

SELECTED DEVELOPMENTS
IN WISCONSIN'S MINERAL INDUSTRY IN 1992

Thomas J. Evans
1993

Wisconsin's mineral industry in 1992 was characterized by record production of nonmetallic minerals and mineral commodities, new legislation affecting metallic mineral and oil and gas production, oil and gas exploration in northern Wisconsin, slumping metallic mineral leasing activity, and the resolution of several issues affecting the Flambeau Mine and Crandon Project in the courts. Construction of Flambeau Mine began; evaluation of other metallic mineral projects continued.

Wisconsin nonfuel mineral production

According to the U.S. Bureau of Mines statistics for nonfuel mineral production, Wisconsin ranked 36th in the nation and reported record values (table 1) in 1992. The annual total was estimated to be in excess of \$218 million, an increase of 2 percent above the 1991 level of nearly \$214 million. An increase in crushed stone production, the state's leading mineral commodity in terms of volume and value of production, was offset partly by a decrease in production of sand and gravel, lime, and dimension stone. Sales of peat increased in 1992.

Mineral statistics are collected by the U.S. Bureau of Mines under a cooperative agreement with the Wisconsin Geological and Natural History Survey, University of Wisconsin-Extension.

Actions with policy implications

Legislature acts on three bills. Three bills introduced late in 1991 were passed in 1992. These new statutes may affect the existing metallic mineral industry and the still-to-be-developed oil and gas industry. The three new laws are 1991 Wisconsin Act 259, 1991 Wisconsin Act 260, and 1991 Wisconsin Act 262.

Act 259, introduced as Assembly Bill 661, affects regulation of metallic mining and the manner in which the Investment and Local Impact Fund Board may distribute certain payments. Act 259 includes provisions that require the development of an Environmental Impact Statement for any metallic mining project, specifies the inclusion of an evaluation of long- and short-term impacts of certain socio-economic parameters, broadens the types of municipalities potentially eligible to negotiate local agreements, and requires state agencies to assist in the enforcement of local agreements in those areas "within the expertise" of the agency. The focus of Act 259 is the provision for up to \$150,000 to be made available to eligible communities to cover costs associated with the negotiation of local agreements with mining companies that have filed a Notice of Intent to Collect Data to Support a Mining Permit Application. This guarantee of funds helps ensure that local municipalities eligible to develop such an agreement have the necessary resources to support their participation.

Act 260 was the result of extensive discussion inside and outside the Legislature regarding how consideration of a mining company's past environmental track record can be included in a metallic mining-permit application review. Introduced as Senate Bill 240, this proposal specified the manner by which *what* an applicant for a mining permit has done in the past can be lawfully considered, and *how* such past activities can affect a decision to grant a mining permit in Wisconsin, regardless of *where* in the United States that environmental track record was developed.

Act 262 was enacted by the Legislature in response to the public attention given to exploration initiatives for oil and natural gas in northern Wisconsin. This bill, introduced as Assembly Bill 701 and Senate Bill 366, included a severance tax of 7 percent of market value on oil and gas produced in the previous year. In addition, the new law provides for the regulation of oil and gas exploration and production by the Wisconsin Department of Natural Resources (DNR) and the development of administrative rules to put this statutory authority into effect.

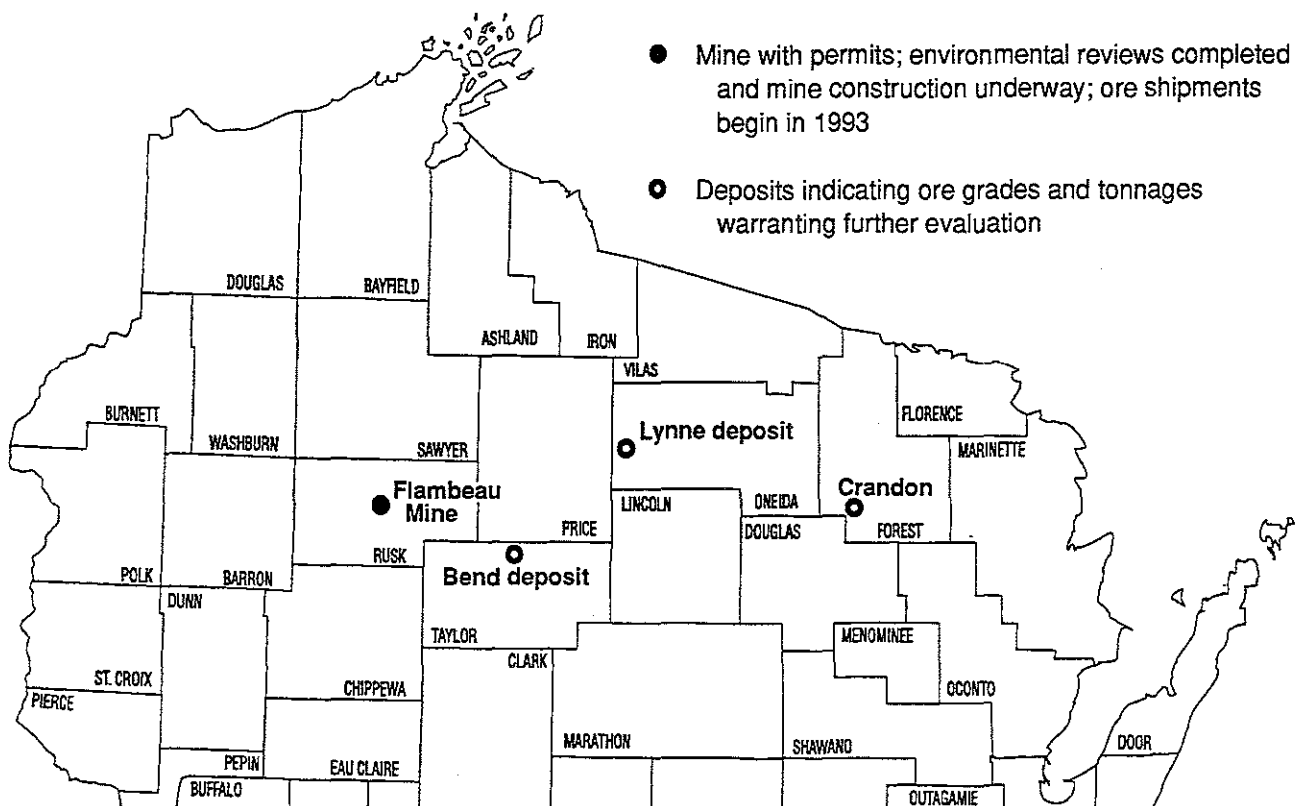


Figure 1. Sites of major metallic mineral projects in Wisconsin.

Courts hand down three decisions in 1992. 1) The Circuit Court of Dane County acted upon a lawsuit seeking to stop an oil and gas exploration well in northern Wisconsin. 2) State courts decided one case that related to the Flambeau Mine project, which allowed construction on the project to resume. 3) The U.S. District Court announced its decision on a long-standing action related to the land on which the Crandon orebody, owned by Exxon Minerals Company, is located.

1) In March 1992 the Lac Courte Oreilles Band of Lake Superior Chippewa Indians (LCO) sought a stay of the DNR decision to grant a permit to Terra Energy, Ltd., to construct an oil and gas exploration drillhole in Bayfield County and filed a motion for injunctive relief in the Circuit Court of Dane County, Branch 8. However, Terra Energy proceeded with construction of the exploration drillhole in compliance with the approval and permit it had received one month earlier from the DNR. After a hearing on the LCO motions, the Court issued a decision and order denying the motions for a temporary restraining order and stay. The Court's decisions on the original actions were in draft stage on March 30 when Terra Energy informed the Court that it had completed its drilling activity and was providing notice of its intent to abandon the drillhole and drilling site.

2) The LCO and the Sierra Club brought a motion for preliminary injunctive relief seeking to stop construction of the Flambeau Mine (fig. 1). This action followed the decision by the DNR that the Supplemental Environmental Impact Statement (SEIS) for the Flambeau Mine project, which focused on the potential impact of the project on threatened and endangered species near the proposed mine site, was an adequate assessment of this issue under the Wisconsin Environmental Policy Act. The Dane County Circuit Court held a hearing on the various issues raised by the LCO and Sierra Club and by the DNR in its motion to dismiss. Basically, the Court found that the SEIS was a discretionary act within the department's authority and requests for actions opposing the SEIS acceptance were without basis in several respects. The Court concluded that the proposed mining would not cause "imminent or irreparable harm." These decisions essentially allowed the Flambeau Mining company to continue construction of the mine site in accordance with the permits and conditions granted by the DNR in early 1991. (See *Metallic mineral developments* section for further information.)

3) The U.S. District Court of the Eastern District of Wisconsin issued a decision on *Sokaogon Chippewa Community v. Exxon Corporation, State of Wisconsin, Forest County, Langlade County, and Oneida County* in September 1992. This action was initiated in 1986 and, after a series of procedural activities, oral arguments were heard in 1991. The focus of the case was the disposition of treaty-related rights on a 12- by 12-mile land parcel within which lie parts of three Wisconsin counties, state-owned land, and the Crandon zinc-copper massive-sulfide orebody (fig. 1). The Court ruled that the Sokaogon Chippewa Community no longer retains the right to possess and occupy off-reservation lands within this area and, even if such rights had been retained, they would not be able to exercise those rights; therefore, the Court issued a summary judgement in favor of the defendants.

Metallic mineral developments

Construction of Flambeau Mine resumes. The completion of the DNR evaluation of the proposed mine's impact on threatened and endangered species near the mine site and the resolution of *LCO and Sierra Club v. DNR* resulted in the resumption of construction activities on the Flambeau Mining Company property south of the City of Ladysmith in Rusk County (fig. 1).

The 1.9-million ton massive-sulfide orebody averages 10.5 percent copper and 0.1 ounce of gold per ton and will be mined over a six-year period. When fully operational, the mine will include a 32-acre open pit, two temporary stockpiles for storage of low- and high-sulfur waste rock, topsoil stockpiles, a water-treatment plant for water that has been in contact with ore or high-sulfur mine wastes and other sources of contamination, and a rail-based ore-loading facility. The copper and gold ore will be shipped to Canada for further processing.

During 1992, the Flambeau Mining Company completed development of its erosion-control plan, which had been partially halted during legal proceedings, and completed nearly all of the surface-preparation work on the mine-waste-disposal facilities and the water-treatment facilities. Final construction and approval of these facilities by the DNR was anticipated in early 1993, with initial ore extraction to begin in May 1993.

The Flambeau Mine is the first new mine permitted under the state's revised regulatory program for metallic mining.

Plans for Lynne deposit put on hold. In January, Noranda Minerals-Wisconsin Corp. filed a Notice of Intent to Collect Data to Support a Mining Permit Application for its Lynne deposit, a zinc-lead-silver massive-sulfide orebody of about 5.8-million tons (fig. 1). The minable reserve for the orebody averages 8.94 percent zinc, 1.66 percent lead, 2.3 ounces of silver per ton, 0.42 percent copper, and 0.02 ounces of gold per ton. A public information meeting concerning the Notice of Intent was held in April. In the summer of 1992, the DNR provided Noranda with a preliminary position regarding the presence and extent of lakebeds on the mine site and spent much of the rest of the year developing data on this issue. Later in the year, Noranda announced the suspension of baseline environmental studies for the Lynne Project pending resolution of the lakebed jurisdictional issues and the emergence of a more clear mine permitting schedule.

Other mineral projects experience little activity. Two other metallic mineral projects received little attention in 1992: the Bend Project of the Jump River Joint Venture in Taylor County and Exxon Coal and Minerals Company's Crandon Project in Forest County (fig. 1).

Bend Project work in 1992 focused on the completion of seven drillholes and identification of additional financial participation in the joint venture under which this 3.6-million ton copper-gold massive-sulfide orebody would be developed. The deposit is entirely within the Chequamegon National Forest.

Exxon Coal and Minerals Company and Phelps Dodge Mining Company announced in August that a joint evaluation of the Crandon Project was underway to determine the feasibility of developing a mining operation on this 67-million ton zinc-copper massive-sulfide orebody. In December, Exxon announced that the joint evaluation had determined that the mine was environmentally and financially feasible, but that Phelps Dodge had decided not to pursue this project. Exxon indicated that it intended to continue to seek a partner for the Crandon Project.

Metallic mineral leasing. Eleven counties in Wisconsin had metallic mineral leasing activity in 1992, and despite what appear to be near record levels of new acreage leased (tables 2 and 3), the leasing activity actually indicates a strikingly depressed level of interest. The reason for this apparent contradiction in level of new acreage leased and the sense of a depressed leasing market is the influence of a single transaction in Forest County. In Forest County, M & W Minerals Company exercised an option to lease 41,675 acres—a single

transaction that account for nearly 77 percent of the state's total new acreage leased in 1992. With the exception of this transaction, the level of new acreage leased is the lowest since the mid-1980s metals-markets depression. Nearly 30,000 acres of land were specifically terminated from leases during 1992; this primarily reflects the August withdrawal of Noranda Exploration from metallic mineral exploration activity in the state.

Items of interest by county include the following: 1) a short-term option between M & W Minerals, a Louisiana firm, and the Chicago & Northwestern Transportation Company (C & NW) for severed mineral interests held by C & NW was enacted in June in Bayfield, Forest, Florence, Langlade, Marathon, and Oneida counties—more than 270,000 acres were included in the option that was ultimately exercised on 41,675 acres in Forest County; 2) in Oneida County, where Noranda maintains an interest in county land associated with the Lynne deposit, Noranda and E.K. Lehman and Associates terminated leases on more than 9,400 acres of other public and private acreage; 3) in Marinette County, 6,400 acres were leased from the county by Noranda in 1992; and 4) in Iron County, 1,400 acres were leased from the county by Cominco American Resources in 1992.

For leases recorded in 1992, financial terms remained similar to previous years. Annual rental payments commonly begin at \$5 per acre per year and are typically graduated to higher payment levels in successive lease years. Purchase option agreements generally include annual rental payments and a purchase price of approximately \$2,000 per acre.

Metallic mineral exploration. Exploration activity in 1992 continued at a modest level (tables 4, 5, and 6). Twenty-four exploratory drillholes were completed in 1992; seven of these were drilled for the Bend Project (fig. 2).

Thirty drillholes completed primarily for grade and tonnage control purposes on the Flambeau Mine property were drilled and abandoned in accordance with the requirements of the mining permit and Ch. NR 130, Wisconsin Administration Code, in 1992. The 30 drillholes accounted for a total footage of 6,109 feet, of which 5,182 feet reached bedrock. Additional grade-tonnage drilling activity is expected throughout the active mining phase of this project.

Oil and gas developments

Terra Energy constructs well to evaluate Precambrian oil potential. The DNR released its environmental assessment for Terra Energy's proposed drilling in February and granted the approval permit to proceed with well construction at that time (fig. 2). The well, Terra/Patrick 7-22, in Keystone Township (T47N, R6W) in Bayfield County, was started in early March and was completed at a depth of 4,700 feet in the Copper Harbor Conglomerate on March 30. This exploration was the first drilling activity associated with the Midcontinent Rift System in Wisconsin and was the third exploratory drillhole completed in that part of the rift extending from Kansas to Iowa to Minnesota to Wisconsin and into the Upper Peninsula of Michigan. Interpretations of reflection seismic data showed the target to be the crest of a large anticline in Oronto Group sedimentary rock. The drillhole was completed in what has been interpreted to be Copper Harbor Formation, the basal conglomerate of the Oronto Group.

The well was abandoned in accordance with DNR regulations shortly thereafter. No further plans for continued exploration were announced.

Oil and gas production rules in development. The DNR was directed by the Legislature in 1991 Wisconsin Act 262 to develop administrative rules regulating the exploration and production of oil and gas to protect environmental resources and prevent waste of the oil and gas resource. The DNR contracted with the Wisconsin Geological and Natural History Survey for preparation of a proposed draft of rules for the DNR's consideration in 1993.

Oil and gas leasing. Leasing for oil and gas exploration and production occurred in three counties: Bayfield, Door, and Kewaunee. Terra Energy leased nearly 9,400 acres; more than 24,800 acres were included in lease extensions. About 22,600 acres owned by Bayfield County are included in these lease extensions. Bayfield County leasing activity focused on areas of interest to Terra Energy and occurred early in 1992, prior to the completion of Terra/Patrick 7-22 in late March.

More than 5,000 acres of land in Kewaunee and Door Counties were leased. No plans for actual exploration are known at this time, because no companies or individuals are licensed for oil and gas exploration and production in Wisconsin (table 6).

Table 1. Nonfuel mineral production in Wisconsin, 1990-92¹

Mineral	1990		1991		1992 ²	
	Quantity (in thousand short tons)	Value (in millions of dollars)	Quantity (in thousand short tons)	Value (in millions of dollars)	Quantity (in thousand short tons)	Value (in millions of dollars)
Lime	461	\$24.608	536	\$23.225	506	\$21.925
Peat	12	0.256	9	227	W ³	W
Sand and gravel						
Construction	29,572	73.750	29,600	77.500	27,700	74.000
Industrial	W	W	W	W	W	W
Stone						
Crushed	26,600	91.000	23,676	80.475	25.500	89.300
Dimension	31	3.811	37	4.347	36	4.227
Combined value of other industrial minerals and values indicated by symbol W	NA	18.622	NA	27.533	NA	28.687
Total	NA ⁴	212.047	NA	213.849 ⁵	NA	218.146

¹ Production as measured by mine shipments, sales, or marketable production (including consumption by producers).

² Estimated.

³ Withheld to avoid disclosing company proprietary data; value included with "Combined value" figure.

⁴ Not applicable.

⁵ Partial total; excludes values that must be concealed to avoid disclosing company proprietary data.

Table 2. New acreage acquired for metallic mineral exploration and acreage for which leases or options were terminated, by county and company, in 1992¹

County	BHP-Utah International		Cominco American Resources		E.K. Lehmann and Assoc. of Wis.		Jump River Joint Venture		Noranda Exploration		Phelps Dodge Exploration East		Totals ²	
	Leased	Term.	Leased	Term.	Leased	Term.	Leased	Term.	Leased	Term.	Leased	Term.	Leased	Term.
Clark	0	0	120	0	0	0	0	0	0	0	0	0	120	0
Florence	0	0	0	0	0	0	0	0	0	5,232	0	0	0	5,232
Forest	0	0	0	0	0	0	0	0	0	7,696	0	0	41,675	7,696
Iron	0	0	1,400 ³	0	0	0	0	0	0	0	0	0	1,400 ³	0
Langlade	0	0	120	0	0	0	0	0	0	0	0	0	120	0
Lincoln	0	0	0	0	0	668	0	0	1,347	615	190	0	1,537	1,283
Marathon	1,293	462	0	0	0	0	0	0	0	1,673	0	45	1,293	2,180
Marinette	0	562	0	0	0	0	0	0	6,383 ³	0	0	0	6,383 ³	562
Oneida	0	0	0	0	0	320 ⁴	0	660	0	9,403	0	0	0	10,383 ⁴
Price	0	0	320	0	156	824 ⁴	0	0	0	0	0	0	477	824 ⁴
Rusk	0	0	0	0	280	862	0	0	0	0	0	0	280	862
Taylor	0	0	2,080	0	0	271	240	0	0	0	0	0	2,320	271
Totals ²	1,293	1,024	4,640	0	436	2,945 ⁴	240	660	7,730	24,619	190	45	55,605 ⁵	29,293

¹ Acreage shown has been rounded off to the nearest whole acre.

² Numbers in columns may not add up to indicated total due to independent rounding of individual county figures.

³ Acreage shown was terminated early in 1993; held for less than one calendar year.

⁴ Estimated amount; accurate to within ±5 acres.

⁵ Total includes 41,675-acre purchase option exercised by M & W Minerals on severed mineral interests formerly held by C&NW Transportation Company.

Table 3. New mineral acreage contracted for leasing, by year

Year	Metallic mineral transactions (total new acreage)	Oil and gas transactions (total new acreage)
1978	81,596	-
1979	16,417	-
1980	51,211	-
1981	29,465	-
1982	18,489	-
1983	14,099	24,002
1984	3,136	196,408
1985	1,270	479,012
1986	1,566	19,335
1987	10,122	18,029
1988	7,137	-
1989	19,524	-
1990	33,555	-
1991	49,075	16,261
1992	55,605 ²	14,618

¹Totals do not indicate land currently under lease due to terminations of leases and lapse of the term of lease.

²Total includes a single transaction of 41,675 acres in Forest County.

Table 4. Metallic mineral exploration summary, 1988-92

	1988	1989	1990	1991	1992 ¹
Companies licensed to drill ²	9	8	8	9	8
Newly licensed companies ²	1	0	1	3	0
Companies conducting drilling programs	5	4	3	4	6
Total counties with drilling activity	5	6	2	8	8
Total holes drilled (development drilling) ³	48 (19)	45 (0)	72 (68)	128 (111)	24 (7)
Total footage drilled (development drilling)	23,577 (2,258)	26,937 (0)	35,875 (33,582)	94,321 (84,179)	22,585 (11,005)
Total bedrock footage (development drilling)	19,697 (1,239)	23,935 (0)	30,862 (28,887)	85,317 (81,146)	19,332 (10,055)

¹Does not include Flambeau Mining Company drilling on their Rusk County property under the Flambeau Mine permit.

²An exploration license may be obtained at any time, but expires July 1st. These totals include companies licensed all or part of the indicated calendar year.

³Numbers in parentheses refer to drilling at known mineral deposits. Totals include figures listed for development drilling.

Table 5. Metallic mineral exploration in 1992, by company and county

Company	Drillholes	Bedrock footage	Total footage
ASARCO, Inc.	4	2,786	3,387
BHP-Utah International	4	2,416	3,073
Cominco American, Inc.	3	1,962	2,438
E.K. Lehmann and Associates of Wisconsin, Inc.	7	9,334	10,305
Noranda Exploration Inc.	3	982	1,318
Phelps Dodge Exploration East	3	1,852	2,064
Total	24	19,332	22,585
County			
Forest	2	724	1,000
Iron	3	1,962	2,438
Lincoln	6	3,576	4,242
Marinette	1	378	403
Oneida	2	599	827
Price	3	2,038	2,670
Taylor	7	10,055	11,005
Total	24	19,332	22,585

Table 6. Mineral exploration licensees, 1992¹

Mineral

License number	Company	License number	Company
1	Exxon Coal and Minerals Company	29	Chevron Resources Co. ²
3	Noranda Exploration, Inc.		
5	E.K. Lehmann and Associates of Wisconsin, Inc.	33	Phelps Dodge Exploration East
		34	Cominco American Resources
28	BHP-Utah International, Inc.	35	Asarco, Inc.

Oil and gas

License number	Company	License number	Company
OG-1	Terra Energy, Ltd. ²	OG-2	Badger State Oil Co., Ltd. ²

¹ Companies listed were licensed to explore for metallic minerals or oil and gas in Wisconsin for all or part of 1992. License numbers not listed represent licenses issued previously to companies that did not renew their license for any part of the 1992 calendar year.

² License not renewed for license year July 1992 to June 1993.

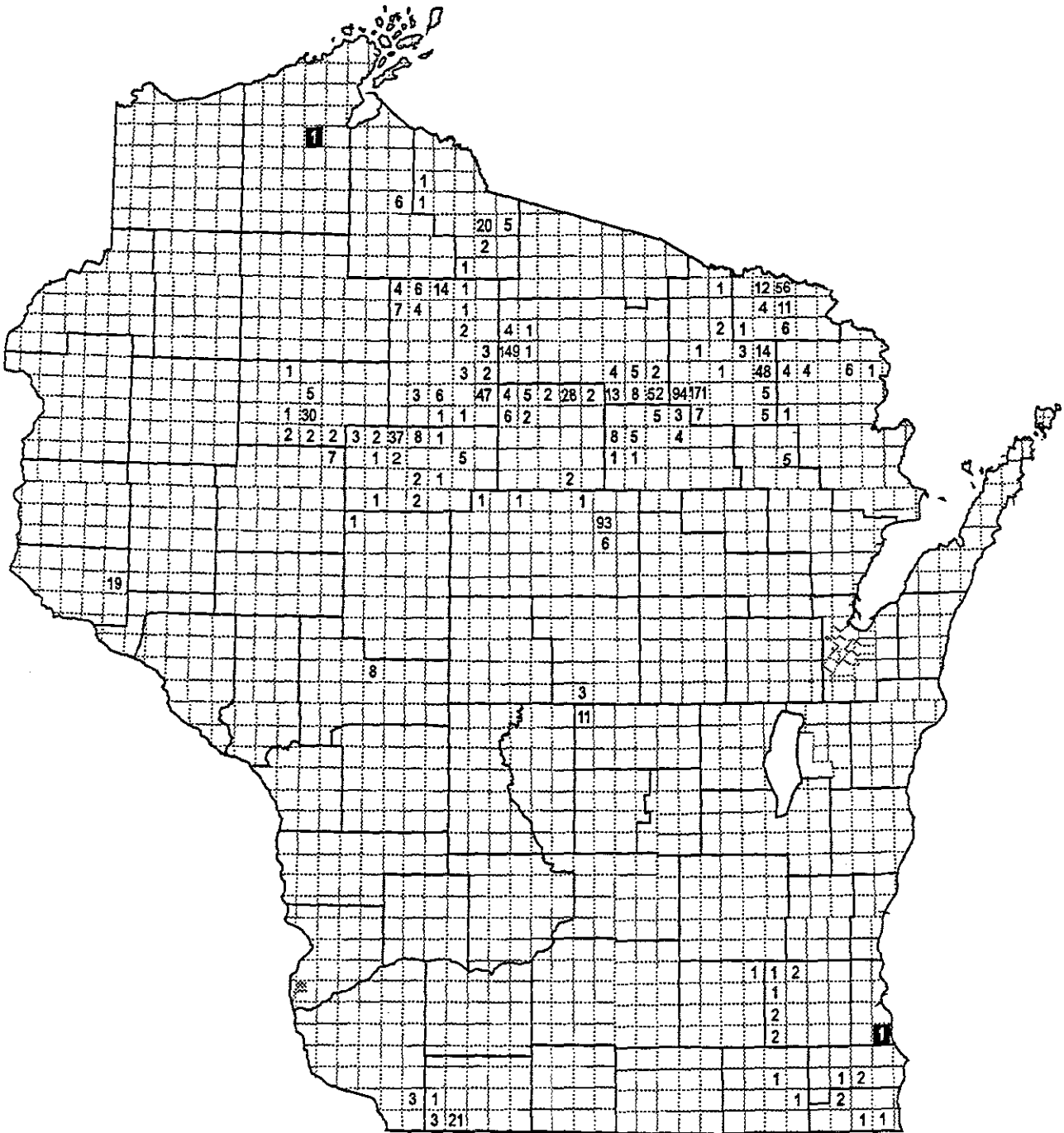


Figure 2. Mineral exploration in Wisconsin, by township, 1977-92. The number of metallic mineral drillholes drilled in a township is shown by arabic numbers; oil and gas exploration drillholes, by the number in reverse (white with black background). All drillhole data are from public records (drillhole abandonment reports submitted by mineral exploration companies to the Wisconsin Department of Natural Resources).

Published by and available from
UWEX University of Wisconsin—Extension
GNHS Wisconsin Geological and Natural History Survey
 3817 Mineral Point Road • Madison, Wisconsin 53705-5100
 James M. Robertson, Director and State Geologist

UW—Extension provides equal opportunities in employment and programming, including Title IX requirements.