



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
Victoria, British Columbia



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FOREWORD

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

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

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

EXECUTIVE SUMMARY

Results of the Federal-Provincial Survey of Mining and Exploration Companies (Federal-Provincial Survey) indicate that Canadian exploration expenditures, exclusive of those spent in the search for oil and gas, totalled \$385 million in 1992, down from \$532 million in 1991. Senior companies spent \$305 million (79 percent) of the \$385 million and junior companies spent the remaining \$80 million (21 percent). Of the \$385 million, \$326 million was spent on general exploration; the remaining \$59 million was spent on mine-site exploration which is defined as the search for new orebodies on the properties of existing mines. Corrected for inflation, exploration expenditures in 1992 were the lowest since 1967.

Base metals and precious metals remained the principal exploration targets in Canada during 1992. The shift from gold exploration to base metals that started in 1987 continued in 1992. Precious-metal exploration declined much more than base-metal exploration and, as a result, expenditures for base metals exceeded those for precious metals for the first time since 1983. In 1992, base-metal exploration accounted for 47 percent of total Canadian exploration expenditures, and precious-metal exploration accounted for 39 percent. In 1987, precious-metal exploration had accounted for 83 percent of total non-petroleum exploration expenditures in Canada.

The preliminary estimate of exploration expenditures in Canada for 1993 shows an increase to about \$483 million, indicating that the decline in exploration appears to have been reversed. Seniors are expected to have spent \$343 million (71 percent) of the \$483 million and juniors, \$140 million (29 percent). The quest for diamonds was the highlight of this welcome improvement in exploration -- preliminary data show that some \$80 million was directed at the search for diamonds in 1993 compared with \$19 million in 1992.

Company exploration spending intentions for 1994 suggest that exploration will again increase. Some \$537 million could be spent on exploration in Canada in 1994. Seniors expect to spend \$340 million (63 percent) of the \$537 million and the juniors, \$197 million (37 percent).

NRCan's view, while still preliminary, is that exploration spending could range between \$500 million and \$550 million in 1994. The upper end of this range is a possibility if diamond exploration continues to accelerate.

NRCan estimates that the amount of money raised with flow-through shares in 1993 was about \$70 million, up \$25 million from the \$45 million raised in 1992. NRCan now estimates that flow-through share financing during 1994 will be somewhat lower, at about \$60 million.

Diamond fever, which reached several provinces in addition to the Northwest Territories, led to a staking rush in 1993 -- 27 million hectares were staked, the second-largest area ever staked in Canada following the unprecedented 33 million hectares staked in 1992.

Over the past few years, some provincial and territorial governments have implemented or enhanced tax incentives or provided grants linked to flow-through shares in order to promote exploration activity in their jurisdiction.

A growing number of Canadian companies have shifted emphasis to foreign exploration plays in recent years. The increasing involvement of these companies in foreign exploration projects has triggered a boom in mining exploration in foreign countries, particularly in Latin America.

TABLE OF CONTENTS

	Page
SECTION A. OUTLOOK FOR CANADIAN MINERAL EXPLORATION AND FLOW-THROUGH SHARE FINANCING	1
1. Outlook for Flow-Through Share Funding in 1994	1
1.1 Introduction	1
1.2 Recent Background	1
1.3 Stock Exchange Data	2
1.4 Outlook	5
2. Outlook for Exploration in 1994	5
2.1 Introduction	5
2.2 NRCan and Statistics Canada Surveys of Exploration Spending Intentions - 1994	5
2.3 Senior Firms' Exploration Spending for 1993 and 1994	8
2.4 Outlook for Exploration Based on Metal Prices	9
2.5 Recent Diamond Drilling Activity	9
3. Overall View on Mining Exploration for 1994	16
 SECTION B. CURRENT REGIONAL OUTLOOK	 19
4.1 Introduction	19
4.2 Newfoundland and Labrador	19
4.3 Nova Scotia	21
4.4 New Brunswick	22
4.5 Quebec	23
4.6 Ontario	27
4.7 Manitoba	29
4.8 Saskatchewan	31
4.9 Alberta	33
4.10 British Columbia	34
4.11 Northwest Territories	37
4.12 Yukon	40
 SECTION C. HISTORICAL PERSPECTIVE ON MINERAL EXPLORATION ACTIVITY IN RECENT YEARS	 43
5.1 Introduction	43
5.2 Exploration Expenditures by Region	43
5.3 Exploration Expenditures by Type of Company	47
5.4 Exploration Expenditures by Type of Commodity Sought ...	52
 SECTION D. HISTORICAL PERSPECTIVE ON FLOW-THROUGH SHARE FINANCING ACTIVITY, 1983-94	 55

FIGURES

		Page
Figure 1	Monthly Average Gold Price, January 1986 to June 1994	4
Figure 2	Total Exploration Expenditures and Metals Price Index Lagged One Year	10
Figure 3	Senior Exploration Expenditures and Metals Price Index Lagged One Year	10
Figure 4	Surface and Underground Drilling, by Month - January 1985 to June 1994	12
Figure 5	Surface and Underground Drilling, by Quarter - 1985 to 1994	13
Figure 6	Surface and Underground Drilling, by Year - 1973 to 1993	14
Figure 7	Surface and Underground Drilling: Contract Diamond Drilling Operations, 1973 to 1992	15
Figure 8a	Field Exploration Expenditures by Type of Company, 1985 to 1992	48
Figure 8b	Exploration Expenditures by Type of Company, 1989 to 1994	49
Figure 9	Exploration Expenditures by Junior and Senior Companies, 1983 to 1994	50
Figure 10	Exploration Expenditures by Junior and Senior Companies, 1969 to 1994	51
Figure 11	Exploration Expenditures by Commodity Sought, 1985 to 1992	53
Figure 12	Canadian Exploration Expenditures for Base Metals and Precious Metals, 1975 to 1992	54
Figure 13	Flow-Through Share Financing Levels, 1983 to 1994	56

TABLES

	Page
Table 1	Flow-Through Share Funds Raised by Diversified Limited Partnerships, 1987-90 2
Table 2	Comparison of Intentions, Preliminary and Actual Exploration Expenditures, 1984-94 7
Table 3a	Mineral Exploration Expenditures in Canada, by Province, 1985-94 44
Table 3b	Mineral Exploration Expenditures in Canada, by Province, 1985-94 45
Table 4	Mineral Exploration Expenditures in Canada, by Province, 1985-94 46
Table 5	Ratio of Flow-Through Share Financing to Total Exploration Expenditures, 1983-94 57

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

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

1. Outlook for Flow-Through Share Funding in 1994

1.1 Introduction

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

Flow-through share financing has been 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. However, information on flow-through share funding collected from stock exchanges does not include flow-through share funding obtained through private issues.

1.2 Recent Background

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

However, rumours and expectations that diamond deposits, which may become North America's first commercial diamond mines, have been found in the Northwest Territories have offered enough market appeal to provide individual junior companies with good flow-through share financing opportunities.

Investor enthusiasm for diamond shares prompted a group to try to arrange a minimum \$5 million and a maximum \$50 million partnership fund offering in 1993. This endeavour proved unsuccessful but, nevertheless, the fund offering marked the first attempt by a diversified limited partnership to re-enter the flow-through share market in three years.

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

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

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

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

1.3 Stock Exchange Data

Despite the slow-moving economic recovery, Canadian corporations sold a record amount of new equity issues in 1993. Buoyed by a bull market and demand for capital on the heels of the recession, 1993 saw a record-breaking \$20.85 billion of Canadian common stock financings. The number and value of equity issues brought to Canadian markets in the first quarter of 1994 kept pace with the boom of 1993 with well over \$5 billion in new issues. Low interest rates have been a key support for equity markets. The retreat of retail and institutional investors from low-paying interest-bearing instruments in favour of equity, encouraged companies to issue new shares. Companies of all sizes and in all sectors of the economy, including resources, have taken advantage of the strong equity markets to raise funds. The rush of money into the resource market was further fuelled by a surging oil and gas sector, a rebound in the price of gold, and speculative exploration plays, particularly in junior diamond stocks.

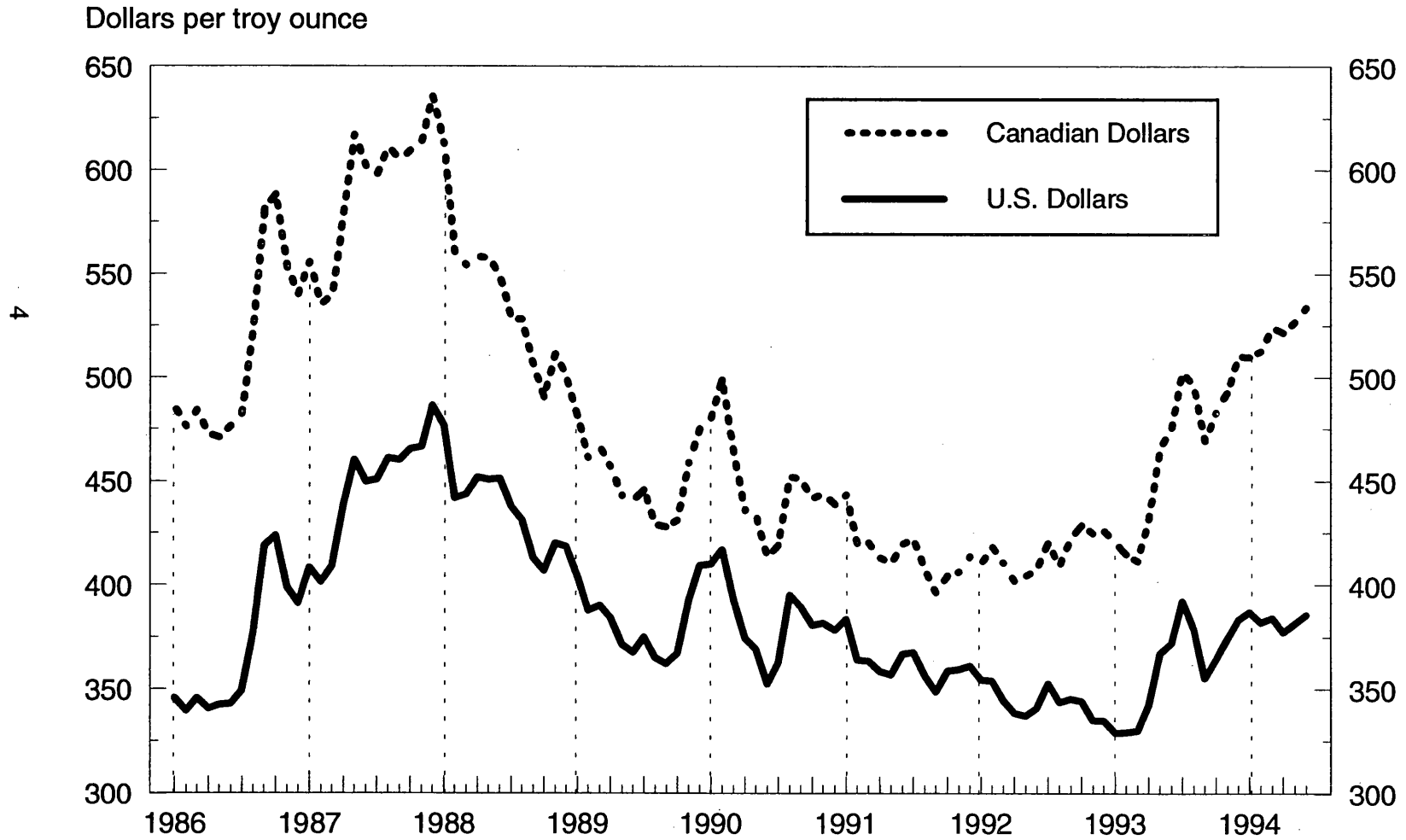
In the spring of 1994, rising interest rates and falling stock markets dampened financing activity. New issue activity is expected to remain slow in the short term because investors are no longer as enthusiastic about equities as they previously were.

The performance of the Vancouver Stock Exchange (VSE) has reflected investor sentiments. The VSE -- taken as a proxy for the measure of investor interest in junior stocks -- experienced a strong 1993, breaking a series of long-standing trading records during the year. Trading activity reached the highest volume and value levels in the Exchange's 86-year history, surpassing the previous highs established in 1987. VSE officials ascribed this to the increase in gold prices, low interest rates and continuing investor interest in diamond exploration in the Northwest Territories and gold exploration in Venezuela. Trading activity increased in all of the Exchange's sub-indices, led by a 53 percent gain in the resources. The value of shares traded was up by 90 percent, led by the resource and venture sub-indices which more than doubled. The venture index is comprised of 1092 stocks, with 57 percent involved in mining. Funds raised through the VSE during 1993 more than doubled to over \$1 billion compared with 1992. Mining firms accounted for 58 percent of all funds raised. Mining companies raised \$613 million during the year, up from \$127 million in 1992. The VSE composite index climbed steadily during 1993 to close at 1064, up 422 points. The climb continued during 1994 as the VSE reached a six-year high of 1169 on February 3, 1994, before retreating to 946 at the end of June. Financing activity remained brisk in the first quarter of 1994 before tapering off in the second quarter.

Although common share financing was strong in early 1994, the same cannot be said of flow-through share financing. Statistics provided by the VSE indicate that some \$8.7 million of flow-through shares were sold through 34 private placements during the first six months of 1994; \$3.6 million of that total is for oil and gas exploration and \$5.1 million is for mining exploration. However, another \$5.6 million of mining-related flow-through share offerings have not been included in the above \$5.1 million, probably because they have yet to be accepted by the VSE.

Statistics provided by the Alberta Stock Exchange indicate that some \$30.2 million of flow-through share financing was raised on that exchange during the first five months of 1994. Flow-through share financing in Alberta has been primarily for oil and gas exploration; however, it is likely that increasing amounts will be directed to mineral exploration. Data from the Montreal Stock Exchange indicate that some \$10 million of flow-through share financing may have been raised on the exchange during the first six months of the year, \$8.8 million of it for mineral exploration. Data from the Toronto Stock Exchange indicate that, excluding amounts raised by interlisted companies, some \$21.2 million of flow-through share financing has been raised on the exchange over the first six months of the year, \$8.5 million of this for mineral exploration.

Figure 1
MONTHLY AVERAGE GOLD PRICE
JANUARY 1986 TO JUNE 1994



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

1.4 **Outlook**

Flow-through share funds raised in 1994 for mining on the four stock exchanges totalled \$28 million at July 1, 1994. Assuming that an equal sum will be raised in the second half of 1994 would lead to the conclusion that some \$56 million of flow-through share financing would be available for the whole year.

Although it is difficult to forecast the amount of flow-through share financing for the entire year at this time, NRCan considers \$60 million to be a reasonable estimate for 1994.

2. **Outlook for Exploration in 1994**

2.1 **Introduction**

This section looks at the expected level of mineral exploration, as opposed to its financing. Since we are looking ahead, the usual statistical reporting sources are supplemented by other sources. The section first reports the results of the Federal-Provincial Exploration Intentions Survey for 1994 coordinated by Statistics Canada and NRCan. While this is the latest complete survey available, it suffers from a serious shortcoming in that the intentions in question were gathered in the November 1993-March 1994 period, and the results of this once-a-year survey may no longer reflect the current situation.

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

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

2.2 **NRCan and Statistics Canada Surveys of Exploration Spending Intentions - 1994**

Methodology

On October 31, 1993, Statistics Canada sent 230 questionnaires to mineral-producing firms. NRCan has assumed responsibility for the collection of data from the non-producing firms and sent out close to 2011 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 about 641, down from 692 in 1993, but

up from 597 in 1992. To avoid duplicate reporting, joint venture partners who are not project operators do not report intended expenditures on exploration. Companies were asked to report intended exploration expenditures for their fiscal year that ends between April 1, 1994 and March 31, 1995.

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

Results

Statistics Canada published the results of its survey under the heading "On-Property Exploration" (mine-site exploration) in its annual publication "Private and Public Investment in Canada - Intentions 1994" (Statistics Canada catalogue 61-205). The Statistics Canada intentions total published for mine-site exploration for 1994 is \$60 million. This total was revised to \$66 million by NRCan as of April 1994. Statistics Canada is currently conducting a revised Forecast 1994 Survey of producing companies and the results should be available soon. The first indication suggests that "general exploration" (off-property exploration) would be \$471 million.

NRCan released the results of its survey in the Spring 1994 issue of the "Mineral Industry Quarterly Report" and in the 1993 edition of the "Canadian Minerals Yearbook: Review and Outlook."

Accordingly, on the basis of company intentions in the December 1993-March 1994 period, total exploration (both on- and off-property) for 1994 would be expected to total about \$537 million (\$471 million plus \$66 million).

Interpretation

The Statistics Canada and NRCan surveys of intentions provided an indication of the late 1993 industry view of total exploration spending expectations for 1994. However, because intentions expressed in late 1993/early 1994 may subsequently have been modified by events that can limit the availability of funds, such as stock market conditions, changing metal prices, as well as other general economic factors 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 1994.

Table 2 shows intentions, as well as preliminary and actual expenditures, for mine-site and general exploration for the years 1984 to 1994. 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.

TABLE 2. Comparison of Intentions, Preliminary and Actual Exploration Expenditures, 1984-94

Exploration Expenditures	Intentions	Preliminary	Actual
		(\$ millions)	
1984			
Minesite		158.6	136.4
General		389.7	480.9
Total	N/A	548.3	617.3
1985			
Minesite	150.9	89.4	100.1
General	361.2	471.5	488.8
Total	512.1	560.9	588.9
1986			
Minesite	87.5	110.2	108.6
General	431.2	483.6	589.3
Total	518.7	593.8	697.9
1987			
Minesite	122.6	121.5	161.0
General	583.2	849.6	1139.0
Total	705.8	971.1	1300.0
1988			
Minesite	154.7	138.7	143.0
General	891.0	1107.9	1207.0
Total	1045.7	1246.6	1350.0
1989			
Minesite	111.7	160.0	115.3
General	832.2	766.7	712.5
Total	943.9	926.7	827.8
1990			
Minesite	150.0	107.7	112.4
General	633.0	643.5	662.3
Total	783.0	751.2	774.7
1991			
Minesite	97.9	80.4	67.3
General	548.3	514.5	464.4
Total	646.2	594.9	531.7
1992			
Minesite	71.2	75.4	59.4
General	426.3	344.2	325.9
Total	497.5	419.6	385.3
1993			
Minesite	70.1	78.1	
General	364.5	404.9	
Total	434.6	483.0	N/A
1994			
Minesite	66.0		
General	470.9		
Total	536.9	N/A	N/A

Source: Statistics Canada and Federal-Provincial Survey of Mining and Exploration Companies. The 1993 actual survey is currently in progress, and the 1994 preliminary and actual questionnaires will not be sent out until late 1994 and early 1995, respectively. N/A: Not available.

In 1989, this pattern was reversed. The explanation for the period 1985-88 could be that exploration funding was becoming more abundant than companies had originally anticipated but, starting in 1989, there was an unexpected decline in the availability of flow-through share funds. For 1993, the trend is similar to the one reported for the period 1985-88. The preliminary data exceed the intentions, likely because funding is more accessible than expected and because the recent diamond discoveries have enhanced exploration activity.

2.3 Senior Firms' Exploration Spending for 1993 and 1994

Methodology

Information on exploration spending by type of company (1992 actual, 1993 preliminary and 1994 intentions) is now available from the Federal-Provincial Survey of preliminary and forecast exploration expenditures. About 149 active senior companies in 1993 and 134 in 1994 reported exploration spending. Included in these numbers for senior companies are producers and their affiliates as well as foreign and petroleum companies. For joint ventures, total project expenditures are reported by the project operator. Accordingly, senior participation has at times been subject to over-estimation. Nevertheless, data analysis has been consistent over the years and a clear trend can be noted.

Results

According to the Federal-Provincial Survey, the decrease in the level of expenditures by seniors was significant from 1988 to 1989, down 19 percent from \$682 million to \$555 million. The decrease continued through 1992. The actual amount for 1992 (\$305 million) was down another 27 percent from 1991 (\$415 million).

However, the preliminary estimate for 1993 (\$343 million) is up 12 percent from 1992, while intentions for 1994 (\$340 million) indicate a level of expenditures comparable to the preliminary estimate for 1993. Expenditures by seniors made up 52 percent of total exploration expenditures in 1988, 67 percent in 1989, 69 percent in 1990, 78 percent in 1991, 79 percent in 1992, an estimated 71 percent in 1993, and an expected 63 percent in 1994.

Overall intentions for 1994 of \$537 million and senior intentions of \$340 million imply a value for junior intentions of \$197 million. However, junior exploration spending levels are determined more by availability of financing than intentions (see section 5.3 for more information on junior companies).

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 view exploration as an investment, with expected returns being dependent on expected revenues from the subsequent mining of discovered deposits. Expected future revenues would obviously depend on future commodity prices. And expectations of future commodity prices by exploration companies would likely be influenced by current commodity prices.

As well, prices are an important determinant of the level of a company's cash flows and, therefore, may indicate the amount of funds available for spending on mineral exploration.

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

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

Results

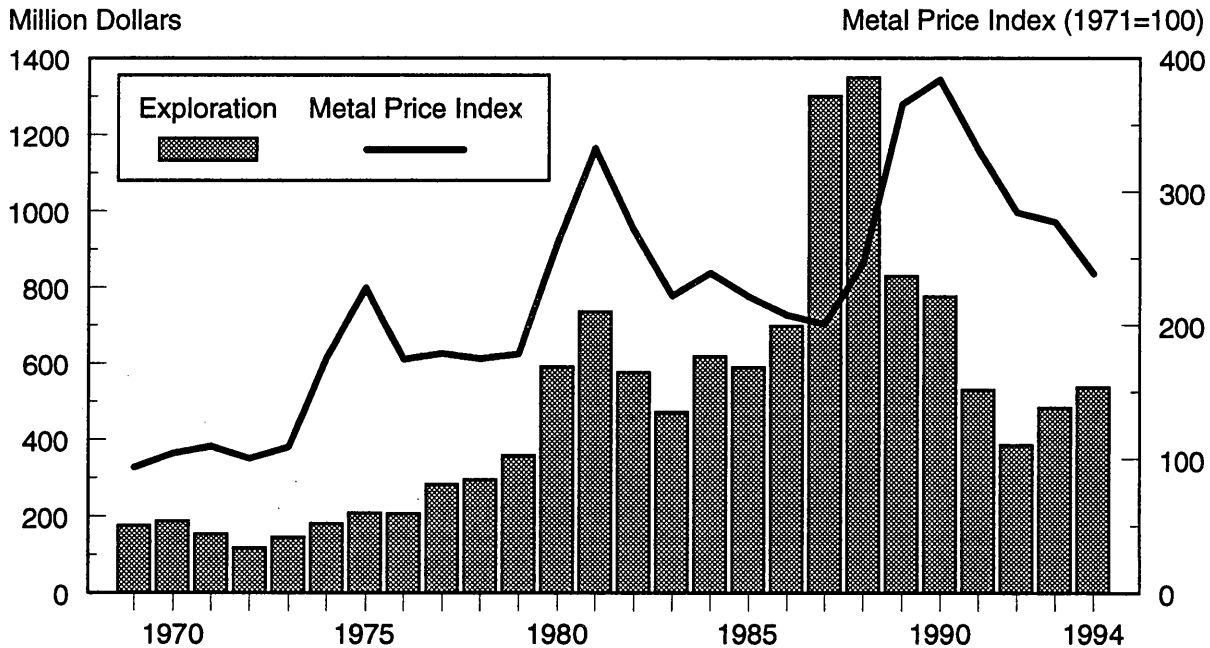
The relationship observed between exploration expenditures and metal prices over the period 1969 to 1993 would predict total exploration expenditures in 1994 in the neighbourhood of \$465 million (Figure 2). For senior companies, a similar estimation would predict exploration expenditures in 1994 of about \$360 million (Figure 3).

The difference between these two estimates would imply spending by juniors in 1994 of about \$105 million. However, since exploration by junior companies is largely determined by the availability of financing from equity markets, no attempt was made to predict junior exploration spending based on metal prices.

2.5 Recent Diamond Drilling Activity

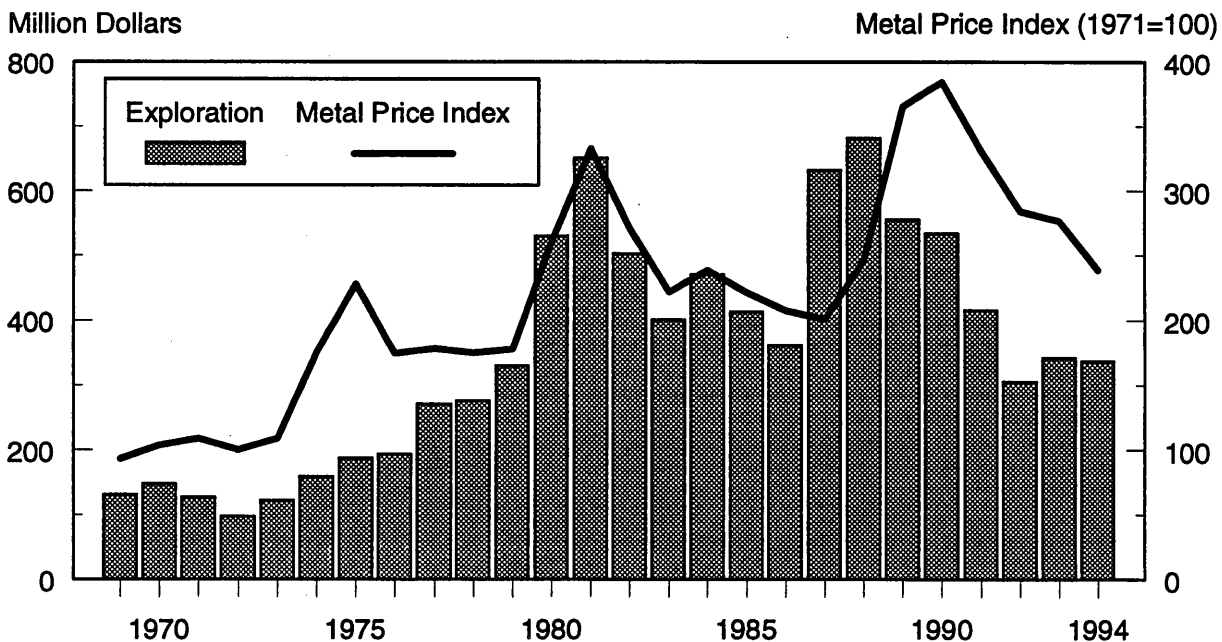
Diamond drilling is an essential component of exploration for nearly all mineral properties in Canada, from the anomaly investigation stage to the deposit delineation and deposit definition stages. This is why diamond drilling statistics constitute a valuable indicator of recent levels of Canadian mineral exploration activity.

Figure 2
TOTAL EXPLORATION EXPENDITURES AND
METAL PRICE INDEX LAGGED ONE YEAR



Sources: Statistics Canada 61-007 and 61-216 for 1969-92 exploration data.
 NRCan for Metal Price Index. 1994 exploration forecast by NRCan model.

Figure 3
SENIOR EXPLORATION EXPENDITURES AND
METALS PRICE INDEX LAGGED ONE YEAR



Sources: Statistics Canada 61-007 and 61-216 for 1969-92 exploration data.
 NRCan for Metal Price Index. 1994 exploration forecast by NRCan model.

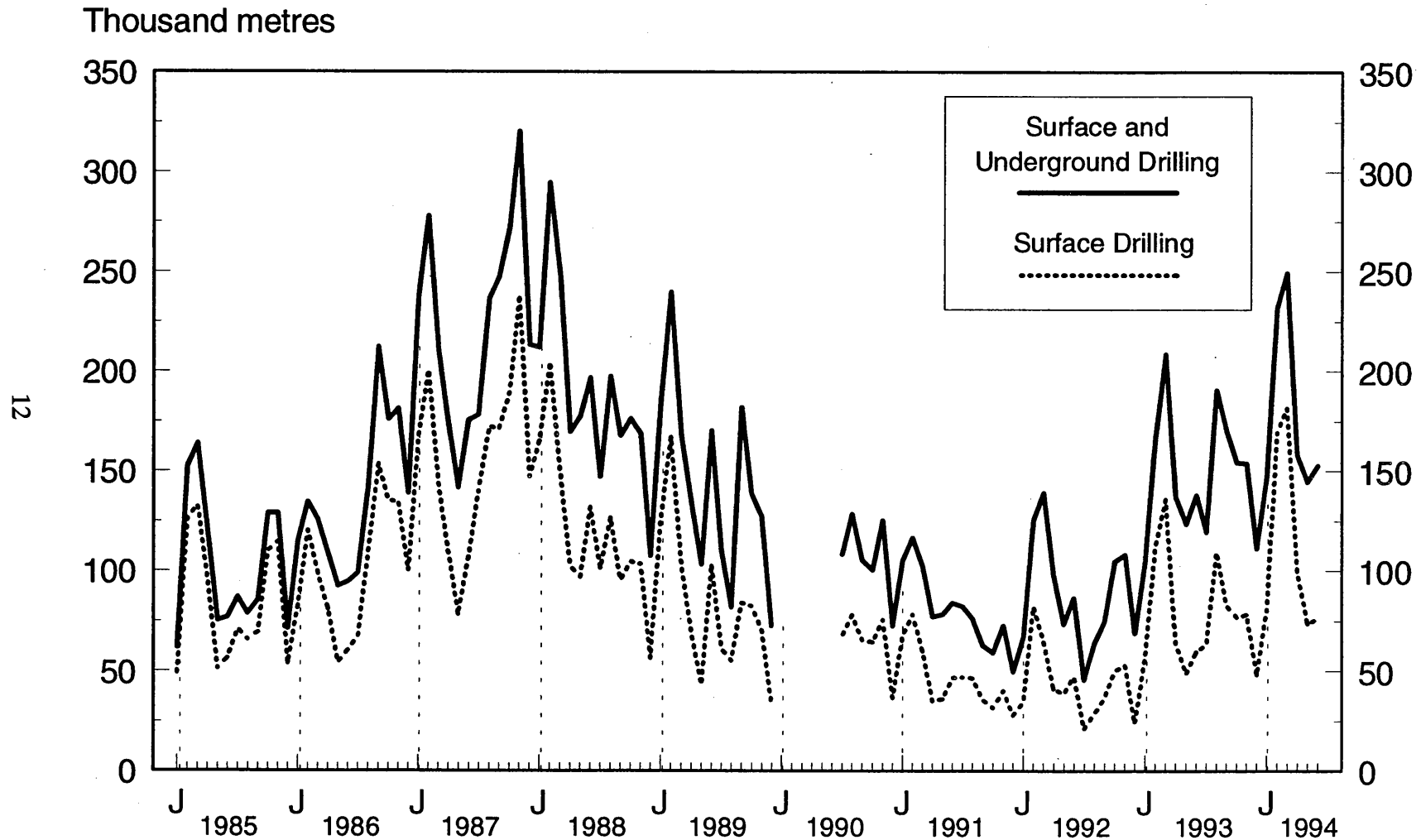
The Canadian Diamond Drilling Association (CDDA) gathers monthly diamond drilling statistics from its member companies. Available CDDA statistics cover about 50-60 percent of total Canadian contract diamond drilling activity. There has been a reasonably close correlation between annual CDDA drilling footages and Canadian exploration expenditures over the past 10 or 15 years, so that the CDDA drilling statistics depicted in Figure 4 (monthly, 1985-94), Figure 5 (quarterly, 1985-94) and Figure 6 (annual, 1973-93) 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 1991, as reported annually to NRCan by drilling contractors and published in Statistics Canada catalogue 26-201. Although these two sources provide different annual results, the same overall trends are observable in both, even though the 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.

Current dollar costs per metre drilled for exploration in Canada can be calculated for the period 1985-92 inclusive, using data from the Federal-Provincial Exploration Survey. Such data are not available for years prior to 1985. These costs may exceed the actual amounts paid to drilling contractors, as some companies may have included some costs associated with the drilling such as geological logging and assaying of core. These average drilling costs include both surface and underground drilling expenditures; surface drilling costs are normally significantly higher than those for underground drilling.

Year	<u>Diamond Drilling</u>			<u>Other Drilling¹</u>		
	<u>Metres Drilled</u> (millions)	<u>Total Cost</u> (\$ millions)	<u>Cost Per Metre</u> (dollars)	<u>Metres Drilled</u> (millions)	<u>Total Cost</u> (\$ millions)	<u>Cost Per Metre</u> (dollars)
1985	2.531	185	73	.270	10.8	40
1986	3.616	249	69	.055	3.4	62
1987	6.221	510	82	.262	18.4	71
1988	6.206	478	77	.211	10.5	50
1989	3.940	291	74	.297	9.5	32
1990	3.702	282	76	.241	12.6	52
1991	2.341	175	75	.234	13.1	56
1992	1.889	141	75	.139	6.5	47

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

Figure 4
SURFACE AND UNDERGROUND DRILLING
BY MONTH - JANUARY 1985 TO JUNE 1994

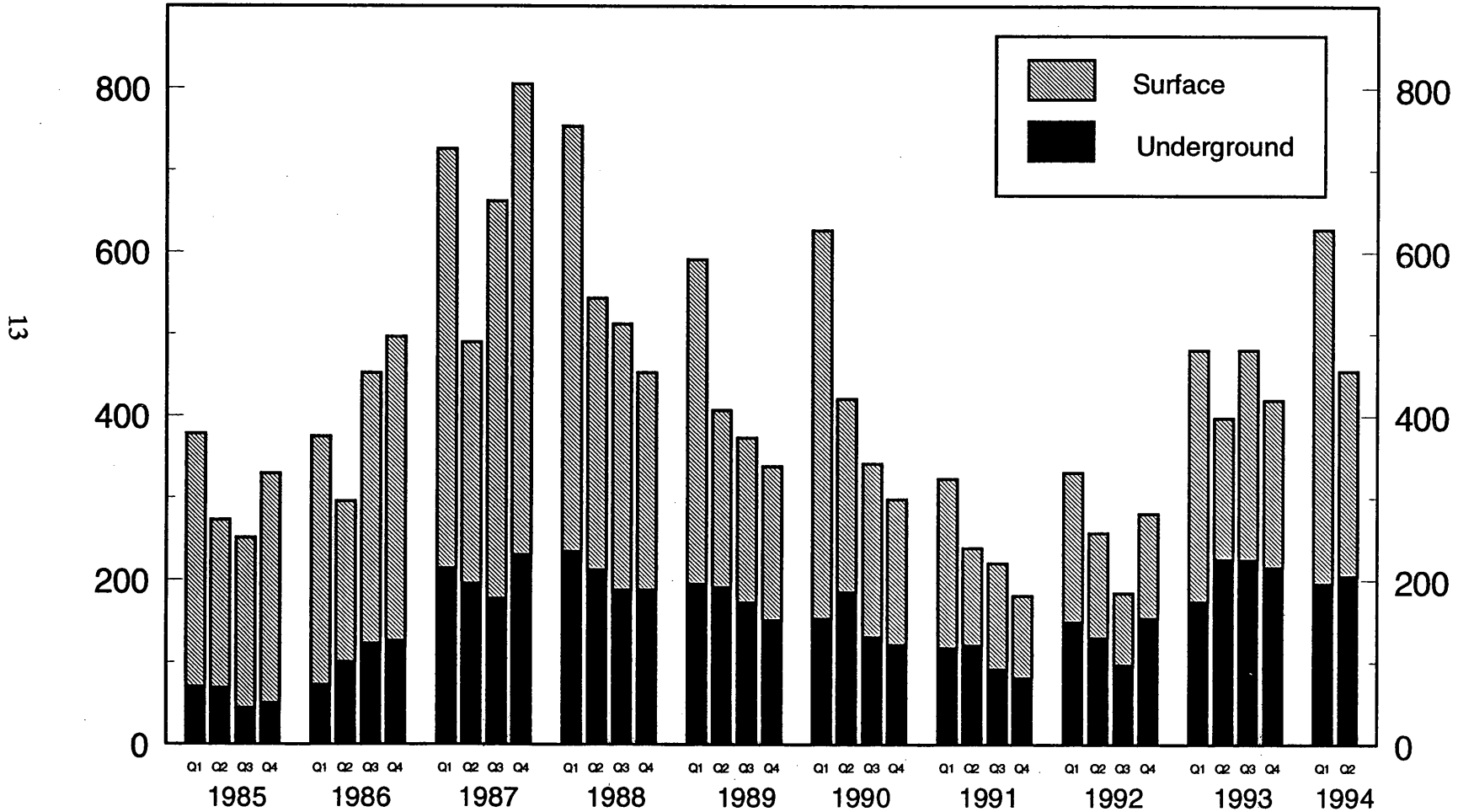


Source: Canadian Diamond Drilling Association.

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

Figure 5
SURFACE AND UNDERGROUND DRILLING
BY QUARTER 1985-94

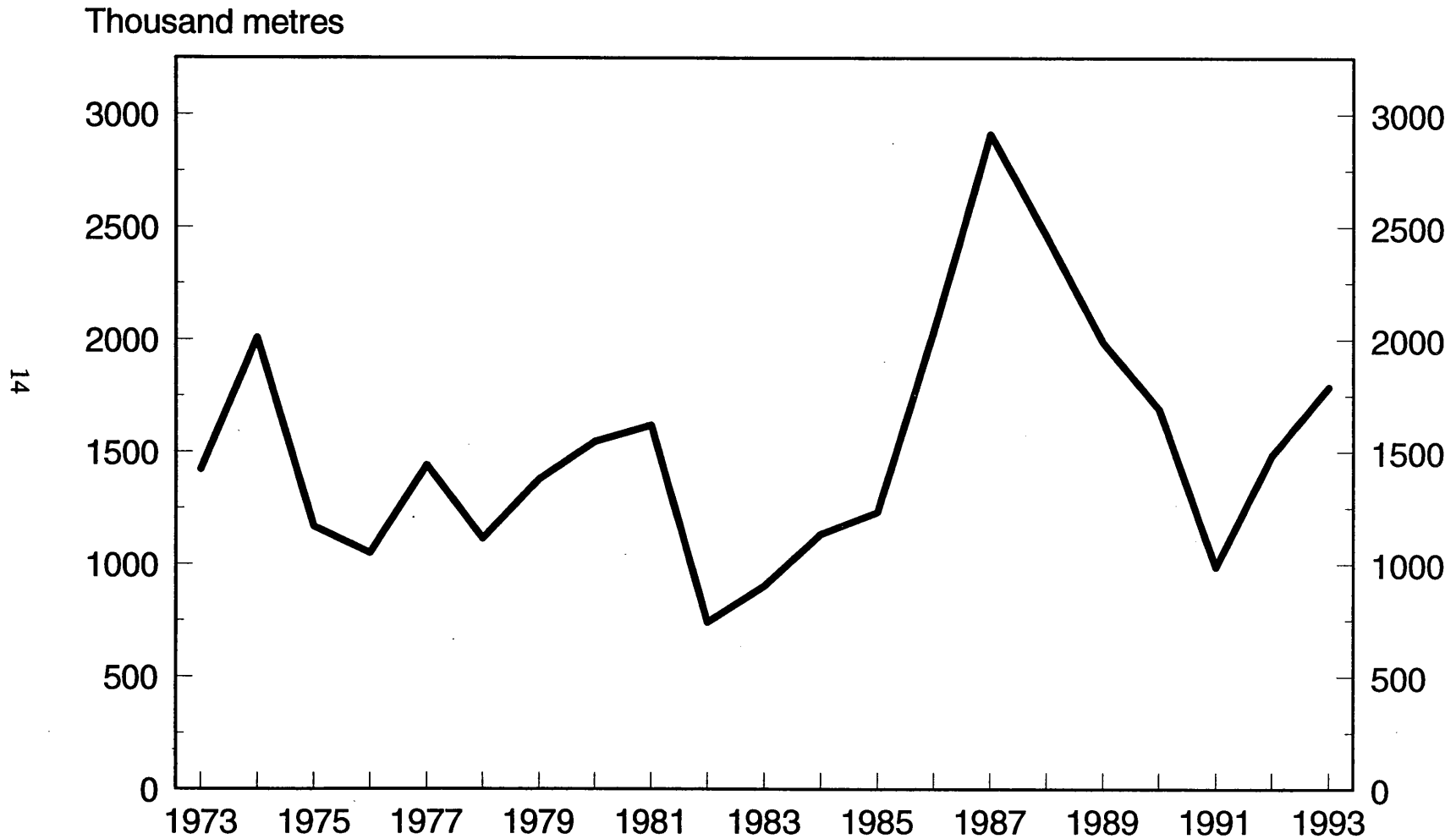
Thousand metres



Source: Canadian Diamond Drilling Association.

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

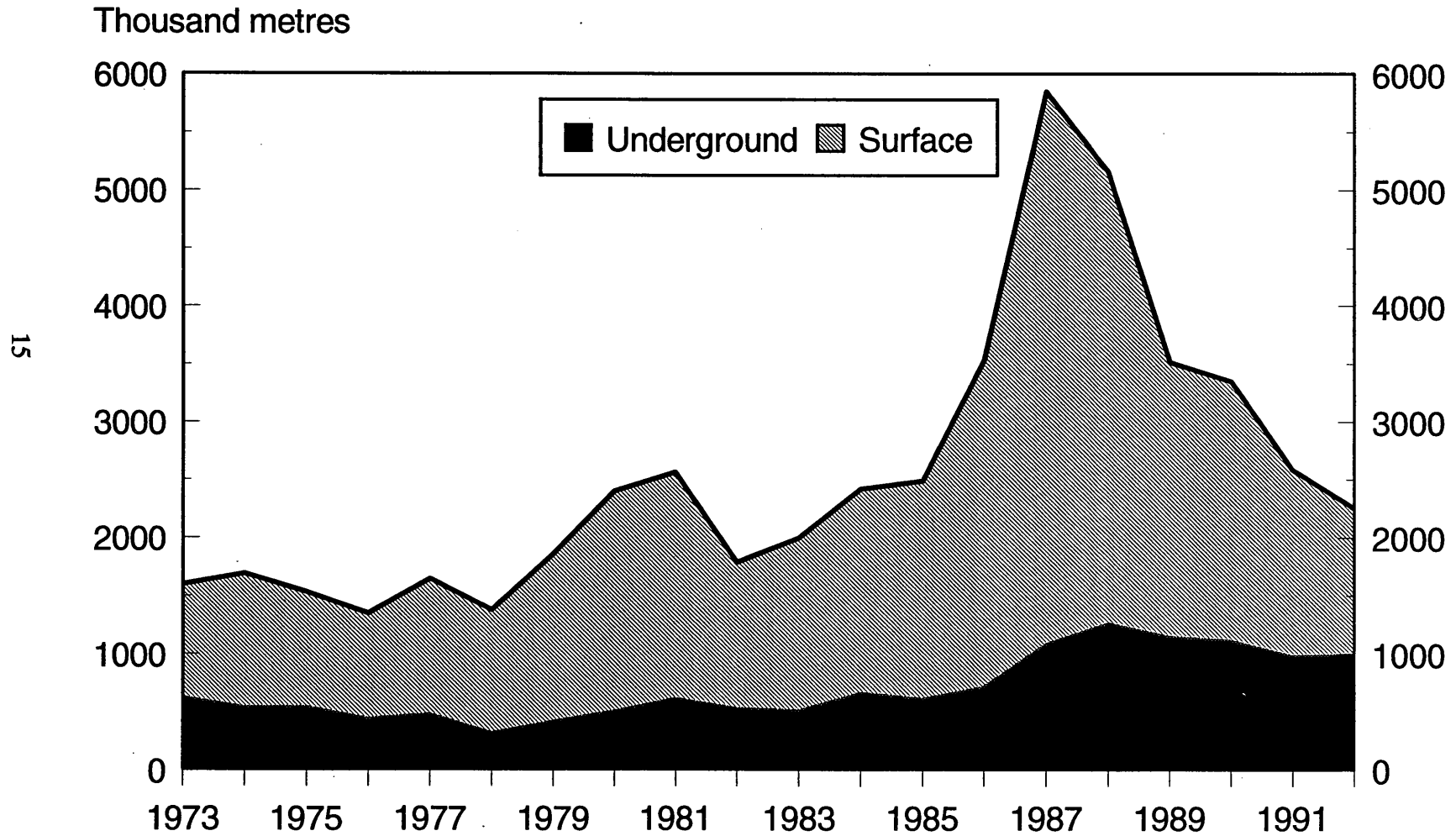
Figure 6
**SURFACE AND UNDERGROUND DRILLING
BY YEAR 1973-93**



Source: Canadian Diamond Drilling Association.

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

Figure 7
**SURFACE AND UNDERGROUND DRILLING
CONTRACT DIAMOND DRILLING OPERATIONS
1973-92**



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

Note: Data refer to SIC 0921; 1992 is the latest year for which data are available.

As can be seen from Figure 5, each of the four years (1988, 1989, 1990 and 1991) has shown a similar pattern of diminishing diamond drilling through the year, with the first quarters exhibiting an increase in drilling over the final quarters of the previous years. This continued until the end of the third quarter of 1992 when the decline in diamond drilling ceased. From 1988 to 1992, drilling peaked consistently during the first quarter. The explanation is twofold: 1) in each of those years, flow-through share funds from the previous year were carried over into January and February, and 2) much drilling must be done during the winter months from the ice on lakes and on areas of muskeg that are generally inaccessible to drilling equipment at other times of the year. The general pattern of decreasing quarterly drilling 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 share 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.

Annual metres of Canadian diamond drilling declined sharply from the 1987 peak until 1991 and has been increasing since then (Figures 5 and 6). Annual Canadian exploration expenditures for 1993 (preliminary) of \$483 million and 1994 (intentions) of \$537 million indicate an upward trend in exploration expenditures from the \$385 million actually spent in 1992. Experience has shown that preliminary expenditures and forecast spending intentions are not always reliable, but this apparent upward trend is confirmed by the increasing metres of drilling being reported by drilling companies to the Canadian Diamond Drilling Association.

Over the years, 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 exploration for new mines. In interpreting Figures 4 to 7, it is important to recognize that, because of the inclusion of underground drilling at producing mines, these figures may in effect be overstating recent levels of mineral exploration activity.

3. Overall View on Mining Exploration for 1994

Total exploration expenditures in 1993 amounted to about \$483 million, with senior exploration at about \$343 million and junior exploration at about \$140 million. This preliminary figure is \$98 million higher than the \$385 million recorded in 1992. Arriving at an overall total forecast for 1994 requires the comparison of different amounts derived from several sources.

Exploration by Senior Companies

The exploration intentions survey carried out in late 1993 and early 1994 indicated that exploration spending in 1994 could reach \$537 million, \$340 million by seniors and \$197 million by juniors.

The regression analysis discussed in section 2.4 provides another estimate. The historical relationship between total exploration expenditures and metal prices leads to an estimate of \$465 million based on the average yearly metal prices during 1993. For senior companies, a similar estimation predicts exploration expenditures in 1994 of about \$360 million, surprisingly close to the intentions survey estimate of \$340 million. Because senior companies have more certain sources of funds than juniors, estimates for these companies are likely to prove more reliable than estimates for junior companies.

The difference between the total exploration expenditure estimate of \$465 million and the \$360 million estimate for senior spending derived from the regression analysis implies spending of about \$105 million by juniors in 1994. However, since exploration by junior companies is largely determined by the availability of financing from the equity markets, no attempt was made to predict junior exploration spending based on metal prices.

Exploration by Junior Companies

The level of junior exploration spending is more difficult to forecast. One indicator of the possible amount of junior exploration spending is the Federal-Provincial Survey of Intentions for 1994 that was carried out in late 1993 and early 1994. According to this survey, juniors intend to spend about \$197 million in 1994, about \$57 million more than the preliminary amount of \$140 million spent in 1993.

It is estimated that about \$60 million of flow-through share financing could be raised in 1994 by junior companies listed on Canadian stock exchanges. If the level of flow-through share financing turns out to be \$60 million, then there would be some \$137 million of additional non-flow-through share financing left to be raised, assuming the full realization of total junior exploration intentions (some \$197 million) as indicated from the Federal-Provincial Survey.

An additional piece of information used to estimate junior exploration spending comes from an examination of the rate of raising new non-flow-through equity capital on the Vancouver Stock Exchange (VSE). Financings raised through the VSE during 1993 more than doubled to over \$1 billion compared with 1992. Mining firms accounted for 58 percent of all money raised. Mining companies raised \$613 million during the year, up from \$127 million during the previous year. VSE officials have indicated that the first quarter financing activity remained buoyant as the composite index gained

further ground to peak on February 3, 1994, on vigorous trading. These favourable conditions have offered junior companies attractive financing opportunities and a good number of small resource companies have issued new equity to raise substantial amounts of funds.

Although recent rising interest rates and falling stock markets will most likely have some effect on new equity issues, much of the exploration activity for this year was planned during last year's hot market and in early 1994.

Even recognizing that a very substantial portion of the funds raised on the VSE is earmarked for foreign exploration, given the recent strong equity markets, the strong rebound in the price of gold and the strong trend in non-flow-through share financing by juniors in 1993 and in the first quarter of 1994, NRCan is inclined to believe that actual junior spending in 1994 will match the \$140 million spent in 1993 and could exceed that preliminary figure.

Total Exploration

With a range of junior exploration spending between \$150 million and \$200 million and an expected \$350 million of senior exploration spending, 1994 exploration expenditures should be in the range of \$500 million to \$550 million. The upper end of this range is a possibility if diamond exploration continues to accelerate.

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 1994.

4.2 Newfoundland and Labrador

Mineral exploration in Newfoundland during 1993 continued to decrease from the record-setting levels in 1988 and 1989, and decreased by 24% from 1992.

The total expenditures on mineral exploration in 1993 are approximately \$8.7 million, down from \$23.0 million in 1990 and approximately \$11.5 million in 1991 and 1992. Expenditures for 1994 are forecast to increase to approximately \$12.0 million - \$15.0 million. The 1992/1993 statistics for claims staked (5118/6955), claims in good standing (24 002/22 910) and diamond drilling (21 873/46 510) also reflect the decline in grass-roots mineral exploration in the province since 1989. First-half 1994 claim statistics stand at 2942 claims staked and 21 394 claims in good standing. A continued increase in diamond drilling is forecast for 1994, reflecting a focus on more advanced exploration projects.

Major exploration efforts continue to be directed towards base metals, followed by gold and industrial minerals. Most exploration programs are being carried out by senior mining firms with a small but growing percentage of total exploration being conducted by the junior sector and prospectors. Exploration is focused on the more advanced projects with limited grass-roots exploration anticipated for 1994, except by individual prospectors. The acquisition by Noranda Exploration Company, Limited of the AND Charter Lands in the general Buchans area of central Newfoundland from Talisman Energy Inc. in early 1993 and Noranda's subsequent 50:50 joint venture exploration agreement with Brunswick Mining and Smelting is considered to be a long-term commitment to base-metal exploration in Newfoundland. This acquisition has sparked a resurgence of exploration activity in the immediate Buchans area with several junior companies, most notably Thunderwood Resources and Newfoundland Mining and Exploration, acquiring ground and conducting aggressive exploration programs. The pending start-up of mining-milling operations at the Pine Cove gold deposit on the Baie Verte Peninsula is significant in that it will be the province's second gold mine in addition to Hope Brook. Underground exploration programs planned for the Nugget Pond gold deposit on the Baie Verte Peninsula and the Hammerdown gold deposit on the Springdale Peninsula, renewed gold exploration on the Avalon Peninsula, and continued diamond exploration in northern Labrador are also considered positive events.

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

The province, through initiatives identified in its Strategic Economic Plan, will continue to cost share advanced exploration activities with Newfoundland-based junior mining companies to a maximum of \$80 000 per approved project. Individual companies may be eligible for assistance on more than one project to a maximum of \$160 000. A total of \$500 000 has been allocated for the current fiscal year.

The 1993/94 provincial budget announced changes to its mining tax regime to encourage investment. Provincial corporate taxes will now be creditable against mining taxes for a mine's first 10 operating years. The depreciation schedule will now allow accelerated write-offs. Meanwhile, the processing allowance will be changed from 8 percent of the processing base up to a maximum of 65 percent of net income, to 8 percent of the processing asset base or 15 percent of taxable income, whichever is greater, to a maximum of 65 percent of net income. The general corporate income tax rates have also been reduced from 16 to 14 percent. The enabling legislation for these tax changes will be enacted in 1994.

NEWFOUNDLAND AND LABRADOR EXPLORATION STATISTICS

	1988	1989	1990	1991	1992	1993p	1994f
(dollars)							
Annual Exploration Expenditures	41 155 481	36 252 686	23 275 000	12 000 000	11 141 000	8 700 000	12 491 000
Claim Staking							
Claims Staked	26 606	17 571	10 421	7 411	5 118	6 955	5 000
In Good Standing	69 677	65 223	45 427	33 297	24 002	22 910	20 000
Exploration Field Expenditures							
BM-PM	17 559 585	10 970 673	10 339 710	7 385 312	5 875 962	4 034 910	N/A
Gold	18 698 498	14 895 933	7 344 583	1 701 298	1 329 545	1 708 576	N/A
Other	457 370	1 364 328	1 520 051	550 502	1 192 898	1 696 325	N/A
(metres)							
Diamond Drilling							
Production/Development	17 449	16 355	8 884	6 850	819	16 982	N/A
Exploration	<u>217 382</u>	<u>106 497</u>	<u>84 462</u>	<u>37 077</u>	<u>21 054</u>	<u>29 528</u>	<u>N/A</u>
Total	234 831	122 852	93 346	43 927	21 873	46 510	45 000

BM: Base Metals PM: Precious Metals p: Preliminary f: Forecast N/A: Not Available

4.3 Nova Scotia

The level of mineral exploration in Nova Scotia during 1993 continued to be very low in comparison to recent years with expenditures for 1993 estimated at \$1.5 million compared with \$4.5 million in 1991 and \$3.3 million in 1992. Expenditures for 1994 are forecast to be up slightly at approximately \$2.0 million.

A total of 10 196 new and reissued claims were staked during 1993, compared with 18 777 in 1991 and 11 965 in 1992. Preliminary figures for new and reissued claims stand at 7680 for the first half of 1994, a significant increase compared with the 4793 claims for the first half of 1993.

The amount of diamond drilling was down significantly in 1993 with the completion of 6385 metres compared with a total of 11 506 metres in 1991 and 12 710 metres in 1992. A slight increase is expected in the amount of diamond drilling for 1994.

Exploration for lead and zinc continued to dominate mineral exploration in Nova Scotia during 1994 and has helped to sustain a moderate level of activity in the Province over the past 3-4 years following the rapid decline in gold exploration that began in 1989. Gold exploration demonstrated a moderate renewal in activity in 1993 with emphasis on the North Brookfield area in Queens County and the Port Dufferin area in Halifax County. Current exploration in Nova Scotia is in general shared equally between the senior and junior mining sectors as well as private concerns and increased activity by prospectors.

Direct financial support for the mineral industry continues to be available through the Canada-Nova Scotia Cooperation Agreement on Mineral Development (CAMD).

The Mineral Investment Stimulation Program (MISP) is a federally funded program to provide assistance to companies and individuals. The current 1992-95 program will contribute up to 50 percent of the costs for qualifying projects to a maximum of \$50 000, with a total of \$600 000 available under the current agreement.

The Nova Scotia Prospectors Assistance Program (NSPAP) is a new federally funded program administered by the Nova Scotia Department of Natural Resources under the CAMD to provide direct financial assistance to qualified prospectors and explorationists. The 1993-96 program provides cash grants up to \$5000 for qualified projects with a total of \$567 000 available through the current agreement.

NOVA SCOTIA MINERAL EXPLORATION STATISTICS 1989-94

	1989	1990	1991	1992	1993	1994
Exploration expenditures (\$) (field+overhead, general+minesite)	21,436,000	11,025,000	4,532,000	3,258,000	¹ 1,500,000	² 2,000,000
Claim staking (new and reissued, excluding closures and uranium licenses)	25,623	21,190	18,777	11,965	10,196	7,680 (June 30)
Exploration diamond drilling (metres)	20,948	15,246	11,504	12,710	6,385	³ 7,000

¹ Preliminary

² Forecast

4.4 New Brunswick

Preliminary exploration expenditure surveys carried out by the New Brunswick Department of Natural Resources and Energy in cooperation with Natural Resources Canada point out that New Brunswick has experienced an increase in exploration in 1993. Results received from a survey conducted in March of 1994 indicate that approximately \$17.1 million was spent in New Brunswick on exploration activity, representing an increase of 40 percent over 1992 figures.

New Brunswick Mineral Exploration Statistics

	1992	1993	1994 Forecast
Exploration Expenditures (general & minesite) millions ¹	\$ 12.0	\$ 17.1 ²	\$ 17.0
Claims Recorded	3,444	2,351	
Claim Equivalent in Effect	28,555	22,500	

¹ Current Dollars

² Preliminary Results

As in the past few years, exploration activities were concentrated in and around the Bathurst camp of northern New Brunswick and in the Annidale-Shannon-Mount Pleasant areas of southern New Brunswick. Most of the exploration work was in search of base metals, with the majority of work being carried out on known deposits such as Half Mile Lake, Key Anacon, Murray Brook Resources, and around Brunswick Mining and Smelting Corporation's No 6 and 12 deposits.

Exploration in the southern portion of New Brunswick was mainly for gold, although base metals, tin, and platinum-palladium did garner some attention as well.

New Brunswick's incentive program, the Mineral Exploration Stimulation Program (MESP), which provides financial assistance to mineral exploration companies and prospectors, approved 26 grants totalling \$19 000 in 1993.

Although exploration expenditure indicators are positive over those of 1992, the same cannot be said for mineral lands statistics. The number of claims recorded and claim equivalents in effect in 1993 were down from the previous year, approximately, 32 percent and 21 percent respectively.

4.5 Quebec

Exploration Expenditures in Quebec

Preliminary data indicate that exploration expenditures in 1993 reached \$125.1 million in Quebec, an increase of 23 percent compared with 1992 (\$101.5 million). Junior spending also increased to \$28 million in 1993 from \$23 million in 1992. Off-property exploration expenditures increased 20 percent with \$100 million in 1993 compared with \$84 million in 1992, while on-property exploration expenses increased 39 percent to \$25 million in 1993 from \$18 million in 1992.

This resurgence is due to the increase in the price of gold since the beginning of 1993, the infatuation with diamond exploration, the impact of the more favourable tax measures announced in 1992 and the growing interest of investors in resource equities.

According to the survey carried out in the fall of 1993 on the spending intentions of mining companies, exploration activity should pick up in 1994. Total exploration spending in Quebec should amount to \$133 million, \$114.4 million in off-property and \$18.5 million in on-property exploration.

Flow-Through Share Financing and Exploration Expenditures in Quebec

	1990	1991	1992	1993 ¹	1994
(\$ Millions)					
Value of Flow-through Share Issues	44.4	9.4	13.6	27.2	N/A ²
Exploration Expenditures	206.3	144.4	101.5	125.1	133.0 ³
Off-property	167.5	124.2	83.6	100.3	114.4 ³
On-property	38.8	20.2	17.9	24.8	18.5 ³

Source: Service de la statistique et de l'économie minérale du ministère des Ressources naturelles du Québec.

1. Preliminary data

2. N/A: Not Available

3. Estimates derived from the survey carried out in the fall of 1993

Flow-Through Share Financing

Preliminary data indicate that the level of flow-through share financing has continued to increase in 1993, reaching \$27.2 million, about double the amount raised in 1992. It is the second consecutive yearly increase, following the disappointing results of 1991, a year during which subscriptions were at their lowest level (in constant dollars) since implementation of the regime in 1980.

These statistics provide a strong indication of a revival in flow-through share financing in Quebec. In 1993, for the first time in several years, available flow-through share issues were insufficient to meet investor demand. Furthermore, since 1992, there has been a noticeable increase in the total amount of financing, in the number of issues, and in the average amount of funds raised.

It is expected that mining companies will continue to benefit from the improving trend in financing and, in particular, in flow-through share financing in 1994. First, stronger economic growth should support equity markets and facilitate access to outside funding. Secondly, the increased availability of funds should enlarge the scope of potential flow-through share investors as they progressively recognize the benefits of the tax deductions that are associated with flow-through shares. On May 12, 1994, the Quebec Minister of Finance announced the extension of the existing flow-through share tax incentives to the 1996 tax year.

Other Statistics on Exploration

The number of metres drilled by diamond drilling companies and the number of claims recorded are two other useful indicators of exploration activity. These two indicators increased in 1993 and in the first quarter of 1994, thus indicating a recovery of exploration in Quebec.

In 1993, diamond drilling reached 741 045 metres compared with 675 941 metres in 1992, an increase of 9.6 percent according to preliminary data. For the first three months of 1994, the number of metres drilled was 346 352, an increase of 55.8 percent over the corresponding period in 1993.

There were 25 887 recorded claims in 1993 compared with 13 253 in the previous year, an increase of 95 percent. At the end of the first three months of 1994, 3869 claims were recorded, an increase of 14 percent compared with the corresponding period in 1993.

Tax Measures For Flow-Through Share Financing

Since 1992, the Quebec government has greatly improved the benefits associated with flow-through share financing. In the May 14, 1992 budget, two new tax measures were announced:

- a) the additional deduction of 33 1/3 percent for exploration expenses incurred in Quebec was reduced to 25 percent and the supplementary deduction of 33 1/3 percent for surface exploration expenses was raised to 50 percent to better target tax concessions to higher-risk exploration expenses. Hence, the total deduction for surface mining exploration expenses is now 175 percent instead of 166 2/3 percent; and
- b) the creation of a special account comprising three quarters of the "Canadian Exploration Expense" (CEE) or three quarters of the "Canadian Development Expense" (CDE) incurred in Quebec giving entitlement to the additional or supplementary deduction allowed investors to reduce their deemed capital gains up to the balance of the account. Thus, a portion of the proceeds of the resale, the amount between zero and the purchase price, is tax exempt.

In the May 20, 1993 budget speech, the Quebec Minister of Finance announced the extension for two more years (1994 and 1995) of the existing flow-through share tax incentives. On May 12, 1994, the Quebec Minister of Finance announced that these tax measures would be in force for one more year, i.e., until 1996. The tax benefits apply to exploration expenses incurred in Quebec before January 1, 1997, subject to the 60-day period provided in tax legislation.

In spite of the elimination of the cumulative \$100 000 capital gains exemption in order to harmonize the Quebec and federal taxation systems, the special exploration expense account will continue to apply.

The impact of these tax benefits is important for investors. With respect to surface exploration costs incurred in Quebec, an investor who buys flow-through shares will benefit from tax deductions of 175 percent of the initial cost at the provincial level and 100 percent at the federal level. The following table provides a few examples of tax saving for various taxable income levels. The table shows that the two levels of government assume up to 73 percent of the cost of exploration expenditures financed with flow-through shares incurred in Quebec, 46 percent by Quebec and 27 percent by the federal government. The net after-tax cost of a \$1000 investment is \$273 at the highest tax rate.

Other Support Measures For Mineral Exploration

Other recent measures have been proposed to stimulate mineral exploration in Quebec. One of them is the "Programme de soutien à l'exploration minière" administered by SOQUEM. This program has been extended for two more years (1994-1995 and 1995-1996) with an annual budget of \$2 million. SOQUEM has invested more than \$10 million in this program over the last three years.

In the May 12, 1994 budget, the Quebec Minister of Finance also announced implementation of the "Programme d'exploration minière du Moyen-Nord." The ministère des Ressources naturelles du Québec (MRN) will set up this program, which aims to stimulate mineral exploration in regions located south of James Bay, and north of Matagami and Chibougamau, etc. This program will emphasize geoscientific research activities (identification of future exploration sites) and will reimburse a portion of the exploration expenditures incurred by companies. The funds under the program will amount to \$1 million in 1994-1995, \$3 million in 1995-1996, \$5 million in 1996-1997 and \$6 million annually thereafter.

Impact of Tax Benefits¹ on a \$1000 Flow-Through Share Investment for Surface² Exploration in Quebec³

Taxable Income	Combined Marginal Tax Rate	Provincial Tax Savings (A)	Federal Tax Savings (B)	Total Savings (A+B)	Net Investment Cost [1,000-(A+B)]	After-Tax Break-even Point ⁴
\$40 000	46.2%	\$414	\$225	\$639	\$361	\$434
\$50 000	48.9%	\$462	\$225	\$687	\$313	\$377
\$60 000 and +	52.9%	\$462	\$265	\$727	\$273	\$340

1. Flow-through shares for surface exploration generate a deduction of 175% at the provincial level and 100% at the federal level.
2. New issues often comprise flow-through shares and common shares sold as units. In such cases, the tax deduction will be proportionate to the number of flow-through shares included in each unit.
3. The table reflects income tax provisions applicable in calendar year 1994 for a taxpayer who is an individual residing in Quebec and who is not liable for the alternative minimum tax. The provincial tax rates take into account the changes announced in the May 1994 budget. As well, the federal tax rates include surtaxes, if applicable. Issue expenses are not taken into account.
4. The break-even point takes into account current income tax provisions relating to capital gains and the reduction available in Quebec by means of the special account that shelters the deemed capital gain from taxation.

Source: Service de la statistique et de l'économie minérale du ministère des Ressources naturelles du Québec.

4.6 Ontario

Mineral Exploration Expenditures and Flow-Through Share Funding Regional Outlook

Mineral exploration and development expenditures in Ontario are forecast to be \$316 million in 1994. These expenditures represent a 26 percent increase over 1993 (preliminary) figures of \$251 million and a 1 percent increase over 1992 expenditures of \$314 million. Mineral exploration and development expenditures in the province peaked in 1988 at \$756 million.

Off- and on-property (general and mine-site) exploration expenditures are forecast to be \$99 million in 1994, up from \$78 million in 1993 (preliminary) and \$77 million in 1992. Mine-site development expenditures are anticipated to be \$217 million in 1994 compared to \$173 million in 1993 (preliminary) and \$236 million in 1992. These data include both field and overhead expenditures.

The number of active claims/claim units in Ontario at the end of December 1993 was 140 162 - up 4 percent from the 134 592 claims in December 1992. 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 peaked in 1988 at over 171 000.

Total exploration expenditures forecast by senior mining companies in 1994 were up 23 percent from 1993 (preliminary). Seniors were responsible for approximately 80 percent of the forecast off- and on-property total exploration expenditures of \$99.2 million in 1994, compared to 83 percent in 1993 (preliminary) and 81 percent in 1992. Junior companies made up 20 percent of forecast total exploration expenditures in 1994, up from 17 percent in 1993 (preliminary) and 19 percent in 1992.

Exploration activity continues to be highest in northeastern Ontario. In 1992, 73 percent of exploration and development expenditures were made in northeastern Ontario, down from 75 percent in 1991. Of the 21 advanced exploration and development projects active in the province in 1993, 13 were located in the northeast. The five development stage projects (production decisions announced) in the province in 1993 were located in the northeast.

In 1992, 51 percent of general and mine-site exploration dollars were spent on base metals exploration and 43 percent was spent on precious metals exploration, primarily gold. This is in contrast to 1991 when 42 percent was spent on base metals and 57 percent for precious metals.

In 1992, 47 percent of mine-site development expenditures were on precious metals projects and 41 percent on base-metal projects. This compares to 40 percent and 54 percent, respectively, in 1991.

In 1993, ten of the sixteen advanced exploration projects in Ontario were gold projects. Three of five mines in the development stage were nickel-copper mines located in the Sudbury area. Two gold mines in the Timmins area were also in the development stage in 1993: Placer Dome's Super Pit and Paymaster Mine projects.

Mineral Exploration Incentive Programs

Ontario's incentive programs, the Ontario Mineral Incentive Program (OMIP) and the Ontario Prospectors Assistance Program (OPAP), provide financial assistance to qualified individuals and companies involved in mineral exploration and development in Ontario. Eligible advanced exploration and industrial mineral programs in Northern Ontario are supported through the Northern Ontario Heritage Fund Corporation's (NOHFC) Resource Diversification and Development Program. For 1994, NOHFC will also support eligible surface definition drilling programs through their Special Projects Program.

In 1993, after three years of enhanced funding, the allocated budget for OMIP and OPAP returned to the original base level of \$5 million. The incentives budget in 1994 will be split \$2 million for OPAP and \$3 million for OMIP.

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

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

A total of 240 individuals received OPAP grants during the 1993-94 fiscal year. In 1993, \$1.9 million was disbursed under the OMIP program to 23 projects.

For 1994, 215 individuals have been approved for OPAP assistance and 56 projects have been approved for OMIP assistance.

To offset the reduced OMIP funding, the Northern Ontario Heritage Fund Corporation (NOHFC) has expanded its program guidelines to provide financial assistance to more advanced mineral exploration projects in Northern Ontario. Advanced exploration programs in Northern Ontario may receive a one time grant of up to \$300 000 per project or 30 percent of eligible costs. Investment, pilot plant, marketing and industrial mineral sampling programs in Northern Ontario are eligible to be considered for a non-repayable contribution up to 75 percent of the approved cost of the project to a maximum of \$75 000. Definition drilling is being supported on a one-year trial

basis through NOHFC. One-time loans, repayable if the deposit is put into production, for 30 percent of the approved costs of surface definition drilling, to a maximum of \$300 000 will be considered.

In 1993, eight advanced exploration projects were approved for NOHFC assistance with a potential grant payout of \$2.1 million.

Tax Treatment of Flow-Through Shares

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

It is too early to determine if changes in Ontario's capital tax regime encouraged junior mines based in Ontario or holding prospects here to make greater use of flow-through share financing.

4.7 Manitoba

Mineral exploration expenditures for 1993 are estimated at \$33 million compared to \$32 million in 1992. The increase in exploration activity in the province resulted from the Mineral Exploration Incentive Program introduced by the Government. Surface diamond drilling in 1993 is estimated at 120 724 metres compared to 131 000 metres in 1992. The total area of claims recorded in Manitoba during 1993 was 486 148 hectares compared to 140 379 hectares in 1992. The total area of mineral dispositions in good standing at the end of 1993, including claims, permits and leases, was 3 032 548 hectares compared to 2 694 952 hectares at the end of 1992.

In the early part of 1994, there has been a tremendous increase in land acquisition for diamond claims in the southeastern part of Manitoba and also in the northern Precambrian Shield. Over 6000 applications for mining claims were processed in the first half of 1994 covering an area of approximately 1.5 million hectares. It is anticipated that the level of exploration in 1994 will increase over 1993.

New interest for gold in Manitoba was triggered by higher gold prices in 1993. Exploration for the yellow metal took place in the Flin Flon-Snow Lake, Lynn Lake and Rice Lake belts and a new gold mine was opened near Lynn Lake. Two former gold producers at Snow Lake and Bissett are currently being considered for possible re-opening. Base metals, however, continued to dominate the exploration scene: copper-zinc in the Flin Flon-Snow Lake greenstone belt and, to a lesser degree, in the Lynn Lake region, and nickel along the Thompson belt and its southern extension under Paleozoic cover.

Mineral Exploration Incentive Program

Through this program, junior exploration corporations are encouraged to perform new exploration activities in Manitoba. Eligible investors are offered a 25 percent grant. Financing is arranged via a partnership of flow-through shares in either a private or publicly traded corporation by private sector corporations registered as Manitoba Exploration Investment Corporations.

Grant funding of \$12.5 million (\$10 million for minerals and \$2.5 million for oil) has been allocated to the program.

Twenty-one mineral and four oil and gas exploration projects have been approved to date, for a total of \$14 077 607 of exploration expenditures. \$1 467 776 of exploration has been completed and \$279 675 of incentives has been paid to Manitoba Exploration Investment Corporations.

Mining Tax Holiday for New Mines

Since January 1, 1993, qualifying mining operators are not required to pay the mining tax until their profit for mining tax purposes equals their capital outlay in the opening of a new mine. At the end of the tax holiday, operators will inherit the undepreciated balance of book assets.

Exploration Expenditures Deduction (150 Percent)

Since January 1, 1992, mining companies significantly increasing their exploration activities in search of new mines in Manitoba are entitled to a new deduction. It is equal to 150 percent of exploration expenditure in a given year that exceeds the average of those expenditures in the previous three years.

Prospectors Assistance Program

The Prospectors Assistance Program, which was initiated in August 1992, reimburses 50% of prospecting expenditures of qualifying self-employed prospectors to a maximum annual grant of \$7500. To March 31, 1994, 56 projects have been approved for a total of \$600 000 of expenditures. \$352 000 of prospecting has been completed and \$175 816 of grants have been paid to prospectors.

Sustainable Development Mineral Strategy

Issues related to land access, environmental permitting, security of tenure, and the need to increase mineral exploration to sustain the mining industry in Manitoba and Canada rank at the top of the mining industry's concerns. A policy applications document has been published outlining how the approval policies will be utilized.

Land Use Policy

A new land use policy has recently been approved by the Government of Manitoba. It encourages investment in the mining industry by increasing security of tenure, and promotes sustainable development by requiring environmentally sound exploration and development, in addition to rehabilitation once the resource is depleted.

4.8 Saskatchewan

The annual survey of mineral exploration expenditures carried out by provincial resident geologists estimates that \$36 million will be spent in 1994 compared to \$24 million in 1993. These figures exclude test mining activities for gold and uranium which together contribute an additional \$54 million and \$63 million in these years. The marked downtrend in exploration activity beginning in 1988 has been reversed as a result of the explosion of interest in diamonds; the traditional areas of uranium, gold and base-metal exploration have remained stagnant (See table).

The total number of dispositions in good standing at the end of 1993 was 6542 (4.4 million hectares) compared with 3164 (2.3 million hectares) in 1992. In 1993, 3692 dispositions were recorded covering 2 257 219 hectares representing an increase of 105 percent over the previous fiscal year.

Saskatchewan remains the focus of uranium production and exploration in Canada, although there were no significant discoveries in 1993 by the ten companies still active in grassroots exploration. Six major projects are at various stages of development.

Following the report on the Midwest, Dominique-Janine and McClean Lake projects by the Joint Federal-Provincial Panel on Uranium Mining Developments, the province and the federal government approved development at Cluff Lake (Dominique-Janine) and at McClean Lake (but without the panel's proposed five-year delay) and accepted the panel's recommendations that the Midwest project not go ahead in its present form. The panel has yet to rule on Cigar Lake, which is on care and maintenance now that the test mining stage is completed. An EIS is in preparation. At McArthur River, the underground exploration stage to establish minable reserves and mining feasibility is proceeding. Approval of the Eagle Point mine was recommended by a Federal Environmental Assessment Panel in November 1993 (it had previously been approved by the provincial government in 1988). The approval was confirmed by the Minister in early 1994, although a decision on related development of the Collins Bay A and D zones was postponed pending further environmental studies. At Eagle Point, underground drilling, test stoping and ore processing were undertaken in 1993. The mine will provide ore for the Rabbit Lake mill when processing of the Collins Bay B zone stockpile is completed in 1994.

Saskatchewan mines at Key Lake, Rabbit Lake and Cluff Lake produced 8.5 million kg U₃O₈ in 1993, a slight increase over 1992. Only Key Lake operated at capacity; Rabbit Lake and Cluff Lake are working at half capacity. Sales amounted to 7.5 million kg U₃O₈ valued at \$375 million.

Only a half-dozen companies were active in gold exploration, compared with more than 60 in 1988, and grassroots exploration declined to a 10-year low. Work continued in the La Ronge Gold Belt where two test mines are under development.

Claude Resources continued to successfully operate Saskatchewan's only gold producer, the Seabee Mine, and improved gold reserves to around 18 months' supply at year-end. The output for 1993 was approximately 57 000 ounces. At Contact Lake a joint venture of Cameco and Uranerz Exploration and Mining Ltd. carried out a test mining project to verify the continuity and ore grade in the Bakos Zone. A production decision followed in 1994 with start up of a 750 t/d mill planned for early 1995. Waddy Lake Resources also embarked on underground test mining of the Komis Zone with a view to commercial production in 1994. Results of this initiative have yet to be announced.

Exploration for base metals remained at a low level. However, the area of most activity moved from the sub-Phanerozoic west of Flin Flon to the Wollaston Domain, where Noranda Exploration initiated a new effort to discover sediment-hosted copper and lead-zinc deposits.

Diamond exploration was the only sector to see increasing activity in 1993. At year-end, some 2.5 million hectares, four times the 1992 figure, were under disposition, predominantly between latitudes 53° and 56° in the Fort à la Corne-Pasquia Hills-Molonosa Arch and Sturgeon, Smoothstone and Wapawekka Lakes areas. Exploration activity consisted mainly of ground detailing of magnetic "bull's-eye" anomalies identified by government and industry airborne surveys and drilling.

Drill sampling continued on the established Fort à la Corne property of Cameco, Uranerz and Monopros, which has yielded macrodiamonds up to 1 carat in size. Seventy kimberlite targets from 1 hectare to 74 hectares in size have been identified on this property since exploration began in 1988, and 25 kimberlites have been drill proven. The bodies occur beneath more than 100 metres of glacial overburden. Rhonda Mining and some 14 partners are the largest landholders in the diamond play, with more than 1 million hectares under disposition. In the Fort à la Corne area, the Rhonda-Aaron Oil joint venture reported, in November 1993, recovery of yellow diamonds from volcanic kimberlite targets drilled in the Snowden and Foxford areas. Consolidated Pine Channel Gold ran joint-venture exploration programs, principally in the area of the Molonosa Arch (having acquired ground identified in Saskatchewan Energy and Mines Open File Report 92-2 as having good potential); the report by M.R. Gent followed from work funded under the current federal-provincial Mineral

Development Agreement). In the area of Candle Lake, 75 km northwest of Prince Albert, War Eagle Mining and joint-venture partner Great Western Gold recently reported drilling three distinct kimberlite pipes on their Candle Lake project. They have reported recovery of diamonds in the 0.3 to 0.6 mm range. Diamond exploration efforts are also being made in south-central Saskatchewan, where kimberlitic indicator minerals are widespread, and in southwest Saskatchewan.

The 1993 diamond exploration play will certainly result in more exploration work than was done on land staked after the original Sturgeon Lake kimberlite find in 1988, and may identify new kimberlites of sufficient grade to support commercial production.

EXPLORATION EXPENDITURES - RESIDENT GEOLOGIST'S SURVEY

(\$ Millions)

	1987	1988	1989	1990	1991	1992	1993	1994e
Precious metals	29	42	20	11	5	6	2	3
Base metals	3	6	7	7	6	4	4	3
Uranium	18	20	21	12	10	8	7	11
Other	--	--	2	2	3	4	11	19
Total	50	68	50	32	24	22	24	36

e: estimate

Other: industrial mineral activity; predominantly diamond exploration

4.9 Alberta

In March of 1993, Alberta's new Metallic and Industrial Minerals Regulation came into effect, establishing an improved and easier system of acquiring the rights to explore for minerals on Crown land. The combination of the new regulation and the interest in diamond exploration across Canada pushed the number of exploration permits to record levels. By the end of May 1994, there were 3952 permits on 34 million hectares, compared to 1392 permits on 11.5 million hectares in March of 1993, and only 212 permits on 1.1 million hectares before the regulation was changed. The work commitment for these permits is \$170 million over the first two years.

Exploration activity has picked up in the province due to the increased interest in metallic minerals and diamonds. Expenditures in 1993 were \$6.8 million, a 25 percent increase over the \$5.4 million spent in 1992. A further 25 percent increase is anticipated for 1994 expenditures.

Diamond exploration has been largely at a reconnaissance level in the province, with airborne geophysical and sediment sampling being the primary surveys conducted. Significant exploration work has been done in the Milk River area of southern Alberta, in the foothills of west-central Alberta, and the area west of Edmonton. Assessment reports have not yet been submitted, but there have been some reports of diamond-indicator minerals having been found.

The Fort McKay area of northeastern Alberta was the focus of a permitting rush in late 1993. Focal Resources of Calgary and Tintina Mines of Toronto separately reported significant assay values for gold, silver and platinum group metals.

Coal exploration was relatively steady with drill holes down slightly from 1992 but an increase in drilled footage. In 1993, 678 holes were drilled with an accumulated depth of 88 000 metres, compared to 702 holes and 68 700 metres in 1992.

Flow-through share issues in 1993 on the Alberta Stock Exchange totalled \$57.1 million which is a 308 percent increase over the \$14 million issued in 1992. To the end of May 1994, year-to-date flow-through share issues were \$30.2 million compared to \$5.9 million in 1993 for the same period. This substantive increase is attributable to strong equity markets and to the federal changes to the Income Tax Act in December 1992 that facilitate greater use of flow-through shares. Flow-through share funding in Alberta has primarily been used for oil and gas exploration; however, it is likely that increasing amounts will be directed to mineral exploration.

4.10 British Columbia

Review of Exploration in B.C.

Exploration activity in British Columbia in 1993 was slightly lower overall, with programs being focussed in areas of the province with known mineral resources and good potential for development. Several relatively low-budget, new regional programs were also conducted throughout the province.

Preliminary estimates from federal/provincial surveys indicate a total of \$68 million was spent on exploration programs in 1993, compared with \$72 million in 1992. Mineral claim staking activity was down from 1992 levels, with 24 816 mineral units recorded versus 31 160 in 1992. Several restaked claims covered old properties with sufficient work completed on them to indicate good future potential.

Project Highlights in 1993

Exploration activity in 1993 was focussed on areas of the province with known resources. Several advanced projects with good potential for development received further work. Homestake Resources conducted a \$1 million property-wide and regional explorational program in 1993, testing numerous zones of mineralization and refining stratigraphy at the Eskay Creek project, which received a Mine Development Certificate in April 1994. Lac Minerals' \$10 million exploration program led to the discovery of two new zones (JW and 141) at its Red Mountain property in the Stewart mining camp. These zones have added to the geological resource and a new gold resource estimate is expected by the end of 1994 in support of a feasibility study.

Redfern Resources spent close to \$3 million on its Tulsequah Chief and Big Bull projects in 1993. At the former, an underground program confirmed tonnage estimates and increased overall grades by between 5 and 10 percent. Further definition of mineable reserves at Big Bull could add significantly to the viability of the Tulsequah Chief deposits. A \$1 million program on the Sulphurets (Bruceside) property confirmed details of the ore-bearing structures and provided additional information on the existing zones which are open along strike and down dip. An estimate of the total mineral inventory for all mineral zones has been completed and a large follow-up program is being conducted in 1994. The project received a Mine Development Certificate in April 1993.

In January 1993, New Canamin Resources Ltd. filed a pre-application prospectus for its Huckleberry copper-molybdenum project. Exploration in 1993 led to the discovery of additional mineralization in the East Zone and a revised prospectus is expected to be filed in 1994.

Several relatively low-budget, new regional programs were also conducted throughout the province. They included sedex deposits in both southeastern and northeastern B.C., exploration for diamonds in the Rocky Mountains, programs on gold deposits in the Interior Plateau of south-central B.C., porphyry deposits in the Babine Lake area, and epithermal precious metal veins and transitional deposits in the area surrounding Stewart in the northwest.

Additional exploration activity proceeded at several locations at or near existing mine sites. Underground drilling on the Twin vein at the Snip mine continued in 1993, with work proceeding to replenish ore reserves and advance inferred resources into proven and probable reserves. Delineation drilling on the Battle/Gap area at Westmin Resources' Myra Falls mine also continued during the year, despite a labour dispute which has severely reduced mining operations from April 1993. The mine is expected to begin normal operations in September 1994 pending results of an arbitration decision.

Wheaton River Minerals' program of trenching and limited follow-up drilling at the Golden Bear mine located two "new" zones: Kodiak, located along strike north of the mine site and Grizzly, located below the Bear Main zone. Follow-up work has identified a five-year heap leaching operation for the deposits. A revised production plan was announced in June 1994 which would allow present production rates to continue for up to five more years.

Exploration on several coal properties and projects also proceeded during the year. Fording Coal carried out a large exploration program including some deep drilling on an area adjoining its newly acquired Greenhills mine. Fording has also developed a new mining plan for the Greenhills mine based on larger-scale equipment and the merging of smaller pits into large ones. Extensive exploration was conducted in 1993 at Line Creek Resources' coal mine to prove up new reserves. At the Telkwa coal property, Manalta Coal conducted a \$700 000 exploration program, following up on 1992 results with drilling and geophysical surveys. An application to the Mine Development Assessment Process for the project has been re-activated for review.

Outlook for 1994

All in all, 1994 activity levels are expected to be up significantly from 1993 levels. Federal/provincial survey results, compiled in April 1994, forecast an increase in overall exploration expenditures of 15 percent to \$78 million in 1994. However, there are indications more recently that exploration activity may increase even further. A recent sharp rise in copper prices has combined with a more favourable dollar exchange rate to improve market conditions for B.C.'s mineral producers. Northwest B.C. is expected to receive nearly half of the total exploration dollars targeted for B.C. in 1994. An estimated \$20 million is slated to be spent on the Red Mountain gold/silver property alone in 1994 by the operator, LAC Minerals. Major expenditures are also planned on pre-production work and to develop mine facilities at Eskay Creek.

Preliminary exploration drilling success at the Similco mine contributed to a decision to re-open the mine in August. Similco had shut down operations in late 1993.

Gibraltar Mines Ltd. announced in July it planned to restart operations at its McLeese Lake copper mine in October, based on improved market conditions and the deferral of some costs through an agreement with the Job Protection Commission. Gibraltar Mines has also entered into an option agreement to acquire the Mount Polley copper-gold project and is examining the viability of processing its ore at the Gibraltar facilities.

Teck's Afton copper mine also is slated to be in full production by the end of September as a result of improved prices. The mine had been shut down since late August 1991 awaiting better market conditions.

In addition to improved market conditions for mining, new initiatives were announced by the Government of B.C. this past March which provide additional incentives to individuals and companies at both the grassroots and advanced exploration levels. These initiatives include a B.C. Prospector's Assistance program which runs from 1994 through 1997; it is designed to promote grassroots exploration for new mineral deposits in B.C. by assisting qualified prospectors with up to \$10 000 to explore for new mineral deposits on or off existing mineral claims. Prospectors are given 50 percent of their approved funding up-front with the remainder paid after the work has been carried out and the results have been submitted. The Province also announced a new \$13.5 million "Explore B.C." mineral exploration incentive program. This program encourages exploration and mining companies to explore on mineral properties or at developed mine sites with identified economic potential. The program contributes one third of total costs up to \$150 000 per property.

4.11 Northwest Territories

1993 Production Summary

The Northwest Territories (NWT) produced:

Percentage of Canada's Total Production	Metal
14.6	Zinc
8.5	Gold
15.4	Lead
1.2	Silver

The total value of the NWT's metal shipments continued to decline from a high of \$935 million in 1989 to, according to preliminary figures, \$389 million in 1993. This amount represents 4.6 percent of the total value of Canada's mineral production. While 1993 production at the NWT's four gold mines and two zinc mines remained near 1992 levels, the plunge in the price of base metals could not be offset despite cost-saving measures and increased production levels. The total yearly value of gold produced in the NWT surpassed that of zinc for the first time since 1965.

Echo Bay Mines Limited's Lupin mine completed a 15 percent mill expansion in April and proceeded to break all previous records during 1993, producing 6.99 tonnes (t) of gold. Proven and probable reserves at year-end were 28.9 t of gold.

Miramar Mining Corporation bought the Con mine from NERCO Minerals Company during 1993. The mine poured its five millionth troy ounce of gold in December. The operation produced 3.84 t of gold in 1993. Proven and probable reserves at year-end for the 56-year-old Con mine were 37.1 t of gold.

The 18-month-long labour dispute at Royal Oak Mines Inc.'s Giant mine was resolved. Annual production for the Giant operation declined 3 percent to 2.89 t of gold. Movable year-end ore reserves for the 46-year-old Giant mine were 26.1 t of gold.

Tremingo Resources Limited's Ptarmigan mine continued to operate at reduced levels, producing 235 kg of gold by mid-year 1993, compared to 476 kg by mid-year 1992. While diamond drilling has identified further reserves, development of access from existing workings would be required.

The two zinc mines operating in Canada's High Arctic are among the lowest-cost producers in the world. Both operations were able to further decrease their operating costs during 1993. Cominco Limited's Polaris mine produced 121.5 kt of zinc and 32.2 kt of lead, down from 1992. The Polaris mine was profitable for the year despite depressed base-metal prices. Year-end reserves were 1,152 kt zinc and 318 kt lead. Conwest Exploration Company Limited's Nanisivik mine produced 53.2 kt zinc, 300 t lead and 16.8 t silver, up slightly from 1992. The Nanisivik operation withheld about 40 percent of its 1993 zinc concentrate shipments in anticipation of better zinc prices during 1994. Year-end reserves for the 18-year-old mine were 197 kt zinc, 4.6 kt lead and 92.8 t silver.

Exploration Highlights

The diamond staking rush continued throughout 1993. The amount of area claimed in 1993 was almost double the 1992 total, or a fifteenfold increase over the 1991 total. About 248 000 km² or 7.2 percent of the total land area of the NWT consisted of mineral claims, mining leases and prospecting permits in good standing as of December 31, 1993.

The NWT moved from fourth place to second place in the provincial ranking of exploration expenditures from 1992 to 1993, according to NRCan-Statistics Canada figures. The preliminary 1993 exploration expenditure total for the NWT is \$94.6 million. While exploration for gold, base metals, uranium and other metals is presumed to have remained steady, exploration expenditures for diamonds increased sixfold from \$10 million in 1992 to more than \$60 million in 1993.

More than 60 kimberlite pipes have been found in the past two years in the central Slave Province of the mainland NWT. An area of contiguous claims measuring roughly 300 km by 400 km, held by more than 150 companies, is being aggressively explored.

The joint venture of BHP Minerals Canada Ltd. and junior partner Dia Met Minerals Ltd. is approaching the transition stage between exploration and development. They have drill-identified 26 kimberlite pipes, rotary drill-sampled 5 of these pipes and are bulk sampling 3 selected pipes. Four diamond-bearing kimberlite pipes of economic potential, called the Koala, Fox, Leslie and Panda pipes, occur in close proximity, with other pipes likely. Preliminary sampling of the Koala pipe, in particular, returned a grade of 1.25 carats/t consisting of 31 percent gems. A 62.11 carat package of diamonds from the Koala pipe was appraised at a mean value of \$US112/carat. These outstanding figures compare favourably with the gem diamond pipe mines in South Africa and Botswana. Elsewhere on BHP/Dia Met ground, the initial 1993 drillhole into Pipe 93/J returned four times as many diamonds than any other pipe at Lac de Gras.

Kennecott Canada Inc. and junior DHK Resources Ltd. are carrying out underground bulk sampling a two-lobed diamond-bearing kimberlite pipe called Tli Kwi Cho to the southeast of Lac de Gras. Preliminary results are encouraging.

The Colomac gold mine was purchased by Royal Oak Mines for \$10 million from Neptune Resources Corporation during 1993. The low-grade Colomac deposit was developed at a cost of \$200 million, produced 4.6 t of gold, and closed in 1991 due to high operating costs. Production is expected by mid-1994 with an annual rate of 5 t/y thereafter. Current reserves stand at more than 32 t of gold.

Significant stratiform mineralization was found during a 1992 drilling program at the Prairie Creek lead-zinc-silver deposit owned by San Andreas Resources Corporation. Reserves at year-end are 565 kt zinc, 502 kt lead and 780 t silver, with potential for additional reserves. A \$64 million mine site was developed to the point of production by a previous owner. San Andreas intends to perform a feasibility study on the Prairie Creek deposit during 1994.

Metall Mining Corporation was unable to make a decision to develop its Izok base-metal deposit, citing high infrastructure costs and poor zinc market fundamentals. Total mineable reserves for the Izok deposit are currently estimated at 16.5 million tonnes grading 11.4 percent zinc, 2.2 percent copper, 1.1 percent lead and 60 g/t silver. This includes mineable underground reserves for the Inukshuk Zone, estimated at 1.6 million tonnes grading 6.3 percent zinc and 2.3 percent copper. Izok's *in situ* metal inventory stands at 1881 kt zinc, 363 kt copper, 182 kt lead and 990 t silver. The project would require a 300-km-long road to a deep-sea port site on the Arctic coast near Coppermine. Ice-strengthened ships would be required to transport mineral concentrates to market.

Elsewhere, extensive diamond drilling was performed on the Boston gold deposit and the Damoti Lake gold-in-iron-formation deposit, owned by BHP Minerals Canada Ltd. and Athabaska Gold Resources Ltd., respectively.

Grants totalling \$85 000 were awarded to 16 NWT prospectors during the second year of the Prospectors Development Initiative of the Canada-NWT Economic Development Agreement.

4.12 Yukon

1993 Production Summary

For the first time in several decades, there were no hardrock mines operating in the Yukon during 1993. Gold production from placer mining operations was about 104 660 crude ounces, a 5 percent increase from 1992. Placer miners are moving away from the traditional Klondike creeks and moving into the Madson Creek area. There was also minor production of nephrite jade for southern and overseas markets. Preliminary estimates by Natural Resources Canada have put the total value of mineral production for 1993 at \$117 million, considerably lower than the \$468 million reported in 1992.

1993 Exploration Summary

Exploration was conducted on approximately 41 mineral properties in the Yukon in 1993. About 5000 new claims were staked, up slightly from 1992, and claims in good standing dropped slightly to about 40 000. According to information compiled by DIAND Exploration & Geological Division, total exploration expenditures in 1993 were about \$20 million, a significant increase from the \$10 million spent in 1992.

The Casino copper-gold-molybdenum porphyry deposit, owned by Pacific Sentinel Gold Corp., was Canada's largest single exploration program in 1993 with expenditures of about \$13 million. Pacific Sentinel drilled 50 000 metres of diamond drill core in 126 holes. Pacific Sentinel reports reserves of 558 million tonnes containing 1.43 billion kilograms of copper, 184,79 million grams of gold and 140 million kilograms of molybdenum from the leached cap, supergene, and hypogene zones. Included in this calculation is an expanded high-grade open-pit mineable core of 90 million tonnes grading 0.4% Cu, 0.05% Mo and 0.48 g/t Au.

Western Copper Holdings and Thermal Exploration continued their development of the Williams Creek oxide copper-gold deposit. Thirteen zones, eight of which have been drilled, have been found on the property. The Main zone is the largest, with open-pit mineable reserves of 11.34 million tonnes grading 1.15% Cu and 0.52 g/t Au. Eleven diamond drill holes totalling 3781 metres were completed during 1993.

Trenching and drilling on Loki Gold Corporation's Brewery Creek property has outlined a large, low-grade oxide gold deposit with reserves of 15.4 million tonnes grading 1.89 g/t Au. This reserve includes 10.8 million tonnes of heap leachable oxide material grading 1.99 g/t Au. The reserves are distributed in eleven zones over a strike length of more than 12 km. Approximately 8000 metres of percussion drilling in 151 holes was carried out in 1993.

Mitsui Kinzoku Resources of Canada Ltd. and Total Energold Corp. continued exploring the Clear Lake shale-hosted lead-zinc deposit. The deposit contains approximately 30 million tonnes of massive sulphides, including 5.53 million tonnes grading 11.34 % Zn, 1.99% Pb and 40.8 g/t Ag. The 1993 exploration program tested coincident gravity and magnetic anomalies peripheral to the known mineralized area. A total of 1456 metres of drilling was completed.

Minto Explorations Ltd. acquired the right to develop the Minto copper-gold deposit which contains a geological reserve of 8 million tonnes grading 1.75% Cu with significant gold and silver values. A mineable reserve of 5.5 million tonnes grading 2.21% Cu, 10.0 g/t silver and 0.65 g/t gold has been delineated. Work in 1993 consisted of an airborne radiometric survey, and diamond drilling (984 metres) for infilling and metallurgical studies.

Ivanhoe Goldfields evaluated several properties in the Dublin Gulch and Haggart Creek areas for their Fort Knox type bulk tonnage gold potential. In 1993, Ivanhoe completed 10 reverse circulation holes totalling 2078 metres, 250 metres of excavation trenching, 2.5 kilometres of Genie EM survey and a contour soil sampling program. Other work included geological mapping and baseline environmental work.

Cash Resources explored the Division Mountain Coal Deposit which contains drill indicated, surface and underground mineable reserves of 11.2 million tonnes. Proximate analyses and petrological and geochemical studies show that the Cairnes seam (the largest seam) has an ASTM rank of High Volatile Bituminous B and a calorific value of about 7500 Kcal/kg (13,500 Btu/lb). The 1993 program included detailed mapping around the main showing, hand trenching, and 16 diamond drill holes totalling 1826 metres.

Other diamond drilling projects completed in 1993 include Kennecott Canada Inc. on the Lone Star property (3100 m of percussion drilling), Yukon Revenue Mines on the Aurex property (128 holes totalling 2169 metres of percussion drilling), and Mountain Province Mining Incorporated on their Ketz River property (1533 metres of diamond drilling).

Forecast for 1994

A survey conducted by the Yukon Chamber of Mines in June 1994 indicated forecast expenditures of about \$30 million for the summer of 1994, more than a 30 percent increase over 1993. United Keno Hill Mines will be spending about \$7 million on drilling, geochemistry and geophysics in an effort to increase reserves at the Silver King, Bellekeno and Husky SW mines. Pacific Sentinel Gold Corp. will expend about \$5 million on diamond drilling on the Casino porphyry copper/molybdenum/gold project. Loki Gold Corp. is developing the Brewery Creek property and will be spending about \$4.3 million on upgrading the road, exploration, and preparing the leach pad. Cominco Ltd. is expected to spend about \$3 million on several properties in Yukon. Approximately \$2 million will be spent in the Wernecke Mountains on diamond drilling by Westmin Resources, Newmont Mining Corp., Pamicon Developments, and Equity Engineering.

The following companies will also be doing work in the Yukon during 1994: BYG Natural Resources on the Mt. Nansen property, Minto Explorations on the Minto property, Kennecott Canada in the Klondike and on Scheelite Dome, Inco on the Hart River property, Wheaton River on the Ketz River and Grew Creek properties, Pacific Comox on the Tay-LP property, and Redell Mining Corp. on the Laforma property.

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 1993 and 1994 levels of exploration activity are described on a preliminary and forecast basis, respectively. The data for these two years were collected between December 1993 and March 1994.

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 1994 period. Table 3b reports the same information, but in constant 1993 dollars. The numbers for "fieldwork" do not include overhead expenses. Table 4 presents these data as percentages.

In recent years the most active exploration areas were Ontario and Quebec. In 1988, these two provinces jointly accounted for 58 percent of total Canadian mineral exploration expenditures. In 1988 and 1989, exploration expenditures in Ontario exceeded those in Quebec for the first time since 1977. In 1990, British Columbia exploration expenditures exceeded those in Quebec for the first time since 1981 with Ontario in third place.

The decrease in exploration expenditures was very significant in 1991 and 1992. In 1992, expenditures were at their lowest since 1967. In 1991, Quebec again led the total amounts spent on exploration followed closely by British Columbia. In 1992, exploration expenditures decreased in all provinces and territories except in Manitoba and the Northwest Territories. Quebec continued to lead in terms of total dollars spent on exploration, followed by Ontario and British Columbia. Exploration activity in British Columbia decreased by 47 percent.

Expenditures are expected to increase during 1993 and 1994. In 1993, the interest in diamond exploration pushed the level of expenditures up, mainly in the Northwest Territories and Saskatchewan (see section 5.4). Preliminary indications are that exploration expenditures were up in most exploration areas in 1993, with the exception of Newfoundland, Nova Scotia, Manitoba and British Columbia. Again, Quebec is likely to rank first followed by the Northwest Territories which, largely because of the boom in exploration for diamonds, is likely to outrank Ontario, which would be third.

TABLE 3A. MINERAL EXPLORATION EXPENDITURES IN CANADA, BY PROVINCE, 1985-94

Province	Field Work Only				Total Exploration(1)					
	1985	1986	1987	1988	1989	1990	1991	1992	1993p	1994f
	(\$ Millions)									
Newfoundland	11.9	12.3	27.7	37.7	36.2	23.3	12.1	11.1	8.5	12.5
Nova Scotia	7.8	17.2	41.6	46.7	21.4	11.0	4.5	3.3	1.0	2.9
New Brunswick	12.1	10.8	9.1	13.8	13.6	16.5	15.8	12.2	17.2	17.0
Quebec	135.2	241.4	415.5	328.2	185.0	196.4	138.1	94.1	120.7	127.0
Ontario	93.2	136.8	308.1	343.6	217.8	152.6	109.7	77.4	77.6	99.2
Manitoba	33.7	26.3	40.0	30.0	37.0	41.2	29.7	32.0	25.4	30.8
Saskatchewan	39.4	36.8	63.5	61.1	63.3	42.2	31.5	25.9	45.3	54.0
Alberta	14.7	3.0	2.5	4.3	6.2	10.7	6.6	5.4	6.8	9.2
British Columbia	73.0	63.1	142.6	196.8	186.6	226.5	135.7	71.6	68.0	78.3
Yukon Territory	22.7	27.9	29.0	38.6	15.1	18.4	16.5	9.7	18.1	15.7
Northwest Territories	46.8	35.8	59.0	66.5	45.7	36.0	31.6	42.7	94.6	90.4
Total Field Work (Excluding Overhead)	490.5	611.4	1138.6	1167.3	703.5	660.3	439.2	323.5	na	na
44 Total Exploration (Including Overhead)	605.8	723.3	1300.0	1350.0	827.9	774.7	531.8	385.3	483.0	536.9

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

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

p Preliminary estimate; f Forecast; na Not available.

Figures may not add to totals due to rounding.

TABLE 3B. MINERAL EXPLORATION EXPENDITURES IN CANADA, BY PROVINCE, 1985-94

Province	Field Work Only				Total Exploration(1)					
	1985	1986	1987	1988	1989	1990	1991	1992	1993p	1994f
(1993 \$ Millions)										
Newfoundland	15.1	15.2	32.8	42.6	39.1	24.3	12.3	11.2	8.5	12.5
Nova Scotia	9.9	21.3	49.2	52.8	23.1	11.5	4.6	3.3	1.0	2.9
New Brunswick	15.3	13.4	10.8	15.6	14.7	17.2	16.1	12.3	17.2	17.0
Quebec	171.4	299.1	491.7	370.8	199.6	205.2	140.8	94.9	120.7	127.0
Ontario	118.1	169.5	364.6	388.2	235.0	159.5	111.8	78.1	77.6	99.2
Manitoba	42.7	32.6	47.3	33.9	39.9	43.1	30.3	32.2	25.4	30.8
Saskatchewan	49.9	45.6	75.1	69.0	68.3	44.1	32.1	26.1	45.3	54.0
Alberta	18.6	3.7	3.0	4.9	6.7	11.2	6.7	5.4	6.8	9.2
British Columbia	92.5	78.2	168.8	222.4	201.3	236.7	138.3	72.2	68.0	78.3
Yukon Territory	28.8	34.6	34.3	43.6	16.3	19.2	16.8	9.7	18.1	15.7
Northwest Territories	59.3	44.4	69.8	75.1	49.3	37.6	32.2	43.1	94.6	90.4
Total Field Work (Excluding Overhead)	621.7	757.6	1347.5	1319.0	758.9	690.0	447.7	326.1	na	na
Total Exploration (Including Overhead)	767.8	896.3	1538.5	1525.4	893.1	809.5	542.1	388.4	483.0	536.9

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

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

p Preliminary estimate; f Forecast; na Not available.

Figures may not add to totals due to rounding.

GDP Deflator (1993=100)	0.789	0.807	0.845	0.885	0.927	0.957	0.981	0.992	1.000	1.000
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TABLE 4. MINERAL EXPLORATION EXPENDITURES IN CANADA, BY PROVINCE, 1985-94

Province	Field Work Only				Total Exploration					
	1985	1986	1987	1988	1989	1990	1991	1992	1993p	1994f
(Percentage distribution)										
Newfoundland	2.4	2.0	2.4	3.2	4.4	3.0	2.3	2.9	1.8	2.3
Nova Scotia	1.6	2.8	3.7	4.0	2.6	1.4	0.8	0.8	0.2	0.5
New Brunswick	2.5	1.8	0.8	1.2	1.6	2.1	3.0	3.2	3.6	3.2
Quebec	27.6	39.5	36.5	28.1	22.3	25.4	26.0	24.4	25.0	23.7
Ontario	19.0	22.4	27.1	29.4	26.3	19.7	20.6	20.1	16.1	18.5
Manitoba	6.9	4.3	3.5	2.6	4.5	5.3	5.6	8.3	5.3	5.7
Saskatchewan	8.0	6.0	5.6	5.2	7.6	5.4	5.9	6.7	9.4	10.1
Alberta	3.0	0.5	0.2	0.4	0.7	1.4	1.2	1.4	1.4	1.7
British Columbia	14.9	10.3	12.5	16.9	22.5	29.2	25.5	18.6	14.1	14.6
Yukon Territory	4.6	4.6	2.5	3.3	1.8	2.4	3.1	2.5	3.7	2.9
Northwest Territories	9.5	5.9	5.2	5.7	5.5	4.6	5.9	11.1	19.6	16.8
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

46

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

p Preliminary estimate; f Forecast.

Note: The percentages from 1985-88 are calculated on field work only, but those from 1989-94 are based on total expenditures, which include related overhead.

Figures may not add to totals due to rounding.

If the 1994 forecast for total Canadian exploration expenditures turns out to be accurate, it will represent a 39 percent increase over the low level of \$385 million spent in 1992.

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

5.3 Exploration Expenditures by Type of Company

Figure 8a depicts field exploration expenditures by type of company from 1985 to 1992 (final field work expenditures for 1993 and 1994 are not yet available). Total exploration expenditures (fieldwork plus overhead) for 1992, 1993 (preliminary) and 1994 (intentions) by type of company are portrayed in Figure 8b. Such data are not available for 1985 to 1988.

From 1985 to 1992, non-petroleum exploration expenditures by oil companies declined in constant dollars by more than 90 percent and by foreign companies by more than 48 percent. In 1977, oil companies accounted for some 24 percent of total non-petroleum exploration, but in 1992 they accounted for only 2 percent. Foreign companies accounted for over 18 percent in 1973 and 1979, but now account for only 9 percent.

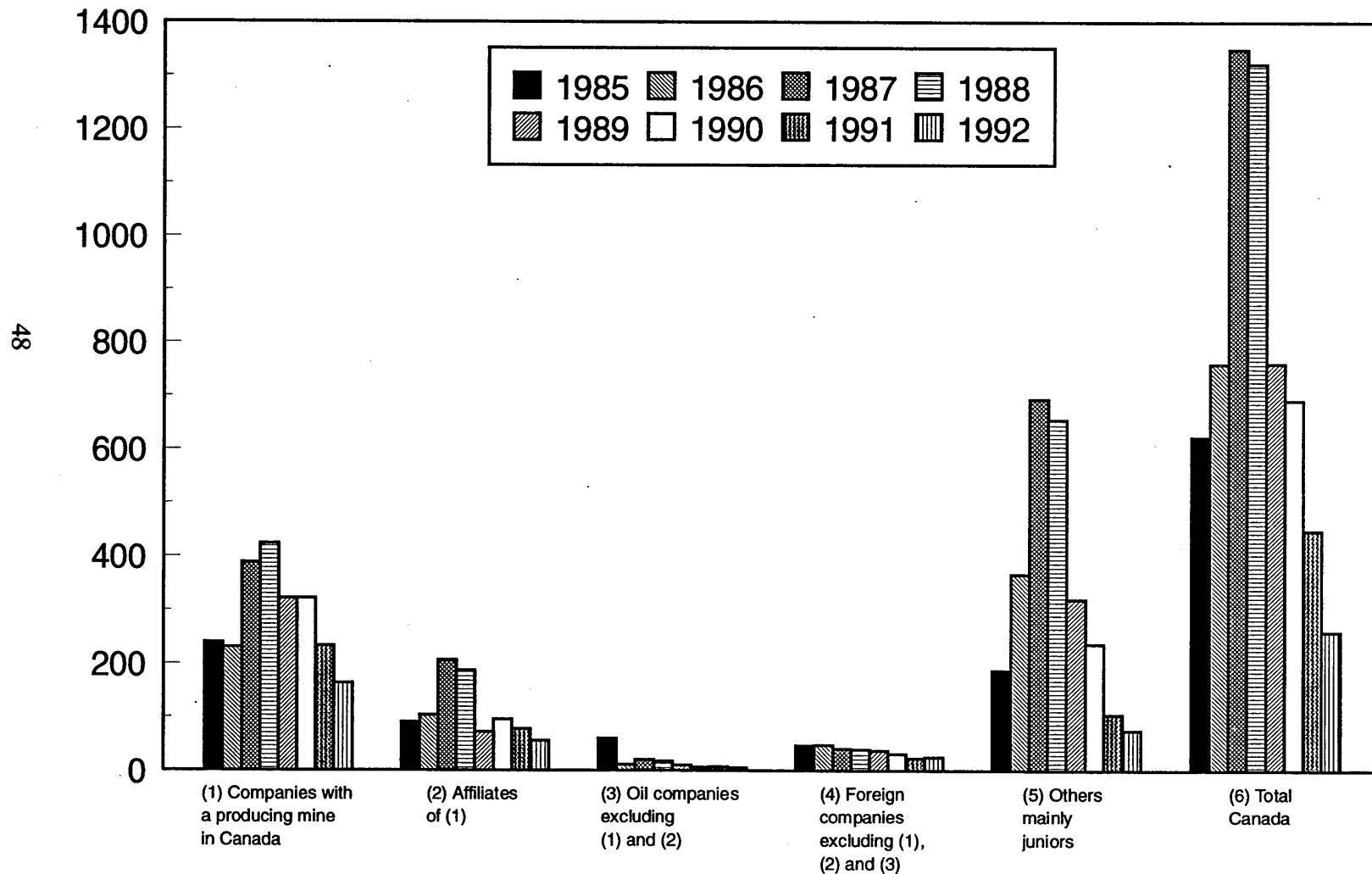
Exploration by producing companies and their affiliates peaked in constant dollar terms in 1987-88 then declined until 1992. This decline may not be as large as it appears because it includes considerable contributions made in the period 1986-88 by junior companies to joint venture projects operated mostly by senior companies. Such expenditures are reported in total by project operators (chiefly the seniors). Contrary to what was forecasted in 1992, expenditures by senior companies are expected to increase by 12 percent in 1993 and remain steady in 1994.

Exploration expenditures by junior companies followed the same pattern as those by senior exploration expenditures (Figure 9); they peaked in 1987-88, then decreased until 1992, but likely increased again in 1993 and 1994. Although junior company exploration expenditures have declined from their high levels of 1987-88, they are still higher than they were during most of the 1970s (Figure 10). Exploration expenditures by the juniors increased almost eightfold from 1983 to 1987, from about \$96 million to almost \$800 million (in 1993 constant dollars). In 1983, these companies accounted for about 15 percent of total Canadian exploration expenditures, but by 1987 this proportion has increased to more than two thirds. In 1988, expenditures by the juniors began to decline. The decline has continued through 1992. In 1992, junior expenditures accounted for 21 percent of total exploration expenditures; however, they are expected to account for 29 percent and 37 percent in 1993 and 1994 respectively.

Figure 8a

FIELD EXPLORATION EXPENDITURES BY TYPE OF COMPANY 1985-92

Millions of 1993 dollars

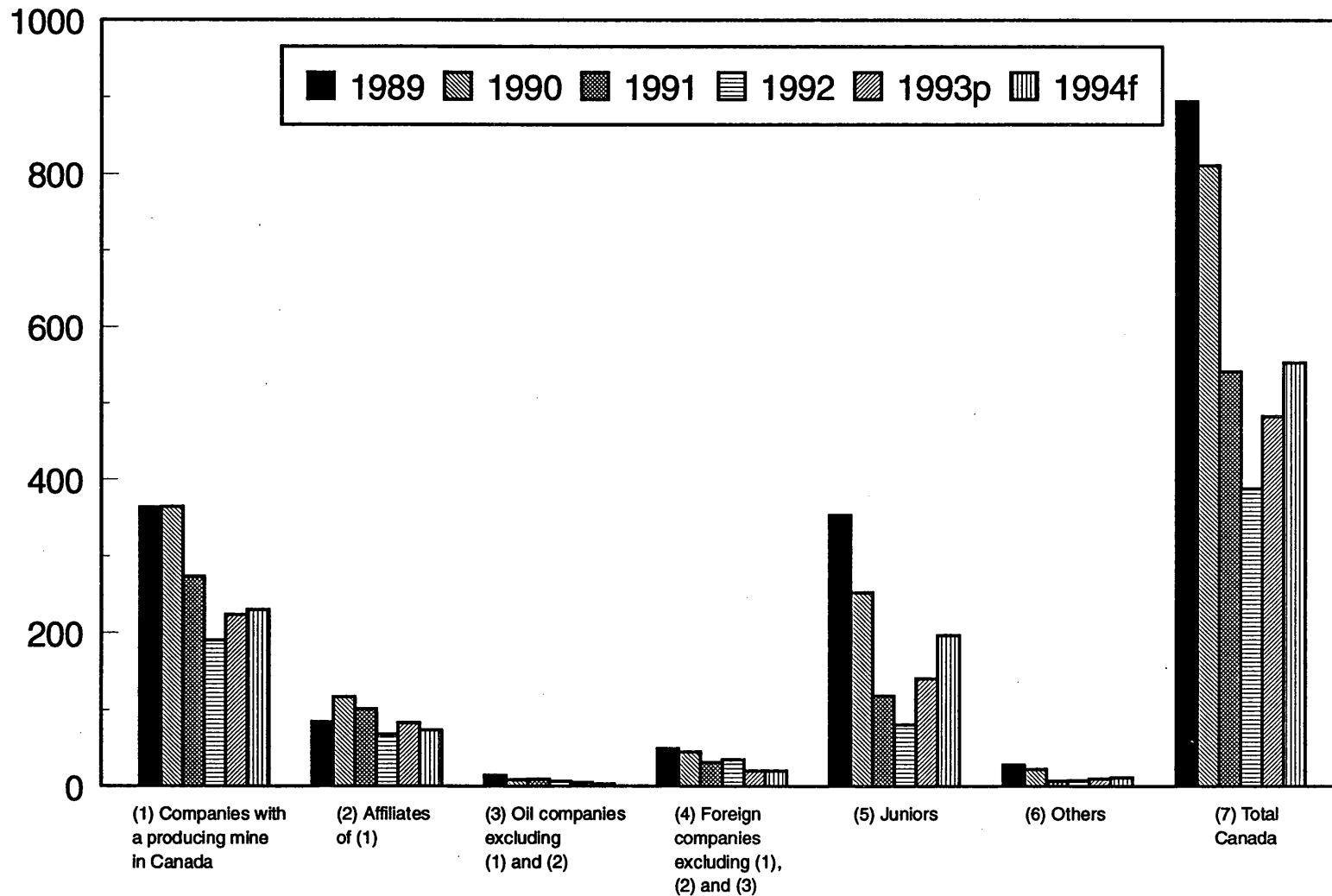


Source: Compiled by NRCan from the Federal - Provincial Survey of Mining and Exploration Companies.
Note: Overhead expenditures are not included.

Figure 8b

EXPLORATION EXPENDITURES BY TYPE OF COMPANY 1989-94

Millions of 1993 dollars



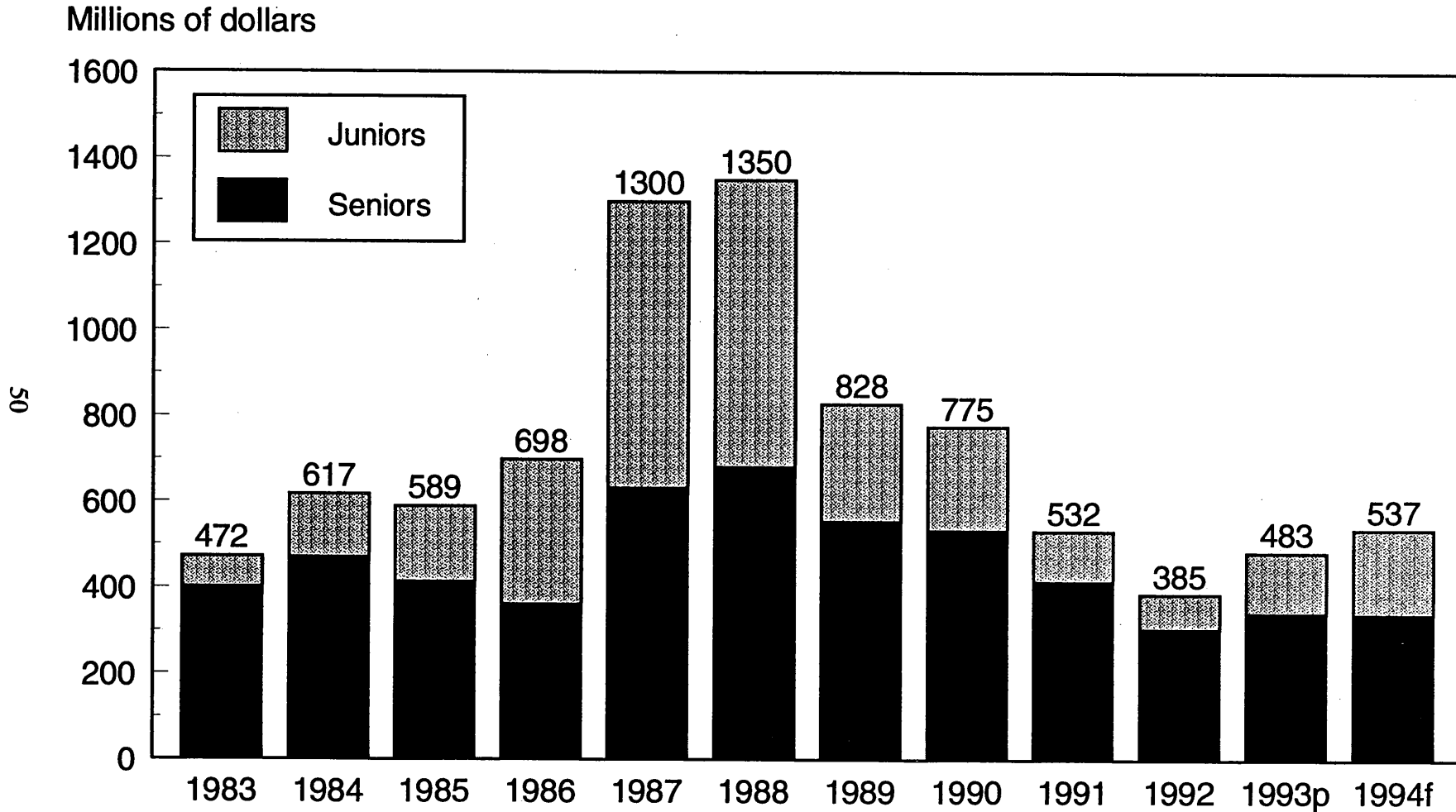
Source: Compiled by NRCan from the Federal - Provincial Survey of Mining and Exploration Companies.

p Preliminary estimate; f Forecast.

Note: Overhead expenditures are included.

Figure 9

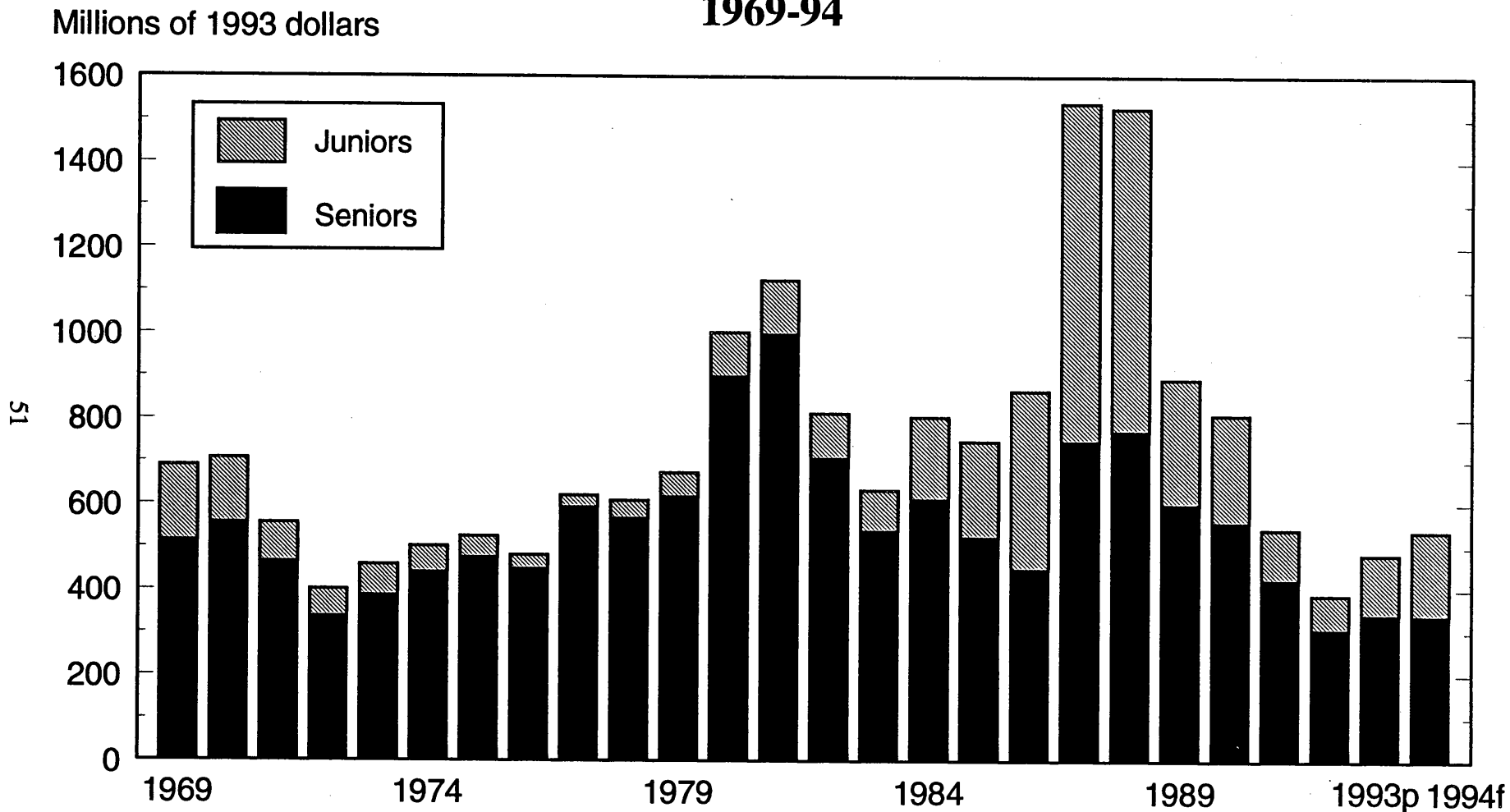
EXPLORATION EXPENDITURES BY JUNIOR AND SENIOR COMPANIES 1983-94



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

Note: Overhead expenditures are included.

Figure 10
EXPLORATION EXPENDITURES
BY JUNIOR AND SENIOR COMPANIES
1969-94



Total exploration expenditures for 1975 to 1981 are overstated by an average of about 17% relative to earlier and later years because of changes to the methodology used by Statistics Canada over the years.

Source: Mining Sector, Natural Resources Canada and Federal-Provincial Survey of Mining and Exploration Companies.

p Preliminary; f Forecast.

Note: Overhead expenditures are included.

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. Canadian exploration expenditure surveys ask that exploration spending be reported by project operators. Because senior companies generally did not contribute large amounts of money to projects operated by junior companies, the exploration surveys during the mid-1980s have tended to overstate the contribution made to spending by senior companies and to understate that of the juniors.

5.4 Exploration Expenditures by Type of Commodity Sought

Exploration for precious metals (95 percent of this for gold during the second half of the 1980s) peaked in 1987 (Figures 11 and 12) and subsequently declined as the availability of flow-through capital decreased and as the gold price declined after the end of 1987. Exploration expenditures for base metals were lowest in 1986. They increased each year until 1990 when they exceeded the lowest level of the late 1970s (Figure 12). Exploration expenditures for base metals declined again in 1991 and 1992. The \$180 million recorded in 1992 is close to the level recorded during the 1987-88 period. The decrease in precious-metals exploration was much more severe than for base-metal exploration; consequently, total expenditures in base-metal exploration exceeded that for precious metals for the first time since 1983.

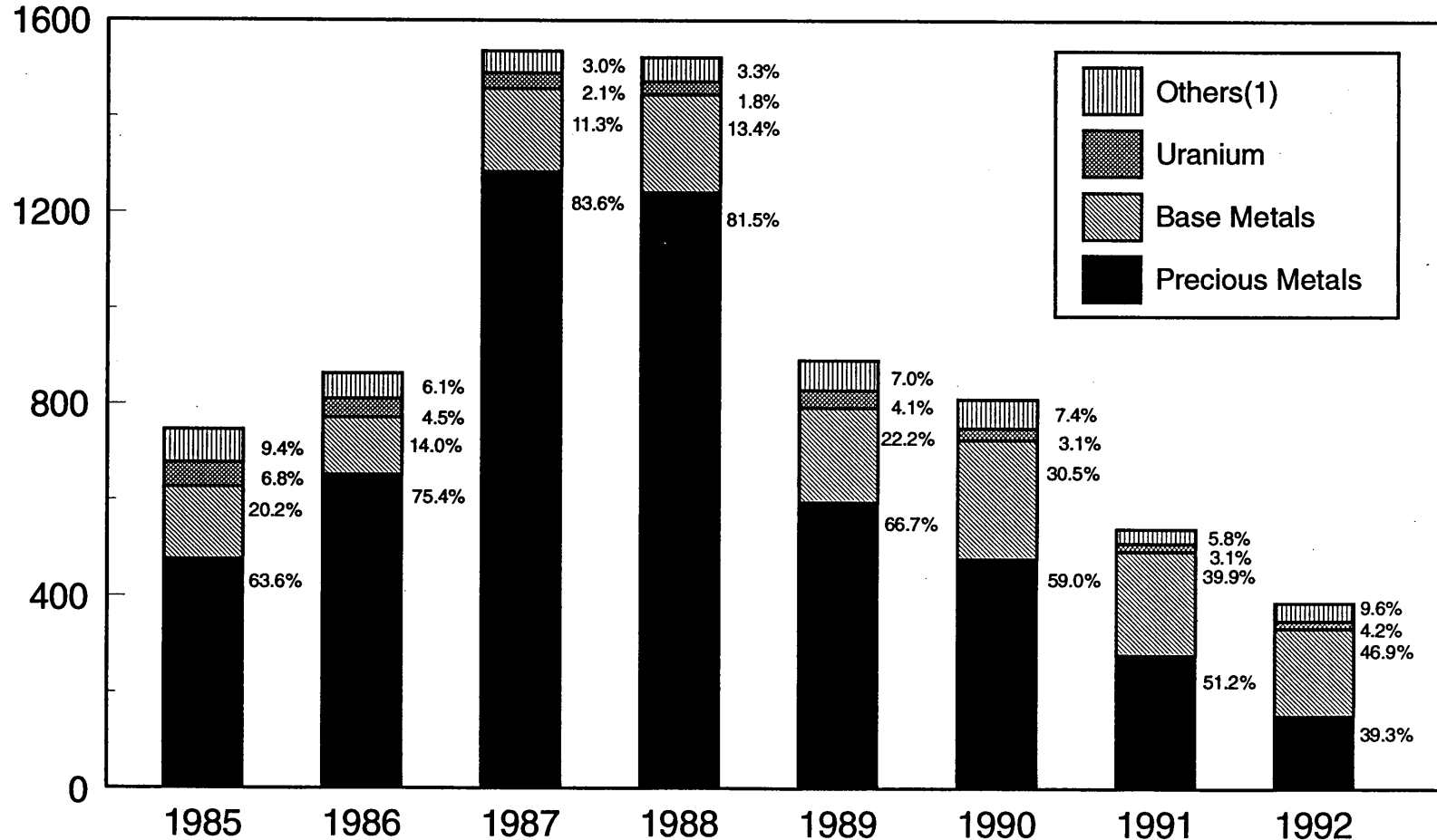
In 1987 and 1988, exploration expenditures for all non-petroleum mineral commodities other than base and precious metals (Figure 11) accounted for only about 3 percent of total Canadian exploration expenditures. In 1989 and 1990, expenditures directed at those other mineral commodities have more than doubled in percentage terms, but have not actually increased much in constant dollars. In 1991, expenditures for "others" decreased in both percentage and constant dollar terms reaching their lowest levels since 1985. They increased again in 1992, both in percentage and in dollar terms. Commodities such as diamonds, ferrous metals, wollastonite and marble contributed to the increase in the level of expenditures in this "others" category.

Interest in diamond exploration accelerated in 1993, especially in the Northwest Territories (mainly in the Lac de Gras area) and in Saskatchewan (mainly in the Fort à la Corne area). Preliminary data for 1993 and forecast data for 1994 show diamond exploration expenditures of about \$58 million in the Northwest Territories for each year. Saskatchewan should rank second with \$9 million and \$17 million for the same years, respectively. Some \$80 million and \$90 million is expected to have been spent on diamond exploration in Canada in 1993 and 1994, respectively. These amounts represent about 15 percent of total Canadian exploration expenditures in those two years, compared to only 5 percent in 1992.

Figure 11

EXPLORATION EXPENDITURES BY COMMODITY SOUGHT 1985-92

Millions of 1993 dollars



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

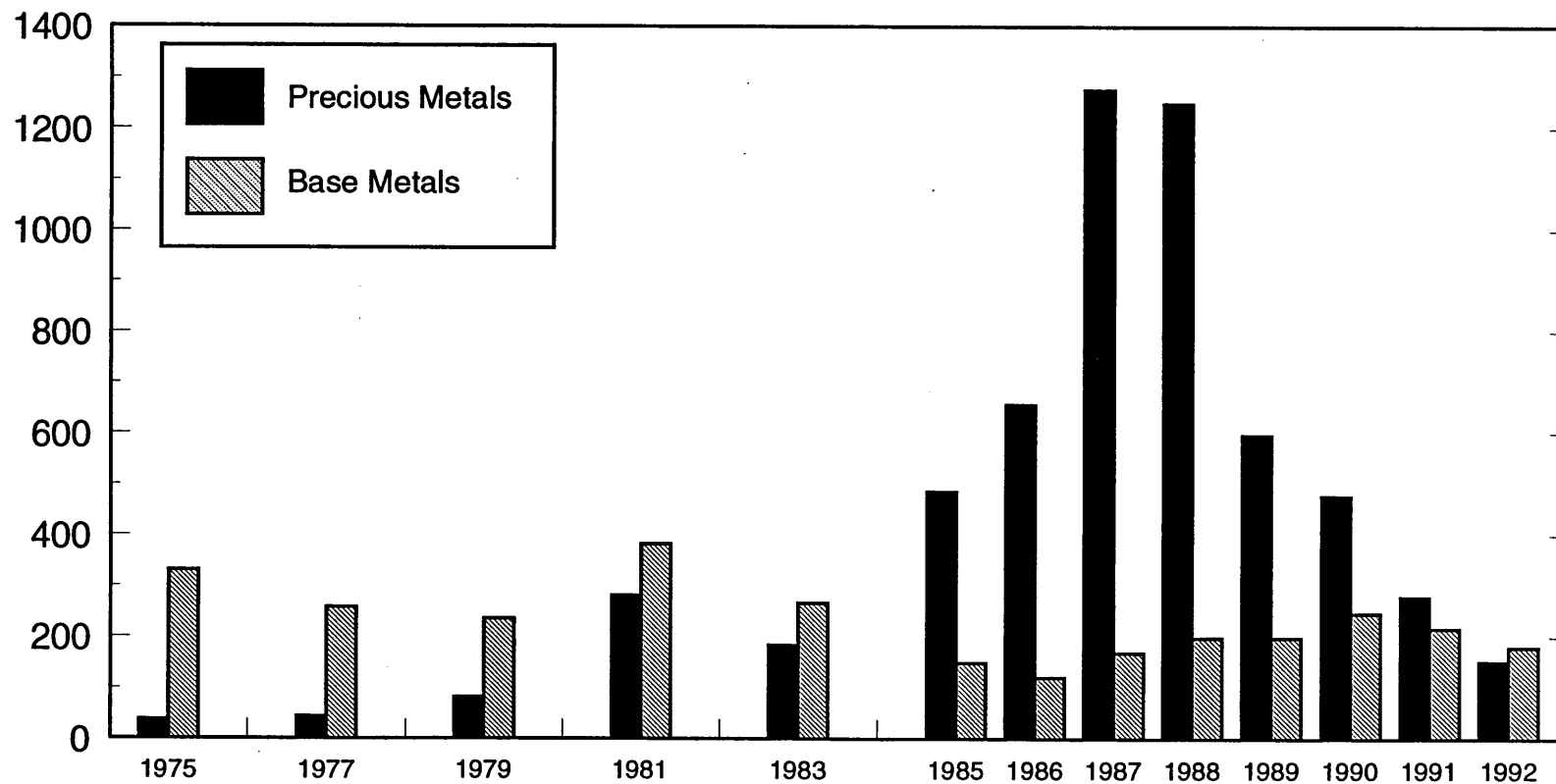
Note: Overhead expenditures are included.

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

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

Figure 12
CANADIAN EXPLORATION EXPENDITURES
FOR BASE METALS AND PRECIOUS METALS
1975-92

Millions of 1993 dollars



54

Source: Natural Resources Canada. Based on Federal-Provincial Survey of Mining and Exploration Companies.
 Data were not compiled by commodities for 1976, 1978, 1980, 1982 and 1984.
 Note: Overhead expenditures are included.

SECTION D. HISTORICAL PERSPECTIVE ON FLOW-THROUGH SHARE FINANCING ACTIVITY, 1983-94

The evolution of flow-through shares as a source of financing for exploration is shown in Figure 13, beginning with 1983 (flow-through shares have actually existed since the 1950s, but were available only to companies and individuals with resource income). Funds raised by flow-through shares peaked at \$1183 million in 1987.

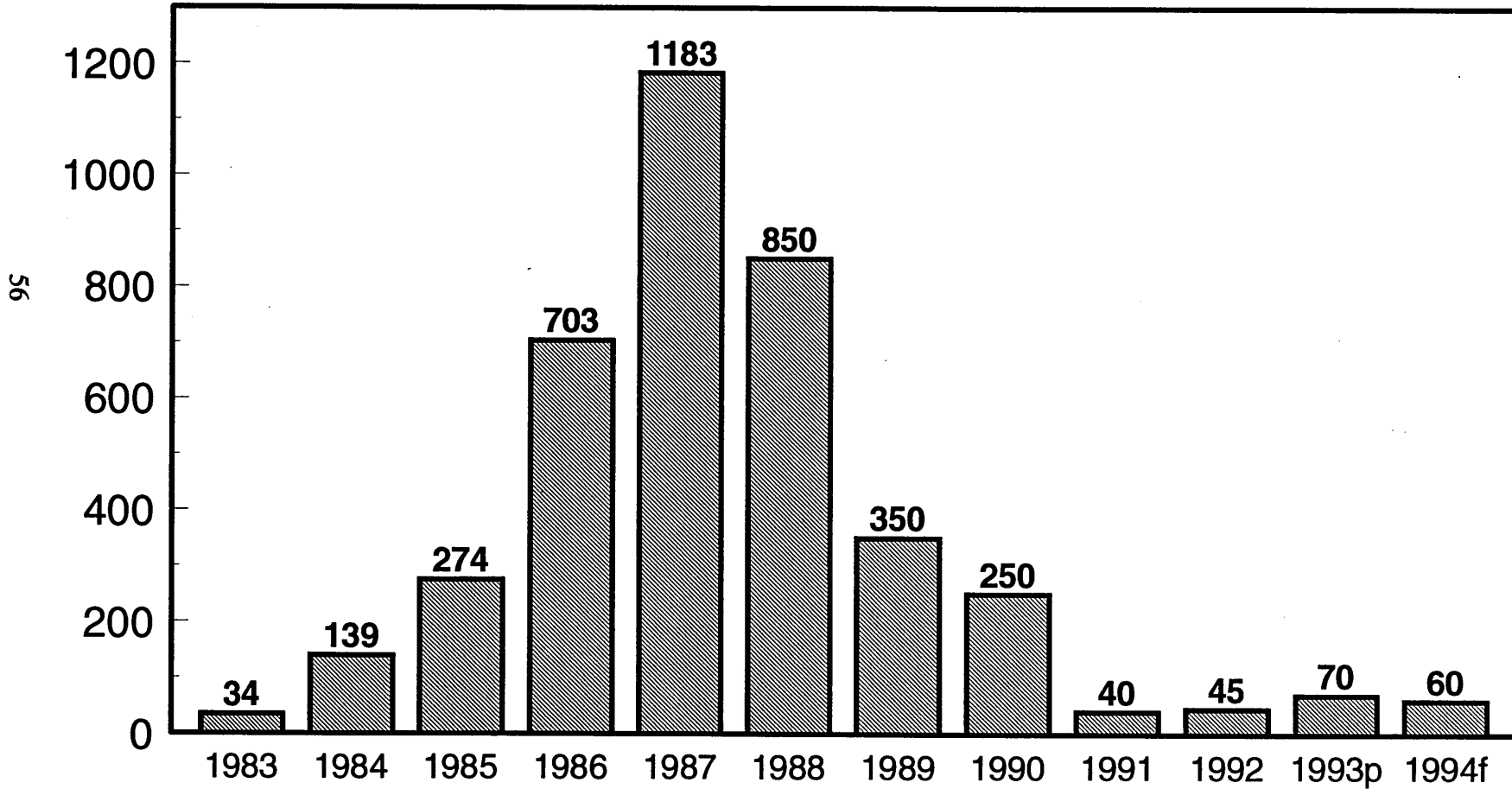
The proportion of total exploration expenditures accounted for by flow-through share financing increased from about 7 percent in 1983 to more than 90 percent in 1986 and 1987. In 1988, however, the level of flow-through share financing of mineral exploration declined to approximately 60 percent of total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

It should be noted that exploration expenditures and amounts financed by flow-through shares cannot realistically be directly compared. Exploration data are compiled on a calendar-year basis, whereas the amount of flow-through share funds raised 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 led to a concurrent increase in the proportion of total exploration by junior mining companies. It was the juniors who made the greatest use of the flow-through share mechanism in 1987 and 1988, and it is estimated that juniors accounted for close to 80 percent of the total amount raised by flow-through shares in 1988. As was pointed out earlier in this report, even though junior companies continued to account for the greatest part of flow-through share-funded exploration by far, it is they who have felt the brunt of the reduced level of flow-through share financing since 1989.

Figure 13
FLOW-THROUGH SHARE FINANCING LEVELS
1983-94

Millions of dollars



Source: Mining Sector, Natural Resources Canada.

p Preliminary estimate; f Forecast.

TABLE 5. Ratio of Flow-Through Share Financing to Total Exploration Expenditures, 1983-94

Year	Total Exploration Expenditures	Flow-Through Share Financing	Percentage Flow-Through Share Financing to Total Exploration Expenditures
	(\$ Millions)	(\$ Millions)	(Percent)
1983	472	34	7
1984	617	139	23
1985	589	274	47 ^a
1986	698	703	100 ^a
1987	1300	1183	95 ^a
1988	1350	850	63 ^a
1989	828	350	42 ^a
1990	775	250	32 ^a
1991	532	40	8 ^a
1992	385	45	12 ^a
1993 ^p	483	70	14 ^a
1994 ^f	500-550	60	11-12 ^a

p: Preliminary; f: Forecast.

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