

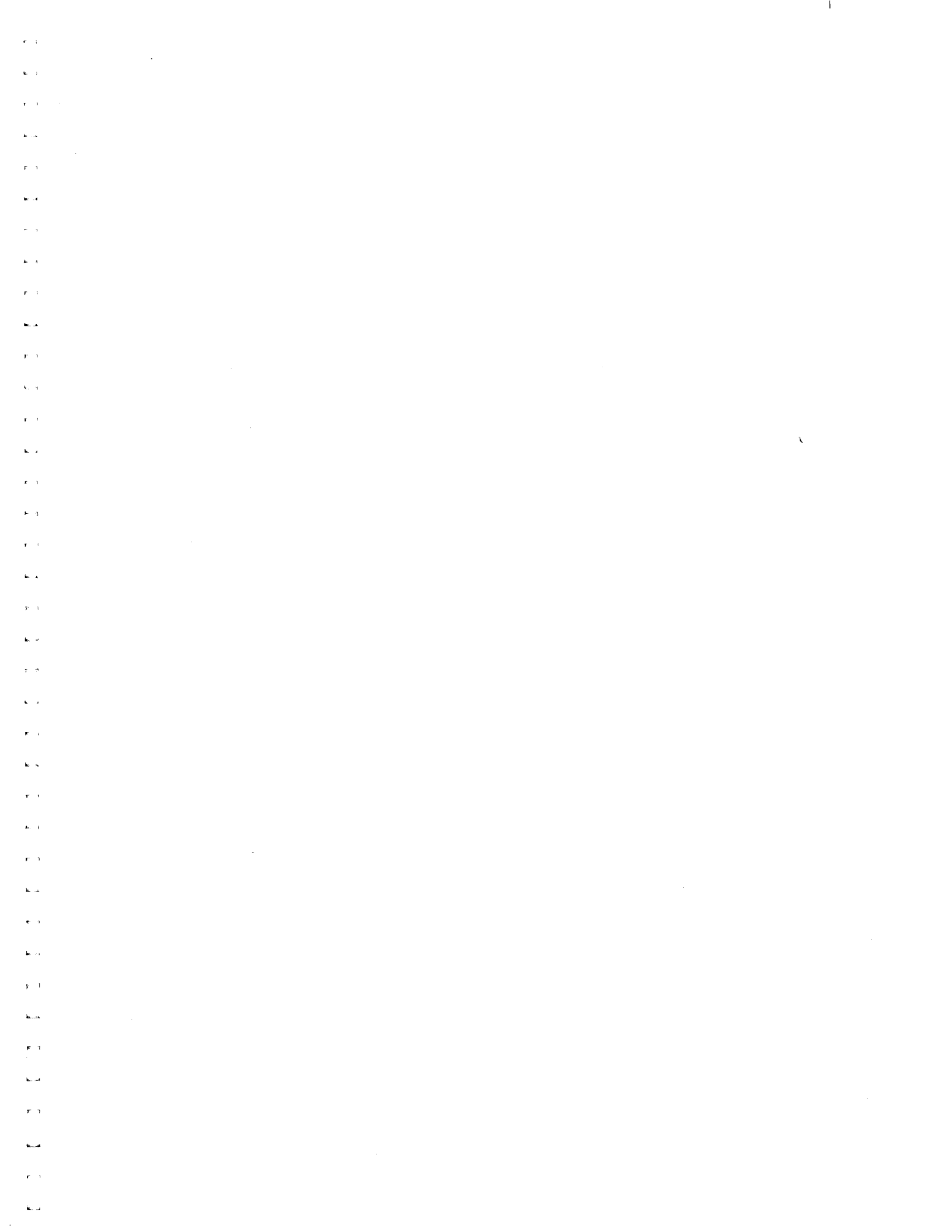


**REPORT ON
MINERAL EXPLORATION
EXPENDITURES AND
FLOW-THROUGH SHARE FUNDING**

BY THE

**INTERGOVERNMENTAL WORKING GROUP
ON THE MINERAL INDUSTRY**

1991



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**PREPARED FOR
THE MINES MINISTERS' CONFERENCE
HALIFAX, NOVA SCOTIA**

September 1991



Energy, Mines and
Resources Canada

Énergie, Mines et
Ressources Canada



FOREWORD

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

The Mineral Policy Sector of the Department of Energy, Mines and Resources (EMR), which prepared reports compiled for the Mines Ministers' Conference in 1988, 1989 and 1990, has coordinated the preparation of this report.

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

EXECUTIVE SUMMARY

Total mineral exploration activity in 1990 was about \$750 million according to the "preliminary" estimate data of the federal-provincial surveys. This was down slightly from the \$828 million achieved in 1989 and considerably lower than the approximate \$1.3 billion expended in 1987 and \$1.35 billion expended in 1988.

Overall, in 1991, exploration in the provinces and territories is expected to be down from the level in 1990 as a result of a reduced level of flow-through share financing. While still preliminary, EMR's current view of total exploration activity for 1991 is that amounts spent will likely be in the area of \$530-\$580 million.

The amount of money raised by flow-through shares in 1990 is now estimated by EMR to have been about \$250 million, down approximately \$100 million from the \$350 million level experienced in 1989. EMR estimates that flow-through share funding for 1991 will fall to somewhere around \$40 million.

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SECTION A. CURRENT 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 1991

1.1 Introduction

This section focuses on the quantity of funds raised for exploration by means of flow-through share financing. In recent years, the majority of junior exploration has been financed by flow-through shares while, for the most part, seniors now finance their exploration by means other than flow-through shares.

Flow-through share financing is an important element in determining the junior component of the total exploration picture. Since most junior companies are public and need approval from the stock exchanges for their placements, the information on their financing activities was obtained mainly from publications reporting on stock exchange activities or from information gathered directly from the exchanges.

1.2 Recent Background

The great increase in flow-through share financing over the 1985-88 period probably would not have been possible without the emergence of the large limited partnerships. These partnerships proved successful because of their ability to mass market flow-through shares and diversify risk. Table 1 illustrates the impressive contribution made by diversified limited partnerships to the total dollar volume of flow-through funds raised in the years 1987 to 1990.

However, in 1991, diversified limited partnerships withdrew from the flow-through share market. At the time of writing, no large limited partnerships have come to the flow-through share market in 1991.

TABLE 1. FLOW-THROUGH SHARE FUNDS RAISED BY DIVERSIFIED LIMITED PARTNERSHIPS IN 1987-90

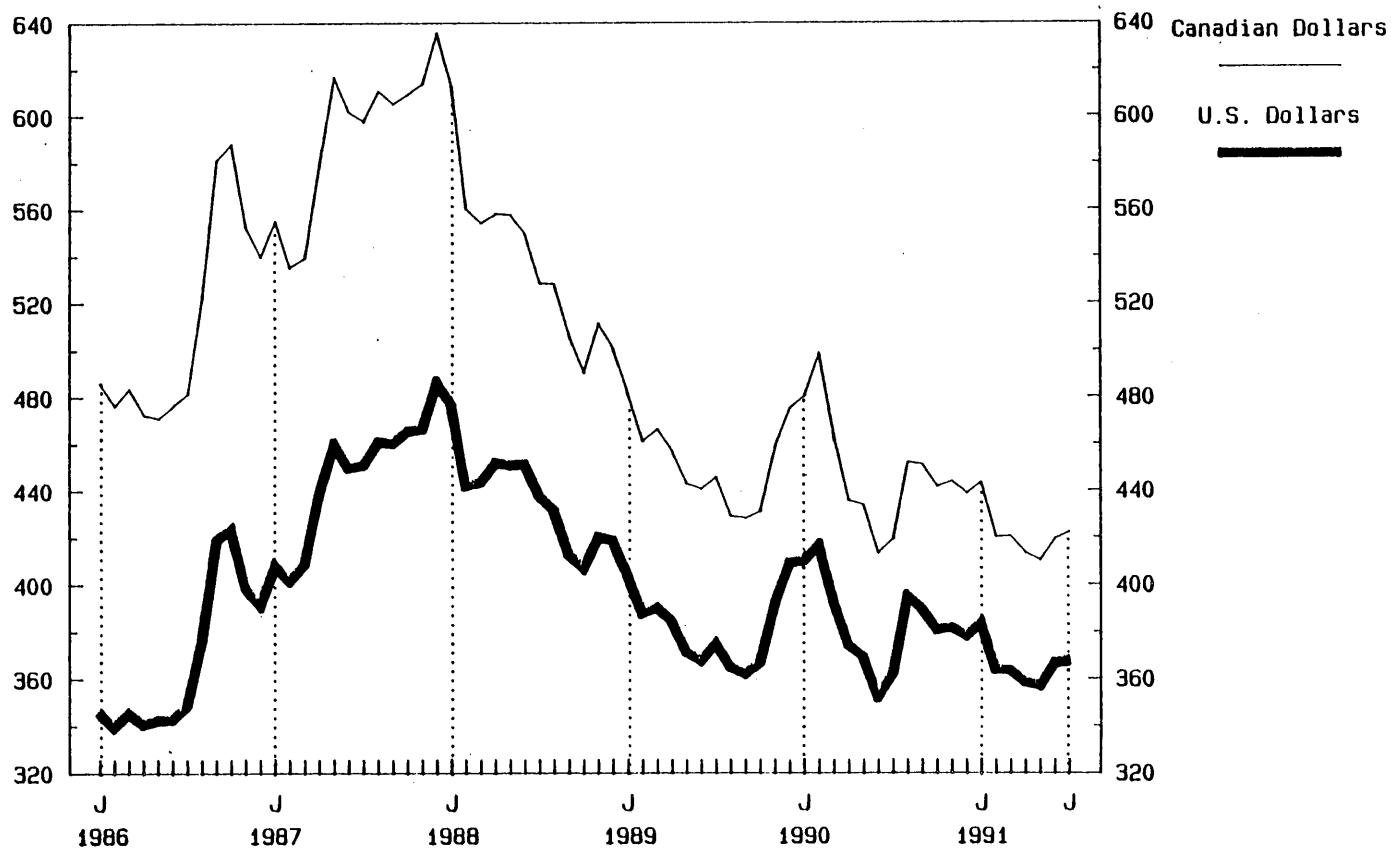
	Value of Issues Sold			
	1987	1988	1989a	1990a
	(\$ million)			
TAP	28	23	0	0
CMP	239	234	113	89.4
NEF	-	8	0	0
MVP	57	26	0	0
NIM	260	270	49	0
FIRST EX	47	21	0	0
MIDDLEFIELD	29	5.5	5.5	10.9
MINTAX	15	3.5	0	0
Total	675	591	167.5	100.3

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

- Nil.

Figure 1
MONTHLY AVERAGE GOLD PRICE
JANUARY 1986 TO JULY 1991

Dollars per troy ounce



Sources: Metals Week and Handy & Harman.

1.3 Stock Exchange Data

The first half of 1991 has given signs of renewed investor confidence in the stock markets and there has been a reasonable amount of money for new stock issues of good quality. This undoubtedly augurs well for senior companies, but the good fortune has not extended to the junior sector.

Stock market conditions for junior equities remain weak. The Vancouver Stock Exchange (VSE) index—if taken as a proxy for the measure of investor interest in junior stocks—peaked at 2015 points in May 1987, the same year in which the volume of flow-through share financing peaked. The index has declined by 33 percent since the middle of 1990 and in January 1991 fell below the 500-point level for the first time in the index's 8-year history. This continues the downward trend that started following the 1987 stock market crash. On July 1, 1991, the index stood at 580 evidencing only a marginal recovery from its lowest point.

Statistics provided by the VSE indicate that some \$7.3 million of flow-through share financing was raised on the VSE through 29 private placements during the first six months of 1991. The \$7.3 million includes \$0.8 million that will be used for oil and gas exploration, which leaves \$6.5 million available for mining exploration. This represents a \$250 000/week average for mining. If this financing trend continues, \$13 million will be raised for mining on the VSE in 1991.

Data from the Montreal Exchange (ME) and the Toronto Stock Exchange (TSE) indicate that, excluding amounts raised by interlisted companies, some \$4 million of flow-through share financing has been raised on these two exchanges. Mineral exploration will use \$3.5 million of this amount. If this financing trend continues, \$7 million will be raised for mining on the ME and TSE in 1991.

1.4 Outlook

The various amounts of flow-through share funds raised for mining on the three stock exchanges add up to \$10 million at July 1, 1991. Assuming that an equal amount of funds will be raised in the second half of 1991 would lead to a conclusion that a total of \$20 million of flow-through share financing would be available for the whole year.

However, traditional late fall and year-end tax shelter "take-up" activity could increase the total amount of funds available for juniors. In fact, recent announcements indicate that flow-through share financing for July was over \$3 million. Although it is difficult to forecast the amount of flow-through share financing for the entire year at this time, EMR believes that \$40 million represents a reasonable estimate for flow-through share financing for 1991 because recent years' experience has demonstrated that the second half of the year's financing is much stronger than the first half of the year.

2. Outlook for Exploration in 1991

2.1 Introduction

This section looks at the expected level of total mineral exploration, as compared to its financing. Since we are looking ahead, the usual statistical reporting sources are supplemented by other sources. The section firstly reports the results of the federal-provincial "Intentions Survey" for 1991 co-ordinated by Statistics Canada and EMR. While this is the latest "complete" survey available, it suffers from a serious shortcoming in that the "intentions" in question were gathered

in the December 1990-March 1991 period, and the results of this once-a-year survey may no longer be current given that many months have elapsed.

Another source of information comes from a modelling technique designed by the Mineral Policy Sector to forecast the amount of total exploration and the amount of senior company exploration. This modelling technique is based on a "statistically significant" relationship between exploration activity and metal prices.

Thirdly, this section reviews recent levels of diamond drilling to give a sense of the actual trend in exploration activity.

2.2 EMR and Statistics Canada Surveys of Exploration Spending Intentions - 1991

Methodology

On October 31, 1990, Statistics Canada sent 350 questionnaires to mineral producing firms. EMR has assumed responsibility for the collection of data from the non-producing firms and has sent out close to 3300 questionnaires (jointly with provincial governments that participate in this exploration survey). It should be noted that one company can receive several questionnaires depending on the number of provinces in which the company is working. The number of companies actually engaged as operators of exploration projects in Canada is more like 900. Other joint-venture partners provide exploration funding but, because they are not project operators, they do not report intended expenditures on exploration. In this survey, companies were asked to report intended exploration expenditures for their fiscal year that ended between April 1, 1991 and March 31, 1992.

The exploration expenditure statistics were collected for both "general" and "minesite" 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" (minesite exploration) in its annual publication "Exploration, Development and Capital Expenditures for Mining and Petroleum and Natural Gas Wells" - Intentions 1991 (Statistics Canada catalogue 61-216). The Statistics Canada intentions total for minesite exploration for 1991 is \$88 million. This figure has since been revised upward to \$98 million, based on updated information received by EMR.

EMR will release the results of its survey in the September 1991 issue of its Canadian Mineral Industry Monthly Report. The first indication suggests that "general exploration" (off-property exploration) would be \$548 million.

Accordingly, on the basis of company intentions in the December 1990-March 1991 period, total exploration (both on- and off-property) for 1991 would be expected to total about \$646 million (\$548 million plus \$98 million).

Interpretation

The Statistics Canada and EMR surveys of intentions provided an indication of the late-1990 industry view of total exploration spending expectations for 1991. However, because intentions expressed in late 1990 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 such as the current recession or company-specific factors, it may be that the results of this survey can no longer be interpreted as being realistic forecasts of the exploration that will be ultimately performed in 1991.

Table 2 shows intentions, as well as preliminary and actual expenditures, for minesite and general exploration for the years 1984 to 1991. The table demonstrates that for the period 1985-88 total expenditures reported initially on a preliminary basis, and then later on an actual basis, generally exceeded intentions for the same period. In 1989, this pattern was reversed. The explanation for the period of 1985-88 could be that exploration funding was becoming more abundant than companies had originally anticipated but, starting in 1989, there was a decline in the availability of flow-through share funds that companies had not expected. If so, then, 1991 actual exploration could be lower than the 1991 intentions data indicate.

2.3 Senior Firm Exploration Spending for 1990 and 1991

Methodology

Information on exploration spending by type of company (1989 actual, 1990 preliminary and 1991 intentions) is now available from the federal-provincial survey of preliminary and forecast exploration expenditures. About 224 active senior companies in 1990 and 195 in 1991 reported exploration spending. Included in the 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 overestimation. Despite this fact, 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 made by seniors was significant from 1988 to 1989, down 22% from \$708 million to \$555 million. The decrease is likely to continue, but to a smaller extent. The preliminary estimate for 1990 (\$502 million) is down 10 percent from 1989 and the "intentions" for 1991 (\$462 million) is 8 percent lower than 1990 expenditures. Expenditures made by seniors contributed to 52 percent of the total exploration expenditures in 1988, 67 percent in 1989 and 1990 and an expected 72 percent in 1991.

With overall intentions for 1991 of \$646 million and senior intentions of \$462 million, the value of junior intentions for 1991 was \$184 million. However, junior exploration spending levels are determined more by availability of financing than by company intentions.

TABLE 2. COMPARISON OF INTENTIONS, PRELIMINARY AND ACTUAL EXPLORATION EXPENDITURES, 1984-91

	Intentions	Preliminary	Actual
	(\$ millions)		
1984			
Minesite Exploration		158.6	136.4
General Exploration		389.7	480.9
Total Exploration	na	548.3	617.3
1985			
Minesite Exploration	150.9	89.4	100.1
General Exploration	361.2	471.5	488.8
Total Exploration	512.1	560.9	588.9
1986			
Minesite Exploration	87.5	110.2	108.6
General Exploration	431.2	483.6	589.3
Total Exploration	518.7	593.8	697.9
1987			
Minesite Exploration	122.6	121.5	161.0
General Exploration	583.2	849.6	1 139.0
Total Exploration	705.8	971.1	1 300.0
1988			
Minesite Exploration	154.7	138.7	143.0
General Exploration	891.0	1 107.9	1 207.0
Total Exploration	1 045.7	1 246.6	1 350.0
1989			
Minesite Exploration	111.7	160.0	115.3
General Exploration	832.2	766.7	712.5
Total Exploration	943.9	926.7	827.8
1990			
Minesite Exploration	150.0	107.7	
General Exploration	633.0	643.5	
Total Exploration	783.0	751.2	na
1991			
Minesite Exploration	97.9		
General Exploration	548.3		
Total Exploration	646.2	na	na

Source: Statistics Canada and federal-provincial survey of mining and exploration companies. The 1990 Actual surveys is currently in progress, and the 1991 Preliminary and Actual surveys will not be sent out until late 1991 and early 1992, respectively.

na Not available.

2.4 Outlook for Exploration Based on Metal Prices

Methodology

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. This may be because companies that spend money on exploration view it like any other investment, with expected returns being dependent on expected revenues from the subsequent mining of discovered deposits. It also appears that current commodity prices figure prominently in the minds of investors in exploration when predicting the course of future prices. As well, prices help to determine cash flows and therefore help determine the amount of the 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 are therefore likely to reflect metal prices in existence during the immediately preceding year.

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

Due, no doubt, to the large increase in the use of flow-through shares by junior companies over the 1986-88 period, the correlation between total exploration spending and metal prices became less pronounced during that interval.

Results

Based on the relationship between total exploration and metal prices observed over the period 1971-90, total exploration expenditures in 1991 could reach an upper value of about \$717 million (Figure 2). Similarly, it is estimated that senior exploration expenditures could amount to as much as \$532 million in 1991 (Figure 3).

Although the model uses average yearly metal prices to predict exploration expenditures, it is likely that a significant price trend during the second half of a year would have an effect not quite captured by the yearly average. If indeed exploration budgets are developed during the latter part of the year, the falling prices experienced during the last quarter of 1990 (and continuing into 1991) may have had an influence on exploration intentions for 1991 that would not have been picked up by the model. In view of this, the model was run using average metals prices for 1990 based on prices at the end of the year. This resulted in an estimate for 1991 of about \$485 for senior exploration and about \$645 million for total exploration.

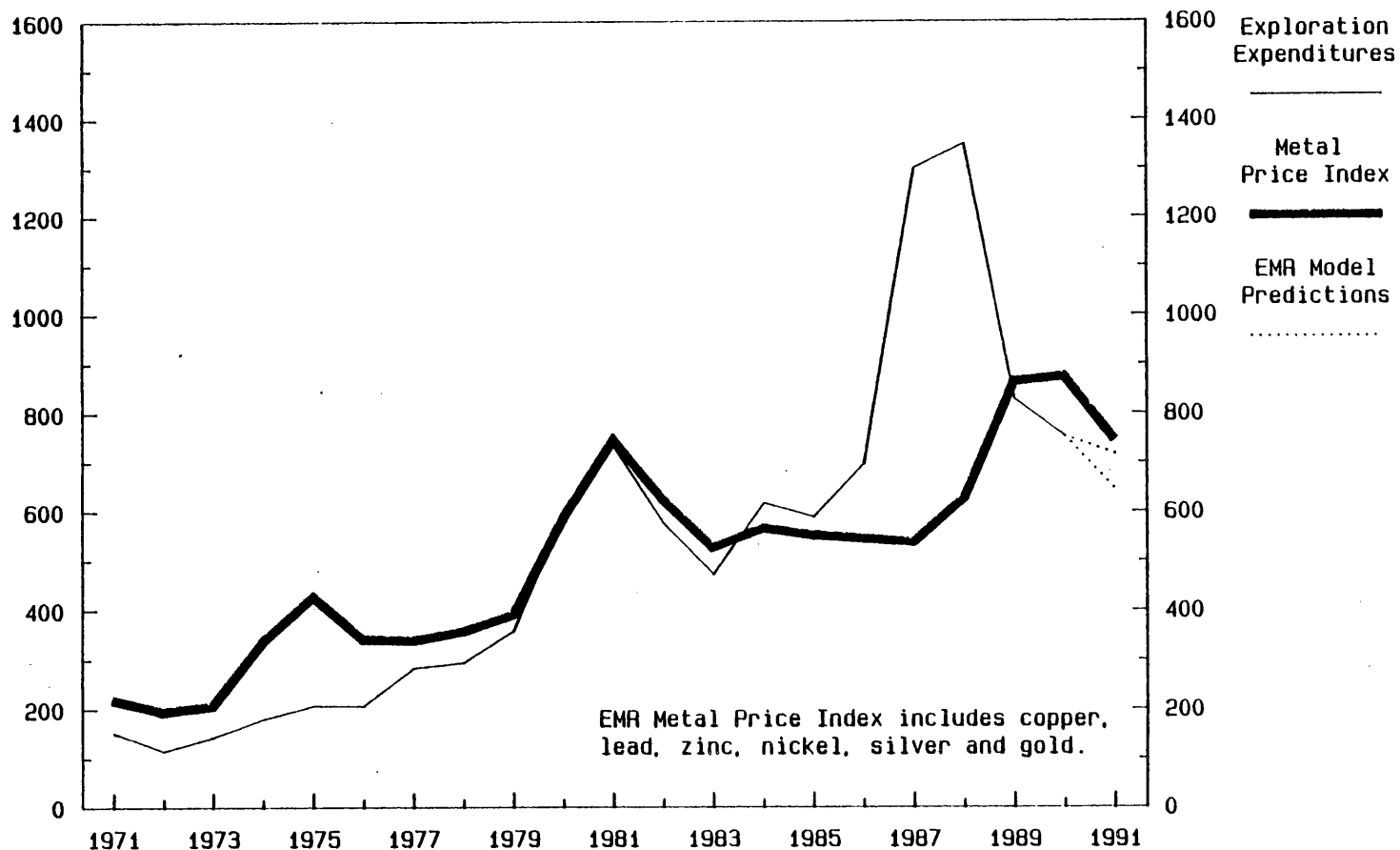
While the difference between these two figures would imply a forecast of \$160 million for junior spending, no attempt was made to predict junior exploration spending by this method, since in that sector, exploration is largely determined by the availability of financing from equity markets.

2.5 Recent Diamond Drilling Activity

Diamond drilling statistics provide another indicator of recent levels of Canadian mineral exploration activity. The Canadian Diamond Drilling Association (CDDA) gathers diamond drilling statistics from its member companies monthly. Available CDDA statistics cover about 50-60 percent of total Canadian contract diamond drilling activity, and are normally available one to three months after month end.

Figure 2
**TOTAL EXPLORATION EXPENDITURES
 AND
 CANADIAN METAL PRICES LAGGED ONE YEAR**

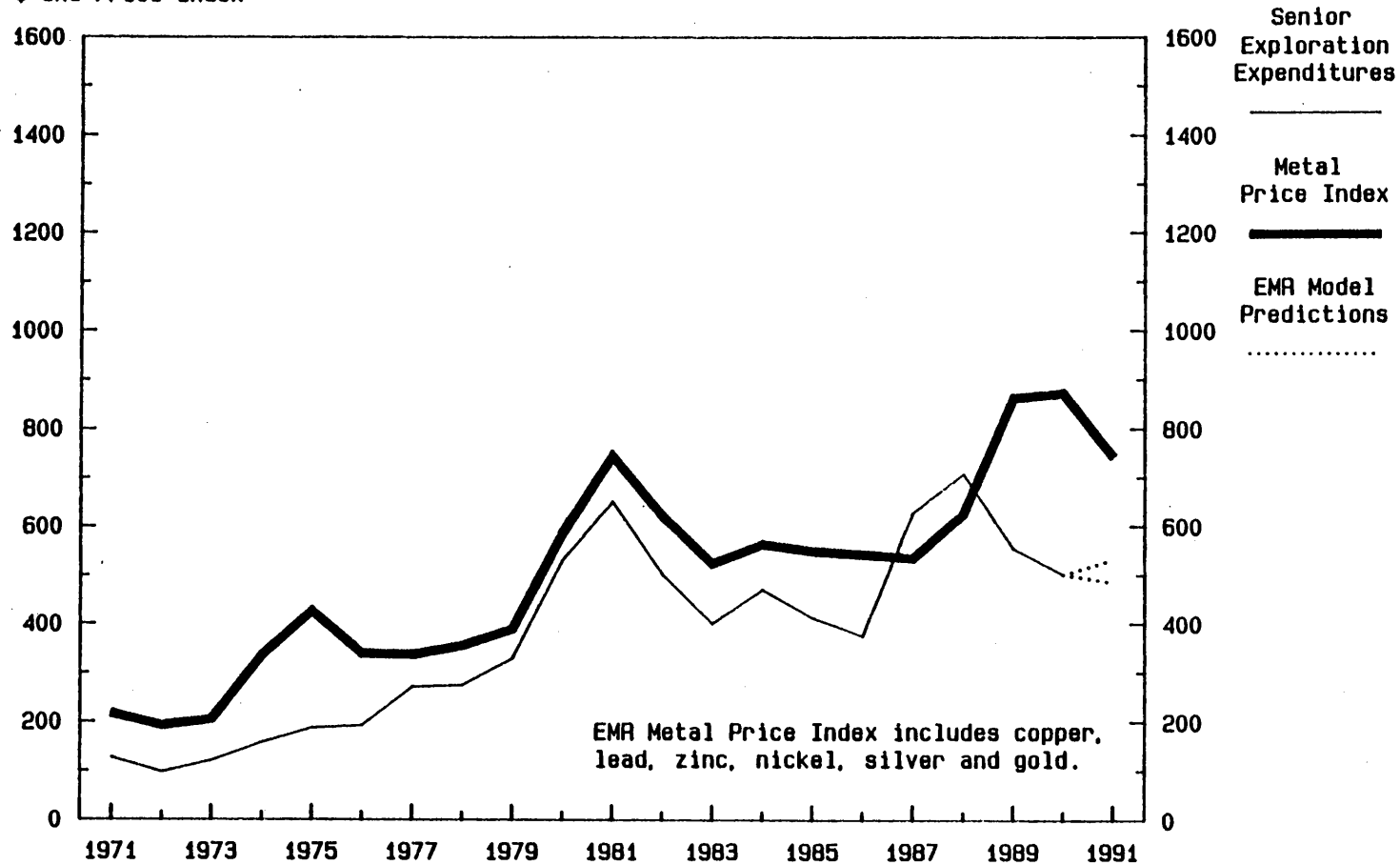
Millions of \$ and Price Index



Sources: Statistics Canada Catalogues 61-007 and 61-216 for exploration data 1971-85; for 1986-88, the federal-provincial field expenditures were multiplied by the ratio total/field from Statistics Canada; 1989 final and 1990 preliminary estimate based on federal-provincial surveys co-ordinated by Statistics Canada and EMR; 1991 forecasts predicted by EMR model.
 Expenditures are in current dollars and include overhead.

Figure 3
**SENIOR EXPLORATION EXPENDITURES
 AND
 CANADIAN METAL PRICES LAGGED ONE YEAR**

Millions of \$ and Price Index



Sources: For 1971-88 senior expenditures were estimated by EMR; 1989 final and 1990 preliminary estimate based on federal-provincial surveys co-ordinated by Statistics Canada and EMR; 1991 predicted by EMR model. Expenditures are in current dollars and include overhead.

In contrast, because of the delay in getting responses from many companies, annual exploration expenditure statistics gathered by the federal-provincial exploration survey are not normally available until about one year after the end of any exploration year. Therefore, they report on exploration spending and activities that took place during the previous 12 to 24 months.

There has been a reasonably close correlation between annual CDDA drilling footages and Canadian exploration expenditures over the past 10 or 15 years, so that the CDDA drilling statistics depicted in Figure 4 (monthly, 1985-91), Figure 5 (quarterly, 1985-91) and Figure 6 (annual, 1973-90) should provide a reasonable and up-to-date indication of recent national mineral exploration activity trends. In addition, a comprehensive 17-year graph (Figure 7) depicts total Canadian contract drilling up to 1989 as reported annually by drilling contractors to EMR and published in Statistics Canada Catalogue 26-201. Although these two sources provide different total results on an annual basis, the same overall trends are observable in both, even though the CDDA statistics are incomplete because not all Canadian diamond drilling contractors are members of CDDA and not all member companies report their drilling to CDDA.

As can be seen from Figure 5, each of the past three years (1988, 1989 and 1990) has shown a similar pattern of diminishing diamond drilling through the year, with the first quarter of 1989, 1990 and 1991 exhibiting an increase in drilling over the final quarter of the previous year. Drilling has consistently peaked during the first quarter both because flow-through funds from the previous year were carried over into January and February of the following year, and because much drilling must be done during the winter months from the ice on lakes and muskeg areas, which are generally inaccessible to drilling equipment at other times of the year. The general pattern of decreasing drilling through 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 increasing availability of flow-through funding. The decline that started in the first half of 1988 supports the general view that exploration activity began to slow down in 1988 from the peak level reached at the end of 1987 and early in 1988. The slowdown in drilling activity over the last two quarters of 1988 reflects the impact of the reduced availability of financing for the junior firms, whose exploration expenditures depended more on financing by sales of flow-through shares than on favourable metal prices. During the latter half of 1988, the flow-through share market tapered off as the gold price declined and as junior equity markets continued to deteriorate. Despite this slowdown in drilling, total Canadian exploration spending in 1988 was \$1.35 billion, a very high level by historical standards.

Exploration drilling continued to decline in the second quarter of 1991, largely because junior companies have found it increasingly difficult to raise exploration funds through the sale of shares, whether flow-through or non-flow-through.

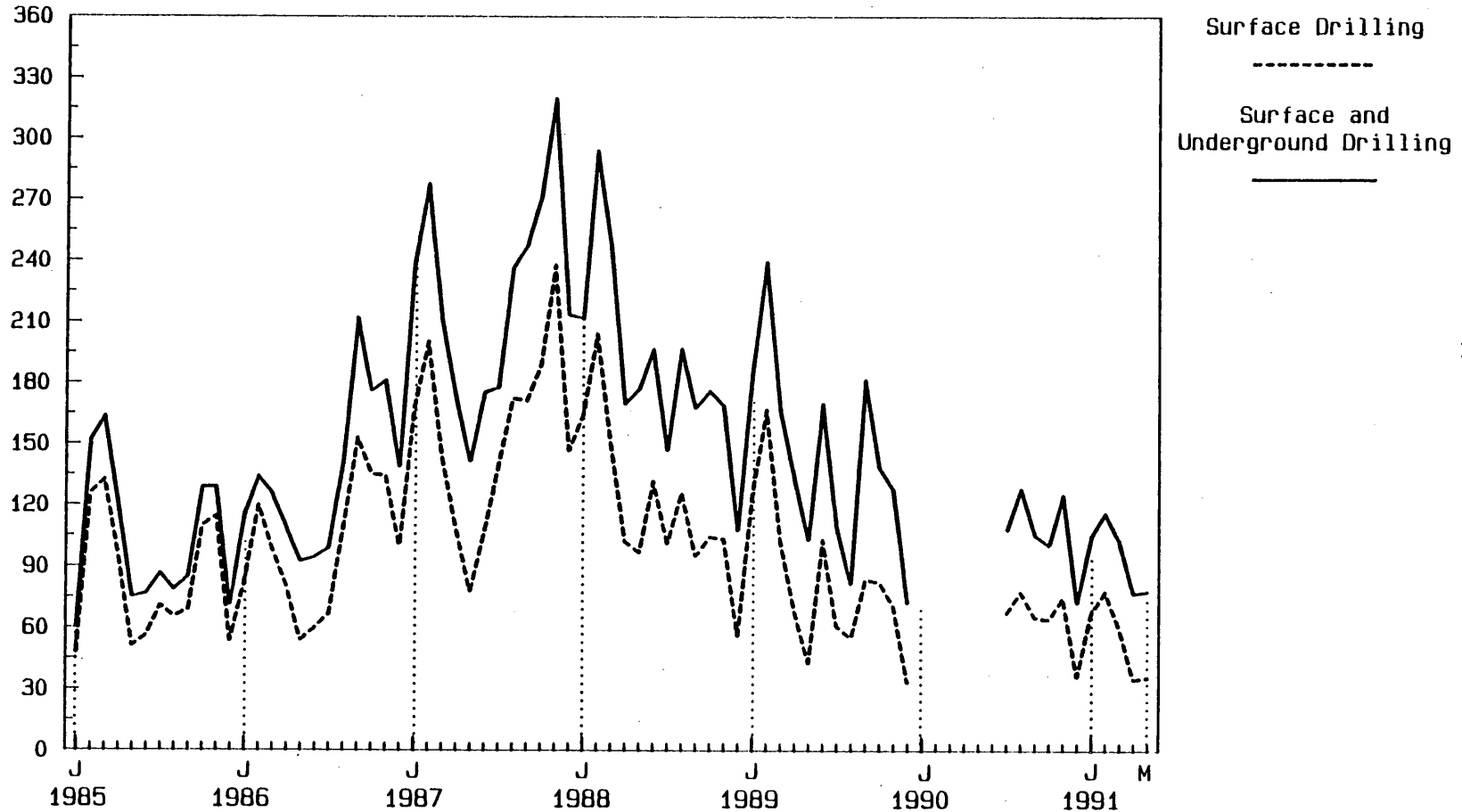
The 18-year and 17-year drilling graphs (Figures 6 and 7), together with Canadian exploration data for earlier years, show the all-time highs for diamond drilling that occurred in 1987 and 1988. The levels in 1989 and 1990 were still strong compared to 1981, the drilling peak immediately prior to the takeoff in flow-through share sales, but the number of metres drilled appears to have dropped off significantly in 1991.

Surface diamond drilling activity has fluctuated more than underground drilling (Figures 4, 5 and 7). The likely explanation for this appears to be that a significant amount of the underground drilling consists of contract drilling aimed at establishing replacement ore reserves at producing mines. In the gathering of exploration expenditures 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

Figure 4

SURFACE AND UNDERGROUND DRILLING BY MONTH – JANUARY 1985 TO MAY 1991

000 metres

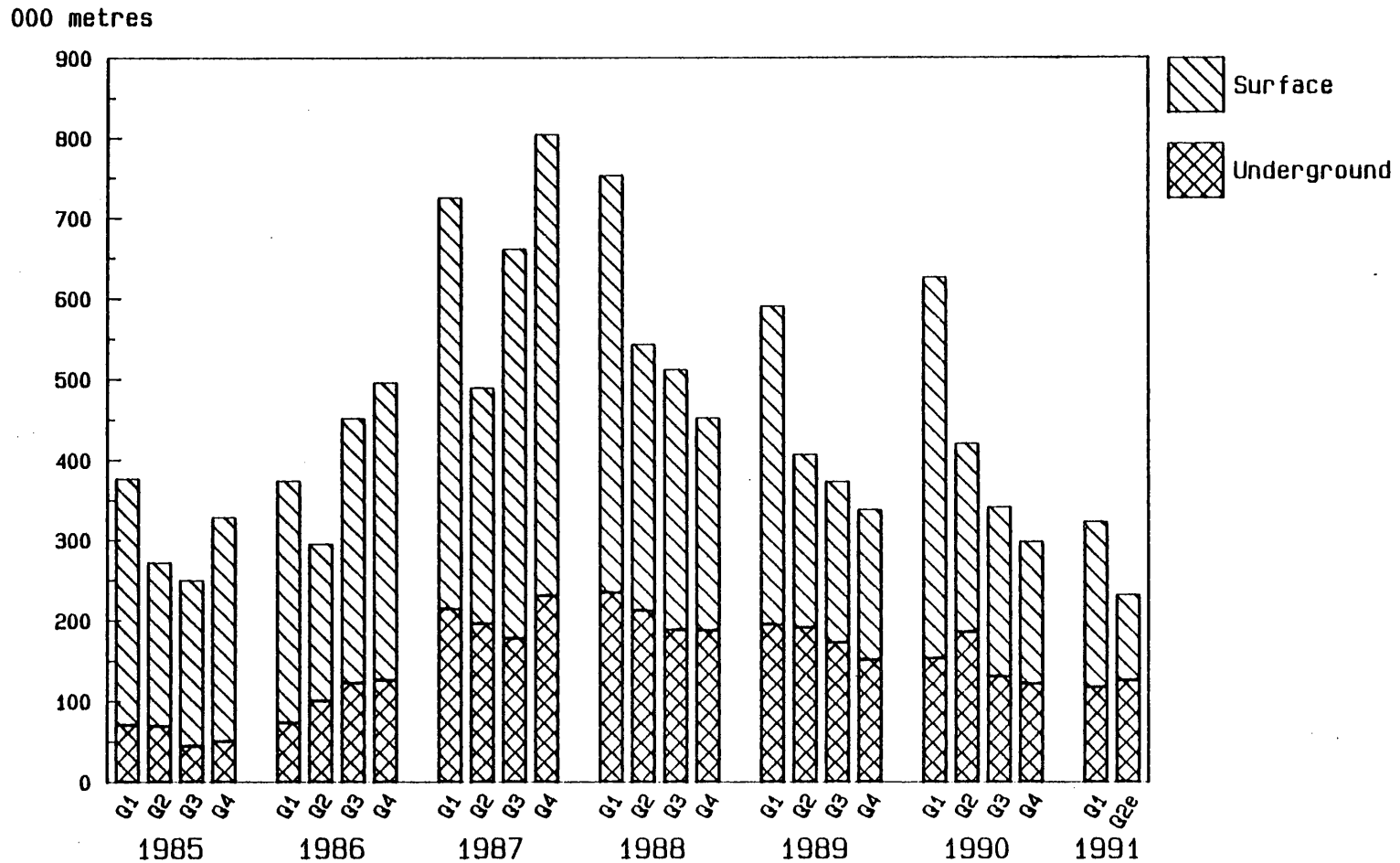


Source: Canadian Diamond Drilling Association.

Note: These data include approximately 50-60 percent of total drilling activity. Monthly data are not available for the period January-June 1990 because final CDDA statistics for this period were released only as a six-month total.

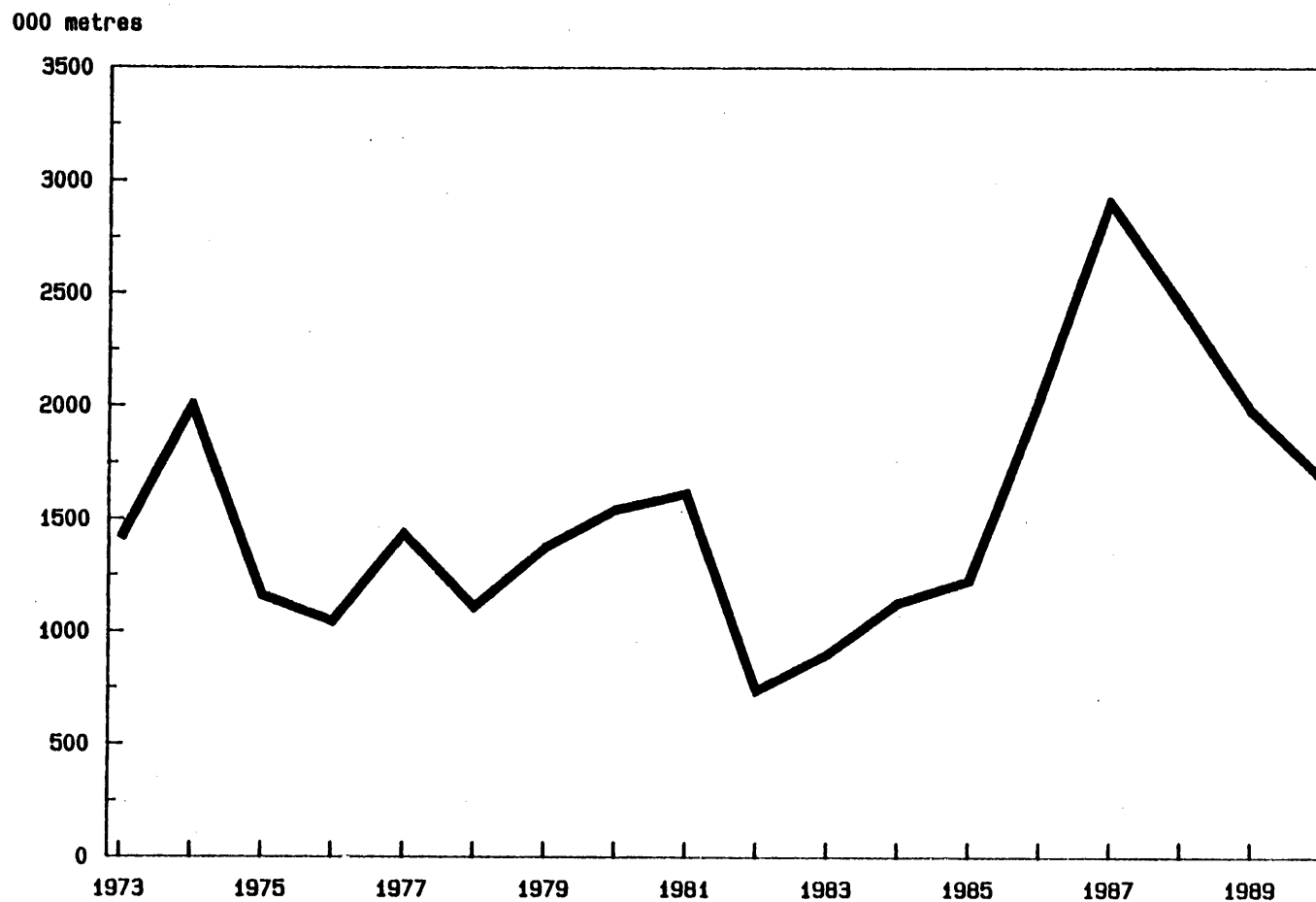
Figure 5

SURFACE AND UNDERGROUND DRILLING BY QUARTER – 1985 TO 1991



Source: Canadian Diamond Drilling Association.
 Note: These data (as reported to CDDA) include approximately 50-60 percent of total drilling activity.
 e Estimate.

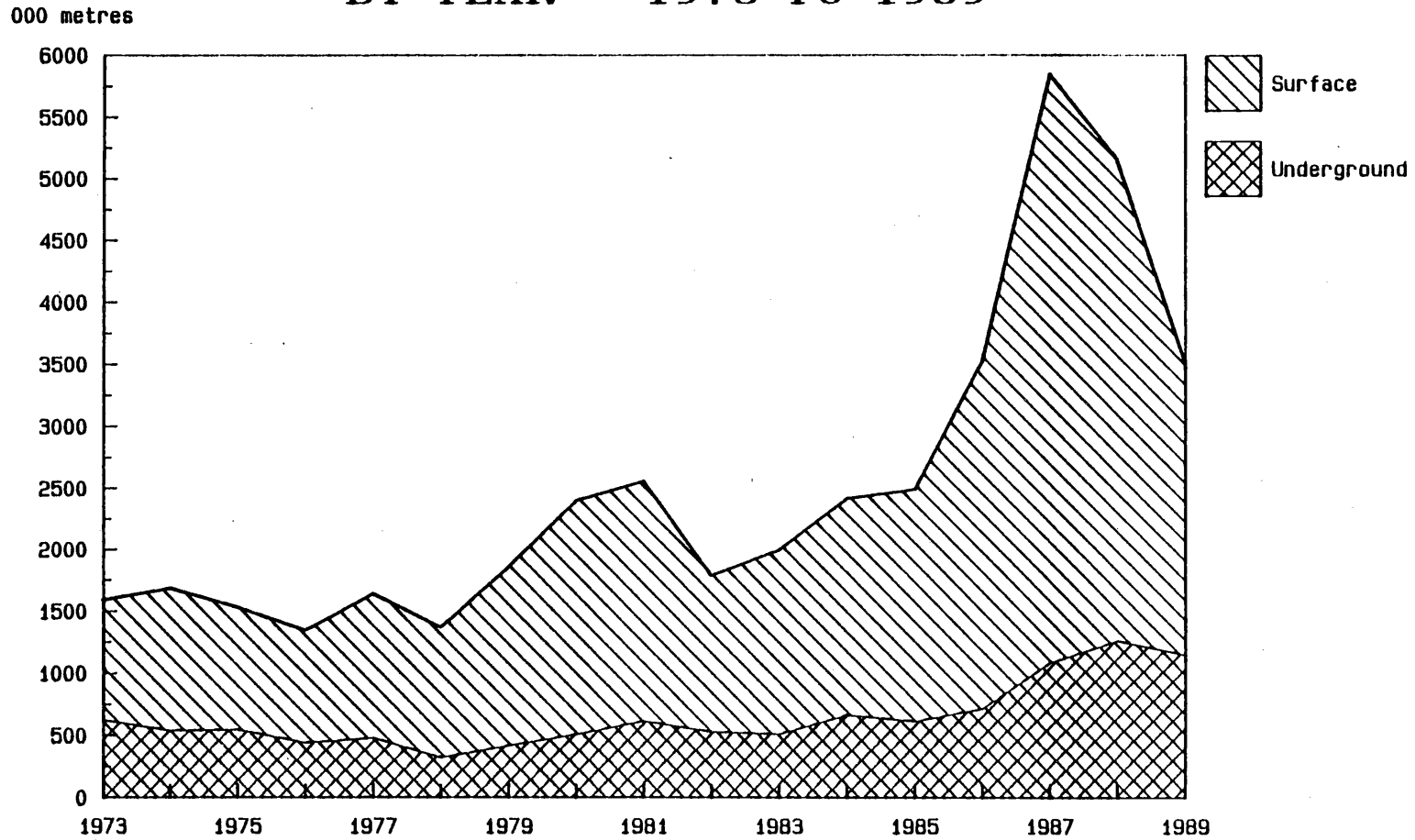
Figure 6
**SURFACE AND UNDERGROUND DRILLING
BY YEAR - 1973 TO 1990**



Source: Canadian Diamond Drilling Association.
Note: These data include approximately 50-60 percent
of total drilling activity.

Figure 7

SURFACE AND UNDERGROUND DRILLING CONTRACT DIAMOND DRILLING OPERATIONS BY YEAR – 1973 TO 1989



Source: Statistics Canada Catalogue 26-201.

Note: Data refer to SIC 0921; 1989 is the latest year for which data are available.

exploration for new mines. However, the increase in the amount of underground diamond drilling that took place during the second half of the 1980s represents underground exploration of gold deposits that were at the exploration stage, that is, they were not producing mines, nor had a production decision been made. However, in interpreting Figures 4 to 7, despite the relatively close correlation of exploration expenditures and metres of contract diamond drilling that has generally applied during the period from about 1975 on, it is important to recognize that recent levels of diamond drilling activity provide only a rough indication of recent levels of Canadian exploration activity and that, because of inclusion of underground drilling at producing mines, Figures 4, 5 and 6 may in effect be overstating recent levels of mineral exploration activity.

3. Overall View on Mining Exploration for 1991

This section brings together the information discussed above.

Total exploration expenditures in 1990 amounted to about \$751 million, with senior exploration at about \$502 million and junior exploration at about \$249 million. This preliminary figure is considerably lower than the \$1.35 billion of expenditures recorded for 1988 and slightly lower than the \$828 million recorded in 1989.

Arriving at an overall total forecast for 1991 requires the comparison of different amounts derived from several sources. The exploration intentions survey indicated that exploration spending in 1991 would be \$646 million. As indicated, this figure included \$462 million for seniors and \$184 million for juniors.

The regression analysis discussed in section 2.4 provides another source of information. The historical relationship between total exploration expenditures and metal prices leads to a figure of \$717 million, or somewhat less, as being a fair estimate based on the average yearly metal prices of 1990. Using the average metal prices that prevailed in the latter part of 1990, the same regression analysis produces an estimate of \$645 million, which is surprisingly close to the intentions survey estimate of \$646 million, with \$485 million for seniors and implying \$160 million for juniors.

Another approach to developing estimates of total exploration expenditures for 1991 is by adding junior common equity financing (including flow-through shares) to senior company intentions. This is an exercise based on financing trends for 1991. A figure of \$462 million for senior exploration spending was obtained from the earlier intentions survey conducted in late 1990, while a figure of \$485 million is obtained under the regression analysis when using late 1990 average metal prices. One could say that these levels of expenditure for seniors are more likely to be assured because senior companies are more sure of their sources of funds than juniors. In recognition of the fact that seniors report total spending for the joint ventures of which they are the operators, and because it is not possible to calculate the precise reduction that would be necessary to avoid an overlap, senior exploration spending has been arbitrarily reduced to \$450 million.

The level of junior exploration spending is more difficult to forecast because it relies to a large extent on the availability of financing and, in recent years, particularly on flow-through share financing. As discussed in Section A, it is estimated that probably about \$40 million of junior flow-through share financing could be raised for 1991. If the level for flow-through share financing turns out to be \$40 million, then there would be some \$140 million of non-flow-through share financing left to be raised, assuming the realization of total junior exploration intentions (some \$180 million) as indicated from the federal-provincial survey. EMR is discounting this level of

junior exploration because the current information on financing does not support that level of junior spending for 1991. A close review of the individual junior company intentions from the federal-provincial survey list and a comparison of individual junior non-flow-through share financings reported in the media and gathered from other available information sources indicate that about \$40 million could be fairly certain. Of the remaining \$100 million of individual company intentions, EMR believes that perhaps, at most, only 50 percent could be financed, that is \$50 million. Adding these values (\$40 million of potential flow-through share financing, \$40 million of probable non-flow-through share financing and a possible additional \$50 million of non-flow-through financing) yields a range of \$80 to \$130 million for juniors.

On the basis of the above forecast for junior exploration and an expected \$450 million of senior exploration spending, EMR is more confident of a total in the range of \$530 to \$580 million than the levels indicated by either the regression model or the federal-provincial survey.

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 1991.

On an overall basis, provinces and territories indicate that grass-roots exploration is down and exploration is more focused on advanced projects. They further indicate that junior exploration is low and that exploration is being planned and carried out mainly by seniors or by juniors that have received funding from seniors. Exploration emphasis has shifted from precious metals towards polymetallic metals and industrial minerals. Taking into account conditions prevailing on financial markets, some provinces have announced new or improved financial assistance for small mining exploration companies in 1990 and 1991.

4.2 Newfoundland and Labrador

Mineral exploration in Newfoundland during 1990 decreased from the record setting levels in 1988 and 1989.

Major exploration efforts in 1990 were directed towards base metals and gold with a small but increasing effort in industrial minerals. Exploration expenditures during 1990 were mainly directed towards advanced exploration projects. These programs were orchestrated and carried out by senior mining firms with only limited exploration being conducted by the junior exploration company sector.

Claim Staking Statistics

The steady rate of increase in the number of claims in good standing during the period 1983-89 has peaked. This figure declined by approximately 20 000 claims in 1990. This trend appears to be continuing into 1991 with first half statistics now standing at 3350 staked and 39 260 claims in good standing.

Diamond Drilling

Diamond drilling is perhaps the single most important activity involved in, and reflection of, exploration activity. The level of activity experienced in 1988 in Newfoundland and Labrador was a result of a combination of factors not the least of which was exploration capital generated by the flow-through tax incentives. The 1989 and 1990 statistics for diamond drilling are down considerably from the 234 000 metres drilled in 1988 but still represent a very healthy level of activity. The forecast for 1991 is 25 000 metres (\pm 5000 metres). This substantial decrease in drilling activity does not augur well for the probability of discovery of new mineral deposits.

Exploration Expenditures

The total value of exploration in 1990 represents a 50 percent decrease from 1988. Forecasts for 1991 indicate that this downward trend in exploration spending will continue. Exploration is now focused on the more advanced projects with a significant reduction in the level of grass roots mineral exploration.

Summary

The projections for 1991 are ominous and disconcerting for mineral exploration in Newfoundland and Labrador. All the major exploration indicators—claims staked, claims in good standing, diamond drilling and exploration expenditures—show a significant decrease from previous years. There is little to suggest a reversal in the downward trend in exploration activity. However, there are a number of promising prospects that continue to be explored by a number of senior mining companies in the province.

NEWFOUNDLAND AND LABRADOR EXPLORATION STATISTICS

	1988	1989	1990 ^p	1991 ^f
(dollars)				
Annual Exploration Expenditures	41 155 481	36 252 686	23 617 000	13 000 000
Claim Staking				
Claims Stakes	26 199	17 190	10 508	6 000
In Good Standing	65 822	63 596	44 833	26 000
Exploration Field Expenditures				
BM-PM	17 559 585	10 970 673	10 019 723	na
Gold	18 698 498	14 895 933	7 054 863	na
Other	457 370	1 364 328	2 245 051	na
(metres)				
Diamond Drilling				
Production/Development	17 449	16 355	8 884	na
Exploration	217 382	106 497	84 462	na
Total	234 831	122 852	93 346	25 000

Source: Dept. of Mines and Energy (28/06/90)

BM Base metals; PM Precious metals; f Forecast; p Preliminary; na Not available.

4.3 Nova Scotia

During 1990, exploration activity in Nova Scotia was characterized by moderate levels of expenditure. There was a renewed interest in polymetallic and base metal targets by a few major companies. Industrial minerals and coal held their own, making their normal contribution to overall activity. The junior companies were not as active as in previous years mainly because of the decline of investor interest in gold exploration. Most of the large-scale surface and underground

exploration programs initiated in 1987 and 1988 were suspended. In general, investment in exploration and mine development has been declining since 1988. This trend is due to the cessation of tax incentive programs, depressed metal prices and a general difficulty in raising high-risk capital. Exploration indicators for 1980-90 are outlined on the accompanying table.

The number of new claims staked in 1990 (10 910) was marginally lower than in 1989. The total number of claims in effect at year-end (28 641) also declined, reflecting a relatively high number of lapsing claims.

The estimated total expenditures for all exploration work in 1990 was \$10 million, less than half the amount spent in 1989. The amount of diamond drilling performed in 1990 (20 000 m) was proportionately low and half the total for 1989.

Most of the exploration work carried out in the first six months of 1991 has been done by senior companies or by junior companies that have received funding from senior companies. There has been a renewed interest by a number of senior companies that had not been exploring in the province in recent years.

The principal targets in 1991 have been base metals in geological environments long known to be good hosts, particularly the lower Carboniferous basins. The search for polymetallic deposits in Precambrian strata of Cape Breton Island has also increased. Exploration for gold in the Meguma environment has declined considerably, however, three major prospects are on hold pending additional financing.

Claim staking for the first six months of 1991 has been at a slightly lower level than the average for 1990. The total amount of claims in effect at year end is also expected to decline in relation to the 1990 total.

Assessment work reported in the first six months of 1991 (reflecting work carried out in the 12 months prior to reporting) totalled approximately \$2 million compared with \$11.6 million for the same period in 1990.

A modified forecast generated from data supplied by Energy, Mines and Resources Canada indicates that the total exploration expenditures for 1991 will probably be lower than for 1990, in the range of \$5-\$8 million.

4.4 New Brunswick

The New Brunswick exploration industry is dominated by six companies representing both the major and junior mineral industry sectors.

The year 1990 ended with the largest number of claims in effect since 1955, even though the number of new claims recorded was down substantially from the previous year. Preliminary data indicate that approximately \$18 million was spent on exploration activity in New Brunswick in 1990.

Respondents to a federal government industry survey on forecasted exploration expenditures have indicated that approximately \$21.7 million will be spent in New Brunswick in 1991. An analysis of available relevant statistics points out that, during the first two quarters of 1991, mineral claim recordings, claim renewals and office visits and information requests by the industry sector are up over the same period last year. Total claims equivalents at the end of June were 30 247, slightly more than the same period in 1990.

EXPLORATION INDICATORS, NOVA SCOTIA DEPARTMENT OF MINES AND ENERGY, FOR 1980-90

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
New claims	(75 464)	(52 018)	29 690	29 057	19 268	28 500	32 685	33 419	20 132	11 397	10 910
Total claims and claim equivalents in effect	83 135	94 408	52 236	54 310	40 438	41 173	46 086	63 585	43 590	37 745	28 641
Value of assessment work received (\$ million)	7.5	8.4	4.1	4.2	2.6	2.3	9.9	26.7	29.0	31.3	16.6
Estimated total exploration expenditures (\$ million)	(10.0)	14.6	5.5	6.5	7.3	9.0	21.0	45.0	49.0	22.0	10.0
Total drill footage (1000 metres)		78	24	30	50	45	75	215	110	42	20.0

() Numbers in parenthesis are approximate.

The majority of exploration activity will be concentrated on the search for base metals; however, the precious metal sector will also receive its share of exploration expenditures. Indications are that, in 1991, the exploration sector will conduct the standard ground geoscientific surveys; however, there will also be a concentration of funds on trenching and drilling programs.

4.5 Quebec

FLOW-THROUGH SHARE FINANCING AND EXPLORATION EXPENDITURES IN QUEBEC IN 1990 AND 1991

Flow-Through Share Financing

In Quebec, flow-through share financing of exploration expenditures was severely hurt by the economic slowdown and the termination of the Canadian Exploration Incentive Program. The two-year extension of additional deductions for exploration expenses announced by the Quebec government (up to 66 2/3 percent for certain surface exploration expenses) does not seem sufficient by itself to reverse the unfavourable trend that has prevailed since the 1987 stock market crash. Thus, in 1990, funds raised by this financing mechanism amounted to about \$48 million, which is less than the \$73 million raised in 1989.

This downward trend in flow-through share financing is continuing in 1991. In fact, juniors managed to raise only about \$4 million in the first six months. The anticipated economic recovery could improve the situation before the end of the year, but the expected total amount of funds will surely not exceed the \$15 to \$20 million range.

To help the most dynamic junior mining exploration companies maintain mining activities, in May 1991 the Quebec government set up a one year financial assistance program designed to allow these juniors to carry out exploration projects on their properties. With a \$5 million budget and administered by the Société québécoise d'exploration minière (SOQUEM), the program targets Quebec-based junior mining exploration companies that have carried out a minimum of \$300 000 worth of mining exploration work in Quebec since January 1, 1988. Further, eligible projects will require expenditures of at least \$100 000 and cannot benefit from other government incentives.

FINANCING BY FLOW-THROUGH SHARES AND EXPLORATION EXPENDITURES IN QUEBEC

	1988	1989	1990 ^P	1991
	(\$ millions)			
Flow-through shares ¹	154	73	47	15-20 ^f
Exploration expenses				
Off-property	331	164	153	141 ^l
On-property	39	32	33	20 ^l
Total	370	196	186	161 ^l

Source: Ministère de l'Énergie et des Ressources, Québec.

¹ These amounts include expenses related to financing by limited partnerships.
^f Forecast; ^P Preliminary data; ^l Intentions data were derived from the survey carried out in the fall of 1990 and were confirmed through a telephone survey in July 1991.

Exploration Expenditures

The results of the annual survey on the spending "intentions" of mining companies point to total exploration expenditures of \$161 million, \$141 million of off-property expenses and \$20 million for on-property expenses. This represents a 13.4 percent decrease from 1990, a decrease over two times more pronounced than the decrease from 1989 to 1990. This decrease is essentially attributable to the deterioration in flow-through share financing, the main financing source for juniors.

However, we note that in the last three years the decrease in total exploration expenditures is not so pronounced as the decrease in flow-through share financing. The decrease is not as pronounced in part because of investments made by producing companies and their subsidiaries. It is also because of exploration activity in the search for industrial minerals (graphite) and metals (chrome, nickel), as well as traditional exploration for gold.

Claims and Diamond Drilling Statistics

The number of metres drilled by diamond drilling companies and the number of recorded claims are two other useful indicators to monitor the evolution of exploration activity. In 1990, diamond drilling remained practically unchanged from 1989, namely 1.30 million metres. For the first five months of 1991, the number stands at 0.48 million metres compared to 0.63 million metres for the corresponding period in 1990.

As for recorded claims, the total number is 16 000 claims in 1990 compared to 27 000 in 1989. For the first four months of 1991, the number of registered claims is 6405, compared to 5918 for the corresponding period in 1990.

4.6 Ontario

In 1989, mineral exploration and development expenditures totalled \$560 million in Ontario. These expenditures are estimated to decrease to \$420 million in 1990 and are forecast to drop to \$355 million by 1991. In 1988 total mineral exploration and development in the province was \$757 million. This data includes both field expenditures and overhead costs.

Off- and on-property (general and minesite) exploration expenditures are expected to decrease from \$218 million in 1989 to \$141 million in 1990 and \$124 million in 1991. Minesite development expenditures are anticipated to decrease from \$342 million in 1989 to \$279 million in 1990 and \$232 million by 1991. This data includes both field expenditures and overhead costs.

Senior mining companies were responsible for approximately 72 percent of the off- and on-property field exploration expenditures of \$185 million in 1989 compared to 56 percent in 1988. The level of exploration expenditures by junior companies thus accounts for 28 percent in 1989, down from 44 percent in 1988. Percentages for senior companies may be high since funds received from joint venture partners, mostly junior companies, are reported by the senior companies.

The number of claims in good standing in Ontario at the end of April 1991 was about 118 740, down 15 percent from 139 040 claims in April 1990. The number of claims in good standing is considered a good indicator of the level of exploration activity in the previous year. The number of claims in good standing at the end of 1990 was about 125 000, the lowest number since 1982. The number of claims in good standing peaked in 1988 at over 171 000.

Exploration activity is highest in northeastern Ontario. Of the twenty-eight advanced underground or open-pit exploration projects in the province at the end of 1990, 60 percent were located in the northeast.

Approximately 80 percent of the advanced projects are gold properties. As of July 1991, however, many of these projects were inactive. Three base-metal mines are in the development stage (production decision announced) in the Sudbury area of northeastern Ontario.

Ontario's two 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. In April 1990, the Ontario government committed \$30 million to the two programs over 3 years. This funding, together with certain amendments to OMIP is intended to lessen the impact of the discontinuation of the federal government's Canadian Exploration Incentive Program (CEIP) in February 1990.

More than 400 Ontario prospectors received OPAP grants of up to \$10 000 for the 1990/91 fiscal year. The financial assistance provided under OMIP takes the form of grants up to \$300 000 a year covering 30 percent of eligible exploration expenditures. In 1990, \$8 million was disbursed under the program to 150 projects.

Special OMIP assistance provides up to 50 percent of eligible expenditures in selected areas that have suffered or are likely to suffer an economic downturn. The Kirkland Lake - Temiskaming, Elliot Lake, Manitouwadge, Atikokan and Beardmore - Geraldton - Longlac - Nakina areas have been chosen for the extra OMIP incentive funding.

4.7 Manitoba

Mineral exploration expenditures for 1990 are forecast to be \$37.0 million. This compares to an estimated \$38.5 million spent in 1989 and \$40.0 million in 1988. Surface diamond drilling for these three years is estimated at 197 000 metres in 1990, 177 896 metres in 1989 and 270 969 metres in 1988. Current indications are that exploration expenditures for 1991 will be comparable to 1990.

The total area of claims recorded in Manitoba during 1990 was 130 105 hectares, as compared to 184 723 hectares recorded in 1989, and 341 722 hectares in 1988. However, total mineral dispositions (which include claims, permits and leases) in good standing at the end of 1990 totalled 2 291 049 hectares, as compared to 1 865 317 hectares and 1 614 463 hectares at the end of 1989 and 1988, respectively.

The strong emphasis placed on gold exploration for most of the 1980s shifted towards base metals which, contrary to gold, exhibited price strength in the late 1980s. In Manitoba, this is evidenced by the fact that all five advanced mining development projects are for base-metal deposits.

Copper-zinc exploration programs were dominant in the Flin Flon-Snow Lake greenstone belt and to a lesser extent in the Lynn Lake region and in southeastern Manitoba. Exploration for nickel continued along the Thompson belt, particularly on its southern extension under Paleozoic cover. Exploration for gold was carried out in the major greenstone belts of Flin Flon-Snow Lake, Lynn Lake, Gods Lake, Island Lake and Rice Lake.

The Manitoba Mineral Exploration Incentive program was announced in the province's 1991/92 budget. This incentive targets new exploration activities in Manitoba by junior exploration companies. Only investments in ventures financed under a flow-through share agreement or limited partnership will qualify. The province is offering investors a 25 percent grant for eligible investments. The marketing will be carried out by registered non-Crown Manitoba Mineral Exploration Investment Corporations. Manitoba Energy and Mines will consider applications for registration beginning January 1, 1992. Eligible flow-through issues will be limited to \$50 million and the total cost to the province is estimated at \$14.5 million over the life of the program. Enabling legislation through Bill 71 was tabled in the Manitoba Legislature in July.

4.8 Saskatchewan

Saskatchewan Resident Geologists carry out an annual survey of mineral exploration expenditures through telephone interviews of the mining exploration companies and prospecting groups. In January/February of each year, companies and groups are asked to provide an estimate of their current budget on a commodity and area-of-search basis. Since 1987 the survey respondents have also been asked to provide actual expenditures for the previous year.

Although there are about 349 registered property holders in the province, only between 40 and 85 companies (46 in 1991) provide exploration financing and they form the basis of the survey. However, due to unforeseen events, budgets may change significantly during the year. Actual total exploration expenditures exceeded preliminary estimates in 1987 and 1988. A reversal of this trend occurred in 1989 and 1990, after flow-through financing had become less attractive and commodity prices were depressed. The exploration expenditures for 1986 to 1991 from the resident geologists' survey are shown in the table below.

EXPLORATION EXPENDITURES - RESIDENT GEOLOGISTS' SURVEY

	1986	1987 ^l	1987 ^f	1988 ^l	1988 ^f	1989 ^l	1989 ^f	1990 ^l	1990 ^f	1991 ^l
	(\$ millions)									
Precious metals	19	34	48	55	55	32	22	13	11	6
Base metals	2	2	3	3	6	5	7	7	7	6
Uranium	22	18	18	44 ^a	40 ^a	47 ^a	46 ^a	43 ^a	37 ^a	38 ^a
Other	-	-	-	-	-	-	2	2	2	3
Total	43	54	69	102	101	84	77	65	57	53

^a Includes underground development at Cigar Lake and Midwest Lake uranium test mines.
^l Intention; ^f final; - Nil.

The marked downturn in mineral exploration expenditures in Saskatchewan since 1988 is consistent with the national trend. In the past few years junior companies have found it increasingly difficult to raise exploration and development capital. As a result, the trend is towards more company-financed explorations from the major corporations.

Diamond exploration continues into its third year. About 80 companies and individuals hold claims under disposition in southern Saskatchewan, mainly in a belt extending eastwards from Prince Albert. The potential for discovering economic diamond deposits is presently a matter of speculation, although the high degree of interest coupled with encouraging exploration results could hasten such a discovery.

Overall, mineral exploration expenditures in Saskatchewan are expected to continue to fall. The 1991 estimate is \$48.0 million lower than the peak expenditures of \$101.0 million in 1988, equivalent to a drop of 47 percent.

4.9 Alberta

Non-petroleum mineral exploration expenditures are expected to decline slightly in 1991. Exploration expenditures are forecast to drop to \$7.1 million, down from an estimated \$7.6 million for 1990. Most of this spending continues to be focused on coal exploration. The number of coal exploration drillholes is forecast to be 876 for 1991 compared to 723 in 1990 and 589 in 1989.

In 1990, over three quarters of Alberta's non-petroleum exploration spending was directed to coal. Uranium was next, attracting just under 20 percent of total mining exploration dollars. The remainder represented modest expenditures on precious metals, nonmetals and structural materials. In 1990, mineral rights were granted in northwest Alberta. Exploration permits were issued covering 780 000 hectares. The value of the assessment work is anticipated to be about \$8 million, of which \$1 million was spent in 1990.

The sluggish performance of the mining industry within an economy slowed by the recession has made financing generally more difficult. Nor have the unique features of flow-through share financing noticeably enhanced the ability of the industry to raise capital using this vehicle. In 1990 flow-through share financing in Alberta continued to decline to about \$75-\$80 million from about \$120 million in 1989. Little of this applied to the mining industry. In 1991, flow-through financing is expected to be about one half of 1990 levels.

4.10 British Columbia

Mineral claim staking increased slightly from the previous year's level with 98 256 new mineral units recorded in 1990, as compared to 97 328 units in 1989 and 87 285 units in 1988. Diamond drilling activity increased from 683 000 metres in 1988 to 717 000 metres in 1989. Total 1990 exploration expenditures, based upon preliminary federal government surveys, are estimated at \$226 million, up by over 21 percent from the final 1989 total of \$186 million.

New exploration discoveries were few, since most of the exploration activity was concentrated near existing "hot spots" such as the Stewart-Iskut River area including Eskay Creek, and the northern Quesnel area, including Mount Milligan.

DISTRIBUTION OF EXPLORATION EXPENDITURES IN BRITISH COLUMBIA BY COMMODITY SOUGHT

	1986	1987	1988	1989
(\$000)				
Precious metals	36 793	15 126	161 992	116 166
Base metals	8 623	114 952	22 633	27 610
Iron	0	0	0	5
Uranium	0	383	0	0
Other metals	942	1 060	1 896	1 244
Nonmetals	4 895	3 753	580	961
Coal	9 261	4 967	4 914	2 531
Commodity not specified	2 626	2 311	4 756	1 215
Total	63 140	142 552	196 771	149 732

Note: Exploration does not include extensions to deposits already being mined or committed to production. Field exploration costs only. Overhead not included.

The search for rich precious and base-metal deposits and for bulk mineable base-precious-metal deposits, particularly copper-gold, dominated industry activity. Major companies accounted for a large share of the year's expenditures as the junior exploration companies and prospectors, the leading mine finders in the province, had to curtail their activities as they adjusted to the end of flow-through financing. The province's Prospectors Assistance Program was curtailed in 1991, which could have a further impact on prospector activity in 1991 and beyond.

Geddes Resources continued exploration at the huge Windy Craggy copper-gold deposit in the northwest corner of the province and discovered a new copper zone.

Cominco Ltd. and Redfern Resources Ltd. met with significant success, highlighted by a spectacular 50 metre intersection at the Tulsequah Chief massive sulphide deposit.

Cominco Ltd. and Prime Resources Group Inc. brought into production the \$65 million Snip gold deposit.

Corona Corporation and Prime Resources Group Inc. continued with significant progress at the rich Eskay Creek gold-silver base-metal deposit, highlighted in August by a spectacular intersection of the 21B zone in the decline.

Placer Dome Inc. acquired control of the giant Mount Milligan copper-gold deposit in November and, after further drilling, proceeded with a feasibility study.

Imperial Metals Corporation and Corona Corporation completed a favourable feasibility study for the Mt. Polley copper-gold deposit and concluded that this \$131.5 million project would have a payback period of 3.6 years.

Curragh Resources Incorporated and Asturiana de Zinc (Spain) are proposing to develop the Stronsay (formerly named Cirque) lead-zinc deposit in northeast British Columbia.

Crowsnest Resources Limited continued its investigation of a potential new 800 000 tonne per year thermal coal mine at Telkwa, near Smithers, British Columbia; however, this project has again become dormant.

Fording Coal Limited received approval-in-principle for the Henretta Dragline extension at the Elkford mine in southeast British Columbia.

All major projects, such as Windy Craggy, Eskay Creek, Mt. Milligan and Stronsay are at Stage I of the Mine Development Review Process. Mount Polley is in Stage II of the review process and is expected to receive approval-in-principle before the end of 1991.

4.11 Northwest Territories

In 1990 the Northwest Territories ranked fifth in the value of Canada's metallic mineral production, supplying 5.9 percent of all metallic minerals. Metal shipments were valued at \$881 million, a 9.1 percent increase from \$805 million in 1988. Data for 1989 show mining accounted for 36 percent of the Northwest Territories Gross Domestic Product. The Northwest Territories, in 1990, produced 24.7 percent of Canada's zinc, 17 percent of its lead, 9.1 percent of its gold, 16.6 percent of its cadmium and 2.1 percent of its silver.

Approximately 60 percent of the estimated 2200 jobs in the Northwest Territories mining sector are held by Territorial residents. Participation by native northerners has increased to about 12 percent of jobs, due to the efforts of both industry and communities. The mining sector paid \$123 million or 13 percent of all salaries in the Northwest Territories during 1989.

Changes to flow-through share laws and the Canadian Exploration Incentive Program (CEIP) reduced the attractiveness of exploration investments. These changes, combined with lower gold prices, the strong Canadian dollar and high interest rates, resulted in a decline in the amount of exploration capital available. Mineral exploration in the Northwest Territories fell from \$112 million in 1988 to \$55 million in 1989 and \$38 million in 1990. The total number of claims in good standing has decreased since the early 1980s. In 1990, mineral claims covering 355 345 hectares were recorded while 563 548 hectares lapsed. Claims in good standing covered 2 947 349 hectares compared with 4 256 528 hectares in 1980. The Northwest Territories share of total exploration investment in 1988, 1989 and 1990 remained constant at approximately 5.2 percent of the total exploration investment in Canada.

Advanced exploration properties include:

George Lake Joint Venture - (Homestake Mining Company Ltd. and Kerr-McGee Corporation) explored for gold, 525 kilometres northeast of Yellowknife. The company plans 24 000 metres of additional diamond drilling during 1991.

BHP-Utah Mines Ltd. - continued work on the Ulu gold property, 550 kilometres north of Yellowknife. The company plans 15 000 metres of diamond drilling in 1991.

Athabaska Gold Res. and Chevron Minerals Ltd. - have defined 557 000 tonnes grading 12.3 grams per tonne gold on the Nicholas Lake deposit 75 kilometres north of Yellowknife.

During 1990, the NorthWest Gold Corp. commenced production at the Colomac mine, a large open-pit gold mine 200 kilometres north of Yellowknife (the mine went into care and maintenance in July 1991). The Giant mine in Yellowknife was purchased by Royal Oak Resources. The Nerco CON mine, also in Yellowknife, refurbished one of their shafts and expanded their mill capacity. The company plans to build an autoclave circuit adjacent to the existing mill, at a cost of \$19.4 million. The pressure oxidation process will recover gold from pre-existing mining waste material and allow processing of refractory ore. The Lupin mine, 400 kilometres northeast of Yellowknife invested in internal infrastructure and development to access deeper reserves. Development on the Kiggavik property, 100 kilometres west of Baker Lake, is delayed pending the completion of the federal environmental review.

4.12 Yukon

In 1991, exploration spending by junior mining companies is expected to remain at a very low level. This can be attributed to the continuing difficulty that such companies are experiencing in raising risk capital, which is the result of depressed share prices, high interest rates, declines in gold and silver prices, and the cancellation of both the earned depletion allowance and the Canadian Exploration Incentive Program.

There has recently been a revival of interest by major companies in base-metal exploration, and expenditures on such projects are expected to be at or possibly slightly above last year's level. Curragh Resources Inc.'s Mount Hundere project is expected to begin shipping concentrate by the end of July 1991.

There is currently a sense of uncertainty in the industry concerning legislative and regulatory changes that are currently being proposed, most particularly in connection with the settlement of the Yukon Indian land claim. However, prospecting activity by individuals remains at a high level, and there is no evidence that any junior or major company has modified its exploration plans as a result of this uncertainty.

A survey completed by DIAND late in 1990 indicated that actual expenditures in the Yukon in 1990 were only about \$11 million. Another survey completed by the Yukon Chamber of Mines in August 1991 indicated that expenditures in 1991 may be somewhat higher at \$14-\$15 million. These figures are much lower than the preliminary estimate for 1990 and forecast for 1991 reported in Table 3a, which suggests that actual spending has dropped considerably below the figures indicated by the "intentions survey."

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 1990 and 1991 levels of exploration activity are described on a preliminary and forecast basis respectively. The data applicable to these two years were collected between December 1990 and March 1991.

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 1991 period. Table 3b reports the same information, but in 1990 dollars. The figures for "fieldwork" do not include overhead expenses. Table 4 presents these data as percentages.

Until 1989, the most active exploration areas were Ontario and Quebec, which, in 1988, jointly accounted for 58 percent of total Canadian exploration spending. In 1988 and 1989 exploration expenditures in Ontario exceeded those in Quebec for the first time since 1977. Exploration spending in British Columbia as a percentage of Canadian exploration has risen rapidly in the second half of the 1980s and, in 1989, was at levels comparable to exploration expenditures in Quebec. In 1990 and 1991 exploration spending in British Columbia is expected to exceed spending in Quebec and Ontario for the first time since 1981. Indications are that, in 1990, exploration expenditures in Ontario declined by 35 percent relative to 1989, leaving Ontario in third place. Ontario is likely to remain in third place in 1991. Total national exploration expenditures are expected to decrease by 9 percent in 1990 relative to 1989 and by another 14 percent in 1991.

In 1989, exploration spending relative to 1988 was down in all provinces except Manitoba, although the decline in Alberta that year was insignificant. In 1990, preliminary totals indicate that exploration spending was up relative to 1989 in British Columbia, the Yukon, Alberta and New Brunswick and down in all other provinces, most notably in Nova Scotia, where 1990 exploration expenditures were down by 60 percent relative to 1989. Exploration intentions for 1991 indicate that increased expenditures are expected relative to those in 1990, in the Yukon, the Northwest Territories, New Brunswick and Nova Scotia.

5.3 Exploration Expenditures by Type of Company

Figure 8a depicts field exploration expenditures by type of company for the years 1985-89. Comparable field expenditures are not yet available for 1990 and 1991 so these years are not shown in Figure 8a. Total exploration expenditures (fieldwork plus overhead) for the years 1989, 1990 preliminary and 1991 spending intentions are portrayed in Figure 8b. Comparable fieldwork plus overhead totals data are not available for the years 1985-89 so those years cannot be shown in Figure 8b.

TABLE 3A. MINERAL EXPLORATION EXPENDITURES IN CANADA, BY PROVINCE, 1985-91

Province	Field Work Only				Total Exploration ¹		
	1985	1986	1987	1988	1989	1990 ^{pe}	1991 ^f
(Current \$ Millions)							
Newfoundland	11.9	12.3	27.7	37.7	36.2	23.6	16.8
Nova Scotia	7.8	17.2	41.6	46.7	21.4	8.7	9.2
New Brunswick	12.1	10.8	9.1	13.8	13.6	18.5	21.7
Quebec	135.2	241.4	415.5	328.2	185.0	175.7	150.7
Ontario	93.2	136.8	308.1	343.6	217.8	141.2	123.8
Manitoba	33.7	26.3	40.0	30.0	37.0	36.6	35.0
Saskatchewan	39.4	36.8	63.5	61.1	63.3	57.6	51.3
Alberta	14.7	3.0	2.5	4.3	6.2	7.6	7.1
British Columbia	73.0	63.1	142.6	196.8	186.6	226.3	166.8
Yukon Territory	22.7	27.9	29.0	38.6	15.1	22.1	27.0
Northwest Territories	46.8	35.8	59.0	66.5	45.7	33.2	36.7
Total Field Work (Excluding Overhead)	490.5	611.4	1 138.6	1 167.3	703.5	na	na
Total Exploration (Including Overhead)	605.8	723.3	1 300.0	1 350.0	827.9	751.2	646.2

Sources: Federal-provincial survey of mining and exploration companies for 1985-89; the 1990 preliminary estimate and 1991 forecast were derived from federal-provincial surveys co-ordinated by Statistics Canada and EMR.

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.
^{pe} 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, 1985-91

Province	Field Work Only				Total Exploration ¹		
	1985	1986	1987	1988	1989	1990 ^{pe}	1991 ^f
(1990 \$ Millions)							
Newfoundland	14.4	14.6	31.3	40.7	37.3	23.6	16.2
Nova Scotia	9.5	20.4	47.0	50.4	22.0	8.7	8.9
New Brunswick	14.7	12.8	10.3	14.9	14.0	18.5	20.9
Quebec	163.9	285.7	469.5	354.0	190.5	175.7	145.2
Ontario	113.0	161.9	348.1	370.7	224.3	141.2	119.3
Manitoba	40.8	31.1	45.2	32.4	38.1	36.6	33.7
Saskatchewan	47.8	43.6	71.8	65.9	65.2	57.6	49.4
Alberta	17.8	3.6	2.8	4.6	6.4	7.6	6.8
British Columbia	88.5	74.7	161.1	212.3	192.2	226.3	160.7
Yukon Territory	27.5	33.0	32.8	41.6	15.6	22.1	26.0
Northwest Territories	56.7	42.4	66.7	71.7	47.1	33.2	35.4
Total Field Work (Excluding Overhead)	594.5	723.6	1 286.6	1 259.2	724.5	na	na
Total Exploration (Including Overhead)	734.3	856.0	1 468.9	1 456.3	852.6	751.2	622.5

Sources: Federal-provincial survey of mining and exploration companies for 1985-89; the 1990 preliminary estimate and 1991 forecast were derived from federal-provincial surveys co-ordinated by Statistics Canada and EMR.

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. ^{pe} 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, 1985-91

Province	Field Work				Total		
	1985	1986	1987	1988	1989	1990 ^{pe}	1991 ^f
(Percentage distribution)							
Newfoundland	2.4	2.0	2.4	3.2	4.4	3.1	2.6
Nova Scotia	1.6	2.8	3.7	4.0	2.6	1.2	1.4
New Brunswick	2.5	1.8	0.8	1.2	1.6	2.5	3.4
Quebec	27.6	39.5	36.5	28.1	22.3	23.4	23.3
Ontario	19.0	22.4	27.1	29.4	26.3	18.8	19.2
Manitoba	6.9	4.3	3.5	2.6	4.5	4.9	5.4
Saskatchewan	8.0	6.0	5.6	5.2	7.6	7.7	7.9
Alberta	3.0	0.5	0.2	0.4	0.8	1.0	1.1
British Columbia	14.9	10.3	12.5	16.9	22.5	30.1	25.8
Yukon Territory	4.6	4.6	2.5	3.3	1.8	2.9	4.2
Northwest Territories	9.5	5.9	5.2	5.7	5.5	4.4	5.7
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Sources: Federal-provincial survey of mining and exploration companies for 1985-89; the 1990 preliminary estimate and 1991 forecast were derived from federal-provincial surveys co-ordinated by Statistics Canada and EMR.

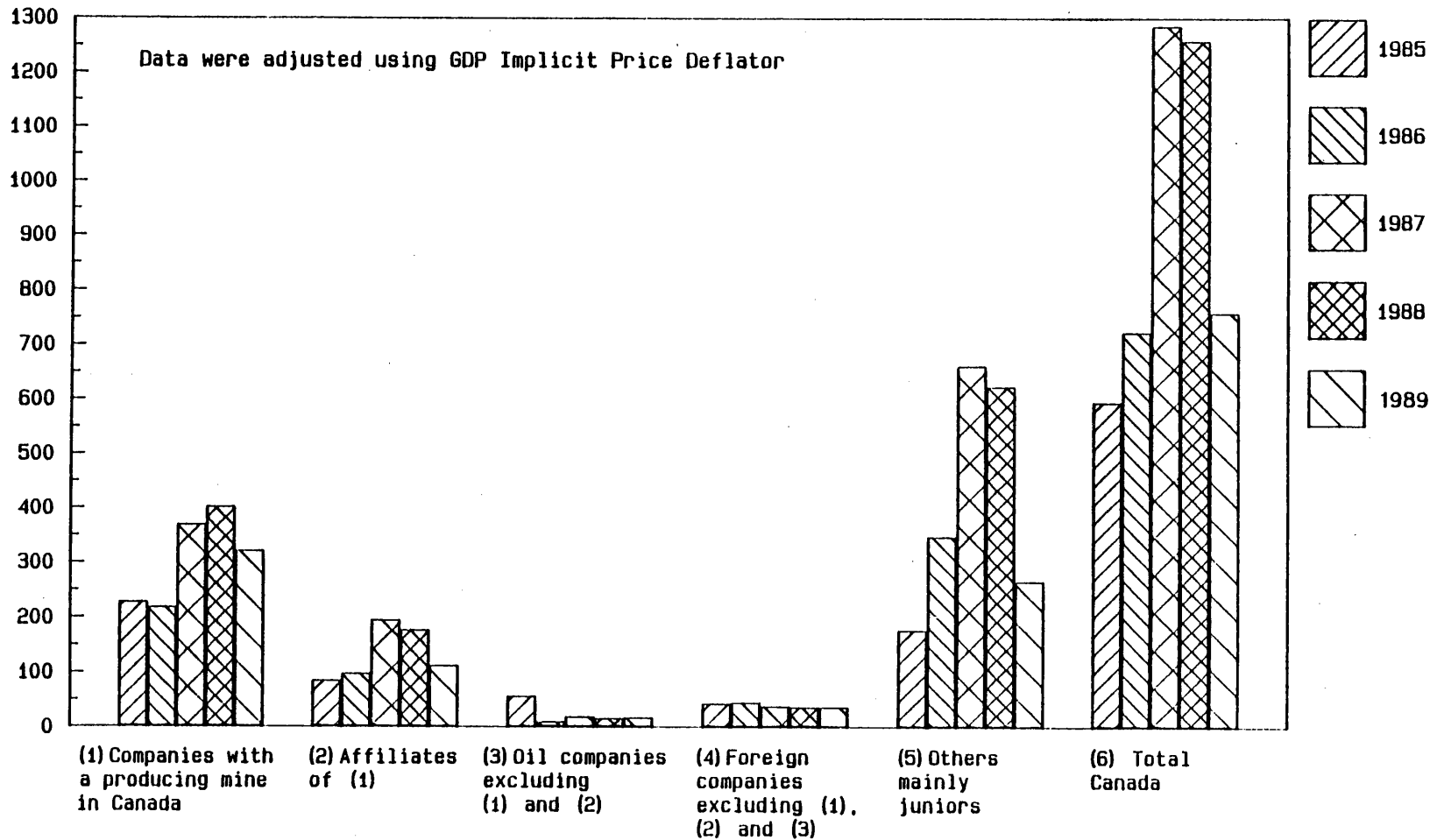
^{pe} Preliminary estimate; ^f Forecast.

Note: The percentages from 1985-88 are calculated on field work only, but those for 1989-91 are based on total expenditures, which include related overhead.

Figure 8a

CANADIAN EXPLORATION EXPENDITURES (FIELD WORK ONLY) BY TYPE OF COMPANY 1985 TO 1989

Millions of 1990 dollars



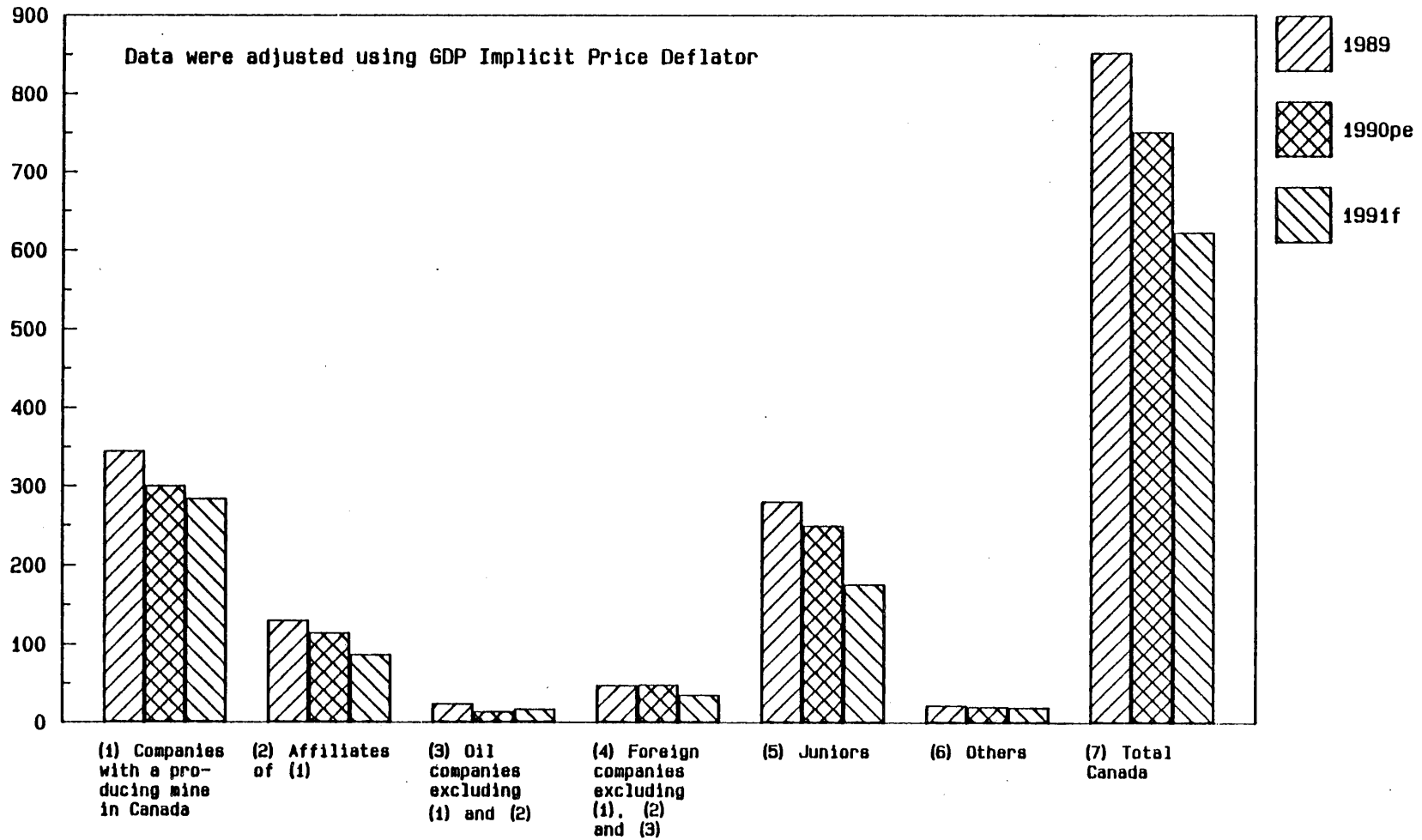
Source: Federal-provincial survey of mining and exploration companies.

Note: Overhead expenditures are not included.

Figure 8b

**CANADIAN EXPLORATION EXPENDITURES (FIELD WORK PLUS OVERHEAD)
BY TYPE OF COMPANY, 1989 WITH 1990 PRELIMINARY ESTIMATE
AND 1991 FORECAST**

Millions of 1990 dollars



Source: Federal-provincial survey of mining and exploration companies for 1989.
pe Preliminary estimate; f Forecast.

Note: Overhead expenditures are included.

Over the period 1985-91, non-petroleum mineral exploration by oil companies declined in constant dollar terms by more than 60 percent, while that by foreign companies declined by more than 70 percent.

Exploration by producing companies and their affiliates peaked in 1987/88 and appears to have declined moderately since then. This decline may actually portray lower contributions by junior companies to joint venture projects operated by senior companies. Expenditures of this nature are reported in total by project operators (mostly senior companies).

Figure 9 portrays Canadian current dollar exploration expenditures for the period 1983-91. Figure 10 portrays Canadian exploration expenditures in 1990 dollars for the period 1969-91. From 1983 to 1987, exploration expenditures by junior companies increased almost tenfold, from about \$71 million in 1983 to almost \$700 million in 1987. Exploration by junior companies, which in 1983 accounted for about 15 percent of total exploration expenditures, increased to more than two thirds of the total. In 1988, expenditures by junior companies began to decline. This decline appears to have continued through 1989, 1990 and 1991.

The fact that junior companies provided about two thirds of total Canadian exploration spending in 1987 and 1988 is not apparent in the bar graphs and may 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. As Canadian exploration expenditure surveys ask that exploration spending be reported by project operators, and because senior companies generally did not contribute large amounts of money to projects operated by junior companies, the exploration surveys have tended to overstate the contributions of the seniors and have understated those of the juniors to Canadian exploration spending during the mid-1980s.

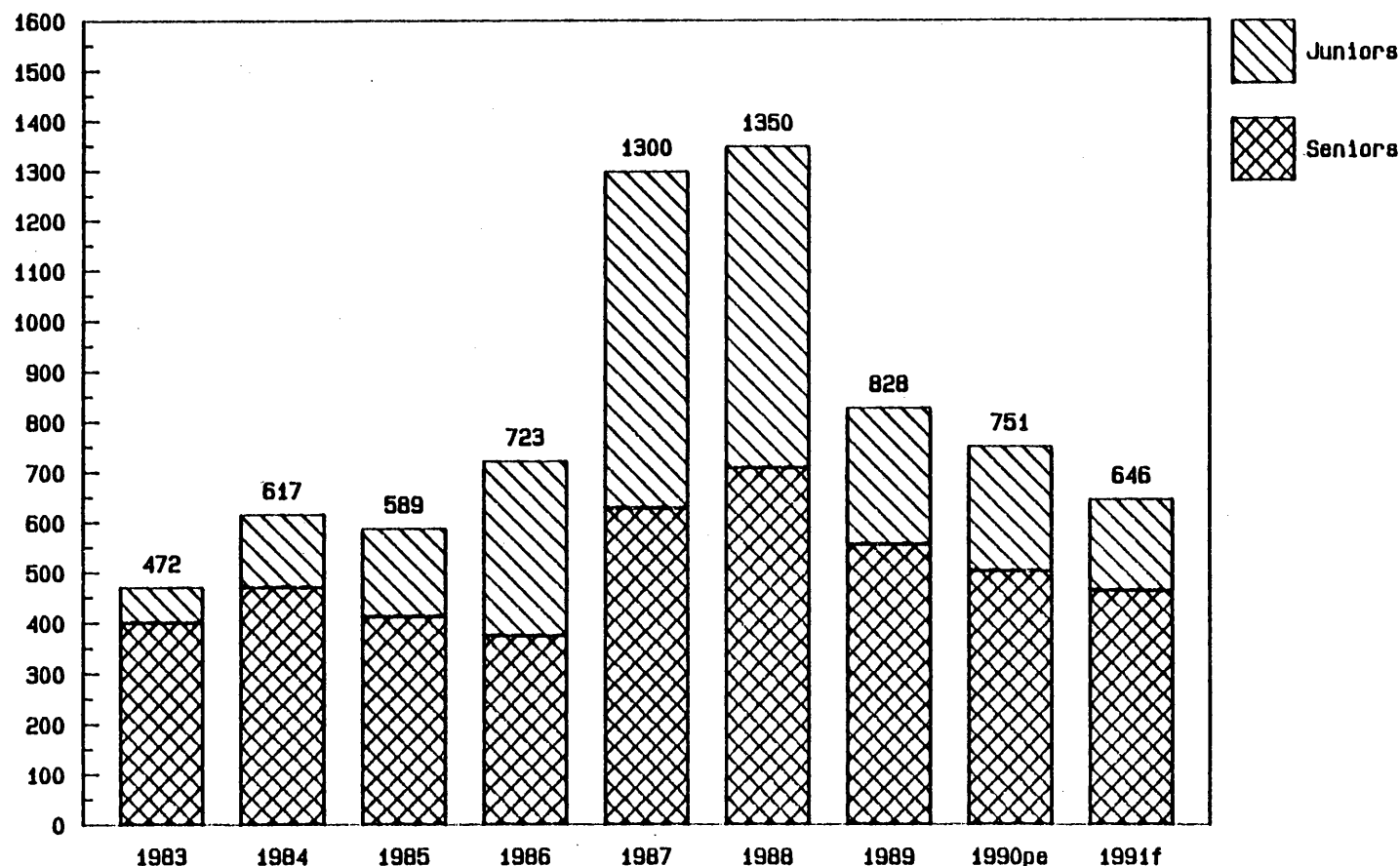
5.4 Exploration Expenditures by Type of Commodity Sought

Figure 11 shows total Canadian exploration expenditures by commodity or commodity group for the period 1985-89 and gives an indication of the changing commodity emphasis of exploration. In 1988, precious metals accounted for 82 percent of total exploration spending in Canada (an estimated 95 percent of this was directed at gold), while base metals accounted for 13 percent, uranium 2 percent and all other mineral commodities, including coal 3 percent. In 1989, there was a significant drop in the percentage of national expenditures allocated to precious metals and an increase in the percentage allocated to base metals, that is, precious metals 67 percent and base metals 23 percent. In current dollars, exploration expenditures for precious metals in 1989 were only half those of 1988, while exploration expenditures for base metals remained about the same. In percentage terms in 1989, uranium exploration accounted for 4 percent of Canadian exploration spending and the other mineral commodities, including coal, accounted for 6 percent.

Figure 9

TOTAL EXPLORATION EXPENDITURES 1983 TO 1989 WITH 1990 PRELIMINARY ESTIMATE AND 1991 FORECAST

Millions of current dollars

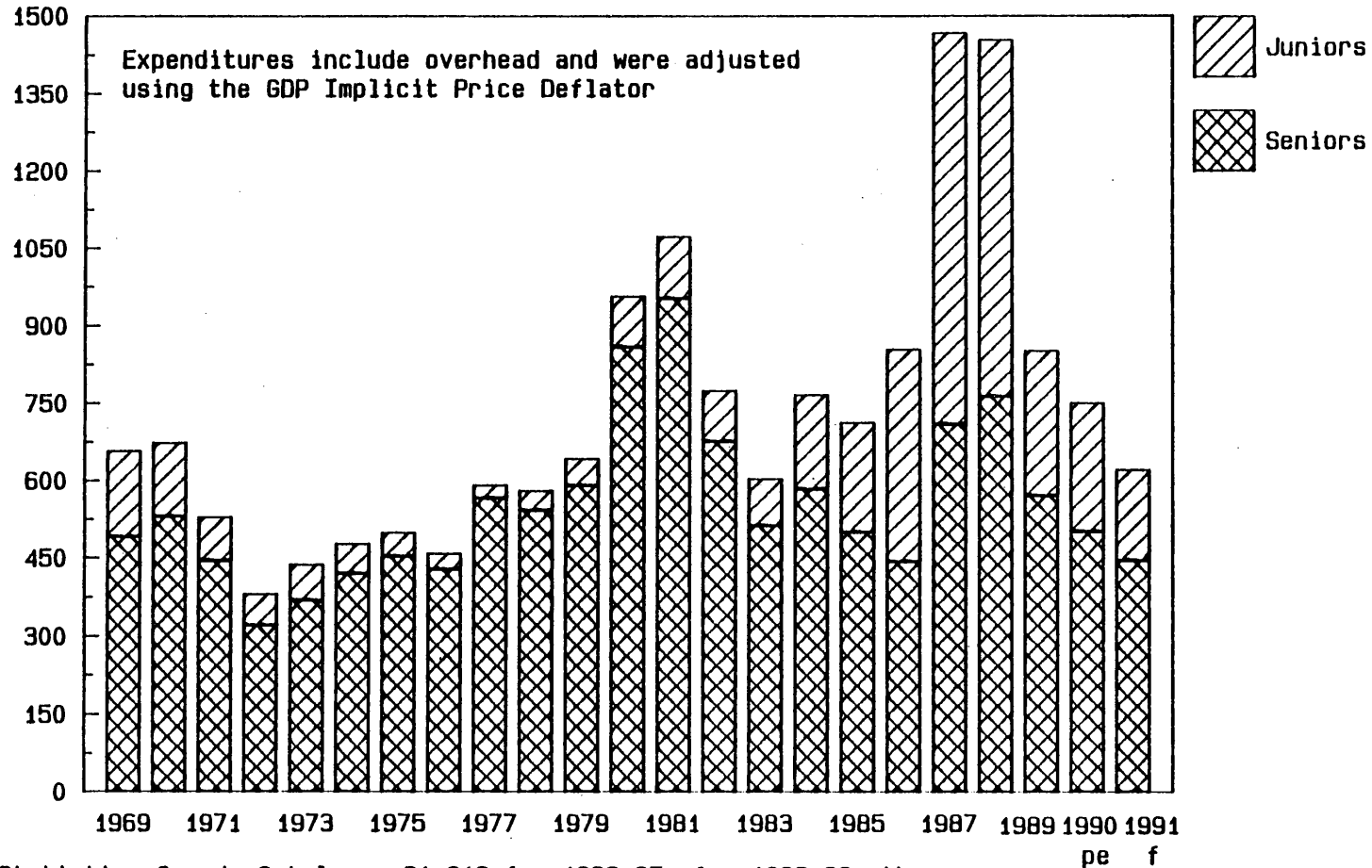


Sources: For 1983-85, Statistics Canada (Catalogue 61-216); for 1986-88, the federal-provincial field expenditures were multiplied by the ratio total/field from Statistics Canada. The 1990 preliminary estimate and 1991 forecast were derived from federal-provincial surveys co-ordinated by Statistics Canada and EMR.
pe Preliminary estimate; f Forecast.

Figure 10

**TOTAL EXPLORATION EXPENDITURES 1969 TO 1989
JUNIOR/SENIOR SPLIT WITH PRELIMINARY ESTIMATE
FOR 1990 AND 1991 FORECAST**

Millions of 1990 dollars



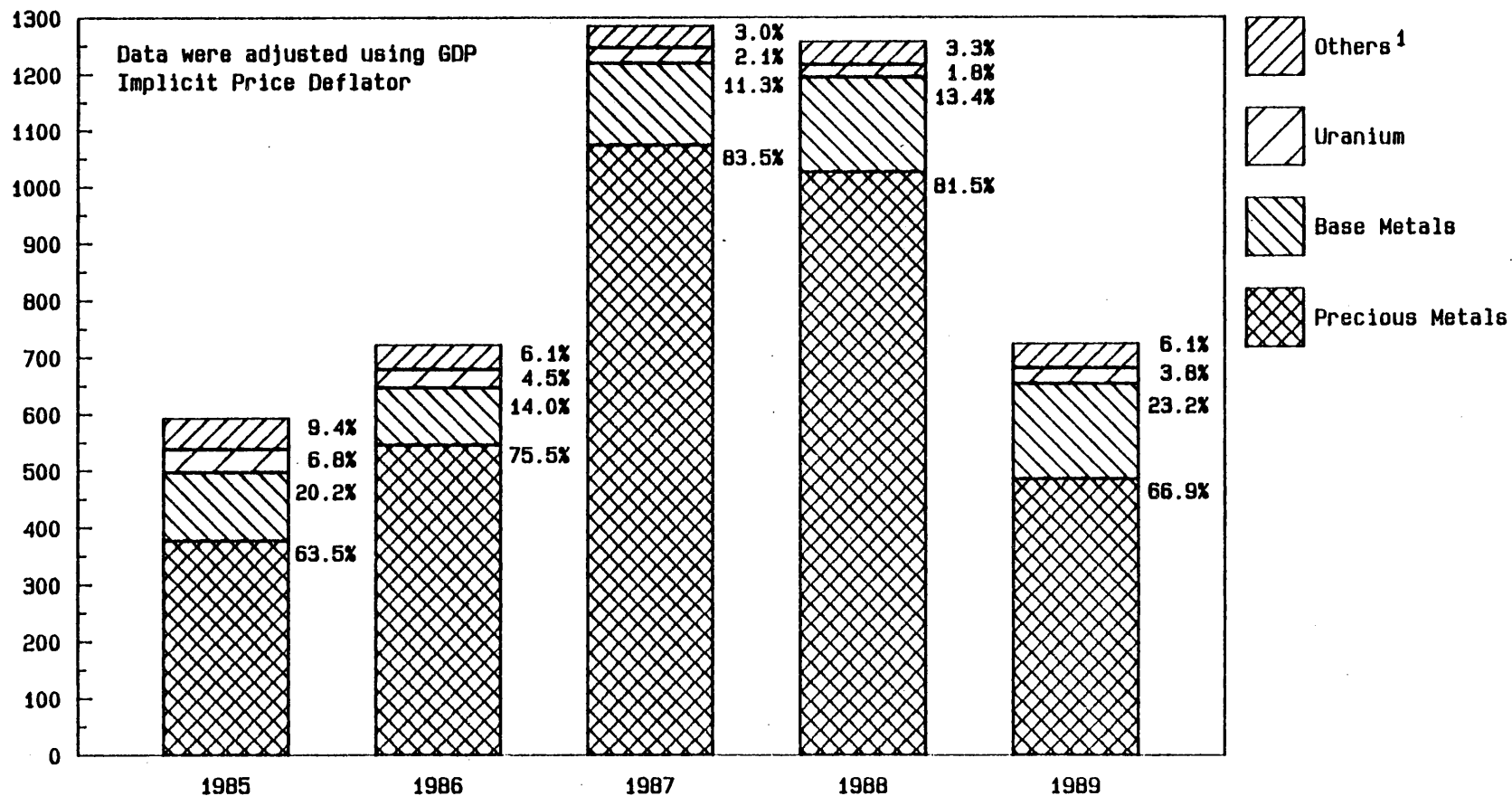
Sources: Statistics Canada Catalogue 61-216 for 1983-85; for 1986-88, the federal-provincial field expenditures were multiplied by the ratio total/field from Statistics Canada. The 1990 preliminary estimate and 1991 forecast were derived from federal-provincial surveys co-ordinated by Statistics Canada and EMR.

pe Preliminary estimate; f Forecast.

Figure 11

CANADIAN EXPLORATION EXPENDITURES DISTRIBUTION BY COMMODITY SOUGHT 1985 to 1989

Millions of 1990 dollars



Source: Federal-provincial survey of mining and exploration companies.

Note: Overhead expenditures are not included.

¹ Others include ferrous metals, other metals, nonmetals (including coal), and "not specified".

SECTION D. HISTORICAL PERSPECTIVE ON FLOW-THROUGH SHARE FINANCING ACTIVITY 1983-91

The evolution of flow-through shares as a source of financing for exploration is shown in Figure 12. 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 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 has continued in 1989 and 1990, and will continue in 1991 (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 is 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 increase in flow-through share funding has witnessed a concurrent increase in the proportion of total exploration by junior mining companies. It is the juniors who made the greatest use of the flow-through share mechanism in 1987 and 1988. 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 juniors continued to account for by far the greatest part of flow-through share funded exploration, it was they who felt the brunt of the reduced level of flow-through share financing since 1989.

TABLE 5. RATIO OF FLOW-THROUGH FINANCING TO TOTAL EXPLORATION EXPENDITURES, 1983-91

Year	Total Exploration Expenditures	Flow-Through Share Financing	Percentage Flow-Through Financing to Total Exploration Expenditures
	(\$ million)		(percent)
1983	472	34	7
1984	617	139	23
1985	589	274	47
1986	698	703	100
1987	1 300	1 183	95
1988	1 350	850	63
1989	828	350	42
1990 ^p	750	250	33
1991 ^f	530-580	40	7

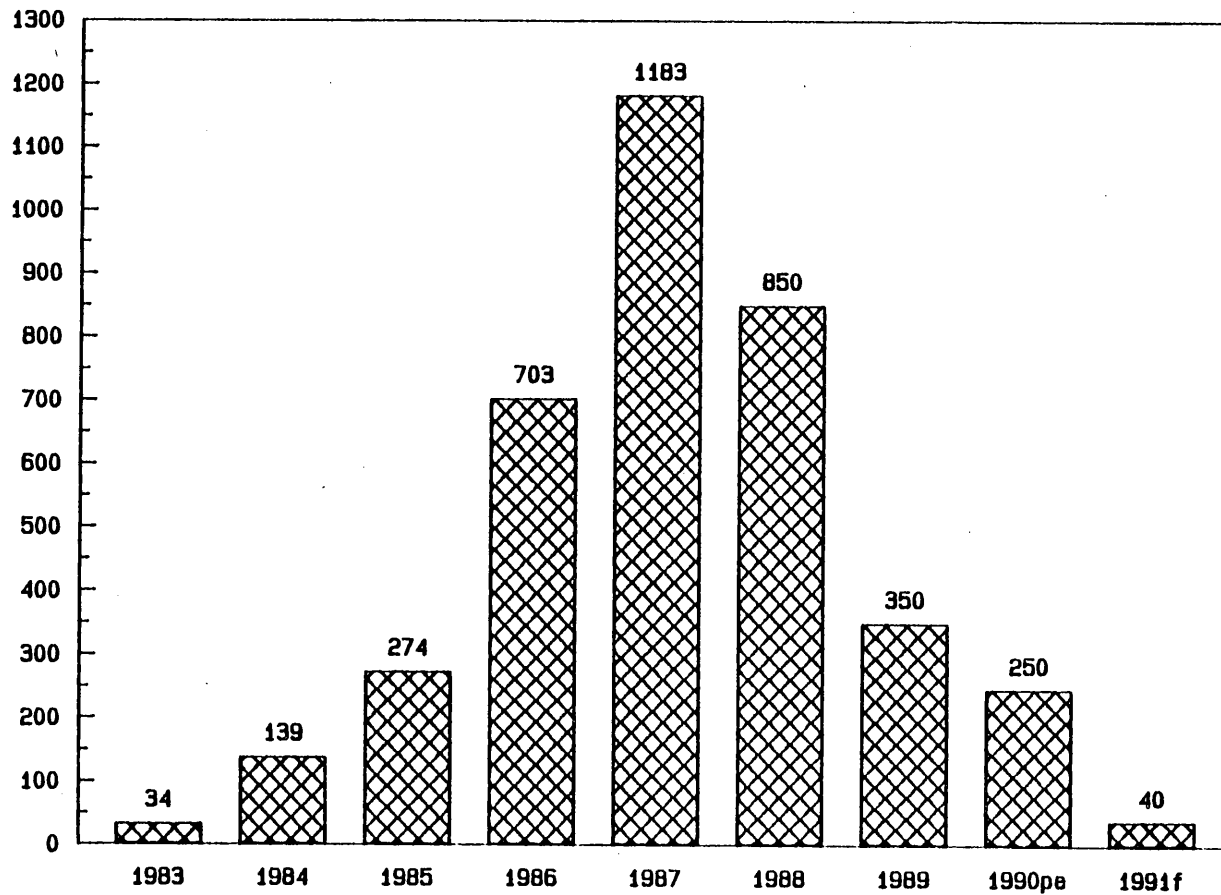
^p Preliminary; ^f Forecast.

Beginning in 1986, some of the flow-through funds raised were actually spent in January and February of the subsequent year (the so-called "look back" period). Over the period 1983-90 inclusive, flow-through shares will have provided some 57 percent of total Canadian non-petroleum mineral expenditures.

Figure 12

FLOW-THROUGH SHARE FINANCING LEVELS 1983 TO 1991

Millions of dollars



Source: Energy, Mines and Resources Canada.
pe Preliminary estimate; f Forecast as of July 1, 1991.