

NOTE

Report on Mineral Exploration Expenditures and Flow-Through Funding (Prepared for the August 1990 Mines Ministers' Conference, in Winnipeg).

Since the table at the bottom of page 20 was prepared, some of the figures for 1990 have been revised. Please insert the revised version of the page in your copy of the report.

Energy, Mines & Resources
Mineral Policy Sector
Ottawa

August 22, 1990

SECTION B. CURRENT REGIONAL OUTLOOK

4.1 Introduction

This section presents comments on recent exploration activity received from provincial and territorial officials, and gives an indication of what they expect for 1990.

4.2 Newfoundland and Labrador

Mineral exploration in Newfoundland during 1989 maintained a very healthy level of activity. Although activity was down from the record level set in 1988, statistics for claims in good standing, exploration expenditures and diamond drilling for 1989 were well above the levels experienced in 1987.

The emphasis in 1989 was balanced between gold and base metal exploration with a smaller but growing interest in industrial minerals. Exploration expenditures during 1989 were well balanced from grass roots programs through to advanced exploration projects. The greater grass roots emphasis was directed to a larger extent towards base metal properties.

	<u>1983</u>	<u>1984</u>	<u>1985</u>	<u>1986</u>	<u>1987</u>	<u>1988</u>	<u>1989</u>	<u>1990*</u>
Claim Staking (x 1,000)	4.5	11.0	15.3	14.6	22.1	26.2	17.2	10.0
Claims in good Standing (x 1,000)	15.3	19.7	29.6	33.3	47.7	65.8	63.6	45.0
Expenditures (x \$1,000,000)	7.7	8.4	12.6	11.8	31.1	41.2	32.6	25.0
Diamond Drilling (x 1000 m)	27.0	44.1	38.7	51.1	89.7	234.8	122.9	125.0 ±10.0

* Forecast



**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
WINNIPEG, MANITOBA**

August 1990



Energy, Mines and
Resources Canada

Énergie, Mines et
Ressources Canada

FOREWORD

At the Mines Ministers' Conference in St. John's, Newfoundland in August 1987, Ministers expressed an interest in being kept aware of the level of non-fuel mineral exploration in Canada. At that time, the focus of attention was on the impact of Tax Reform proposals, particularly the reduction in the levels of incentive that were being provided through the tax system. Because of this concern, Ministers agreed to have exploration levels closely monitored by members 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 the reports compiled for the last two Mines Ministers' conferences in 1988 and 1989, has coordinated the preparation of this report.

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

It is important to note that the information in Section A on the outlook for flow-through shares and exploration is constantly changing. This report reflects the data available at July 31, 1990.

EXECUTIVE SUMMARY

According to "preliminary actual" data gathered by EMR under the federal/provincial survey, total exploration expenditures in 1989 were \$927 million. As of late 1989/early 1990, when the "intentions for 1990" survey was completed, forecast outlays for 1990 were \$783 million. EMR's current assessment of total mineral exploration expenditures for 1990 is that the amounts spent will likely be somewhat more than \$750 million, but probably no higher than \$850 million. The survey of intentions total (\$783 million) falls within this range.

These amounts are down somewhat from the levels of \$1.3 and \$1.35 billion achieved in 1987 and 1988 respectively. The years 1987 and 1988 may be considered exceptional in that the amounts are high when viewed over a longer historical perspective. However, exploration in certain regions, for example northwestern Quebec and northern Ontario, began to fall after mid-1988.

The decline in 1989 and 1990 is mainly the combined result of a reduced level of flow-through share financing and a decline in the price of gold. The search for precious metal deposits continues to dominate exploration, but lately there has been a revival of interest in base metals.

In recent years, most of the exploration carried out by junior firms (firms that do not have income from producing mines) has been financed by flow-through shares. In the past, many senior companies (firms that have income from producing mines) also used flow-through share financing to fund exploration. As of 1988, when their profitability improved substantially, senior companies have used this method of financing to a much lesser extent. Most of these senior firms now have taxable income from producing mines and are better off retaining for their own use the tax deductions associated with exploration. For the most part, seniors now finance their exploration by means other than flow-through shares.

The amount of money raised for mineral exploration by flow-through shares in 1989 is estimated by EMR to have been about \$350 million, down approximately \$500 million from the \$850 million raised in 1988. In 1990, flow-through share funding for mineral exploration is expected to fall further, to about \$250 million. Of this amount, the share for juniors is estimated at \$190 million, leaving a balance of \$60 million for seniors.

With the decline in flow-through share financing since the peak of \$1,183 million in 1987, the share of mining exploration accounted for by junior companies has decreased substantially.

For the years 1987 to 1990, the following two tables indicate total Canadian exploration spending and amounts raised by flow-through shares, and Canadian exploration spending by senior companies and by junior companies.

**Overview of mineral exploration expenditures and
flow-through share financing
(\$ million)**

Year	1987 Actual	1988 Actual	1989 Preliminary Actual	EMR 1990 Forecast
Total Exploration	\$1,300	\$1,350	\$927	\$750-850
Amount Raised by Flow- Through Share Financing	1,183	850	350	250

**Junior/senior split in exploration expenditures
(\$ million)**

Year	1987 Actual	1988 Actual	1989 Preliminary Actual	EMR 1990 Forecast
Senior	\$628	\$708	\$566	\$450
Junior	672	642	361	300-400
Total	1,300	1,350	927	750-850

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

1. Outlook for Flow-Through Share Funding in 1990

1.1 Introduction

This section focuses on the quantity of funds raised for exploration by means of flow-through share financing, an amount that is essential to the determination of EMR's estimate for total Canadian mineral exploration in 1989 and 1990. It also presents the results of surveys of brokers and other financial intermediaries involved in flow-through share financing carried out in mid-1990.

1.2 Recent Background

A number of factors have influenced 1990 exploration levels to date and are likely to affect levels for the rest of the year.

Following the October 1987 stock market crash, there was concern that the junior exploration sector would experience serious difficulty in raising flow-through share capital. In response, the federal government extended the Mining Exploration Depletion Allowance (MEDA) for individuals until the end of 1988, and introduced the Canadian Exploration Incentive Program (CEIP) for mineral exploration effective January 1, 1989. CEIP was cancelled in the February 1990 Budget.

The price of gold peaked at \$421.40 U.S. per troy ounce (London Gold Market) in February 1990, but subsequently dropped down to about \$350 U.S. per troy ounce, a decline of about 20 per cent (see Figure 1). The price has remained near that level for a good part of the early summer of 1990. Given the dominance of gold in recent mineral exploration activity, this volatility in the gold price has been an important dampening factor for the flow-through share market. Junior mining company stock prices have fallen sharply over the last two years as the price of gold declined and as investors shied away from high-risk investments.

A number of other significant factors has also been affecting the flow-through share market. These include: the decreased participation of senior companies and the resulting lower quality of limited partnership portfolios; a relative lack of discoveries compared to investor expectations; higher interest

rates for competing fixed income investments; higher borrowing costs; and, general investor uncertainty about the direction of the economy and the stock market.

1.3 Outlook

EMR frequently canvasses flow-through share limited partnerships to keep up-to-date on flow-through financing trends. Table 1 shows the results of EMR's latest survey of limited partnerships, comparing amounts raised in 1987, 1988 and 1989 with those expected for 1990.

Table 1. Flow-through share funds raised for spending in 1990 by limited partnerships, compared to revised estimates of amounts raised in 1987, 1988 and 1989

	Value of issues sold			
	1987	1988	1989*	1990*
	(\$ 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

* 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 retain CEIP monetary incentives and spend them as well.

In addition to the \$100.3 million of flow-through share financing by the limited partnerships in 1990, another \$75.2 million of flow-through share financing is eligible for CEIP incentives. Thus, the total amount of flow-through share money expected to attract CEIP incentives in 1990 is \$175.5 million. Of this amount, \$130 million will be for junior companies and \$45.5 million for senior companies.

From other public sources of information, we have counted further flow-through share funding (not eligible for CEIP) amounting to \$6 million for juniors and \$13 million for seniors. In addition, EMR's experience with flow-through share private placements indicates that they are running in 1990 at about \$2 million per week. Accordingly, an additional amount of \$52 million has been added to the estimate for total flow-through share financing for 1990. Summation of these individual items leads to the conclusion that funds raised from 1990 flow-through share issues will amount to close to \$250 million.

2. Outlook for Exploration in 1990

2.1 Introduction

This section looks at the expected level of total mineral exploration, as opposed to its financing. Since we are looking ahead, the usual statistical reporting sources are supplemented by other sources. The section first reports the results of the Statistics Canada and EMR "Intentions Survey" for 1990. While this is the latest "complete" survey available, it suffers from a serious shortcoming. The "intentions" in question were gathered in the December 1989-January 1990 period, and the predictive value of the results of this once-a-year survey is now somewhat questionable given that many months have elapsed and that there have been considerable changes in economic circumstances.

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 - 1990

Methodology

On October 31, 1989, 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 4,000 questionnaires (jointly with those provinces 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. Many 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, 1990 and March 31, 1991.

The exploration expenditure statistics were collected for both "general" and "minesite" exploration. Forecast exploration figures include: 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)" in its annual publication "Exploration, Development and Capital Expenditures for Mining and Petroleum and Natural Gas Wells" - Intentions 1990 (Statistics Canada catalogue 61-216). The Statistics Canada intentions total for minesite exploration for 1990 is \$154 million. This figure has since been revised by EMR to \$150 million.

EMR released the results of its survey in the June 1990 issue of its Canadian Mineral Industry Monthly Report. The first indication suggested that general ("off-property") exploration would be \$633 million.

Accordingly, on the basis of company intentions in the December 1989-January 1990 period, total exploration (both on- and off-property) for 1990 is expected to total about \$783 million (\$633 million plus \$150 million).

Interpretation

The Statistics Canada and EMR surveys of intentions provided a good indication of the late-1989 industry view of total exploration spending targets for 1990. However, because intentions expressed in late 1989 may subsequently have been modified by events that can limit the availability of funds, such as, the falling price of gold, the cancellation of the CEIP program and other general or company-specific factors, it may well be that the results of those surveys can no longer be interpreted as realistic forecasts of the exploration to be actually performed in 1990.

Table 2 shows "intentions", as well as "preliminary" and "actual" expenditures, for minesite and general exploration for the years 1984 to 1990. The table demonstrates that total expenditures reported initially on a "preliminary" basis, and then later on an "actual" basis, generally exceeded intentions for the same period. In recent years the degree of variance has been significant. For instance, intentions expressed for 1987 were 46 per cent below the actual amount later reported as having been spent.

While it is of course speculative to make conclusions about 1990 from the experience of the past, one could deduce that mine site exploration is likely to be in the \$115-\$180 million (constant 1990 dollars) range because it was maintained between those values throughout the 1984-89 period.

In the 1985-1988 period, years in which "intentions" for "general" exploration were exceeded by "actual" values, exploration funding, particularly flow-through share funding, was becoming more abundant than companies had originally anticipated. It is possible that this pattern may have changed as of calendar year 1989 because of a significant decline in the availability of flow-through share funds.

Table 2. Comparison of intentions, preliminary and actual exploration expenditures, 1984-1990

	Intentions	Preliminary	Actual
	(\$ Millions)		
1984			
Minesite Exploration		158.6	136.4
General Exploration		<u>389.7</u>	<u>480.9</u>
Total Exploration	na	548.3	617.3
1985			
Minesite Exploration	150.9	89.4	100.1
General Exploration	<u>361.2</u>	<u>471.5</u>	<u>488.8</u>
Total Exploration	512.1	560.9	588.9
1986			
Minesite Exploration	87.5	110.2	108.6
General Exploration	<u>431.2</u>	<u>483.6</u>	<u>589.3</u>
Total Exploration	518.7	593.8	697.9
1987			
Minesite Exploration	122.6	121.5	161.0
General Exploration	<u>583.2</u>	<u>849.6</u>	<u>1139.0</u>
Total Exploration	705.8	971.1	1300.0
1988			
Minesite Exploration	154.7	138.7	143.0
General Exploration	<u>891.0</u>	<u>1107.9</u>	<u>1207.0</u>
Total Exploration	1045.7	1246.6	1350.0
1989			
Minesite Exploration	111.7	160.0	
General Exploration	<u>832.2</u>	<u>766.7</u>	
Total Exploration	943.9	926.7	na
1990			
Minesite Exploration	150.0		
General Exploration	<u>633.0</u>		
Total Exploration	783.0	na	na

Source: Statistics Canada and Federal-Provincial Exploration Survey (1989 Actual survey currently in progress, 1990 Preliminary and Actual surveys will not be sent out until late 1990 and early 1991, respectively). na Not available.

2.3 Senior Firm Exploration Spending for 1989 and 1990

Methodology

EMR has discontinued the special survey that it previously made of exploration spending by selected large senior companies. A new source of information is now available through EMR's recently increased involvement in the federal-provincial survey of preliminary and forecast exploration expenditures. About 200 senior companies were identified among those surveyed, and their expenditures were totalled. In the case of a joint venture, total project expenditures are reported only by the project operator. Accordingly, senior participation can be subject to overestimation. Despite this fact, data analysis has been consistent over the years and a clear trend can be noted.

Results

Although the results are not yet final, there appears to have been a significant decrease in the level of expenditures made by seniors from 1988 to 1989 (20 per cent), and there may be a less significant decrease from 1989 to 1990 (13 per cent). The senior exploration spending totals dropped from \$708 million in 1988 to a preliminary \$566 million in 1989 and to a forecast of \$491 million in 1990.

2.4 Outlook for Exploration Based on Metal Prices

Methodology

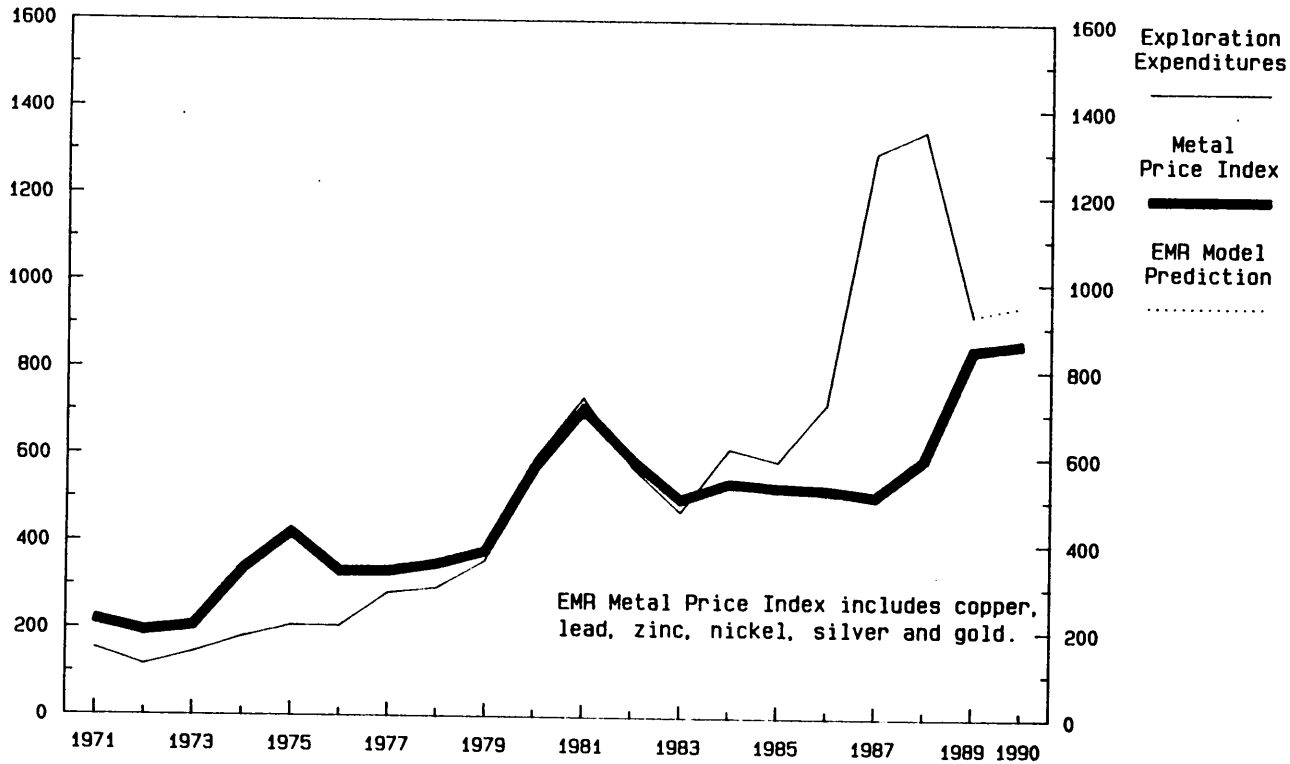
A An analysis of the data from 1969 to 1989 indicates that the level of expenditures on mineral exploration in a given year can be linked to the previous year's metal prices. This may be because companies that spend money on exploration view it like any other investment, with expected returns being dependent on expected revenues from the subsequent mining of discovered deposits. Expectations of future revenues are influenced by expectations of future prices, which, in turn, are influenced by current prices. As well, higher prices usually result in higher cash flows and more funds available for subsequent spending on exploration.

B Figure 2 displays the relationship between total exploration expenditures and the EMR Annual Metal Price Index, lagged one year. The index (see ~~Figure 2~~) is a six-metal index comprising gold, silver, copper, lead, zinc and nickel. Changes in exploration spending are

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; EMR estimates from 1986-88 based on Federal/Provincial Field Expenditures Survey; 1989 preliminary estimate based on federal-provincial surveys co-ordinated by Statistics Canada and EMR; 1990 predicted by EMR model. Expenditures are in current dollars and include overhead.

Figure 3

CANADIAN METAL PRICE INDEX 1971 TO 1989

Index 1971=100



Source: Energy, Mines and Resources Canada.
Note: Metal Price Index was adjusted using
the GDP Implicit Price Index.

Index is weighted by production and includes
copper, lead, zinc, nickel, silver and gold.
Preliminary data were used for 1989 production.

Beant'd

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.

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

Results

Based on the relationship between total exploration and metal prices observed over the period 1969 to 1989, total exploration expenditures in 1990 could be in the neighbourhood of \$950 million (using the average price for the whole of 1989 as the independent variable). Similarly, EMR used a statistical model to estimate senior exploration expenditures, and found that these could amount to as much as \$750 million in 1990 (see Figure 4). Using this approach, the predicted 1990 expenditures by junior companies would be \$200 million (\$950 million less the \$750 million predicted for seniors).

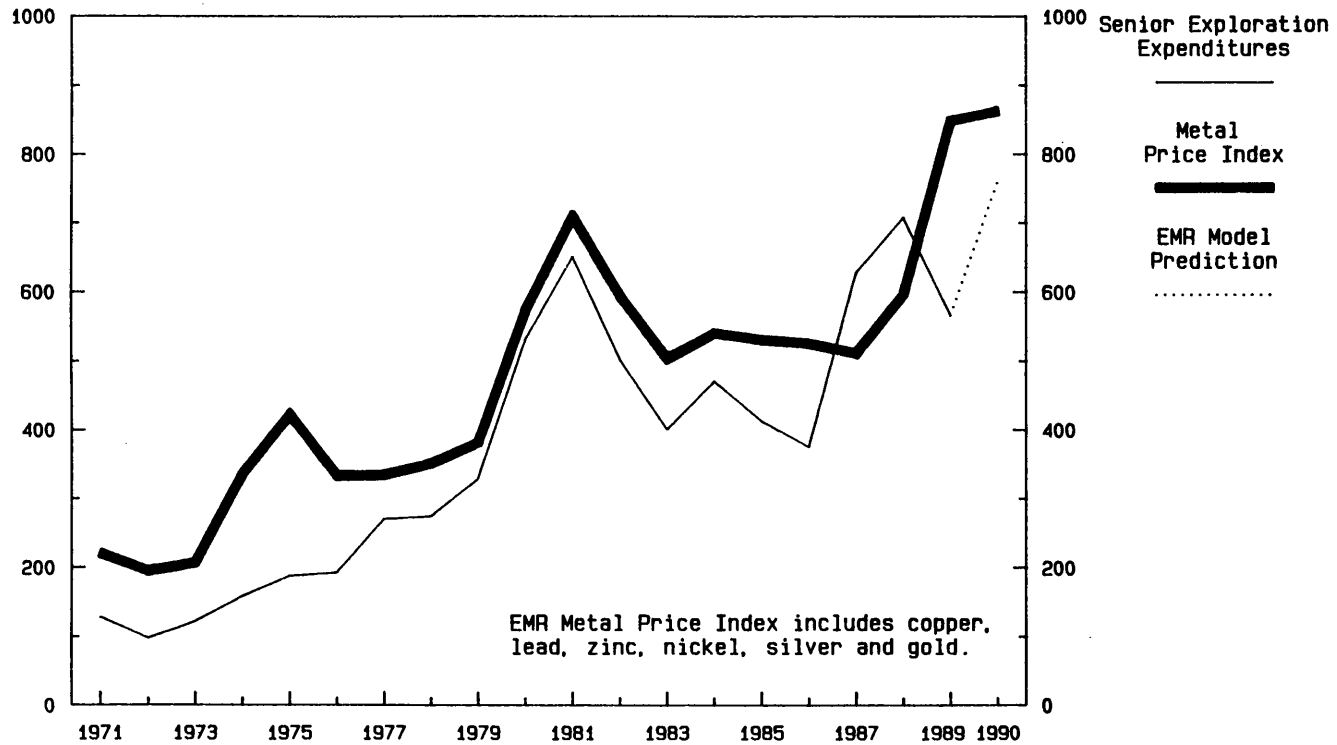
Interpretation

Because of the very high correlation found, the statistical model would suggest very strongly that total exploration for 1990 should be in the neighbourhood of the \$950 million prediction. However, this estimate is higher than the \$750 million to \$850 million estimates cited elsewhere in this report. One reason for this may be that, in 1989, metal prices were high during the first half of the year and falling during the second half of the year. If indeed exploration budgets were being developed during the latter half of the year, the falling prices may have had an influence on exploration intentions for 1990 that would not have been picked up by the model, which uses average annual prices. In view of this, the model was run using metal prices based on the second half of 1989. This resulted in an estimate of total exploration for 1990 of about \$850 million rather than \$950 million. Since the standard error of the model is about \$80 million, total exploration as predicted could be below \$800 million.

Figure 4

SENIOR EXPLORATION EXPENDITURES AND CANADIAN METAL PRICES LAGGED ONE YEAR

Millions of \$ and Price Index



Source: Senior expenditures estimated by EMR from 1971-89; 1990 predicted by EMR model. Expenditures are in current dollars and include overhead.

One could perhaps go further and say that it could be expected that senior companies would be concerned at the end of 1989 with lower prices and were worried about declining economic activity. This leads to a view of even lower senior spending in 1990.

The one-year lag effect of changes in metal prices appears to strongly influence senior company exploration spending. However, this does not hold as well for junior exploration spending, the level of which is essentially determined by the availability of financing from equity markets.

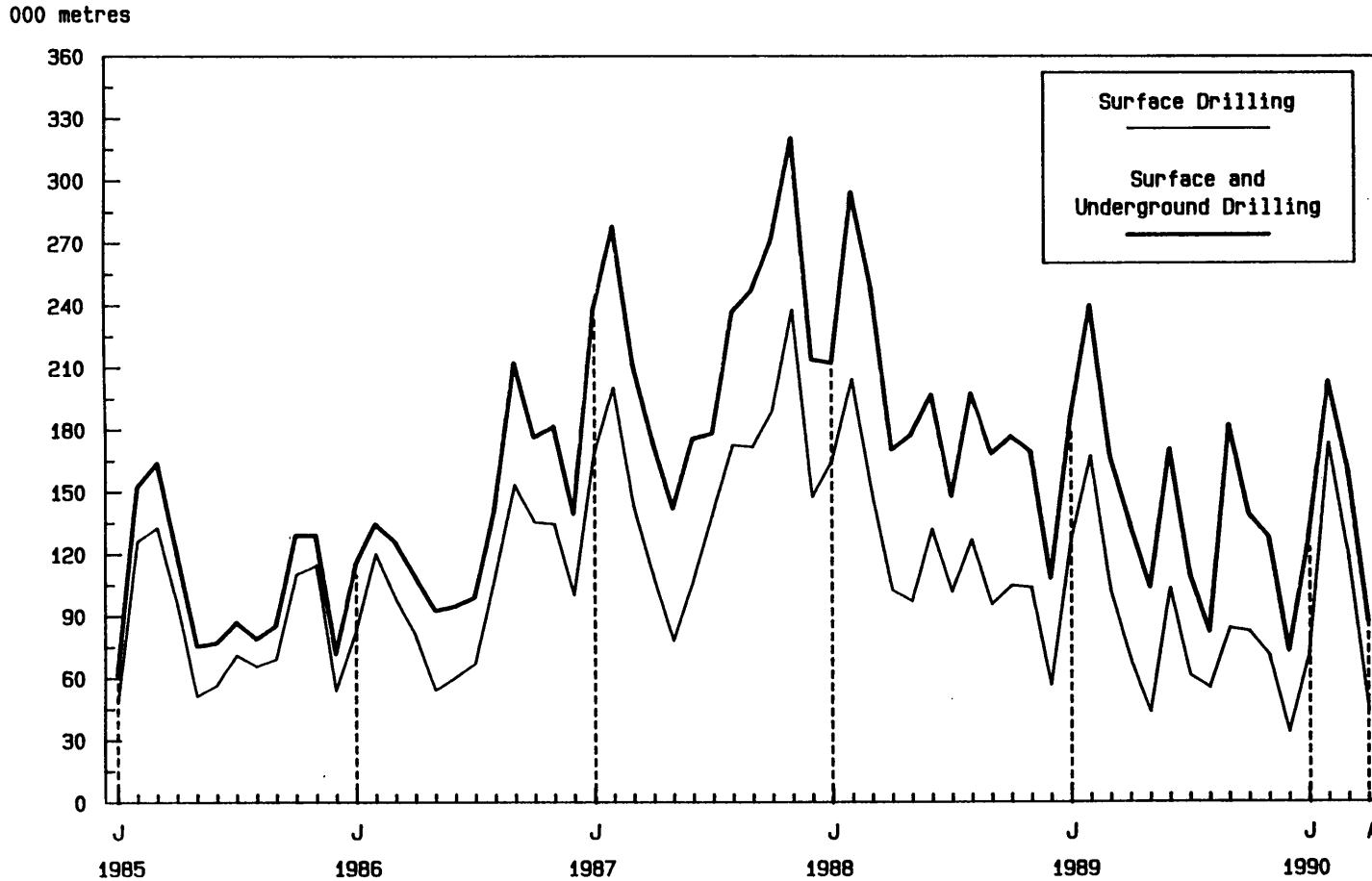
2.5 Recent Diamond Drilling Activity

Another indication of the trend in the level of exploration activity can be obtained from an analysis of diamond drilling data. Figures 5, 6 and 7 depict surface and underground drilling on a monthly (1985-1990), quarterly (1985-1990), and annual (1973-1989) basis. These data were provided by the Canadian Diamond Drilling Association (CDDA), which covers about 50-60 per cent of total diamond drilling activity. In addition, a 16-year graph (Figure 8) shows contract diamond drilling operations up to 1988 as published in Statistics Canada Catalogue 26-201. These two sources provide different total results on an annual basis, but the same overall trends are observable.

As can be seen from Figure 6, each of the last two years (1988 and 1989) has shown a similar pattern of higher drilling activity in the first two quarters. However, an overall continuing downward trend is apparent since the peak in 1987. As one might expect, the same pattern is apparent in the graph of monthly activity. This contrasts with the pattern of the previous two years (1986-1987), when diamond drilling in the latter half was higher than in the first half. The decline that started in the last half of 1988 supports the general view that exploration activity in 1988 began to slow down from the peak level reached at the end of 1987. 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 spending depends more on flow-through share financing than on metal prices. During the latter half of 1988 the flow-through share market tapered off as the gold price declined and junior equity markets continued to deteriorate. Despite this slowdown in drilling, total exploration spending in 1988 was \$1.35 billion, a very high level by historical standards.

Figure 5

SURFACE AND UNDERGROUND DRILLING BY MONTH – JANUARY 1985 TO APRIL 1990

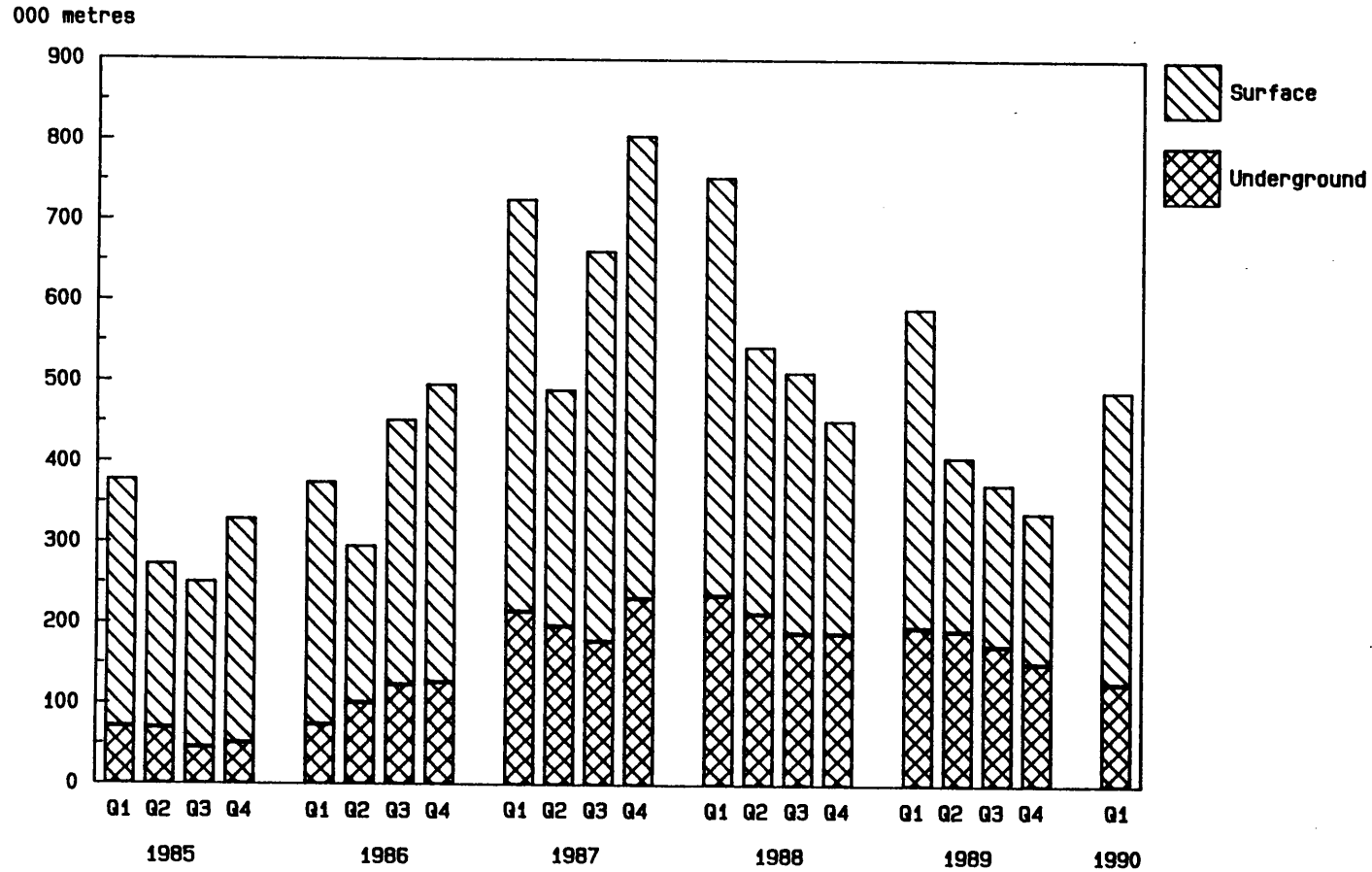


Source: Canadian Diamond Drilling Association (CDDA).

Note: These data, as reported by CDDA contractors, include approximately 50-60% of total drilling activity; the 1990 data may represent only 40% of activity, but gives a trend.

Figure 6

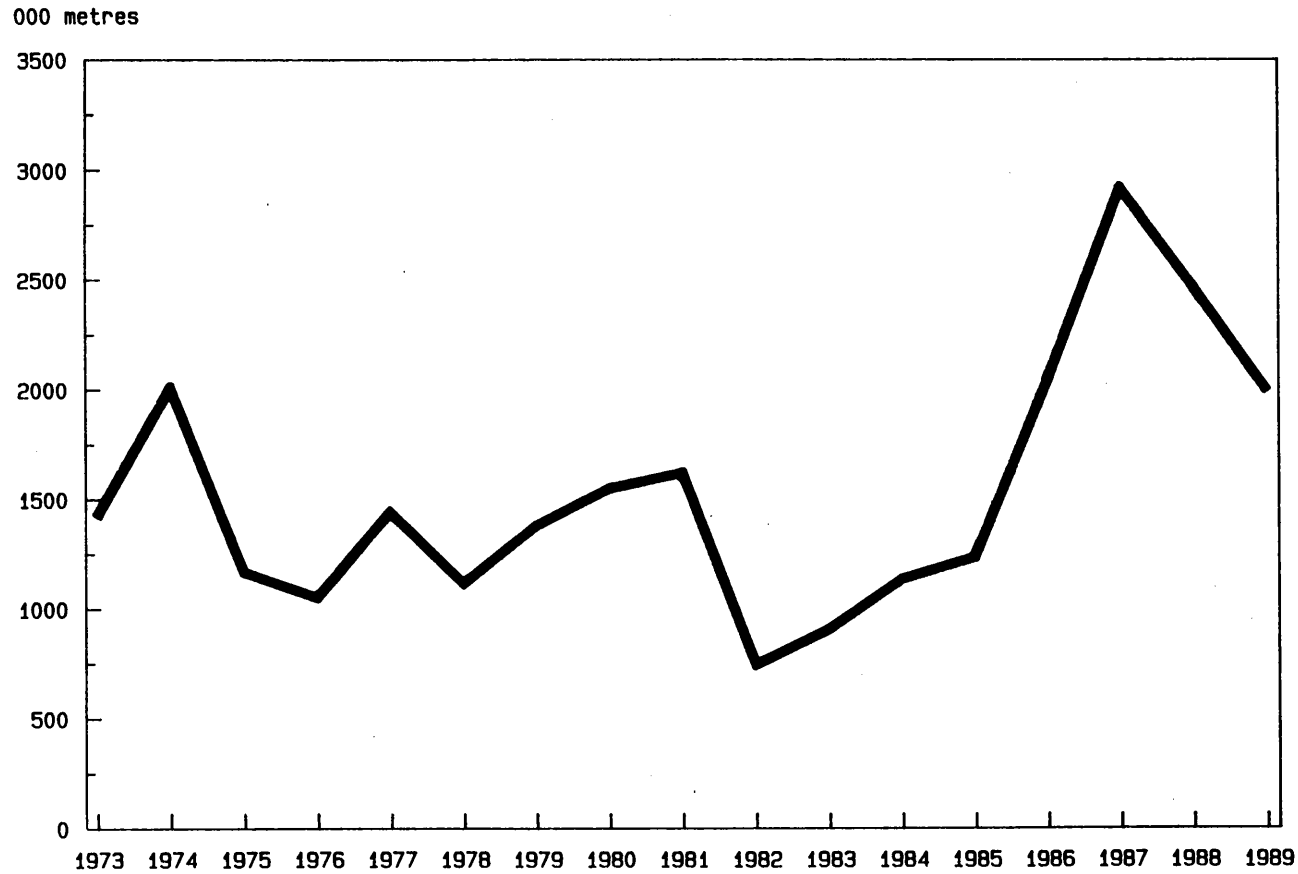
SURFACE AND UNDERGROUND DRILLING BY QUARTER - 1985 TO 1990



Source: Canadian Diamond Drilling Association (CDDA).
Note: These data, as reported by CDDA contractors, include approximately 50-60% of total drilling activity; the first quarter of 1990 may represent only 40% of activity, but gives a trend.

Figure 7

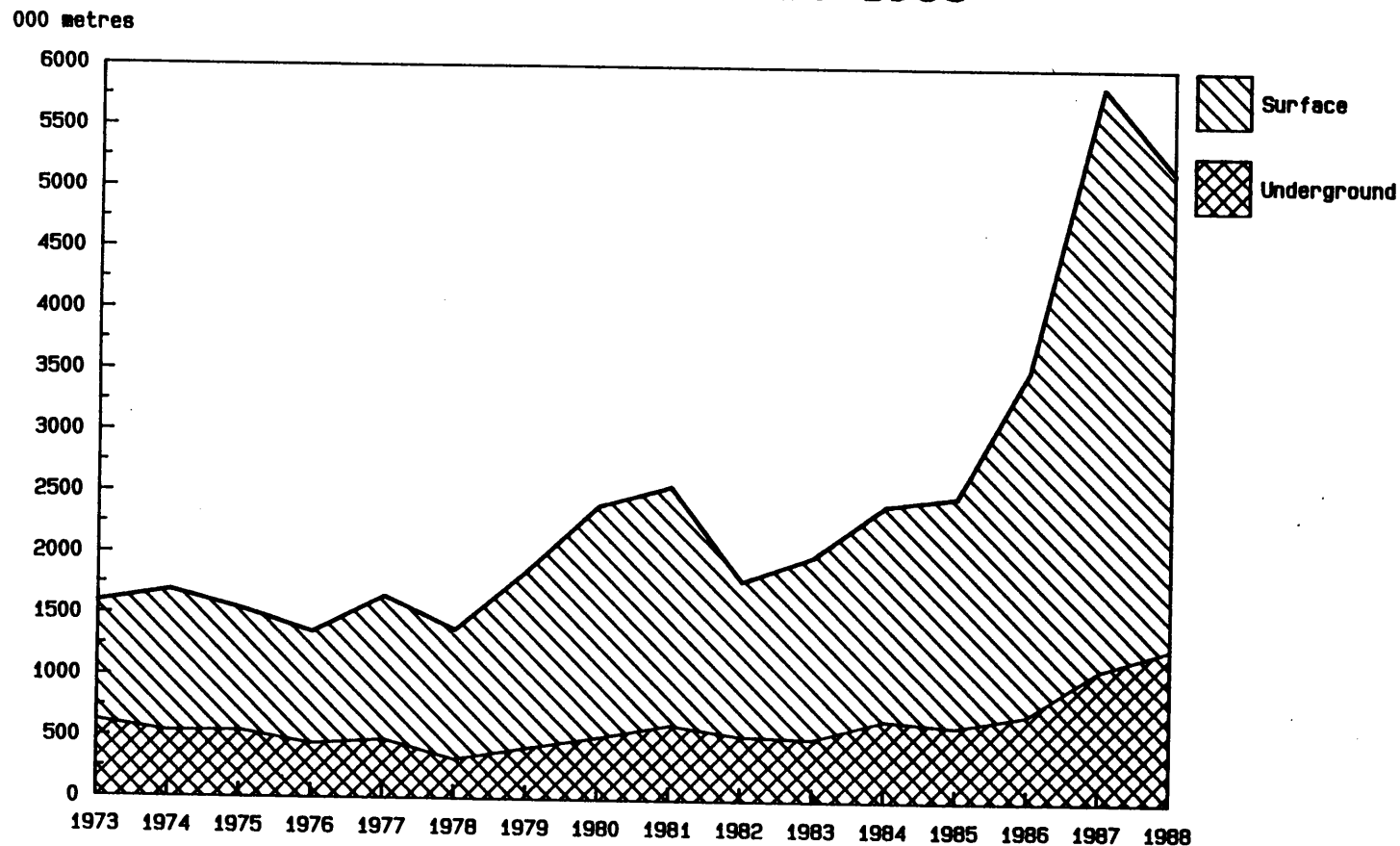
SURFACE AND UNDERGROUND DRILLING BY YEAR - 1973 TO 1989



Source: Canadian Diamond Drilling Association (CDDA).
Note: These data, as reported by CDDA contractors,
include approximately 50-60% of total drilling activity.

Figure 8

SURFACE AND UNDERGROUND DRILLING CONTRACT DIAMOND DRILLING OPERATIONS BY YEAR - 1973 TO 1988



Source: Statistics Canada Catalogue 26-201.
Note: Data refer to SIC 0921; 1988 is the
latest year for which data are available.

It is believed by the CDDA that the level of the first quarter of 1990 (see Figure 6) covers only 40 per cent of drilling activity instead of 50-60 per cent as in other years' surveys. The implication here is that drilling does not appear to have declined in the first quarter of 1990 relative to the first quarter of 1989. This is probably because of some carryover of 1989 exploration funds into the January-February 1990 period.

The 17-year and 16-year drilling graphs (Figures 7 and 8) together with Canadian exploration data available for earlier years provide very clear evidence that 1987 and 1988 were all-time highs for the level of diamond drilling. The level in 1989 was still very strong compared to 1981, the previous peak prior to the takeoff in the flow-through share market. The question is whether drilling will fall back to the levels that persisted over much of the 1970s and early 1980s, which averaged less than half of the 1987 peak.


It is interesting to note that surface diamond-drilling activity fluctuated considerably more than underground drilling (see Figure 8). One could speculate that the reason for this is that projects involving surface drilling are in general at a less advanced exploration stage and that surface projects depend much more on the relative availability of equity financing.

3. Overview of Exploration and Flow-Through Share Financing for 1990

This section brings together the information discussed above.

Total exploration expenditures in 1989 amounted to about \$927 million, with senior exploration at about \$566 million and junior exploration at about \$361 million. This figure is considerably lower than the \$1.35 billion of expenditures recorded for 1988.

Arriving at an overall total forecast for 1990 requires the comparison of different amounts derived from several sources. The exploration intentions survey indicated that exploration spending in 1990 would be \$783 million. In previous years, "actual" figures were somewhat higher than the earlier "intentions" although using that fact to make a deduction about 1990 may be clouded because of the reduced availability of flow-through share financing. In other words, in previous years, companies raised more flow-through share financing than they had originally expected. This trend may now be reversing.



Another piece of information used in assessing overall 1990 exploration is that \$850 million, or somewhat less, may be a fair estimate based on regression analysis as discussed in section 2.4. The regression analysis estimate of \$850 million is reasonably close to the intentions survey estimate of \$783 million.

Another approach to developing estimates of total exploration expenditures for 1990 is by adding junior common equity financing (including flow-through shares) to senior company "intentions". We are calling this an exercise based on financing trends for 1990. The figure of \$491 million for senior exploration spending was obtained from the earlier intentions survey. One could say that this level of expenditure is more likely to be assured because senior companies are more sure of their sources of funds than juniors. However, for the purposes of the estimate developed for senior companies for this exercise, we have reduced this number to \$450 million in recognition of the fact that seniors report total spending for the joint ventures of which they are the operators. It was not possible to calculate the precise reduction that would be necessary to avoid an overlap. The \$41 million reduction was an arbitrary choice made simply to put the seniors at \$450 million. As discussed in Section A, it is estimated that \$250 million of flow-through share financing will be raised for 1990, of which some \$60 million will be for the seniors. The other \$190 million of flow-through shares will be for junior exploration. An additional piece of information used in this exercise, the estimate for total exploration, comes from an examination of the rate of raising new non-flow-through equity capital on the Vancouver Stock Exchange. It is estimated that some \$116 million of such funds were raised up to June 30, 1990. This figure could later prove to be much higher, and might even double to \$232 million, if the pace remains the same for the rest of the year. Adding \$450 million, \$190 million and \$116 million leads to a total of \$756 million, which could, as shown above, increase to as much as \$872 million.

On the basis the above, it is felt that 1990 exploration expenditures will fall in the range of \$750 to \$850 million.

SECTION B. CURRENT REGIONAL OUTLOOK

4.1 Introduction

This section presents comments on recent exploration activity received from provincial and territorial officials, and gives an indication of what they expect for 1990.

4.2 Newfoundland and Labrador

Mineral exploration in Newfoundland during 1989 maintained a very healthy level of activity. Although activity was down from the record level set in 1988, statistics for claims in good standing, exploration expenditures and diamond drilling for 1989 were well above the levels experienced in 1987.

The emphasis in 1989 was balanced between gold and base metal exploration with a smaller but growing interest in industrial minerals. Exploration expenditures during 1989 were well balanced from grass roots programs through to advanced exploration projects. The greater grass roots emphasis was directed to a larger extent towards base metal properties.

	1983	1984	1985	1986	1987	1988	1989	1990*
Claim Staking (x 1,000)	4.5	11.0	15.3	14.6	22.1	26.2	17.2	15.0
Claims in good Standing (x 1,000)	15.3	19.7	29.6	33.3	47.7	65.8	63.6	60.0
Expenditures (x \$1,000,000)	7.7	8.4	12.6	11.8	31.1	41.2	32.6	30.0 ±2.0
Diamond Drilling (x 1000 m)	27.0	44.1	38.7	51.1	89.7	234.8	122.9	125.0 ±10.0

* Forecast

Claim Staking Statistics

The steady rate of increase in the number of claims in good standing during the period from 1983 to 1988 would appear to have peaked. This statistic appears to be stabilizing at approximately 60,000 claims in good standing. New staking during the first quarter of 1990 was brisk with 3,672 claims staked.

Diamond Drilling

Diamond drilling is perhaps the single most important activity involved in, and is a reflection of, exploration activity. The level of activity experienced in 1988 in Newfoundland and Labrador is an anomaly produced by the coalescence of a number of advanced projects and conditions in the industry, not the least of which was exploration capital generated by the flow-through tax incentives. The 122 852 m drilled in 1989 represents a very healthy level of activity and indications are that the level for 1990 should be in the range of 125 000 m. This augurs well for the possibility of discovery of new mineral deposits.

Exploration Expenditures

On the surface, the total value of exploration in 1989 represents an approximate 25 per cent decrease in the level from 1988. In fact, the 1989 figure represents a significant increase in levels of expenditure on the part of major mining companies exploring in Newfoundland and Labrador and the greatly reduced level of exploration work being generated by junior mining companies. Juniors successful in generating exploration capital during 1989 were the exception to the general trend affecting the industry. This situation has worsened in 1990.

Summary

The year 1990 is shaping up to be a critical year for mineral exploration in Newfoundland and Labrador. There are a number of very promising prospects and properties to be explored this year, any one or a number of which could advance to become producers in the near future. Ominously, there appears to be a reduced grass roots effort in the province this year. The greatest concern for the exploration sector, particularly the junior company, is the increased difficulty or unavailability of exploration funding. The crunch could come in the 1991 exploration season and will only be avoided by extraordinarily positive results in the 1990 season.

Newfoundland and Labrador exploration statistics.

	<u>1988</u>	<u>1989</u>	<u>1990f</u>
Annual Exploration Expenditures	\$41,155,481	\$32,615,786	\$25,000,000
Claim Staking			
Claims Staked	26,199	17,190	10,000
In Good Standing	65,822	63,596	45,000
Exploration Field Expenditures			
BM-PM	\$17,559,585	\$12,446,315	na
Gold	18,698,498	18,669,471	na
Other	457,370	1,500,000	na
Diamond Drilling (metres)			
Production/Development	17,449	16,355	na
Exploration	<u>217,382</u>	<u>106,497</u>	<u>na</u>
Total	234,831	122,852	125,000

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

BM Base metals. PM Precious metals. f Forecast. na Not available.

4.3 Nova Scotia

The preliminary estimate for mineral exploration expenditure on projects in Nova Scotia during 1989 is approximately \$29 million, or double the amount forecast one year ago. Preliminary estimates for exploration diamond drilling in 1989 are in the range of 42 000 m, compared with the 130 000 m reported for 1988. The decline in activity reflects the inability of junior gold exploration companies to raise risk capital due to the lack of attractive fiscal or tax-based incentives, and the lack of success of some projects during the last few years.

Exploration indicators for 1980 to 1989
Nova Scotia department of mines and energy.

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
New Claims	(75,464)	(52,018)	29,690	29,057	19,268	28,500	12,685	33,419	20,132	11,397
Total Claims and Claim Equivalents in Effect	83,135	94,400	52,236	54,310	40,438	41,173	46,086	63,585	43,590	37,745
Value of Assessment Work Received (\$1,000)	7.5	8.4	4.1	4.2	2.6	2.3	9.9	26.7	29.0	31.3
Estimated Total Exploration Expenditures (\$1,000)	(10.0)	14.6	5.5	6.5	7.3	9.0	21.0	45.0	49.0	29.0
Total Drill Footage (1,000 metres)		78.0	24.0	30.0	50.0	45.0	75.0	215.0	110.0	42.0

() numbers in parenthesis are approximate

Companies responding to the survey of intentions for 1990 have indicated that they intend to spend \$13 million on exploration on projects in Nova Scotia in 1990. Of this total, approximately 75 per cent is dependent on junior company financing for gold properties. Several gold projects with good potential, which have already sustained a considerable amount of exploration work, are currently not active pending further financing.

Interest continues at moderate levels in base metal properties, particularly those with associated specialty metals and/or precious metals, in industrial minerals and in coal, with participation by private, junior and senior exploration companies, and by producing companies.

Overall exploration activity appears now to be at a more traditional level and it is generally anticipated that the present conditions will continue, given the uncertainty in the direction of the economy.

4.4 New Brunswick

Exploration expenditures are likely to be marginally lower in 1990. Those reported as assessment work in 1989 were near \$10 million, however, the total amount spent is estimated to have been \$18 to \$20 million. By the end of 1989, over 21,000 mineral claims were in good standing. During the year, there were 8,700 new claims staked. In 1990, the number of new claims will be lower as mineral exploration companies concentrate on properties acquired in 1989. Diamond drilling is forecast to rise above the 63 000 m drilled in 1989.

Reduced activity in gold exploration in 1989 will continue in 1990 due to a number of factors: gold price, and lack of tax incentives (demise of CEIP and flow-through share funding). The interesting gold belts in northern and southern New Brunswick will not see as much exploration as in 1988 and in 1989.

Base metal interest will remain high, due to the interesting discoveries reported by Brunswick Mining and Smelting Corporation Limited in late 1989. A drillhole put down to test a geological prediction intersected 8.5 m of sulphides grading 9.91 per cent zinc, 4.61 per cent lead, 0.22 per cent copper and 1.83 g/t silver. Another discovery of a "blind" sulphide body was reported by Heath Steele Mines Division of Noranda Inc. in the Stratmat group of sulphide deposits. Similar finds are anticipated elsewhere in the Bathurst-Newcastle district of northern New Brunswick.

4.5 Quebec

In Quebec, off-property exploration expenditures have been trending lower since the peak of 1987, which was at a level of \$408 million. The difficulties in financing by means of flow-through shares are reflected in the exploration expenditure numbers (statistics compiled on a fiscal year basis). In particular, exploration in 1989 only reached a level of \$165 million, compared to \$331 million for the year 1988.

Earlier, it had been expected that 1990 exploration would level out at the 1989 amount, but that now does not seem to be the case.

The "intentions" data for 1990, obtained through the annual survey carried out in the autumn of 1989, is slightly lower than the "intentions" data for 1989 (\$165 million in 1989 compared to \$159 million in 1990). It should be noted that the same "intentions" data for 1989 obtained a year earlier had shown about \$30 million more than the later "preliminary" data for 1989.

The Quebec tax rules for flow-through shares were improved twice in 1989, firstly, by the granting of an additional deduction for surface exploration, and secondly, by the non-inclusion of the 50 per cent of Canadian exploration expenses in calculating the cumulative net investment loss account for Quebec income tax purposes) However, financing by flow-through shares (for exploration in Quebec only) declined from \$154 million in 1988 to only \$75 million in 1989. Since the spending of exploration funds is, in part, delayed from one year to the next (flow-through shares benefit from the 60 day rule, whereas statistics on expenses are compiled on a calendar year basis), it has to be expected that exploration expenses this year would be lower than those of the previous year.

The abolition of CEIP will have all of its impact in the second quarter of 1990. To this point (early June 1990), slightly more than \$35 million worth of flow-through shares for exploration in Quebec have been issued. These flow-through shares issues have benefitted from the grandfathering rules, which make them eligible for CEIP up to February 1991.

A maximum of \$20 million will be spent in Quebec by CMP. In fact, CMP is investing about twice this amount in petroleum and gas exploration. CMP will have to market its issue by the end of June for a maximum of \$150 million, of which \$105 million has been received

as of early June. VSM has gone to market with a public financing of \$6.4 million. Another financing is in progress by the Minexco limited partnership that could raise \$3 million. Many small companies are trying to make small private placements (generally less than \$1 million) to a limited number of subscribers. Finally, three public issues of mining limited partnerships are presently being offered; they are not eligible for CEIP payments and their sale is rather uncertain. Those projects that offer a higher proportion of grass roots exploration are less in demand because of higher interest rates and the greater risk involved.

**Financing by flow-through shares
and exploration expenditures in Quebec
(in millions of \$).**

	1987	1988	1989	1990
Flow-Through Shares ¹	532.4	154.2	74.8	60-70 ²
Exploration Expenses ³				
Off Property	333.1	258.2	126.9	115.3 ⁴
On Property	46.0	30.5	38.0	17.8 ⁴
Total	379.0	288.7	164.9	133.1 ⁴

¹ - These amounts include expenses related to financing by limited partnerships.

² - Following the cancellation of CEIP, it is probable that there will be a substantial drop in financing through flow-through shares in the second quarter.

³ - Source: Ministry of Energy and Resources, Quebec.

⁴ - Intentions data from the survey carried out in the fall of 1989.

The drop in financing by flow-through shares after 1987 had an impact on the level of exploration carried out by junior companies, although producers and their subsidiaries also lowered their exploration budgets in Quebec. According to data compiled by the Quebec Ministry of Energy and Resources, off-property exploration expenditures by junior companies declined from \$282 million in 1987, to \$224 million in 1988, and to \$76 million in 1989. It should be noted that the takeover of certain juniors by large mining companies means the former are no longer classified as junior companies, so that they are no longer eligible for the

extra Quebec tax deductions.

Other Data

Monthly statistics on the rate of unemployment in Abitibi-Temiscamingue (the principal mining region of Quebec) show a rising trend since the end of 1987. For the first four months of 1990, average unemployment in the region stood at 13.3 per cent, as compared to 10.6 per cent in the rest of Quebec.

The number of metres drilled by diamond drilling companies was a little lower in 1989 (1.3 million) than in 1986 (1.4 million). For the first four months of 1990, the number of metres drilled is comparable to that in 1989, namely 0.5 million.

4.6 Ontario

In 1988, mineral exploration and development expenditures totalled \$757 million in Ontario. These expenditures are estimated to have decreased to \$520 million in 1989 and are forecast to drop to \$502 million by 1990. Off- and on-property exploration expenditures are expected to decrease from \$396 million in 1988 to \$200 million by 1990. Mine site development expenditures are anticipated to decrease from \$361 million in 1988 to \$302 million by 1990*.

Senior mining companies continue to play an important role in mineral exploration in Ontario, accounting for 56 per cent of the off- and on-property field exploration expenditures of \$345 million in 1988, compared with 44 per cent expended by junior companies active in the province **.

The number of claims in good standing in Ontario as of the end of April 1990 was about 139,750, down 18 per cent from the 170,900 claims in April 1989. The trend is significant since the current level of claims in good standing more closely reflects exploration activities back at least one year. The total number of

* This data includes both field expenditures and administrative costs; overhead costs for 1988 are estimated; field expenditures totalled \$658 million in 1988 and it is estimated that overhead costs were \$99 million in 1988.

** Percentages for senior mining companies are overstated since funds received from joint venture partners (junior mining companies) are reported by senior mining companies.

claims in good standing at year-end from 1983 to 1989 ranged from 128,000 to 171,000. In 1989, the year-end figure dropped to 148,000 from 171,000 in 1988.

On a regional basis, significant increases in exploration expenditures (in percentage terms) were observed in the province's Northeast and Southern regions from 1987 to 1988. The regional results are summarized below:

Ontario
Off- and On- Property Exploration Expenditures
(in millions of \$)

<u>Region</u>	<u>1987</u>	<u>1988</u>	<u>% CHANGE</u>
Northwest	128.9	105.7	-18%
Northeast	146.3	221.6	+51%
Southern	4.5	9.3	+107%

At July 1990, about 60 per cent of the advanced exploration stage (active underground or open pit) mining projects are located in the province's Northeast region. The distribution of exploration expenditures in 1987 and 1988 reflects, in part, an increased emphasis placed on advanced exploration stage projects beginning in 1988.

Although most of the advanced exploration projects in northern Ontario are gold properties, the three mines in the development stage (a production decision has been announced) are base metal projects in the Sudbury area. In southern Ontario, most of the important exploration projects are on industrial mineral properties. One development stage project, a graphite property, is scheduled to begin production this year and three more graphite projects are in the advanced exploration stage.

The 1990 provincial budget provided the Ministry of Northern Development and Mines with an additional \$30 million for its mineral exploration incentives programs over the next three years. The Ontario Prospectors Assistance Program received an additional \$1 million per year and now has an annual budget of \$4 million. The additional funding gives the Ontario Mineral Incentives Program (OMIP) a total budget of \$33 million over the three-year period. OMIP has been expanded to include flow-through funded projects, projects by producers, selected industrial minerals

studies, and limited expenses on underground exploration projects. A total of \$5 million of the additional OMIP funding is available for programs in selected areas around mining communities experiencing serious economic difficulties resulting from mine closures. Projects within these designated areas receive grants totalling 50 per cent of their eligible expenses rather than the normal 30 per cent rate.

4.7 Manitoba

Mineral exploration expenditures for 1989 are forecast to be \$37 million. This compares to an estimated \$40 million spent in 1988 and \$50 million in 1987. Surface diamond drilling for these three years is estimated at 177 896 m in 1989, 270 969 m in 1988 and 278 537 m in 1987. Current indications are that exploration expenditures for 1990 will be comparable to 1989.

The total area of claims recorded in Manitoba during 1989 was 184 723 hectares, as compared to 341 722 hectares recorded in 1988, and 212 139 hectares in 1987. However, total mineral dispositions (which include claims, permits and leases) in good standing at the end of 1989 totalled 1 865 317 hectares, as compared to 1 614 463 hectares and 1 708 971 hectares at the end of 1988 and 1987, 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 five of the eight advanced mining projects are for base metal deposits.

Base metal 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 on the major greenstone belts of Flin Flon-Snow Lake, Lynn Lake, Gods Lake, Island Lake and Rice Lake.

4.8 Saskatchewan

In 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 are asked to provide an estimate of their current budget on a commodity and area-of-search basis. Since 1987, companies have been asked to provide, in addition, actual expenditures for the previous year.

Although there are about 420 registered mineral property holders in the province, only between 40 and 85 companies (57 in 1990) provide exploration financing and they form the basis of the survey. It is believed that estimates are accurate to within 10 per cent at the time of the survey. However, due to the short term of the flow-through financing cycle, budgets may change significantly during the year, particularly those for precious metal exploration. As a result, in the past several years, actual expenditures have generally exceeded the preliminary estimates. Expenditures for the period 1984-90 are as follows:

SASKATCHEWAN

Exploration expenditures - resident geologists' survey.

	1984	1985	1986	1987	1987	1988	1988	1989	1989	1990
				(int)	(fin)	(int)	(fin)	(int)	(fin)	(int)
	(\$ million)									
Precious metals	6	8	19	34	48	55	55	32	22	13
Base metals	4	3	2	2	3	3	6	5	7	7
Uranium	22	19	22	18	18	44 ⁽¹⁾	40 ⁽¹⁾	47 ⁽¹⁾	46 ⁽¹⁾	43 ⁽¹⁾
Other	-	-	-	-	-	-	-	-	2	2
Total	32	30	43	54	69	102	101	84	77	65

(1) Includes underground development at Cigar Lake and Midwest Lake uranium test mines.

int Intention; fin Final

The preliminary estimate of exploration and predevelopment expenditures for 1990 in northern Saskatchewan is \$65 million, compared with actual expenditures of \$77 million in 1989. It is to be noted that 1989 actuals were lower than the initial estimate by some \$9 million, a reflection of the crash of flow-through funding. Gold expenditures will fall to some 25 per cent of the 1988 high of \$55 million, and

uranium expenditures, while remaining buoyed up by underground test mining projects at Cigar Lake and Midwest Lake, will fall at the grass roots level from \$21 million in 1989 to \$14 million in 1990. This reflects low uranium prices and the reality that it is cheaper to buy reserves or product than to find and produce it. The other category, new for 1989 and 1990, comprises diamond exploration expenditures of the major land holders and the major companies. However, it is not envisaged that significant expenditures have been or will be incurred by the large number of "speculators", thereby greatly changing these totals.

4.9 Alberta

Non-petroleum mineral exploration activity in Alberta is expected to remain relatively constant through 1990 with exploration expenditures continuing in the \$5 million to \$8 million range. The greatest emphasis will still be in coal exploration where the number of exploration drillholes is anticipated to be about 510 in 1990 compared to 589 in 1989 and 344 in 1988. Virtually no change is expected from the \$500,000 to \$600,000 spending level for uranium but the flurry of interest in gold exploration was brief and is now almost nonexistent.

With no active metal mines and limited metallic mineral exploration in Alberta, the barometer measuring the impact of flow-through shares on activity has been the coal and the oil and gas industries.

The cancellation of the CEDIP and CEIP programs has eliminated a valuable tax incentive for companies using flow-through share financing and will make it even more difficult for them to raise the financing necessary to pursue exploration programs.

The impact of current higher interest rates on the intermediate and junior oil companies (comparing May 1990 to January 1989) is equivalent to about a \$2.00/barrel decrease in the price of oil. The consequent exchange rate impact, which affects all oil companies, is equivalent to a further oil price drop of about \$1.85/barrel. Thus, the combination of higher interest rates and the strength of the Canadian dollar effectively discount the prevailing price of oil by almost \$4.00/barrel.

4.10 British Columbia

Based upon EMR's preliminary survey, overall exploration expenditures in B.C. in 1989 were reported as \$218 million. More recently, returns from the actual survey being conducted by B.C. indicate a somewhat lower level of between \$180 and \$190 million for the year, down \$40 to \$50 million from final 1988 expenditures of \$230 million.

While the search for precious metals continued to dominate exploration interest, 1989 saw a resurgence of exploration for base metals and a return of major exploration companies as the major spenders. These changes were brought about by major changes in regulations regarding flow-through share financing, lower average prices for gold and silver, and stronger base metal prices, particularly for copper and zinc. The recognition that national base metal reserves are rapidly depleting was also an important factor.

Mineral claim staking increased 8 per cent over 1988 levels to 94,233 units staked.

A high level of exploration activity continued in the Iskut River area of northwestern B.C., spurred by results at Eskay Creek. Renewed interest in base metals contributed to activity in several geologically distinct areas of the province, in contrast to 1988 when the major concentration of large programs was run in the Stewart-Iskut River area in the northwest of the province.

Particularly active was the northern Quesnel trough, northwest of Fort St. James, where continued encouraging results from the Mount Milligan porphyry copper deposit attracted several large drilling programs.

4.11 Northwest Territories

Mineral exploration in the Northwest Territories is forecast to be approximately \$45 million in 1990, down from \$55 million in 1989 and \$112 million in 1988. Most of the change in expenditures from 1989 and 1990 can be attributed to the completion of underground exploration at the Noranda-Total Energold Tundra property in 1989. Exploration expenditures by district for 1990 are estimated to be: Mackenzie, \$30.5 million (69 per cent); Keewatin, \$11.7 million (26 per cent); and, Arctic Islands, \$2.1 million (5 per cent).

Diamond drilling in 1988 was approximately 185 000 m and 160 921 m in 1989. Total area staked remains relatively unchanged between 1988 and 1989 at 2,940,000 and 3,085,000 hectares respectively.

The majority of exploration expenditures are focused on gold (68 per cent), with base metals (20 per cent) and uranium (10 per cent) accounting for the remainder. The expenditure levels by commodity being sought remained relatively unchanged in the last three years.

The large-tonnage, low-grade Colomac gold deposit of Northwest Gold Limited (formerly Neptune Resources Corp.), 220 miles northwest of Yellowknife, will be in production by the end of the summer. The Athabaska Gold Resources and Chevron Minerals Ltd. gold property, 85 km north of Yellowknife, is in the pre-feasibility stage. The Urangeschellschaft Kiggavik uranium property, 60 km west of Baker Lake is undergoing a Federal Environmental Assessment and Review Office (FEARO) panel review. Other large exploration programs include the George River Joint Venture (Homestake Mining Company and Kerr McGee Corporation), 80 km east of the Lupin Mine, and the Noranda Exploration program on the Sunrise base metal deposit, 100 km northwest of Yellowknife.

4.12 Yukon

In 1990, 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.

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 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.

In general, exploration spending in Yukon in 1990 is expected to be about the same as in 1989.

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 1989 and 1990 levels of exploration activity are described on a preliminary basis. The data applicable to these two years were collected between December 1989 and January 1990.

5.2 Exploration Expenditures by Region

Tables 3 and 4 are based on the federal-provincial exploration survey conducted by EMR, Quebec, Ontario, Newfoundland, Nova Scotia, Manitoba and British Columbia.

Table 3 shows current dollar expenditures on mineral exploration in Canada, by province, for the 1985 to 1990 period. The figures for "fieldwork" do not include overhead expenses. Table 4 presents this data in percentages.

Until 1989, the most active exploration areas were Ontario and Quebec, which, in 1988, jointly accounted for 58 per cent of total Canadian exploration spending. In that year, exploration expenditures in Ontario exceeded those in Quebec for the first time since 1977. In Ontario, 1988 field exploration expenditures were \$344 million, up significantly from the \$308 million spent in 1987. Exploration spending in British Columbia as a percentage of Canadian exploration has risen rapidly in the second half of the 1980s and is now at levels comparable to those of Quebec and Ontario. In fact, preliminary indications are that spending in British Columbia actually exceeded that in Quebec in 1989. Field exploration expenditures for 1988 in Quebec were \$328 million, down considerably from the \$416 million expended in 1987.

First indications for the year 1989 (Table 3) are that there was a significant drop in exploration expenditures, close to 40 per cent in each of Nova Scotia, Quebec, Ontario, Northwest Territories and the Yukon Territory. This decreasing trend will likely continue in 1990.

While all regions of Canada have experienced increased exploration spending over the period 1985 to 1990, the provincial distribution of spending has seen

Table 3. Mineral exploration expenditures in Canada, by province, 1985 to 1990
(millions of current dollars)

	1985	1986	1987	1988	1989pe	1990f
	Field Work	Field Work	Field Work	Field Work	Total * Exploration	Total * Exploration
Newfoundland	11.9	12.3	27.7	37.7	33.7	32.6
Nova Scotia	7.8	17.2	41.6	46.7	29.8	12.8
New Brunswick	12.1	10.8	9.1	13.8	18.5	16.7
Quebec	135.2	241.4	415.5	328.2	203.2	174.0
Ontario	93.2	136.8	308.1	343.6	237.0	199.7
Manitoba	33.7	26.3	40.0	30.0	30.0	35.7
Saskatchewan	39.4	36.8	63.5	61.1	70.1	72.8
Alberta	14.7	3.0	2.5	4.3	6.9	7.7
British Columbia	73.0	63.1	142.6	196.8	218.3	165.9
Yukon Territory	22.7	27.9	29.0	38.6	25.5	22.2
Northwest Territories	46.8	35.8	59.0	66.5	48.0	43.3
Total Field Work (Excluding Overhead)	490.5	611.4	1,138.6	1,167.3	na	na
Total Exploration Including Overhead	605.8	723.3	1,300	1,350	926.8	783.4

Sources: Federal/provincial field expenditures survey for 1985-1988; the 1989 preliminary estimate and 1990 forecast were derived from federal/provincial surveys co-ordinated by Statistics Canada and EMR. pe Preliminary estimate. f Forecast. na Not available.

* "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.

Figures may not add to totals due to rounding.

**Table 4. Mineral exploration expenditures in Canada, 1985 to 1990
percentage distribution, by province**

Province	1985 % of Field Work	1986 % of Field Work	1987 % of Field Work	1988 % of Field work	1989 ^{pe} % of Total	1990 ^f % of Total
Newfoundland	2.4	2.0	2.4	3.2	3.6	4.2
Nova Scotia	1.6	2.8	3.7	4.0	3.2	1.6
New Brunswick	2.5	1.8	0.8	1.2	2.0	2.1
Quebec	27.6	39.5	36.5	28.1	21.9	22.2
Ontario	19.0	22.4	27.1	29.4	25.6	25.5
Manitoba	6.9	4.3	3.5	2.6	3.9	4.5
Saskatchewan	8.0	6.0	5.6	5.2	7.6	9.3
Alberta	3.0	0.5	0.2	0.4	0.7	1.0
British Columbia	14.9	10.3	12.5	16.9	23.6	21.2
Yukon Territory	4.6	4.6	2.5	3.3	2.8	2.8
Northwest Territories	9.5	5.9	5.2	5.7	5.2	5.5
Total Canada	100.0	100.0	100.0	100.0	100.0	100.0

Source: Calculated from data in Table 3
pe Preliminary Estimate. f Forecast.

Note: The percentages from 1985-1988 are calculated on field work alone, but those for 1989 and 1990 are based on total expenditures, which include related overhead.

considerable variation. Quebec's percentage of overall Canadian exploration spending rose from 29 per cent in 1984 to 37 per cent in 1987, but declined to 28 per cent in 1988, and only 22 per cent in 1989. Ontario's share of Canadian exploration spending, rose from 18 per cent in 1984 to 27 per cent in 1987, peaked at 29 per cent in 1988, and then fell back to 26 per cent in 1989. The prairie provinces' share fell from approximately 18 per cent in 1985 to about 8 per cent in 1988, but rose thereafter to 12 and 15 per cent in 1989 and 1990 respectively. British Columbia's share fell between 1984 and 1986, but increased from 10 per cent in 1986 to about 24 per cent in 1989 and 21 per cent in 1990. The Yukon and Northwest Territories' joint share fell from about 11 per cent in 1984 and 14 per cent in 1985 to levels in the 8 per cent range in the 1987 to 1990 period. Over the period 1985-1990, the Atlantic region marginally increased its share of total exploration spending.

5.3 Exploration Expenditures by Type of Company

Figure 9 depicts exploration expenditures by various types of companies for the years 1985 to 1988 in greater detail than shown in Figures 10 and 11. Those two figures illustrate only the spending split between junior and senior companies. The data in Figure 9 show that in this period exploration expenditures by most categories increased, with the exception of oil companies and foreign companies. Over the period, non-petroleum mineral exploration by oil companies declined by more than 60 per cent.

Exploration by junior companies, which in 1983 accounted for about 15 per cent of total exploration expenditures, increased in importance to such a degree that, by 1987, their share of total expenditures was estimated to have been over two thirds¹ of the total.

¹ 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

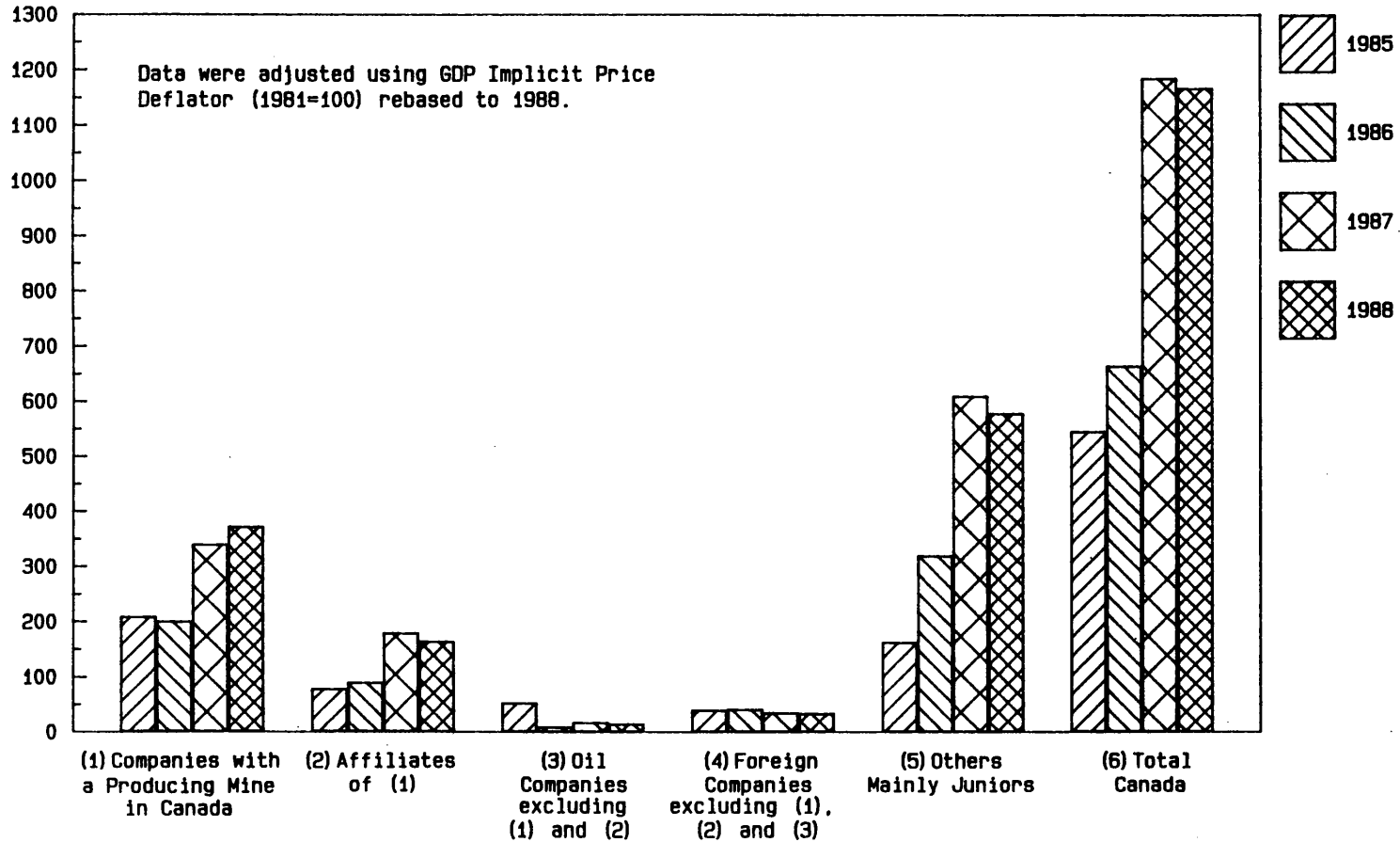
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Figure 9

TOTAL CANADIAN EXPLORATION EXPENDITURES BY TYPE OF COMPANY 1985 TO 1988

Millions of 1988 dollars

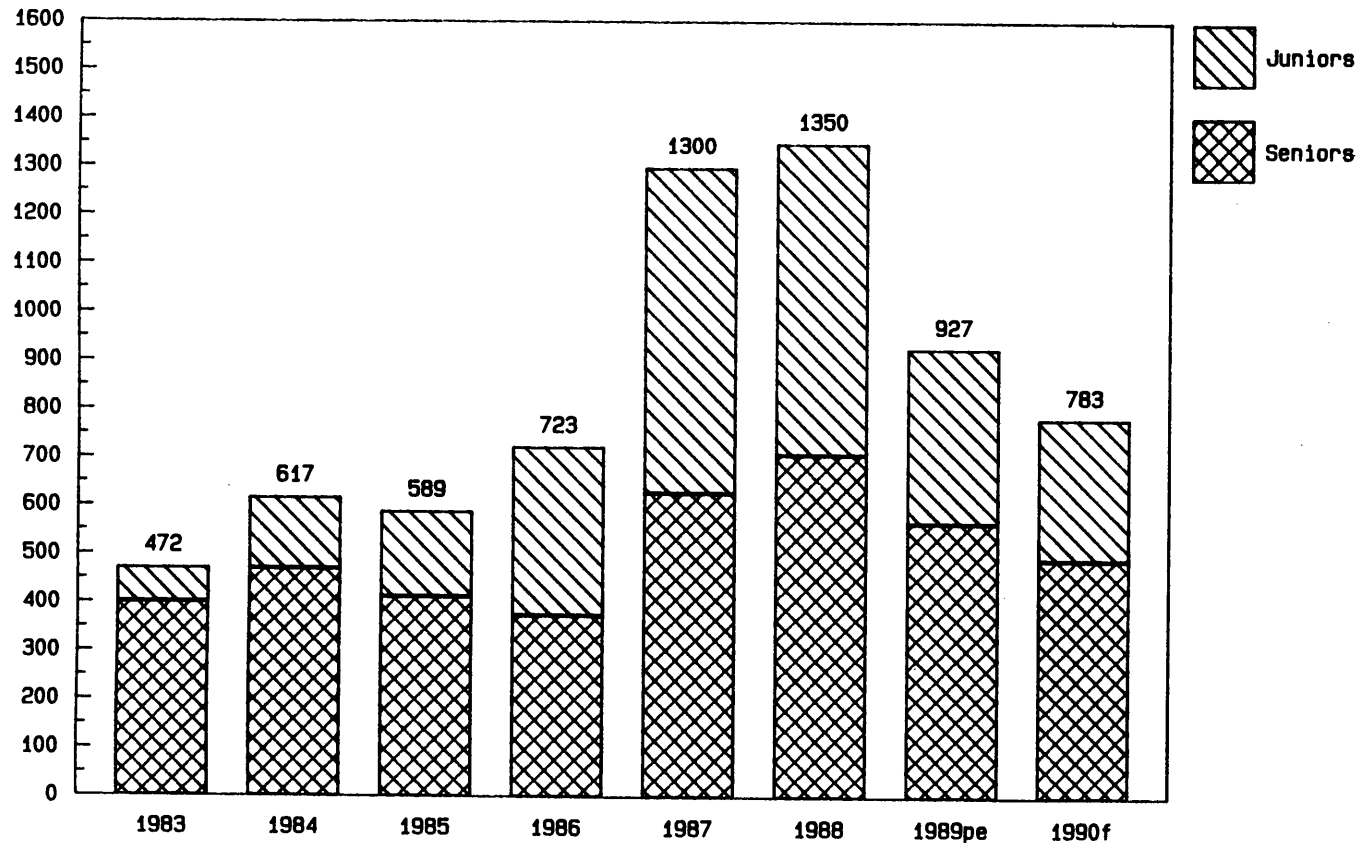


Source: Federal-Provincial Field Expenditures Survey.
Note: Overhead expenditures are not included.

Figure 10

TOTAL EXPLORATION EXPENDITURES 1983 TO 1988 WITH 1989 PRELIMINARY ESTIMATE AND 1990 FORECAST

Millions of dollars

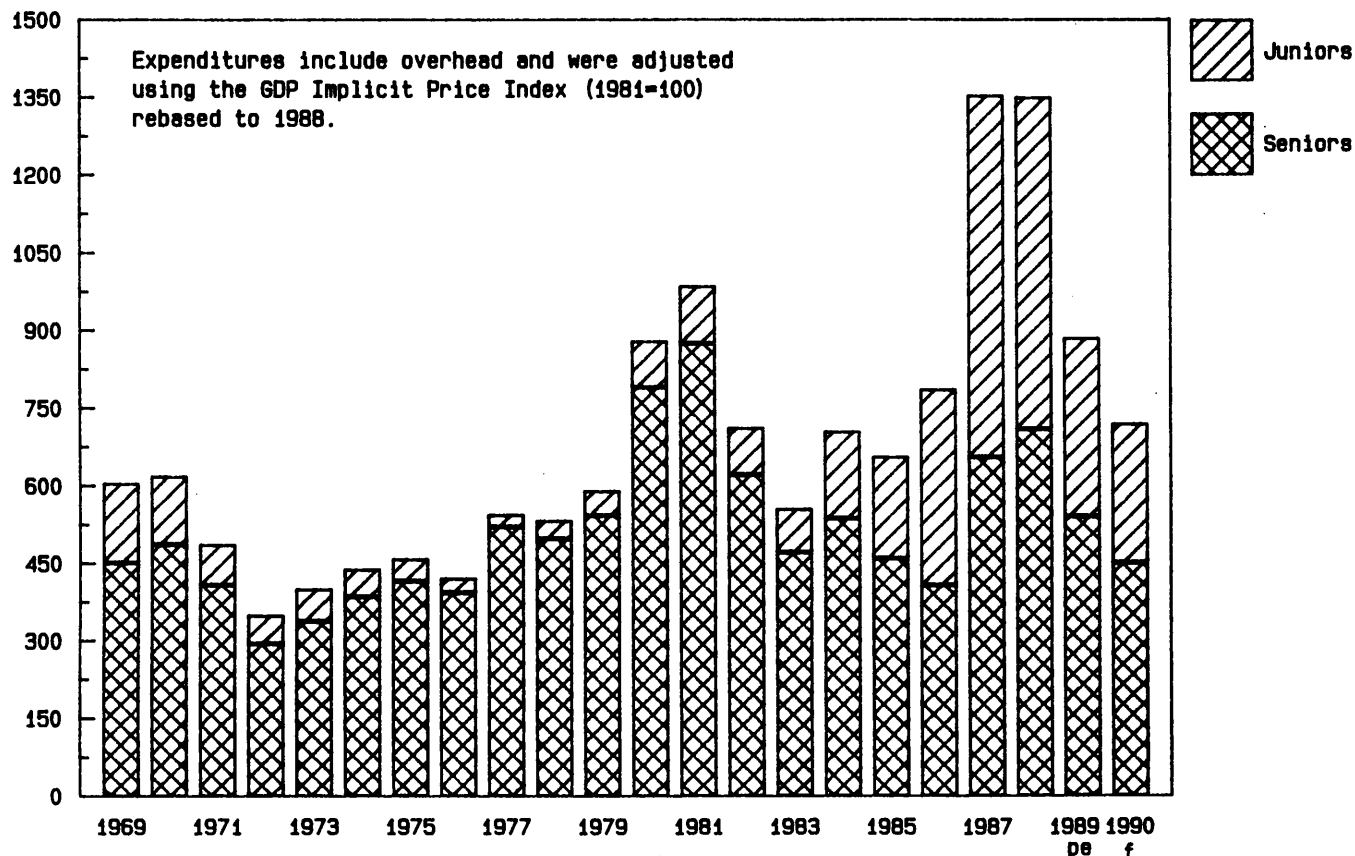


Sources: Statistics Canada Catalogue 61-216 for 1983-1985; for 1986-88, the Federal-Provincial field expenditures were multiplied by the ratio Total/Field from Statistics Canada. The 1989 preliminary estimate and 1990 forecast were derived from Federal-Provincial surveys co-ordinated by Statistics Canada and EMR. The junior/senior split was estimated by EMR. pe Preliminary estimate; f Forecast.

Figure 11

TOTAL EXPLORATION EXPENDITURES 1969 TO 1988 JUNIOR/SENIOR SPLIT WITH PRELIMINARY ESTIMATE FOR 1989 AND 1990 FORECAST

Millions of 1988 dollars



Sources: Statistics Canada Catalogue 61-216 for 1983-1985; for 1986-88, the Federal-Provincial field expenditures were multiplied by the ratio Total/Field from Statistics Canada. The 1989 preliminary estimate and 1990 forecast were derived from Federal-Provincial surveys co-ordinated by Statistics Canada and EMR. The junior/senior split was estimated by EMR. pe Preliminary estimate; f Forecast.

From 1983 to 1988, absolute expenditures by juniors increased almost tenfold, from about \$71 million to almost \$700 million in the peak junior-company exploration year. In 1988, expenditures began to decline. Indications are that this trend has continued, with a sharp decline in junior exploration spending in 1989. The total share of expenditures accounted for by senior companies increased from 52 per cent in 1988 to 61 per cent in 1989. Current indications are that spending by the seniors is likely to account for about 63 per cent of the Canadian total in 1990.

5.4 Exploration Expenditures by Type of Commodity Sought

Figure 12 shows total Canadian exploration expenditures by commodity or commodity group for the period 1985 to 1988 and gives an indication of the changing emphasis on exploration expenditures according to commodity sought. In 1987, precious metals, mainly gold, accounted for 84 per cent of total exploration spending in Canada, base metals for 11 per cent, uranium for 2 per cent and all other metals and minerals, including coal, for 3 per cent. In 1988, there was a slight drop in the percentage of expenditures allocated to precious metals and increased exploration for base metals (precious metals: 82 per cent; base metals 13.5 per cent). Expenditures for uranium were still maintained at 2 per cent of Canadian exploration spending and those for other metals and minerals, including coal, at 3 per cent.

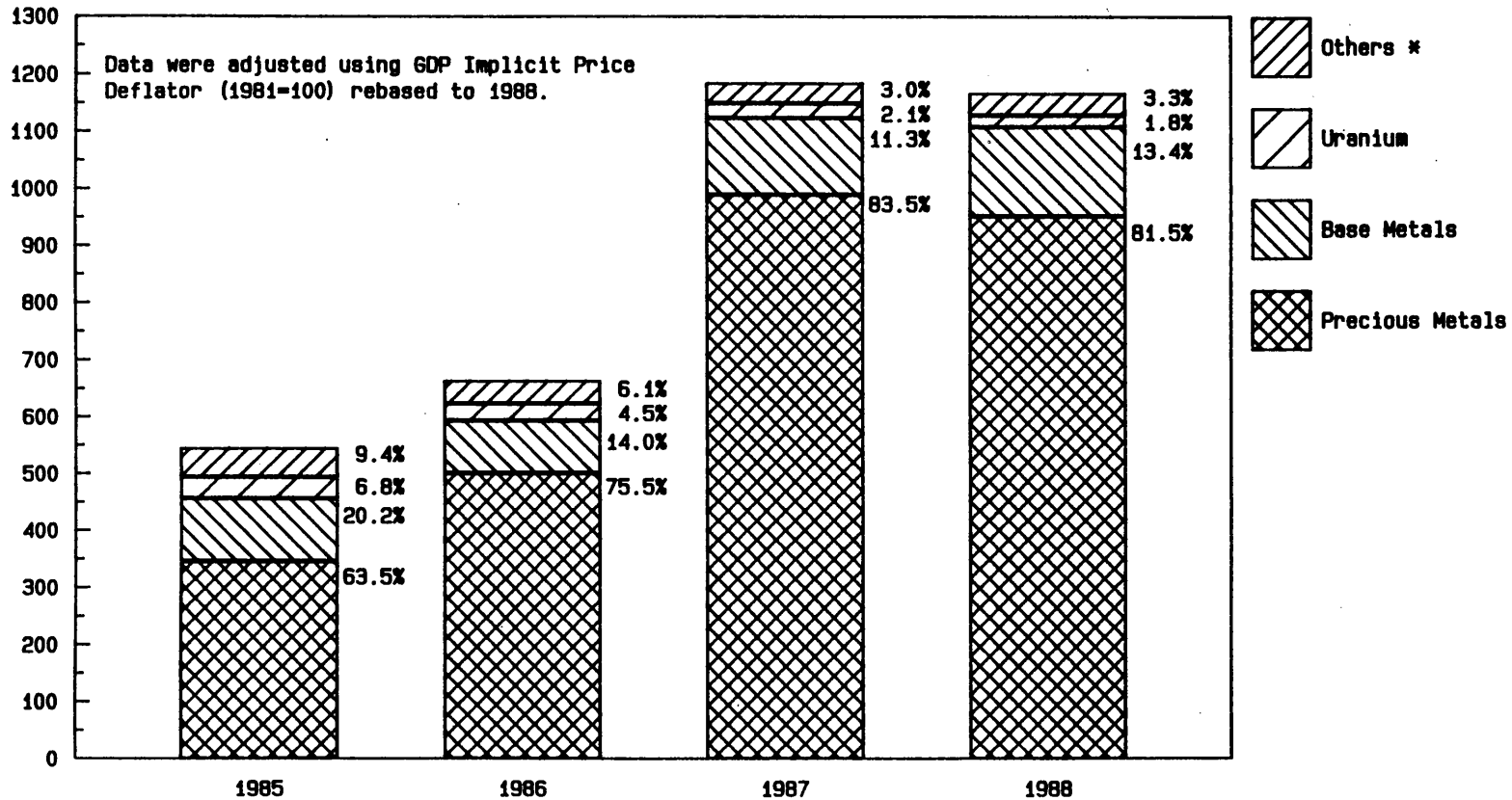
In 1988, expenditures on coal exploration increased by 17 per cent over 1987, but still represented only 0.7 per cent of total 1988 spending. British Columbia was dominant in coal exploration accounting for 58 per cent of the total expenditures on searching for coal, a decrease from the 69 per cent recorded in 1987. In Alberta, coal exploration expenditures increased from 23 per cent to 37 per cent of total Canadian expenditures on coal exploration in 1987 and 1988 respectively.

Interest in exploration for gold remained very strong, with spending on gold exploration almost comparable in 1987 and in 1988. As for base metals, data for 1989 are not yet available, but industry representatives claim that there has been a revived interest in exploration for base metals and that commodity-related exploration data for 1989 should reflect this when they become available.

Figure 12

TOTAL CANADIAN EXPLORATION EXPENDITURES DISTRIBUTION BY COMMODITIES SOUGHT 1985 to 1988

Millions of 1988 dollars



Source: Federal-Provincial Field Expenditures Survey.

Note: Overhead expenditures are not included.
* Others include ferrous metals, other metals, nonmetals (including coal), and "not specified".

SECTION D. HISTORICAL PERSPECTIVE ON FLOW-THROUGH SHARE FINANCING ACTIVITY 1983-1990

The growth in the popularity of flow-through shares as a source of financing for exploration is shown in Figure 13. Funds raised by flow-through shares increased dramatically from \$34 million in 1983 to \$1,183 million in 1987.

The proportion of total exploration expenditures accounted for by flow-through share financing increased from about 7 per cent in 1983 to more than 90 per cent in 1986 and 1987. In 1988, however, the level of flow-through financing of mineral exploration declined to approximately 60 per cent of total spending, mainly as a result of decreased participation by senior companies in the flow-through share market (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 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.

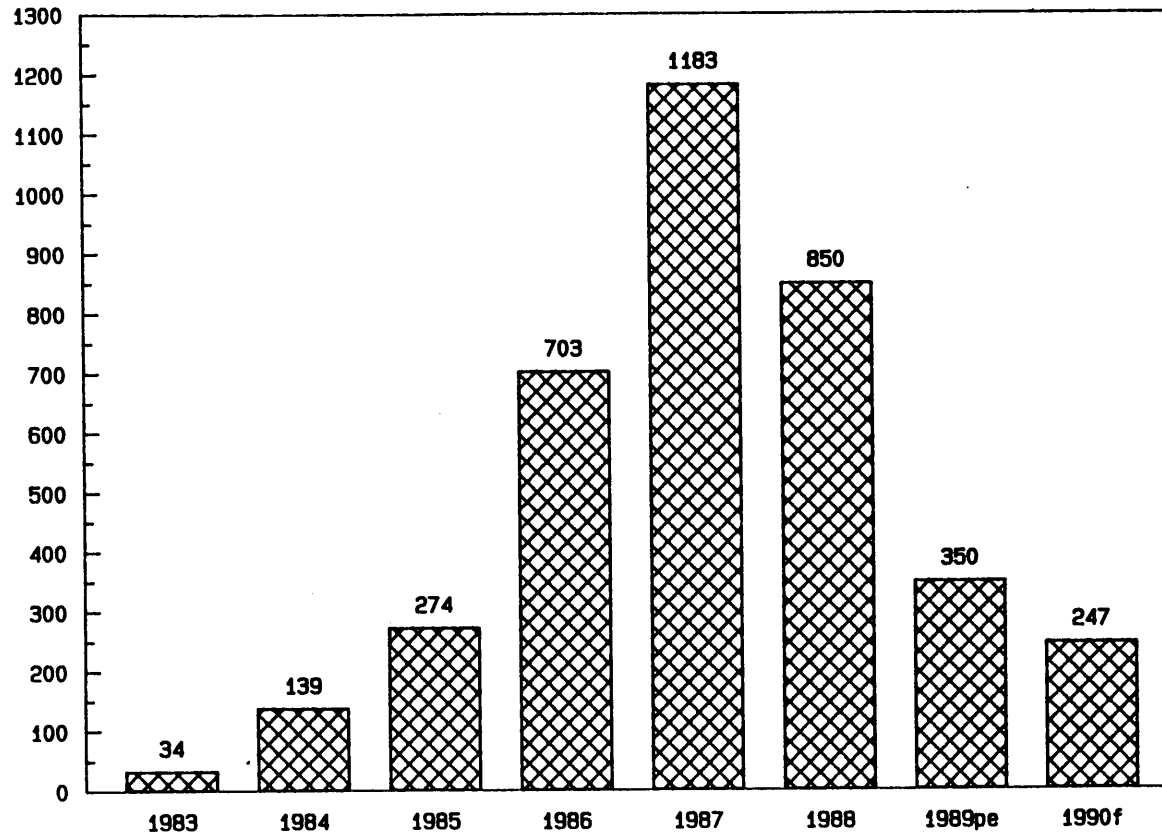
The rise in flow-through share funding has witnessed a concurrent increase in the proportion of total exploration by junior mining companies. It is the juniors who made the greatest use of the flow-through share mechanism in 1987 and 1988. It is estimated that juniors accounted for close to 80 per cent 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 in 1989.



Figure 13

FLOW-THROUGH SHARE FINANCING LEVELS 1983 TO 1990

Millions of dollars



Source: Energy, Mines and Resources Canada.
pe Preliminary estimate; f Forecast as of July 10, 1990.

Table 5. Ratio of flow-through financing to total exploration expenditures, 1983 to 1990

Year	Total Exploration Expenditures (\$ Million)	Flow-Through Share Financing	Percentage Flow-Through Financing to Total Exploration Expenditures
1983	472	34	7%
1984	617	139	23%
1985	589	274	47%*
1986	723	703	97%*
1987	1300	1183	95%*
1988	1350	850	63%*
1989p	927	350	38%*
1990f	750-850	247	33-29%*

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 to 1990 inclusive, flow-through shares will have provided some 65 per cent of total Canadian non-petroleum mineral expenditures.

