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Report  
on

Mineral Exploration Expenditures and  
Flow-Through Share Funding

by the  
Intergovernmental Working Group on  
the Mineral Industry

prepared for the  
Mines Ministers' Conference  
Saskatoon, Saskatchewan

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September 1995

## **FOREWORD**

The intent of this report is to present the facts on the current level of mining exploration expenditures and flow-through share financing in Canada. The data and views expressed have been assembled and agreed upon by the joint federal/provincial Intergovernmental Working Group (IGWG) on the Mineral Industry.

The Mining Sector of Natural Resources Canada (NRCan), which has compiled similar reports since 1988, has coordinated the preparation of this report.

Throughout this report, mineral exploration refers to exploration for metallic minerals, nonmetallic minerals and coal, but not for oil sands, tar sands or oil and gas.

## **EXECUTIVE SUMMARY**

### **1993 Versus 1992 Actual Survey Results**

Results of the Federal-Provincial Survey of Mining and Exploration Companies (Federal-Provincial Survey) indicate that actual Canadian exploration expenditures, exclusive of those spent in the search for oil and gas, totalled \$477 million in 1993, up from \$385 million in 1992. Senior companies spent about \$335 million (70 percent) of the \$477 million and junior companies spent the remaining \$142 million (30 percent). Of the \$477 million, \$413 million was spent on general exploration; the remaining \$64 million was spent on mine-site exploration which is defined as the search for new orebodies on the properties of existing mines. To put the 1992 low level of exploration into historical perspective, corrected for inflation, exploration expenditures in 1992 were the lowest since 1967.

Precious metals and base metals remained the principal exploration targets in Canada during 1993. In 1992, exploration expenditures for base metals had exceeded those for precious metals for the first time since 1983. However, this trend was reversed in 1993 when exploration expenditures for precious metals again exceeded those for base metals. The gold price was up that year, whereas, by October 1993, the inflation-adjusted prices of nickel, copper, zinc and lead were at all-time lows. In 1993, precious-metal exploration accounted for 37 percent and basemetal exploration accounted for 32 percent of total Canadian exploration expenditures. This is in sharp contrast to 1987, when precious-metal exploration had accounted for 83 percent of total non-petroleum exploration expenditures in Canada.

The 24 percent increase in total exploration in 1993 relative to 1992 was mainly due to increased exploration for diamonds, which accounted for \$87 million, or 18 percent of total exploration expenditures in Canada, up from \$19 million or 5 percent in 1992.

### **1994 Preliminary Survey Results**

The preliminary estimate of exploration expenditures in Canada for 1994 shows an increase to about \$630 million, indicating that the decline in exploration has rebounded from its 1992 low. Seniors are expected to have spent some \$430 million (68 percent) of the \$630 million, and juniors, about \$200 million (32 percent). The quest for diamonds was again the highlight of this welcome improvement in exploration. Roughly \$140 million was spent on diamond exploration in 1994, and a considerable portion of that was spent on advanced exploration projects.

## **1995 Forecast**

Company exploration spending intentions for 1995 suggest that exploration will increase slightly. Some \$655 million could be spent on exploration in Canada in 1995. Seniors expect to spend some \$415 million (64 percent) of the \$655 million, and juniors, about \$240 million (36 percent).

Diamond fever, which reached several provinces in addition to the Northwest Territories, led to a staking rush in 1993. Some 27 million hectares were staked, the second-largest area ever staked in Canada following the unprecedented 33 million hectares staked in 1992. Exploration continued in 1994 and 1995 on the original discovery near Lac de Gras, where exploration was concentrated on the mining and testing of bulk samples. Plans are under way to build Canada's first diamond mine.

The nickel-copper-cobalt discovery in Newfoundland's Voisey Bay area, which resulted from exploration for diamonds, has drawn the attention of the world's major mining companies and is described as potentially the richest Canadian mineral find in decades. In what some say is the biggest mining rush ever in Atlantic Canada, prospectors hoping to stake mining claims near the promising discovery have overwhelmed the local claims recording office; about 75 juniors have snapped up property in the area in hopes of duplicating such a find. This base-metal staking rush comes on the heels of the famous diamond rush that started in the Northwest Territories in 1992.

NRCan estimates that the amount of money raised with flow-through shares in 1994 was about \$80 million, up by \$10 million from the \$70 million raised in 1993. NRCan now estimates that flow-through share financing during 1995 will be about \$80 million to \$90 million.

NRCan's view, while still preliminary, is that exploration spending could range between \$600 million and \$650 million in 1995. The upper end of this range is a possibility if the speculative fever surrounding the Voisey Bay discovery significantly stimulates base-metal exploration in Newfoundland.

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## **SECTION A. OUTLOOK FOR CANADIAN MINERAL EXPLORATION AND FLOW-THROUGH SHARE FINANCING**

This paper reports on the current outlook and recent historical trends in both flow-through share financing activity and mineral exploration.

### **1. Outlook for Flow-Through Share Funding in 1995**

#### **1.1 Introduction**

This section focuses on the quantity of funds raised for exploration by means of flow-through share financing.

Since 1983, flow-through share financing has been an important element in determining the junior component of the total exploration picture. Most junior companies are public and need approval from the stock exchanges for their placements; therefore, information on the financing activities of junior companies was obtained mainly from publications reporting on stock exchange activities or from information gathered directly from the exchanges. However, information on flow-through share funding collected from stock exchanges does not include flow-through share funding obtained through private issues.

#### **1.2 Recent Background**

Funds raised by flow-through shares increased dramatically from \$34 million in 1983 to a peak of \$1183 million in 1987. Since 1988, however, many factors have led to increasing difficulties in raising flow-through share funds for junior exploration companies. These include: (1) the stock market crash of October 19, 1987; (2) changes in the income tax treatment of capital gains; (3) lower gold prices; (4) a relative lack of major exploration successes; (5) investor disenchantment as a result of losses on past flow-through share investments; (6) the recession of the early 1990s; and (7) since 1991, the withdrawal of the diversified limited partnerships from the flow-through share market.

However, speculation that diamond deposits found in the Northwest Territories may become North America's first commercial diamond mines has offered enough market appeal to provide some junior companies with good flow-through share financing opportunities in 1993 and 1994.

In addition, the recent huge nickel-copper-cobalt discovery in Labrador's Voisey Bay area -- potentially the richest Canadian mineral find in decades -- has given Howe Street the "big play" it needed in 1995. Hopes that there are more huge deposits to be found in the under-explored Voisey Bay region have spread among junior companies and some of Canada's most seasoned mining promoters. Dozens of stocks that boast land claims in the Voisey Bay area have benefited



from the speculative fever surrounding Voisey Bay and have taken advantage of this favourable financing environment. Actual drilling activity, likely to begin in mid-summer, should provide the flow of news usually needed to maintain and accentuate investor interest. It is such speculative activity that typically revitalizes investors' interest in junior stocks and provides them with heightened flow-through share financing opportunities.

Table 1 illustrates the impressive contribution made by diversified limited partnerships to the total dollar volume of flow-through share funds raised in the years 1987 to 1990.

**TABLE 1. Flow-Through Share Funds Raised by Diversified Limited Partnerships, 1987-90**

	Value of Issues Sold			
	1987	1988	1989 <sup>1</sup>	1990 <sup>1</sup>
	(\$ millions)			
TAP	28	23	0	0
CMP	239	234	113	89.4
NEF	-	8	0	0
MVP	57	26	0	0
NIM	260	270	49	0
FIRST EX	47	21	0	0
MIDDLEFIELD	29	5.5	5.5	10.9
MINTAX	15	3.5	0	0
<b>Total</b>	<b>675</b>	<b>591</b>	<b>167.5</b>	<b>100.3</b>

<sup>1</sup> The figures for 1989 and 1990 generally represent financing for mining only. Some limited amounts of funds raised for oil and gas exploration are, however, included in the 1987 and 1988 totals. The numbers for 1989 and 1990 include the so-called "gross-up" whereby companies retained Canadian Exploration Incentive Program (CEIP) monetary incentives and spent them as well.

### 1.3 Stock Exchange Data

The Vancouver Stock Exchange (VSE), traditional home to the junior resource companies, was in a prolonged slump in 1994. The VSE composite index fell from 1169 in early February 1994 to a year low of 722 on December 20, 1994, before recovering slightly to close the year at 767. After having continued to struggle and

having slumped to a low of 690 in March 1995, the composite index jumped above the 800 level in the spring of 1995 and stood at 841 on July 1 of this year.

The rebound in value and volume figures on the VSE was fuelled mainly by speculation in the mining industry as a result of continued interest in the diamond play in the Northwest Territories and the excitement generated by the recent huge nickel-copper-cobalt discovery in Labrador's Voisey Bay. The find has transformed a former VSE-listed junior mining company into a major TSE-listed company almost overnight. The wave of speculation also spread to some of the 75 junior resource companies active near the rich find which is being closely watched by some of the world's largest mining concerns.

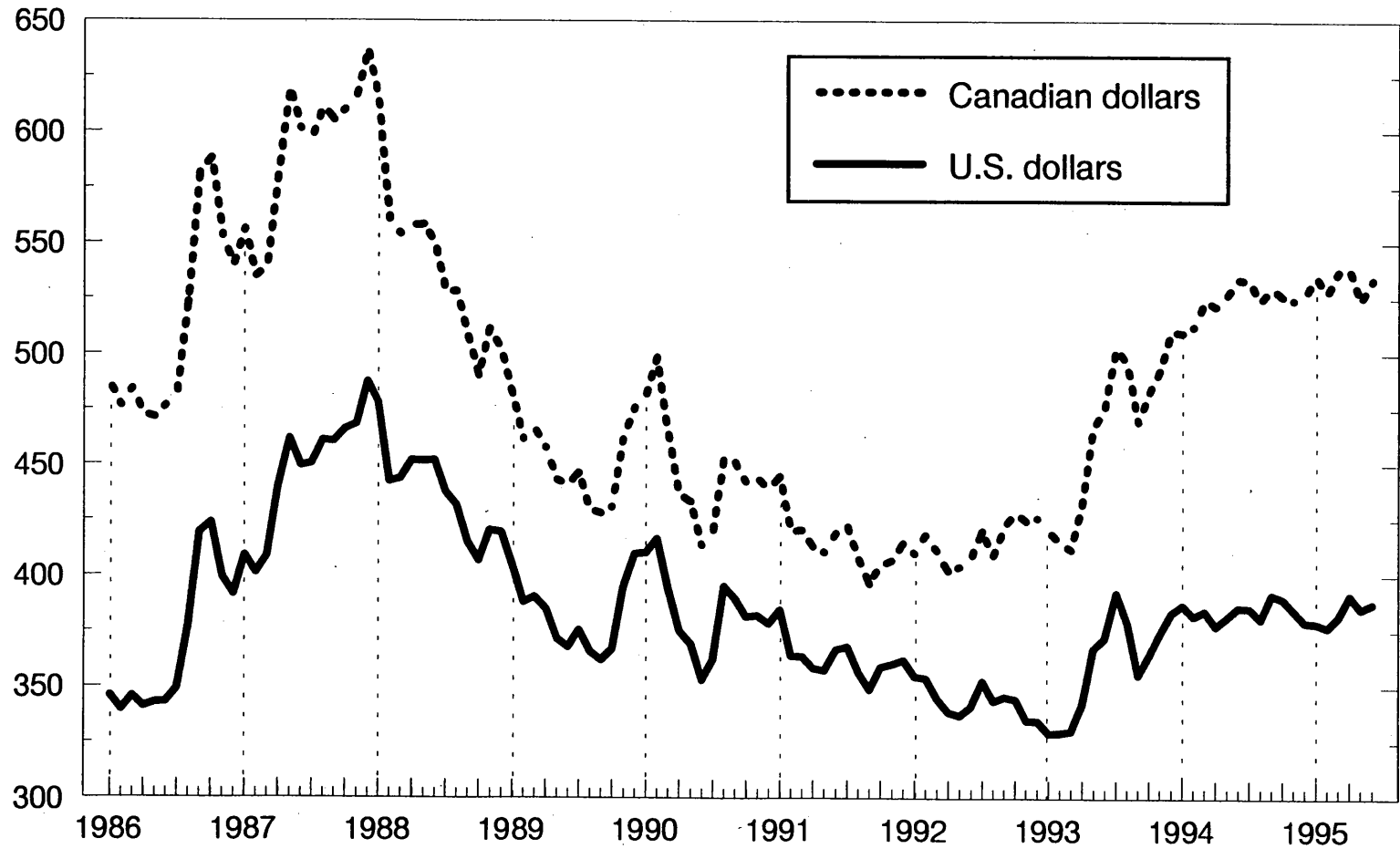
Resource financings on the VSE are expected to drop significantly in 1995 from the levels set in 1993 and the early part of 1994 when the market was fuelled by the unexpected and short-lived surge in the price of natural gas and by investor excitement in the diamond discovery in the Northwest Territories. Nevertheless, financial sources believe companies active in the Newfoundland and Labrador play had raised \$40 million by the end of May and estimate that about \$75 million will be raised for exploration by the junior companies looking for minerals in the areas around the Voisey Bay discovery. Statistics for the VSE indicate that some \$23 million of flow-through shares was placed during the first six months of 1995.

Statistics provided by the Alberta Stock Exchange indicate that some \$39 million of flow-through share financing was raised on that exchange during the first four months of 1995. Flow-through share financing in Alberta has been primarily for oil and gas exploration. However, it is likely that increasing amounts will be directed to mineral exploration. Data from the Montréal Exchange indicate that some \$10 million of flow-through share financing may have been raised on that exchange during the first six months of the year, \$8 million of it for mineral exploration. Data from the Toronto Stock Exchange indicate that, excluding amounts raised by interlisted companies, some \$43 million of flow-through share financing has been raised on that exchange over the first six months of the year, \$9.7 million of which is for mineral exploration.

Figure 1

# Monthly Average Gold Price January 1986 to June 1995

Dollars per troy ounce



Sources: Metals Week, Handy & Harman, and average of London daily prices.

## **1.4 Outlook**

Flow-through share funds raised in 1995 for mining on the four stock exchanges totalled \$43 million at July 1, 1995. Assuming that an equal sum will be raised in the second half of 1995 would lead to the conclusion that some \$86 million of flow-through share financing would be available for the whole year.

At this time, although it is difficult to forecast the amount of flow-through share financing for the entire year, NRCan considers \$80 million-\$90 million to be a reasonable estimate for 1995.

## **2. Outlook for Exploration in 1995**

### **2.1 Introduction**

This section looks at the expected level of mineral exploration, as opposed to its financing. Since we are looking ahead, the usual statistical reporting sources are supplemented by other sources. The section examines the results of the Federal-Provincial Survey "Canadian Mineral Exploration Expenditures Preliminary Estimate 1994 and Forecast 1995" coordinated by Statistics Canada and NRCan. While this is the latest complete survey available, it suffers from a serious shortcoming in that the intentions in question were gathered in the November 1994/March 1995 period, and the results of this once-a-year survey may no longer reflect the current situation.

A second source of information is a modelling technique designed by NRCan's Mining Sector to forecast the amount of junior and senior exploration. This modelling technique is based on a "statistically significant" relationship between metal prices and exploration activity.

Finally, this section reviews recent levels of diamond drilling to give yet another view of the trend in exploration activity.

### **2.2 NRCan and Statistics Canada Surveys of Exploration Spending Intentions - 1995**

#### **Methodology**

On October 31, 1994, Statistics Canada sent 232 questionnaires to mineral-producing firms. NRCan has assumed responsibility for the collection of data from the non-producing firms and sent out 2197 questionnaires (jointly with provincial governments which participate in this exploration survey). It should be noted that one company can receive several questionnaires depending on the number of provinces in which it is working. The number of companies covered by this survey that indicated they expected to be engaged as operators of exploration projects in Canada is about 650, down from 700 in 1994, but up from 630 in 1993. To avoid duplicate reporting, joint-venture partners who are not project operators do not report intended

expenditures on exploration. Companies were asked to report intended exploration expenditures for their fiscal year that ends between April 1, 1995 and March 31, 1996.

The exploration expenditure statistics were collected for both "general" and "mine-site" exploration. Forecast exploration figures include expenditures in the following categories: field expenditures on physical work and surveys; related land costs; overhead expenditures in the field; and exploration-related head office expenses.

## **Results**

Statistics Canada published the results of its survey under the heading "On-Property Exploration" (mine-site exploration - i.e., the search for new mines on the properties of producing mines or properties committed to production) in its annual publication "Private and Public Investment in Canada - Intentions 1995" (Statistics Canada catalogue 61-205). The Statistics Canada intentions total published for mine-site exploration for 1995 is \$53 million. This total was revised to \$68 million by NRCan as of April 1995. Statistics Canada is currently conducting a revised Forecast 1995 Survey of producing companies and the results should be available soon.

The NRCan-coordinated survey of general exploration (exploration of areas of Canada other than existing mine properties) indicates that companies intended to spend \$587 million on such exploration in 1995.

Accordingly, on the basis of company intentions in the November 1994 to March 1995 period, total exploration (both on- and off-property) for 1995 would be expected to total about \$655 million (\$587 million plus \$68 million).

## **Interpretation**

The Statistics Canada and NRCan surveys of intentions provided an indication of the late 1994/early 1995 industry view of total exploration spending expectations for 1995. However, intentions expressed in late 1994/early 1995 may subsequently have been modified by events that can limit the availability of funds, such as stock market conditions, changing metal prices, and other general economic factors or company-specific factors. The results of this survey cannot be interpreted as being accurate forecasts of the exploration that will ultimately be performed in 1995.

Table 2 shows intentions, as well as preliminary and actual expenditures, for mine-site and general exploration for the years 1985 to 1995. The table demonstrates that, for the periods 1985-88 and 1993-94, total expenditures reported, initially on a preliminary basis and then later on an actual basis, generally exceeded intentions for the same period.

**TABLE 2. Comparison of Intentions, Preliminary and Actual Exploration Expenditures, 1985-95**

Exploration Expenditures	Intentions	Preliminary	Actual
	(\$ millions)		
<b>1985</b>			
Mine-site	150.9	89.4	100.1
General	361.2	471.5	488.8
Total	<u>512.1</u>	<u>560.9</u>	<u>588.9</u>
<b>1986</b>			
Mine-site	87.5	110.2	108.6
General	431.2	483.6	589.3
Total	<u>518.7</u>	<u>593.8</u>	<u>697.9</u>
<b>1987</b>			
Mine-site	122.6	121.5	161.0
General	583.2	849.6	1139.0
Total	<u>705.8</u>	<u>971.1</u>	<u>1300.0</u>
<b>1988</b>			
Mine-site	154.7	138.7	143.0
General	891.0	1107.9	1207.0
Total	<u>1045.7</u>	<u>1246.6</u>	<u>1350.0</u>
<b>1989</b>			
Mine-site	111.7	160.0	115.3
General	832.2	766.7	712.5
Total	<u>943.9</u>	<u>926.7</u>	<u>827.8</u>
<b>1990</b>			
Mine-site	150.0	107.7	112.4
General	633.0	643.5	662.3
Total	<u>783.0</u>	<u>751.2</u>	<u>774.7</u>
<b>1991</b>			
Mine-site	97.9	80.4	67.3
General	548.3	514.5	464.4
Total	<u>646.2</u>	<u>594.9</u>	<u>531.7</u>
<b>1992</b>			
Mine-site	71.2	75.4	59.4
General	426.3	344.2	325.9
Total	<u>497.5</u>	<u>419.6</u>	<u>385.3</u>
<b>1993</b>			
Mine-site	70.1	78.1	64.0
General	364.5	404.9	413.2
Total	<u>434.6</u>	<u>483.0</u>	<u>477.2</u>
<b>1994</b>			
Mine-site	66.0	68.2	
General	470.9	561.8	
Total	<u>536.9</u>	<u>630.8</u>	N/A
<b>1995</b>			
Mine-site	67.9		
General	586.8		
Total	<u>654.7</u>	N/A	N/A

Source: Federal-Provincial Survey of Mining and Exploration Companies. The 1994 actual survey is currently in progress, and the 1995 preliminary and actual questionnaires will not be sent out until late 1995 and early 1996, respectively.  
N/A: Not available.

For the period 1989-92, this pattern was reversed. The explanation for the period 1985-88 could be that exploration funding was becoming more abundant than companies had originally anticipated but, starting in 1989, there was an unexpected decline in the availability of flow-through share funds. Similarly, for the period 1993-94, the general funding was probably more accessible than expected as a result of the growing interest generated after the diamond discoveries.

## **2.3 Senior Firms' Exploration Spending for 1994 and 1995**

### **Methodology**

Information on exploration spending by type of company (1993 actual, 1994 preliminary and 1995 intentions) is now available from the Federal-Provincial Survey of Preliminary and Forecast Exploration Expenditures. About 129 active senior companies in 1994 and 130 in 1995 reported exploration spending. Included in these numbers for senior companies are producers and their affiliates as well as foreign and petroleum companies. For joint ventures, total project expenditures are reported by the project operator. Accordingly, senior participation has, at times, been subject to over-estimation. Nevertheless, data analysis has been consistent over the years and a clear trend can be noted.

### **Results**

According to the Federal-Provincial Survey, the decrease in the level of expenditures by seniors was significant from 1988 to 1989, down 19 percent from \$682 million to \$555 million. The decrease continued through 1992 reaching a low of \$305 million.

The percentage of total exploration expenditures by seniors increased significantly from 51 percent in 1988 to almost 79 percent in 1992. Thereafter, the percentage declined and is expected to be 63 percent in 1995. Even though the senior contribution as a percentage of overall exploration expenditures may be lower than in 1992, the absolute amount spent on exploration by seniors increased through 1993-1995.

In 1993, senior expenditures increased by 10 percent to \$335 million compared with 1992. The preliminary estimate for 1994, \$430 million, is up 29 percent from 1993, while intentions for 1995, at \$415 million, indicate a level of expenditures comparable to the 1991 level of \$415 million.

Overall intentions for 1995 are \$655 million and senior intentions of about \$415 million imply a value for junior intentions of about \$240 million (see Section 5.3 for more information on junior companies).

## **2.4 Outlook for Exploration Based on Historical Statistical Estimation**

### **Methodology**

In this section, an attempt is made to predict the level of exploration for 1995 using standard statistical techniques. An estimate of exploration spending by both senior and junior mining companies was made by linking exploration spending to factors for which historical data are available.

An analysis of historical data indicates that the level of expenditures on mineral exploration in a given year can be linked to the previous year's metal prices, particularly in the case of senior companies. This may be because companies view exploration as an investment, with expected returns being dependent on expected revenues from the subsequent mining of discovered deposits. Expected future revenues would obviously depend on future commodity prices, and expectations of future prices would likely be influenced by current prices. As well, prices influence the level of a company's revenues and the amount of internal funds available for spending on mineral exploration.

Changes in exploration spending are likely to lag price changes because exploration activity in any particular year is the result of a budgeting process that takes place in the preceding year. Budget allocations in a given year are therefore likely to reflect metal prices and resultant profits in existence during the immediately preceding year.

Figure 2 shows the relationship between historic exploration expenditures by senior companies and the NRCan yearly metals price index, lagged one year. The index is a composite of the prices of six metals - gold, silver, copper, zinc, lead and nickel.

For junior mining companies, the role of metal prices in exploration spending may be less important than the expectations and excitement caused by such factors as the interest in diamonds and the recent large nickel-copper-cobalt discovery at Voisey Bay. To capture the influence of these expectation factors in determining the level of exploration by junior mining companies, a variable representing claim-staking activity was used along with the metal price index. For this variable also, a lagged form was found to provide the best fit.

### **Results**

The statistical equation estimated over the years 1969 to 1994 would predict senior exploration expenditures in 1995 to be about \$415 million (Figure 3). For junior companies, the estimated equation would predict exploration expenditures in 1995 of about \$190 million. However, with diamonds as a relatively new significant influence on exploration, this estimate may be somewhat lower than what will likely be the case in 1995.



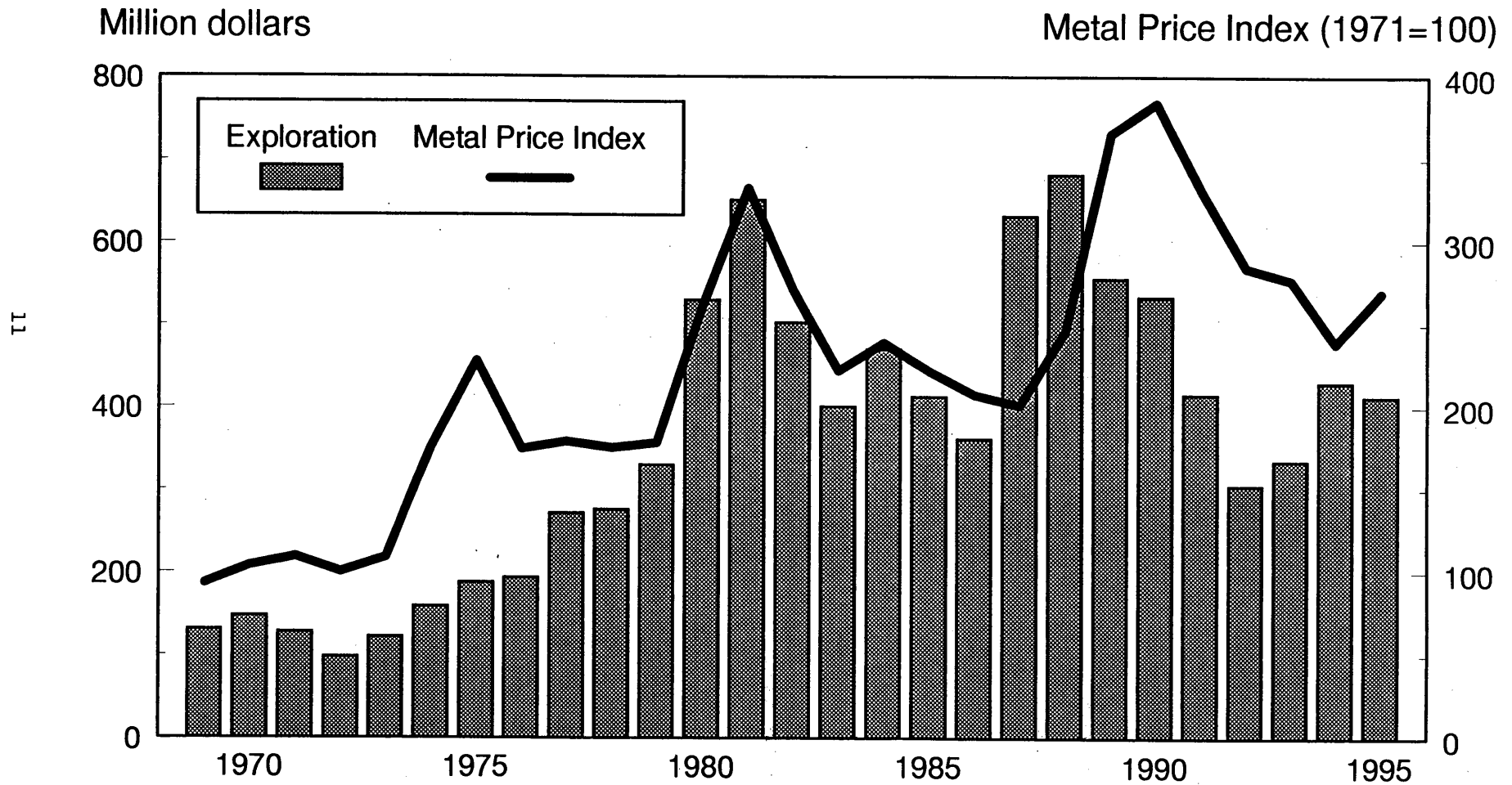
## 2.5 Recent Diamond Drilling Activity

Diamond drilling is an essential component of exploration for nearly all mineral properties in Canada, from the anomaly investigation stage to the deposit delineation and deposit definition stages. This is why diamond drilling statistics constitute a valuable indicator of recent levels of Canadian mineral exploration activity. The Canadian Drilling Association (CDA) gathers monthly diamond drilling statistics from its member companies. Available CDA statistics cover about 50-60 percent of total Canadian contract diamond drilling activity. There has been a reasonably close correlation between annual CDA drilling footages and Canadian exploration expenditures over the past 10 or 15 years, so that the CDA drilling statistics depicted in Figure 4 (monthly, 1985-95), Figure 5 (quarterly, 1985-95) and Figure 6 (annual, 1973-94) should provide a reasonable and up-to-date indication of recent national mineral exploration activity trends. In addition, a comprehensive 20-year graph (Figure 7) depicts total Canadian contract drilling up to 1993, as reported annually to NRCan by drilling contractors and published in Statistics Canada catalogue 26-201. Although these two sources provide different annual results, the same overall trends are observable in both, even though the CDA statistics are incomplete because not all Canadian diamond drilling contractors are members of the CDA and not all member companies report their drilling activity to the CDA.

Current dollar costs per metre drilled for exploration in Canada can be calculated for the period 1985-93 inclusive, using data from the Federal-Provincial Exploration Survey. Such data are not available for years prior to 1985. These costs may exceed the actual amounts paid to drilling contractors, as some companies may have included some costs associated with the drilling such as geological logging and assaying of core. These average drilling costs (in dollars of the day) include both surface and underground drilling expenditures; surface drilling costs are normally significantly higher than those for underground drilling.

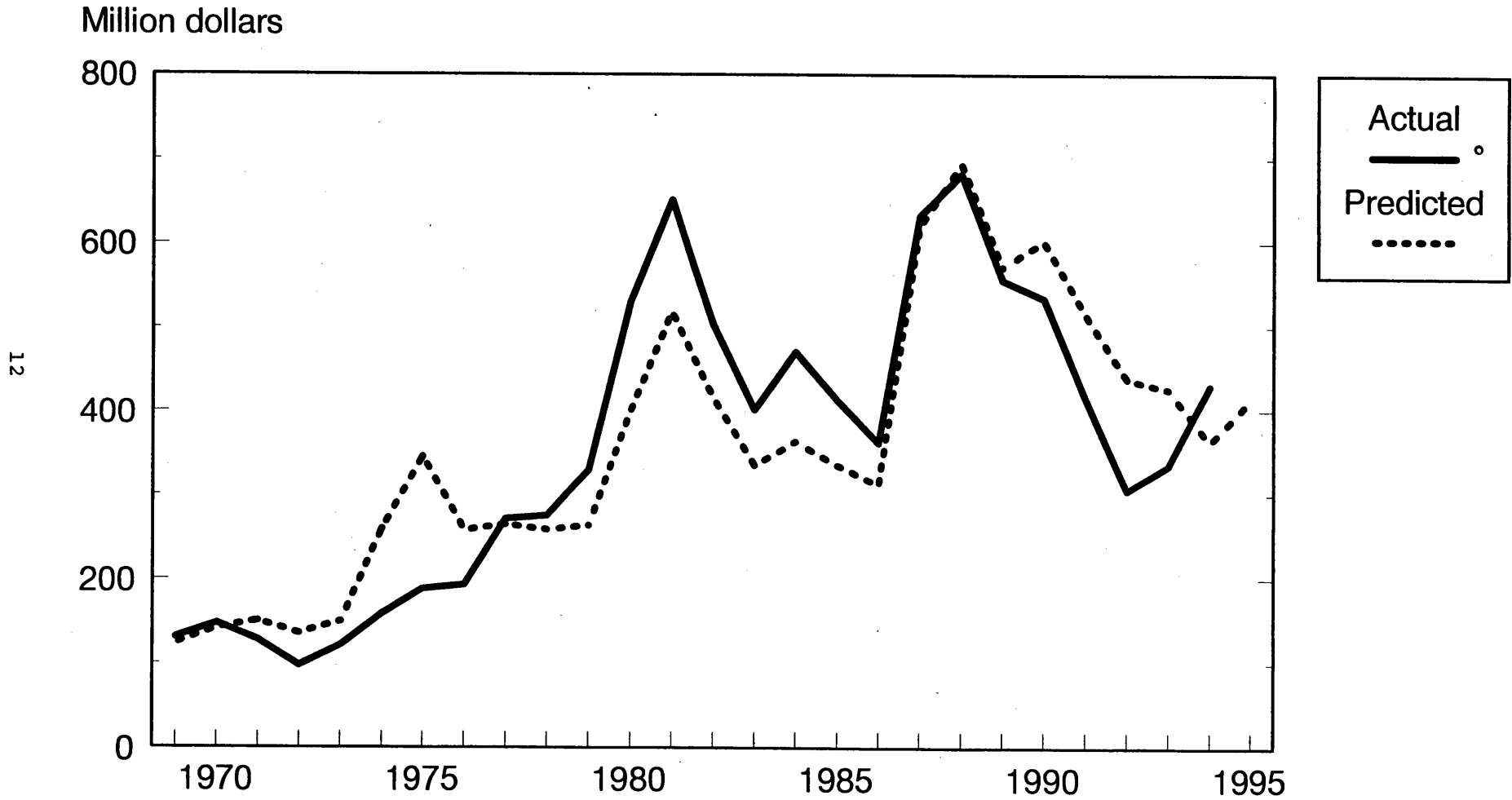
Figure 2

## Senior Exploration Expenditures and Metal Price Index Lagged One Year



Source: Natural Resources Canada, based on the Federal-Provincial Survey of Mining and Exploration Companies.  
1995 exploration forecast by Natural Resources Canada.

Figure 3  
**Actual and Predicted Senior Exploration Expenditures  
1969-94**



Source: Natural Resources Canada.

Year	<u>Diamond Drilling</u>			<u>Other Drilling<sup>1</sup></u>		
	Metres Drilled (millions)	Total Cost (\$ millions)	Cost Per Metre (dollars)	Metres Drilled (millions)	Total Cost (\$ millions)	Cost Per Metre (dollars)
1985	2.531	185	73	.270	10.8	40
1986	3.616	249	69	.055	3.4	62
1987	6.221	510	82	.262	18.4	71
1988	6.206	478	77	.211	10.5	50
1989	3.940	291	74	.297	9.5	32
1990	3.702	282	76	.241	12.6	52
1991	2.341	175	75	.234	13.1	56
1992	1.889	141	75	.139	6.5	47
1993	1.932	146	76	.282	12.9	46

<sup>1</sup> Drilling methods such as percussion exploration drilling, reverse circulation drilling for overburden and rotary drilling (such as used in petroleum exploration) employed in exploration for coal, potash, salt, gypsum and similar layered mineral commodities.

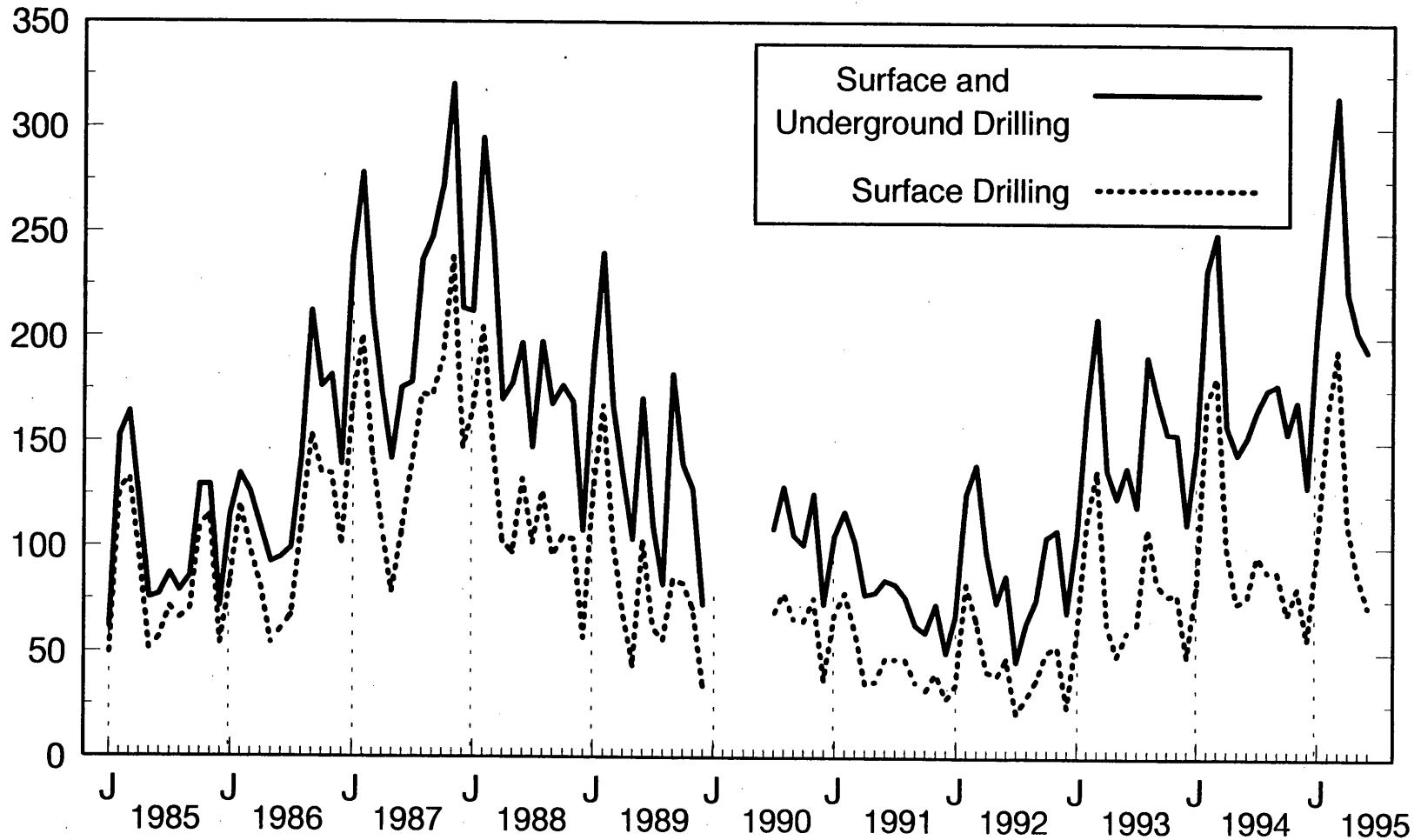
As can be seen from Figure 5, each of the four years (1988, 1989, 1990 and 1991) exhibited a similar pattern of diminishing diamond drilling through the year, with metres drilled in the first quarter of each year higher than metres drilled in the final quarter of the previous year. This general quarterly decline in drilling throughout the years continued until the third quarter of 1992, when metres drilled in the fourth quarter increased relative to the third quarter. From 1988 to 1992, drilling peaked consistently during the first quarter. The explanation is twofold: (1) in each of those years, flow-through share funds from the previous year were carried over into January and February, and (2) much drilling must be done during the winter months on frozen lakes and on areas of muskeg that are generally inaccessible to drilling equipment at other times of the year. The general pattern of decreasing quarterly drilling throughout the year in 1988, 1989, 1990 and 1991 contrasts with the pattern of 1986 and 1987 when diamond drilling levels in the second half of the year were higher than in the first half because of the increasing availability of flow-through share funding.

Total metres drilled in 1993 were considerably higher than in 1992, with a further increase in 1994. Metres drilled in the first quarter of 1995 are significantly higher than in the first quarter of 1994.

Figure 4

# Surface and Underground Drilling by Month - January 1985 to June 1995

Thousand metres



14

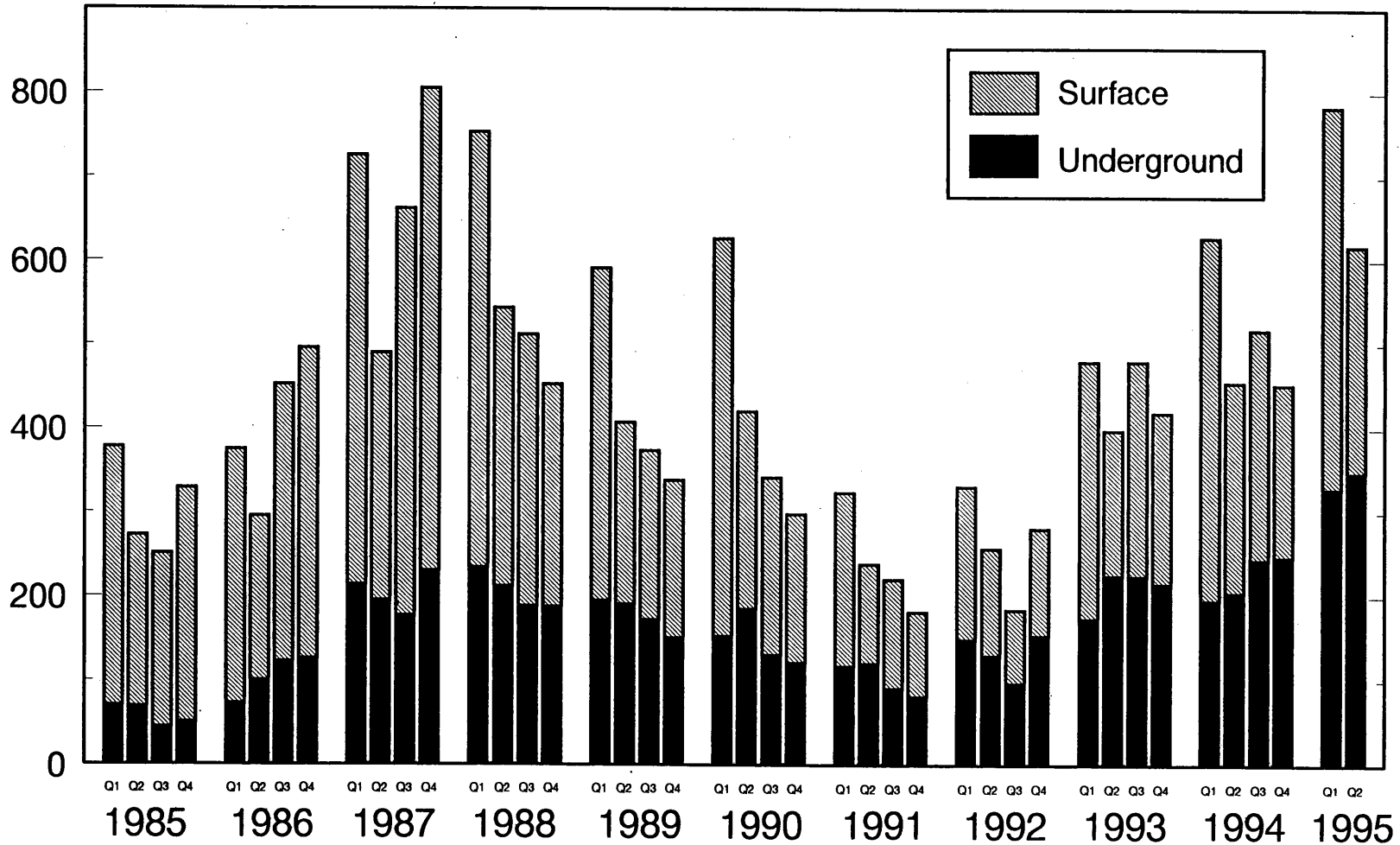
Source: Canadian Drilling Association.

Note: CDA data are incomplete because not all member companies report their drilling. Monthly data were not available for the period January to June 1990 because final CDA statistics for this period were released only as a six-month total.

Figure 5

# Surface and Underground Drilling by Quarter 1985-95

Thousand metres



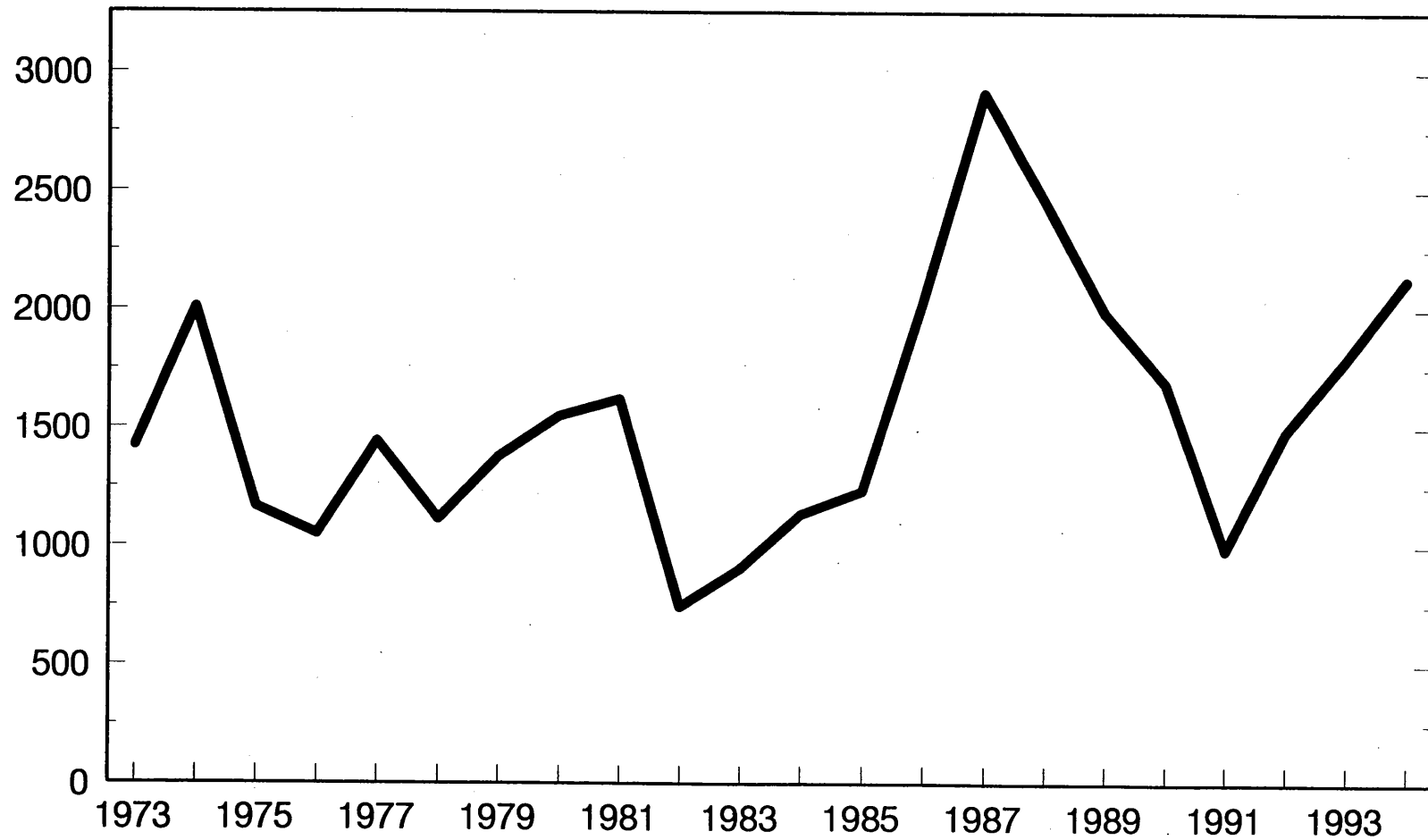
Source: Canadian Drilling Association.

Note: CDA data are incomplete because not all member companies report their drilling.

Figure 6

## Surface and Underground Drilling by Year 1973-94

Thousand metres

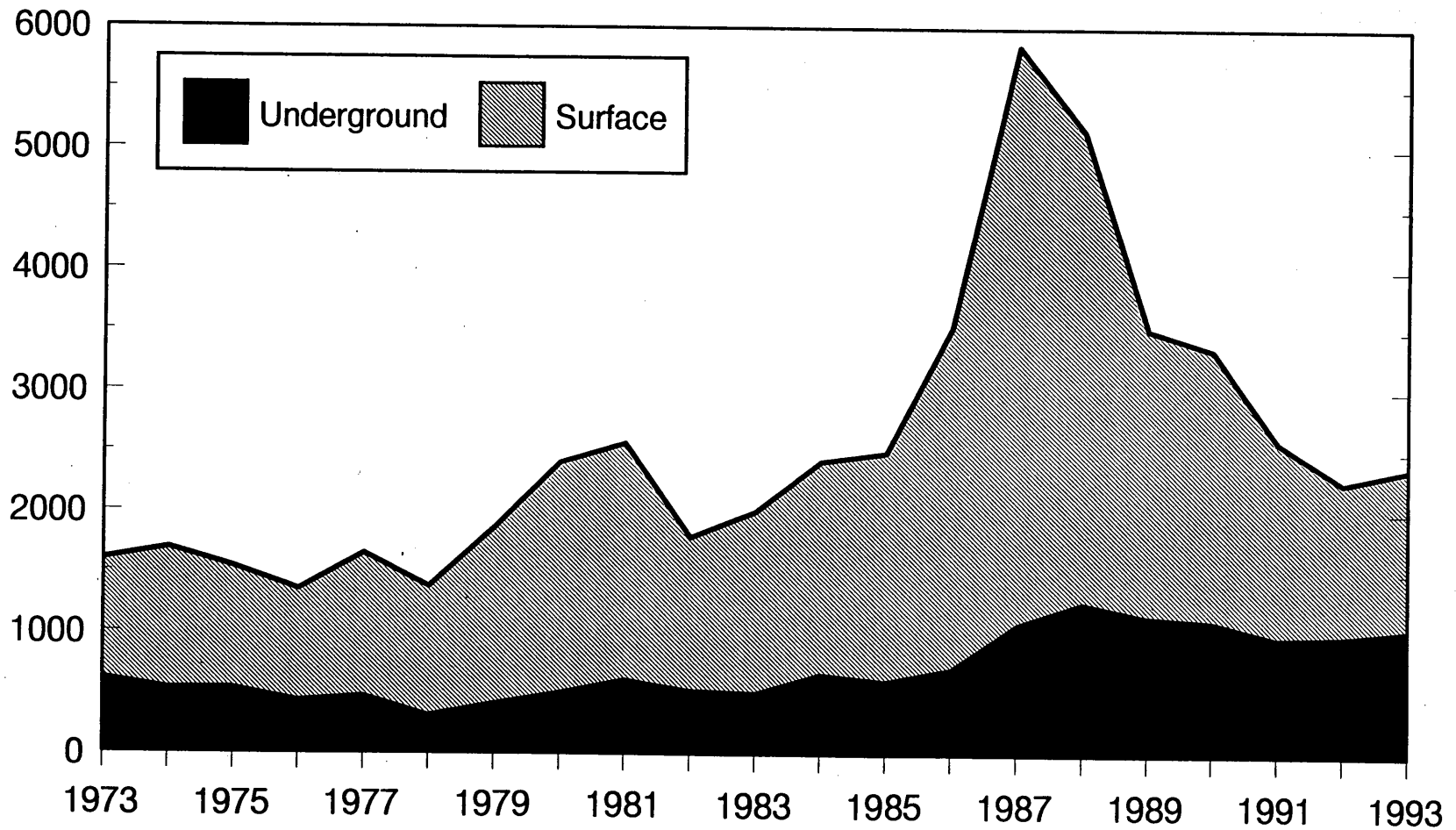


Source: Canadian Drilling Association.

Note: CDA data are incomplete because not all member companies report their drilling.

Figure 7  
**Surface and Underground Drilling  
Contract Diamond Drilling Operations  
1973-93**

Thousand metres



Source: Statistics Canada, Catalogue no. 26-201.

Note: Data refer to SIC 0921; 1993 is the latest year for which data are available.



Annual Canadian exploration expenditures for 1994 (preliminary) of \$630 million and for 1995 (company spending intentions) of \$655 million indicate an upward trend in exploration expenditures from the \$385 million of expenditures in 1992 and \$477 million in 1993. The apparent upward trend of exploration expenditures in 1995 appears to confirm the increasing metres of diamond drilling reported to the Canadian Diamond Drilling Association for the first quarter of 1995 relative to the first quarter of 1994.

A significant amount of the underground drilling (Figures 5 and 7) consists of contract drilling aimed at establishing replacement ore reserves at producing mines. In the gathering of exploration expenditure statistics, expenditures on this sort of drilling are counted as "development expenditures" rather than "exploration expenditures," so that much of the underground diamond drilling is not "exploration drilling" in the sense of being aimed at the exploration for new mines. In interpreting Figures 4 to 7, it is important to recognize this fact.

### **3. Overall View on Mining Exploration for 1995**

Total exploration expenditures in 1994 amounted to about \$630 million, with senior exploration at about \$430 million and junior exploration at about \$200 million. This preliminary figure is \$153 million higher than the \$477 million recorded in 1993. Arriving at an overall total forecast for 1995 requires the comparison of different amounts derived from several sources.

#### **Exploration by Senior Companies**

The exploration intentions survey carried out in late 1994 and early 1995 indicated that exploration spending in 1995 could reach \$655 million -- \$415 million by seniors and \$240 million by juniors.

The regression analysis discussed in Section 2.4 provides another estimate. The historical relationship between total exploration expenditures and metal prices leads to an estimate for 1995 of \$415 million for seniors. Because senior companies have more certain sources of funds than juniors, estimates for these companies are likely to be more reliable than estimates for junior companies.

#### **Exploration by Junior Companies**

The level of junior exploration spending is more difficult to forecast. One indicator of the possible amount of junior exploration spending is the Federal-Provincial Survey of Intentions for 1995 that was carried out in late 1994 and early 1995. According to this survey, juniors intend to spend about \$240 million in 1995, about \$40 million more than the (preliminary) \$200 million spent in 1994.

It is estimated that about \$80 million-\$90 million of flow-through share financing could be raised in 1995 by junior companies listed on Canadian stock exchanges. If the level of flow-through share financing turns out to be \$80 million-\$90 million, there would be some \$150 million to \$160 million of additional non-flow-through share financing left to be raised, assuming the full realization of total junior exploration intentions (some \$240 million) as indicated from the Federal-Provincial Survey.

The regression analysis estimate for junior exploration for 1995 is \$190 million. Although this appears lower than the \$240 million estimate provided by the Federal-Provincial Survey, the standard error of the estimate would include \$240 million.

### **Total Exploration**

With a range of junior exploration spending between \$190 million and \$240 million and an expected \$415 million of senior exploration spending, 1995 exploration expenditures should probably be in the range of \$600 million to \$650 million. The upper end of this range, and maybe even more, is a possibility if diamond exploration continues to remain buoyant and exploration in Voisey Bay accelerates.

## **SECTION B. CURRENT REGIONAL OUTLOOK**

### **4.1 Introduction**

This section presents comments from provincial and territorial officials on recent exploration activity and gives an indication of what they expect for 1995. Some of the exploration expenditure results mentioned in the following section by the different provincial and territorial authorities may differ from those reported under Section 5 (official federal-provincial figures released by NRCan). For Manitoba, the figures were recently revised. For Québec, the figures include expenditures by the Québec Ministry of Natural Resources which are excluded from all NRCan published totals. The alternate surveys from Saskatchewan and Yukon are not based on the same set of definitions used in the national survey.

### **4.2 Newfoundland and Labrador**

Mineral exploration in Newfoundland in 1994 increased by 32 percent from 1993 levels.

The total expenditures on mineral exploration in 1994 are approximately \$12.4 million, up from \$8.7 million in 1993. Expenditures for 1995 are forecast by the Federal-Provincial survey to be \$23 million but could reach \$50 million. The 1993/1994 statistics for claims staked (6 955/22 256), claims in good standing (22 910/37 084) and diamond drilling (46 510/49 485) also reflect this increase. First-half 1995 claim statistics stand at 31 653 claims staked and 67 078 claims in good standing. The forecast for diamond drilling in 1995 is 100 000 metres, reflecting a focus on both advanced and grassroots projects. Most exploration efforts continue to be carried out by senior mining firms with a growing percentage of total exploration being conducted by the junior sector and prospectors. This percentage is forecast to increase substantially in 1995.

On November 3, 1994, Diamond Fields Resources Inc. announced a potentially significant occurrence of base-metal mineralization containing nickel, copper and cobalt at Voisey Bay, Labrador. Drilling to June 1995 has outlined 27 million tonnes of indicated resources grading 3.6 percent nickel, 2.7 percent copper and 0.15 percent cobalt in a massive deposit, as well as substantial quantities of lower-grade resources in semi-massive and disseminated deposits. On April 11, 1995, Teck Corporation announced an agreement whereby Teck Corporation purchased three million treasury shares of Diamond Fields for \$108 million, representing a 10.4 percent interest. On June 29, 1995, Inco Limited entered into an agreement with Diamond Fields to acquire a 25 percent interest in the Voisey Bay deposit and all of Diamond Fields' Labrador holdings. Drilling is ongoing and an airborne geophysical survey is scheduled later to be completed by July.

This discovery has sparked the biggest staking rush in Newfoundland's history with about 6 250 000 hectares or 250 000 claims staked. Approximately one hundred companies have acquired mineral rights. Several airborne geophysical surveys have been completed and targets are now being screened in preparation for drilling.

Exploration activity on the island portion of Newfoundland also increased in 1994. Noranda Mining and Exploration, in a joint venture with Brunswick Mining and Smelting, continued to explore the AND Charter Lands in central Newfoundland for base metals. The discovery of the Lochinvar base-metal prospect, near Springdale, by Major General Resources is considered significant in that the host rocks have been correlated with the Buchans-Roberts Arm belt, host to the high-grade Buchans deposits. Planned underground exploration programs include (1) the Nugget Pond gold deposit on the Baie Verte peninsula, (2) the Hammerdown gold deposit on the Springdale peninsula, (3) the Beaver Brook antimony deposit south of Gander, and (4) the dewatering and subsequent mining of the Ming West copper-gold deposit on the Baie Verte Peninsula. Renewed gold exploration on the Avalon Peninsula, increased gold exploration by Royal Oak at the Hope Brook mine and outlying properties, new base- and precious-metal discoveries in the Flat Bay Brook area of western Newfoundland, and the renewed interest in the St. Lawrence Fluorspar deposit on the Burin Peninsula are also considered positive events.

The Mineral Industry Assistance Program (MIAP) under the Canada-Newfoundland Mineral Development Agreement continued to provide training programs and grants to local prospectors as well as assistance to individuals and companies for feasibility/demonstration and infrastructure projects. Funding for prospectors' grants decreased from \$175 000 in 1994/1995 to \$142 000 in 1995/1996. The locally based junior mining sector and independent prospectors are becoming well established and self-sustaining, and comprise a significant and growing component in the total exploration effort. MIAP has been a valuable investment in this sector, an investment that is beginning to pay dividends as prospectors, with increasing frequency, make discoveries and joint-venture agreements.

The province, through the Newfoundland Exploration Assistance Program (NEXAP), will continue to cost-share advanced exploration activities with Newfoundland-based junior mining companies to a maximum of \$80 000 per approved project. Individual companies may be eligible for assistance on more than one project to a maximum of \$160 000. A total of \$500 000 has been allocated for the current fiscal year.

On September 1, 1994, the map staking system for the entire province was adopted. Prior to this, ground staking applied to the island portion of the province and map staking to Labrador.

**NEWFOUNDLAND AND LABRADOR EXPLORATION STATISTICS**

	1988	1989	1990	1991	1992	1993	1994p	1995f
(dollars)								
Annual Exploration Expenditures	41 155 481	36 252 686	23 275 000	12 000 000	11 141 000	8 700 000	12 491 000	50 000 000
Claim Staking								
Claims Staked	26 606	17 571	10 421	7 411	5 118	6 855	22 256	250 000
In Good Standing	69 677	65 223	45 427	33 297	24 002	22 910	37 084	270 000
Exploration Field Expenditures								
BM-PM	17 559 585	10 970 673	10 339 710	7 385 312	5 875 962	4 034 910	6 524 000	NA
Gold	18 698 498	14 895 933	7 344 583	1 701 289	1 329 545	1 708 576	5 083 000	NA
Other	457 370	1 364 328	1 520 051	550 502	1 192 898	1 192 898	884 000	NA
(metres)								
Diamond Drilling								
Production/	17 449	16 355	8 884	6 850	819	16 982	7 260	NA
Development	<u>217 382</u>	<u>106 497</u>	<u>84 462</u>	<u>37 077</u>	<u>21 054</u>	<u>29 528</u>	<u>42 225</u>	<u>NA</u>
Exploration	234 831	122 852	93 346	43 927	21 873	46 510	49 485	100 000
Total								

BM: Base metals    PM: Precious Metals    p: preliminary    f: forecast    N/A: not available

### 4.3 Nova Scotia

Mineral exploration activity in Nova Scotia during 1994 continued at roughly the same level as in the previous three years, with expenditures for 1994 estimated at \$1.4 million compared with \$1.8 million in 1993. Expenditures for 1995 are forecast to be similar to 1994, at approximately \$1.35 million.

A total of 12 900 new and reissued claims were staked during 1994, up significantly from the 10 193 claims staked in 1993. Preliminary figures for new and reissued claims stand at approximately 2000 for the first quarter of 1995, down significantly from the roughly 4000 claims staked during the first quarter of 1994.

The amount of exploration drilling was up moderately in 1994 with the completion of approximately 7725 m compared with a total of 6200 m in 1993. The amount of exploration drilling for 1995 is expected to be similar to 1994.

Exploration for base metals dropped off sharply in 1994 but was offset by an increase in the level of activity for gold, primarily as a result of renewed interest in the Meguma hosted gold deposits. Highlighting this activity was the initiation of development work on the former Crown Reserve property at Dufferin Mines by Dufferin Resources Incorporated and preliminary development work by Tangier Mining Incorporated on the Tangier gold property. Exploration for industrial minerals continued at roughly the same level of activity as in recent years and no exploration was undertaken for coal. Exploration in Nova Scotia continues to be shared equally between the senior and junior mining sectors, with significant activity by private concerns and prospectors.

Direct financial support for the mineral industry continues to be available through the final year (1995) of the Canada-Nova Scotia Cooperation Agreement on Mineral Development (CAMD) under two federally funded programs.

The Mineral Investment Stimulation Program (MISP) is a federally funded and administered program to provide assistance to companies and individuals. The current 1992-95 program contributes up to 50 percent of the costs for qualifying projects to a maximum of \$50 000 with a total of \$485 000 available under the current agreement.

The Nova Scotia Prospectors Assistance Program (NSPAP) is a federally funded program administered by the Nova Scotia Department of Natural Resources under the CAMD to provide direct financial assistance to qualified prospectors and explorationists. The 1992-95 program provides cash awards up to \$5000 for qualified projects with a total of \$640 000 available for grants through the current agreement.

An important step was taken in reducing the tax burden for the mining industry in Nova Scotia with the tabling of the provincial budget on April 11. The 4 percent health services tax (non-renewable resource sales tax) on equipment used in the exploration, production and primary processing of mineral commodities has been removed.

The existing tax credit system has been improved to help attract private sector venture capital for mineral exploration and development. A personal income tax credit of up to \$9000, or 30 percent of the first \$30 000, is now available for investors in new share issues of eligible companies. This is up significantly from the previous tax credit of 25 percent of the first \$10 000, a maximum credit of \$2500.

In addition, the government has introduced a new corporate income tax credit to assist small companies in accessing equity markets by lowering the cost of issuing shares to the public. The first \$100 000 of costs associated with the preparation of a public offering is now eligible for a non-refundable credit of 35 percent, a total credit of \$35 000.

**NOVA SCOTIA MINERAL EXPLORATION STATISTICS, 1990-95**

	1990	1991	1992	1993	1994	1995
Exploration expenditures (\$) (field+overhead, general+mine-site)	11 025 000	4 532 000	3 258 000	1 797 000	<sup>p</sup> 1 411 000	<sup>f</sup> 1 348 000
Claim staking (new and reissued) (general+special licences, excluding closures and uranium licences)	21 190	18 777	11 965	10 193	12 900	2 000 (March 31)
Exploration diamond drilling (metres)	15 246	11 504	12 710	6 221	<sup>f</sup> 7 725	<sup>f</sup> 6 000

<sup>p</sup> preliminary  
<sup>f</sup> forecast

**4.4 New Brunswick**

Mineral exploration expenditures in New Brunswick in 1994 approached the amount spent in 1992 and 1993. Preliminary statistical surveys carried out by the New Brunswick Department of Natural Resources and Energy in cooperation with Natural Resources Canada illustrate that during 1994 approximately \$10.9 million was spent by the exploration sector in New Brunswick.

Once again, mineral exploration activities were concentrated in and around the Bathurst-Miramichi Camp of northern New Brunswick. The bulk of the exploration expenditures in this part of the province was spent by Noranda Exploration and Brunswick Mining and Smelting Corp. Ltd. A large portion of Noranda's exploration funding was allocated to the further delineation of reserves at the Halfmile Lake property.

## New Brunswick Mineral Exploration Statistics

	1993	1994	1995 Forecast
Exploration Expenditures (general & mine-site) millions <sup>1</sup>	\$ 11.1	\$10.9 <sup>2</sup>	\$10.7
Mineral Claims Recorded	2 351	3 980	-
Total Claim Equivalents in Effect	22 453	23 872	-

<sup>1</sup> Current Dollars

<sup>2</sup> Preliminary Survey Results

Although most of the exploration work in 1994 was in search of base metals, several properties in southern New Brunswick were explored for their gold potential while other properties had attention drawn to their tin and titanium potential. In this region, most of the exploration activity centred around the Annidale-Shannon-Mount Pleasant areas.

The forecast for 1995 suggests that exploration activity will again result in approximately \$10 million-\$11 million being spent in New Brunswick. Mineral claim recordings in 1994 were up. The number of claims recorded in 1994 was 3980, up 69 percent from the 1993 total of 2351. At the end of the year, there were 17 439 claims, 5 coal agreements (3904 claim equivalents), 2 potash leases (1753.3 claim equivalents), and 16 mining leases (776 claim equivalents) in effect, which represent a total claim equivalent of 23 872 (up 6.3 percent from 1993).

The Province of New Brunswick has a number of programs in place aimed at addressing the key issue of declining base-metal reserves. These programs include: the Mineral Exploration Stimulation Program (MESP); the New Brunswick Exploration Assistance Program (NBEAP); EXTECH II, and an Airborne Geophysical Survey of Bathurst Camp.

### **Mineral Exploration Stimulation Program (MESP)**

In order to provide stimulus to the exploration industry, the Province of New Brunswick continued its support of the prospector incentive program, called the Mineral Exploration Stimulation Program (MESP), by approving 28 grants totalling \$50 000 in 1994. Similar funding will be available in 1995.



## **New Brunswick Exploration Assistance Program (NBEAP)**

NBEAP is a federal/provincial assistance program aimed at assisting the junior mining sector in New Brunswick. The program was initiated in 1994 with an annual budget of \$400 000, funded 65 percent federal and 35 percent provincial under the Economic Diversification Agreement. The program provides assistance of 80 percent of project costs to a maximum of \$16 000 per project.

In 1995, a joint industry/government committee evaluated 47 applications and awarded assistance to 27 projects. Four projects received assistance of \$8000 while the remaining 23 projects received the maximum \$16 000 for a total of \$400 000.

The program has received approval for three years for a total funding of \$1.2 million. The program is a key component of the New Brunswick Mineral Resource Policy addressing the issue of declining mineral reserves.

## **Extech II Program**

The Extech II Program entered its second year of a scheduled five-year duration. The program, worth \$6.8 million, will carry out exploration technology research projects in the Bathurst Mining Camp and will run from 1994 to 1999. This involves bedrock mapping, mineral deposit studies, ore beneficiation, surficial geology, geochemistry, geophysical surveys and the integration of the results into a computerized GIS. The program is jointly funded by Natural Resources Canada and the New Brunswick Department of Natural Resources and Energy.

## **Airborne Geophysical Survey - Bathurst-Camp**

AERODAT Inc. has been selected to carry out an airborne geophysical survey of the Bathurst Mining Camp. The survey will commence in the summer of 1995 and results will be available in the spring of 1996. The survey will cover 3400 square kilometres or 20 471 flight kilometres. The results of the survey will intensify exploration and will generate considerable interest in this world-class mining camp. The program is funded jointly by the federal and provincial governments under the Canada/New Brunswick Cooperation Agreement on Economic Diversification.

## **4.5 Québec**

### **Exploration Expenditures in Québec**

Preliminary data indicate that exploration expenditures in 1994 reached \$136.4 million in Québec, an increase of 22 percent compared with 1993 (\$111.8 million). This second consecutive yearly increase in exploration expenditures follows a low of \$101.5 million reached in 1992. Junior spending also increased to \$31 million in 1994 from

\$26 million in 1993. Off-property exploration expenditures increased 22 percent to \$112 million in 1994 compared with \$92 million in 1993, while on-property exploration also increased 22 percent to \$24 million in 1994 from \$20 million in 1993.

This improved performance is due to the Québec mining industry benefiting from better worldwide economic conditions. It is also due to the increase in the price of gold which, expressed in Canadian dollars, is up almost 13 percent because of the decrease in our currency rate. Moreover, the increase in the price of the other precious metals and base metals has contributed to boost exploration activity. The impact of favourable flow-through share tax incentives, together with various programs to support mining exploration in Québec, were also important factors.

According to the survey carried out in the fall of 1994 on the spending of mining companies, the rebound in exploration activity should continue in 1995. Total exploration spending in Québec should amount to \$141 million, \$116 million in off-property and \$25 million in on-property exploration.

### Flow-Through Share Financing and Exploration Expenditures in Québec

	1991	1992	1993	1994 <sup>p</sup>	1995 <sup>e</sup>
(\$ millions)					
Value of Flow-through Share Issues	9.4	13.6	27.2	24.6	N/A
Exploration Expenditures	144.4	101.5	111.8	136.4	140.9
Off-property	124.2	83.6	91.9	112.0	116.4
On-property	20.2	17.9	19.9	24.4	24.5

Source: Service de la recherche en économie minérale.

p : Preliminary data.

e : Estimates derived from the survey carried out in the fall of 1994.

### Flow-Through Share Financing

Preliminary data indicate that the level of flow-through share financing reached \$25 million in 1994 compared to \$24 million in 1993. The equity markets have not been favourable to junior flow-through share financings, especially during the last three months of the year. The metals and minerals index dropped 5 percent on the Montréal Exchange during that period. Given that many flow-through share financings usually take place during that period, this situation had a negative impact on flow-through

share issues. The value of shares being lower, the amounts of the offerings had to be reduced and many offerings had to be withdrawn.

Although cyclical stocks, such as those in the mining sector, could continue to benefit from economic growth, it is unlikely that this will have much impact on the volume of financing because mining companies have increased their equity significantly since 1993.

Hence, in 1995, the mining industry is expected to witness a reduction in public financing because most of the companies that have development projects have already secured the funds they need. As far as flow-through share financing is concerned, the stock market performance during the balance of the year, especially in the last quarter, will be critical. At this stage of the economic cycle, it is expected that the level of funds raised in 1995 by means of flow-through shares will be close to the level of 1994.

### **Other Statistics on Exploration**

The number of metres drilled by diamond drilling companies and the number of claims recorded are two other useful indicators of exploration activity. Diamond drilling increased in 1994 while the number of claims decreased.

In 1994, diamond drilling reached 986 103 metres, up from 741 045 metres in 1993, an increase of 33 percent according to preliminary data. For the first three months of 1995, the number of metres drilled was 303 907, a decrease of 6.9 percent over the corresponding period in 1994.

There were 19 277 recorded claims in 1994, a decrease of 25 percent from 1993.

### **Tax Measures For Flow-Through Share Financing**

In the May 12, 1994 budget speech, the Québec Minister of Finance announced that the existing flow-through share tax incentives would be in force for one more year, i.e., to the end of 1996. The tax benefits apply to exploration expenses incurred in Québec by an individual before January 1, 1997, subject to the 60-day period provided in tax legislation.

The impact of these tax benefits is important for investors. With respect to surface exploration expenses, an investor who buys flow-through shares benefits from tax deductions of 175 percent of the expenses at the provincial level and 100 percent at the federal level. The following table provides a few examples of tax savings at various taxable income levels. The table shows that the two levels of government assume up to 73 percent of the cost of exploration expenditures in Québec financed with flow-through shares, 46 percent by Québec and 27 percent by the federal

government. The net after-tax cost of a \$1 000 investment is \$273 at the highest tax rate.

Further, in the May 9, 1995 budget speech, the Québec Minister of Finance announced a study to be undertaken jointly between the Department of Natural Resources and the Department of Finance to look at the terms and conditions to extend for one year, beyond the current 60-day period, the possibility for an investor to deduct in the current tax year, exploration expenses incurred in the following year.

### **Other Mining Exploration Incentives**

In the budget speech of May 9, 1995, the Québec Department of Finance announced that a new refundable tax credit for financing small- and medium-sized mining companies would become available under the *Loi concernant les droits sur les mines* (mining tax). This credit would apply to the cost of certain types of investments which do not qualify for the refundable tax credit for losses which is currently allowed under this law. The terms of this new measure will be announced in the coming months, and a Bill to this effect could be tabled in the fall of 1995. This new measure will be in effect for a period of five years from the date at which it is brought into force or until a total amount of \$9 million in credits has been allowed.

Starting in 1995-96, the current Québec mining exploration incentive program (Programme de soutien à l'exploration minière au Québec - PSEMQ), which is administered by SOQUEM and ends next year, is being replaced by a mining investment support program (Programme de soutien à l'investissement minier - PSIM) and extended for two more years, until June 30, 1998. This program will have an annual budget of \$2 million. It will be available to any small- or medium-size mining company having a place of business in Québec and which has less than \$50 million in assets or less than \$40 million in equity. Small- and medium-sized companies must have incurred exploration expenditures of at least \$300 000 in Québec during the five years preceding their application. Within this framework, SOQUEM will target, although not exclusively, the projects of small- and medium-sized mining companies that have reached a stage beyond that of exploration.

**After-Tax Cost of a \$1 000 Flow-Through Share Investment  
for Surface Exploration<sup>1</sup> in Québec**

Taxable Income	Combined Marginal Tax Rate	Provincial Tax Savings (A)	Federal Tax Savings (B)	Total Savings (A + B)	Net Investment Cost [1,000-(A+B)]	After-Tax Break-Even Point <sup>2</sup>
\$40 000	46.2 %	\$414	\$225	\$639	\$361	\$434
\$50 000	47.7 %	\$441	\$225	\$666	\$334	\$402
\$60 000	51.5 %	\$462	\$251	\$713	\$287	\$354
\$62 195 and over	52.9 %	\$462	\$265	\$727	\$273	\$340

Note: Flow-through shares for surface exploration generate a deduction of 175 % at the provincial level and 100 % at the federal level.

The table reflects income tax provisions applicable for calendar year 1995 for a Québec taxpayer who is an individual. Marginal tax rates take into account the provincial and federal surtaxes. Issue expenses are not taken into account.

1. New issues often comprise flow-through shares and common shares sold as units. In such cases, the tax deduction will be proportionate to the number of flow-through shares included in each unit.
2. The break-even point takes into account current income tax provisions relating to capital gains and the reduction available in Québec by means of the special account that shelters the deemed capital gain from taxation that excludes the cost of flow-through shares.

#### 4.6 Ontario

##### **Mineral Exploration Expenditures and Regional Outlook**

Mineral exploration and development expenditures in Ontario are forecast to be \$333 million in 1995. These expenditures represent a 16 percent increase over 1994 (preliminary) figures of \$288 million and a 10 percent increase over 1993 expenditures of \$304 million. Mineral exploration and development expenditures in the province peaked in 1988 at \$756 million.

Mine-site development expenditures are anticipated to be \$211 million in 1995 compared to \$189 million in 1994 (preliminary) and \$299 million in 1993. These data include both field and overhead expenditures. In 1993, 53 percent of mine-site development field expenditures were on precious-metals projects and 36 percent on

base-metal projects. This compares to 48 percent and 42 percent, respectively, in 1992.

Off- and on-property (general and mine-site) exploration expenditures are forecast to be \$122 million in 1995, up from \$99 million in 1994 (preliminary) and \$76 million in 1993. In 1993, 41 percent of general and mine-site field exploration dollars were spent on base-metal exploration and 55 percent was spent on precious-metal exploration, primarily for gold. This is in contrast to 1992 when 49 percent was spent on base metals and 44 percent on precious metals.

Total exploration expenditures forecast by senior mining companies in 1995 were up 11 percent from 1994 (preliminary). Seniors were responsible for approximately 75 percent of the forecast off- and on-property total exploration expenditures of \$122 million in 1995, compared to 84 percent in 1994 (preliminary) and 88 percent in 1993. Junior companies made up 25 percent of forecast total exploration expenditures in 1995, up from 16 percent in 1994 (preliminary) and 12 percent in 1993.

The number of active claims/claim units in Ontario at the end of December 1994 was 153 040, up 8 percent from the 140 162 claims in December 1993. The number of claims in good standing is considered a good indicator of the level of exploration activity in the previous year. The 1994 figure represents the highest level since the number of claims in good standing peaked in 1988 at over 171 000.

In 1994 and 1995, exploration activity continues to be highest in northeastern Ontario. There are 17 advanced exploration stage projects and 7 development stage projects (production decisions announced) active in the province. Of these, 10 advanced exploration projects and 6 development projects are located in the northeast. In 1993, 72 percent of exploration and development field expenditures were made in northeastern Ontario, down from 74 percent in 1992.

Development stage projects in the Timmins area include Placer Dome's Super Pit and Paymaster Mine gold projects and Black Hawk Mining's Redstone base-metal project. In the Sudbury region, the Craig Mine and McCreedy East Mine base-metal projects are in the development stage. Production decisions have also been announced at Hemlo Gold's Holloway gold project north of Kirkland Lake and Inco's Shebandowan base-metal mine west of Thunder Bay.

### **Mineral Exploration Incentive Programs**

Ontario's incentive programs, the Ontario Mineral Incentive Program (OMIP) and the Ontario Prospectors Assistance Program (OPAP), provide financial assistance to qualified individuals and companies involved in mineral exploration and development in Ontario. The incentives budget allocated for 1995 totals \$5 million, \$3 million for

OMIP and \$2 million for OPAP. Eligible advanced exploration and industrial mineral programs in Northern Ontario are supported through the Northern Ontario Heritage Fund Corporation's (NOHFC) Resource Diversification and Development Program. Starting in 1994, the NOHFC also supported eligible surface definition drilling programs through the Special Projects Program.

OMIP provides grants to qualified companies and individuals equal to 30 percent of approved eligible expenses. Maximum assistance for grassroots projects in Ontario is \$100 000 per project, \$200 000 per applicant per calendar year. Maximum assistance for advanced exploration/industrial mineral pre-development projects in Southern Ontario is \$300 000 per applicant per calendar year. Maximum assistance is \$300 000 per applicant per calendar year for designated projects.

OPAP provides grants to qualified individuals equal to 100 percent of approved eligible expenses. Maximum assistance is \$10 000 per individual per year.

A total of 209 individuals received OPAP grants during the 1994-95 fiscal year. OMIP grants were distributed to 58 projects during the same period.

For 1995, 233 individuals have been approved for OPAP assistance and 74 projects have been approved for OMIP assistance.

To offset the reduced level of OMIP funding in 1993, the NOHFC expanded its program guidelines to provide financial assistance to more advanced mineral exploration programs in Northern Ontario. Advanced exploration programs in Northern Ontario may receive a one-time grant of up to \$300 000 per project, or 30 percent of eligible costs. Investment, pilot plant, marketing and industrial mineral sampling programs in Northern Ontario are eligible to be considered for a non-repayable contribution up to 75 percent of the approved cost of the project to a maximum of \$75 000. Definition drilling was supported for a one-year trial basis through NOHFC. One-time loans, repayable if the deposit is put into production, for 30 percent of the approved costs of surface definition drilling, to a maximum of \$300 000, will be considered.

In 1993, eight advanced exploration projects were approved for NOHFC assistance for a grant payout of about \$2.1 million. Since 1993, 32 advanced exploration projects were approved for \$11.4 million in NOHFC assistance.

### **Tax Treatment of Flow-Through Shares**

The Ontario government approved legislation that provides capital tax relief for mining companies using flow-through shares for financing. Although Ontario capital tax relief is retroactive to 1985 for exploration expenses renounced to individuals, corporations assessed Ontario capital tax under the old rules should apply for reassessments.

## **4.7 Manitoba**

### **Manitoba Commentary**

Mineral exploration expenditures for 1994 are estimated at \$40 million compared to \$31 million in 1993. Surface diamond drilling in 1994 is estimated at 157 779 metres compared to 120 724 metres in 1993. The total area of claims recorded in Manitoba during 1994 was 1 085 711 hectares compared to 486 148 hectares in 1993. The total area of mineral dispositions in good standing at the end of 1994, including claims, permits and leases, was 3 521 046 hectares compared to 3 032 548 at the end of 1993.

A tremendous increase in land acquisition for diamond claims in the southeastern part of Manitoba and in the northern Precambrian Shield occurred in early 1994. Due, however, to a nationwide loss of momentum in diamond exploration activity, this early 1994 heavy land acquisition activity in Manitoba was not followed by the expected exploration activities.

A continuing interest for gold and base metals continued in 1994, with highlights as follows:

- Towards the end of 1994, Granduc Mining Corporation achieved its targeted production rate of 1200 tonnes per operating day at the Keystone Gold Project near Lynn Lake. Hudson Bay Mining and Smelting Company Limited (HBMS) brought the Westarm copper-zinc mine, 15 km south of Flin Flon, back into production.
- At Snow Lake, TVX Gold Inc. continued to work on the New Britannia Gold Mine Project, with the intention to start production late in 1995.
- Inco Limited announced the discovery of a high-grade nickel deposit referred to as Pipe Deep, 30 km south of Thompson, and at Photo Lake, 10 km southwest of Snow Lake, HBMS outlined a small high-grade copper-zinc deposit.
- At Pipestone Lake in central Manitoba, Gossan Resources Limited and Cross Lake Mineral Exploration Inc. (a private company owned by the Cross Lake First Nations Indian Band) have completed a \$1.5 million drilling program on a large titanium-vanadium-iron deposit with promising economic concentrations of these three elements.



## **Mining and Exploration Incentive Programs**

The 1994 Government of Manitoba budget introduced several tax initiatives that build upon previous incentives such as the Mining Tax Holiday for new mines, the Mining Tax Exploration Incentive, the Mineral Exploration Incentive Program and the Manitoba Prospectors Assistance Program. These incentive programs have repositioned Manitoba from having the highest combined income and mining tax rates to among the lowest in Canada for new mines.

### **Tax Initiatives Announced in 1994 Budget**

- A new investment credit of 7 percent of investments made between April 21, 1994 and December 31, 2003, in new mines and processing facilities in Manitoba, or major expansions of existing mines or processing facilities, will be available. The new credit is deductible to a maximum of 30 percent of mining tax payable in a given year and can be carried forward for use in future years.
- The processing allowance, which may be deducted from mining taxes, has been increased from 10 to 20 percent of the original cost of processing assets acquired for new mines or major expansions to existing facilities.
- The sales tax for electricity used for mining and manufacturing has been reduced by one-half, to 3.5 percent, effective June 11, 1994. Effective April 1, 1995, electricity used for mining and manufacturing will be completely sales tax exempt.

### **Mining Tax Holiday for New Mines**

For new mines established after January 1, 1993, a mining tax holiday has been implemented. Qualifying mining operators will not be required to pay the mining tax until their profits for mining tax purposes equal their capital outlays in opening the new mine. At the end of the tax holiday, operators will inherit the undepreciated balance of book assets.

### **Mining Tax Exploration Incentive**

Mining companies which increase their exploration activities in search of new mines in Manitoba are entitled to a deduction equal to 150 percent of exploration expenditures. Eligible exploration expenditures in a given year must exceed the average of expenditures in the previous three years.

### **Prospectors Assistance Program**

The government will reimburse 50 percent of prospecting expenditures of qualifying self-employed prospectors to a maximum annual grant of \$7500 on pre-approved projects. To March 31, 1995, 76 projects have been approved for a total of \$870 000 of expenditures; \$545 000 of prospecting has been completed and \$273 043 of grants have been paid to prospectors.

### **Mineral Exploration Incentive Program**

The Mineral Exploration Incentive Program (MEIP) is a \$12.5 million grant program designed to assist exploration companies in raising investment capital via flow-through shares and limited partnerships. \$10 million has been approved for mining exploration and \$2.5 million for oil and gas exploration. MEIP has been operating since April 1, 1992.

Forty-two exploration projects for \$25.3 million of exploration expenses and \$7.25 million of incentives grants have been approved since April 1, 1992. \$8.36 million of exploration has been completed and \$1.45 million of incentive grants have been issued. MEIP has incurred total expenditures of \$1.8 million, including incentive grants, operating expenditures and salaries.

Twelve exploration projects for \$13.01 million of exploration expenses and \$3.40 million of incentives were approved in the 1994/95 fiscal year. \$890 223 of incentive grants have been issued and over \$5.67 million of exploration was completed in 1994/95. MEIP incurred expenditures of \$1 million during this fiscal year.

### **Sustainable Development Mineral Strategy**

The Government of Manitoba has adopted the principles of sustainable economic development as the cornerstone of its economic and environmental agenda. A document entitled "Sustainable Development Mineral Policy Applications" has been produced to define the policy as it applies to the mining sector. An implementation and action plan is presently being prepared and this document, in conjunction with the introduction of a Sustainable Development Act, will outline the process by which the principles of sustainable development will be applied to government programs.

Issues related to land access, environmental permitting, security of tenure, and the need to increase mineral exploration to sustain the mining industry in Manitoba and Canada continue to rank at the top of the mining industry's concerns.

## **Land Use Policy**

A new land use policy was enacted as a regulation under the *Planning Act* in September 1994. The policy provides for regulatory control of land use allocation and offers comprehensive protection for mineral resources and mining rights.

Policy No. 9 of the *Planning Act* states that "Economically valuable mineral and oil and gas resources shall be protected from land uses that would restrict mineral and oil and gas exploration and development. Ongoing and future development of the province's mineral and oil and gas resources shall be encouraged."

### **4.8 Saskatchewan**

The annual survey of mineral exploration expenditures carried out by the provincial resident geologists estimates expenditures of \$23 million in 1995 compared to \$29 million in 1994. These figures exclude test mining activities for gold and uranium, which together contributed an additional \$37 million and \$49 million, respectively, in these two years. The downtrend in exploration activity beginning in 1988, while stalled by the explosion of interest in diamonds, has not been offset as exploration for uranium, gold and base metals has remained stagnant (see table).

The total number of dispositions in good standing at the end of 1994 was 8463 (covering 6.0 million hectares) compared with 6542 (covering 4.4 million hectares) in 1993. In 1994, 2318 new dispositions were recorded covering 1 953 635 hectares, a decrease of 13 percent in the number of new dispositions over the previous fiscal year.

While uranium exploration in Canada remained focused on Saskatchewan, the level of activity in the province was still at a low ebb. Both a local reserve base that exceeds 20 years, and a global supply surplus due to inventory sales from the C.I.S. republics and the Western world, have contributed to the reduced activity. Exploration, which was concentrated in the eastern and southeastern parts of the Athabasca Basin, failed to produce any significant discoveries in 1994; rather, the industry was in a development phase. In March, federal government approval was received for full production at the Eagle Point mine at Rabbit Lake. The Cigar Lake test mine was on a care and maintenance basis pending preparation and submission of an Environmental Impact Statement (EIS) to the federal-provincial uranium review panel. The McArthur River underground exploration program was ongoing for production mine design purposes. New developments at Cluff Lake (Dominique-Janine extension project) approved in December 1993 were under way. The McClean Lake project, which also received approval, was preparing for construction scheduled to begin in early 1995. The project was launched in March 1995 with Cogema Resources Inc.'s announcement of the decision to proceed. The Midwest project, which failed to receive approval, has been re-engineered by Cogema (the operator) who envisages mining of the McClean

and Midwest properties as a complementary operation. Both federal and provincial governments have agreed to a joint panel review of a new EIS.

The gold sector, like uranium, was in a development phase. Exploration, focused in the La Ronge and Glennie domains, was undertaken by less than ten companies compared to over 60 in 1988. Greater Lenora Resources Corporation was active again on the Goldfields property, south of Uranium City. A 52-hole drill program tested the Box Mine mineralization proximal to old workings and at depth; a 50-hole drill program was completed at the Athona Mine. The new drilling results served to indicate an improved grade of around 2.4 g/t (0.07 oz/ton) gold but a reduced volume of reserves, previously estimated at 27 million tonnes grading 1.85 g/t (0.054 oz/ton) gold. A final reserve estimate and feasibility study is scheduled to be completed by mid-1995. A 4100 tpd operation using total gravity separation with production of 100 000 oz of gold per year is envisaged.

A Cameco-operated joint venture brought the Contact Lake mine in La Ronge Provincial Park to commercial production at the end of 1994. The official opening was held on February 22, 1995. The 700 tpd mill is hoped to eventually produce in excess of 60 000 oz of gold annually from mineable reserves of 1.3 million tonnes grading 8.0 g/t (0.23 oz/ton) gold. The mine, potentially the largest gold mine to date in Saskatchewan's history, has an estimated life of six years; however, additional geological reserves and ongoing exploration will likely extend this period.

Waddy Lake Resources Inc., 55 percent owned by Golden Rule Resources Ltd., successfully completed underground test mining and a 7000-m surface drill program on its 100 percent-owned Komis property. Full production has been scheduled for the second half of 1995, pending EIS approval. Milling will be undertaken at the old 400 tpd "Jolu" mill, 40 km south of the mine-site. Total reserves are estimated at 1 148 000 t grading 14.45 g/t (0.42 oz/ton) gold and proven reserves at 331 000 t grading 18.8 g/t (0.55 oz/ton) gold. Komis is one of several advanced gold properties held by Golden Rule in the Byers Fault area.

Claude Resources Inc.'s Seabee Mine achieved some 50 700 oz. of production in 1994. Underground exploration significantly increased reserves which stood at 445 000 t grading 10-11 g/t (0.29-0.32 oz./ton) gold in November 1994. Exploration will almost certainly identify additional reserves both on the Seabee property and in the surrounding area, for which Claude has a development agreement with Currie Rose Resources Inc.

Base-metal exploration programs were undertaken primarily in the southeastern Shield area and its sub-Phanerozoic extension and in the Wollaston Domain. At Denare Beach, near Flin Flon, Hudson Bay Exploration and Development Company Limited pursued an aggressive land acquisition program in response to encouraging results from drilling mafic volcanics. Previously discovered massive sulphide deposits in

these rocks include the copper-dominant Birch, Flexar, and Coronation mines. Noranda Exploration Company Ltd. continued its efforts to locate stratiform, sediment-hosted base-metal deposits in the Wollaston Domain. Geophysical and drill programs were carried out in early 1994 in the Pendleton, Sito, Fannon, and Duddridge lakes areas in follow-up to 1993 drilling, which had intersected low-grade copper and lead-zinc mineralization over significant widths. Noranda has been inactive on this play since the new 1994 drilling, leaving a number of discoveries inadequately tested. Detailed mapping by Saskatchewan Energy and Mines in the Janice Lake area resulted in discovery of two new copper prospects.

Diamond exploration boomed in 1994 with over 4 million hectares under disposition, some seven times the area of two years ago, mostly between latitudes 53° and 56° in the Fort à la Corne, Sturgeon-Candle-Tobin lakes area. In early 1994, a War Eagle Mining Co. Ltd.-Great Western Gold Corp. joint venture drilled five diamondiferous pipes at two locations near Candle Lake. These discoveries fall within the Candle Lake magnetic low trend and form a northern extension to the Fort à la Corne kimberlite field, which contains at least 70 bodies up to 100 ha in size. Fort à la Corne is currently under investigation by a Monopros Ltd.-Cameco-Uranerz Exploration and Mining Ltd. joint venture, which has been bulk sampling the most prospective targets, and by Rhonda Mining Corp. and its joint-venture partners. Cameco reported grades of up to 11.97 cpht in the 1994 drilling of 12 kimberlites, seven of which were previously untested. A total of 30 kimberlites remain to be evaluated on the joint-venture property. Kimberlite complexes in this region are almost totally preserved in the Cretaceous sedimentary sequence in the form of kimberlite filled craters flanked by kimberlitic and reworked kimberlitic sediments. Several new airborne magnetic surveys were flown by joint ventures during the year, as this exploration method has proven most effective in locating kimberlite targets identified as bull's-eye magnetic "highs." A period of ground follow-up and diamond drilling in harmony with rationalization of land holdings has begun and will escalate in 1995. Diamond exploration is also ongoing in the southwest and south-central areas of the province where kimberlite indicator minerals are widespread.

**EXPLORATION EXPENDITURES - RESIDENT GEOLOGIST'S SURVEY**  
(\$ millions)

	<u>1987</u>	<u>1988</u>	<u>1989</u>	<u>1990</u>	<u>1991</u>	<u>1992</u>	<u>1993</u>	<u>1994</u>	<u>1995e</u>
Precious metals	29	42	20	11	5	6	2	4	4
Base metals	3	6	7	7	6	4	4	4	3
Uranium	18	20	21	12	10	8	7	11	11
Other	-	-	2	2	3	4	11	10	5
<b>Total</b>	<u>50</u>	<u>68</u>	<u>50</u>	<u>32</u>	<u>24</u>	<u>22</u>	<u>24</u>	<u>29</u>	<u>23</u>

e: estimate

Other: some industrial mineral activity but predominantly diamond exploration.

## 4.9 Alberta

Alberta continued to have a large amount of land under exploration agreements, due in large part to the diamond and gold rushes of 1993 and 1994. At the end of May 1995, there were 4320 active metallic and industrial minerals permits on 37.6 million hectares, covering an area equal to 57 percent of the province. Assessment reports on these permits are only starting to come in now, so the total level of expenditures will not be known until late in 1995.

Exploration for diamonds continues in the form of sediment sampling, ground and airborne geophysics and drilling. Montello Resources reported recovering drift diamonds in the Hinton area, and kimberlites are rumoured to have been found in the Peace River area. Exploration has also proceeded in the central Foothills region and in southern Alberta, where the first drift diamonds were reported. Indicator minerals have been reported in many parts of Alberta, and both the Alberta Geological Survey and the Geological Survey of Canada have published background data for diamond exploration.

The other major exploration focus has been for gold and base metals in the Fort MacKay area. Significant exploration programs have been conducted by Tintina Mines Ltd., Birch Mountain Minerals and Focal Resources. Advances have been made in the detection of metals and values have now been obtained through traditional assay techniques for both precious and base metals. As a result of exploration, the units of interest now include not only the original Devonian carbonates, but also the Cretaceous sandstones, the Shaftesbury shales, the coal units, and the underlying basement and placer deposits. The Geological Survey of Canada and the Alberta Geological Survey are involved in projects investigating the Shaftesbury Formation across the northern part of the province and the Devonian carbonates in the Fort MacKay region.

Flow-through shares in 1994 on the Alberta Stock Exchange totalled \$60.9 million, which is a 6.7 percent increase over the 1993 total of \$57.1 million. To the end of April 1995, year-to-date flow-through share issues were \$39.1 million compared to \$28.8 million for the same period in 1994. The high level of flow-through share activity since 1993 is attributable to the federal changes to the *Income Tax Act* in December of 1992 that facilitate greater use of flow-through shares. This funding has primarily been used for oil and gas exploration, with issues on all exchanges estimated at \$138.6 million for 97 financings in 1994, compared to \$145.1 million through 112 issues in 1993.

## **4.10 British Columbia**

### **Exploration in B.C. in 1994**

Exploration activity levels in B.C. increased substantially in 1994. Preliminary estimates from federal/provincial surveys indicate that a total of \$93 million was spent on exploration programs, an increase of over 40 percent from the \$66 million spent in 1993. Ministry sources estimate exploration expenditures for industrial minerals more than doubled from \$2 million to \$4.5 million in 1994. Mineral claim-staking activity rose in 1994 with 29 245 mineral claim units recorded, up 18 percent from 1993 levels.

Based on information supplied by B.C.'s provincial regional geologists, approximately 11 percent of exploration expenditures were at mine-sites, 9 percent on bulk sampling projects, and 32 percent on "advanced" projects, including environmental studies and reclamation programs. Almost half of all exploration dollars was estimated to have been spent on less advanced, general and grassroots programs. Regional summaries counted approximately 225 projects with budgets in excess of \$100 000, up from 100 projects in 1993. Twenty companies spent more than \$1 million each on exploration in B.C. during 1994.

Over half of all project expenditures in 1994 were made in the northwest part of the province. The growing revival in porphyry copper exploration is the most apparent new trend in northwestern B.C. The porphyry component of exploration spending increased to \$9 million in 1994 from \$3 million in 1993. This increase reflects not only the addition of a major program at American Bullion's Red Chris property and continuation of the Huckleberry project, but also new activity in the Houston-Babine area. Continued strength in copper prices and in the demand for copper concentrate are likely to maintain interest in porphyry copper exploration in 1995.

There is also continuing interest in small, high-grade gold deposits, particularly in the northwest and south-central regions of the province. Exploration for projects such as the Elk/Siwash mine can be partially financed through the sale of high-grade, direct-shipping ore from bulk sampling projects.

The outlook for 1995 shows continuing strength in activity on B.C. projects. The most recent federal/provincial survey forecasts exploration spending of \$91 million in 1995, on par with the \$93 million spent in 1994. Claim-staking activity for the first five months of 1995, at 9572 mineral claim units recorded, is below the 12 011 recorded in the same period a year ago; however, staking activity for May 1995 was up substantially from a year ago.

## **Highlights of B.C. Exploration and Development in 1994**

1994 saw the opening of Prime Resources' Eskay Creek mine, a high-grade silver-gold mine in northwestern B.C. Construction of mine facilities was completed in September and mine production began in December. The mine, which is the first new major mine to open in B.C. since 1991, will ship 90 000 tonnes of ore in 1995 containing 5.3 million grams of gold and 227 million grams of silver. The mine employs 115 people.

Several other major projects continued development towards production. Kinross Gold's Quesnel River Project, southeast of Quesnel, began construction in 1994. Mining and stockpiling of ore commenced in April 1995 and milling began in June. At full production, the project will produce 1.2 million grams of gold annually from a combination of open-pit and underground mining and employ 80 people.

Bralorne-Pioneer Gold Mines and International Avino Mines received a Mine Development Certificate in March 1995 to reopen the Bralorne gold mine near Lillooet, based on newly discovered reserves. The project is expected to begin production by the end of 1995, producing 780 000 grams of gold in 1996 and will employ 150. The Bralorne mine last produced in 1970.

Construction of Imperial Metals' Mount Polley copper-gold project, northeast of Williams Lake, will continue through 1996 with the mine scheduled to open in early 1997. The mine will produce 15 million kilograms of copper and 2.1 million grams of gold annually and will be B.C.'s first new copper mine in more than a decade.

In August 1994, Wheaton River Minerals and North American Metals received a Mine Development Certificate for a revised production plan at the Golden Bear mine in northwestern B.C. The plan involves heap-leach technology from the Kodiak deposit and extends the life of the operation for an additional five years based on currently known lode gold and stockpiles. Several million dollars were spent at the site in 1994, including additional drilling on the Grizzly deposit, which could allow the mill to reopen in the future. The mine expects to resume gold production through heap-leaching by September 1995.

Several B.C. projects had more than \$1 million worth of exploration work during 1994. As in 1993, by far the largest program in the province was the \$15 million spent by Lac Minerals Ltd. on the Red Mountain gold project near Stewart, which included road construction, underground development and intensive diamond drilling; however, American Barrick Resources gained control of Lac Minerals Ltd. in 1994 and attempted to sell the property but has since placed the project on hold. American Bullion Minerals conducted an exploration program of \$4 million, including a 58-hole diamond drilling program on its Red Chris property, designed to expand a higher grade core within the deposit. Southwest of Houston, New Canamin Resources



completed a \$3 million program including nearly 33 000 metres of drilling on the Main and East zones at its Huckleberry copper project. The mining plan outlines two open pits that would be developed sequentially over a mine life of 18 years, producing nearly 30 million kilograms of copper annually. Princeton Mining Corp., which was in the process of acquiring New Canamin Resources in June 1995, expects to submit a revised application for a mine development certificate in 1995.

Fairfield Minerals continued several million dollars worth of underground exploration, development and test mining at its Elk property and Siwash mine, as well as on the nearby Crest and Oka gold properties. Hera Resources Inc. and International Taurus Resources Ltd. spent over \$1.5 million on exploration at the Taurus project near Cassiar in 1994, including underground exploration and development, surface drilling and trenching. At Fish Lake, Taseko Mines completed a \$1.7 million pre-feasibility work program. The company is in the pre-application phase of the Mine Development Assessment Process. Newhawk Gold Mines spent \$1.5 million at its Sulphurets project in 1994, near the Eskay Creek project, including several thousand metres of deep hold drilling.

### **B.C. Initiatives For Mining and Exploration**

In 1994, the province announced initiatives worth \$100 million over the next five years providing significant tax reductions and exploration incentives to assist and promote the mining industry in B.C. These initiatives include EXPLORE B.C., a three-year program designed to provide part of the risk capital required by companies to finance their exploration programs, to extend the economic lives of existing mines, and to contribute to community stability in existing mining regions.

The program has two components. The first, the Mineral Exploration Incentive Program (MEIP), provides grants to eligible exploration companies or individuals to cover up to one-third of eligible exploration expenses on mineral properties with identified economic potential. Maximum assistance is \$150 000 per project. In 1994/95, grants totalling \$1.65 million were dispersed to 39 companies under the MEIP program. The second, the Accelerated Mine Exploration Program (AMEP), provides grants to mining companies to cover up to one-third of eligible exploration expenses at existing mines for the purpose of discovering additional reserves. Maximum assistance is also \$150 000 per project. Under the AMEP program, grants totalling more than \$1 million were awarded to eleven projects. In addition, the three-year Prospectors' Assistance Grant Program is designed to promote grassroots prospecting for new mineral deposits in B.C., which would contribute up to 75 percent of eligible costs of an approved project to a maximum of \$10 000. In 1994, sixty-nine grants were awarded, totalling approximately \$500 000.

A number of tax changes were made to promote mineral development. The 1994 Provincial Budget amended the *Mineral Tax Act* to allow companies with more than

one operating mine in the province to pool exploration expenditures effective March 23, 1994, providing new flexibility for mining companies in using exploration deductions. In addition, effective January 1, 1995, a five-year program began whereby the allowable deduction for capital costs for a new mine or major expansion was to be increased by one-third for the calculation of mineral taxes. Effective January 1, 1995, mineral taxes were made deductible for the calculation of provincial corporate income tax. In addition, effective March 23, 1994, mineral tax rates for coal mines were reduced to the levels of metal mines.

B.C. also spent \$1.6 million in 1994/95 under the Federal/Provincial Mineral Development Agreement. This program runs to 1995/96 and coordinates the efforts of Canada and B.C. to strengthen and diversify the province's mineral industry. Activities sponsored under the agreement include the funding of geological, market and technology studies. New value-added opportunities will also be examined.

#### **4.11 Northwest Territories**

##### **1994 Production Summary**

Preliminary production figures for 1994 show that the NWT supplied 5.3 percent of the total value of Canada's metallic minerals. The operating mines of the NWT produced 18.8 percent of Canada's zinc, 9 percent of its gold, 21.7 percent of its lead and 2.4 percent of its silver. In Canada, the NWT moved up to second spot in zinc production.

For the first time since 1989, the preliminary value of metallic minerals shipped from the NWT mines increased instead of declined and in 1994 stood at \$493.7 million compared to \$392.5 million in 1993. Zinc and gold continue to be the primary commodities of the NWT.

NWT's 13 079 kilograms of gold worth \$220.5 million makes the NWT the third largest gold producer in Canada. The volume of gold shipments has been steadily decreasing since 1991. The value of gold produced forms 45 percent of the NWT's total metallic minerals in 1994.

Zinc continues to be the most valuable commodity to the NWT as its value of \$242.4 million represents 49 percent of NWT metallic minerals. The total tonnage of zinc shipments increased 21 percent to 180 730 tonnes from 1993. The NWT is Canada's second largest zinc producer.

Lead shipments increased from 29 178 tonnes in 1993 to 36 058 tonnes in 1994 and their value was \$26.8 million. The NWT is Canada's third largest lead producer.

Royal Oak's Colomac gold mine re-opened in February, 1994. The 9400-tpd Colomac Mine is located in the Indin Lake area approximately 200 km north-northeast of Yellowknife.

### **1994 Exploration Summary**

The exploration boom in the NWT continued throughout 1994. Preliminary results from Natural Resources Canada's exploration surveys indicate that the NWT is first in Canada by far in mineral exploration expenditures of \$157.7 million. The NWT Chamber of Mines' survey has a preliminary figure for exploration expenditures of \$171 million, of which \$134 million was for diamonds, \$22 million for gold and \$10 million for base metals.

Over 3400 claims were staked in 1994 covering over 2.8 million hectares (6.8 million acres). Much of the staking was focused in the central to southern portion of the Slave Province as the search for diamonds continued.

A record number of prospecting permits were issued in 1994. Many of the 309 permits were for areas on Victoria Island where nickel-copper deposits and diamonds were the targets.

Industry did not solely target diamonds in 1994. Gold and base metals were also a focus of industry interest.

The Slave Province was once again the most active mineral exploration area in the country. Diamond exploration continued unabated during 1994.

The BHP-DiaMet diamond project is the most advanced of the many diamond projects ongoing in the NWT. A full EARP (Environmental Assessment Review Process) panel, requested by the Minister of Indian and Northern Affairs is now under way. The panel was appointed in December, 1994 by the federal Minister of the Environment. The review is estimated to be completed by early to mid-1996.

BHP-DiaMet submitted a project description in January 1994 and resubmitted a revised project description in December 1994. The project description outlines plans to develop and mine 5 kimberlite pipes over a 25-year period. Bulk samples of varying sizes have been collected from all five pipes.

The revised project description provides details on BHP-DiaMet's plans for the Koala mine. All five pipes will be mined initially as open pits; two pipes, Koala and Panda, will also be mined underground. The mill will be centrally located near the Koala pipe and process 9000 tonnes per day (tpd) during the first 9 years of production, increasing to 18 000 tpd in year 10. Employment at the mine is estimated at 650.

BHP-DiaMet are in the process of negotiating an Impact Benefits Agreement with various Aboriginal organizations in the region.

Work continued on numerous other diamond properties. While the testing of Kennecott's DO-27 pipe was disappointing, a mini-bulk sample of DO-18 was planned in early 1995. DO-27 and DO-18 form the Tli Kwi Cho double pipe and are jointly owned by Kennecott Canada Inc. (40 percent), Aber Resources (15 percent), Southernera Resources (10 percent) and Dentonia Resources Ltd., Horseshoe Gold Mining Inc., and Kettle River Resources Ltd. (collectively 35 percent).

Work on the A154 pipe on the Diavik property is advancing rapidly, since the discovery hole was announced in May 1994. The property is owned by Aber Resources (40 percent) and Kennecott Canada (60 percent). Several diamonds were visually identified in the drill core from a number of drill holes. Mini-bulk sample drilling started in the fall. Aber Resources and Kennecott Canada have applied for permits to complete a 6000-tonne bulk sample of the pipe in 1995.

A Yellowknife prospector, following a hunch, staked and drilled the Drybones Bay kimberlite, 45 km southeast of Yellowknife, on the shore of Great Slave Lake. The find revitalized diamond exploration outside of the "Corridor of Hope."

BHP Minerals Canada Ltd. continued into the fourth year of their major exploration program on the Boston gold property. The Boston property is 170 km south-southeast of Cambridge Bay and 50 km east of Bathurst Inlet. In late 1994, BHP Minerals applied for permits to proceed with an underground bulk sample on the property to be completed during 1995 and 1996.

The Nicholas Lake gold deposit, held by Athabaska Gold Resources Ltd., is 90 km north of Yellowknife. An underground bulk sampling program was completed in 1994. The ore will be shipped to Yellowknife via winter road for custom milling. Based on the underground sampling, new ore reserves have been calculated. A mine life of five years with an annual production of 33 000 ounces of gold has been projected. Athabaska plans to begin full-scale mining in early 1996.

Damoti Lake is 190 km north of Yellowknife and 12 km southwest of winter road access to the Colomac gold mine. Considerable exploration has been undertaken in the area around the original discovery, with over \$2.5 million spent on the Damoti property itself. The property is owned by Consolidated Ramrod Gold Corp. (51 percent), Gitennes Exploration Inc. (25 percent) and Athabaska Gold Resources Inc. (24 percent). Two other properties are being actively explored in the Damoti Lake area. The Fishhook property is 100 percent owned by Gitennes, while the TQY property is 50 percent owned by Tanqueray Resources and 50 percent by Gitennes.

The Discovery Mine, 85 km northeast of Yellowknife, operated between 1950 and 1969, producing 1 000 000 ounces of gold. New Discovery Mines Ltd. (50 percent), with GMD Resources (50 percent), has identified further ore reserves at the mine-site (Main Zone) and approximately 2700 m to the south (Ormsby Zone). They plan to go underground to collect a 7300t bulk sample at the Ormsby Zone in early 1995.

Fortune Minerals staked the NICO claims, looking for a polymetallic deposit, late in 1994 after the Geological Survey of Canada (GSC) released airborne magnetic data of the area. The NICO claims are approximately 150 km northwest of Yellowknife.

The Meliadine River Project, in the Keewatin, is a 50/50 joint venture between Cumberland Resources Ltd. and Comstate Resources Ltd. The large (41 000 ha) gold property is 20 km north northeast of Rankin Inlet and is 8 km wide and 72 km long. The Discovery deposit contains a mineral inventory of 900 000 t grading 9.94 g/t gold. Several other zones of mineralization have been identified. Over 8500 m were drilled in 1994, focusing on identifying zones of mineralization, rather than increasing tonnage in one deposit.

Of interest to the diamond exploration companies is the Thirsty Lake property, located 120 km northwest of Rankin Inlet. The property is owned by Cumberland Resources (50 percent), Comstate Resources (25 percent) and Manson Creek Resources (25 percent), known as the Parker Lake Joint Venture. Adjacent to the Sandhill base-metal property, a number of small samples have yielded a large number of micro-diamonds. The diamonds have been found in a minette dyke, different from kimberlite rocks usually associated with diamonds. The diamonds are small and generally of poor quality. However, the find has increased interest by diamond exploration companies and in the whole region.

A large part of the mineral exploration activity on the Arctic Islands was for diamonds. Exploration spread north from the mainland onto Victoria Island. Diamond exploration continued in the Brodeur Peninsula (Baffin Island) and Somerset Island areas. Lead-zinc exploration continued around both the Nanisivik and Polaris mines. A number of companies are exploring for copper and nickel, as well as diamonds on eastern and central Victoria Island. A dispute between the Department of Indian Affairs and Northern Development and the Inuvialuit Regional Council (IRC) concerning the authority and process for issuing prospecting permits arose and has now gone to arbitration.

Exploration work is also under way in the Paulatuk area, at the Darnley Bay gravity anomaly. Darnley Bay Resources acquired a number of prospecting permits in the area in early 1994. After discussions with the IRC and the community of Paulatuk, Darnley Bay Resources relinquished their permits within the proposed Bluenose (Tuktut Nogait) National Park, and received approval and cooperation for its exploration plans on the remaining permits.

The Prairie Creek deposit in the Mackenzie Mountains, north of Nahanni National Park, includes the 90 to 95 percent completed surface facilities, constructed by a former developer at a cost of \$100 million (1994 dollars). The mine-site was under care and maintenance from 1982 to 1991. San Andreas Resources Corporation began working on the deposit in 1991 and had identified by year-end 1994, reserves of 6.2 Mt grading 12.86% zinc, 12.18% lead and 179.9 g/t silver.

## **4.12 Yukon**

### **1994 Production Summary**

For the second year in a row there were no hardrock metal mines operating in the Yukon, but there are some advanced exploration projects which forecast production in 1995 or 1996. These are summarized in the following section on the exploration and development forecast for 1995. Placer gold mining continues to be a major Yukon industry, producing approximately 3218 kg gold (107 392 crude ounces) in 1994, a 5 percent increase over 1993. However, according to the Exploration and Geological Services Division of DIAND, the low number of placer leases staked in recent years suggests that exploration for new deposits had been minimal, and that production could soon decline. Anvil Range Mining Corporation acquired the Faro Mine assets and began stripping overburden from the Grum deposit, with mining planned for August of 1995 following completion of stripping. Two semi-precious mines produced minor tonnages of jade and rhodonite.

### **1994 Exploration Summary**

Exploration took place on more than 40 different properties in the Yukon but the bulk of 1994 exploration dollars were spent on 7 projects. The number of claims staked was 10 238, double the number staked in 1993, and the number of claims in good standing increased by 17 percent. DIAND Exploration and Geological Services Division reports that exploration expenditures reached approximately \$36 million, up from the \$20 million spent in 1993.

The seven projects which received the bulk of exploration dollars in 1994 include Casino, Brewery Creek, Division Mountain Coal, United Keno Hill Mines, Kudze Kayah and the Fairchild Lake Project. The first six of these are summarized in the following section. The Fairchild Project is located in the Bonnet Plume area, where diamond drilling exploration focused on copper-gold-silver-cobalt mineralization in "Wernecke breccias" on the Slab Olympic and Hoover properties.

In addition to the above projects, gold exploration drilling projects include the Laforma property on Mt. Freegold (2000 m in 23 diamond drill holes [DDH] ), the Aurex property (6000 m in 200 percussion holes and 600 m in 4 DDH), Red Mountain

property (243 m in 6 DDH) and the Tay-LP property (27 reverse circulation holes in 426 m). Base-metal exploration drilling projects include the Mel deposit (6 deep DDH), Canalask Property (940 m in 6 DDH), Blende Deposit (596 m in 7 DDH), and the Hart River deposit (1653 m in 6 DDH).

### **Exploration and Development Forecast for 1995**

According to a survey conducted by the Yukon Chamber of Mines in June of 1995, exploration expenditures for this year are projected to be approximately \$23 million and development spending on advanced projects is estimated to be \$61.5 million.

Loki Gold Corporation proposes to develop a bulk tonnage, low-grade heap leachable gold deposit on its **Brewery Creek** property, located 57 km east of Dawson City. This eight-year project involves open-pit mining from eight shallow gold deposits and the use of sodium cyanide solution to recover gold from the ore. The project will produce about 83 000 ounces of gold annually. The final environmental hearing before the Yukon Water Board took place on May 10-11, 1995, and a positive decision was made on July 18. Negotiations with the Dawson First Nation for a Socio-Economic Accord were successfully completed in the spring of 1995. The Brewery Creek project is scheduled for construction in 1995 and production in early 1996 pending permitting.

The **Carmacks Copper** Project, located 46 km northeast of Carmacks, is a low-grade heap leachable copper deposit owned by Western Copper Holdings Ltd. and Thermal Exploration Company. Ore will be mined from a single open-pit for 200 days of the year and sulphuric acid leaching of ore will continue year round. The project will operate for about 8.5 years and produce 14 310 tonnes of copper cathode per year. Copper cathode will be trucked to Skagway and then shipped by ocean to market. A production decision is not expected until the fall of 1995. The permitting process is under way and is expected to be complete by the fall of 1995. An Economic Development Agreement with the Little Salmon Carmacks First Nation is expected shortly.

Waste removal at the **Grum** deposit in Faro is ahead of schedule. Anvil Range Mining had stripped more than 5.5 million tonnes of waste by the end of April 1995 and hopes to have 22.5 million tonnes removed over the next 8-10 months. In addition, the company expects the first shipment of concentrate to occur by the end of October 1995. The Grum deposit has a projected minelife of about six years.

The **Casino** gold-copper-molybdenum project is owned by Pacific Sentinel Gold Corporation and located in the Dawson Range about 188 miles northwest of Whitehorse. **Casino** was the largest exploration project in the Yukon in 1994 with expenditures of about \$4.5 million. Open-pit mine design and preliminary

metallurgical studies are under way. Pre-feasibility studies will follow the metallurgical testing.

The permitting process is continuing on YGC Resources Ltd.'s **Grew Creek/Ketza River** project. The company plans to open-pit mine the Grew Creek gold and silver deposit, located 35 km west of Ross River, and truck the ore 90 km to the Ketza River mill for processing. Projected production is 30 000 ounces of gold per year for three years. YGC is examining various financing options for the project. Exploration drilling will continue on the Ketza River property this summer.

The **Minto** deposit is located about 80 km northwest of Carmacks and owned by Minto Explorations Ltd. The company proposes to mine the copper-gold-silver deposit using a combination of open-pit and underground methods and process the ore through a conventional mill. The project would be in operation for about 12 years and employ approximately 80 people. Permitting is under way and production is currently scheduled for October 1996. Advanced exploration will continue in the summer of 1995.

B.Y.G. Natural Resources is developing the **Mount Nansen** property as an open-pit mine with a projected start-up in 1995. The site is located approximately 60 km west of Carmacks. BYG plans to mine approximately 300 tonnes of gold-bearing oxide ore per day using open-pit mining methods and to process this ore in an on-site mill. Proven reserves from the Brown-McDade zone suggest a project life of about four years, including one year of pre-production work. Permitting is under way.

An exploration program was completed at the **Sa Dena Hes** property early in 1995. Cominco Ltd. is trying to improve the mine reserve figure and if the program is successful and zinc prices remain strong, production may resume at **Sa Dena Hes** in 1996.

United Keno Hill Mines Ltd. is conducting an underground rehabilitation and drilling program at its **United Keno Hill** property on the Bellekeno and Silver King Mines. The goal of this program is to increase reserves to support an initial five-year mine life at an average historic grade of 1300 g/t silver. If this goal is reached, production could resume in 1996.

The **Division Mountain** coal deposit is located 90 km north-northwest of Whitehorse and owned by Cash Resources. Exploration to date has focused on outlining sufficient reserves suitable for a 50-MW thermal power generation plant and on thermal coal for export. Division Mountain coal is comparable to thermal coal used in Alberta for power generation. In 1994, Cash completed an extensive trenching and drilling program. Open-pit, drill-indicated reserves are now 31.7 million tonnes of low sulphur, high volatile bituminous coal. This would be sufficient coal to feed a 50-MW thermal power generation plant for about 160 years.



Copper-lead-zinc-silver-gold mineralization was discovered on the **Kudz Ze Kayah** property in 1993 by Cominco Ltd. Kudz Ze Kayah is a significant new polymetallic base-metal deposit located about 110 air km southeast of Ross River and 20 km southwest of Finlayson Lake, on the Robert Campbell Highway. Diamond drilling during 1994 has outlined an inferred resource of 13 million tonnes of 5.5 percent zinc, 1 percent copper, 1.3 percent lead, 125 grams per tonne silver and 1.2 g/t gold. Drilling will continue in 1995 and the results from this work will be used to calculate a more detailed ore reserve and form the basis of preliminary mine production forecasting and flowsheet design. Advanced metallurgical testing, engineering, cost studies and environmental permitting activities are now in progress. This work and related economic and feasibility studies are scheduled to allow and, if warranted, a production decision is possible by the end of 1995 for production in 1997.

First Dynasty Mines Ltd. of Denver, Colorado, has acquired the **Dublin Gulch** property, a large-tonnage, low-grade gold deposit located approximately 40 km northeast of Mayo. The company is currently evaluating the possibility of developing the property using a heap leach extraction process, and has undertaken to complete a pre-feasibility study by the end of 1995. Inferred reserves indicate that a large open-pit mine with well over 100 million tonnes may be possible; however, the 1995 exploration program will focus on the initial development of a higher-grade core of approximately 30 million tonnes grading 1.19 grams per tonne of gold or better. Permitting is under way.

Northern Platinum Ltd. will be conducting a drilling program on the **Wellgreen** project located about 80 miles northwest of Haines Junction during 1995. A 6100 m drill program has been planned for this copper-nickel-platinum-palladium property. Nickel prices have shown some recent strength and combined with copper prices sets the stage for renewed interest in this project.

## **SECTION C. HISTORICAL PERSPECTIVE ON MINERAL EXPLORATION ACTIVITY IN RECENT YEARS**

### **5.1 Introduction**

This section presents an overview of various aspects of mineral exploration in recent years. Patterns of exploration spending are shown by region, by commodity sought and by type of company. The 1994 and 1995 levels of exploration activity are described on a preliminary and forecast basis, respectively. The data for these two years were collected between November 1994 and March 1995.

### **5.2 Exploration Expenditures by Region**

Tables 3a, 3b and 4 are based on the federal-provincial survey of mining and exploration companies.

Table 3a shows current dollar expenditures on mineral exploration in Canada, by province, for the 1985 to 1995 period. Table 3b reports the same information, but in constant 1994 dollars. The numbers for "fieldwork" do not include overhead expenses. Table 4 presents these data as percentages.

In recent years Québec and Ontario have been the provinces with the greatest exploration activity. In 1993, for the first time since 1982, the exploration spending in these two provinces fell below 40 percent of the Canadian total, having peaked at 66 percent in 1987. The high levels of diamond exploration expenditures in the Northwest Territories accounted for 21 percent of total Canadian exploration in 1993, the highest percentage since Canadian exploration expenditure statistics were first collected in 1946. In 1993, Québec was in first place in exploration spending (\$106 million) followed in descending order by the Northwest Territories, Ontario and British Columbia. Preliminary 1994 exploration expenditures and company spending intentions for 1995 indicate that the Northwest Territories will lead all Canadian provinces and territories in exploration spending in both of these years.

The Mining Exploration Depletion Allowance (MEDA), which was introduced in 1983 and replaced by the Canadian Exploration Incentive Program (CEIP) in 1989, and high gold prices (until the end of 1987) were responsible for the high level of expenditures in 1987 and 1988. Exploration expenditures decreased between 1989 and 1992, reaching in 1992 the lowest level since 1967.

The 24 percent increase in exploration expenditures in 1993 relative to 1992 was due in part to increased exploration for diamonds, which accounted for 21 percent of total exploration expenditures in Canada in 1993, up from only 5 percent in 1992. Higher gold prices in 1993 were also a significant factor. Diamond exploration pushed the level of expenditures up, mainly in the Northwest Territories and Saskatchewan (see

Section 5.4). Preliminary exploration survey results indicate that exploration expenditures were up in all provinces and territories in 1994, with the exception of Nova Scotia and New Brunswick.

The increase in exploration expenditures will likely continue during 1995 except in Nova Scotia, New Brunswick and British Columbia, with a 70 percent increase in Canadian exploration expenditures expected relative to the \$385 million spent in 1992.

Diamond fever, which has affected several provinces in addition to the Northwest Territories, led to a staking rush in 1993 with 27 million hectares staked, the second largest area ever staked in Canada following the unprecedented 33 million hectares staked in 1992. Major areas were staked in the Northwest Territories and Alberta, with substantial areas also staked in Saskatchewan and in various other provinces.

The area of claims staked in 1994 was 15 million hectares. The decline probably relates more to the fact that most of the land with potential for diamond discovery has already been staked, especially in Alberta where 57 percent of the province has been taken up for diamond exploration. In 1994, the areas staked were lower relative to 1993 in the Northwest Territories, Alberta, Québec and Saskatchewan.

**TABLE 3a. MINERAL EXPLORATION EXPENDITURES IN CANADA, BY PROVINCE, 1985-95 (CURRENT DOLLARS)**

Province	Field Work Only				Total Exploration(1)						
	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994p	1995f
	(\$ Millions)										
Newfoundland	11.9	12.3	27.7	37.7	36.2	23.3	12.1	11.1	8.9	11.6	23.3
Nova Scotia	7.8	17.2	41.6	46.7	21.4	11.0	4.5	3.3	1.8	1.4	1.3
New Brunswick	12.1	10.8	9.1	13.8	13.6	16.5	15.8	12.2	11.1	10.9	10.7
Quebec	135.2	241.4	415.5	328.2	185.0	196.4	138.1	94.1	106.1	129.9	132.9
Ontario	93.2	136.8	308.1	343.6	217.8	152.6	109.7	77.4	75.6	98.6	122.2
Manitoba	33.7	26.3	40.0	30.0	37.0	41.2	29.7	32.0	27.4	37.4	31.7
Saskatchewan	39.4	36.8	63.5	61.1	63.3	42.2	31.5	25.9	53.1	54.7	58.9
Alberta	14.7	3.0	2.5	4.3	6.2	10.7	6.6	5.4	7.3	12.2	14.7
British Columbia	73.0	63.1	142.6	196.8	186.6	226.5	135.7	71.6	66.0	92.9	91.0
Yukon Territory	22.7	27.9	29.0	38.6	15.1	18.4	16.5	9.7	19.2	22.7	26.3
Northwest Territories	46.8	35.8	59.0	66.5	45.7	36.0	31.6	42.7	100.7	157.7	141.8
Total Field Work											
(Excluding Overhead)	490.5	611.4	1138.6	1167.3	703.5	660.3	439.2	323.5	410.1	na	na
Total Exploration											
(Including Overhead)	605.8	723.3	1300.0	1350.0	827.9	774.7	531.8	385.3	477.3	630.1	654.7

Source: Federal-Provincial Survey of Mining and Exploration Companies.

(1) "Total Exploration" includes related overhead expenditures; for the years 1985-88, totals with overhead were calculated by multiplying the federal-provincial field expenditures by the ratio total/field from Statistics Canada.

p Preliminary estimate; f Forecast; na Not available.

Figures may not add to totals due to rounding.

**TABLE 3b. MINERAL EXPLORATION EXPENDITURES IN CANADA, BY PROVINCE, 1985-95 (1994 DOLLARS)**

Province	Field Work Only				Total Exploration(1)						
	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994p	1995f
	(\$ Millions)										
Newfoundland	15.3	15.5	33.2	43.2	39.6	24.7	12.5	11.3	9.0	11.6	23.3
Nova Scotia	10.0	21.6	49.9	53.5	23.4	11.7	4.6	3.3	1.8	1.4	1.3
New Brunswick	15.6	13.6	10.9	15.8	14.9	17.5	16.3	12.4	11.2	10.9	10.7
Quebec	173.8	303.3	498.2	375.9	202.2	208.3	142.7	95.8	106.8	129.9	132.9
Ontario	119.8	171.9	369.4	393.6	238.0	161.8	113.3	78.9	76.1	98.6	122.2
Manitoba	43.3	33.0	48.0	34.4	40.4	43.7	30.7	32.5	27.6	37.4	31.7
Saskatchewan	50.6	46.2	76.1	70.0	69.2	44.8	32.5	26.3	53.5	54.7	58.9
Alberta	18.9	3.8	3.0	4.9	6.8	11.3	6.8	5.5	7.4	12.2	14.7
British Columbia	93.8	79.3	171.0	225.4	203.9	240.2	140.2	72.9	66.5	92.9	91.0
Yukon Territory	29.2	35.1	34.8	44.2	16.5	19.5	17.0	9.8	19.3	22.7	26.3
Northwest Territories	60.2	45.0	70.7	76.2	49.9	38.2	32.6	43.5	101.5	157.7	141.8
Total Field Work (Excluding Overhead)	630.5	768.1	1365.2	1337.1	768.9	700.2	453.7	329.4	413.0	na	na
Total Exploration (Including Overhead)	778.7	908.7	1558.8	1546.4	904.8	821.5	549.4	392.4	480.6	630.1	654.7

Source: Federal-Provincial Survey of Mining and Exploration Companies.

(1) "Total Exploration" includes related overhead expenditures; for the years 1985-88, totals with overhead were calculated by multiplying the federal-provincial field expenditures by the ratio total/field from Statistics Canada.

p Preliminary estimate; f Forecast; na Not available.

Figures may not add to totals due to rounding.

**TABLE 4. MINERAL EXPLORATION EXPENDITURES IN CANADA, BY PROVINCE, 1985-95 (PERCENT DISTRIBUTION)**

Province	Field Work Only				Total Exploration						
	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994p	1995f
Newfoundland	2.4	2.0	2.4	3.2	4.4	3.0	2.3	2.9	1.9	1.8	3.6
Nova Scotia	1.6	2.8	3.7	4.0	2.6	1.4	0.8	0.8	0.4	0.2	0.2
New Brunswick	2.5	1.8	0.8	1.2	1.6	2.1	3.0	3.2	2.3	1.7	1.6
Quebec	27.6	39.5	36.5	28.1	22.3	25.4	26.0	24.4	22.2	20.6	20.3
Ontario	19.0	22.4	27.1	29.4	26.3	19.7	20.6	20.1	15.8	15.6	18.7
Manitoba	6.9	4.3	3.5	2.6	4.5	5.3	5.6	8.3	5.7	5.9	4.8
Saskatchewan	8.0	6.0	5.6	5.2	7.6	5.4	5.9	6.7	11.1	8.7	9.0
Alberta	3.0	0.5	0.2	0.4	0.7	1.4	1.2	1.4	1.5	1.9	2.2
British Columbia	14.9	10.3	12.5	16.9	22.5	29.2	25.5	18.6	13.8	14.8	13.9
Yukon Territory	4.6	4.6	2.5	3.3	1.8	2.4	3.1	2.5	4.0	3.6	4.0
Northwest Territories	9.5	5.9	5.2	5.7	5.5	4.6	5.9	11.1	21.1	25.0	21.7
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: Federal-Provincial Survey of Mining and Exploration Companies.

p Preliminary estimate; f Forecast.

Note: The percentages from 1985-88 are calculated on field work only, but those from 1989-95 are based on total expenditures, which include related overhead.

Figures may not add to totals due to rounding.

### 5.3 Exploration Expenditures by Type of Company

Figure 8a depicts field exploration expenditures by type of company from 1985 to 1993 (final field work expenditures for 1994 and 1995 are not yet available). Total exploration expenditures (fieldwork plus overhead) for 1993, 1994 (preliminary) and 1995 (intentions) by type of company are portrayed in Figure 8b. Such data are not available for 1985 to 1988.

From 1985 to 1993, non-petroleum exploration expenditures by oil companies declined in constant dollars by more than 90 percent and by foreign companies by 74 percent. In 1977, oil companies accounted for some 24 percent of total non-petroleum exploration, but in 1993 they accounted for less than 1 percent. Foreign companies accounted for over 18 percent in 1973 and 1979, but now account for only 3 percent.

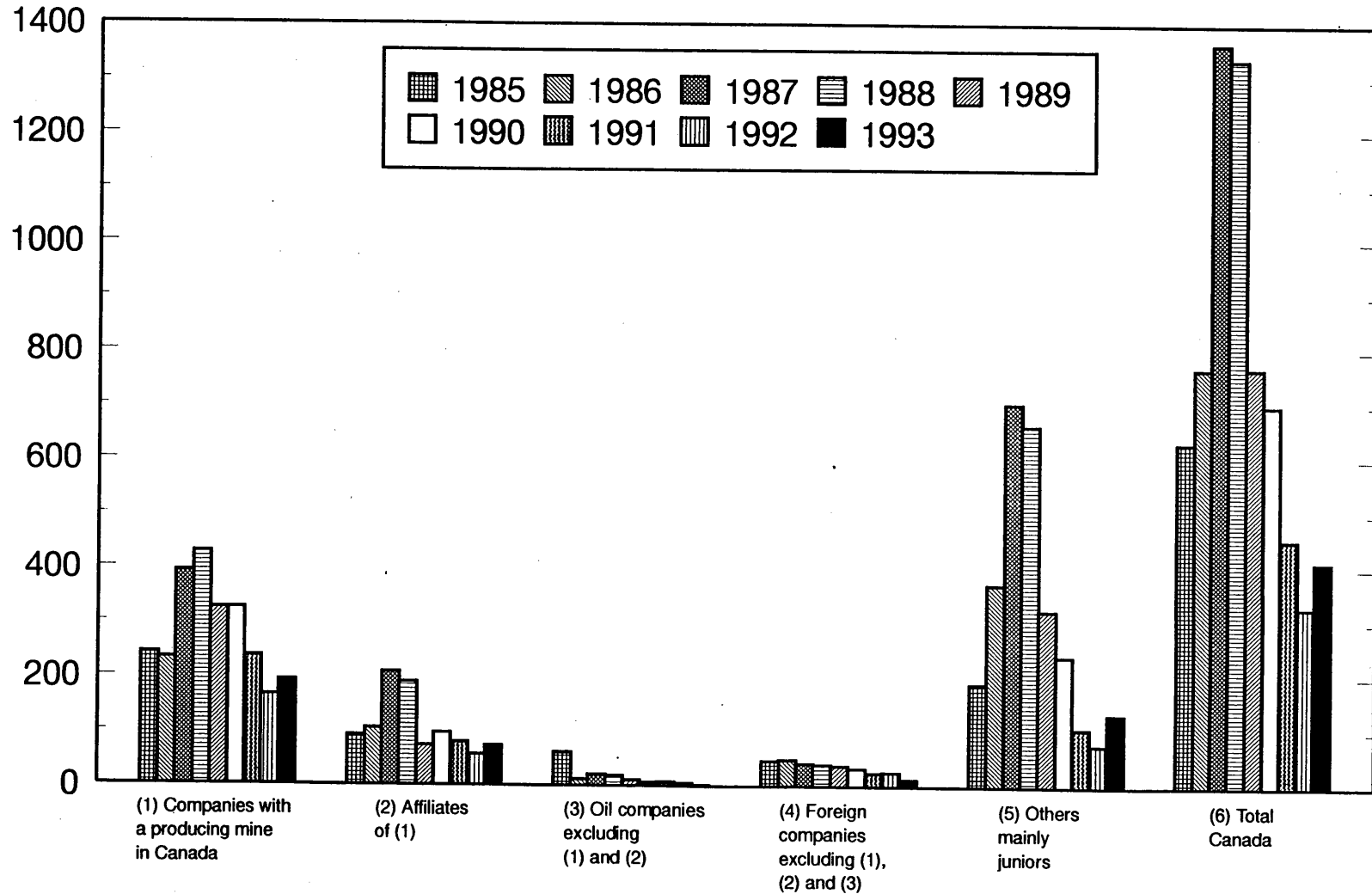
Exploration by producing companies and their affiliates peaked in constant dollar terms in 1987-88, declined until 1992 and started to increase in 1993. This period of decline may not be as large as it appears because it includes considerable contributions made in the period 1986-88 by junior companies to joint-venture projects operated mostly by senior companies. Senior companies are inclusive of producers, affiliates, oil, foreign and companies other than juniors. Such expenditures are reported in total by project operators (chiefly the seniors). Expenditures by senior companies are expected to increase by about 30 percent in 1994 and remain at about the same level in 1995.

Exploration expenditures by junior companies followed the same pattern as those by senior exploration expenditures (Figure 9, 10); they peaked in 1987-88, then decreased until 1992, increased again in 1993 and will likely increase further in 1994 and 1995. Although junior company exploration expenditures have declined from their high levels of 1987-88, they are still higher than they were during most of the 1970s (Figure 10). Exploration expenditures by the juniors increased almost eightfold from 1983 to 1987, from about \$97 million to almost \$800 million (in 1994 constant dollars). In 1983, these companies accounted for about 15 percent of total Canadian exploration expenditures, but by 1987 this proportion had increased to more than two thirds. In 1988, absolute expenditures by the juniors began to decline. The decline has continued through 1992. Junior expenditures accounted for 21 percent of total exploration expenditures in 1992, 30 percent in 1993 and likely 32 percent and 37 percent in 1994 and 1995, respectively.

Figure 8a

# Field Exploration Expenditures by Type of company 1985-93

Millions of 1994 dollars



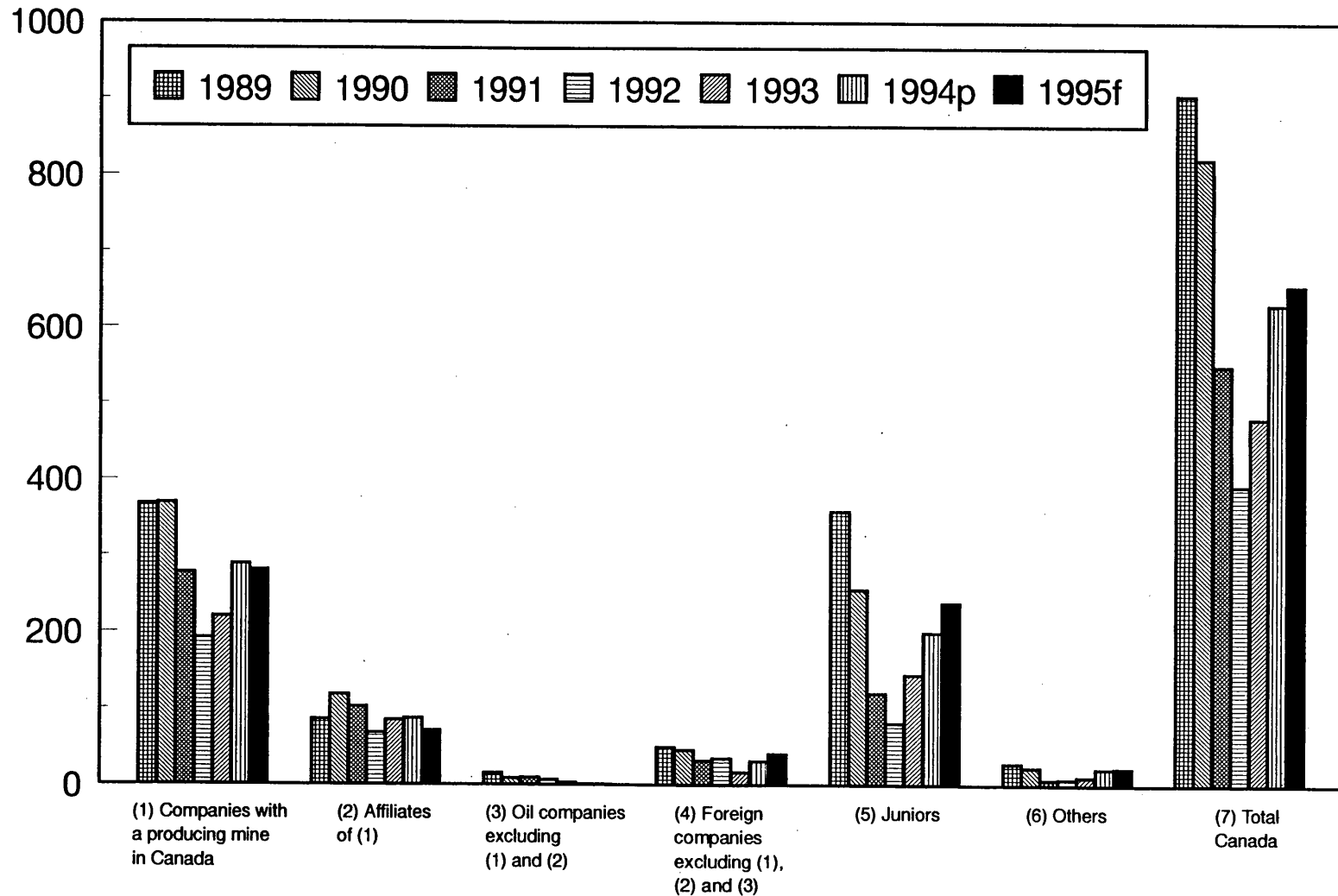
Source: Compiled by NRCan from the Federal-Provincial Survey of Mining and Exploration Companies.  
Note: Overhead expenditures are not included.



Figure 8b

# Exploration Expenditures by Type of Company 1989-95

Millions of 1994 dollars



Source: Compiled by NRCan from the Federal-Provincial Survey of Mining and Exploration Companies.

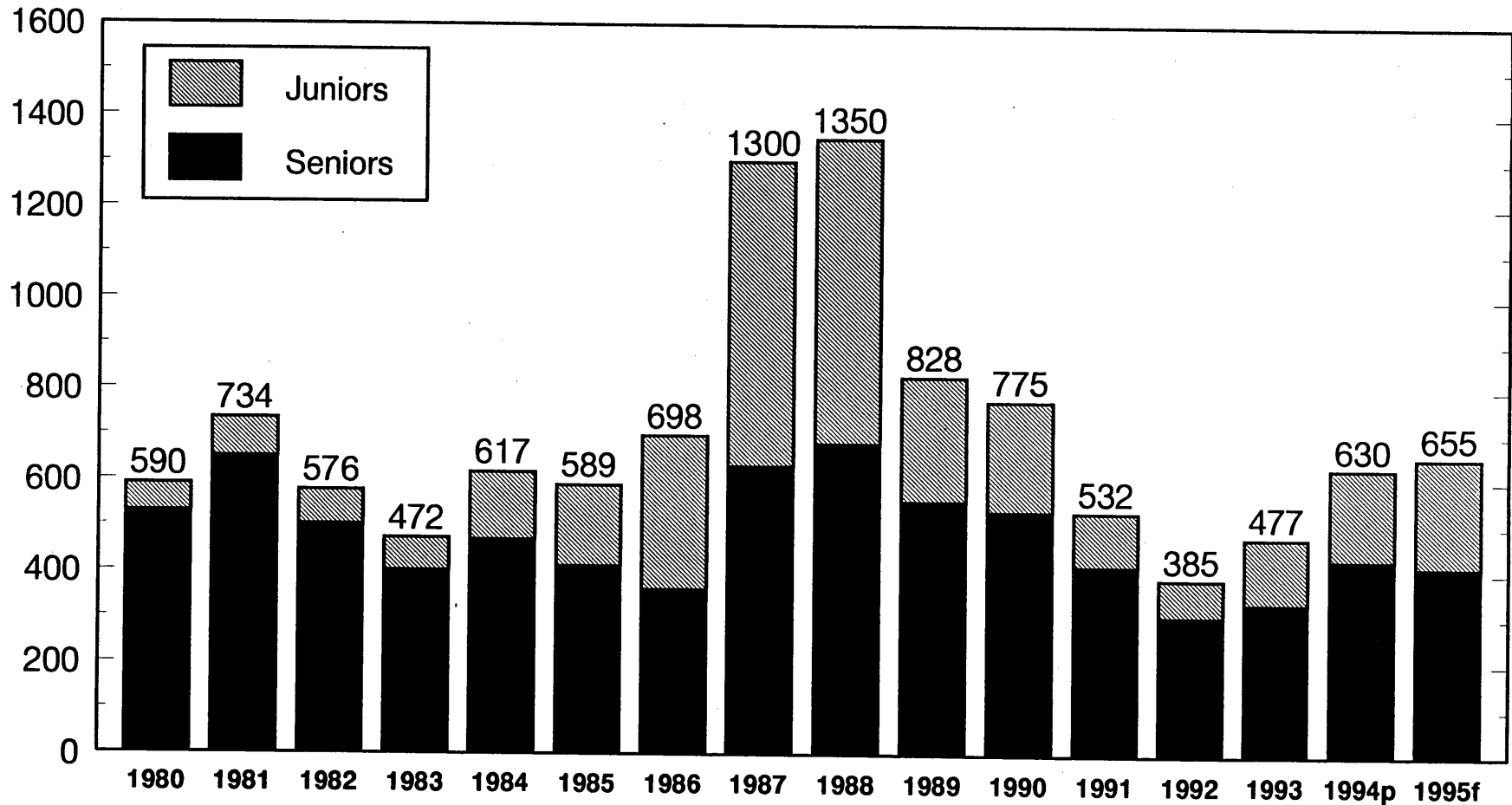
p Preliminary estimate; f Forecast.

Note: Overhead expenditures are included.

Figure 9

# Exploration Expenditures by Junior and Senior Companies 1980-95

Millions of dollars



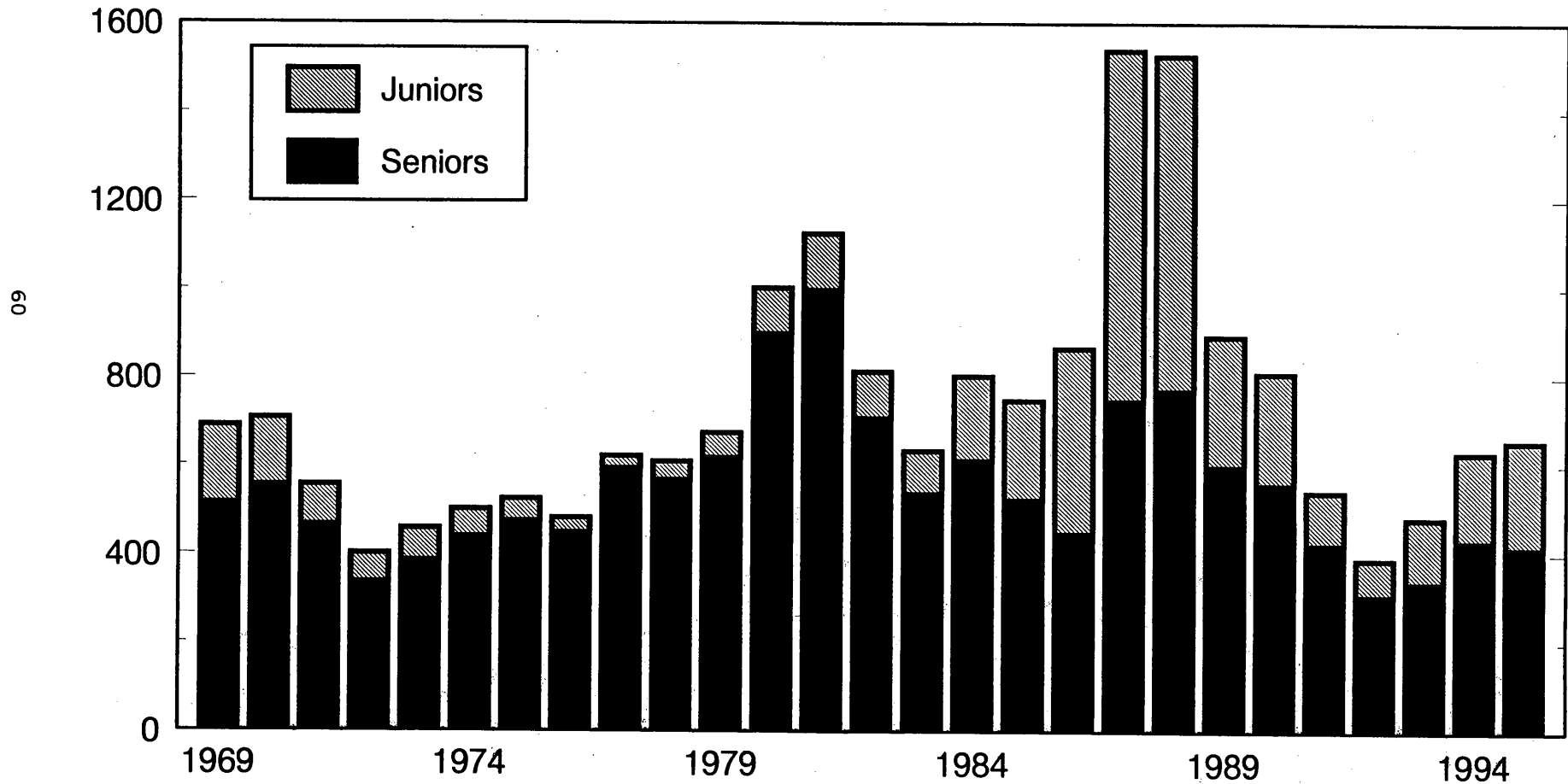
Source: Compiled by Natural Resources Canada from the Federal-Provincial Survey of Mining and Exploration Companies.  
p Preliminary; f Forecast.

Note: Overhead expenditures are included.

Figure 10

# Exploration Expenditures in Canada by Junior and Senior Companies 1969-95

Millions of 1994 dollars



Sources: Natural Resources Canada and Statistics Canada.  
1994 Preliminary; 1995 Forecast.

Notes: Exploration expenditures for 1975 to 1981 are overstated by an average of about 17% relative to earlier and later years because of changes to the methodology used by Statistics Canada over the years. The expenditures include overhead.

The fact that junior companies provided about two-thirds of total Canadian exploration spending in 1987 and 1988 is not apparent from the bar graphs and can be explained as follows: from 1984 on, a significant amount of exploration money was provided by junior companies for joint-venture exploration projects operated by senior companies. Canadian exploration expenditure surveys ask that exploration spending be reported by project operators. Because senior companies generally did not contribute large amounts of money to projects operated by junior companies, the exploration surveys during the mid-1980s have tended to overstate the contribution made to spending by senior companies and to understate that by juniors.

Figure 11 shows comparative regional breakdown of junior, senior expenditures for the period 1992-1995. In 1992 and 1993 Québec was the leader in terms of senior exploration expenditures. For 1994 and 1995 the Northwest Territories are expected to be first for the reasons mentioned in Section 5.2. Junior expenditures were dominant in British Columbia in 1992 and the Northwest Territories in 1993 and likely in 1994. Again, British Columbia should be first in terms of junior expenditures in 1995 upon confirmation of the figures.

#### **5.4 Exploration Expenditures by Type of Commodity Sought**

Exploration for precious metals (95 percent of which was for gold during the second half of the 1980s) peaked in 1987 (Figures 12 and 13) and, subsequently declined as the availability of flow-through capital decreased and as the gold price declined after the end of 1987. Expenditures rose again during 1993. The gold price was up that year. Exploration expenditures for base metals were lowest in 1986. They increased each year until 1990 when they exceeded the lowest level of the late 1970s (Figure 13). Exploration expenditures for base metals declined again in 1991 and through 1993. By October 1993, the inflation-adjusted prices of nickel, copper, zinc and lead were at all-time lows. During 1992, the decrease in precious-metal exploration was much more severe than for base-metal exploration; consequently, total expenditures in base-metal exploration exceeded that for precious metals for the first time since 1983.

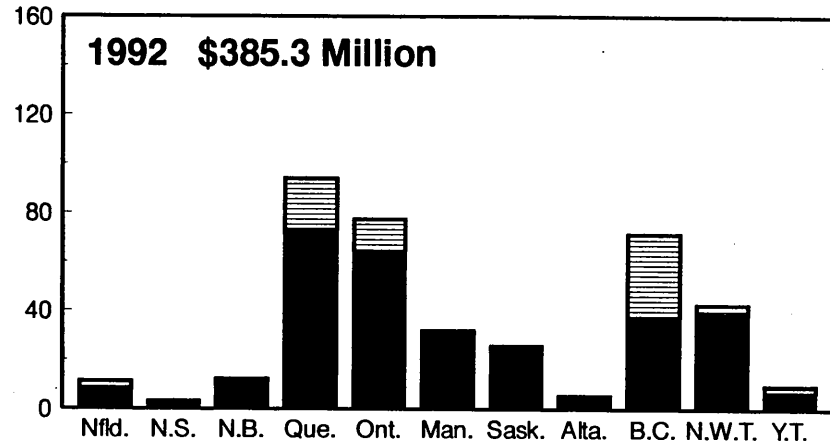
In 1987 and 1988, exploration expenditures for all non-petroleum mineral commodities other than base and precious metals (Figure 12) accounted for only about 5 percent of total Canadian exploration expenditures. In 1989 and 1990, expenditures directed at other mineral commodities have more than doubled in percentage terms, but have not actually increased much in constant dollars. In 1991, expenditures for "others" decreased in both percentage and constant dollar terms reaching their lowest levels since 1985. They increased again in 1992, both in percentage and in dollar terms and significantly in 1993 (25 percent; \$121 million). Commodities such as diamonds, mainly with some asbestos, potash and ferrous metals, contributed to the increase in the level of expenditures in this "others" category.

Figure 11

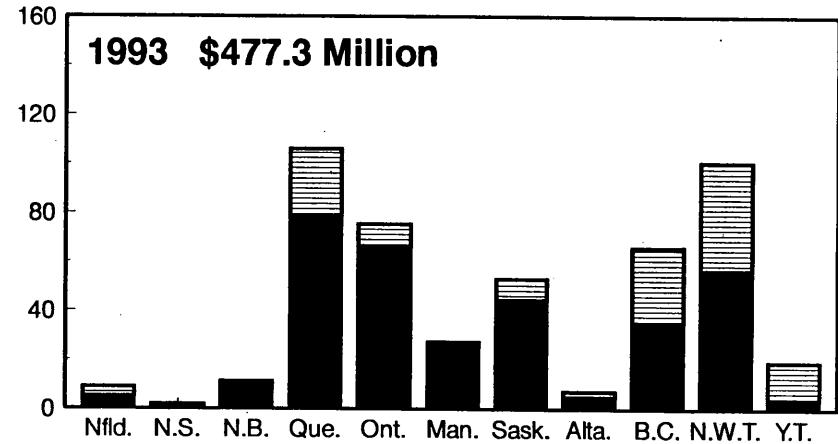
# Exploration Expenditures for Junior and Senior Companies by Province and Territory, 1992-95

■ Senior    ▨ Junior

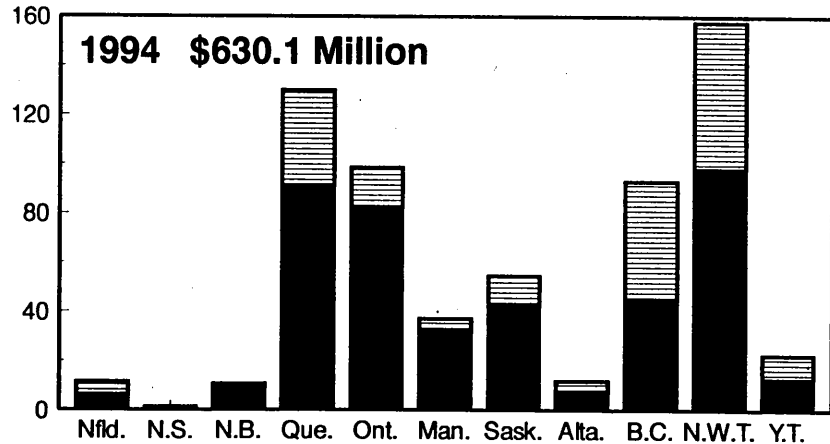
Million dollars



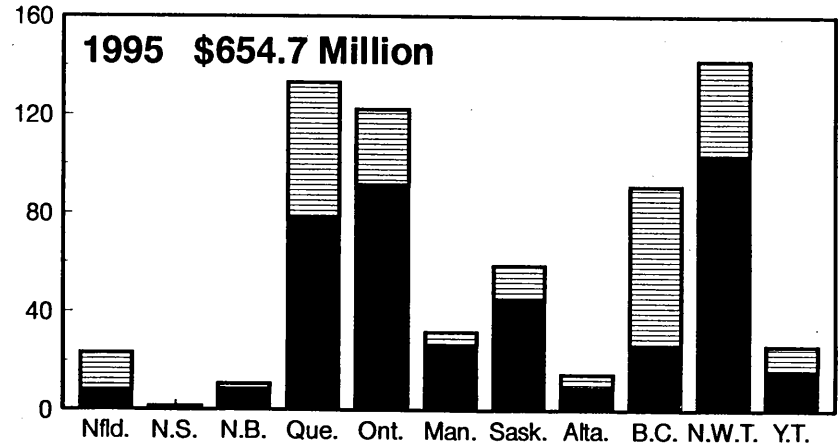
Million dollars



Million dollars



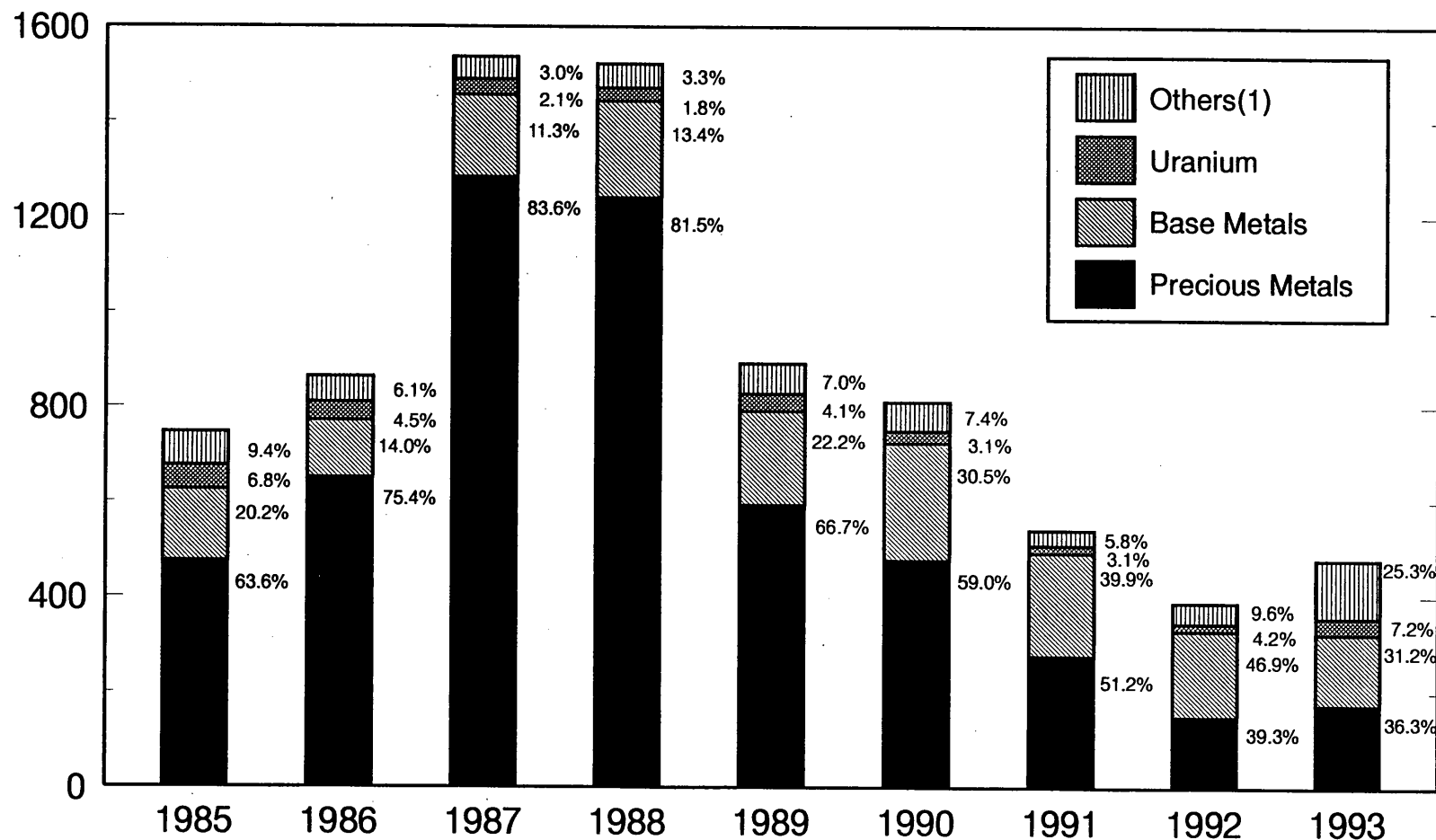
Million dollars



Sources: NRCan and Statistics Canada through the Federal-Provincial Survey of Mining and Exploration Companies.  
 Notes: 1994 data are preliminary estimates; 1995 data are forecasts. Overhead expenditures are included.

Figure 12  
**Exploration Expenditures by Commodity Sought**  
**1985-93**

Millions of 1994 dollars



Source: Compiled by NRCan from the Federal-Provincial Survey of Mining and Exploration Companies.

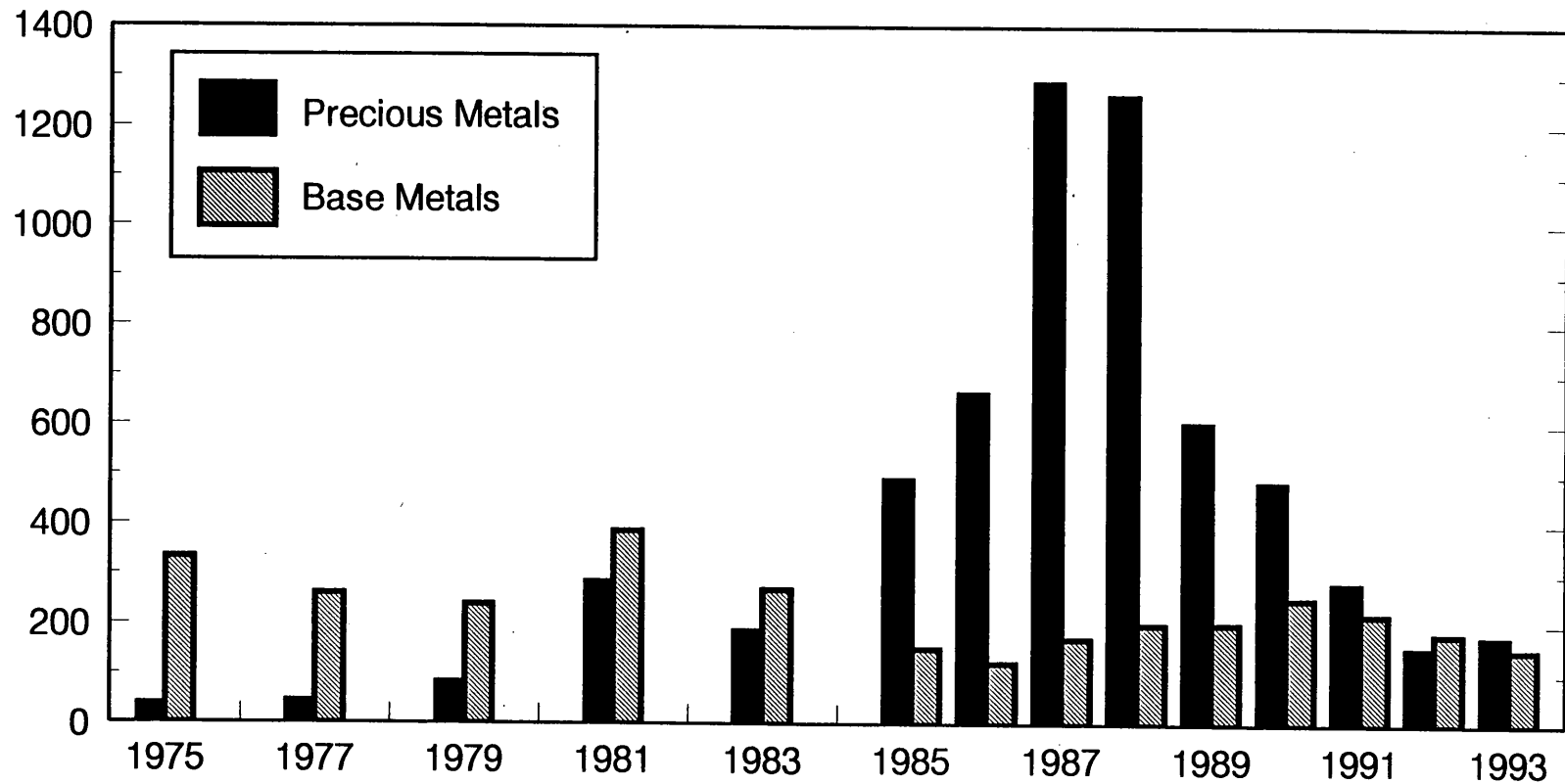
Notes: Overhead expenditures are included. Numbers to the right of bars are percentages of total exploration expenditures directed annually at each commodity group.

(1) Includes ferrous metals, other metals, nonmetals (including coal and diamonds) and "not specified."

Figure 13

## Exploration Expenditures in Canada for Base Metals and Precious Metals 1975-93

Millions of 1994 dollars



Source: Natural Resources Canada, based on Federal-Provincial Survey of Mining and Exploration Companies. (Data were not compiled by commodities for 1976, 1978, 1980, 1982 and 1984.)

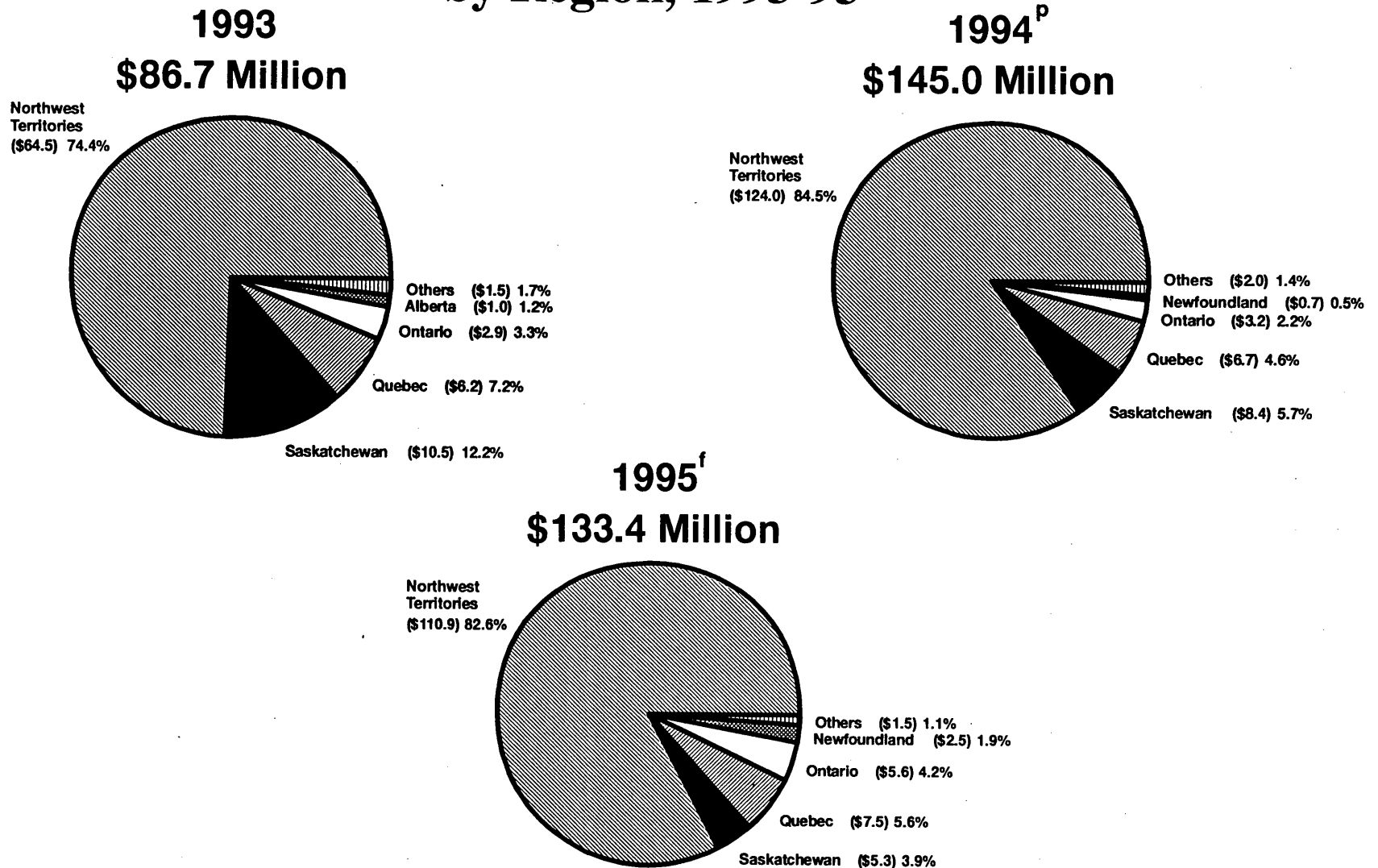
Note: Overhead expenditures are included.

Interest in diamond exploration accelerated in 1993, especially in the Northwest Territories (mainly in the Slave Craton area) and in Saskatchewan (mainly in the Fort à la Corne area). The amount spent (\$87 million) was up considerably from earlier years. Figure 14 shows the comparative regional breakdown in diamond exploration for the years 1993-1995. We estimate that close to \$400 million will have been spent in exploration for diamonds during the period 1989-1995. Preliminary and forecast data show diamond exploration expenditures in the Northwest Territories of about \$124 million and \$111 million for 1994 and 1995, respectively. In Canada in 1994 and 1995 respectively, some \$145 million and \$133 million is expected to have been spent on total diamond exploration. These amounts represent about 22 percent of total Canadian exploration expenditures in those two years, compared to 18 percent in 1993 and only 5 percent in 1992.



Figure 14

# Diamond Exploration Expenditures by Region, 1993-95



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Source: Economic and Financial Analysis Branch, NRCan.

Notes: Dollar figures associated with the charts are expressed in millions of dollars. "Others" includes Manitoba, British Columbia and either Newfoundland or Alberta. p: Preliminary estimate; f: Forecast.

#### **SECTION D. HISTORICAL PERSPECTIVE ON FLOW-THROUGH SHARE FINANCING ACTIVITY, 1983-95**

The evolution of flow-through shares as a source of financing for exploration is shown in Figure 15, beginning with 1983 (flow-through shares have actually existed since the 1950s, but were available only to companies and individuals with resource income). Funds raised by flow-through shares peaked at \$1183 million in 1987.

The proportion of total exploration expenditures accounted for by flow-through share financing increased from about 7 percent in 1983 to more than 90 percent in 1986 and 1987. In 1988, however, the level of flow-through share financing of mineral exploration declined to approximately 60 percent of total spending, mainly as a result of decreased participation by senior companies in the flow-through share market. The downward trend, which continued in 1989, 1990 and 1991, stabilized in 1992 and reversed itself slightly in 1993 (see Table 5).

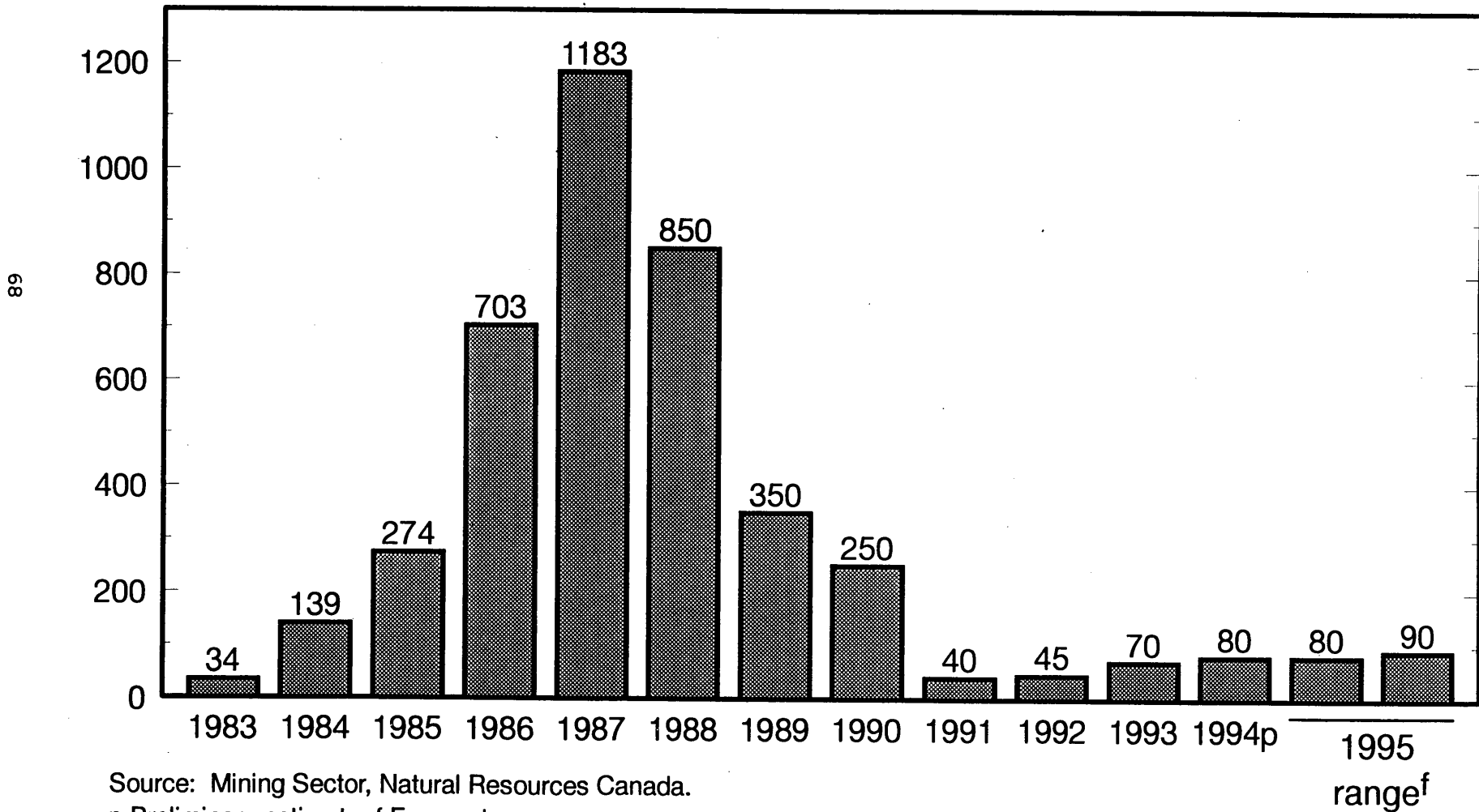
It should be noted that exploration expenditures and amounts financed by flow-through shares cannot realistically be directly compared. Exploration data are compiled on a calendar year basis, whereas the amount of flow-through share funds raised are compiled on a taxation year basis. Since 1986, this latter amount has included money raised for spending in the following January and February, the so-called "look-back period." For example, some of the money raised in 1987 would have been spent in early 1988.

The rise in flow-through share funding led to a concurrent increase in the proportion of total exploration by junior mining companies. It was the juniors who made the greatest use of the flow-through share mechanism in 1987 and 1988, and it is estimated that juniors accounted for close to 80 percent of the total amount raised by flow-through shares in 1988. As was pointed out earlier in this report, even though junior companies continued to account for the greatest part of flow-through share-funded exploration by far, it is they who have felt the brunt of the reduced level of flow-through share financing since 1989.

Figure 15

# Flow-Through Share Financing Levels 1983-95

Millions of dollars



Source: Mining Sector, Natural Resources Canada.  
p Preliminary estimate; f Forecast.

**TABLE 5. Ratio of Flow-Through Share Financing to Total Exploration Expenditures, 1983-95**

Year	Total Exploration Expenditures	Flow-Through Share Financing	Percentage Flow-Through Share Financing to Total Exploration Expenditures
	(\$ Millions)	(\$ Millions)	(Percent)
1983	472	34	7
1984	617	139	23
1985	589	274	47 <sup>a</sup>
1986	698	703	100 <sup>a</sup>
1987	1300	1183	95 <sup>a</sup>
1988	1350	850	63 <sup>a</sup>
1989	828	350	42 <sup>a</sup>
1990	775	250	32 <sup>a</sup>
1991	532	40	8 <sup>a</sup>
1992	385	45	12 <sup>a</sup>
1993	477	70	15 <sup>a</sup>
1994 <sup>p</sup>	630	80	13 <sup>a</sup>
1995 <sup>f</sup>	655	80-90	12-14

p: Preliminary; f: Forecast.

a: Beginning in 1986, some of the flow-through share funds raised were actually spent in January and February of the subsequent year (the so-called "look back" period).