

# Canada's Global Mining Presence

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## GLOBAL MARKET FOR MINERAL EXPLORATION

The year 2004, much like the previous one, was very favourable for the financing of mining companies. Over \$11.4 billion in equity capital was raised on international markets for mineral exploration and development projects around the globe.<sup>1</sup> Almost half of the funds raised during the year were for companies listed on Canadian stock exchanges.

The value of exploration programs expected to be undertaken worldwide in 2004 for precious metals, base metals and diamonds (Table 1) rose to over \$5.0 billion (US\$3.8 billion), up in constant Canadian dollars by \$1.5 billion, or 40%, from the \$3.6 billion that companies planned to spend in 2003.<sup>2</sup> The value of these programs includes the budgets of the larger companies and those of the smaller companies. It also includes estimates for firms that do not disclose their exploration plans and for firms

that were likely to spend less than \$133 000 (US\$100 000) in 2004.

The world's larger companies are defined, in this paper, as those companies that planned to spend at least \$4.0 million (current US\$3 million) on mineral exploration in 2004; the world's smaller companies are defined as those companies that planned to spend at least \$133 000, but less than \$4.0 million, on mineral exploration in 2004.

The number of companies that reported budgets for mineral exploration of at least \$133 000 rose to 1138, up by 221 firms, or 24%, from 917 the previous year. As a group, these 1138 companies planned to spend \$4.7 billion in 99 countries. Almost 680, or 60%, of these companies were based in Canada.

Compared with the previous year, the budgets of companies that planned to spend at least \$133 000 on mineral exploration in 2004 increased for almost 80% of the countries in which they expected to operate. Their year-over-year budgets grew by \$225 million for Canada, by \$190 million for Australia, by \$150 million for the United States, by \$120 million for Russia, by roughly \$90 million for each of China, Mexico, Mongolia and Peru, and by \$70 million for South Africa. In each of the few countries where decreases in exploration budgets were expected to occur from 2003 to 2004, these decreases were likely to amount to less than \$5 million, except in New Caledonia where the decrease was likely to be about \$20 million.

**TABLE 1. WORLDWIDE EXPLORATION BUDGETS FOR PRECIOUS METALS, BASE METALS OR DIAMONDS, BY TYPE OF COMPANY AND BY DOMICILE OF COMPANY, 2004**

	Canada	Australia	Africa- Middle East	Europe- FSU	United States	Latin America	Other Asia-Pacific	Unspecified Domicile	Total	Proportion of Subtotal
	(\$ millions)									(%)
Larger companies	1 414	486	573	492	405	276	55	–	3 701	78
Smaller companies	608	295	11	52	33	30	8	–	1 037	22
Subtotal	2 022	781	584	544	438	306	63	–	4 738	100
Other	..	..	..	..	..	..	..	296	296	
Total	..	..	..	..	..	..	..	296	5 034	

Source: Natural Resources Canada, based on *Corporate Exploration Strategies: A Worldwide Analysis*, Metals Economics Group, Halifax, Nova Scotia.  
– Nil; .. Not available.

Notes: (1) "Larger companies" are defined here as those with budgets for mineral exploration in 2004 of \$4.0 million (US\$3 million) or more. There were 213 such companies in 2004. These companies usually account for roughly 80% of documented annual global exploration budgets. There are 13 years of data available for these companies. The focus of this paper is on the larger companies. (2) "Smaller companies" are defined here as those with budgets for mineral exploration in 2004 of at least \$133 000 (US\$100 000), but less than \$4.0 million (US\$3 million). There were 925 such companies in 2004. General comments about these companies as a group appear in this paper. (3) "Other" includes estimates for companies with budgets for mineral exploration in 2004 of less than \$133 000 (US\$100 000) and estimates for companies that undertake significant exploration programs, but that did not disclose their budgets for 2004. There were roughly 250 such companies in 2004. These companies are ignored in this paper.

## WORLD'S LARGER COMPANIES

Global trends in mineral exploration are based on data for the world's larger companies.<sup>3</sup> The larger companies are the only ones for which there are consistent multi-year data on worldwide exploration plans. There are currently 13 years of such data available. Therefore, the focus of this paper is on this group of companies.

During 2004, the world's larger companies were expected to undertake exploration programs with a combined value of \$3.7 billion (US\$2.8 billion) in 74 countries, six more than in 2003. The aggregate budgets of the world's larger companies increased by \$1.2 billion, or 48%, from \$2.5 billion the previous year.

In 2004, the number of companies based around the world that intended to spend at least \$4.0 million on mineral exploration rose to 213 (Figure 1), compared with only 100 that planned to spend an equivalent amount in 2003. In 1997, the number stood at 279, a record high.

Although, in 2004, the world's 213 larger companies represented only about 19% of the 1138 companies that reported exploration budgets of at least \$133 000, they accounted for 78% of the value of their programs (Table 1). On a commodity basis, the larger companies accounted for 87% of the value of worldwide programs aimed at diamonds, for 83% of those aimed at base metals, for 80% of those aimed at platinum group metals (PGMs), and for 74% of those aimed at gold.

On a regional basis, the world's larger companies accounted for 85% of the value of the exploration programs planned for Africa and the Middle East; for 84% of those planned for Latin America, the Caribbean, Europe and the former Soviet Union (FSU); for 83% of those planned for the United States; for 73% of those planned for Asia-Pacific; and for 67% of those planned for Canada.

## WORLD'S SMALLER COMPANIES

During 2004, the world's smaller companies were expected to undertake exploration programs around the world with a combined value of \$1.0 billion (US\$778 million). About 30% of the budgets of these companies were expected to be spent in Canada.

The smaller companies are significant contributors to mineral exploration and development in many regions of the world. In many countries, the smaller companies are the only ones that undertake commercial mineral exploration. In 2004, there were 25 countries where the only firms planning to be active in mineral exploration were smaller companies.

In 2004, 925 companies were classified as smaller companies, up from 817 in 2003. Almost two-thirds of these companies were based in Canada.

The smaller companies are a significant component of the exploration activity occurring in Australia and in Canada. In 2004, the smaller Canadian-based companies accounted for 30% of the budgets of the smaller and larger Canadian-based companies combined; in Australia the comparable figure was 38%.

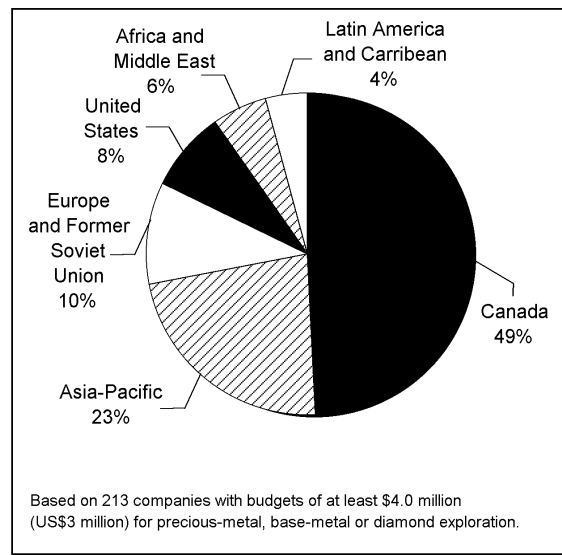
The smaller Canadian companies planned to spend \$303 million in Canada, or 50% of their worldwide budgets of \$608 million; in Australia, the comparable figures were \$223 million, or 76% of worldwide budgets of \$295 million.

Although the world's smaller companies accounted for 22% (Table 1) of the value of all exploration programs expected to be undertaken worldwide during 2004, their activities are not addressed specifically here.

## LARGER CANADIAN-BASED COMPANIES

There are more mining companies based in Canada than anywhere else. In 2004, 105 of the world's 213 larger companies were based in this country (Figure 1), up from 45 in 2003.

**Figure 1**  
Distribution of the World's Larger Exploration Companies, by Domicile, 2004



Source: Natural Resources Canada, based on *Corporate Exploration Strategies: A Worldwide Analysis*, Metals Economics Group, Halifax, Nova Scotia.

In 2004, the value of the exploration programs that the 105 larger Canadian-based companies planned to undertake in Canada and elsewhere around the world increased to more than \$1.4 billion (Figure 2), up by \$590 million, or 70%, from the \$824 million that they budgeted in 2003.

The larger Canadian-based companies allocated 59% of their budgets to explore for gold, 30% to explore for base metals, 6% to explore for diamonds, and 1% to explore for PGMs. The proportion of the total budgets of the larger Canadian-based companies allocated to gold was considerably larger than the industry average, while the proportions that they allocated to diamonds and to PGMs were substantially smaller. In comparison, the world averages for gold, base metals, diamonds and PGMs stood at 47%, 28%, 15% and 5%, respectively.

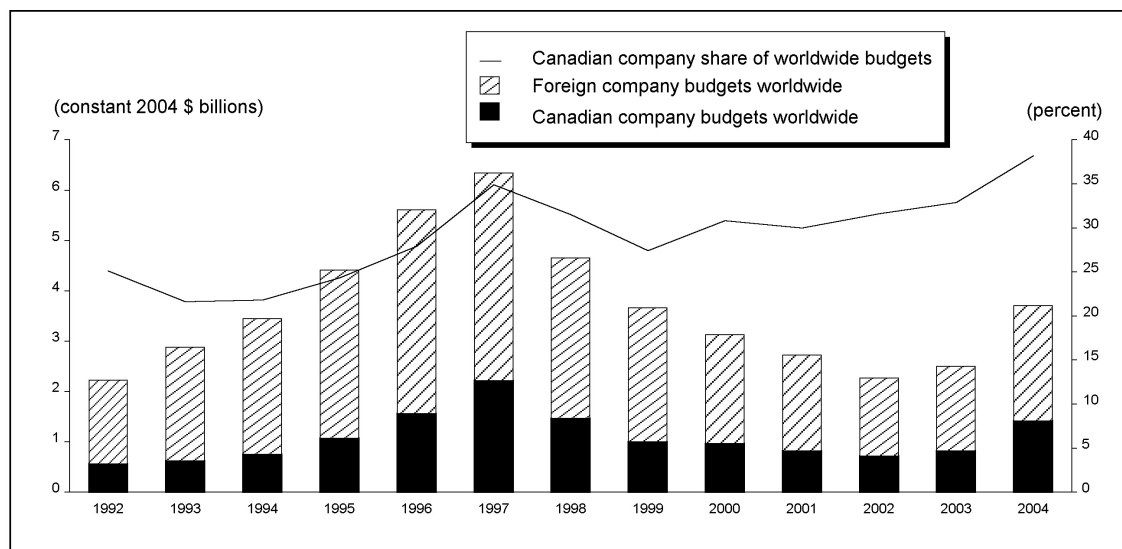
The value of the programs that the larger Canadian-based companies planned to undertake during 2004 grew to 38% of the value of all larger-company exploration programs for the entire world compared with one-third in 2003. However, adding the value of the programs of the smaller Canadian-based companies to those of the larger ones raises the proportion of the value of exploration programs planned by Canadian-based companies here and abroad to almost 43% of all of the expected world activity.

Canadian companies account for the dominant share, by far, of the value of all mineral exploration programs planned worldwide by the larger companies. In contrast, in 2004, the larger companies based in Africa accounted for 15%, those based in Europe and those based in Australia each accounted for 13%, and those based in the United States accounted for 11%.

The larger Canadian-based companies typically budget less individually for exploration programs than the industry average worldwide. In 2004, the aggregate exploration budgets of the larger Canadian-based companies had a mean of \$13.5 million and a median of \$6.7 million. This compared with global averages of \$17.4 million and \$6.9 million, respectively. The largest Canadian mineral exploration budget in 2004 was \$147 million, while the world's largest was \$227 million.

Although, on a company-by-company basis, there can be significant variations between exploration budgets and expenditures, aggregate budgets generally provide a reliable estimate of the total amount that is likely to be spent in the field. In 2003, 45 larger Canadian-based companies, as a group, exceeded their exploration budgets by \$104 million, or by about 14% more than they had initially planned to spend. In comparison, the larger Canadian-based companies under-spent their budgets by roughly 7% in each of 1998 and 1999.<sup>4</sup>

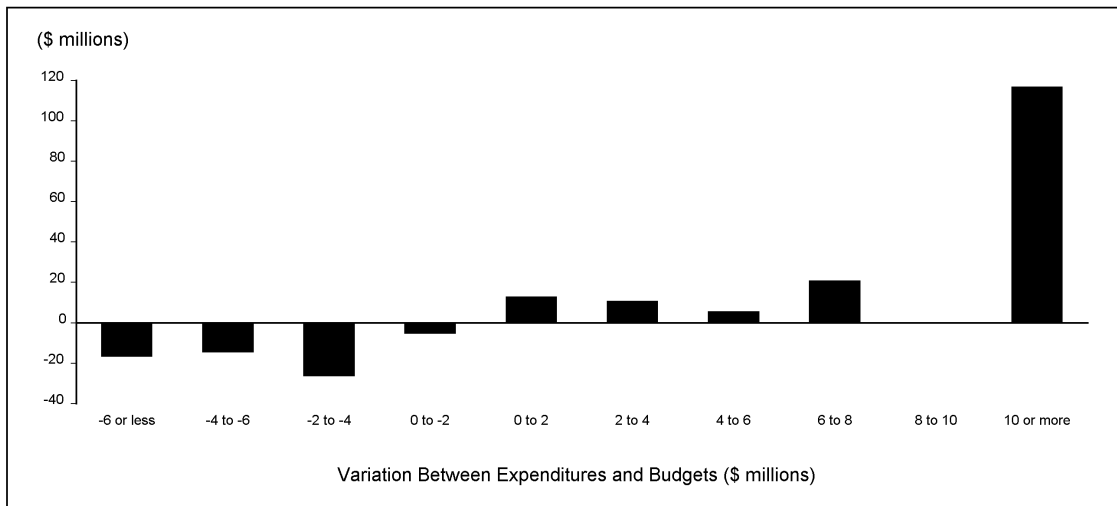
**Figure 2**  
**Exploration Budgets of the World's Larger Companies, by Domicile, 1992-2004**  
Companies With Worldwide Budgets of at Least \$4.0 Million in 2004 for Precious-Metal, Base-Metal or Diamond Exploration



Source: Natural Resources Canada, based on *Corporate Exploration Strategies: A Worldwide Analysis*, Metals Economics Group, Halifax, Nova Scotia.

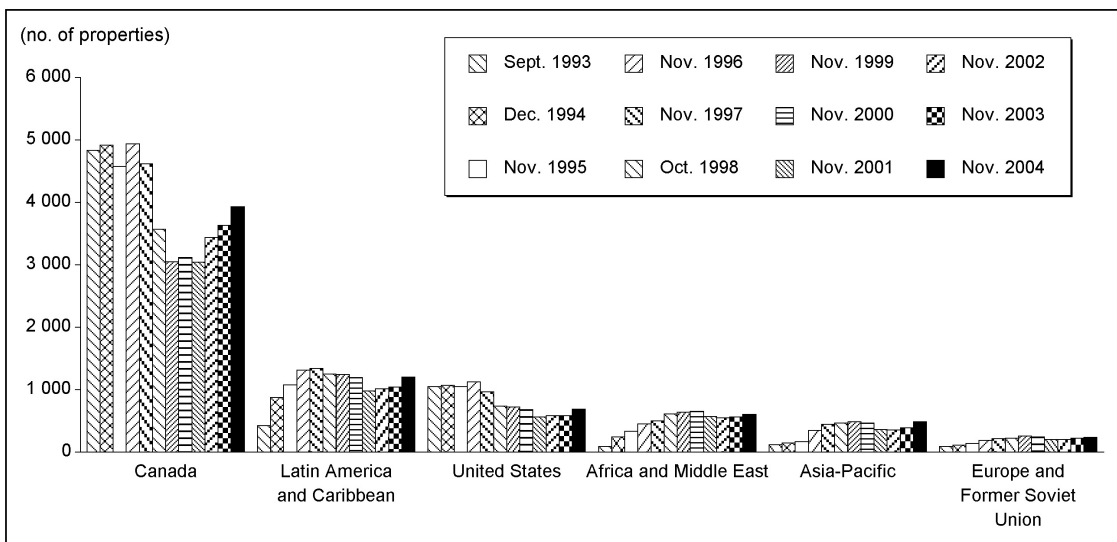
Notes: The worldwide exploration budgets of companies that intended to spend less than \$4.0 million (US\$3 million) in 2004 and an equivalent amount in previous years are excluded. The worldwide exploration budgets for other commodities such as uranium or industrial minerals are also excluded.

**Figure 3**  
**Distribution of the Variation of Exploration Expenditures From Budgets of the Larger Canadian-Based Companies, 2003**



Source: Natural Resources Canada, based on *Corporate Exploration Strategies: A Worldwide Analysis*, Metals Economics Group, Halifax, Nova Scotia.

**Figure 4**  
**Canadian Mineral Property Portfolio Worldwide, by Region, 1993-2004**  
 Companies of All Sizes Listed on Canadian Stock Exchanges



Source: Natural Resources Canada, based on *MIN-MET CANADA* for 1993-97 and InfoMine db for 1998-2004, Robertson Info-Data Inc., Vancouver, British Columbia, and used under licence.

Note: The decrease in properties in Canada after 1997 is due, in part, to the implementation of database features that make it possible to exclude many inactive properties.

In 2003, 16 of the 45 larger Canadian-based companies spent, in total, \$63 million less than they had budgeted; 24 of them spent, in total, \$167 million more than budgeted; and 5 of them spent exactly what they had budgeted. That year, the departure of individual company expenditures from budgets ranged from \$16.7 million under budget to \$59.5 million over budget. The three companies whose expenditures exceeded budgets by the largest amount accounted, in total, for \$117 million of expenditures over budget (Figure 3).

At the end of 2004, companies of all sizes listed on Canadian stock exchanges held interests in a portfolio of more than 7100 mineral properties (Figure 4) located in Canada or in more than 100 other countries around the world.<sup>5</sup> Most of this portfolio consists of properties at the early stages of exploration.

The number of properties in which these companies held interests worldwide at the end of 2004 increased by more than 700, or 11%, compared with the number that they held at the end of the previous year. More than 40% of the increase in the portfolio of interests in mineral properties occurred in Canada. This reflects, in part, the growing recognition by the global mining industry of the diamond and PGMs potential in this country.

## LARGER-COMPANY EXPLORATION MARKET IN CANADA

In 2004, the larger-company mineral exploration market in Canada was valued at \$622 million (Figure 5), up by almost \$169 million, or 37%, from roughly \$453 million in 2003. As in the previous two years, Canada, in 2004, remained the country where the global mineral exploration industry expected to be the most active. Australia held that position from 1992 through 2001.

In 2004, 69 of the world's larger domestic-based or foreign-based companies planned to explore for minerals in Canada, up from 41 companies in 2003. During 2004, almost 17% of the exploration efforts of the world's larger companies was expected to take place in Canada, roughly the same proportion as in 2003 (Figure 6). However, including the exploration programs of the smaller companies with those of the larger ones raises the proportion of the world's total exploration activity planned for Canada in 2004 to roughly 20%.

At the end of 2004, there were more than 3900 mineral properties with recent exploration activity in this country<sup>6</sup> (Figure 4), about 300 more properties than at the end of 2003.

## Larger Canadian-Based Companies in Canada

In 2004, 57 of the larger Canadian-based companies allocated, in total, almost \$485 million for mineral exploration in Canada (Figure 5). Their budgets were up by more than \$195 million, or 67%, from the \$290 million that they allocated in 2003. For the fifth year in a row, Canadian companies planned to spend more on mineral exploration in Canada than they planned to spend in all of the Latin American countries combined.

With increasing globalization, the share of the domestic exploration market controlled by Canadian-based companies generally fell annually as foreign-based companies increased the amount of activity that they undertook in this country. However, in 2004, the share of the larger-company mineral exploration market controlled by the larger Canadian-based companies grew to 78%, up from 64% in 2003. In 1992, domestic companies controlled 80% of the Canadian market. Since the early 1990s, the annual decrease in the share of the domestic exploration market controlled by the larger local firms has generally been more pronounced in the United States and Australia than in Canada.

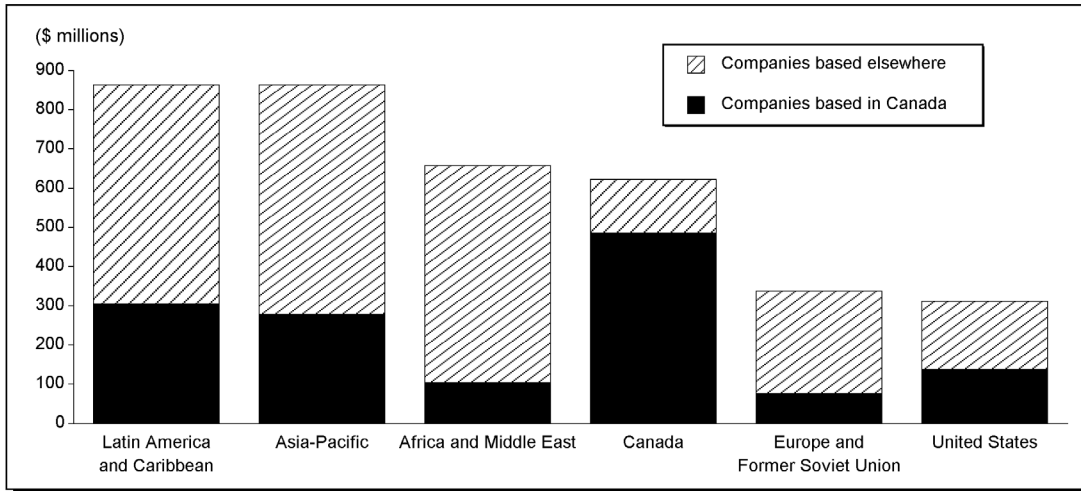
Because mineral exploration is such an international enterprise, the dominance of exploration programs by domestic firms is relatively uncommon. In 2004, there were only nine countries, other than Canada, where domestic companies accounted for more than half of the value of the larger-company market for mineral exploration: Australia (50%), Brazil (54%), Russia (57%), Sweden (75%), South Africa (80%), Kazakhstan (89%), and Japan, Lesotho and Spain, each with 100%. Although, during 2004, the larger-company mineral exploration market was valued at \$472 million in Australia, at \$224 million in South Africa, at \$193 million in Russia, and at \$166 million in Brazil, it was valued at only \$21 million in Sweden, at \$12 million in Spain, at \$6 million in each of Kazakhstan and Lesotho, and at less than \$2 million in Japan.

In 2004, the larger Canadian-based companies allocated 34% of their global exploration budgets to programs for Canada. In 1992, that proportion was 57%. In comparison, in 2004, the larger Australian-based companies allocated 48% of their global budgets to domestic exploration while American companies allocated 22%.

Although Canadian companies operate all over the world, Canada remains the country where they conduct the largest proportion, by far, of their global mineral exploration programs (Figure 7).

**Figure 5**  
**Exploration Budgets of the World's Larger Companies for Selected Regions of the World, 2004**

Companies With Worldwide Budgets of at Least \$4.0 Million for Precious-Metal, Base-Metal or Diamond Exploration

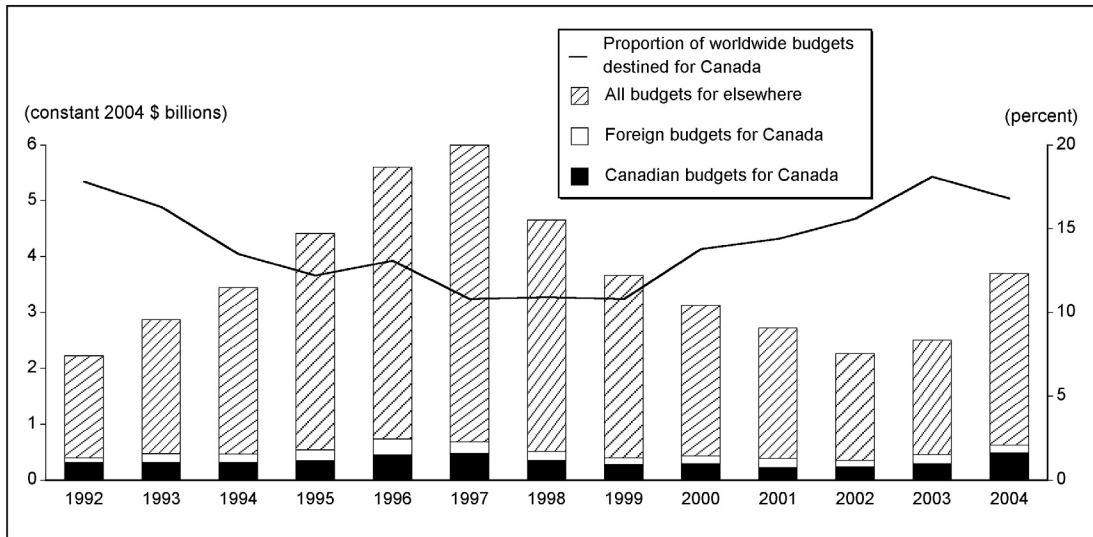


Source: Natural Resources Canada, based on *Corporate Exploration Strategies: A Worldwide Analysis*, Metals Economics Group, Halifax, Nova Scotia.

Notes: The worldwide exploration budgets of companies that intended to spend less than \$4.0 million (US\$3 million) in 2004 are excluded. The worldwide exploration budgets for other commodities such as uranium or industrial minerals are also excluded.

**Figure 6**  
**Exploration Budgets of the World's Larger Companies for Canada and Elsewhere, 1992-2004**

Companies With Worldwide Budgets of at Least \$4.0 Million in 2004 for Precious-Metal, Base-Metal or Diamond Exploration

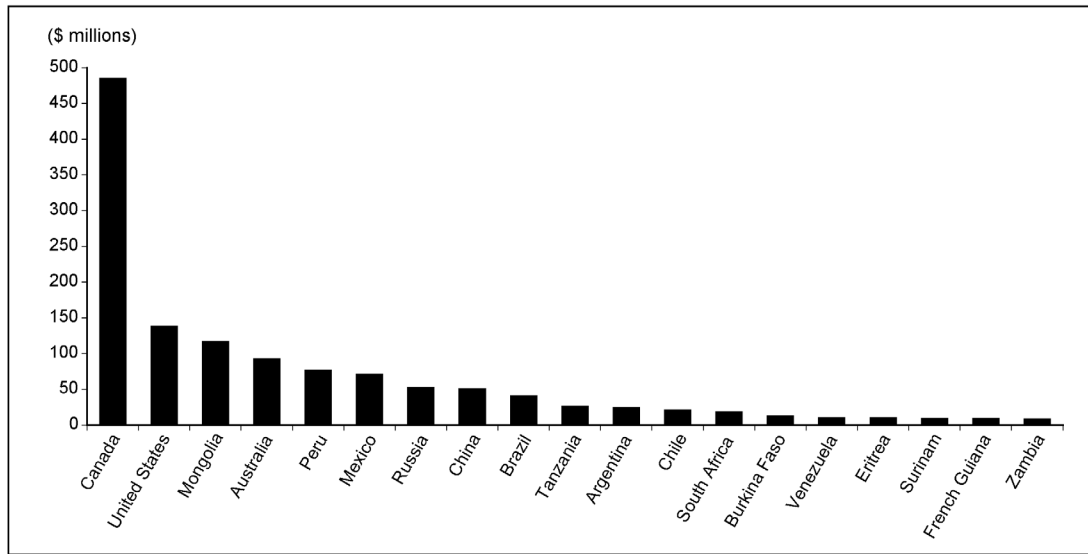


Source: Natural Resources Canada, based on *Corporate Exploration Strategies: A Worldwide Analysis*, Metals Economics Group, Halifax, Nova Scotia.

Notes: The worldwide exploration budgets of companies that intended to spend less than \$4.0 million (US\$3 million) in 2004 and an equivalent amount in previous years are excluded. The worldwide exploration budgets for other commodities such as uranium or industrial minerals are also excluded.

**Figure 7**  
**Exploration Budgets of the Larger Canadian-Based Companies, 2004 – Countries**  
**Accounting for 90% of Canadian Budgets**

Companies With Worldwide Budgets of at Least \$4.0 Million for Precious-Metal, Base-Metal or Diamond Exploration



Source: Natural Resources Canada, based on *Corporate Exploration Strategies: A Worldwide Analysis*, Metals Economics Group, Halifax, Nova Scotia.

Notes: The worldwide exploration budgets of companies that intended to spend less than \$4.0 million (US\$3 million) in 2004 are excluded. The worldwide exploration budgets for other commodities such as uranium or industrial minerals are also excluded.

## Foreign-Based Companies in Canada

During 2004, 12 of the larger foreign-based companies planned to spend, in total, almost \$138 million on mineral exploration in Canada (Figure 5), down by \$26 million, or 16%, from \$164 million in 2003. In 2004, foreign-based companies were expected to undertake 22% of all larger-company exploration programs planned for this country.

The larger foreign-based companies active in mineral exploration in Canada in 2004 included the BHP Billiton Group based in Australia; Phelps Dodge Corporation and Meridian Gold Inc., both based in the United States; the Anglo American group, Lonmin Plc, and Rio Tinto plc, all based in the United Kingdom; Boliden Limited, based in Sweden; Anglo American Platinum Corporation Limited, AngloGold Ashanti Limited, the De Beers group, and Gold Fields Limited, all based in South Africa; and Grupo México S.A. de C.V., based in Mexico.

In 2004, De Beers and BHP Billiton were expected to spend roughly \$52 million each on mineral exploration in Canada. The budgets of these companies represented the largest exploration programs planned for this country during the year. The entire budget of De Beers for Canada was directed at diamonds, as was almost all the budget of BHP Billiton. Together these companies accounted for 17% of all the larger-company exploration budgets for Canada.

## LARGER CANADIAN-BASED COMPANIES ABROAD

In 2004, the larger Canadian-based companies planned to spend almost \$929 million on mineral exploration outside of Canada (Figure 5). Their foreign budgets were up by \$395 million, or roughly 75%, from the more than \$534 million that they planned to spend in 2003.

Almost two-thirds of the worldwide budgets of the larger Canadian-based companies were allocated to programs abroad in 2004, about the same proportion as in each of the previous two years. The foreign programs of the larger Canadian-based companies, as a proportion of their domestic and foreign programs combined, peaked at over 78% in 1997. In 1992 that proportion was only 43%.

More than 70% of the 105 larger Canadian-based companies planned to work abroad during 2004: 48 of these companies (46%) planned to work only abroad, 26 of them (25%) planned to work in both Canada and abroad, and 31 of them (29%) planned to work only in Canada.

Although mining is a global enterprise, undertaking exploration programs in several countries simultaneously is relatively uncommon (Figure 8). In 2004, only 11 (10%) of the 105 larger Canadian-based companies budgeted for

programs in five or more countries, 21 (20%) budgeted for programs in two countries, and 59 (56%) budgeted for programs in only one country.

Smaller companies are less likely to undertake foreign operations than the larger ones. In 2004, only half of the 573 smaller Canadian-based companies budgeted for work abroad: 212 of these companies (37%) planned to work only abroad, 77 of them (13%) planned to work in both Canada and abroad, and 284 of them (50%) planned to work only in Canada. Of these 573 smaller Canadian-based companies, only 1 planned to work in five or more countries, 98 of them (17%) planned to work in two countries, and 455 of them (79%) planned to work in a single country.

At the end of 2004, companies of all sizes listed on Canadian stock exchanges held interests in a portfolio of almost 3200 mineral properties located abroad (Figure 4), up by over 400 properties compared with the number that they held at the end of the previous year.

Foreign properties represent almost 45% of the total mineral property portfolio held by companies of all sizes listed on Canadian stock exchanges. In 1992 that proportion was only one quarter. Apart from the United States, where companies of all sizes listed on Canadian stock exchanges have a substantial mining presence, about 30 other nations,

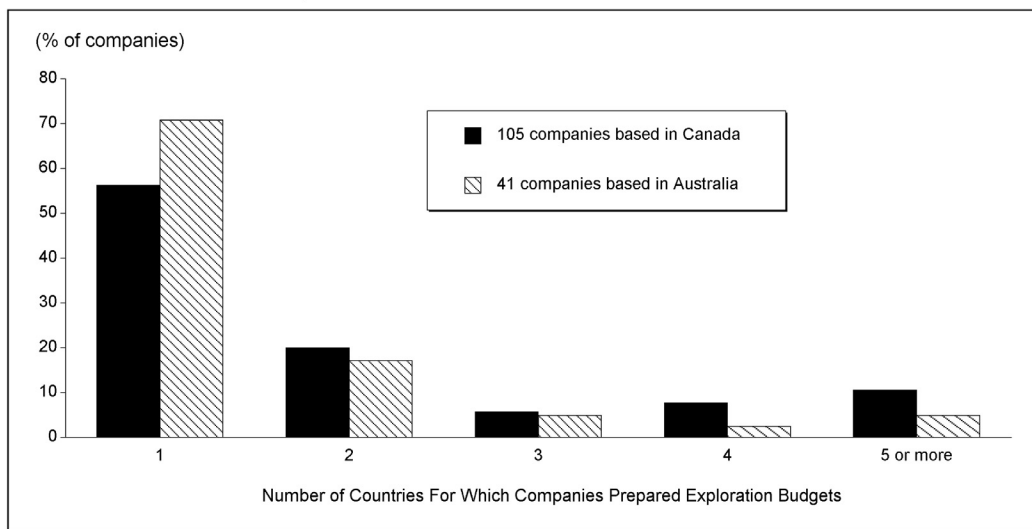
spread across the globe, account for much of the balance of their foreign mineral property portfolio (Figure 9).

In mid-2000, Canadian companies had interests in over 200 mines, smelters, refineries, plants under construction, or other advanced mineral development projects (Figure 10) in roughly 60 foreign countries.<sup>7</sup> Canadian companies also had interests in hundreds of other projects at the early stages of exploration in these countries and in more than 40 others.

At the beginning of 2003, there was at least US\$54 billion worth of new copper, diamond, gold, iron, nickel, PGMs, silver or zinc mining projects, each with a value of at least US\$65 million, either at the planning, feasibility, construction or deferred stage of development in Canada or elsewhere around the world<sup>8</sup> (Figure 11). Although, at that time, only 9% of the total value of those projects was expected to be invested in this country, Canadian companies were expected to participate in roughly 30% of all mining investment planned for Canada and the other regions of the globe.

The activities of Canadian mining companies in Canada and abroad have fostered the development, in this country, of over 2200 suppliers of specialized mining goods and services. Many of these suppliers, such as some drilling companies (Figure 12), export their products all over the world.<sup>9</sup>

**Figure 8**  
**Geographic Scope of Programs Planned by the Larger Exploration Companies Based in Selected Regions of the World, 2004**  
Companies With Worldwide Budgets of at Least \$4.0 Million for Precious-Metal, Base-Metal or Diamond Exploration

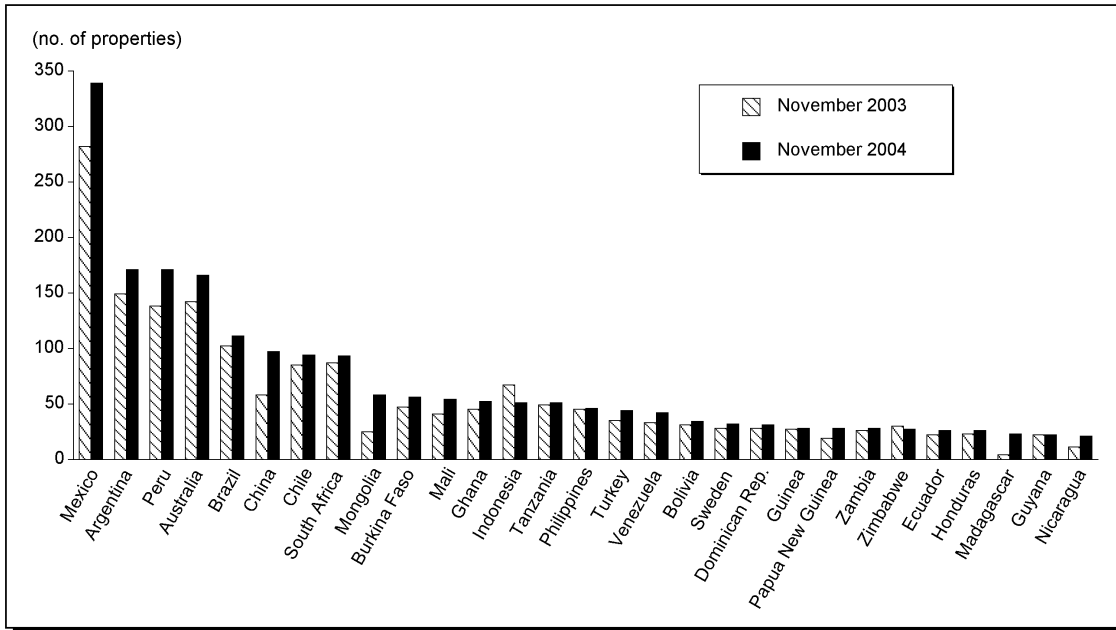


Source: Natural Resources Canada, based on *Corporate Strategies: A Worldwide Analysis*, Metals Economics Group, Halifax, Nova Scotia.

Notes: The worldwide exploration budgets of companies that intended to spend less than \$4.0 million (US\$3 million) in 2004 are excluded. The worldwide exploration budgets for other commodities such as uranium or industrial minerals are also excluded.

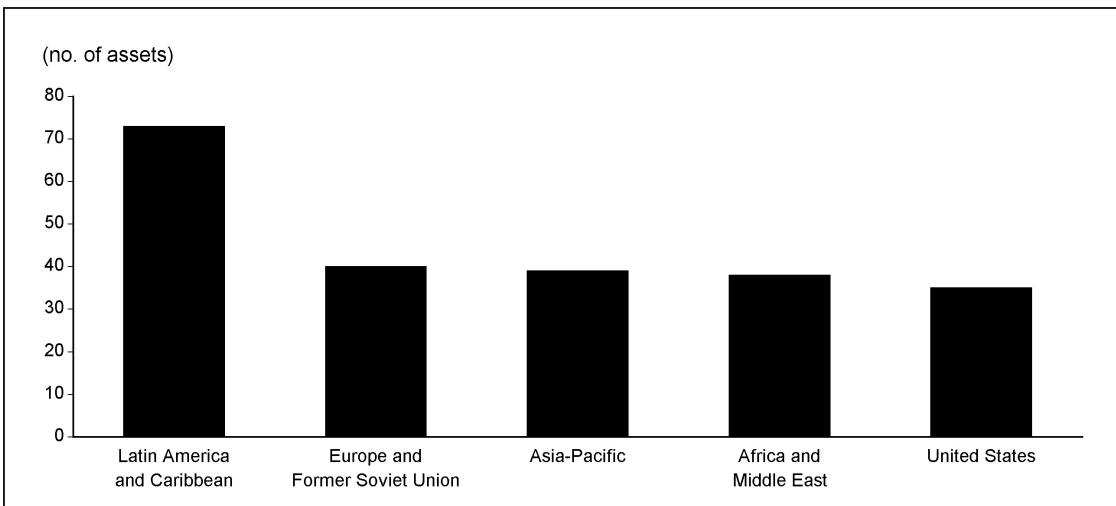


**Figure 9**  
**Canadian Mineral Property Portfolio Abroad, 2003 and 2004 – Countries Accounting for 80% of Canadian Holdings Located Outside the United States in 2004**  
 Companies of All Sizes Listed on Canadian Stock Exchanges



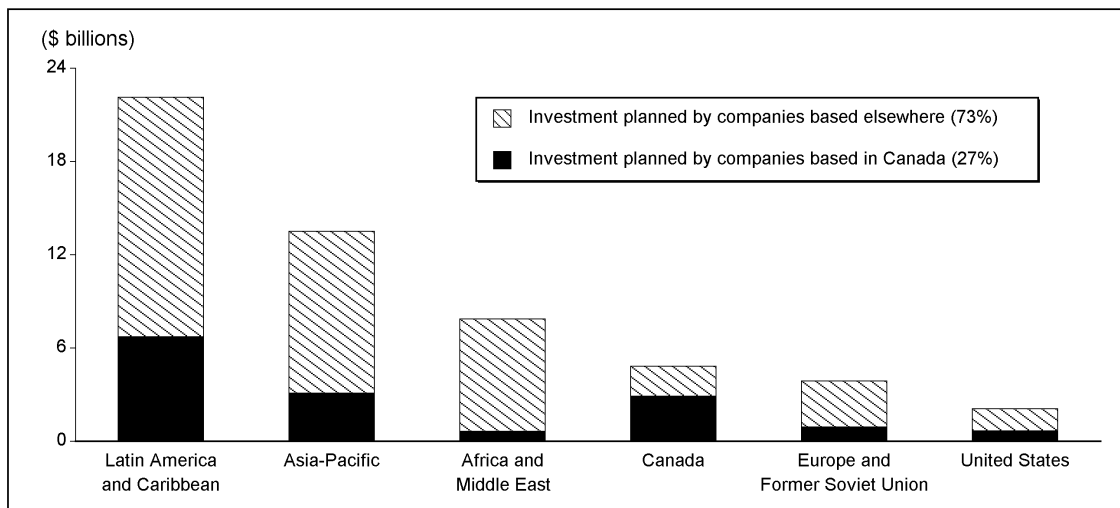
Source: Natural Resources Canada, based on InfoMine db, Robertson Info-Data Inc., Vancouver, British Columbia, and used under licence.

**Figure 10**  
**Mines, Refineries, Smelters and Advanced Projects Abroad in Which Canadian Companies Have an Interest**



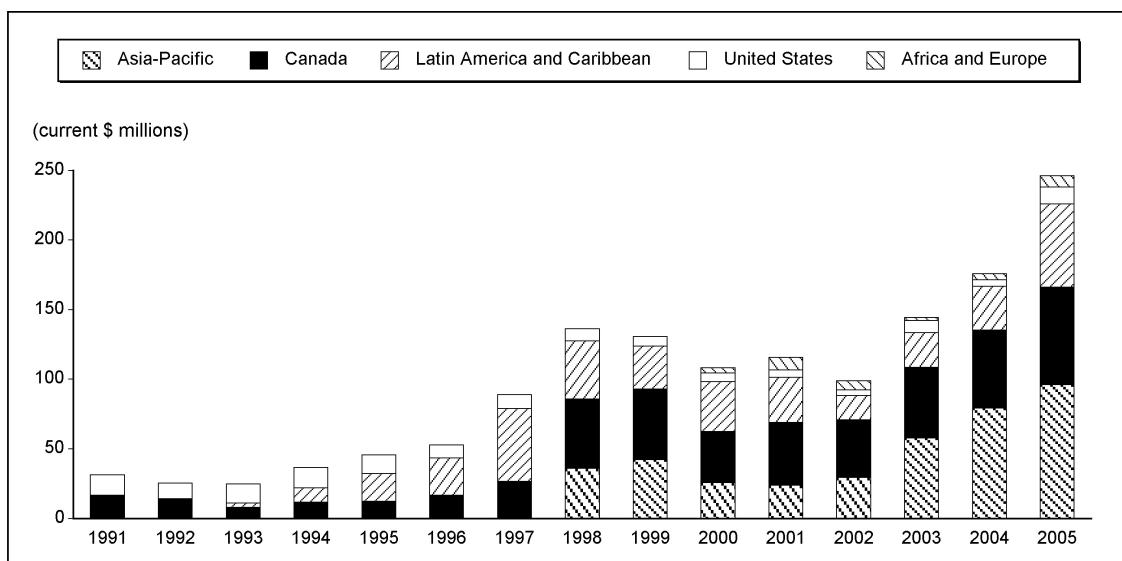
Source: Natural Resources Canada, based on company reports available in June 2000.

**Figure 11**  
**New Copper, Diamond, Gold, Iron, Nickel, PGMs, Silver and Zinc Mining Projects Each Requiring an Investment of US\$65 Million or More, January 2003**  
 Construction, Feasibility, Planned or Deferred Status – Total of US\$54 Billion



Source: Natural Resources Canada, based on *Engineering & Mining Journal*, January 2003, after Raw Materials Group, Stockholm.

**Figure 12**  
**Major Drilling Group International Inc., Drilling Revenues by Region, 1991-2005**  
 Fiscal Year Ending April 30th



Source: Natural Resources Canada, based on company reports.  
 Note: The company is based in Moncton, New Brunswick.

## United States

In 2004, the larger-company mineral exploration market in the United States was valued at \$311 million (Figure 5), or more than 8% of the \$3.7 billion larger-company market worldwide. Larger-company budgets for the United States were up by \$128 million, or by more than 70%, compared with those of the previous year. Twenty-one of the larger Canadian-based companies planned to spend, in total, over \$137 million in the United States, up from \$89 million in 2003.

The share of the larger-company mineral exploration market held by Canadian-based companies in the United States in 2004 stood at 44%, down somewhat from 49% the previous year. The United States ranks second, after Canada, in terms of countries where Canadian companies are the most active in mineral exploration (Figure 7).

During 2004, Canadian companies planned to spend 50% more on mineral exploration in the United States than domestic firms. The annual budgets of American companies for domestic exploration increased for the first time since 1997. The budgets of domestic companies for the United States had generally been falling annually from a high of over \$290 million in 1992. Although American companies accounted for almost 60% of the value of exploration programs in their country in 1992, their activities represented only 29% in 2004. Since 1998, American companies have allocated less than one-quarter of their worldwide budgets to domestic exploration.

Of all the larger Canadian-based companies operating in the United States, Barrick Gold Corporation, Placer Dome Inc., Northern Dynasty Minerals Ltd., Kinross Gold Corporation, NovaGold Resources Inc., American Bonanza Gold Corp. and Emgold Mining Corporation planned the largest mineral exploration programs for that country during 2004. Together these companies planned to spend almost \$80 million, equivalent to more than three-quarters of the value of all programs planned by the larger Canadian-based companies for that country.

Barrick was expected to spend more than \$36 million in the United States on further exploration for gold at or in the vicinity of its mines in Nevada. Placer Dome planned to spend more than \$19 million on exploration in the United States. The company planned to spend almost \$12 million of that amount at the Cortez, Bald Mountain and Turquoise Ridge (Getchell) gold mines, also in Nevada. During 2004, the company also continued to assess the Donlin Creek gold project, located about 20 km north of Crooked Creek, Alaska. That project envisages a mine that would produce 600 000 oz/y. Measured and indicated resources at Donlin Creek are estimated at 82 Mt grading 3 g/t gold. The company planned to spend the rest of its exploration budget for the United States on grass-roots exploration for gold elsewhere in Nevada.

Northern Dynasty planned to spend more than \$15 million on advanced exploration at the Pebble deposit in Alaska. Measured and indicated resources at Pebble are estimated at 3.030 billion t grading 0.32 g/t gold, 0.28% copper and 0.015% molybdenum.

Kinross was expected to spend \$10 million on mine-site and advanced exploration for gold. NovaGold also planned to spend almost \$10 million, much of it on advanced exploration at the Rock Creek deposit in Alaska. The company is assessing the feasibility of building a mine at Rock Creek to produce 100 000 oz/y by late 2006 or early 2007. Measured and indicated resources at Rock Creek are estimated at 6.4 Mt grading 2.7 g/t gold.

American Bonanza planned to spend \$8 million on advanced exploration, mainly at the Copperstone gold deposit in Arizona. Emgold planned to spend over \$7 million exploring for gold at the Idaho-Maryland deposit in California.

At the end of 2004, companies of all sizes listed on Canadian stock exchanges held interests in 680 mineral properties in the United States (Figure 4), roughly 100 more than in which they held interests at the end of the previous year. In 2000, companies of all sizes listed on Canadian stock exchanges had interests in properties located in 22 states, but their efforts were concentrated mainly in the western part of the country in Nevada, Alaska, California, Arizona, Montana, Idaho, Wyoming, Colorado, Washington, Utah and South Dakota in decreasing order.<sup>10</sup> That year, Nevada alone accounted for more than 250 of their interests in mineral properties, or for almost 40% of the total Canadian portfolio in the United States.

Although Canadian companies have expanded considerably their activities in Latin America, Africa and Asia since the early 1990s, the United States is likely to remain, for the foreseeable future, the foreign country where they hold their largest portfolio of mineral properties. At the end of 2004, the United States accounted for over 20% of all interests in properties held abroad by companies of all sizes listed on Canadian stock exchanges.

## Latin America and the Caribbean

In 2004, the larger-company mineral exploration market in Latin America and the Caribbean was valued at over \$860 million (Figure 5), or 23% of the \$3.7 billion larger-company market worldwide. The larger Canadian-based companies planned to spend \$305 million in the region, up by \$116 million, or more than 60%, from \$189 million in 2003.

After Canada, Latin America and the Caribbean is the region of the world where Canadian companies are currently the most active in mineral exploration (Figure 5). However, from 1995 to 1999, Canadian companies spent more on mineral exploration in Latin America and the

Caribbean than they did in this country. Over the 12-year period 1991-2002, the global mining industry invested more than US\$7.2 billion (current dollars) in mineral exploration in Latin America and the Caribbean. Companies listed on Canadian stock exchanges made one third of that investment.<sup>11</sup>

In 2004, Canadian companies held 35% of the larger-company mineral exploration market in Latin America and the Caribbean, up from 29% the previous year. The Canadian share is the largest, by far, of all international competitors in the region and is roughly \$50 million more than domestic companies planned to spend there. The share of the exploration market held by local companies in the region stood at 30% in 2004. In contrast, in 1994, local companies held less than 14% of the market. However, their share has generally been rising each year since then.

At the end of 2004, companies of all sizes listed on Canadian stock exchanges held interests in almost 1200 mineral properties in Latin America and the Caribbean, about 160 more than in 2003. Since 1996, the number of mineral property interests held by Canadian companies in the region has exceeded the number held in the United States (Figure 4).

### **Mexico**

In 2004, the larger-company mineral exploration market in Mexico was valued at \$146 million, or roughly 4% of the \$3.7 billion larger-company market worldwide. Larger-company budgets for Mexico were roughly \$50 million more than those of the previous year.

Mexico is one of the relatively few countries where domestic companies carry out a significant proportion of mineral exploration programs, even if it is not the dominant share. Together the Mexican companies Industrias Peñoles, S.A. de C.V. and Grupo México were expected to spend about \$55 million. This represents almost 40% of the exploration programs planned for that country during 2004.

In 2004, Mexico ranked second in Latin America, and sixth in the world, in terms of countries where Canadian companies are the most active in mineral exploration (Figure 7). Twelve of the larger Canadian-based companies planned exploration programs for Mexico during 2004. These companies were expected to spend, in total, \$70 million, which represents almost half of the larger-company market in that country.

Gammon Lake Resources Inc. planned to spend almost \$14 million on exploration in Mexico, most of it at the Ocampo gold-silver project in the state of Chihuahua. The company is building an open-pit and underground mine at Ocampo that is expected to produce 170 000 oz of gold and 6 million oz of silver annually. Production is expected to start in early 2006. Proven and probable

reserves at Ocampo are estimated at 33.6 Mt grading 1.25 g/t gold and 52 g/t silver.

Wheaton River Minerals Ltd. (now Goldcorp Inc.) was expected to spend almost \$11 million exploring for gold and silver at its mining operations in the district of San Dinás and in the state of Querétaro, as well as elsewhere in Mexico. The company is also developing the Los Filos gold deposit in the state of Guerrero where production is expected to begin in early 2006.

Minefinders Corporation Ltd. planned to spend more than \$9 million in the country, most of it at the Dolores gold-silver project in the state of Chihuahua. At year-end, the company was completing a final feasibility study for an open-pit mine at Dolores. Measured and indicated resources at Dolores are estimated at 101 Mt grading 0.8 g/t gold and 39 g/t silver.

Scorpio Mining Corporation planned to spend \$8.0 million for advanced exploration at the Nuestra Señora silver project in the state of Sinaloa. Mexgold Resources Inc. planned to spend more than \$7 million exploring for gold and silver at the El Cubo mine in the state of Guanajuato and at the Guadalupe property in the state of Chihuahua.

Teck Cominco Limited was expected to spend more than \$6 million for exploration in Mexico. The company is carrying out advanced exploration at the Morelos gold deposit in the state of Guerrero. Towards the end of 2001, the company completed a feasibility study that estimated at almost US\$246 million the capital cost of building a 15 000-t/d open-pit mine at the San Nicolas copper-zinc-gold-silver deposit located in the state of Zacatecas. Resources included in the mine plan are estimated at 65 Mt grading 1.32% copper, 2.04% zinc, 0.53 g/t gold, and 32.1 g/t silver. That project is currently on care and maintenance.

At the end of 2004, companies of all sizes listed on Canadian stock exchanges held interests in about 340 mineral properties in Mexico, about 60 more than at the end of 2003.<sup>12</sup>

### **South America**

In 2004, the larger-company mineral exploration market in South America was valued at \$654 million, or almost 18% of the \$3.7 billion larger-company market worldwide. Thirty-three of the larger Canadian-based companies planned to spend, in total, \$211 million in the region, about \$70 million more than during the previous year. Their programs accounted for 32%, and the largest share, of all larger-company mineral exploration activity planned there.

Canadian companies held the dominant share of the larger-company mineral exploration market in Argentina, Bolivia, Columbia, Ecuador, French Guiana, Guyana, Peru

and Surinam. Peru, Brazil, Argentina and Chile rank fifth, ninth, eleventh and twelfth, respectively, in the world in terms of countries where Canadian companies are the most active in mineral exploration (Figure 7).

In Peru, Barrick's exploration budget was the second largest for that country, accounting for more than 10% of all larger-company exploration programs expected to take place there in 2004. Barrick planned to spend over \$25 million, much of it exploring for gold at and around the Lagunas Norte gold deposit in the Alto Chicama district. At year-end, Barrick was in the process of building, at a cost of US\$340 million, a 550 000-oz/y mine at Lagunas Norte. Peru Copper Inc. planned to spend almost \$19 million on advanced exploration at the Toromocho copper-molybdenum-silver deposit in the central part of the country. That deposit contains an inferred resource of 655 Mt grading 0.61% copper. Southwestern Resources Corp. planned to spend almost \$7 million on grass-roots exploration at the Liam gold-silver project in the department of Cuzco, as well as on exploration elsewhere in the country.

In Argentina, Barrick was building at year-end, at Veladero in the province of San Juan, an open-pit gold mine. That mine, to be built at a capital cost of US\$540 million, is expected to produce 530 000 oz of gold annually. Proven and probable reserves at Veladero are estimated at 360 Mt grading 1.1 g/t gold. Tenke Mining Corp. planned to spend over \$5 million on exploration for gold and copper at the Vicuna, Josemaria and Batidero properties in the Cuyo region and at the El Bagual property in Patagonia. IMA Explorations Inc. planned to spend \$4 million on advanced exploration at the Navidad silver-lead-copper-zinc property in the province of Chubut.

In Chile, Barrick planned to spend about \$3 million on grass-roots exploration for gold at the Jeronimo property in the north-central portion of the country. However, in 2006, the company plans to start building an open-pit gold-silver mine at Pascua-Lama that straddles the border between Argentina and Chile. That mine is expected to produce 1 200 000 oz of gold equivalent annually at a capital cost of roughly US\$1.5 billion. Proven and probable reserves at Pascua-Lama are estimated at 327 Mt grading 1.7 g/t gold and 61.1 g/t silver. Production at Pascua-Lama is expected to begin in 2009.

In Brazil, Yamana Gold Inc. was expected to spend over \$12 million exploring at or in the vicinity of the Fazenda Brasileiro mine in the state of Goais, and at the São Francisco deposit in the state of Mato Grosso. At year-end, Yamana Gold was building, at a capital cost of US\$46.1 million, a 109 000-oz/y mine at São Francisco. As well, the company was building, at a capital cost of US\$178 million, an open-pit mine at the Chapada deposit, in the state of Goais, to produce 134 000 oz of gold and 59 000 t of copper annually. The company was also

preparing a feasibility study for an open-pit gold mine at the São Vicente deposit in the state of Mato Grosso. Desert Sun Mining Corp. planned to spend almost \$7 million re-developing the Jacobina underground gold mine in the state of Bahia. A feasibility study completed in 2003 estimated the capital cost of re-activating Jacobina to produce 100 000 oz/y at US\$34 million.

In Bolivia, Eaglecrest Explorations Ltd. planned to spend \$8 million on grass-roots exploration for gold at the San Simon property in the province of Itenez. In Colombia, Greystar Resources Ltd. planned to spend over \$4 million on advanced exploration at the Angostura gold-silver-copper project in the province of Santander.

In Ecuador, Corriente Resources Inc. planned to spend more than \$4 million on advanced exploration, much of it at the Mirador porphyry copper deposit where a feasibility study for an open-pit operation was in progress at year-end. IAMGOLD Corporation planned to spend almost \$3 million on grass-roots exploration at the Quimsacocha property in the southern part of the country.

In French Guiana, Cambior Inc. planned to spend almost \$9 million, most of it on advanced exploration at the Camp Caiman gold deposit. At year-end, the company was preparing a feasibility study for that deposit. In Surinam, the company planned to spend \$6 million to explore at the Rosebel mine, which achieved commercial production in February at a capital cost of US\$95 million.

In Venezuela, Bolivar Gold Corp. planned to spend more than \$6 million on advanced exploration at the Choco gold deposit in the district of El Callao. Proven and probable reserves at Choco are estimated at 21.4 Mt grading 1.9 g/t gold.

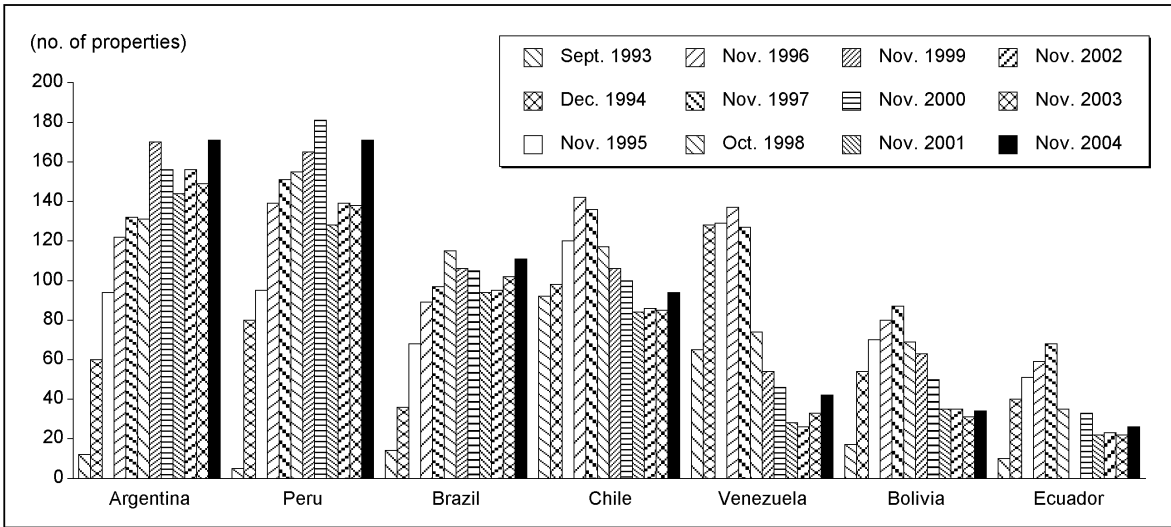
At the end of 2004, companies of all sizes listed on Canadian stock exchanges held interests in 715 mineral properties throughout South America, about 85 more than at the end of the previous year. They held interests in 170 properties in both Argentina and Peru, in 110 in Brazil, in more than 90 in Chile, in more than 40 in Venezuela, and in roughly 30 in each of Bolivia and Ecuador (Figure 13).

### **Central America**

In 2004, the larger-company mineral exploration market in Central America was valued at \$26 million, or less than 1% of the \$3.7 billion larger-company market worldwide. The larger Canadian-based companies planned to spend \$16 million in the region.

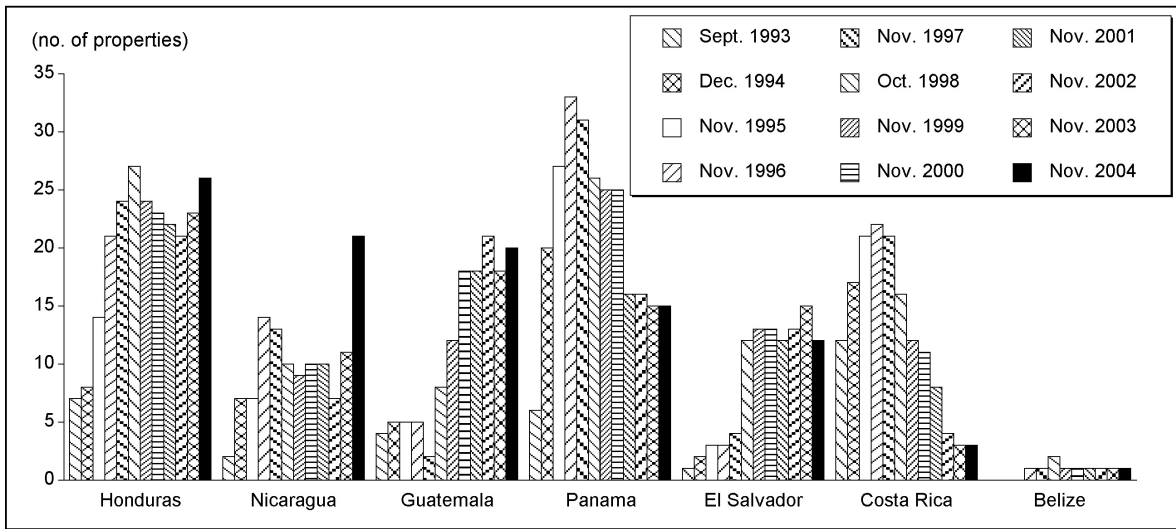
In El Salvador, Pacific Rim Mining Corp. planned to spend almost \$5 million on grass-roots and advanced exploration at or in the vicinity of the El Dorado gold-silver project located in the department of Cabañas.

**Figure 13**  
**Canadian Mineral Property Portfolio in South America, 1993-2004 –**  
**Countries Accounting for 90% of Canadian Holdings in 2004**  
 Companies of All Sizes Listed on Canadian Stock Exchanges



Source: Natural Resources Canada, based on *MIN-MET CANADA* for 1993-97 and InfoMine db for 1998-2004, Robertson Info-Data Inc., Vancouver, British Columbia, and used under licence.

**Figure 14**  
**Canadian Mineral Property Portfolio in Central America, 1993-2004**  
 Companies of All Sizes Listed on Canadian Stock Exchanges



Source: Natural Resources Canada, based on *MIN-MET CANADA* for 1993-97 and InfoMine db for 1998-2004, Robertson Info-Data Inc., Vancouver, British Columbia, and used under licence.

In Guatemala, Jaguar Nickel Inc. planned to spend over \$4 million on grass-roots and advanced exploration at the Sechol nickel-cobalt project in the east-central part of the country.

In Nicaragua, Radius Gold Inc. planned to spend \$6 million on grass-roots exploration at the El Pavon and other gold projects in the country.

Central America is one of the regions of the world where the smaller companies, and those based in Canada in particular, account for a substantial proportion of the mineral exploration activity that usually takes place there. In 2004, the smaller Canadian-based companies were expected to account for roughly 70% of the \$10 million smaller-company exploration market in that region.

At the end of 2004, companies of all sizes listed on Canadian stock exchanges held interests in roughly 100 mineral properties throughout Central America. They held interests in more than 25 in Honduras, in 20 in each of Nicaragua and Guatemala, and in 10 or more in each of El Salvador and Panama (Figure 14).

### **Caribbean**

In 2004, the larger-company mineral exploration market in the Caribbean was valued at roughly \$8 million, or less than 1% of the \$3.7 billion larger-company market worldwide. Canadian-based companies were expected to undertake almost all of the larger-company exploration programs planned for the region.

In Cuba, Holmer Gold Mines Ltd. (now Lake Shore Gold Corp.) planned to spend \$6 million on advanced exploration at the Loma Hierro silver project in the province of Pinar del Río.

In the Dominican Republic, Placer Dome planned to spend more than \$1 million on grass-roots exploration in the vicinity of the Pueblo Viejo gold deposit.

At the end of 2004, companies of all sizes listed on Canadian stock exchanges held interests in roughly 40 mineral properties in the Caribbean, about 30 of them in the Dominican Republic.

### **Europe and the Former Soviet Union**

In 2004, the larger-company mineral exploration market in Europe and the former Soviet Union was valued at \$337 million (Figure 5), or roughly 9% of the \$3.7 billion larger-company market worldwide. From 2003 to 2004, the market in the region grew by almost \$150 million. The larger Canadian-based companies planned to spend \$76 million in the region, equivalent to 23% of the market there and roughly double the amount that they planned to spend there the previous year.

At the end of 2004, companies of all sizes listed on Canadian stock exchanges held interests in roughly 230 mineral properties in Europe and the FSU (Figure 4).

#### **Western Europe**

In 2004, the larger-company mineral exploration market in western Europe was valued at \$84 million, or roughly 2% of the \$3.7 billion larger-company market worldwide. The larger Canadian-based companies planned to spend about \$4 million in the region, equivalent to 5% of the market.

In Finland, Inmet Mining Corporation planned to spend \$1.5 million on mine-site exploration at the Pyhäsalmi copper-zinc underground operation in the central part of the country. Inco Limited planned to spend more than \$1.5 million on grass-roots exploration at the Inari nickel-copper-PGMs project in the northern part of the country.

In Ireland, Sabina Resources Limited planned to spend \$0.3 million on grass-roots exploration for zinc-lead in East County Galway. Galantas Gold Corporation, as well, planned to spend \$0.3 million on grass-roots exploration in Ireland. The company is also developing the Omagh gold deposit in County Tyrone.

In Sweden, Equinox Minerals Limited planned to spend \$0.1 million on grass-roots exploration for gold in the northern part of the country.

At the end of 2004, companies of all sizes listed on Canadian stock exchanges held interests in more than 120 mineral properties in western Europe. They held interests in roughly 30 in Sweden and in 15 or more in each of Finland and Spain (Figure 15).

#### **Eastern Europe**

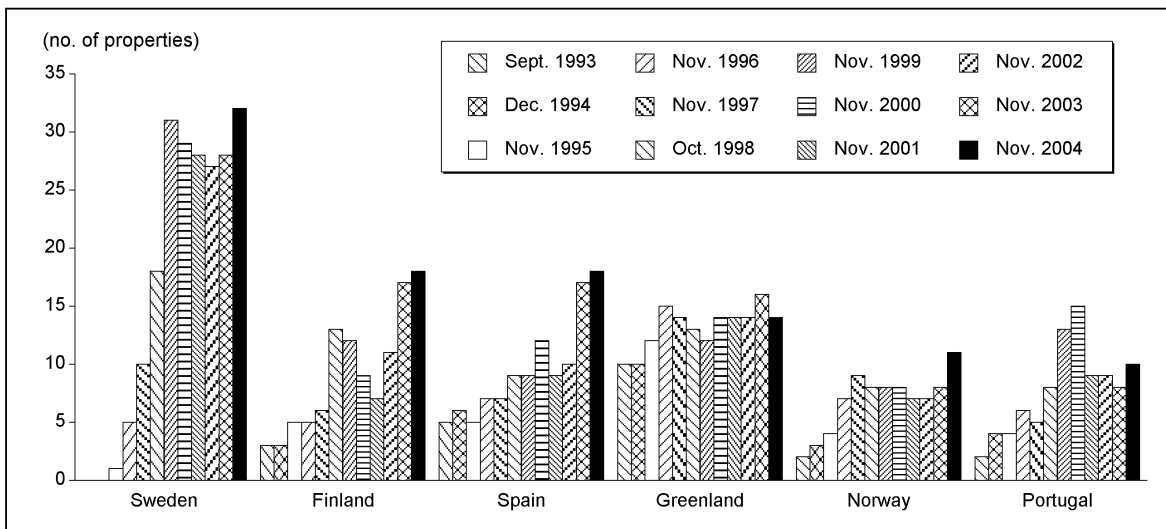
In 2004, the larger-company mineral exploration market in eastern Europe was valued at roughly \$22 million, or less than 1% of the \$3.7 billion larger-company market worldwide. The larger Canadian-based companies planned to spend about \$10 million in the region, equivalent to roughly 45% of the market there.

In Greece, European Goldfields Limited planned to spend almost \$3 million on advanced exploration in the northern part of the country. The company is developing the Mavres-Petres and the Madem Lakkos lead-zinc-silver deposits located at Stratoni. It is also updating feasibility studies for both the Olympias gold-lead-zinc-silver deposit and the Skouries copper-gold deposit.

In Romania, European Goldfields planned to spend almost \$3 million on advanced exploration at the Certej gold-silver deposit.

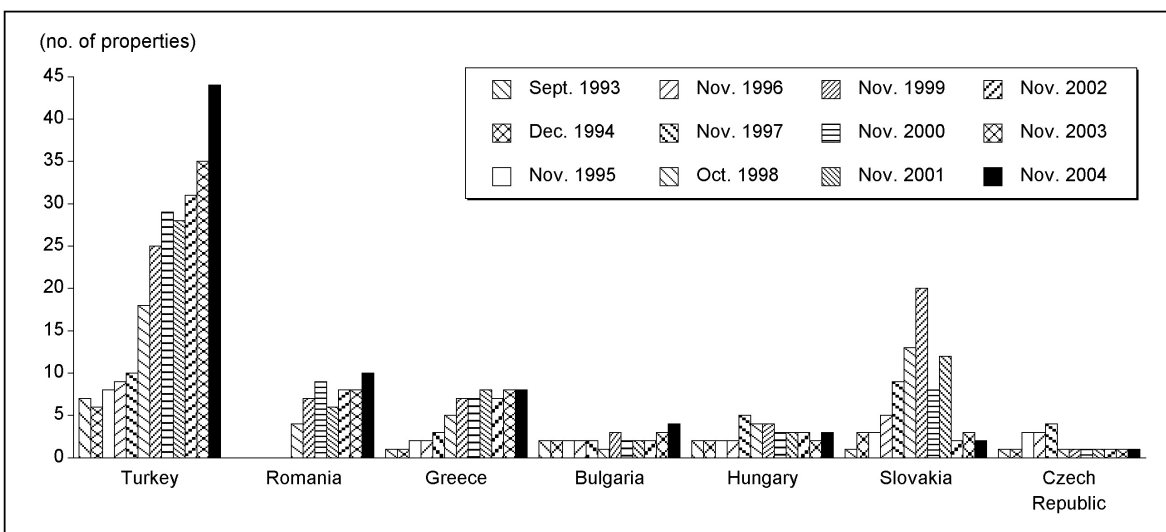
In Turkey, Inmet planned to spend \$2 million on exploration at the Çayeli underground mine in the province of

**Figure 15**  
**Canadian Mineral Property Portfolio in Western Europe, 1993-2004 –**  
**Countries Accounting for 90% of Canadian Holdings in 2004**  
 Companies of All Sizes Listed on Canadian Stock Exchanges



Source: Natural Resources Canada, based on *MIN-MET CANADA* for 1993-97 and InfoMine db for 1998-2004, Robertson Info-Data Inc., Vancouver, British Columbia, and used under licence.

**Figure 16**  
**Canadian Mineral Property Portfolio in Eastern Europe, 1993-2004 –**  
**Countries Accounting for 95% of Canadian Holdings in 2004**  
 Companies of All Sizes Listed on Canadian Stock Exchanges



Source: Natural Resources Canada, based on *MIN-MET CANADA* for 1993-97 and InfoMine db for 1998-2004, Robertson Info-Data Inc., Vancouver, British Columbia, and used under licence.



Rize. Inmet is also developing the Cerattepe deposit in the province of Artvin. A feasibility study completed in mid-2004 estimated the capital cost of building a 250 000-t/y underground mine there at US\$46 million. Production is expected to begin in late 2006. Proven and probable reserves at Cerattepe are estimated at 1.6 Mt grading 8.8% copper.

At the end of 2004, companies of all sizes listed on Canadian stock exchanges held interests in over 70 mineral properties in eastern Europe. They held interests in more than 40 properties in Turkey and in roughly 10 in each of Greece and Romania (Figure 16).

### Former Soviet Union

In 2004, the larger-company mineral exploration market in eight countries of the FSU was valued at \$221 million,<sup>13</sup> or 6% of the \$3.7 billion larger-company market worldwide. From 2003 to 2004, the market in the FSU grew by over \$130 million. The larger Canadian-based companies planned to spend \$61 million in the FSU, more than double what they planned to spend in 2003.

In Russia, the larger Canadian-based companies planned to spend more than \$50 million, up by \$30 million compared with 2003. These Canadian programs for Russia in 2004 were equivalent to 27% of the market in that country. Bema Gold Corporation alone planned to spend more than \$40 million, about 80% of it for advanced exploration at the Kupol gold-silver deposit located in the autonomous region of Chukotka in the federal district of the Russian

Far East. Kupol could be in production by 2008. Bema was expected to spend the rest of its exploration budget for Russia at the Julietta underground mine located in the district of Omsukchansk, in the region of Magadan.

In Kyrgyzstan, Centerra Gold Inc. planned to spend almost \$6 million on exploration at the Kumtor open-pit gold mine.

At the end of 2004, companies of all sizes listed on Canadian stock exchanges held interests in roughly 40 mineral properties in six countries of the FSU (Figure 17). The number of properties in which they held interests in Russia stood at roughly 15.

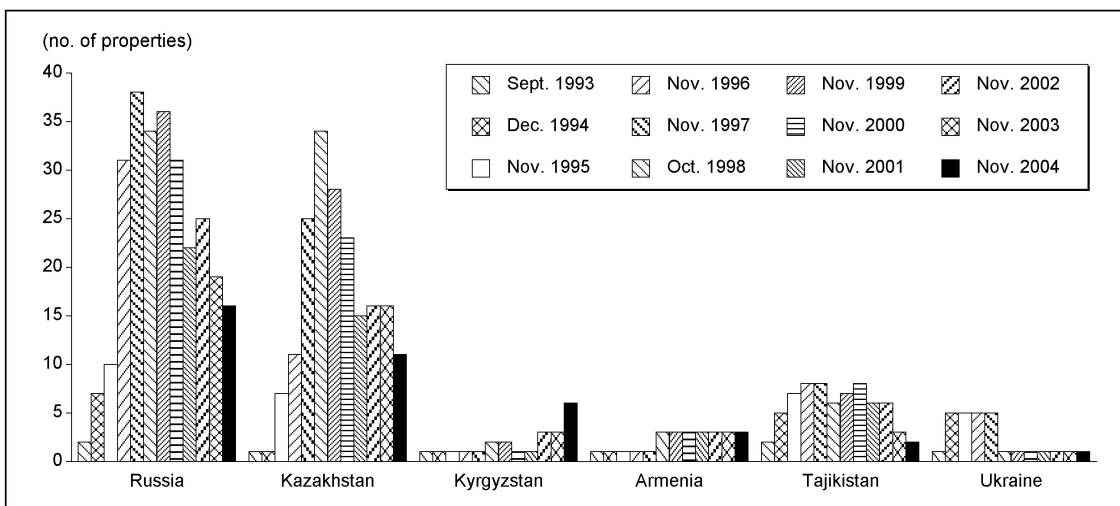
### Africa and the Middle East

In 2004, the larger-company mineral exploration market in Africa and the Middle East was valued at \$657 million (Figure 5), or roughly 18% of the \$3.7 billion larger-company market worldwide. For the second year in a row, substantial growth occurred in the market for exploration in the region. From 2003 to 2004, exploration budgets for the region grew by over \$190 million, or by over 40%. Africa accounts for almost all of the mineral exploration market in Africa and the Middle East.

### Africa

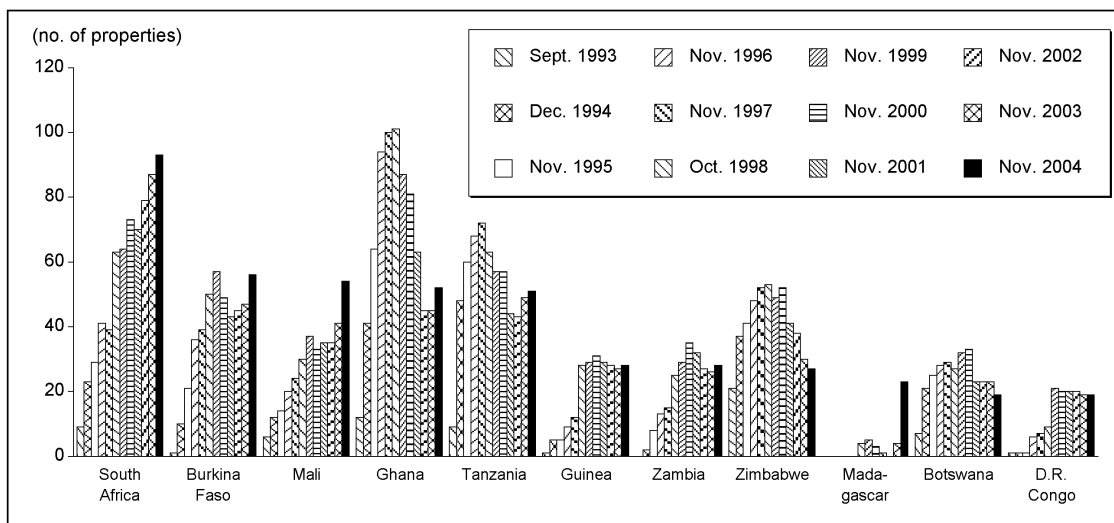
In 2004, the larger-company mineral exploration market in Africa was valued at \$655 million, or almost 18% of the

**Figure 17**  
**Canadian Mineral Property Portfolio in the Former Soviet Union, 1993-2004 –**  
**Countries With Canadian Holdings in 2004**  
Companies of All Sizes Listed on Canadian Stock Exchanges



Source: Natural Resources Canada, based on *MIN-MET CANADA* for 1993-97 and InfoMine db for 1998-2004, Robertson Info-Data Inc., Vancouver, British Columbia, and used under licence.

**Figure 18**  
**Canadian Mineral Property Portfolio in Africa, 1993-2004 –**  
**Countries Accounting for 75% of Holdings in 2004**  
 Companies of All Sizes Listed on Canadian Stock Exchanges



Source: Natural Resources Canada, based on *MIN-MET CANADA* for 1993-97 and InfoMine db for 1998-2004, Robertson Info-Data Inc., Vancouver, British Columbia, and used under licence.

\$3.7 billion larger-company market worldwide. The larger Canadian-based companies planned to spend \$104 million in Africa, equivalent to roughly 16% of the larger-company market on that continent. From 2003 to 2004, the larger Canadian-based companies more than doubled their budgets for Africa.

The larger Canadian-based companies planned to spend \$26 million in Tanzania. That nation ranked 10th in the world in terms of countries where Canadian companies are the most active in mineral exploration (Figure 7). Barrick alone was expected to spend over \$17 million there, the largest program for that country in 2004. The company planned to explore for gold at and in the vicinity of the Bulyanhulu underground mine located south of Lake Victoria. At year-end, Barrick and Northern Mining Explorations Ltd. were developing, at a capital cost of roughly US\$50 million, an open-pit gold mine at Tulawaka. That operation is expected to produce 100 000 oz of gold annually over a period of four years at a cash cost of US\$175/oz. Placer Dome planned to spend almost \$9 million in Tanzania, most of it at the North Mara open-pit mine in the northern part of the country.

In Botswana, LionOre Mining International Ltd. planned to spend over \$3 million on exploration, most of it at the Phoenix nickel-copper-cobalt-PGMs open-pit mine located east of Francistown in the northeastern part of that country.

In Burkina Faso, Orezone Resources Inc. planned to spend \$4 million on exploration for gold at the Essakan deposit

and at the Séguenega (Sega) and Bondigui (Bondi) properties. Indicated and inferred resources at Essakan are estimated at 54.7 Mt grading 1.5 g/t gold.

In the Central African Republic, Axmin Inc. planned to spend over \$5 million on grass-roots exploration for gold, most of it at the Passendro project where indicated and inferred resources are estimated at 32 Mt grading 2.1 g/t gold.

In the Democratic Republic of the Congo, Banro Corporation planned to spend \$4 million exploring at a number of properties located in the Twangiza-Namoya gold belt in the provinces of South Kivu and Maniema.

In Eritrea, Nevsun Resources Ltd. planned to spend \$10 million on grass-roots exploration for gold-copper-zinc-silver at the Bisha property located in the Gash-Barka district.

In Ghana, St. Jude Resources Ltd. planned to spend \$2.5 million exploring for gold at the Hwini-Butre and Benso properties.

In southwestern Mali, Nevsun planned to spend \$0.7 million for advanced exploration at the Tabakoto project in the district of Kenieba. The company is building there, at a capital cost of US\$63 million, an open-pit mine to produce roughly 100 000 oz of gold annually. Commercial production is expected to start in early 2006. The Tabakoto deposit contains proven and probable reserves estimated at 3.4 Mt grading 5.26 g/t gold.

In South Africa, Great Basin Gold Ltd. planned to spend almost \$5 million exploring for gold on the Burnstone property located in the province of Mpumalanga. SouthernEra Resources Limited (now Southern Platinum Corp.) planned to spend over \$4 million exploring for PGMs-gold-nickel-copper at the Messina mine in the province of Limpopo and at the Millenium property in the province of Mpumalanga.

In Zambia, First Quantum Minerals Ltd. planned to spend \$4 million exploring for copper at the Kashime (Mkushi), Mwinilunga and Luamata properties. Equinox planned to spend \$3.7 million on advanced exploration at the Lumwana property in the North Western province. The company is developing Lumwana for production as early as 2007. Proven and probable reserves in the Malundwe and Chimiwungo deposits at Lumwana are estimated at 205.3 Mt grading 0.61% copper, 0.009 g/t gold and 58 ppm cobalt.

At the end of 2004, companies of all sizes listed on Canadian stock exchanges held interests in over 600 mineral properties located in 33 countries on the African continent. From 2003 to 2004, the number of properties in which they held interests grew by about 40. Canadian companies held interests in over 90 properties in South Africa; in more than 50 in each of Burkina Faso, Mali, Ghana and Tanzania; and in more than 20 in each of Guinea, Madagascar, Zambia and Zimbabwe (Figure 18).

### **Middle East**

In 2004, the larger-company mineral exploration market in the Middle East was valued at \$2 million. None of the larger Canadian-based companies planned to explore in that region of the world.

### **Asia-Pacific**

In 2004, the larger-company mineral exploration market in Asia-Pacific was valued at \$863 million (Figure 5), or 23% of the \$3.7 billion larger-company market worldwide. From 2003 to 2004, the market for exploration in the region grew by \$350 million. The larger Canadian-based companies planned to spend \$278 million in Asia-Pacific, equivalent to more than 32% of the market there and roughly double what they planned to spend in 2003.

At the end of 2004, companies of all sizes listed on Canadian stock exchanges held interests in over 480 mineral properties in Asia-Pacific (Figure 4), about 100 more than at the end of the previous year.

### **Southeast Asia**

In 2004, the larger-company mineral exploration market in Southeast Asia was valued at \$136 million, or roughly 4% of the \$3.7 billion larger-company market worldwide.

The larger Canadian-based companies planned to spend \$11 million in the region, equivalent to 8% of the market there. Canadian budgets for individual countries were relatively small and no single company planned to spend more than \$5 million in any given country of the region during 2004.

In Indonesia, Inco planned to spend \$0.8 million on grass-roots and mine-site exploration for nickel at or in the vicinity of the Sorowako mine in Sulawesi.

In Papua New Guinea, Noranda Inc. (now Falconbridge Limited) planned to spend over \$4 million on advanced exploration for base metals at the Frieda River copper-gold property located in the province of Sandaun in the western part of the country. Placer Dome planned to spend \$2 million on exploration at the Porgera open-pit and underground gold mine located in the province of Enga. Inmet planned to spend \$1 million on exploration at the Ok Tedi copper-gold mine in the western part of the country.

In Myanmar, Ivanhoe Mines Ltd. planned to spend roughly \$2.7 million on advanced exploration for gold at the Modi Taung property.

In Vietnam, Tiberon Minerals Ltd. planned to spend \$0.5 million to continue to explore the Nui Phoa tungsten-fluorine-copper-gold-bismuth deposit. The capital cost of building an open-pit mine there that, on average, would produce 4689 t of tungsten, 213 739 t of fluor spar ( $\text{CaF}_2$ ), 1991 t of bismuth, 5537 t of copper, and 2274 oz of gold annually over a period of more than 16 years is estimated at US\$230 million. Proven and probable reserves at Nui Phoa are estimated at 55.7 Mt grading 0.207  $\text{WO}_3$  (tungsten trioxide), 8.13%  $\text{CaF}_2$ , 0.185% copper, 0.206 g/t gold and 0.093% bismuth. Production at Nui Phoa is expected to start in late 2007.

At the end of 2004, companies of all sizes listed on Canadian stock exchanges held interests in roughly 140 mineral properties in Southeast Asia, about the same number as at the end of the previous year. They held interests in about 50 properties in Indonesia and in more than 40 properties in the Philippines (Figure 19).

### **East Asia**

In 2004, the larger-company mineral exploration market in east Asia, which includes China, Japan, Mongolia and South Korea, was valued at \$212 million,<sup>13</sup> or roughly 6% of the \$3.7 billion larger-company market worldwide. From 2003 to 2004, the market in east Asia grew by \$158 million. The larger Canadian-based companies planned to spend \$167 million in the region, equivalent to almost 80% of the market and about four times what they planned to spend in 2003.

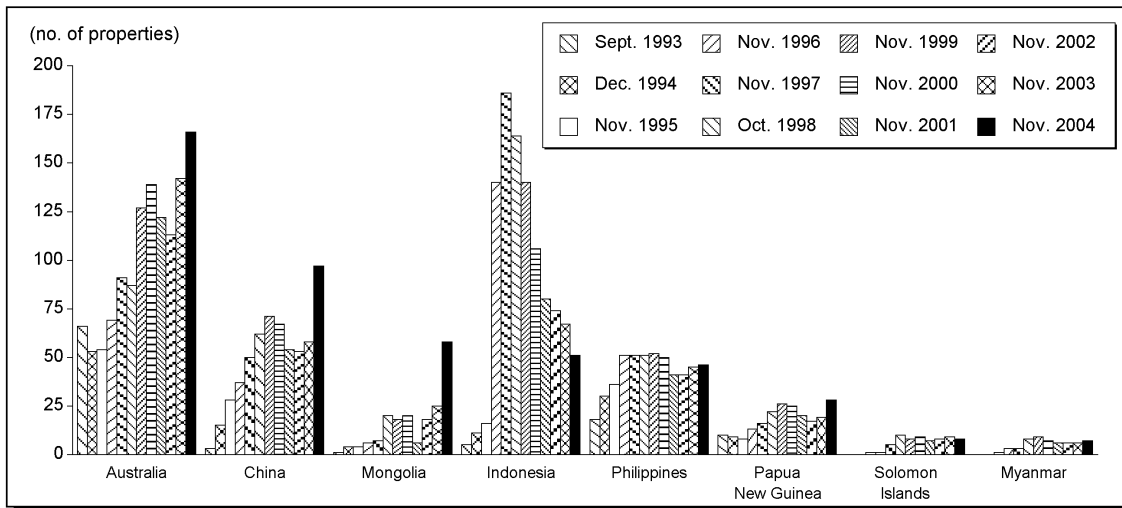
**TABLE 2. BUDGETS OF CANADIAN COMPANIES FOR MINERAL EXPLORATION IN CHINA, 1994-2004**  
**Companies of All Sizes**

Company	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	Total
	(constant 2004 \$ millions)											
Banker's Petroleum Ltd. (formerly Goldpark China Limited)							2.7	1.7	0.2			4.6
Barrick Gold Corporation (includes Lac Minerals Ltd.)	3.5	9.7	5.6	3.1							1.3	23.2
Big Bar Gold Corporation											0.8	0.8
Bright Star Ventures Ltd.											0.3	0.3
Buffalo Gold Ltd. (formerly Buffalo Diamonds Ltd.)										1.0		1.0
Cameco Corporation		0.3	..	..								0.3
China Clipper Gold Mines Ltd.				5.8								5.8
China Education Resources Inc. (formerly China Ventures Inc. and formerly Copper Mountain Mines Ltd.)							0.2	0.2				0.4
Donner Minerals Ltd. (formerly Donner Resources Inc.)				2.4								2.4
E4 Energy Inc. (formerly Southpoint Resources Ltd. and formerly Naneco Minerals Ltd.)								0.5				0.5
Eldorado Gold Corporation (includes AFCAN Mining Corporation)										2.4	6.3	8.7
Energem Resources Inc. (formerly Diamondworks Ltd.)				1.1	0.3							1.4
Falconbridge Limited (includes Noranda Inc.)			..	..	..	..	0.3	0.2	0.2		0.1	0.8
First Fortune Investments Inc.											0.5	0.5
Frontier Pacific Mining Corporation							0.2	0.2				0.4
Fury Explorations Ltd.											1.1	1.1
General Minerals Corporation				1.9	0.7	0.2						2.8
Golden China Resources Corporation (formerly APAC Minerals Inc.)										0.7	1.7	2.4
Goldrea Resources Corp. (formerly Verdstone Gold Corporation)											0.3	0.3
Hanfeng Evergreen Inc. (see also McVicar Resources Inc.)											0.3	0.3
Inco Limited										1.9	2.8	4.7
Inter-Citic Minerals Ltd. (formerly Inter-Citic Mineral Technologies Inc.)											2.0	2.0
International Barytex Resources Ltd.										2.1	0.1	2.2
International Kirkland Minerals Inc.											0.8	0.8
Ivanhoe Mines Ltd.										3.4	21.3	24.7
Jinshan Gold Mines Inc. (formerly Global-Pacific Minerals Inc. and formerly Pacific Minerals Inc.)							0.6	0.8	1.7	0.4	5.3	8.8
Linux Gold Corp. (formerly LinuxWizardry Systems Inc.)											0.3	0.3
Luna Gold Corp. (formerly wwBroadcast.net Inc.)											0.5	0.5
Magnus International Resources, Inc. (formerly Gravity Spin Holdings Inc.)											0.7	0.7
Majestic Gold Corp.											3.1	3.1
Minco Mining & Metals Corporation								0.8	0.7	0.9	0.1	2.5
Mundoro Mining Inc.											5.1	5.1
Orca Petroleum Inc. (formerly Zen International Resources Ltd.)				4.7								4.7
Pinnacle Mines Ltd. (formerly Broadlands Resources Ltd.)											2.0	2.0
Placer Dome Inc.		0.3		..	..	0.2	0.8	1.5	2.2	2.2	2.0	9.2
Silvercorp Metals Inc. (formerly SKN Resources Ltd.)											2.7	2.7
Southwestern Resources Corp. (formerly Southwestern Gold Corporation)			1.1	1.6	0.3	0.5	0.5	0.2	0.2	0.6	6.7	11.7
Sparton Resources Inc.											1.5	1.5
Teck Cominco Limited (includes former Teck Corporation and former Cominco Limited)	0.7	0.2	..	..	..	0.2	0.6	0.5				2.2
TVI Pacific Inc.									0.2	0.3	2.0	2.5
Valgold Resources Ltd. (formerly Valerie Gold Resources Ltd.)											0.3	0.3
Viceroy Exploration Ltd. (formerly Quest Capital Corp. and formerly Viceroy Resource Corporation)			..	..								..
<b>Total</b>	<b>4.2</b>	<b>10.5</b>	<b>6.7</b>	<b>20.6</b>	<b>1.3</b>	<b>1.1</b>	<b>5.9</b>	<b>6.6</b>	<b>5.4</b>	<b>15.9</b>	<b>72.0</b>	<b>150.2</b>

Sources: Natural Resources Canada, based on *Corporate Exploration Strategies: A Worldwide Analysis*, Metals Economics Group, Halifax, Nova Scotia; www.SEDAR.com; www.InfoMine.com.

.. Not available.

**Figure 19**  
**Canadian Mineral Property Portfolio in Asia-Pacific, 1993-2004 –**  
**Countries Accounting for 95% of Canadian Holdings in 2004**  
 Companies of All Sizes Listed on Canadian Stock Exchanges



Source: Natural Resources Canada, based on *MIN-MET CANADA* for 1993-97 and InfoMine db for 1998-2004, Robertson Info-Data Inc., Vancouver, British Columbia, and used under licence.

Since the early 1990s, there has been considerable interest in the mineral potential of China. More recently, the significant growth in demand occurring in that country for many mineral commodities has provided an even greater impetus for mining companies to explore there, especially for those companies based in Canada (Table 2). In 2004, 21 of the 39 companies of all sizes that planned to explore for minerals in China were based in this country.

In China, Ivanhoe planned to spend more than \$20 million on grass-roots and advanced exploration. The company is exploring for gold, copper and silver in the autonomous region of Inner Mongolia. It is also exploring for copper and PGMs in the province of Yunnan and for gold in the province of Liaoning. Southwestern Resources Corp. planned to spend almost \$7 million on advanced exploration at the Boka gold deposit in Yunnan. AFCAN Mining Corporation planned to spend \$6 million, mainly on advanced exploration at the Tanjianshan (TJS) gold project located in the province of Qinghai in the western part of China.

In Mongolia, Ivanhoe planned to spend over \$100 million on exploration for gold and base metals in the Gobi desert, 80% of it on advanced programs at the Oyu Tolgoi (Turquoise Hill) copper-gold project in the province of Omnigov. The company is assessing the feasibility of a combined operation to mine the Hugo Dummett deposit from underground, and to mine the southern Oyu deposits (Southwest Oyu, South Oyu, Central Oyu, Far Southwest, Bridge, Wedge and South Silver) from an open pit. Pro-

duction from Oyu Tolgoi could begin as early as 2007. Ivanhoe's budget for Mongolia was, by far, the largest Canadian budget for a single country in 2004.

In late 2004, companies of all sizes listed on Canadian stock exchanges held interests in almost 160 mineral properties in East Asia. As a result of growing interest in the region, the number of properties in which they hold interests increased by 70 compared with the previous year. They held interests in almost 100 properties in China and in almost 60 in Mongolia (Figure 19).

### South Pacific

In 2004, the larger-company mineral exploration market in the South Pacific was valued at \$494 million, or more than 13% of the \$3.7 billion larger-company market worldwide. From 2003 to 2004, the market in the South Pacific grew by over \$130 million. The larger Canadian-based companies planned to spend \$100 million in the South Pacific, about the same as in 2003 and equivalent to 20% of the market in the region.

Australia ranks fourth in the world in terms of countries where the larger Canadian-based companies are the most active in mineral exploration (Figure 7). Placer Dome planned to spend almost \$27 million on exploration in that country, more than 80% of it at the Granny Smith and Henty gold mines in Western Australia and Tasmania, respectively, and at the Osborne copper-gold mine in Queensland. In 2004, Placer Dome had the fourth-largest budget for Australia.

Also in Australia, Barrick was expected to spend roughly \$15 million exploring for gold, approximately half of it on mine-site programs at the Darlot, Kalgoorlie, Lawlers and Plutonic operations, all in Western Australia, and the rest on grass-roots programs at the Woolgar and Pajingo South projects in Queensland, and at the Mount Gibson and Mount Burgess deposits in Western Australia. Barrick is also building an open-pit mine at the Cowal deposit in New South Wales. The capital cost of building a mine there to produce some 230 000 oz of gold annually is estimated at US\$305 million. Proven and probable reserves are estimated at 58 Mt grading 1.3 g/t gold. Production at Cowal is expected to begin in the first quarter of 2006.

Still in Australia, LionOre planned to spend almost \$12 million, much of it exploring for nickel-copper-PGMs at the Emily Ann mine and at the Waterloo and Amorac deposits, and exploring for gold at the Thunderbox mine, all located in Western Australia. Wheaton River (now Goldcorp Inc.) was expected to spend about \$11 million on exploration for gold at, or in the vicinity of, the Peak gold mine located in New South Wales. Inco planned to spend about \$9 million on grass-roots exploration for nickel at a number of properties located in South Australia and in Western Australia.

In New Caledonia, Inco planned to spend over \$7 million on exploration at the Prony nickel laterite project. Prony adjoins the company's Goro nickel-cobalt deposit where a mine is currently under construction. In late 2004, Inco announced that the capital cost of building an open-pit mine and related processing facilities at Goro with an annual capacity of 60 000 t of nickel and somewhere between 4300 and 5000 t of cobalt stood at US\$1.878 billion. Proven and probable reserves are estimated at 95 Mt grading 1.53% nickel and 0.12% cobalt. Goro is expected to be in production by late 2007.

Also in New Caledonia, Falconbridge is assessing options for financing the construction of a mining operation at the Koniambo lateritic nickel deposit. In the fourth quarter of 2004, the company announced the results of a bankable feasibility study that estimated the capital cost of a mine, processing plant, power station and related infrastructure that would produce some 60 000 t/y of nickel in ferromnickel at US\$2.2 billion. Measured and indicated resources at Koniambo are estimated at 142 Mt grading 2.13% nickel and 0.07% cobalt. Koniambo could be in production as early as 2009.

At the end of 2004, companies of all sizes listed on Canadian stock exchanges held interests in almost 180 properties in the South Pacific, 25 more than at the end of the previous year. More than 90% of the properties in which Canadian companies have an interest in the region are located in Australia (Figure 19).

## South Asia

In 2004, the larger-company mineral exploration market in South Asia, which includes India, Pakistan and Sri Lanka, was valued at \$16 million, or less than 1% of the \$3.7 billion larger-company market worldwide. The larger Canadian-based companies reported no exploration programs or property holdings in that region of the world.

## SUMMARY AND OUTLOOK

The year 2004, much like the one prior, was very conducive to the financing of mining companies, particularly those based in Canada. Roughly half of the \$11.4 billion in equity capital raised globally during the year for mineral exploration and development projects worldwide was for the projects of companies listed on Canadian stock exchanges.

In 2004, the global market for mineral exploration grew to \$5.0 billion, up (in constant dollars) from \$3.6 billion the previous year. Indicators of exploration activity were up almost everywhere. During the year, the larger Canadian-based companies (those that budgeted to spend at least \$4 million to look for minerals) planned to undertake programs valued at more than \$1.4 billion in Canada and elsewhere around the world. Compared with 2003, their exploration budgets increased by \$590 million. Almost 60% of the 1134 companies of all sizes that planned to undertake mineral exploration programs during 2004 were based in this country.

The share of the global exploration market held by the larger Canadian-based companies rose from 33% in 2003 to 38% in 2004. In comparison, the larger companies based in South Africa held 15% of the global market, those based in Australia and in Europe each held 13%, and those based in the United States held 11%. As a group, the larger Canadian-based companies allocated, proportionately, much more of their exploration programs to gold than the worldwide industry average. However, they allocated, proportionately, much less to diamonds and PGMs.

From 2003 to 2004, the value of the larger-company mineral exploration market in Canada grew from \$453 million to \$622 million. Some 17% of all the mineral exploration programs planned by the world's larger companies were expected to be conducted in Canada. As in the previous two years, Canada, in 2004, remained the country where the world's mining companies were the most active in mineral exploration.

The number of mineral properties in which companies of all sizes listed on Canadian stock exchanges held interests grew by more than 700 during 2004. As a result, at the end of that year, Canadian companies held interests in a

portfolio of more than 7100 mineral properties worldwide. About 3200 of these properties were located abroad, dispersed in over 100 countries.

The larger Canadian-based companies allocated almost \$485 million to exploration programs in Canada during 2004, or more than one-third of their total budgets and about the same proportion as in the previous year. Foreign companies allocated a further \$138 million to programs in Canada, about 80% of it to look for diamonds. The largest individual company mineral exploration budgets for Canada were those of foreign-based companies. Nonetheless, Canada remains one of the few countries where the domestic industry consistently dominates mineral exploration activity year after year.

The larger Canadian-based companies allocated almost \$929 million to exploration programs outside Canada in 2004; this compares with \$534 million in 2003. Seventy-four of the 105 larger Canadian-based companies planned to be active abroad; about half of these 105 companies planned to explore only outside Canada and about 10% of them planned to explore simultaneously in five or more countries. The larger Canadian-based companies were expected to carry out the dominant share of the exploration programs not only in this country, but also in the United States, Mexico, South America, Central America, the Caribbean, and East Asia.

Some countries in Asia are growing in importance as potential new sources of large quantities of mineral materials. During 2004, the market for mineral exploration grew considerably in China and Mongolia. Companies based in Canada held the dominant share of the mineral exploration market in both of these countries. Twenty-one of the 39 companies of all sizes that planned to explore for minerals in China in 2004 were Canadian. Even though Canadians are almost ubiquitous in their exploration activities, Canada, nonetheless, remains the country where they continue to be, by far, the most active in mineral exploration.

Although the focus here is on the exploration activities of the world's larger companies, the smaller companies (those that budgeted at least \$133 000, but less than \$4 million, to look for minerals during 2004) are an important and essential component of exploration and development in many regions of the world, but especially in Australia and Canada. The smaller companies are of particular significance to many developing nations. In 2004, there were 25 such countries where the smaller companies were the only ones conducting commercial mineral exploration programs.

The smaller Canadian-based companies planned to spend \$608 million on mineral exploration worldwide in 2004, \$303 million of it looking for minerals in this country. In the case of Canada, adding the budgets of the smaller

companies to those of the larger ones raises the proportion of all global exploration programs planned by Canadian-based companies in 2004 to 43% of world activity; it also raises the proportion of all of the world's mineral exploration programs expected to take place in this country to roughly 20%.

In 2005, the market for mineral exploration is likely to have grown by almost 40% compared with the size of the market in 2004. Although Canadian companies tend, on average, to have smaller exploration budgets than their competitors, they are considerably more numerous than companies based elsewhere. As a result, Canadian companies are likely to have dominated global mineral exploration again in 2005 and they are likely to continue to do so for the foreseeable future.

## REFERENCES

- <sup>1</sup> *Mining and Exploration Company Financings: Monthly Records and Historic Trends, December 2004*, Gamah International Limited, Toronto, Ontario, January 2005, Section II, pp. 1-100.
- <sup>2</sup> Unless indicated otherwise, all currencies in this review are expressed in Canadian dollars and currency comparisons between years are expressed in constant Canadian dollars.
- <sup>3</sup> Most of the statistical data on the larger-company mineral exploration market worldwide are based on *Corporate Exploration Strategies: A Worldwide Analysis*, published annually by Metals Economics Group, Halifax, Nova Scotia. The information on specific projects is based largely on company reports.
- <sup>4</sup> André Lemieux, "Canada's Global Mining Presence," in the 1998 edition of the *Canadian Minerals Yearbook*, Natural Resources Canada, Ottawa, pp. 7.1 and 7.2 ([www.nrcan.gc.ca/mms/cmy/content/1998/08.pdf](http://www.nrcan.gc.ca/mms/cmy/content/1998/08.pdf)). See also André Lemieux, "Canada's Global Mining Presence," in the 1999 edition of the *Canadian Minerals Yearbook*, Natural Resources Canada, Ottawa, pp. 7.1 and 7.3 ([www.nrcan.gc.ca/mms/cmy/content/08.pdf](http://www.nrcan.gc.ca/mms/cmy/content/08.pdf)).
- <sup>5</sup> Most of the data for 1991 through 1997 on the mineral property portfolio of companies of all sizes listed on Canadian stock exchanges are derived from MIN-MET CANADA; for 1998 through 2004, the data are derived from InfoMine db. These databases are products of Robertson Info-Data Inc. of Vancouver, British Columbia.
- <sup>6</sup> For trends in mineral deposit appraisal activity in Canada over the interval 1982-97, and for a list of projects at the deposit appraisal stage in the late 1990s, see André Lemieux, "Canada's Global Mining Presence," in the 1996 edition of the *Canadian Minerals Yearbook*, Natural Resources Canada, Ottawa, pp. 8.9 and 8.11-8.22 ([www.nrcan.gc.ca/mms/cmy/content/1996/08.pdf](http://www.nrcan.gc.ca/mms/cmy/content/1996/08.pdf)).
- <sup>7</sup> For a list of mines, smelters, refineries and other advanced mineral development projects in which companies based in Canada had an interest in mid-2001, see André Lemieux,

“Canada’s Global Mining Presence,” in the 2000 edition of the *Canadian Minerals Yearbook*, Natural Resources Canada, Ottawa, pp. 7.16-7.19 ([www.nrcan.gc.ca/mms/cmy/content/08.pdf](http://www.nrcan.gc.ca/mms/cmy/content/08.pdf)).

<sup>8</sup> “Project Investment Survey 2003,” *Engineering & Mining Journal*, January 2003, pp. 28-34.

<sup>9</sup> For a discussion of the global market for mining goods and services, and the role played by Canadian companies, see André Lemieux, *Canadian Suppliers of Mining Goods and Services: Links Between Canadian Mining Companies and Selected Sectors of the Canadian Economy*, Natural Resources Canada, Ottawa, September 2000, 84 pp. ([www.nrcan.gc.ca/mms/pubs/services-mines-e.pdf](http://www.nrcan.gc.ca/mms/pubs/services-mines-e.pdf)).

<sup>10</sup> For the geographic distribution, by state, of mineral properties in which Canadian companies have an interest in the United States, see André Lemieux, “Canada’s Global Mining Presence,” in the 2000 edition of the *Canadian Minerals Yearbook*, Natural Resources Canada, Ottawa, pp. 7.5-7.7 ([www.nrcan.gc.ca/mms/cmy/content/08.pdf](http://www.nrcan.gc.ca/mms/cmy/content/08.pdf)).

<sup>11</sup> André Lemieux, *Attracting International Mineral Exploration: The Competitive Position of Peru*, unpublished paper, Natural Resources Canada, Ottawa, March 2002, 37 pp.

<sup>12</sup> For the geographic distribution, by state, of mineral properties in which Canadian companies have an interest in Mexico, see André Lemieux, “Canada’s Global Mining Presence,” in the 2000 edition of the *Canadian Minerals Yearbook*, Natural Resources Canada, Ottawa, pp. 7.7 and 7.8 ([www.nrcan.gc.ca/mms/cmy/content/08.pdf](http://www.nrcan.gc.ca/mms/cmy/content/08.pdf)).

<sup>13</sup> The size of the mineral exploration market in certain regions of the world is underestimated because there are few data available on the extent of exploration programs undertaken by some private enterprises and state agencies.

*Notes: (1) Information in this review was current as at September 2005. (2) This and other reviews, including previous editions, are available on the Internet at [www.nrcan.gc.ca/mms/cmy/2004CMY\\_e.htm](http://www.nrcan.gc.ca/mms/cmy/2004CMY_e.htm).*

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