

SELECTED DEVELOPMENTS IN WISCONSIN'S MINERAL INDUSTRY IN 1995

Thomas J. Evans 1996

Significant activity affecting the metallic and nonmetallic mineral industries in Wisconsin occurred in 1995. Nonfuel mineral production value reached a record level of more than \$441 million. For the metallic mining industry, the successful operation of the Flambeau Mine and the continuing evaluation of the Crandon Mining Company project in Forest County highlighted the year. For the nonmetallic mining industry, activity related to evaluating the potential for diamond resources and the ongoing review of proposed administrative rules to regulate nonmetallic mining reclamation were principal areas of interest.

WISCONSIN NONFUEL MINERAL PRODUCTION

According to the U.S. Bureau of Mines (USBM) statistics for nonfuel mineral production (table 1), the preliminary value of Wisconsin's nonfuel mineral production in 1995 was \$441,227,000—the largest single-year mineral production value in the history of the state. The largest contributor to this production figure is the combined value of copper, gold, and silver from the Flambeau Mining Company's open-pit mine near Ladysmith, Wisconsin. Other significant contributors to the record 1995 value include construction sand and gravel, which was more than \$100 million, and crushed stone, valued at about \$114 million. Other nonfuel mineral commodities, as identified by the USBM, produced in 1995 included gemstones, lime, peat, industrial sand and gravel, silica stone (crushed quartzite), and dimension stone.

Mineral production and value statistics were collected by the USBM under a memorandum of understanding with the Wisconsin Geological and Natural History Survey. In early 1996, the USBM was terminated as a separate federal agency within the U.S. Department of Interior. The mineral statistics

functions of the former USBM were transferred to the newly created Office of Minerals Information in the U.S. Geological Survey (telephone 703/648.4758).

ACTIONS WITH POLICY IMPLICATIONS

Legislative activity. In 1995, five bills related to metallic mining were introduced in the Wisconsin Legislature; several of these bills had been introduced in previous legislative sessions. *Assembly Bill 336* relates to groundwater-quality standards applicable to metallic mining operations (currently identified in NR 182, Wis. Admin. Code) and seeks to require that such mining operations be subject to the groundwater-quality standards currently specified in NR 140. *Assembly Bill 336* has been introduced several times previously, but failed to pass both houses of the Legislature. *Assembly Bill 337* is known as the "bad actor" bill and seeks to extend existing statutory provisions that allow consideration of a mining company's previous environmental track record in making decisions on granting permits for proposed mining projects in Wisconsin. *Assembly Bill 337* is similar to proposed legislation that has previously failed to be adopted. *Assembly Bill 338* would prohibit the granting of exceptions or variances to the Wisconsin Department of Natural Resources (DNR) rules, an action currently permitted upon a showing that the requested exception or variance would not result in the failure to meet any other environmental standard or rule. The elimination of the exception or variance language concept, as proposed in AB 338, has been introduced several times in recent years. *Assembly Bill 339* and companion bill, Senate Bill 307, would prohibit metallic mining on land owned and managed by the DNR. Similar provisions have been considered in the Legislature before and on one occasion reached the Governor, who vetoed the legislation. *Assembly Bill*

758 was introduced at the end of the year and provides for a moratorium on granting a metallic mining permit until a mining-permit applicant can successfully demonstrate that a sulfide mine has operated for a period of at least 10 years and has been reclaimed for a similar period of time and during which there has been no evidence of contamination of groundwater or surface water. Assembly Bill 758 and the other four bills have been referred to committees in the State Assembly, where action is pending.

Activity in the courts. In 1995, the Rusk County Citizens Action Group successfully challenged a DNR Board ruling that the DNR did not have authority to ban mining of sulfide minerals. The challenge was filed in the Rusk County Circuit Court, which found that sufficient authority to enact such

a ban was embodied in the current statutes and that the DNR Board must consider the substantive merits of a 1994 petition filed by the group seeking a categorical ban on the mining of sulfide minerals. At the end of the year, the DNR was preparing to appeal the circuit court decision.

METALLIC MINERAL DEVELOPMENTS

JCIC reclamation partially completed. Jackson County Iron Company's open-pit taconite mine-mill complex west of Black River Falls produced taconite pellets from 1969 to 1982; the mining site has been undergoing reclamation since 1982. Currently, the site is substantially reclaimed and is being used as a major new county park and recreational facility. In 1995, the reclamation plan for the site was modified

Table 1. Nonfuel mineral production in Wisconsin, 1993–95¹. (Source: the former U.S. Bureau of Mines; now U.S. Geological Survey, Office of Mineral Information)

Mineral	1993		1994		1995 ²	
	Quantity (in thousand metric tons)	Value (in millions of dollars)	Quantity (in thousand metric tons)	Value (in millions of dollars)	Quantity (in thousand metric tons)	Value (in millions of dollars)
Gemstones	NA ³	\$0.045	NA	\$0.053	NA	\$0.065
Lime	511	30.880	507	30.275	543	32.813
Peat	W ⁴	W	2	0.061	W	W
Sand and gravel						
<i>Construction</i>	27,600	82.800 ⁵	29,224	91.518	31,000	100.700
<i>Industrial</i>	1479 ⁶	31.399 ⁶	1,627	32.408	1,627	32.408
Stone						
<i>Crushed</i>	26,248 ^{5,7}	98.026 ^{5,7}	28,505 ⁷	114.2737	28,200 ^{5,7}	114.000 ^{5,7}
<i>Dimension</i>	122 ⁵	13.098 ⁵	118	14.886	128 ⁵	15.553 ⁵
Combined value of other industrial and metallic minerals and values indicated by symbol W	— ⁸	57.064	—	126.212	—	145.608
Total value	—	313.312⁶	—	409.686	—	441.227

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

² Preliminary.

³ Not available.

⁴ Data withheld to avoid disclosing company proprietary data; value included with "Combined value" data.

⁵ Estimated.

⁶ Revised.

⁷ Excludes certain stones; value included with "Combined value" data.

⁸ Not applicable.

to allow for the retention of certain facilities, such as the water-supply well and pumphouse and some of the access roads that were incorporated into the county park itself. The final permitted land use for the site was changed from light recreation and wildlife habitat to public recreational use. In addition, much of the former mining site was certified as fully reclaimed (a certificate of completion was issued by the DNR) following a hearing held in November. The remaining parts of the site—unconsolidated parts of pit walls, waste-rock dump 1, and the old plant site—were submitted to the DNR as reclaimed by the mining company in early 1996; there is a mandatory four-year waiting period before a certificate of completion can be issued.

Flambeau Mine continues operations as the state's only metallic mine. Flambeau Mining Company's open-pit copper-gold operation, located just south of the city of Ladysmith in Rusk County (fig. 1), is the only metallic mine in Wisconsin. Dur-

ing the year, production of massive sulfide ore containing enriched concentrations of copper metal and minor quantities of gold and silver remained at near-peak levels (about 380,000 short tons). Three ore types were shipped during the year: gold-bearing gossan and direct-smelting copper ore were shipped to Rouyn, Quebec, for recovery of the metal values and the more typical, although still enriched, copper ore was shipped to Timmins, Ontario, for milling and subsequent metal recovery. Flambeau's 1994 copper production ranked it as the 14th largest copper producer in the United States. (Flambeau's 1995 ranking was not available at the time this report was prepared.)

According to the DNR, no environmental compliance problems were encountered during the year. Flambeau Mining Company was recognized in 1995 for its safety record—employees at the mining site experienced no lost-time accidents since its opening in 1993.

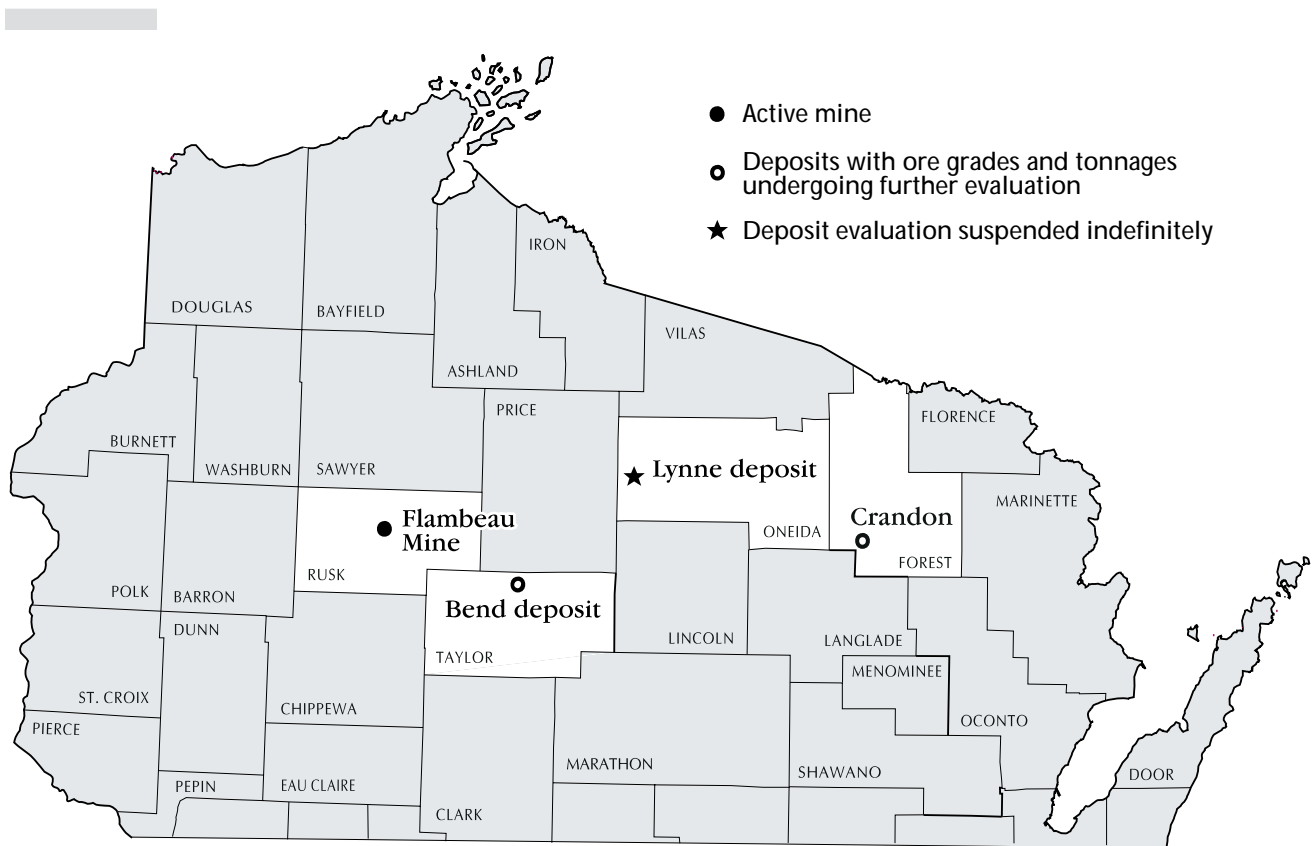


Figure 1. Sites of major metallic mineral projects in Wisconsin.

Flambeau Mining Company reported a payment to the Wisconsin Department of Revenue in excess of \$6.1 million in 1995 for the occupational tax levied on the net proceeds of the Flambeau Mine for calendar year 1994. Payments to local communities included \$150,600 each to the city of Ladysmith and the town of Grant, \$527,100 to Rusk County, and \$5,298,366 to the state of Wisconsin, specifically for the Mining Investment and Local Impact Fund and the Badger Fund. This tax is in addition to other income and employment taxes levied on all Wisconsin corporations.

During 1995 Flambeau Mining Company finished a program of deep exploratory drilling to define deep resources and determined that insufficient metal content was present to warrant any further evaluation of the Flambeau site.

Crandon Mine proposal undergoes continuing evaluation. Crandon Mining Company (CMC), a partnership between Exxon Coal and Minerals Company and Rio Algom Ltd., completed an environmental impact report (EIR) for its proposed underground mine in Forest County (fig. 1). The ore deposit proposed for development is a large copper-zinc massive sulfide deposit that is about 55 million tons in size, with grades of zinc and copper averaging 5 percent and 1 percent, respectively, over the entire ore body. Minor quantities of lead, gold, and silver are also present and recoverable. During 1995, most of the necessary permit applications were completed and the initial environmental assessments performed by CMC were submitted in the EIR. At the end of 1995, the DNR was reviewing the EIR and permit applications to determine their suitability and completeness and had initiated the preparation of the draft environmental impact statement (EIS) on the proposed mine. The major environmental issues still under review were the groundwater modeling program and the location and design of the tailings management area.

The schedule for the ongoing review of the Crandon Mine proposal, as released by the DNR, is to complete the EIR review and review of all permit applications by mid-1996, release the draft EIS and hold the mandatory public informational hearing in the second half of 1996, release the final EIS in early

1997, and convene and complete the Master Hearing on all permits required by the state during the second half of 1997. The decision on state permits is now expected in early 1998.

In 1994, the U.S. Army Corps of Engineers had determined that a separate EIS would be needed regarding the permit decision they must make on CMC's application for a \$404 permit to discharge dredged and fill material into waters of the United States, including wetlands, in conjunction with the development and operation of the proposed Crandon Mine. Public scoping meetings for identification of issues for the EIS were held in January and February of 1995.

Mining impact fund board distributes net proceeds revenues. The Mining Investment and Local Impact Fund Board (MILIFB) reported a year-end balance of about \$2.3 million. This balance was created following an increase in the fund in 1995 of \$4.2 million (most of which originated from payments made by Flambeau Mining Company) minus the encumbrances on and disbursements from the fund to local communities for mining-related impacts, notice-of-intent payments, and first-dollar payments to local communities in the Ladysmith area for 1995 and early 1996. The encumbrances and disbursements totaled about \$2.0 million. The MILIFB, a unit within the Wisconsin Department of Revenue, is responsible for the distribution of certain tax revenues in accordance with the requirements of the state's occupational tax on the net proceeds of metalliferous mining operations.

NONMETALLIC MINERAL DEVELOPMENTS

Administrative rules for reclamation of non-metallic mining operations considered. A series of hearings was held around the state to receive public comments on draft Administrative Rule NR 135, which provides for the reclamation of non-metallic mining operations. The rule had been prepared by the DNR using the advice of a technical advisory committee following the passage of 1993 Wisconsin Act 464 in 1994. The law mandates that all 72 counties adopt ordinances consistent with the requirements of Act 464, sets up a permitting program,

establishes reclamation standards, outlines funding and financial assurance requirements, and provides a mechanism for protection of known mineral deposits. The draft of NR 135 was broadly criticized and at the end of the year the DNR was seeking to develop a new version before returning to the Legislature to obtain corrective legislation.

Wisconsin Act 464 also mandated the creation of a Nonmetallic Mining Council to advise the DNR on its rules and their implementation. The nine-member council was appointed during the year with representation from the nonmetallic mining industry, county zoning officials, and county highway officials.

Several bills have been introduced in the Legislature to modify Act 464 and limit the extent of the nonmetallic mining reclamation program proposed in it. These laws would allow withdrawal of municipalities from the stipulated regulatory program (AB 368), eliminate various requirements of the program as currently promulgated (AB 697), and would modify DNR review of county nonmetallic mining reclamation programs (SB 190). In light of the ongoing review of the program under the auspices of the Nonmetallic Mining Council and the DNR's technical advisory committee, the fate of these legislative proposals is uncertain.

Diamond potential continues to be evaluated. Crystal Exploration Inc. proceeded to evaluate the potential for diamond-bearing kimberlite deposits in the state during 1995. Crystal Exploration is a wholly owned subsidiary of Crystal Mining NL, an Australian company, and holds a minority participating interest in and manages the Lake Superior Venture, a diamond exploration program in the upper Midwest. Other participants include majority-interest owner Ashton Mining of Canada, Ltd. and Dow Chemical Co., a 2.4 percent net profits royalty owner in the program.

Exploration (drilling) activity has focused on geophysically defined targets in southeastern and east-central Wisconsin and on county-owned lands in Marinette County. Leasing of lands in other areas of the state was reported early in 1996. Because diamond exploration involves only nonmetallic minerals, regulation of drilling activity is based on coop-

erative, voluntary arrangements between the exploration company and the DNR. As a consequence, reporting of diamond exploration and leasing activity is probably based on incomplete information.

METALLIC MINERAL LEASING AND EXPLORATION ACTIVITY

Metallic mineral leasing was at a reduced level in 1995 (tables 2 and 3); however, a proposal to lease several thousand acres of county forest land in west-central Wisconsin by Flambeau Mining Company was under consideration. Reportedly, more than 40,000 acres of public and private lands were under consideration in this leasing effort. Eau Claire County declined to lease its lands primarily because exploration and mining were not compatible with the recently adopted 10-year plan for the

Table 2. New mineral acreage contracted for leasing, by year¹. (Data compiled by Wisconsin Geological and Natural History Survey.)

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
1993	1,565	1,284
1994	5,503	—
1995	3,644	—

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

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

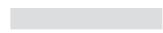


Table 3. New acreage acquired for metallic mineral exploration and acreage for which leases or options were terminated, by county and company, in 1995. (Data compiled by Wisconsin Geological and Natural History Survey.)

Company	BHP Minerals International Inc.		Cominco American Resources Co.		Kennecott Exploration Co.		Sharpe Energy & Resources Ltd.		Totals ³	
	Leased	Term.	Leased	Term.	Leased	Term.	Leased	Term.	Leased	Term.
County										
Clark	0	0	0	396	0	0	0	0	0	396
Florence	0	560	0	0	0	0	0	0	0	560
Forest	843	0	0	0	0	0	0	0	843	0
Iron	0	0	0	701	0	0	0	0	0	701
Lincoln	1,519	0	0	120	0	0	40	45 ²	1,559	165
Marathon	0	1,092 ³	0	0	0	0	0	0	0	1,092
Oconto	0	0	0	0	80	0	0	0	80	0
Oneida	0	0	0	720	0	0	0	0	0	720
Outagamie	0	0	0	0	56	0	0	0	56	0
Price	0	0	0	340	0	0	1,106	0	1,106	340
Taylor	0	0	0	107	0	0	0	40 ²	0	147
Totals²	2,362	1,652	0	2,384	136	0	1,146	85²	3,644	4,121³

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

² Termination of lease held by Cyprus Gold Exploration Corp.

³ Includes a 70-acre lease terminated by Noranda Exploration Inc.

county forest. At year-end, Jackson and Clark Counties were continuing to negotiate regarding their county forest lands. In addition, other private lands in Trempealeau and La Crosse Counties were included in the leasing program.

Metallic mineral exploration proceeded at a moderate rate during the year (fig. 2; tables 4, 5, and 6). Thirty exploration drillholes were completed by three companies. Flambeau Mining Company completed 16 exploratory drillholes evaluating deep mineralization on their Flambeau Mine property and the previously discovered Eisenbrey (Thornapple) massive sulfide orebody located several miles away. BHP Minerals International Inc. drilled nine holes in a variety of targets in Forest and Florence Counties. Sharpe Energy and Resources Ltd. drilled five holes on two properties: the Bend deposit in the Chequamegon National Forest in Taylor County and the Horseshoe deposit in Lincoln County. According to the Society of Economic Geologists Newsletter of April 1995, the Bend deposit contains 3.3 million tons grading 2.05 percent copper, 0.07 ounces per ton gold, and 0.41 ounces per ton silver. The Horseshoe deposit re-

portedly contains about 1 million tons grading 1.95 percent copper, 4.35 percent zinc, 0.78 percent lead, 0.06 ounces per ton gold, and 1.07 ounces per ton silver.

Exploration activity on federal lands. Five exploration drillholes were constructed on federal prospecting permits in Chequamegon and Nicolet National Forests. (Under federal law, prospecting permits are issued for specific land parcels upon which exploratory drilling is likely to occur.) Three holes were located on the lands currently held under the name of Cyprus Gold Exploration Company under their preference-right lease application in the Chequamegon in north-central Taylor County near Perkinstown. This is the Bend copper-gold massive-sulfide deposit that is now under evaluation by Sharpe Energy and Resources Ltd. The other two holes were drilled by BHP Minerals International Inc. on a now-expired prospecting permit in the Nicolet National Forest in Florence County. Fourteen prospecting permits were issued in 1995 with primary terms of two years and six other applications were pending as of December 31st. ■

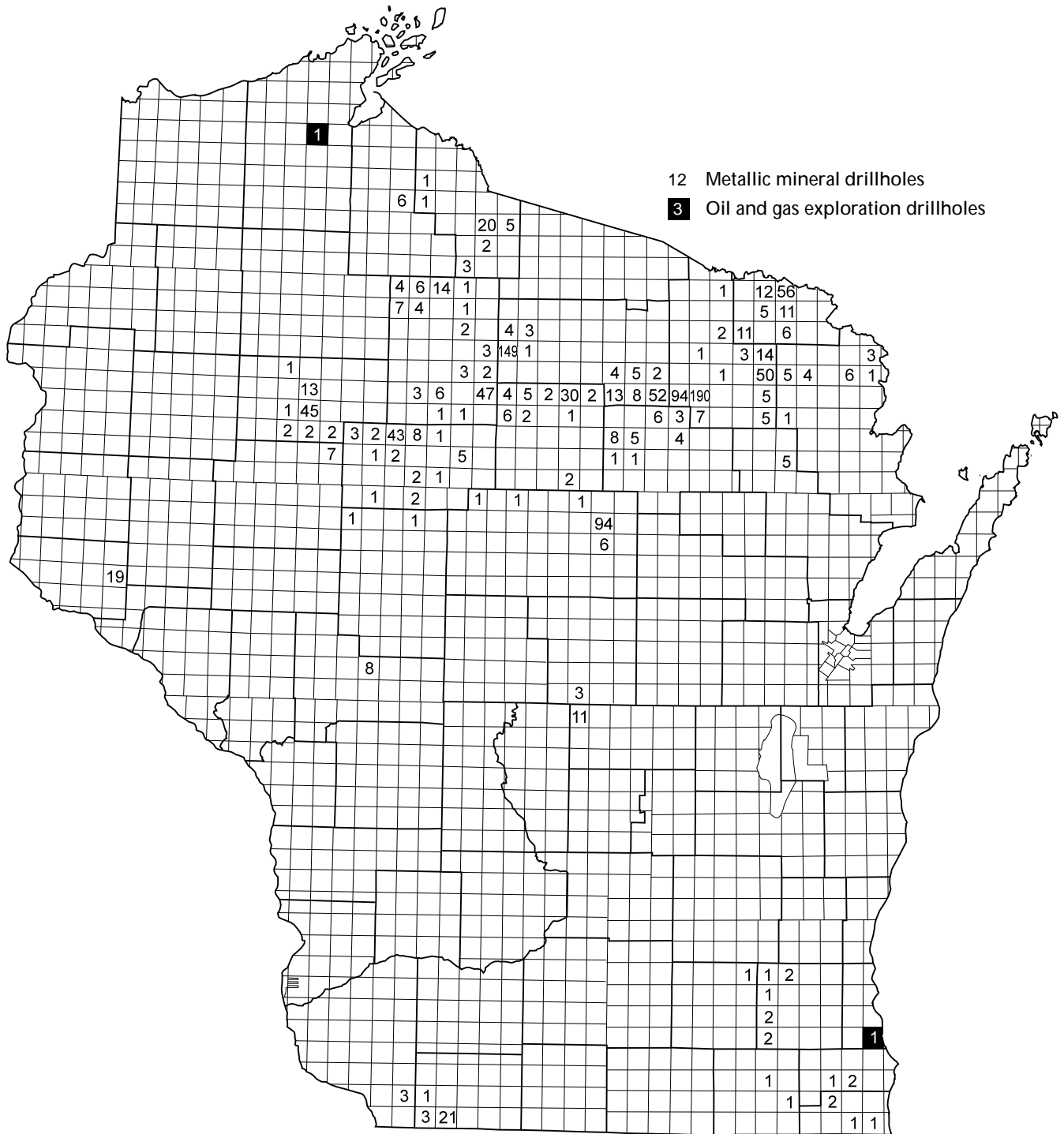


Figure 2. Metallic mineral exploration in Wisconsin, by township, 1977–95. The number of metallic mineral drillholes constructed in a township is shown by arabic numbers; oil and gas exploration drillholes, by the number in reverse (white with black background). All drillhole data are from public records (drillhole abandonment reports submitted by mineral exploration companies to the Wisconsin Department of Natural Resources).

Table 4. Summary of metallic mineral exploration in Wisconsin, 1991–95. (Source: Wisconsin Department of Natural Resources.)

	1991	1992	1993	1994	1995
Companies licensed to drill ¹	9	8	8	9	10
Newly licensed companies ¹	3	0	2	2	1
Companies conducting drilling programs	4	6	4	5	3
Total counties with drilling activity	8	8	5	8	5
Total holes drilled (development drilling) ²	128 (111)	24 (7)	18 (10)	26 (14)	30 (14)
Total footage drilled (development drilling)	94,321 (84,179)	22,585 (11,005)	10,492 (4,493)	34,499 (23,426)	28,809 (6,505)
Total bedrock footage (development drilling)	85,317 (81,146)	19,332 (10,055)	7,405 (3,543)	31,653 (21,658)	26,635 (5,826)

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

² Numbers in parentheses refer to drilling at known mineral deposits, also known as development drilling. Totals include figures shown for development drilling.

Table 5. Metallic mineral exploration in 1995, by company and county (Source: Wisconsin Department of Natural Resources.)

		Drillholes	Bedrock length (in feet)	Total length (in feet)
Company	BHP Minerals International Inc.	9	9,041	9,823
	Flambeau Mining Company	16	15,416	16,011
	Sharpe Energy and Resources Ltd.	5	2,178	2,975
Total		30	26,635	28,809
County	Florence	7	7,153	7,586
	Forest	2	1,888	2,237
	Lincoln	1	920	1,158
	Rusk	16	15,416	16,011
	Taylor	4	1,258	1,817
Total		30	26,635	28,809

Table 6. Metallic mineral exploration licensees, 1995¹. (Source: Wisconsin Department of Natural Resources.)

License number ²	Company	License number	Company
5	E.K. Lehmann and Associates of Wisconsin, Inc.	34	Cominco American Resources Co.
28	BHP Minerals International Inc.	36	Cyprus Gold Exploration Corporation
30	Flambeau Mining Company	37	Crandon Mining Company
33	Phelps Dodge Exploration East Inc.	38	Kennecott Exploration Company
		39	Sharpe Energy and Resources Ltd.
		40	Zavco Inc.

¹ Companies listed were licensed to explore for metallic minerals or oil and gas in Wisconsin for all or part of 1995.

² License numbers not listed represent licenses issued previously to companies that did not renew their licenses for any part of the 1995 calendar year.

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