stockpile perimeter rather than one large landform. Other disadvantages pertaining to the use of the Alternate South Stockpile Area described in V. A. Thus the proposed diversion of Snowden Creek along the north toe of the west portion of the South Stockpile Area is considered highly desirable by the Company.

Alternate diversion courses considered were along the south toe of the South Stockpile Area and around the north side of Leonidas and West Eveleth on fill through the Spruce and Leonidas Pits. The south route is not feasible because of its excessive length and unfavorable gradient. Further analysis of the north route has shown that the large cuts and fills and length make this an unworkable alternative. In addition to the physical difficulties, the north route would require the acquisition or easement across several additional parcels of state land, would encumber the state ores in the Leonidas property, and would require two crossings of County State Aid Highway 101. The Company's proposed location for the Snowden Creek diversion appears to be the best practical location for the diversion channel.

E. If the State lands in Section 26 are not available, the remaining parts of the North Stockpile together with the

Alternate North Stockpile Area would be used to provide an equivalent volume of stockpile space. The overall effect would be to shift the North Stockpile to the south and east, requiring relocation of the Duluth, Missabe and Iron Range Railway track in Sections 25 and 35, Township 58-18. The Alternate North Stockpile Area lies in the Southwest Quarter of Section 25 and the east half of the Southeast Quarter of Section Thirty-five.

1. Disadvantages.

a. The relocation of approximately two miles of existing railroad to closely parallel the Duluth, Winnipeg and Pacific trackage would be necessary.

b. The stockpile would be more than 2000 feet closer to West Eveleth and Leonidas.

c. A meandering stockpile with a greater perimeter length, covering more land area and having four corners instead of three would result.

d. One additional resident would have to be relocated from the Alternate North Stockpile Area.

e. The required relocation of a Minnesota Power & Light Company transmission line would be extended for an additional 2000 feet.

2. There are no known advantages to the use of the North Alternate Stockpile area.

D. Watercourse Alternatives.

1. The principal alternative to the continued use

of the diversion ditch in Section 24-57-18 would be to refill the diversion and widen and deepen the original channel. It would then have the capacity to carry the mine pumpage. This would necessitate the disturbance of the soil and vegetation in an area 5700 feet in length by approximately 100 feet in width along the diversion, and the disturbance of the soil and vegetation in an area of similar width and approximately 3700 feet in length along the pre-existing channel. The resulting increase in erosion and sedimentation would be temporary, and could be minimized by prompt reseeding. The long range impacts of this alternative would be the loss of the diversion watercourse and the gain of potential timber production of approximately 3.2 acres of land, of which approximately 2.1 acres is state land.

Other alternatives would be to shift the entire flow to the diversion ditch or shift the entire flow to the pre-existing channel without deepening or widening. These would avoid the need for maintenance of a diversion structure, but would either deprive owners along the old channel of any flow or increase the frequency of flooding their lands.

2. The Company has requested the inclusion of the three forty-acre parcels or 120 acres in Section 24 owned by the State in the proposed land exchange. This marginal land, without road access, would thereby be placed on the tax rolls, in exchange for lands the Department of Natural Resources deems desirable for state ownership. Nevertheless, there are

other less permanent or less extensive means of conveyance which would give the Company the rights it desires. For example, only the approximate 24.5 acres now leased to the Company could be included in the land exchange rather than the entire 120 acres. Or, the lease now in effect could be amended to give the Company an option or successive options to renew as long as the stream is needed for mine pumpage, and as amended could be continued in effect. A third alternative would be the grant of a flowage and channel maintenance license for as long as the stream is needed for mine pumpage, pursuant to M.S.A. 117.47. The presently anticipated environmental consequences of one means of conveyance would be the same as those of any other means. The difference is the amount of acreage exchanged with the State, and the duration of the private ownership.

3. There is no reasonably available physical alternative to the use of the watercourse across the Northwest Quarter of the Southeast Quarter of Section 36-57-18 to carry the mine pumpage. As mentioned with respect to the Section 24 lands it would be feasible for the State to convey only a part of the forty acres, or to grant a lease or an easement for flowage and channel maintenance. This parcel abuts privately owned lands on three sides.

FIGURES

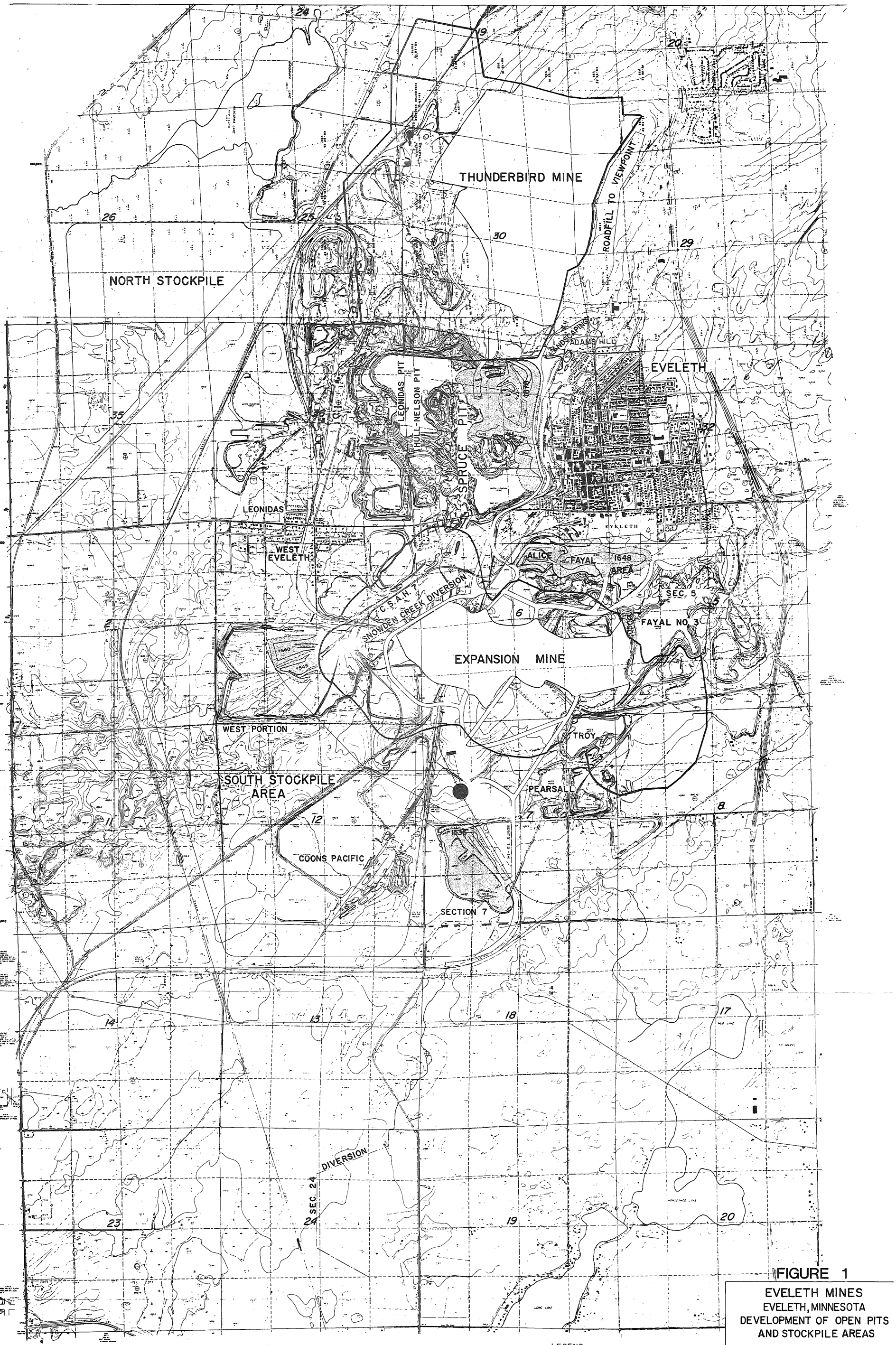


FIGURE 1

EVELETH MINES
EVELETH, MINNESOTA
DEVELOPMENT OF OPEN PITS
AND STOCKPILE AREAS

1-1-1980

MAP IDENT. NO. 103
SCALE 1" = 2400' JAN. 1980

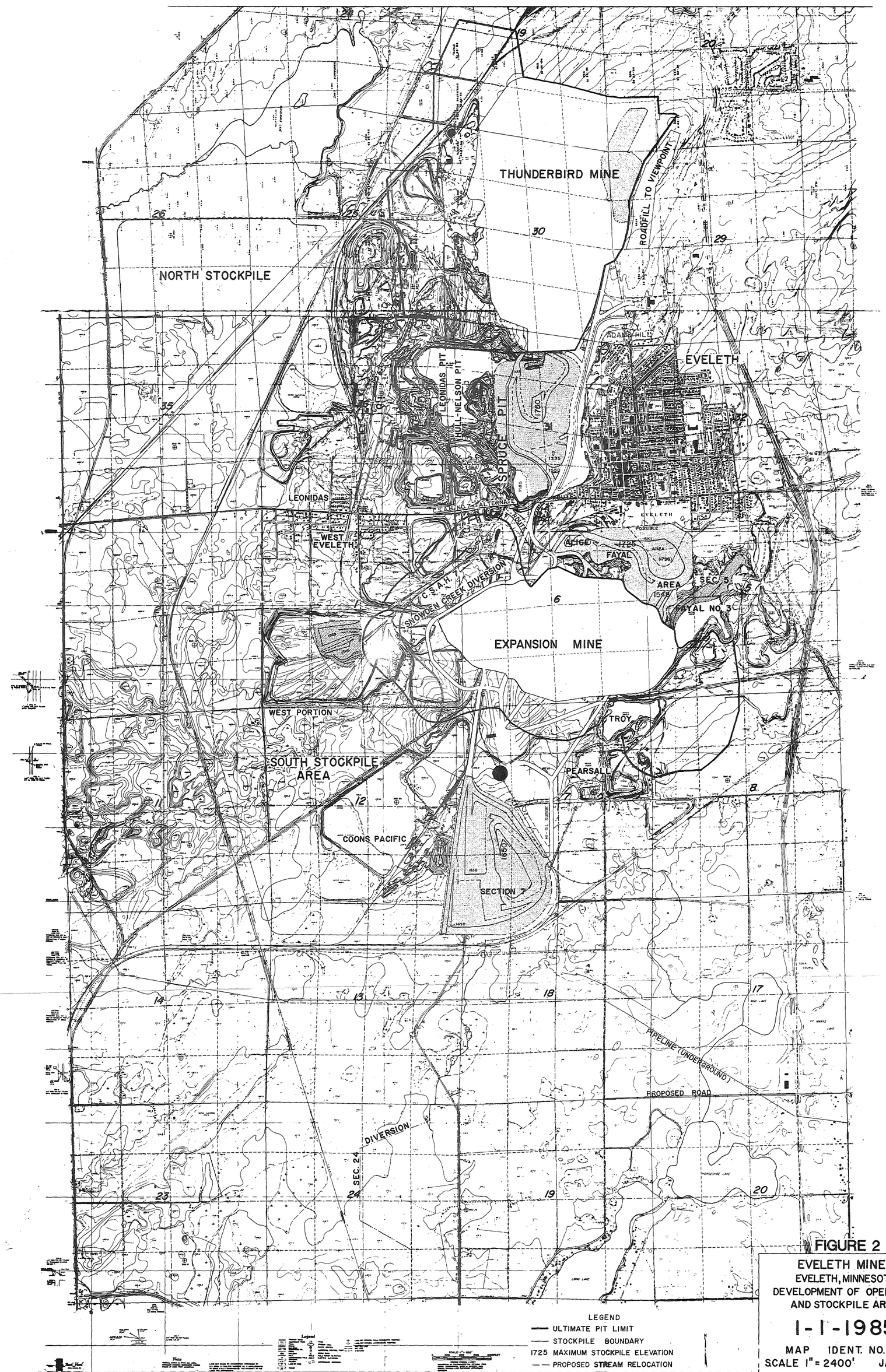


FIGURE 2

EVELETH MINES
EVELETH, MINNESOTA
DEVELOPMENT OF OPEN PITS
AND STOCKPILE AREAS

1-1-1985

MAP IDENT. NO. 104
SCALE 1" = 2400' JAN. 198

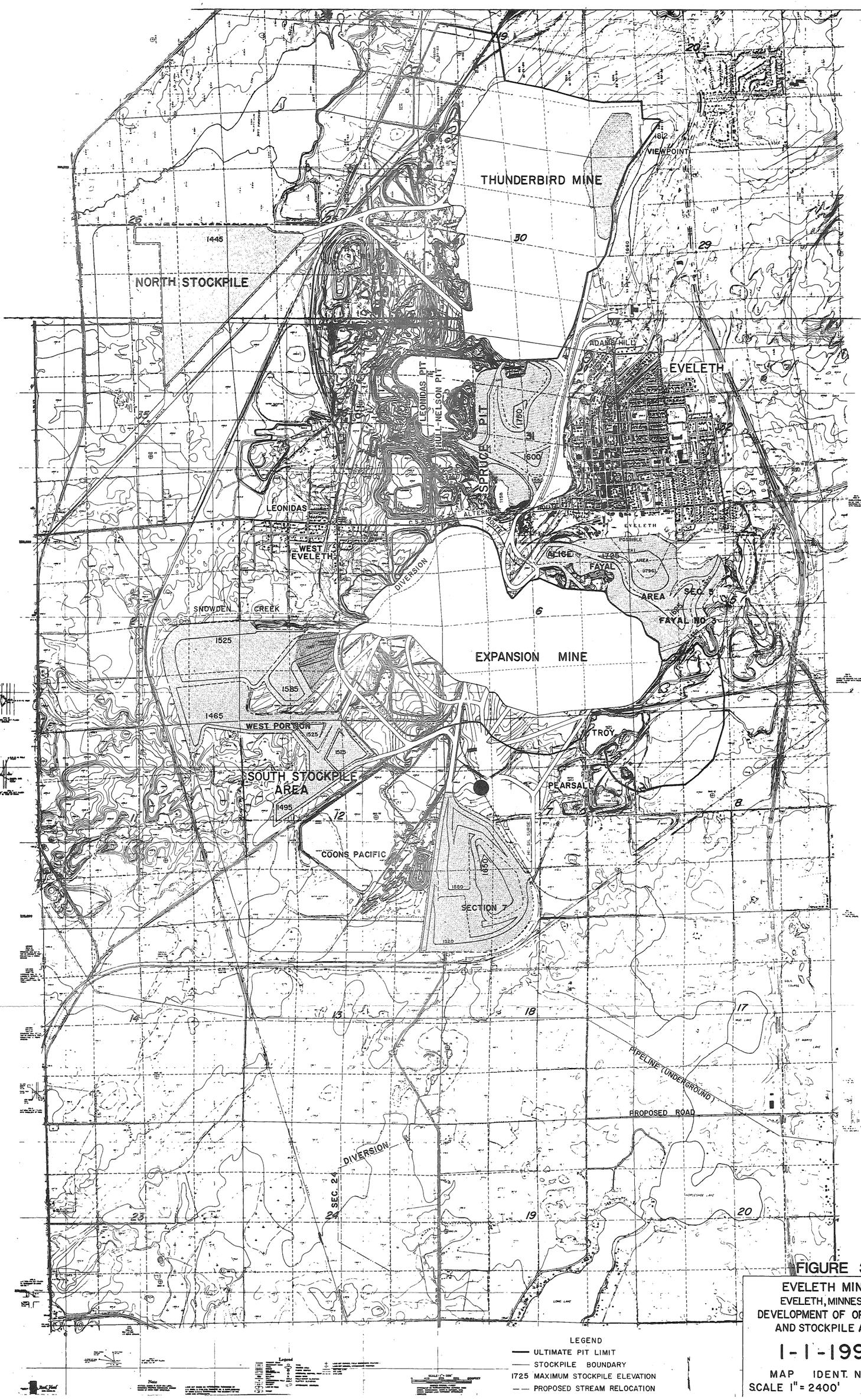


FIGURE 3

EVELETH MINES
EVELETH, MINNESOTA
DEVELOPMENT OF OPEN PITS
AND STOCKPILE AREAS

1-1-1990

MAP IDENT. NO. 105
SCALE 1" = 2400' JAN. 1980

THUNDERBIRD MINE

NORTH STOCKPILE

1565

1505

LEONIDAS PIT

HULL-RUST-MAHONING PIT

SPR

LEONIDAS

C.S.A.H. NO. 7 ALTERNATE

TRUNK HIGHWAY 53

EVELETH

ADAMS HILL

1812

VIEW POINT

WEST EVELETH

DIVERSION

SNOWDEN CREEK

GLOBE

FAYAL

AREA

FAYAL NO. 3

EXPANSION MINE

1645

1670

WEST PORTION

1525

SOUTH STOCKPILE AREA

1700

PEARSALL

COONS PACIFIC

1640

1580

1520

1460

1610

1650

SECTION 7

PIPELINE (UNDERGROUND)

PROPOSED ROAD

DIVERSION

SEC. 24

LEGEND

ULTIMATE PIT LIMIT

STOCKPILE BOUNDARY

1725 MAXIMUM STOCKPILE ELEVATION

PROPOSED STREAM RELOCATION

FIGURE 4

EVELETH MINES
EVELETH, MINNESOTA
DEVELOPMENT OF OPEN PITS
AND STOCKPILE AREAS

1-1-2010

MAP IDENT. NO. 106
SCALE 1" = 2400' JAN. 1980

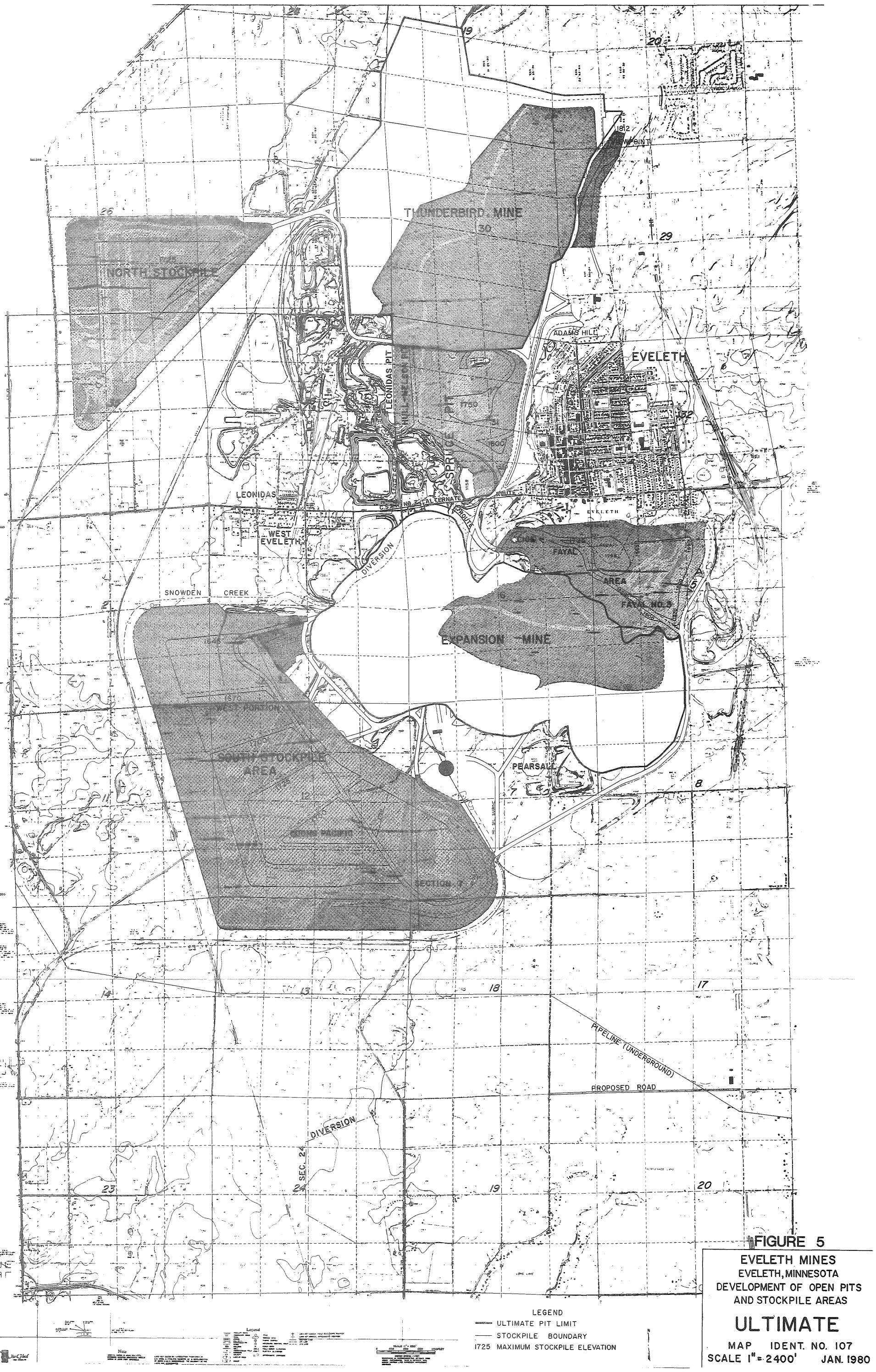


FIGURE 5

EVELETH MINES
EVELETH, MINNESOTA
DEVELOPMENT OF OPEN PITS
AND STOCKPILE AREAS

ULTIMATE

MAP IDENT. NO. 107
SCALE 1" = 2400' JAN. 1980

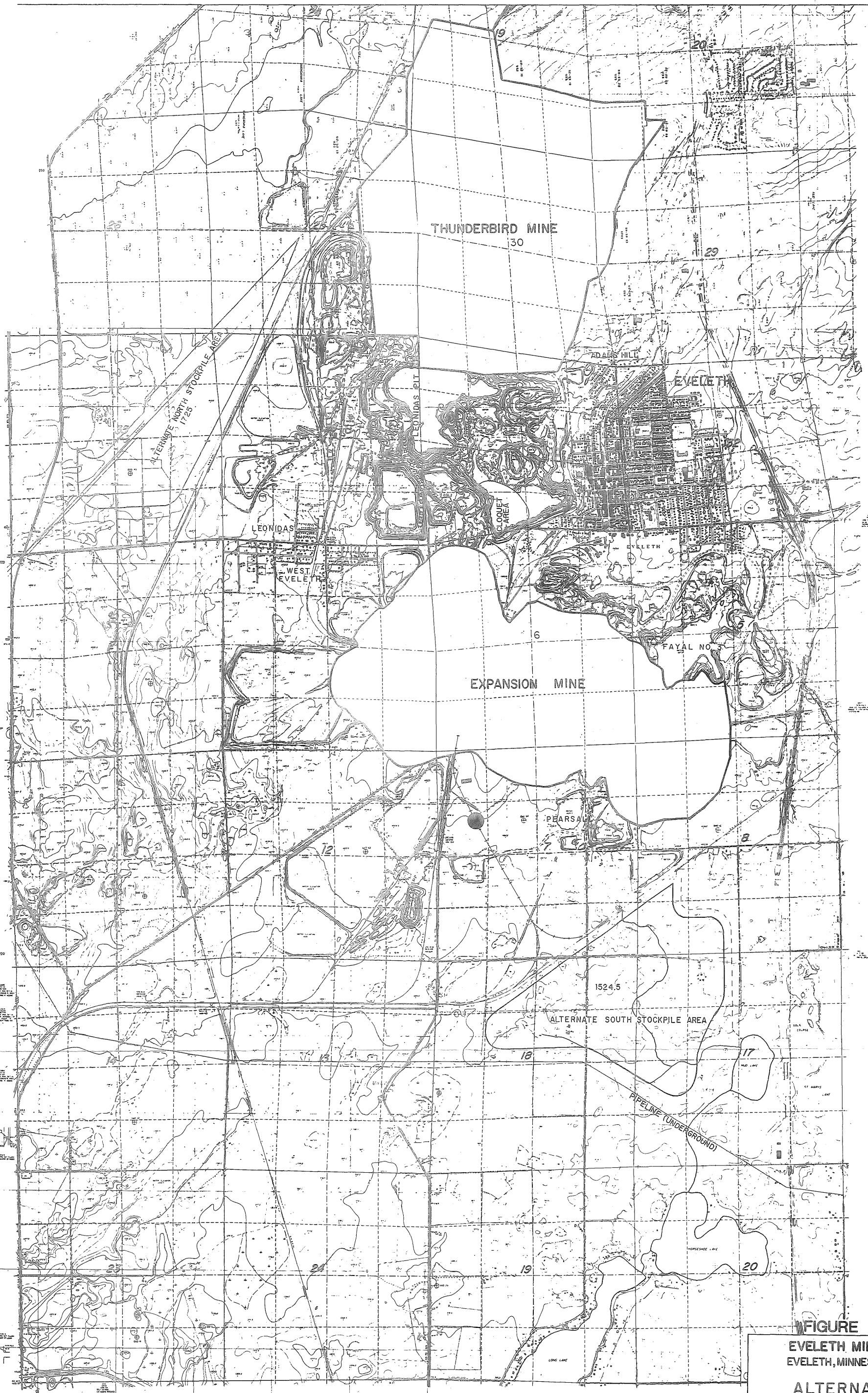


FIGURE 6

EVELETH MINES
EVELETH, MINNESOTA

ALTERNATE STOCKPILE AREAS

MAP IDENT. NO. 108
SCALE 1" = 2400' JAN. 1980

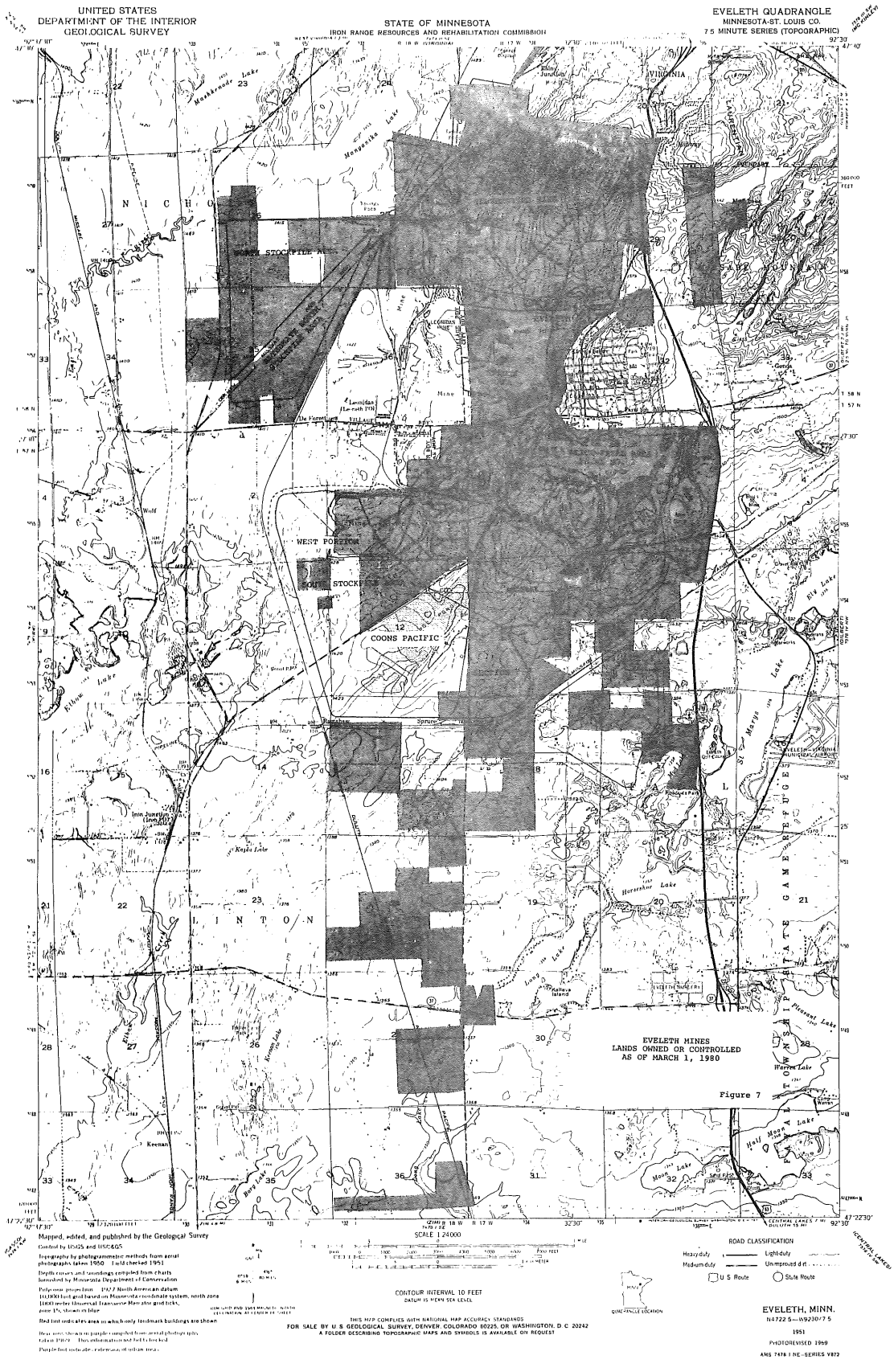


Figure No. 7

Figure No. 7 depicts those lands which Eveleth Mines controls by means of a long term mineral lease or by fee ownership.

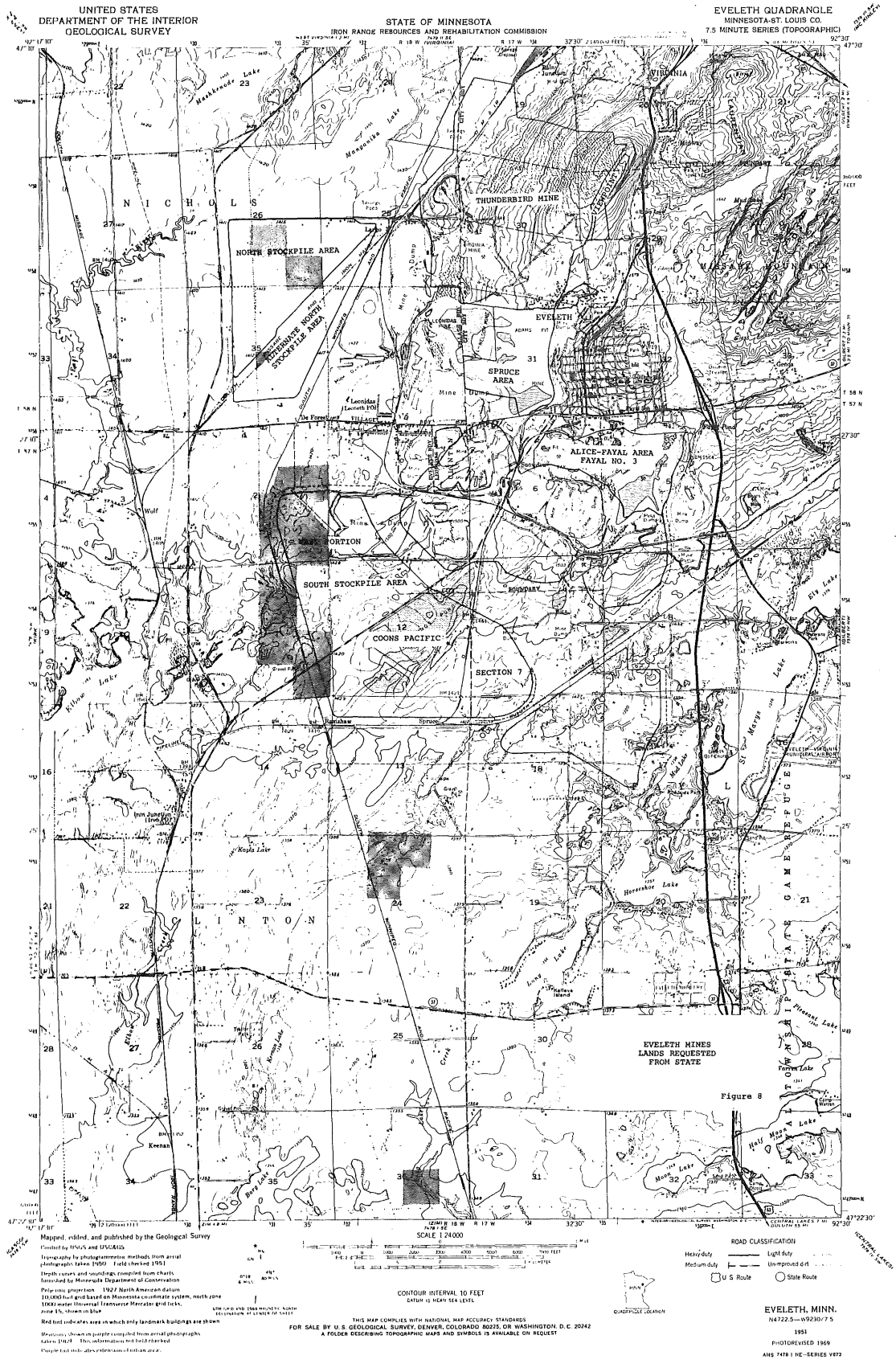


Figure 8.

Figure 8 graphically shows the state lands, either state trust or tax forfeited lands, which are needed by Eveleth Mines for the project.

Figure 9.

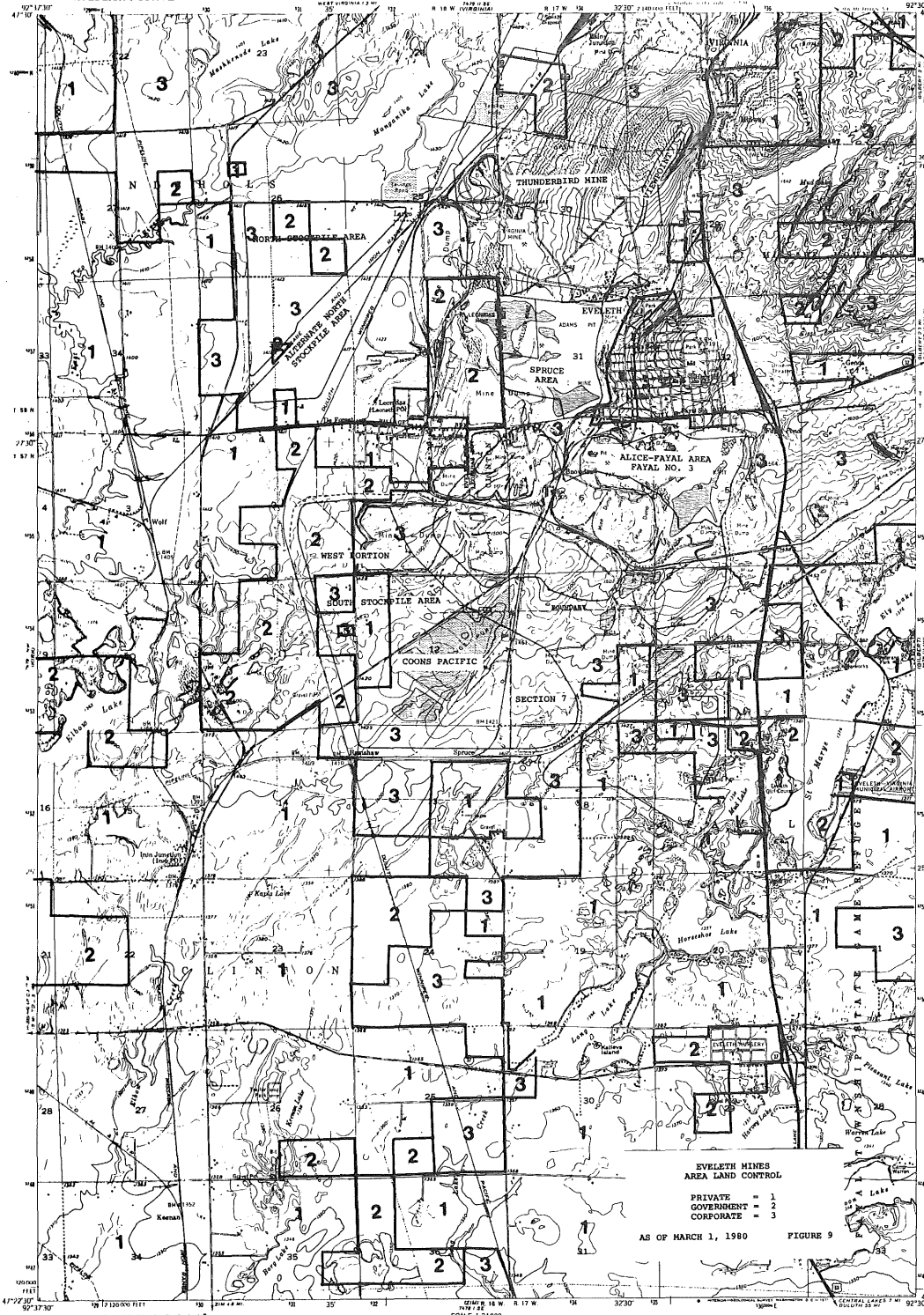
Figure No. 9 provides an overview representation as to the control of the land area. The land has been classified as private, governmental, including local, state and federal, and corporate. Corporate includes the lands owned or controlled by Eveleth Mines as well as other corporations. The figure demonstrates that the vast majority of the iron formation is owned by corporate interests, with the government having portions. Private ownership tends to be to the south of the formation.

Figure No. 9 was prepared upon information developed from the St. Louis County Auditor's office, including tax records, and the Land Atlas and Plat Book published by Rockford Map Publishing, Inc. 1979 Edition. The reader is cautioned that errors may exist as to ownership or as to exace boundaries. The intent is to provide an overview of individual parcels.

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

STATE OF MINNESOTA
IRON RANGE RESOURCES AND REHABILITATION COMMISSION

EVELETH QUADRANGLE
MINNESOTA-ST. LOUIS CO.
7.5 MINUTE SERIES (TOPOGRAPHIC)



Mapped, edited, and published by the Geological Survey

Control by USGS and USC&GS

Topography by photogrammetric methods from aerial photographs taken 1950. Field checked 1951

Depth curves and soundings compiled from charts furnished by Minnesota Department of Conservation

Polyconic projection. 1927 North American datum
10,000-foot grid based on Minnesota coordinate system, north zone
1000 meter Universal Transverse Mercator grid ticks, zone 15, shown in blue

Red tint indicates area in which only landmark buildings are shown

Revisions shown in purple compiled from aerial photographs taken 1969. This information not field checked

Purple tint indicates extension of urban areas

SCALE 1:24 000

CONTOUR INTERVAL 10 FEET
DATUM IS MEAN SEA LEVEL

UTM GRID AND 1980 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

ROAD CLASSIFICATION
Heavy-duty ——— Light-duty ———
Medium-duty ——— Unimproved dt ·····
U.S. Route ○ State Route

QUADRANGLE LOCATION

THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS
FOR SALE BY U.S. GEOLOGICAL SURVEY, DENVER, COLORADO 80225, OR WASHINGTON, D.C. 20242
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST

EVELETH, MINN.
N4722.5—W9230/7.5
1951
PHOTOREVISED 1969
ANS 7478 I NE-SERIES V8??

APPENDIX

INTRODUCTION

The Minnesota Department of Natural Resources, Division of Minerals, has developed a computerized Iron Range Information System (IRIS). By compiling natural resource information available from governmental and private sources, the IRIS constitutes a comprehensive, detailed inventory of natural resources on the Mesabi Iron Range. It was designed to serve as a common data base for state agencies and mining operators in the preparation and evaluation of mining proposals.

GENERAL PROCEDURES USED IN DEVELOPING VARIABLES

Data Collection and Compilation:

Information is collected which describes the study area in terms of each resource or land use variable. This often includes consultation with resource specialists and considerable review of available reports and maps. Many agencies are contacted to obtain information.

For some variables, the available information is very general while for others it is very specific. For example, the Soils variable contains data derived from the Soil Conservation Service's General Soils map of the Arrowhead Region, which is accurate to approximately 40 acres. In contrast, the Utilities variable mapped for the pilot study area was compiled from detailed trackage maps provided by commercial power and railroad companies.

Once collected, the information is compiled on USGS 7½ minute quadrangle sheets. The coding process involves transferring the data off the base map onto a cell grid coding sheet suitable for computer entry.

Using a transparent grid overlay, the base map is divided into one hectare (2.47 acre) cells. The information is then transferred off the base map and onto coding sheets. In general, if a particular constituent occupies more than 50 per cent of a cell on the overlay grid, the corresponding cell on the coding sheet is given the symbol for that constituent. For linear data, such as roads, a cell is assigned if the road passes through it. The data is entered into the University of Minnesota computer files.

Using the resource information collected, classified and coded into computer format, it is possible to prepare graphic displays of the data. Maps are produced by a computerized printer which represents each of the cells in a resource class with its corresponding symbol or tone.

To identify land characteristics in the IRIS study area twelve resource variables were developed. Ten of these variables were used in the supplemental EIS for analyzing the physical aspects of stockpiling in relation to the environment. A general description of each variable is presented below.

Bedrock Geology

The major geologic formations of the Mesabi Iron Range are well known since mining has been occurring on the range for almost a century. There are five major formations: the Biwabik Iron Formation, the Pokegama Quartzite, the Virginia Formation, the Giants Range Granite and the Duluth Complex. Where detailed mapping was available, such as for the Duluth Complex and the Giants Range Granite, formations are coded according to their component rock units. It should be noted, however, that the contacts delineated between the individual units are less reliable than those between the major formations.

Soil Association

Soil Associations are interpreted from characteristic geographical patterns visible on aerial photographs. The interpretations are refined by field certification. Factors considered in defining soil series and associations are: profile, color, structure, consistency, sequence of horizons, conditions of relief and drainage, and origin mode of formation. Accuracy of the soil mapping units are unreliable below forty acres.

Watershed

A Watershed is the drainage basin of a particular stream. A watershed boundary is defined by a topographic highland which surrounds the basin and segregates it from neighboring basins. Those watersheds with drainage areas greater than five square miles are identified.

Surface Hydrology

Surface Hydrology describes the surface water resources of the Mesabi Range. The hydrology of each watershed was classified by uniquely identifying each lake and each segment of the stream hierarchy with a two digit number. Streams were segmented wherever they were intersected by a tributary, marsh, gaging station or other unique feature. The two digit system allows stream order to be maintained.

Mining Land Use

The mining land use on the range falls into two categories: Storage Facilities, such as stockpiles, tailings basins, and reservoirs; and Extractive Operations, including pits, shafts, caved areas and buildings.

Every stockpile, tailings basin and pit is given a unique number in order to be able to reference each land use individually. In this way, an information file can be maintained for each land use, and the variable map will act as a location map.

Vegetation

Vegetation basically describes forest cover. The tree type, size and density of the forested areas were interpreted from aerial photographs. Six classifications of tree types were identified: pines, upland spruce-balsam, aspen-birch, northern hardwoods, lowland hardwoods and swamp conifers. Open areas were identified as cultivated, open field, pasture, wetland, unproductive or industrial.

Recreational-Historical/Archeological Sites

Recreation on the range is increasing in importance as an industry. Some recreational activities are compatible with various mining land uses while others are very incompatible. Resorts, campgrounds, trails, rest areas, public boat accesses, golf courses and state and federal forest boundaries were identified.

Historical and archeological sites consist of areas which are significant in terms of obtaining an historical perspective of the Mesabi Range. Indian trails, early roads, early railroads, logging sites, sawmills and early mining locations are contained in this variable.

Utilities

The location of utilities is an important indicator of the development in an area. The utilities variable includes powerlines, substations, radio towers, waterworks, pipelines, railroads and airplane facilities. USGS quadrangle sheets were updated using information received from various utilities companies.

Roads

Roads were entered as a variable separate from utilities since in many places roads and powerlines occupied the same cell.

Each road was identified by a different number so that it could be easily classified by computer into a group. Criteria for classification included such factors as surface type, weight restriction and maintenance jurisdiction.

Urban and Rural Development

Urban and rural development depicts the location of residential and commercial areas. There are essentially three categories in this variable:

1. Incorporated - Developed. Fifty percent or more of the cell contains buildings.

2. Incorporated - Undeveloped. Within the boundaries of incorporation, but less than fifty percent of the cell contains buildings.

3. Unincorporated - Developed. Occurs in communities either listed in the 1970 Census, or served by a paved street other than county or state roads. These criteria were established to exclude farmsteads from the developed classification.

Wildlife and Natural Areas

Unique natural and wilflife resources are the responsibility of the DNR and such resources should be considered during the design and evaluation of mining proposals. The Wildlife and Natural Areas Map identifies unique natural areas such as waterfalls, rapids, virgin timber, and wildrice lakes; and wildlife areas such as deer yards, eagle nest locations, unique fisheries, colonial water bird nesting sites, etc.

TABLE A-1

BEDROCK GEOLOGY

(in acres)

Stockpile	Virginia Formation
North	447
South	1,277
TOTAL	1,724
North Alternate	299
South Alternate	405
TOTAL	704
State and T.F. Land	
NW-SE S 26, 58-18	40
SE-SE	40
SW-NE	27*
SE-NE	40
NW-SE	40
NE-SE	25*
SW-SE	40
SE-SE	40
NW-NE 11,	40
SW-NE	40
NW-SE	40
NE-SE	40
SE-SE	40
NE-NW 24,	40
NW-NE	40
SE-NW	40
	612

* State land area.

TABLE A-2

SOIL ASSOCIATIONS

(in acres)

Stockpile	Mine Lands	Peat	Undiff. Esker & Outwash Plain	Clayey Soils Level	Clayey Soils Undulating	Total
North	2	240		200	5	447
South	351	40		27	859	1277
TOTAL	353	280		227	864	1724
State & T.F. Land						
NW-SE S26, 58-18		30		10		40
SE-SE		38		2		40
SW-NE				27		27
SE-NE				17	23	40
NW-SE		22			18	40
NE-SE				5	20	25
SW-SE		10			30	40
SE-SE					40	40
NW-NE 11,		5			35	40
SW-NE		10			30	40
NW-SE		12	8		20	40
NE-SE		2			38	40
SE-SE					40	40
NE-NW 24,		38			2	40
NW-NE		17			23	40
TOTAL		184	8	61	319	572

Stockpile	Peat	Undulating Sand, Outwash Plains and Moraines	Clayey Soils Level	Clayey Soils Undulating	Total
North Alternate	168		131		299
South Alternate	44	153		208	405
TOTAL	212	153	131	208	704

TABLE A-3

SURFACE HYDROLOGY

(in acres)

Stockpile	Wooded Marsh	Swamp	Secondary Stream Long Lake Creek #1	Tertiary Stream Snowden Creek	TOTAL
North	47	49			96
South	64		15	49	128
TOTAL	111	49	15*	49*	224
State & T.F. Land					
NW-SE S26, 58-18					
SE-SE	7	10			17
SW-NE	5	2			7
SE-NE	2				2
NW-SE	25				25
NE-SE	2				2
SW-SE				5	5
SE-SE	5				5
NW-NE 11,	2			10	12
SW-NE	5			5	10
NW-SE	5			5	10
NE-SE				5	5
SE-SE	2				2
NE-NW 24,	25		2		27
NW-NE	2				2
SE-NW	20				20
TOTAL	107	12	2*	30*	151

Stockpile	Wooded Marsh	Swamp	Primary Stream No. 2	Secondary Stream Unnamed	Total
North Alternate	2	69			71
South Alternate	20		10	44	74
TOTAL	22	69	10	44	145

* Areas (in acres) containing streams.

(in acres)

Stockpile	Pine PT M	SP-BAL PT M	Aspen-Birch S&S M	Aspen-Birch S&S P	Aspen-Birch PT M	Bottomland Hardwoods S&S M	Bottomland Hardwoods S&S P	Bottomland Hardwoods PT G	Bottomland Hardwoods PT M	Bottomland Hardwoods PT P	Swamp Conifers S&S G	Swamp Conifers S&S M	Swamp Conifers S&S P	Swamp Conifers PT M	Swamp Conifers PT P	Open Field	Wet-lands	Non-Veg.	TOTAL
North						2	22	7	97	12			40	37		74	129	27	447
South	77	10		7	254				20					37	10	109	74	679	1227
TOTAL	77	10		7	254	2	22	7	117	12			40	74	10	183	203	706	1724
State & T.F. Lands																			
NW-SE S 26, 58-18									25					10			5		40
SE-SW									13				2				25		40
SW-NE					10									2	2		5	8	27
SE-NE					10													30	40
NW-SE					12										8		8	12	40
NE-SE					10													15	25
SW-SE					33				2								5		40
SE-SE	2				26												12		40
NW-NE 11					17									8		5	2	8	40
SW-NE		5			24				2							2	2	5	40
NW-SE		5			10									8	10	2	5		40
NE-SE					28												10	2	40
SE-SE			2		2									24		2	5	5	40
NE-NW 24					13						2		18				2	5	40
NW-NE					10						15	15							40
SE-NW					15								5				13	7	40
TOTAL	2	10	2		220				42		17	15	25	52	20	11	99	97	612

Stockpile	Pine ST M	Aspen-Birch S&S M	Aspen-Birch PT M	Bottomland Hardwoods S&S M	Bottomland Hardwoods PT G	Bottomland Hardwoods PT M	Bottomland Hardwoods PT P	Bottomland Hardwoods S&S G	Swamp Conifers S&S M	Swamp Conifers S&S P	Swamp Conifers PT G	Swamp Conifers PT M	Swamp Conifers PT P	Open Field	Wet-Lands	Non-Veg.	TOTAL
North Alternate					54	5	10		5	10		68		22	95	30	299
South Alternate	17	17	102	17				25			7	59	2	110	47	2	405
TOTAL	17	17	102	17	54	5	10	25	5	10	7	127	2	132	142	32	704

TABLE A-6

Supplement

NOTE:

SP-BAL	- Mixed uplands, spruce and balsam
STS	- Seedlings and Saplings
PT	- Poletimber
ST	- Sawtimber
G	- Good Stocking
M	- Medium Stocking
P	- Poor Stocking
Open Field	- Open fields and pastures not grazed by livestock.
Wetlands	- Wetlands, open and non-productive wet areas.
Non-Veg.	- Lands in commercial, industrial and residential uses.

TABLE A-7

RECREATIONAL, HISTORICAL, ARCHEOLOGICAL USES
(in acres)

Stockpile	Early Road	Historic RR in Use	Site of Spruce	Early Road and Historic RR In Use	Total
North		7			7
South	35	35	2		72
TOTAL	35	42*	2		79
North Alternate		32			32
South Alternate					None
TOTAL		32			32
State & T.F. Land					
NW-SE S 26, 58-18					
SE-SE					
SW-NE		2			2
SE-NE					
NW-SE		10			10
NE-SE					
SW-SE		10			10
SE-SE					
NW-NE 11,		10			10
SW-NE		10			10
NW-SE					
NE-SE	5	10			15
SE-SE	2	7		2	11
NE-NW 24,		2			2
NW-NE					
SE-NW		10			10
TOTAL	7	71		2	80

* Area (in acres) containing road or railroad

TABLE A-8

UTILITIES/ROADS*

(in acres)

Stockpile	MP&L Powerline & N.W. Bell Phoneline	DM&IR Railroad		ROADS			TOTAL
		Single Track	Multi-Track	County No.7	Gravel	Gravel	
North	44	22	42		40		148
South	44	69	10	35	72	12	242
TOTAL	88	91	52	35	112	12	390
North Alternate	12	5	37			5	59
South Alternate						44	44
TOTAL	12	5	37			49	103
State & T.F. Land							
NW-SE S26, 58-18					10		10
SE-SE							
SW-NE		2					2
SE-NE					10		10
NW-SE		10					10
NE-SE					2		2
SW-SE		10					10
SE-SE					10		10
NW-NE 11,		10					10
SW-NE		10					10
NW-SE							
NE-SE		10		5	7		22
SE-SE	10	7		5			22
NE-NW 24,		2					2
NW-NE							
SE-NW		10					10
TOTAL	10	71		10	39		130

* Area (in acres) containing variable

TABLE A-9

URBAN/RURAL DEVELOPMENT

(in acres)

Stockpile	Mt. Iron Undev.	Leonidas Undev.	Eveleth Undev.	Un-Organized	TOTAL
North	447				447
South			173	1104	1277
TOTAL	447		173	1104	1724
North Alternate	259	40			299
South Alternate				405	405
TOTAL	259	40		405	704
State & T.F. Land					
NW-SE s 26, 58-18	40				40
SE-SE	40				40
SW-NE				27	27
SE-NE			40		40
NW-SE				40	40
NE-SE			7	18	25
SW-SE				40	40
SE-SE				40	40
NW-NE 11,				40	40
SW-NE				40	40
NW-SE				40	40
NE-SE				40	40
SE-SE				40	40
NE-NW 24,				40	40
NW-NE				40	40
SE-NW				40	40
TOTAL	80		47	485	612

WILDLIFE AND NATURAL AREAS - STOCKPILE ALTERNATES

(in acres)

Stockpiles	Warm Water Stream No. 2	Total
North Alternate		None
South Alternate	45	45
TOTAL	45	45

IRIS

IRON RANGE INFORMATION SYSTEM

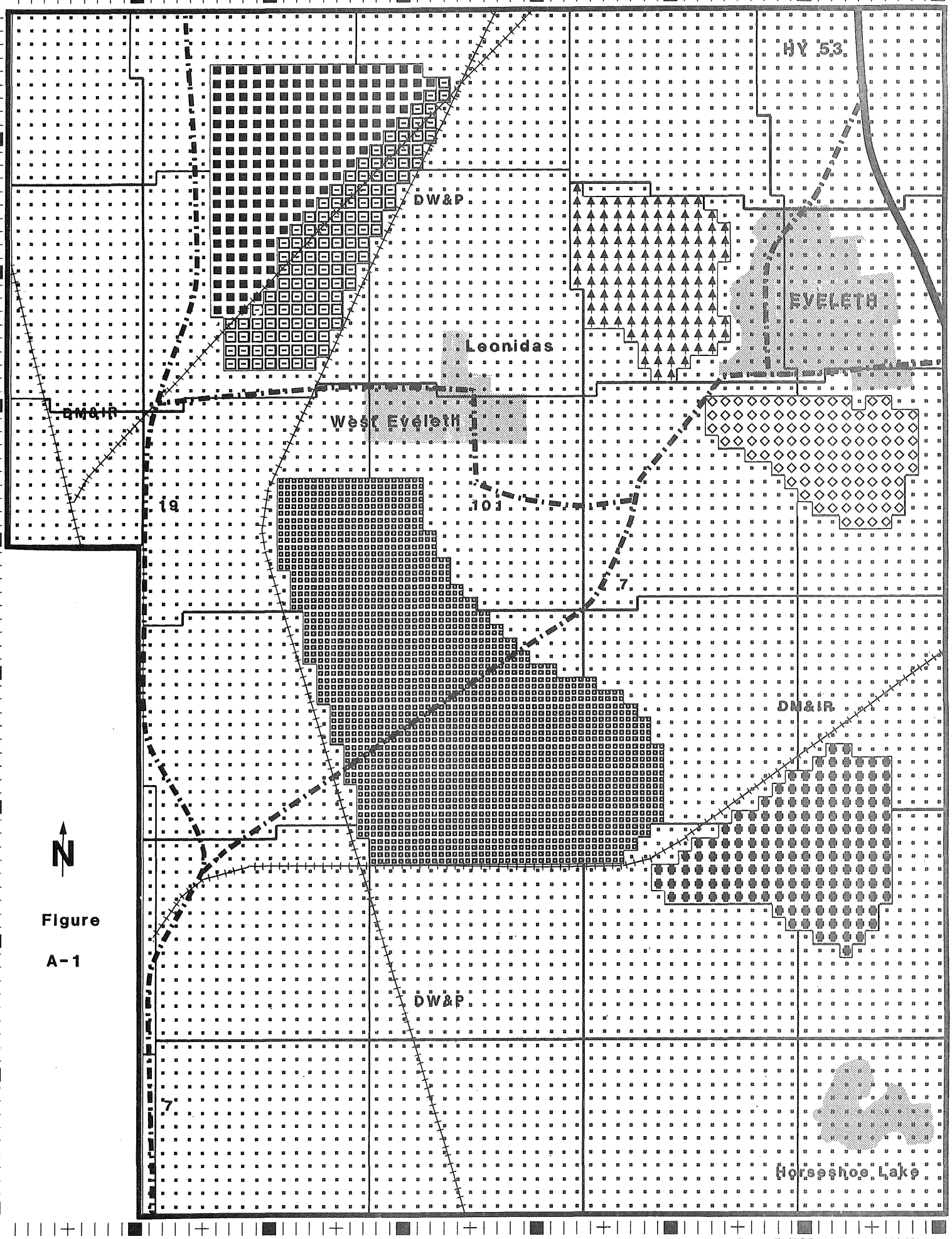
MDNR

MINNESOTA DEPARTMENT
OF NATURAL RESOURCES,
DIVISION OF MINERALS.

1 KILOMETER = 10 CELLS.
1 MILE = 16 CELLS.

OGLEBAY NORTON STOCKPILE SITES

	LEV	COUNT	PCT	ACRES	LEGEND
■ ■ ■	1	181	3.1	447.0	STOCKPILE 1
⊟ ⊟ ⊟	2	121	2.0	298.8	STOCKPILE 2
▲ ▲ ▲	4	131	2.2	323.5	STOCKPILE 4
◇ ◇ ◇	5	112	1.9	276.6	STOCKPILE 5
▫▫▫▫▫▫▫ ▫▫▫▫▫▫▫	7	517	8.9	1276.9	STOCKPILE 7
● ● ●	8	164	2.8	405.0	STOCKPILE 8
. . .	15	4574	78.8	11297.7	ON SITE BUT NO STOCKPILE PROPOSED


HY 53
DW&P
EVELETH
Leonidas
West Evaleth
DM&IR
19
101
7
DM&IR
DW&P
7
Horseshoe Lake
N

Figure

A-1

IRIS

IRON RANGE INFORMATION SYSTEM

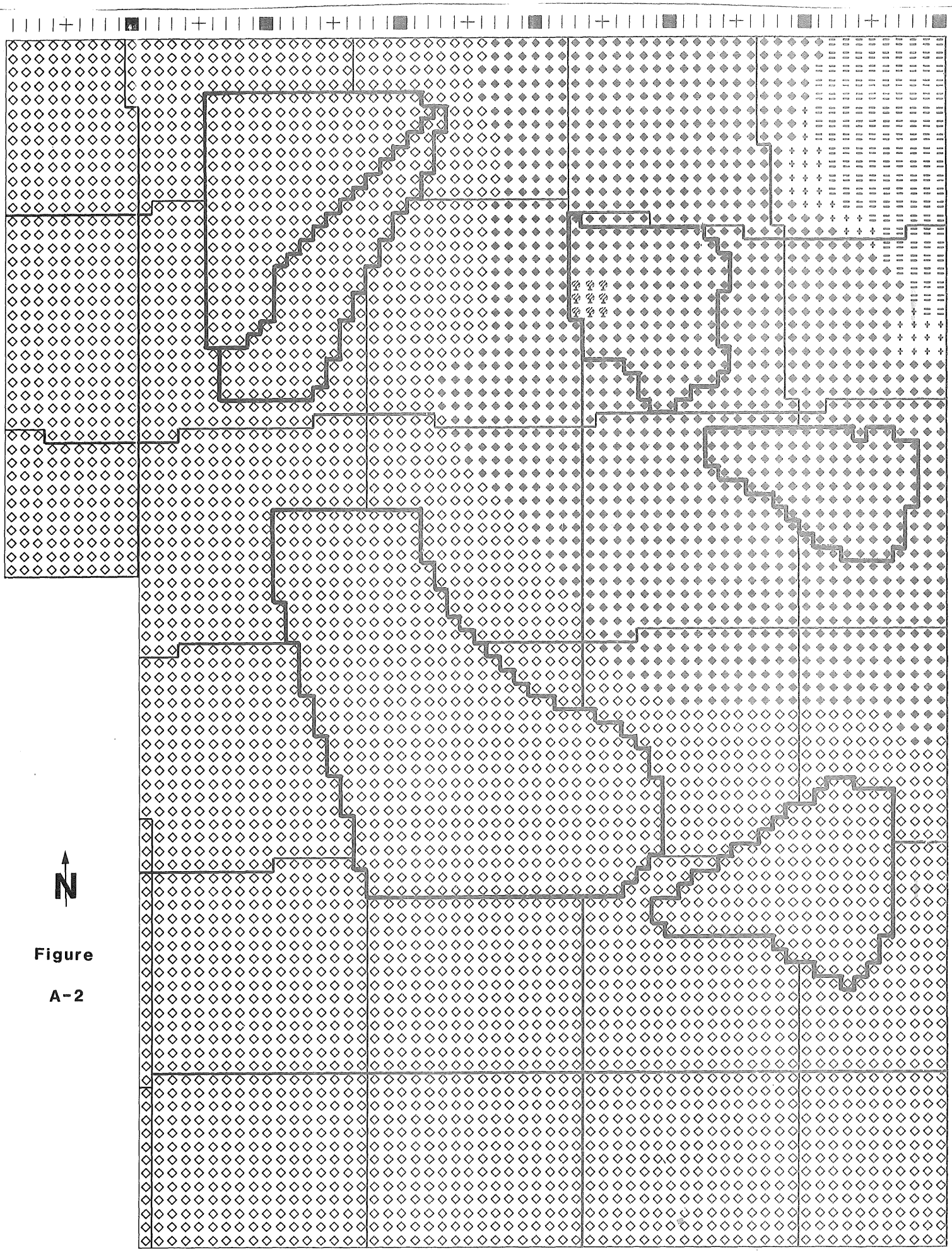
MONA

MINNESOTA DEPARTMENT
OF NATURAL RESOURCES.
DIVISION OF MINERALS.

1 KILOMETER = 10 CELLS.
1 MILE = 16 CELLS.

OGLEBAY NORTON BEDROCK GEOLOGY

	LEV	COUNT	PCT	ACRES	LEGEND
◆ ◆ ◆	1	1432	24.6	3537.0	BIWABIK IRON FORMATION
◇ ◇ ◇	2	4166	71.8	10290.0	VIRGINIA FORMATION
+ + +	3	38	0.6	93.8	POKEGAMA QUARTZITE
⚲ ⚲ ⚲	4	9	0.1	22.2	CRETACEOUS ROCKS
= = =	25	155	2.6	382.8	METASEDIMENTS



N

Figure

A-2

IRIS

IRON RANGE INFORMATION SYSTEM

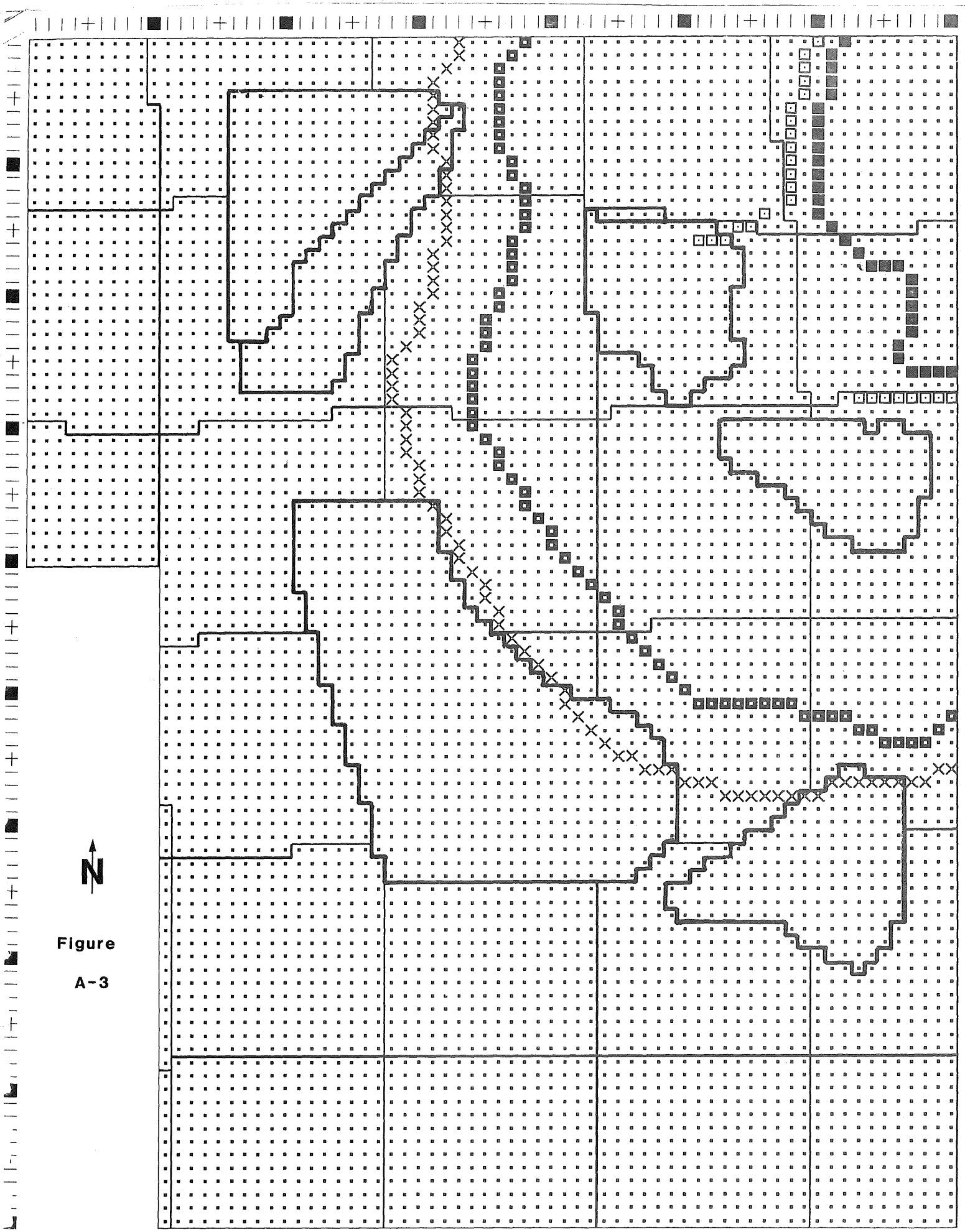
MDNR

MINNESOTA DEPARTMENT
OF NATURAL RESOURCES.
DIVISION OF MINERALS.

1 KILOMETER = 10 CELLS.
1 MILE = 16 CELLS.

PROPOSED BY R. MARSDEN

	LEV	COUNT	PCT	ACRES	LEGEND
...	0	5579	96.1	13780.1	NO DATA
▪▪▪	1	70	1.2	172.9	BIWABIK IRON FORMATION-VIRGINIA FORMATION CONTACT
XXX	2	80	1.3	197.6	UTILMATE PIT LIMIT
▫▫▫	3	27	0.4	66.6	BIWABIK IRON FORMATION-POKEGMA QUARTZITE CONTACT
■■■	4	31	0.5	76.5	NORTHERN PIT LIMIT



Figure

A-3

IRIS

IRON RANGE INFORMATION SYSTEM

MONR

MINNESOTA DEPARTMENT
OF NATURAL RESOURCES,
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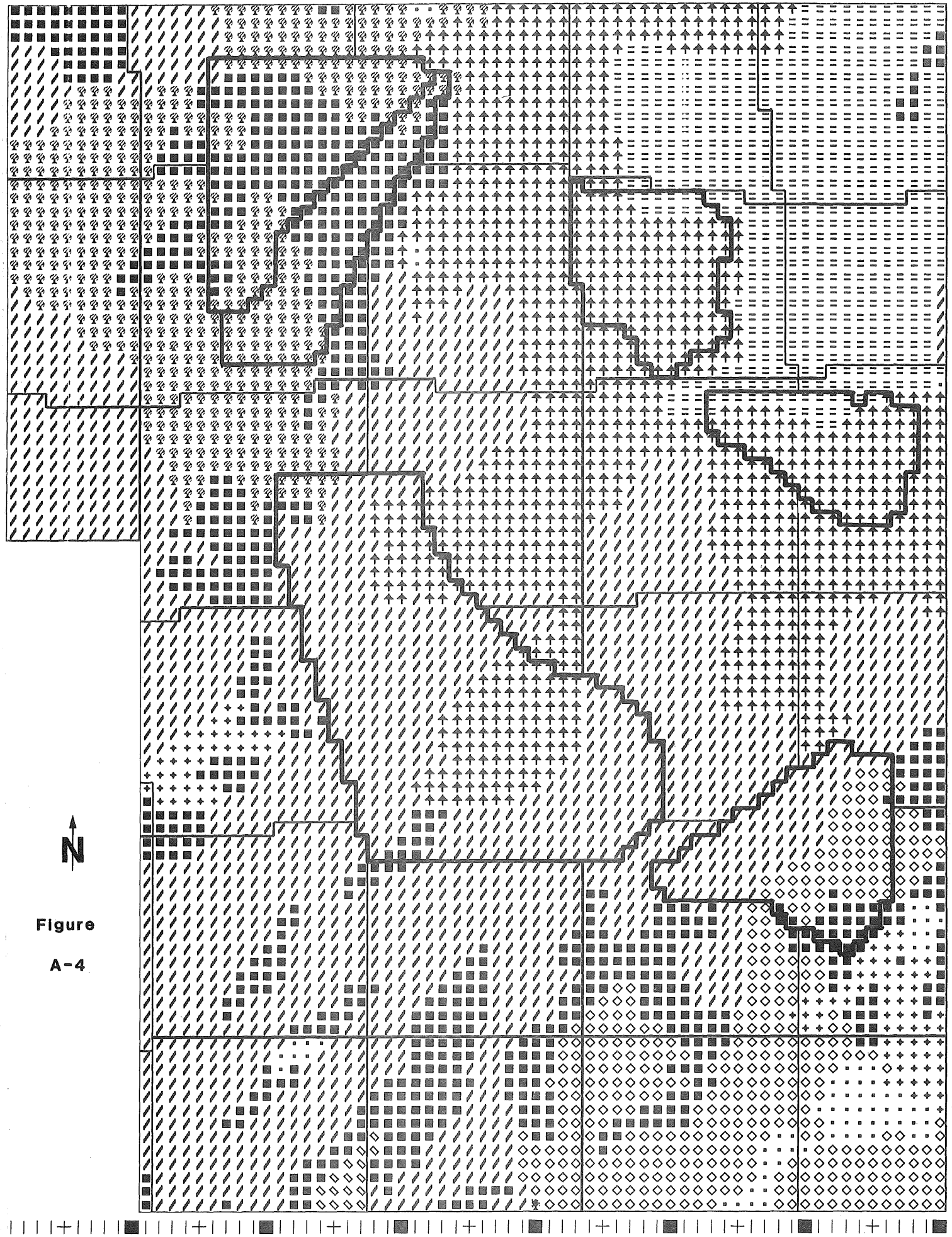
1 KILOMETER = 10 CELLS.
1 MILE = 16 CELLS.

OOLEBAY NORTON SOIL ASSOCIATIONS

	LEV	COUNT	PCT	ACRES	LEGEND
▪ ▪ ▪	0	72	1.2	177.8	OFF-SITE OR OPEN WATER
↑↑↑	1	1184	20.4	2924.4	MINE LANDS
■■■	3	815	14.0	2013.0	PEAT AND MUCK SOILS - BOGS
+ + +	8	104	1.7	256.8	UNDIFFERENTIATED GRAVELLY ESKERS AND OUTWASH AREAS
= = =	10	556	9.5	1373.3	UNDULATING TO HILLY LOAMY SOILS - SHALLOW TO BEDROCK
◇◇◇	20	429	7.3	1059.6	UNDULATING SANDY SOILS - OUTWASH PLAINS AND SANDY MORRAINES
⚘⚘⚘	25	1	0.0	2.4	LEVEL LOAMY SOILS - GLACIAL LAKE PLAIN
◇◇◇	29	16	0.2	39.5	UNDULATING GRAVELLY SOILS - OUTWASH PLAIN
⚲⚲⚲	31	571	9.8	1410.3	LEVEL CLAYEY SOILS - GROUND MORRAINE
///	32	2052	35.3	5068.4	UNDULATING CLAYEY SOILS - MORRINES



Figure

A-4

IRIS

IRON RANGE INFORMATION SYSTEM

MONA

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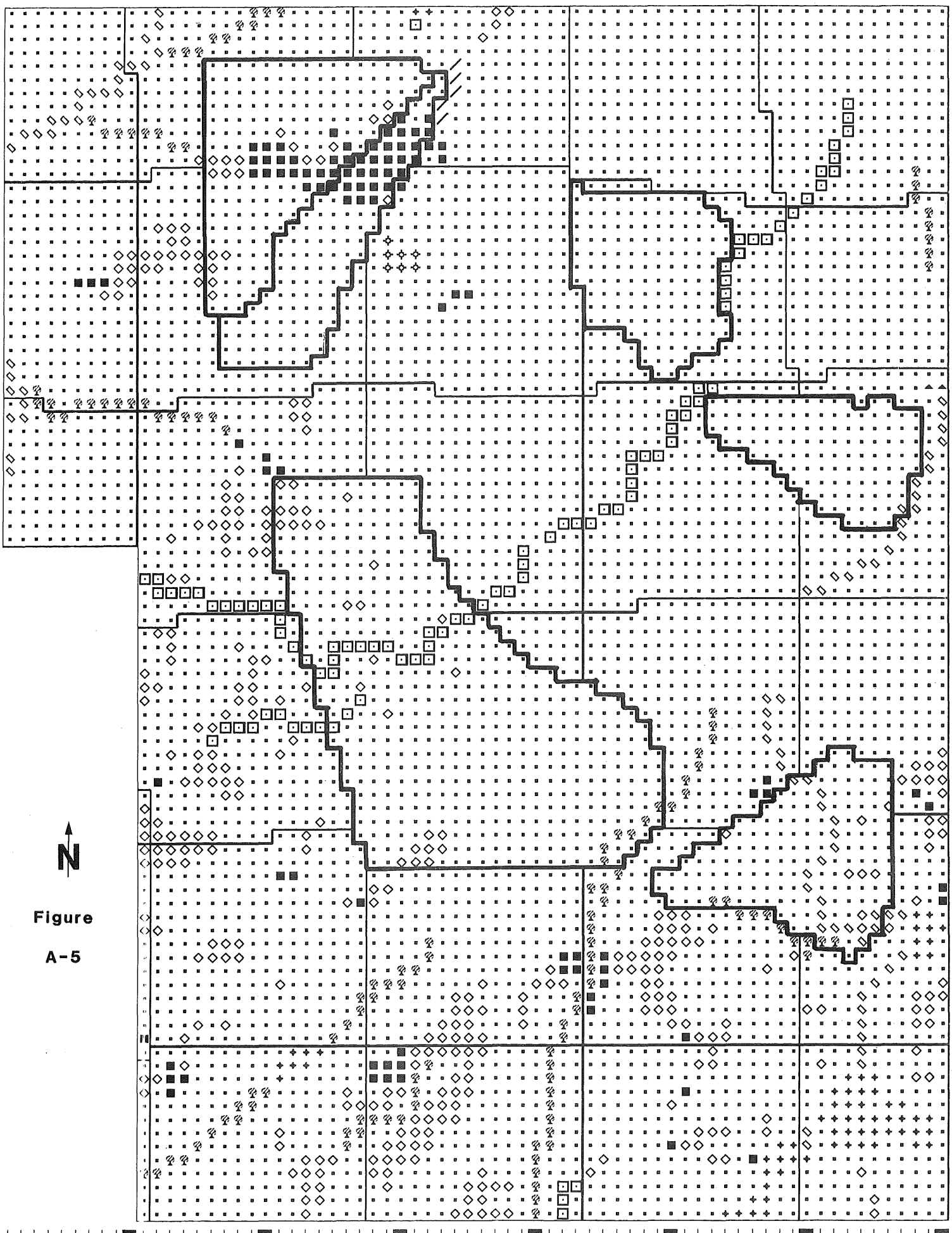
1 KILOMETER = 10 CELLS.
1 MILE = 16 CELLS.

OOLEBAY NORTON SURFACE HYDROLOGY

	LEV	COUNT	PCT	ACRES	LEGEND
▪ ▪ ▪	0	4950	85.3	12226.5	NO DATA
///	1	5	0.0	12.3	ISOLATED STREAMS
◇◇◇	3	359	6.1	886.7	WOODED MARSH
■■■	4	98	1.6	242.0	SWAMP
◇◇◇	5	86	1.4	212.4	PRIMARY STREAM
⚲⚲⚲	6	131	2.2	323.5	SECONDARY STREAM
⊡⊡⊡	7	94	1.6	232.1	TERTIARY STREAM
✦✦✦	8	68	1.1	167.9	LAKE WITH INLET AND OUTLET
▲▲▲	9	2	0.0	4.9	LAKE WITH OUTLET ONLY
✧✧✧	10	7	0.1	17.2	LAKE WITH NO INLET OR OUTLET



Figure

A-5

IRIS

IRON RANGE INFORMATION SYSTEM

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1 KILOMETER = 10 CELLS.
1 MILE = 16 CELLS.

OGLEBAY NORTON WATERSHEDS AND DESCRIPTIVE WATER BODY

	LEV	COUNT	PCT	ACRES	LEGEND
● ● ●	70	395	6.8	975.6	WATERSHED 70 MANGANIKA AND MASKENODE LAKES
◇ ◇ ◇	73	1372	23.6	3388.8	WATERSHED 73 EAST TWO RIVERS
□ □ □	74	2379	41.0	5876.1	WATERSHED 74 ELBOW CREEK
◇ ◇ ◇	75	1522	26.2	3759.3	WATERSHED 75 LONG LAKE CREEK
◆ ◆ ◆	82	132	2.2	326.0	WATERSHED 82 ELY - ST. MARYS LAKE

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Figure A-6

IRIS

IRON RANGE INFORMATION SYSTEM

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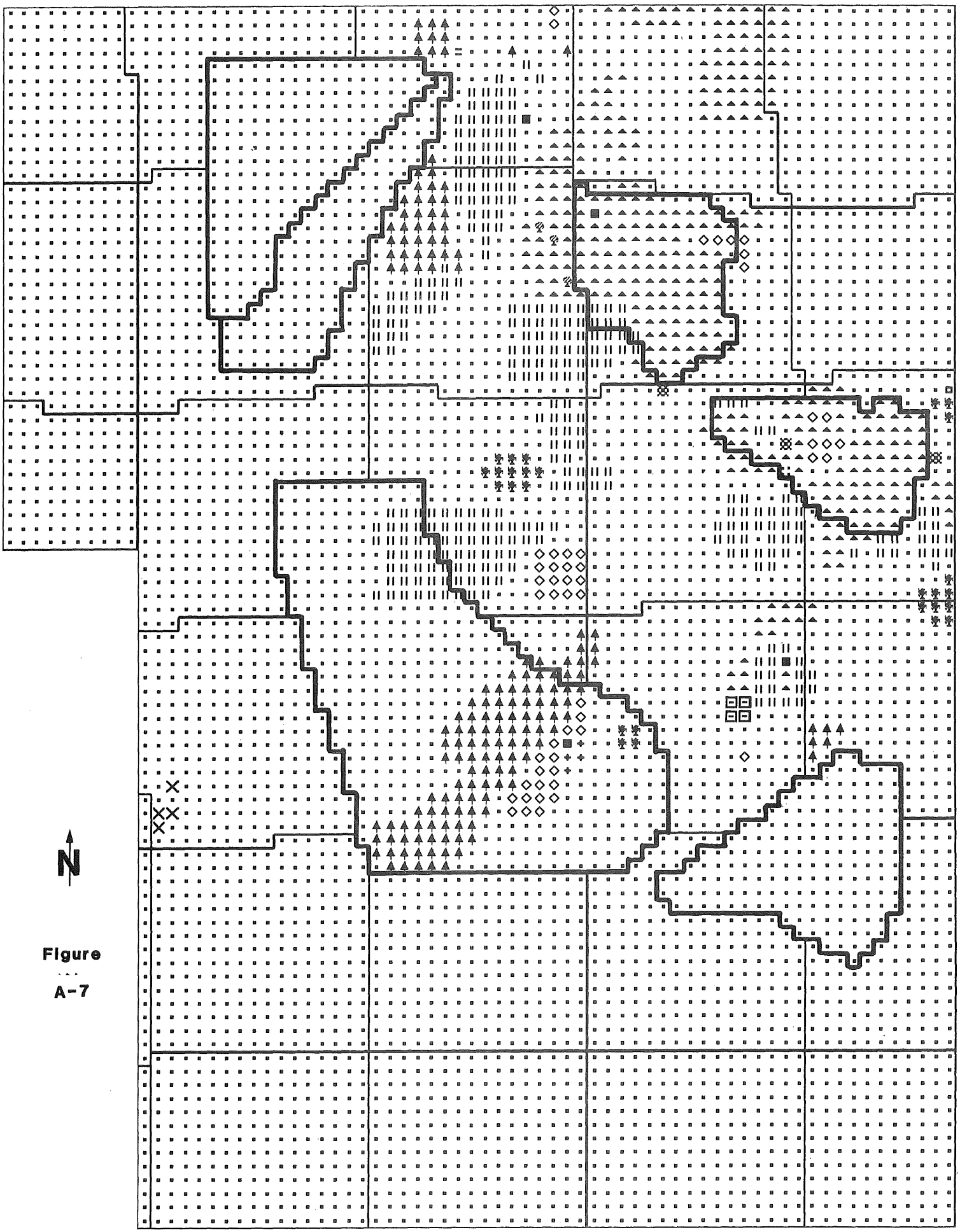
1 KILOMETER = 10 CELLS.
1 MILE = 16 CELLS.

OGLEBAY NORTON MINING LAND USE

	LEV	COUNT	PCT	ACRES	LEGEND
▪ ▪ ▪	0	4864	83.8	12014.0	NO DATA
■ ■ ■	1	4	0.0	9.8	BUILDINGS
= = =	2	1	0.0	2.4	RESERVOIR
▩▩▩	3	3	0.0	7.4	MINESHAFTS
:::::	4	1	0.0	2.4	CAVED AREAS
XXX	6	4	0.0	9.8	GRAVEL PITS
▲ ▲ ▲	7	376	6.4	928.7	OPEN PIT
⚲ ⚲ ⚲	8	3	0.0	7.4	TACONITE STOCKPILE
⊟⊟⊟	9	4	0.0	9.8	LEAN ORE STOCKPILE
⚜ ⚜ ⚜	10	27	0.4	66.6	OVERBURDEN
‖ ‖ ‖	11	293	5.0	723.7	LAYERED STOCKPILE
✦ ✦ ✦	12	4	0.0	9.8	PAINT ROCK STOCKPILE
◇◇◇	13	51	0.8	125.9	UNKNOWN MATERIALS
▲ ▲ ▲	14	164	2.8	405.0	TAILINGS
▫ ▫ ▫	15	1	0.0	2.4	MISCELLANEOUS



Figure

A-7

IRIS

IRON RANGE INFORMATION SYSTEM

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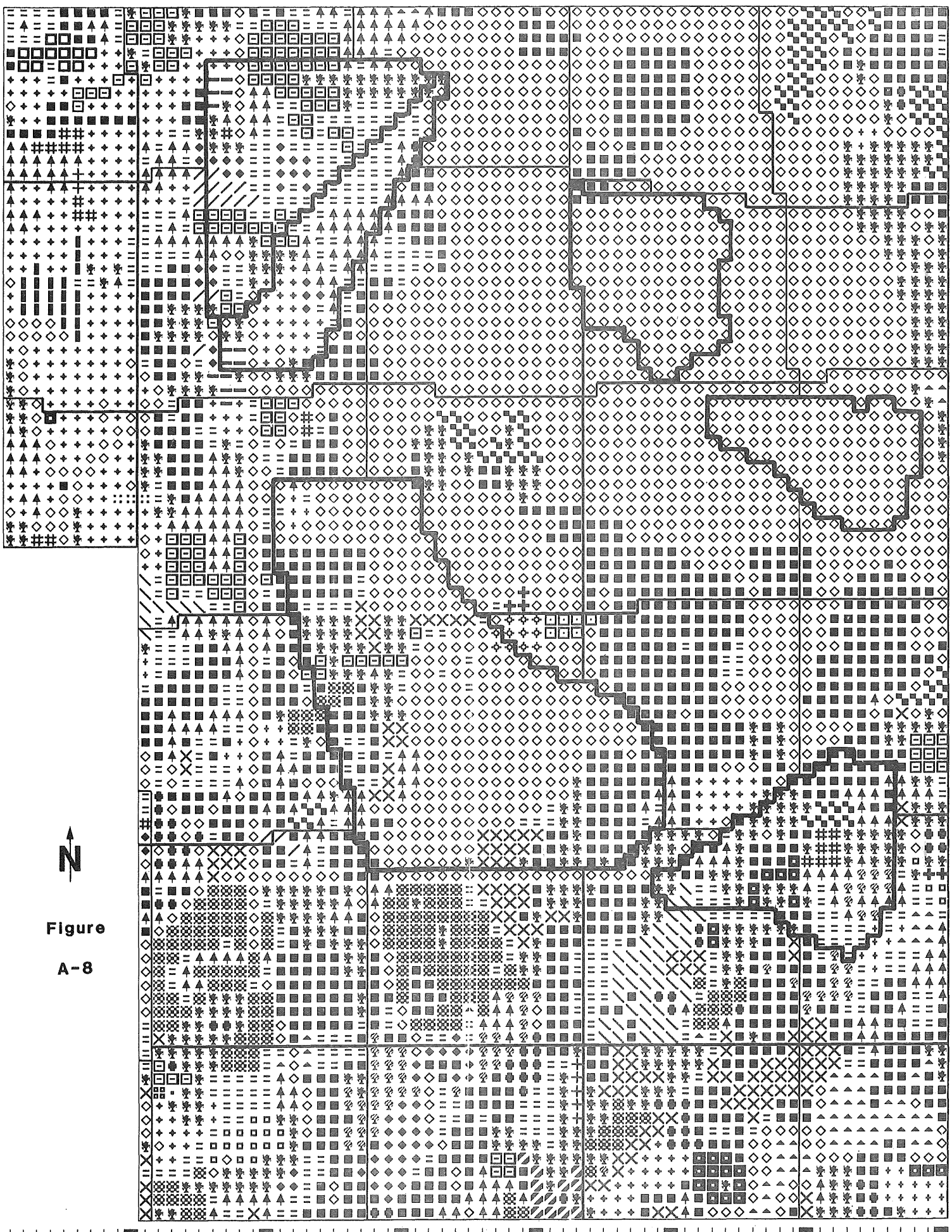
1 KILOMETER = 10 CELLS.
1 MILE = 16 CELLS.

OOLEBAY NORTON VEGETATION

	LEV	COUNT	PCT	ACRES	LEGEND
	1	1	0.0	2.4	PINE:SEEDLINGS AND SAPLINGS:GOOD
	2	7	0.1	17.2	PINE:SEEDLINGS AND SAPLINGS:MEDIUM
	3	1	0.0	2.4	PINE:SEEDLINGS AND SAPLINGS:POOR
	4	15	0.2	37.0	PINE:POLETIMBER:GOOD
	5	136	2.3	335.9	PINE:POLETIMBER:MEDIUM
	7	12	0.2	29.6	SWAMP CONIFERS:POLETIMBER
	8	26	0.4	64.2	PINE:SAWTIMBER:MEDIUM
	9	3	0.0	7.4	PINE:SAWTIMBER:POOR
	14	172	2.9	424.8	MIXED, UPLAND SPRUCE AND BALSAM:POLETIMBER: MEDIUM
	15	20	0.3	49.4	MIXED, UPLAND SPRUCE AND BALSAM:POLETIMBER: POOR
	19	7	0.1	17.2	ASPEN-PAPER BIRCH:SEEDLINGS AND SAPLINGS: GOOD
	20	76	1.3	187.7	ASPEN-PAPER BIRCH:SEEDLINGS AND SAPLINGS: MEDIUM
	21	11	0.1	27.1	ASPEN-PAPER BIRCH:SEEDLINGS AND SAPLINGS: POOR
	23	1094	18.8	2702.1	ASPEN-PAPER BIRCH:POLETIMBER:MEDIUM
	24	5	0.0	12.3	ASPEN-PAPER BIRCH:POLETIMBER:POOR
	35	21	0.3	51.8	NORTHERN (UPLAND) HARDWOODS:SAWTIMBER:MEDIUM
	38	22	0.3	54.3	BOTTOMLAND HARDWOODS:SEEDLINGS AND SAPLINGS: MEDIUM
	39	17	0.2	41.9	BOTTOMLAND HARDWOODS:SEEDLINGS AND SAPLINGS: POOR
	40	310	5.3	765.7	BOTTOMLAND HARDWOODS:POLETIMBER:GOOD
	41	139	2.3	343.3	BOTTOMLAND HARDWOODS:POLETIMBER:MEDIUM
	42	14	0.2	34.5	BOTTOMLAND HARDWOODS:POLETIMBER:POOR



Figure

A-8

Oglebay Norton Vegetation continued

	47	64	1.1	158.0	SWAMP CONIFERS:SEEDLINGS AND SAPLINGS:GOOD
	48	56	0.9	138.3	SWAMP CONIFERS:SEEDLINGS AND SAPLINGS:MEDIUM
	49	66	1.1	163.0	SWAMP CONIFERS:SEEDLINGS AND SAPLINGS:POOR
	50	52	0.8	128.4	SWAMP CONIFERS:POLETIMBER:GOOD
	51	326	5.6	805.2	SWAMP CONIFERS:POLETIMBER:MEDIUM
	52	26	0.4	64.2	SWAMP CONIFERS:POLETIMBER:POOR
	57	527	9.0	1301.6	OPEN FIELDS AND MEADOWS NOT GRAZED BY LIVESTOCK
	58	12	0.2	29.6	PASTURE FOR DOMESTIC LIVESTOCK
	59	449	7.7	1109.0	WETLANDS: OPEN AND NON-PRODUCTIVE WET AREAS
	60	68	1.1	167.9	OPEN WATER IN LAKES, RIVERS, AND STREAMS
	62	2045	35.2	5051.1	LAND IN COMMERCIAL, INDUSTRIAL, OR RESIDENTIAL USES

IRAIS

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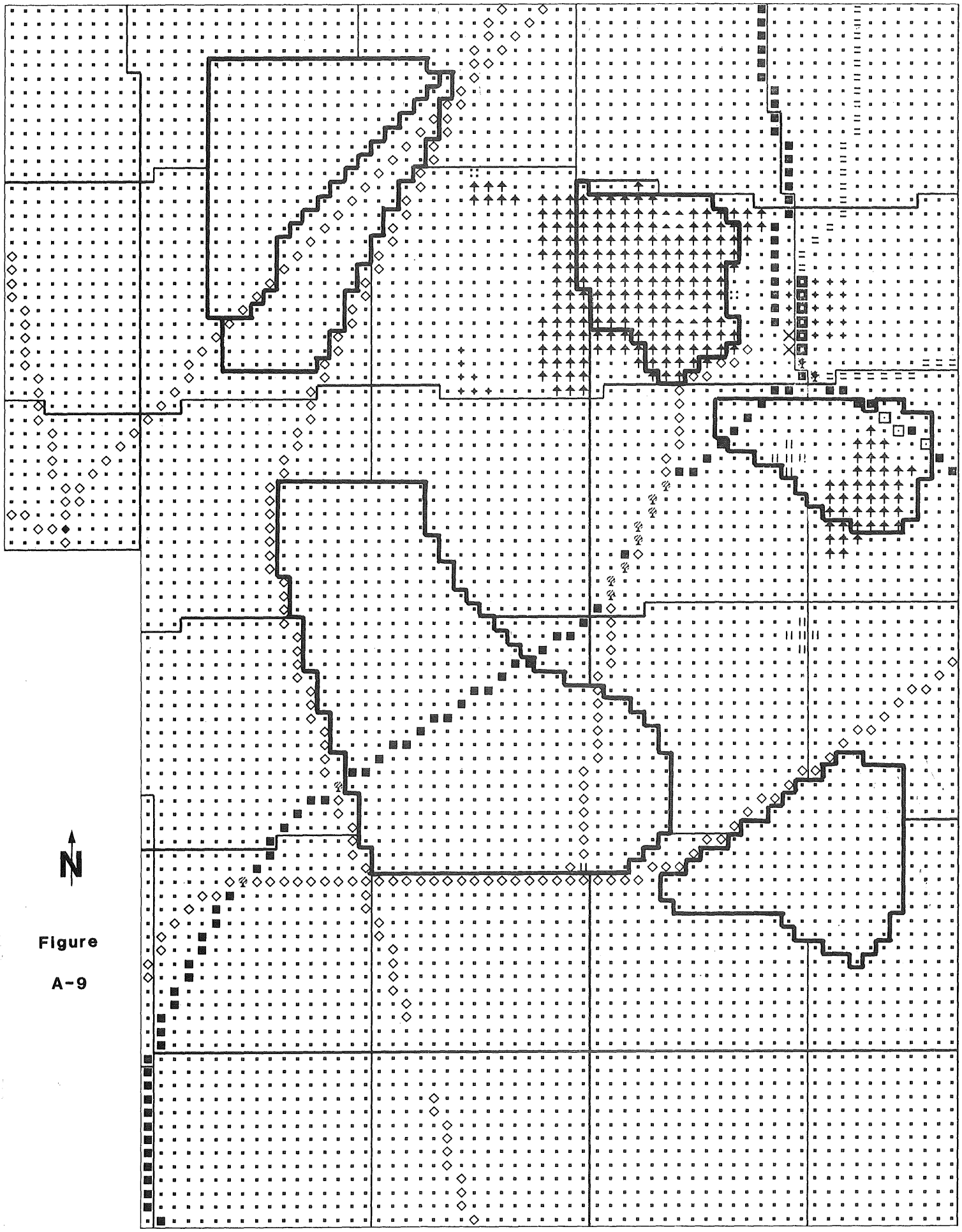
DIVISION OF MINERALS.

1 KILOMETER = 10 CELLS.
1 MILE = 16 CELLS.

OGLEBAY NORTON RECREATION-HISTORICAL-ARCHEOLOGICAL SITES

	LEV	COUNT	PCT	ACRES	LEGEND
▪ ▪ ▪	0	5138	88.5	12690.8	NO DATA
■ ■ ■	13	93	1.6	229.7	EARLY ROAD
◇ ◇ ◇	14	237	4.0	585.3	HISTORIC RAILROAD IN USE
= = =	15	30	0.5	74.1	HISTORIC RAILROUD ABANDONED
+ + +	17	26	0.4	64.2	HISTORIC SECTION OF CITY
|| || ||	18	11	0.1	27.1	GHOST TOWN
↑ ↑ ↑	20	231	3.9	570.5	CURRENT EXTENT OF HISTORIC MINE
::::::	21	2	0.0	4.9	LOGGING SITE
XXX	27	2	0.0	4.9	EARLY ROAD AND HISTORIC SECTION OF CITY
⊡ ⊡ ⊡	28	3	0.0	7.4	EARLY ROAD AND HISTORIC MINE
Y Y Y	29	10	0.1	24.7	EARLY ROAD AND HISTORIC RAILROAD IN USE
Y Y Y	30	2	0.0	4.9	EARLY ROAD AND HISTORIC RAILROAD ABANDONED
◆ ◆ ◆	47	1	0.0	2.4	HISTORIC RAILROAD IN USE AND GHOSTTOWN
■ ■ ■	51	6	0.1	14.8	HISTORIC RAILROAD ABANDONED AND HISTORIC SECTION OF CITY
▲ ▲ ▲	60	6	0.1	19.7	GHOST TOWN AND CURRENT EXTENT OF HISTORIC MINE



Figure

A-9

IRIS

IRON RANGE INFORMATION SYSTEM

MDNR

MINNESOTA DEPARTMENT
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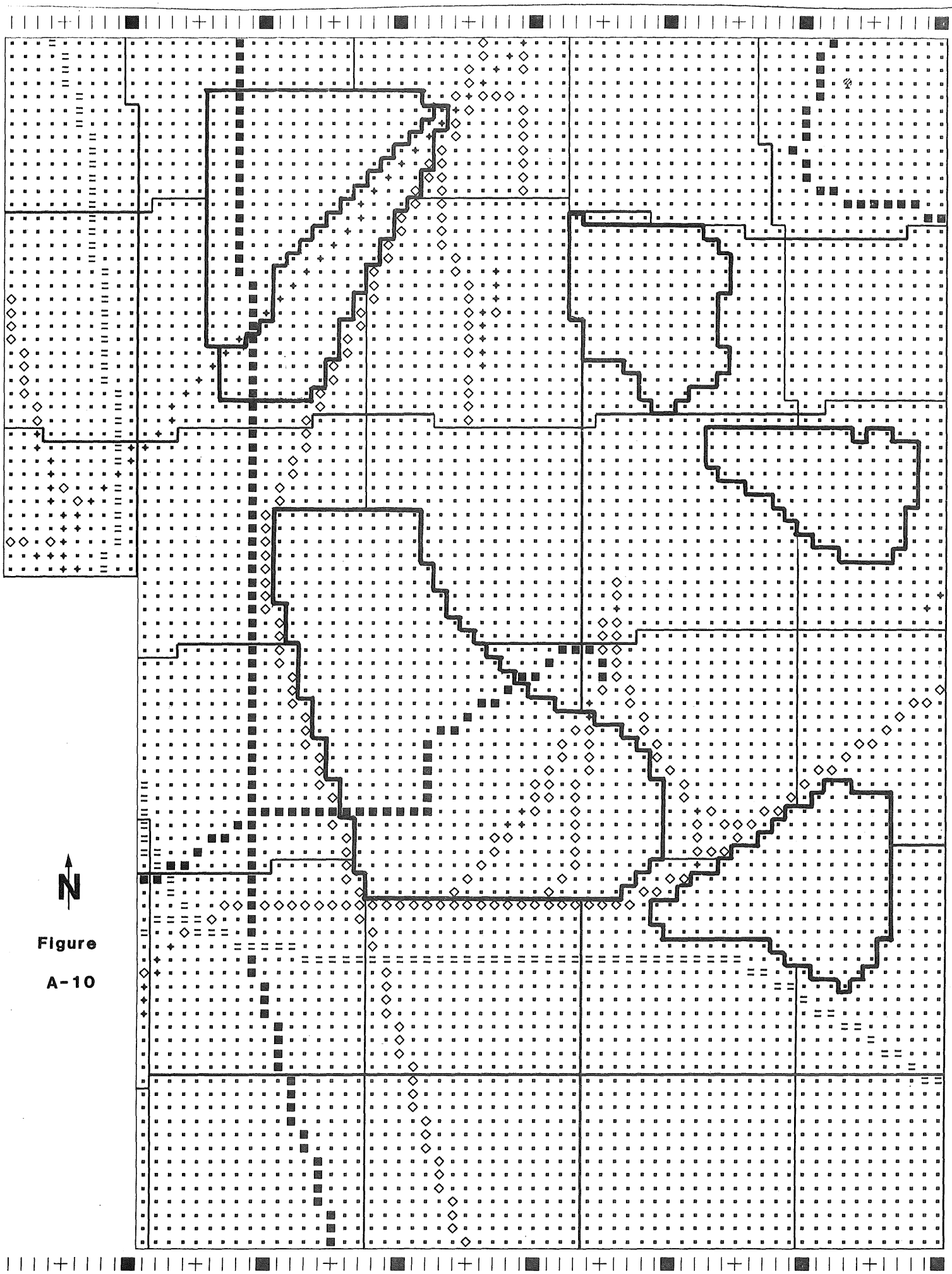
DIVISION OF MINERALS.

1 KILOMETER = 10 CELLS.
1 MILE = 16 CELLS.

OGLEBAY NORTON UTILITIES

	LEV	COUNT	PCT	ACRES	LEGEND
▪ ▪ ▪	0	5220	90.0	12893.4	NO DATA
■ ■ ■	2	150	2.5	370.5	POWERLINE 115KV
◇ ◇ ◇	10	243	4.1	600.2	SINGLE TRACK RAIL LINE
✦ ✦ ✦	11	75	1.2	185.2	MULTIPLE TRACK RAIL LINE
= = =	12	111	1.9	274.1	PIPLINE
𝕐 𝕐 𝕐	15	1	0.0	2.4	RADIO TOWER, EVELETH



Figure

A-10

IRIS

IRON RANGE INFORMATION SYSTEM

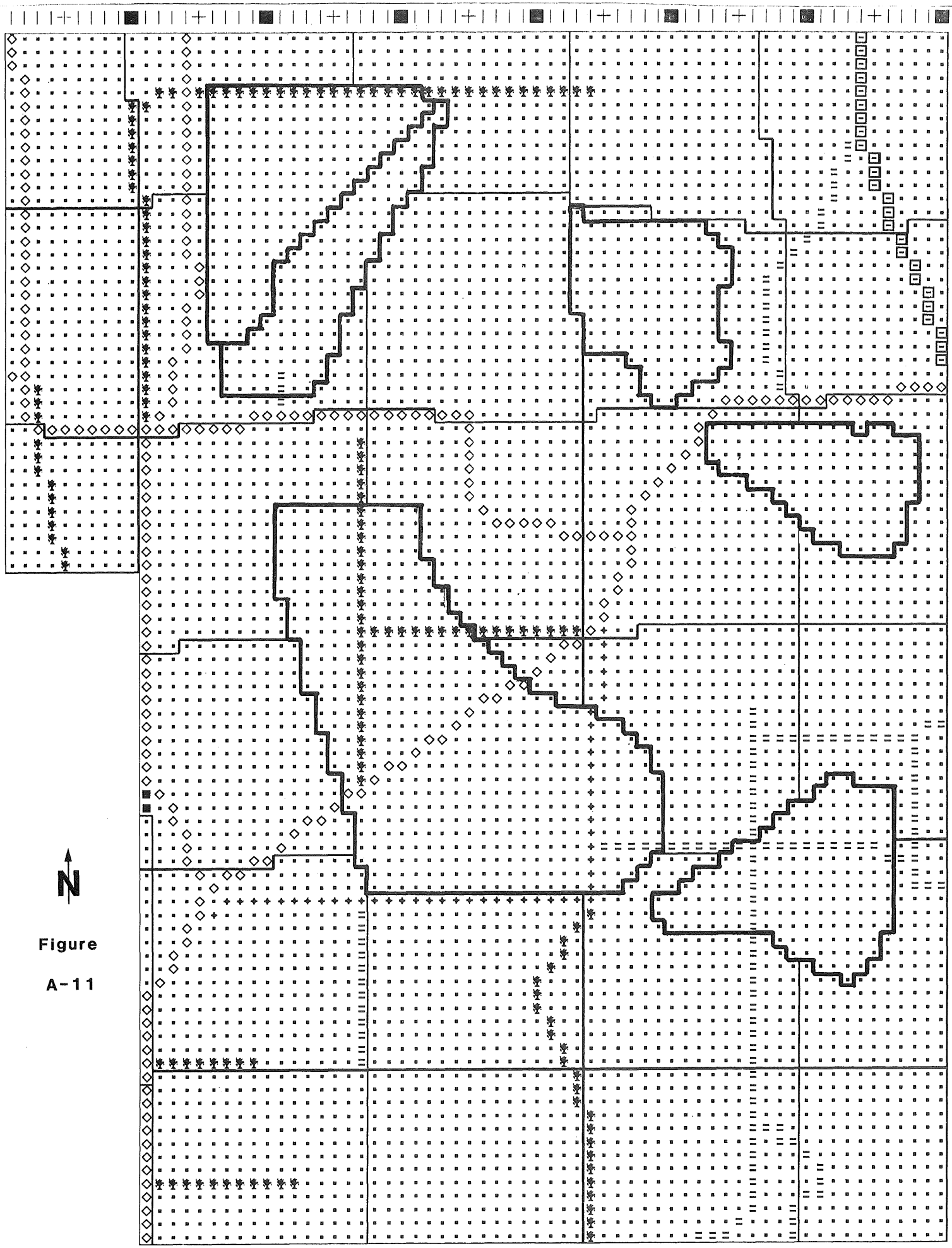
MDNR

MINNESOTA DEPARTMENT
OF NATURAL RESOURCES.
DIVISION OF MINERALS.

1 KILOMETER = 10 CELLS.
1 MILE = 16 CELLS.

OOLEBAY NORTON ROADS

	LEV	COUNT	PCT	ACRES	LEGEND
▪ ▪ ▪	0	5201	69.6	12846.4	NO DATA
⊟⊟⊟	3	25	0.4	61.7	US HIGHWAY 53 - PAVED
◇◇◇	8	230	3.9	568.1	COUNTY- STATE AID HIGHWAY -BITUMINOUS
✦ ✦ ✦	9	49	0.8	121.0	COUNTY - BITUMINOUS
✱ ✱ ✱	10	156	2.6	385.3	COUNTY - GRAVEL
■ ■ ■	11	2	0.0	4.9	COUNTY - UNIMPROVED
= = =	12	137	2.3	338.3	GRAVEL OR UNIMPROVED



Figure

A-11

IRIS

IRON RANGE INFORMATION SYSTEM

MONA

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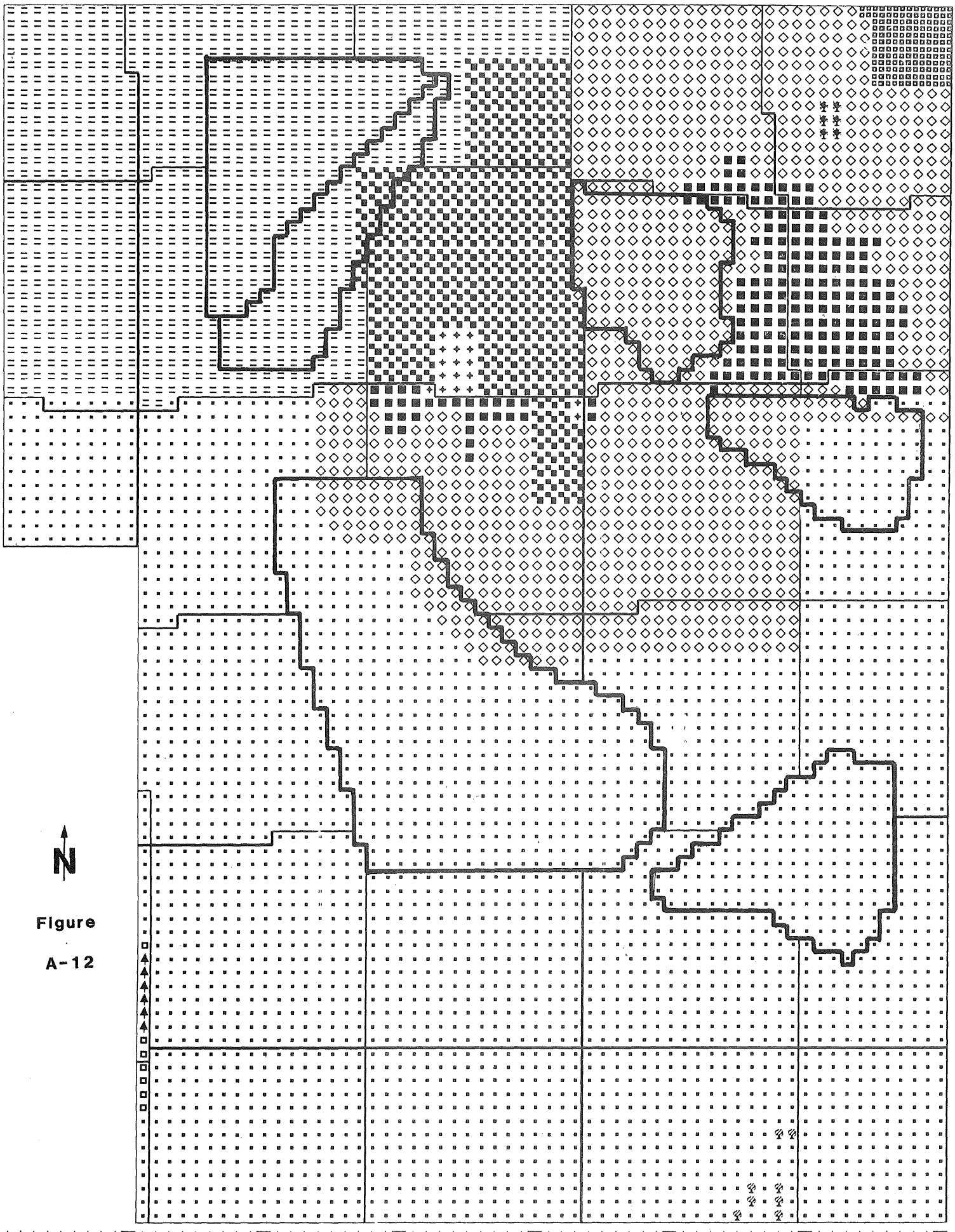
1 KILOMETER = 10 CELLS
1 MILE = 16 CELLS.

OGLEBAY NORTON URBAN AND RURAL DEVELOPMENT

	LEV	COUNT	PCT	ACRES	LEGEND
	0	3109	53.6	7679.2	NO DATA
	6	889	15.3	2195.8	MOUNTAIN IRON, UNDEVELOPED
	10	37	0.6	91.3	VIRGINIA, UNDEVELOPED
	11	18	0.3	44.4	LEONIDAS, DEVELOPED
	12	345	5.9	852.1	LEONIDAS, UNDEVELOPED
	13	201	3.4	496.4	EVELETH, DEVELOPED
	14	1174	20.2	2899.7	EVELETH, UNDEVELOPED
	15	6	0.1	14.8	IRON JUNCTION, DEVELOPED
	16	7	0.1	17.2	IRON JUNCTION, UNDEVELOPED
	19	8	0.1	19.7	UNINCORPORATED DEVELOPED AREAS
	20	6	0.1	14.8	CEMETARIES



Figure

A-12

IRIS

IRON RANGE INFORMATION SYSTEM

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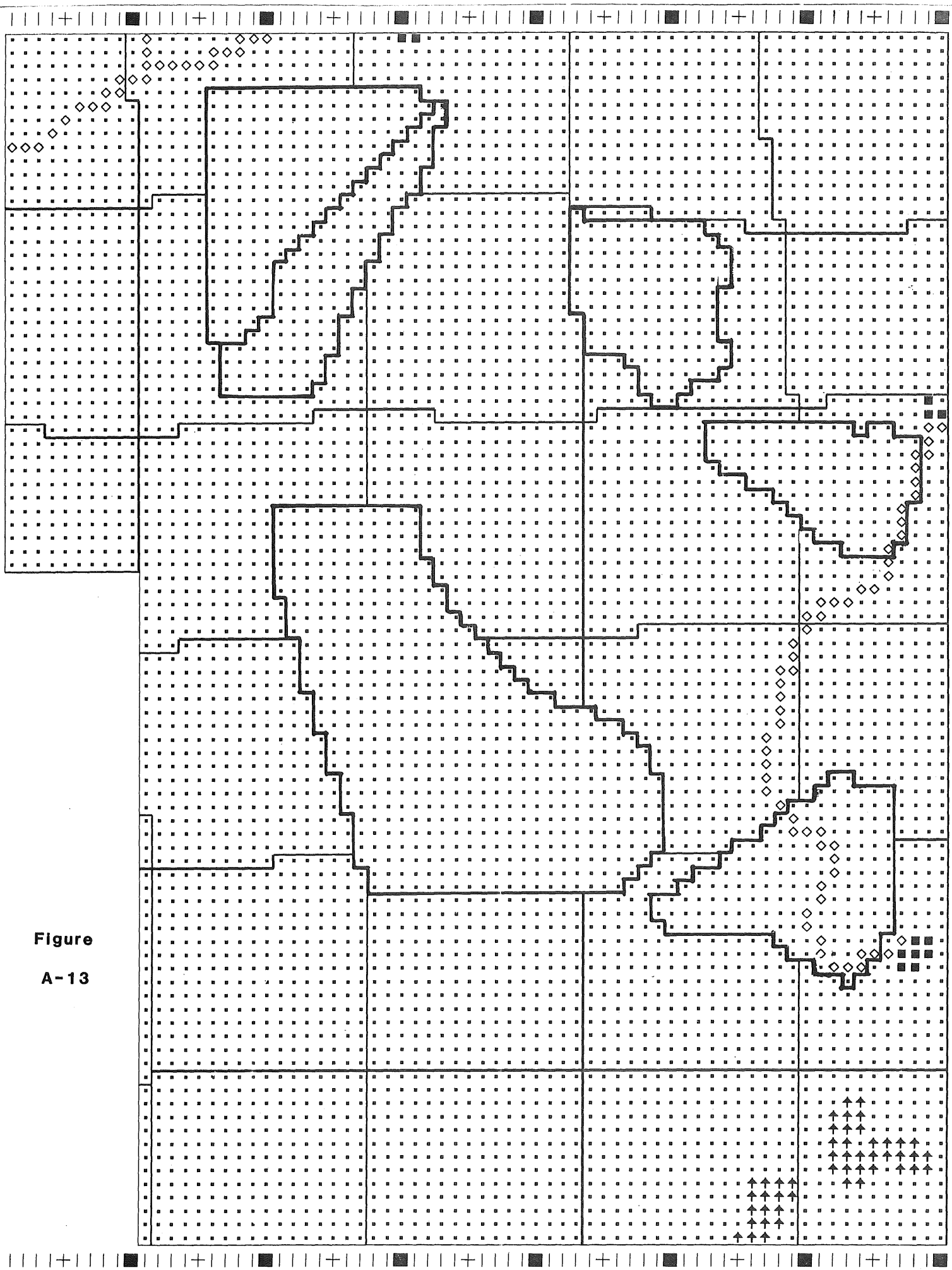
1 KILOMETER = 10 CELLS.
1 MILE = 16 CELLS.

OGLEBAY NORTON WILDLIFE AND NATURAL AREAS

	LEV	COUNT	PCT	ACRES	LEGEND
▪ ▪ ▪	0	5656	97.5	13970.3	NO DATA
♦♦♦	1	48	0.8	118.5	LAKE OF FISHERIES RESOURCE VALUE
■■■	2	12	0.2	29.6	WINTERKILL LAKE
◇◇◇	4	84	1.4	207.4	WARM WATER STREAM



Figure

A-13

IRIS

IRON RANGE INFORMATION SYSTEM

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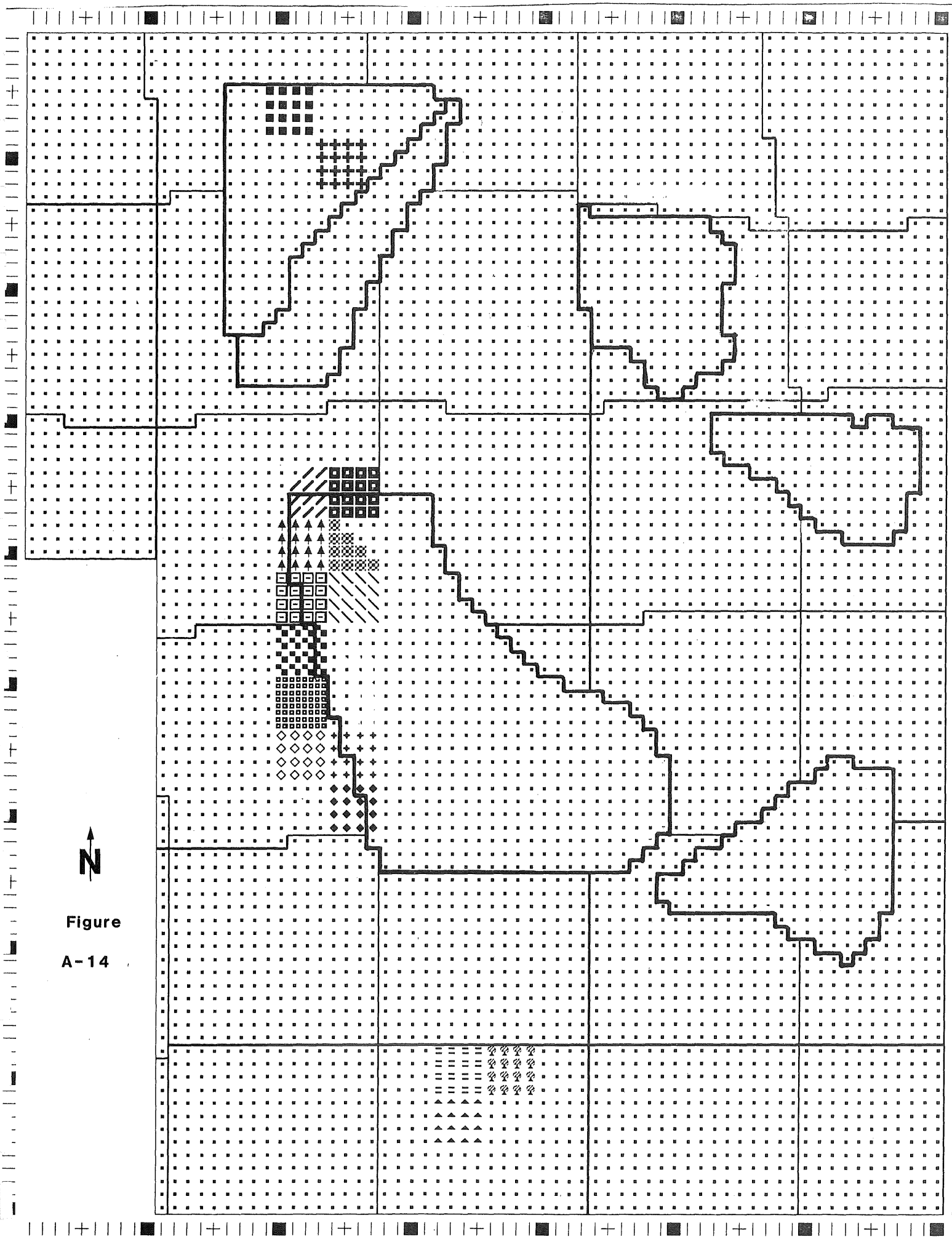
DIVISION OF MINERALS.

1 KILOMETER = 10 CELLS.
1 MILE = 16 CELLS.

PROPOSED FORTY ACRE PARCELS FOR LAND EXCHANGE

	LEV	COUNT	PCT	ACRES	LEGEND
▪ ▪ ▪	0	5555	95.7	13720.8	NO DATA
■ ■ ■	1	16	0.2	39.5	STATE PARCEL NW-NE S26 T58 R18
✚ ✚ ✚	2	16	0.2	39.5	STATE PARCEL SE-SE S26 T58 R18
///	4	11	0.1	27.1	TAX FORFEIT PARCEL SW-NE S2 T57 R18
◘ ◘ ◘	5	16	0.2	39.5	STATE PARCEL SE-NE S2 T57 R18
▲ ▲ ▲	6	16	0.2	39.5	TAX FORFEIT PARCEL NW-SE S2 T57 R18
▩ ▩ ▩	7	10	0.1	24.7	TAX FORFEIT PARCEL NE-SE S2 T57 R18
⊟ ⊟ ⊟	8	16	0.2	39.5	TAX FORFEIT PARCEL SW-SE S2 T57 R18
\ \ \	9	16	0.2	39.5	STATE PARCEL SE-SE S2 T57 R18
▚ ▚ ▚	10	16	0.2	39.5	TAX FORFEIT PARCEL NW-NE S11 T57 R18
▦ ▦ ▦	11	16	0.2	39.5	TAX FORFEIT PARCEL SW-NE S11 T57 R18
◇ ◇ ◇	12	16	0.2	39.5	TAX FORFEIT PARCEL NW-SE S11 T57 R18
✦ ✦ ✦	13	16	0.2	39.5	TAX FORFEIT PARCEL NE-SE S11 T57 R18
◆ ◆ ◆	14	16	0.2	39.5	TAX FORFEIT PARCEL SE-SE S11 T57 R18
= = =	15	16	0.2	39.5	TAX FORFEIT PARCEL NE-NW S24 T57 R18
❦ ❦ ❦	16	16	0.2	39.5	TAX FORFEIT PARCEL NW-NE S24 T57 R18
▲ ▲ ▲	17	16	0.2	39.5	TAX FORFEIT PARCEL SE-NW S24 T57 R18



Figure

A-14