Gold Mining and Exploration in Central America

By Virginia Heffernan, February 2004

COUNTRY STATISTICS

Belize
Population: 250,000
Area: 22,965 sq. km
GNI: US$750 million
GNI per capita: US$2960
Corruption Perception Index
CPI rank : NA

Costa Rica
Population: 4.2 million
Area: 51,060 sq km
GNI: US$17.2 billion
GNI per capita: US$4100
CPI rank: 50/133

El Salvador
Population: 6.5 million
Area: 21,400 sq. km
GNI: $13.5 billion
GNI per capita: US$2080
CPI rank: 59/133

Guatemala
Population: 12.3 million
Area: 108,890 sq. km
GNI: $21.5 billion
GNI per capita: US$1750
CPI rank: 100/133

Honduras
Population: 6.9 million
Area: 112,088 sq. km
GNI: $6.3 billion
GNI per capita: US$920
CPI rank: 106/133

Nicaragua
Population: 5.5 million
Area: 147,950 sq. km
GNI: $2.6 billion
GNI per capita: US$470
CPI rank: 88/133

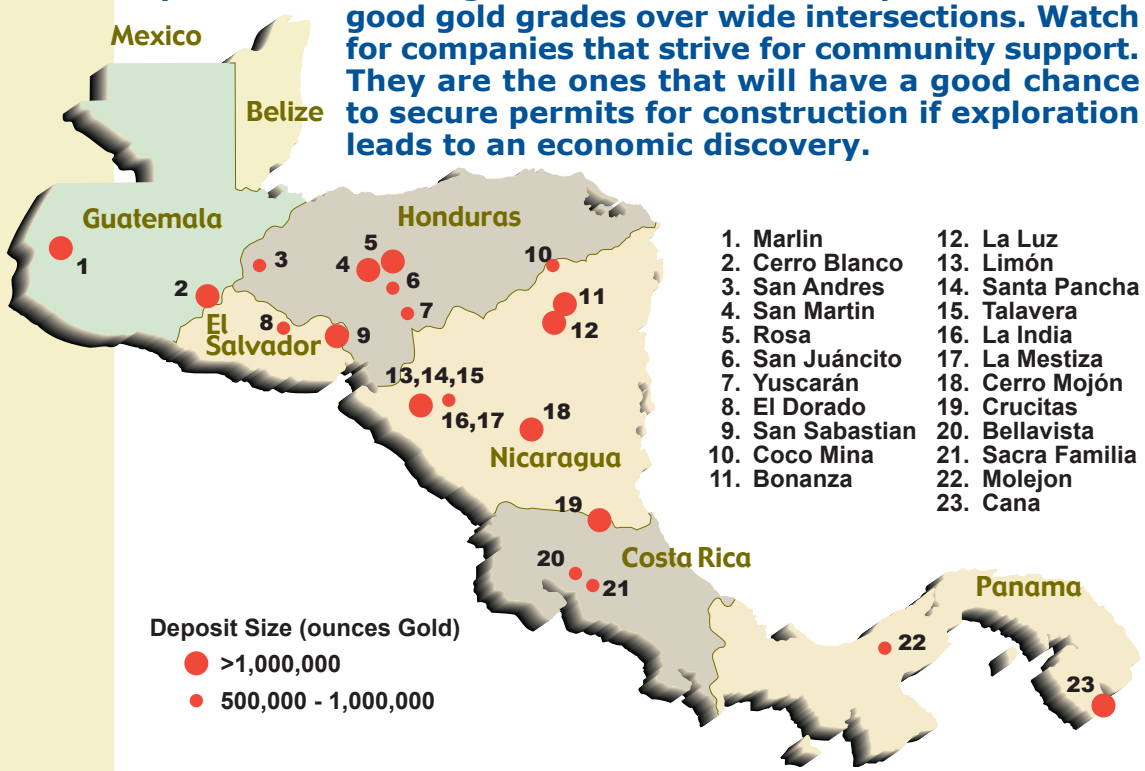
Panama
Population: 3.1 million
Area: 78,000 sq. km
GNI: $12.5 billion
GNI per capita: US$4020
CPI rank: 66/133

Gross National Income (GNI) is made up of gross domestic product plus the net income earned from investments abroad (minus similar payments made to non-residents who contribute to the domestic economy). 2002 GNI statistics are from CIDA and, in the case of Belize, World Bank.

Corruption Perception Index (CPI) is from Transparency International, 2003

The level of gold exploration in Central America has increased significantly over the past year because the region is relatively underexplored, the price of gold is robust and laws are generally favourable to mining and exploration.

Investors can expect significant discoveries in the region in 2004 as well-funded drilling programs get underway on epithermal vein targets. But success will require more than good gold grades over wide intersections. Watch for companies that strive for community support. They are the ones that will have a good chance to secure permits for construction if exploration leads to an economic discovery.



Central America is re-emerging as a top destination for gold mining companies. Although just a quarter of the size of Mexico, its neighbour to the north, the long isthmus that connects South and North America is dotted with high-grade gold deposits. Several companies established gold exploration and mining projects there in the 1990s, but when the gold price collapsed below US$300 per oz., many of these operations were suspended. Now a combination of significant grassroots discoveries, favourable mining codes and a gold price resurgence above US$400/oz. is attacting both explorers and producers back to the region.

Central America has an area of about 542,000 sq. km, the size of continental France or the Yukon Territory, and a population close to 37 million. It consists of seven countries: Belize, Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua and Panama.

With an estimated GDP averaging just US$3,900 per capita, Central America ranks among the poorer regions of the world. Its creditors, including the United States, the International Monetary Fund and the World Bank, exert a strong influence over fiscal policy. By and large, Central American jurisdictions encourage mining and exploration with legislation similar to that of Canada.

Mining History

Gold mining in Central America has a long history. Numerous pre-Columbian gold jewelry artifacts from peoples such as the Maya in Guatemala and Honduras have been uncovered. Metallurgy reached Panama by 200-300 AD and Costa Rica by 700 AD. Later, the artisans in Nicaragua became famous for their intricate goldsmithing.

The Spanish conquest during the 16th century was motivated by the search for gold and, in 1544, the Honduran gold-mining town of Gracias became capital of Spanish Central America. In fact, it is said that Columbus named Costa Rica (or Rich Coast) after noting the large amounts of gold jewelry worn by the native people there. The countries of Central America gained independence from Spain in the early 19th century, but gold mining by international operators continued. Costa Rica produced more than one million ounces from "bonanza" gold veins (veins of relatively low tonnage and relatively high grade) in the early 1900s. In the 1940s and 1950s, Nicaragua ranked among the top 20 gold producers in the world.

Modern exploration began with programs initiated by the United Nations in the late 1960s. But despite this history, Central America is still considered underexplored compared to some of its Latin American cousins such as Chile, Peru and Brazil.

Geology

The isthmus overlies the junction of four tectonic plates, all pushing against and sliding under one another to create the earthquakes and volcanic activity for which Central America is famous. There are an estimated 250 volcanoes formed by the convergence of the Cocos and Caribbean Plates along the highlands stretching from Guatemala to Panama. Many are still active.

Two other major mountain ranges tower over the region: the non-volcanic Northern Sierra starting in Guatemala and stretching south to northern Nicaragua; and the Cordillera de Talamanca, which forms a long string of inactive volcanoes from Costa Rica south to Panama.

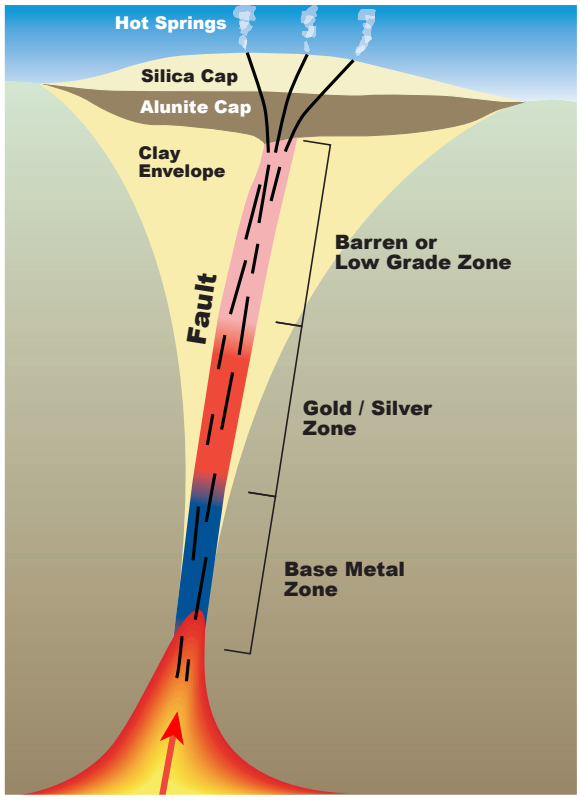
Four major geological faults play a role in controlling the deposition of gold and other metal deposits. The Motagua zone, which hosts several gold occurrences, extends across southern Guatemala at the fracture zone between the North American and Caribbean plates; the Pacific zone, where geological activity is related to the shifting of the Cocos Plate; the Nicaraguan Depression, which forms Lakes Managua and Nicaragua and the San Juan River Basin; and the Chagres River fault zone in Panama.

Most gold deposits in Central America are associated with epithermal vein deposits, lens-shaped bodies that formed in these ancient volcanic environments when deep hot magmatic waters mixed with shallow, cool groundwater. Mineralization in this type of deposit occurs in branching fissures, vein structures or pie-shaped bodies filled with fractured rock.

The host rock has a distinct texture that geologists can use to determine where the vein lay in relation to the surface when mineralization occurred. This is the key to exploration for epithermal veins because the productive gold horizon is often associated with a "boiling zone" that occurs at a certain depth. As a result, surface samples on gold exploration prospects can often provide a sniff of richer values below that a well-targeted drill program can confirm.

Creation of an Epithermal Gold Deposit

1. A fault or fissure in the earth is created by seismic activity.
2. Water heated to extreme temperatures by nearby volcanic activity rises through the fault to surface, creating a hot spring.
3. In some cases, this water contains dissolved particles of gold and other minerals.
4. When the water hits a certain temperaturature and pressure, these minerals precipitate out, forming a vein.
5. At lower levels, elements such as copper, lead and zinc are deposited.Higher up in the system, gold is deposited.



Current Exploration

Of the seven countries that make up the isthmus, only Belize lacks major metal deposits. Current exploration is centred on the steeply-dipping, epithermal veins that have provided most of the gold produced in Central America. Most of these deposits are hosted by the older, deeply eroded volcanics (e.g. Cerro Quema in Panama), but significant discoveries have also been made in the younger volcanics (e.g. Marlin in Guatemala) and, occasionally, in non-volcanic rocks (San Martin, Honduras). The margins of grabens (depressions between two faults), such as the Nicaraguan Depression that cuts northwest across Central America from the province of Limon in Costa Rica to western Nicaragua, are considered prime hunting ground for gold.

Both shallow epithermal hot-spring related deposits (e.g. Crucitas in Costa Rica) and deeper bonanza epithermal veins and vein stockworks (e.g. Limon in Nicaragua) are important targets for exploration. Many of the bonanza gold veins, which cluster around sub-volcanic intrusions in districts that mimic the spacing of active volcanoes, have yielded more than one million ounces of gold historically (e.g. San Sebastian in El Salvador, the aptly-named Bonanza and Limon in Nicaragua, and the Cana district in Panama). Sulphide content in these deposits tends to be low, avoiding the problem of acid mine drainage that plagues many high-sulphide gold operations and thus making the permitting process easier.

Another distinct advantage Central American gold operations have over those in many other gold-producing jurisdictions is that they are dollarized. As a result, mines in Central America benefit from a rising U.S. dollar gold price. Whereas gold rose 20% in U.S. dollars in 2003, the price declined in Australian and Canadian dollars and the South African rand because of strengthening local currencies, making gold operations in these countries less profitable. Gold is expected to continue to be a declining U.S. dollar story, rewarding companies operating in dollarized economies such as those in Central America.

Active Mining Companies

There are no major gold producers operating in Central America because most of the gold deposits in the region do not meet the multi-million ounce cut-off major producers seek. However, the area is an attractive target for junior and intermediate companies who specialize in grassroots exploration or are looking for smaller deposits that can be brought to production quickly and profitably while gold prices on are in an up cycle.

The anchor in the region is **Glamis Gold (GLG:TSX)**, a Nevada-based intermediate gold producer with mines in Nevada, Mexico and Central America. The company operates the San Martin mine in Honduras, discovered in the mid-1990s and sold to Glamis in 1998. Glamis built the mine for US$28 million and has been producing gold there since 2000 at a rate of about 100,000 oz. per year. With 650,000 oz. of reserves remaining, San Martin is considered a classic example of the epithermal gold deposits typical of Central America.

San Martin Mine

Although Glamis has been successful in Honduras, the producer appears to be shifting its exploration focus north to Guatemala. The Guatemalan government recently approved development and mining plans for the company's Marlin gold/silver project, where reserves stand at 15.6 million tons at 0.139 oz. gold and 2.15 oz. silver per ton. Glamis is planning a combined open pit/underground operation with average annual production of 217,000 oz. gold and 3.3 million oz. silver over a 10-year mine life. President Kevin McArthur says Glamis intends to develop the Marlin area into a major new gold-producing district and will be testing other targets within the company's 2,000 sq.-km area in western Guatemala this year.

Mill at the Limon Mine

With one mine operating in Nicaragua and another under construction in Costa Rica, Canadian **Glencairn Gold Corporation (TSX:GGG)** is the new kid on the block in Central America. Glencairn managed to pick up the Bellavista project – fully permitted with a bankable feasibility study, for less than $1 per ounce when gold was still trading in the $300 range. The project had a difficult run with the permitting process during the 1990s and low gold prices until 2002. A permit was finally granted in 2001. Then, the government put a moratorium on new open pit mining permits, from which it turned out Bellavista was exempt. Any doubt about these issues was put to rest when construction began in late 2003.

After spending an estimated US$26 million to build the open pit heap leach operation, Glencairn expects to produce an average of 60,000 ounces gold per annum at a cash cost of US$163 per oz. over the mine's 7.5-year mine life, starting next year.

By integrating Costa Rican professionals into the mine management, lobbying for half of the 2% government royalty to be allocated to the local community, and keeping residents of the nearby town of Miramar up-to-date on developments at the project, Glencairn has overcome one of the major challenges associated with modern mining projects: community resistance. About 90% of the residents of Miramar now support the mine, compared with only 20% six years ago, according to Glencairn president and CEO Kerry Knoll, who has been involved with the project for seven years, going back to his days with former owner Wheaton River Minerals.

About a seven-hour drive north of Bellavista is the Limon Mine in Nicaragua, which Glencairn acquired when it merged with Black Hawk Mining in 2003. Although the mine has been in continuous operation for more than 60 years, most of that time with only a couple of years' reserves ahead of it, Limon is really an exploration story. Bonanza gold veins, many of which carry more than one million ounces of gold, have provided most of the gold production in Nicaragua. Glencairn recently announced

Market Capitalizations of Companies with Reserves

Glamis Gold (GLG: TSX;NYSE)
Market Capitalization: $2.8 billion
Proven & Probable ounces: 4.9 million
Market Cap/ oz. P&P: $570

Glencairn Gold (GGG: TSX-V)
Market Cap: $96.3 million
Proven & Probable ounces: 725,000
Market cap/oz. P&P: $132

RNC Gold (RNC-TSX)
Market Cap:$45.5 million
Proven & Probable ounces: 504,000
Market cap/oz. P&P: $90

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an intensive drilling campaign to test about a dozen of these vein-type targets at its 813 sq.-km properties in and around Limon. Although ore shoots within these structures can be difficult to pinpoint, Glencairn has a budget ample enough to launch the kind of drill-intensive exploration necessary to succeed. Glencairn's goal is to add several more years of production, by converting current resources to reserves and exploring a number of untested veins in the area. It is currently conducting a 40,000-metre drill program at Limon.

Another new mid-sized gold producer is **RNC Gold (RNC:TSX),** which commenced trading on the Toronto Stock Exchange in December 2003. The company has acquired a 100% interest in the La Libertad open-pit mine and an 80% interest in the Bonanza mine in Nicaragua, both former assets of the now-defunct **Greenstone Resources**. Although operations at its flagship La Libertad mine suffered a number of setbacks during 2003, the company hopes to get things back on track this year. Under the management of former Greenstone COO Randy Martin, RNC intends to produce more than 100,000 oz. from the two mines in 2004 and use revenues from production to support exploration on related concessions in the country.

RNC also has the right to acquire a 100% interest in the Cerro Quema project in Panama and the option to acquire a 25% interest in the San Andreas mine in Honduras. Cerro Quema has 6.3 million tonnes grading an average of 1.18 grams gold per tonne. San Andreas is an open pit heap-leach mine that produced 98,979 oz gold in 2002.

Near the Costa Rican-Nicaragua border, **Vannessa Ventures (VVV:TSXV)** is still awaiting approval for its Cerro Crucitas gold project, a multi-million ounce, bulk-tonnage deposit. Although the company submitted its EIA for the project in March 2002, it has not yet been given the green light for construction by the Costa Rican government and has faced the opposition of numerous environmental groups. The current mining plan for Crucitas calls for an open pit mining of the near-surface saprolite ore to produce 88,000 oz. gold per year at a cash cost of US$130 per oz. Approximately US$34 million has been spent on exploration and development at Crucitas over the years.

A small producer in the region is **Defiance Mining (DM:TSX).** The junior is about to cease production at its Vueltas heap-leach mine in the northeast corner of Honduras, which produced roughly 40,000 oz. in 2003 at a cash cost of US$280 per oz. Defiance hopes to replace the ounces at Vueltas with estimated resources of 440,000 oz. from the nearby Zopilote project owned by **Doublestar Resources (DSR:TSXV).** In order to earn a 60% interest in Zopilote, Defiance has agreed to complete a feasibility study by February, 2005 and contribute its Vueltas plant to the new mine. Zopilote is an epithermal vein deposit with an estimated resource of 10.5 million tonnes grading 1.32 g/t gold.

Using a grassroots exploration strategy that has been successful in the past for President Simon Ridgway (e.g. the San Martin deposit), **Radius Explorations (RDU:TSXV)** is fanning out across Guatemala and, more recently, Nicaragua in search of epithermal gold veins. In Guatemala, Radius is drilling the high-grade Bandera gold-silver vein target along the Motagua fault , a major gold-bearing shear zone, with partner **PilaGold (PRI:TSXV).** Radius has also identified a gold resource of 270,000 oz and an untested gold-in-soil anomaly over a strike length of 6 km at its wholly-owned Tambor property. In Nicaragua, the junior has made two high-grade gold discoveries at El Pavon and La Partiota and continues to explore other targets within its large land position there. Intersections as rich as 21.7 g/t over very significant width of 8.4 metres have been sampled in the trenches at El Pavon.

Intrepid Minerals (IAU:TSXV) is tapping similar vein structures on its 270-sq-km land position in El Salvador. A 1000-metre drill program is underway in the historical Gigante and Hormiguero districts, which both contain low-sulphidation, epithermal gold-and-silver-bearing vein systems. The Gigante program is testing the grade continuity of grade of a 1.5-km long vein system along strike and down-dip, while the Hormiguero drilling is testing the down-dip extension of the Guadalupe vein, where a 9.2-metre channel sample 30 metres below surface returned 5.68 g/t gold and 27.8 g/t silver. Along with these promising grassroots targets, Intrepid holds the Divisadero deposit, a past producer containing 350,000 oz gold and 18 million oz silver.

The drills are also turning at the El Dorado project in El Salvador, another past producer, where **Pacific Rim Mining (PMU:TSX)** is hoping to expand an existing resource of 821,000 oz gold and 5.3 million oz silver. The junior, managed by Catherine McLeod-Seltzer of Arequipa fame, is currently exploring several untested veins on the property that could enhance the feasibility of establishing a high-grade, low-cost underground mine to complement the company's Denton-Rawhide operation in Nevada.

Having raised $1.5 million though a private placement, **First Point Minerals (FPX:TSXV)** is focusing on its Rio Luna property in Nicaragua and the Cacamuyá property in Honduras. Mapping and sampling at Rio Luna have defined several epithermal vein systems over a strike length of 8.8 km with grades ranging from 3 to 21 g/t gold. A 2,000-metre, 15-hole drilling program is now underway to test these veins at depth, where First Point expects to encounter higher grades. At Cacamuyá, the company is using geophysics to prioritize several drill targets.

Under a new mandate to seek properties in Central America, **Gold-Ore Resources (GOZ:TSXV)** has picked up two properties, Agua Fria and Monserrat, in Honduras. The Agua Fria deposit produced 150,000 oz until 1953 when operations were suspended at a depth of only 220 metres, but Gold-Ore believes the mesothermal-style gold deposits on the property have the potential to extend to depths of over 1000 metres. The United Nations calculated an historic reserve of 1.5 million tonnes at 10.9 g/t gold equivalent at Monserrat, which contains a high-grade gold-silver vein system.

Attitude Towards Exploration & Mining

Central American countries encourage mineral exploration and mining, with the notable exception of Costa Rica where a moratorium on new open pit mining permits is in place. Nicaragua, one of the poorest countries in the group, is considered one of the best places to explore because of a new mining code which places no limit on the amount of land that can be held under a mining or exploration claim but requires regular work reports and increasing fees to keep claims in good standing. Before the new law was introduced, most of prospective ground in the country was tied up by a handful of companies that were allowed to retain their claims whether or not they worked on them. The law has opened up new ground to juniors serious about exploration.

Companies hoping to operate in Central America today, from grassroots explorers to mine managers, must demonstrate environmental responsibility and respect for the local community or risk the fate of the Tambo Grande project in Peru or the Esquel project in Argentina. Mining companies are responding to these challenges by supporting local businesses, hiring locally, keeping residents informed as their project progresses. Most operating mines in Central America now follow World Bank standards as a matter of course, even though these are usually more stringent than local standards. As a result, several new mining permits in Central America have been approved over the past two years. Nevertheless, some environmental groups (e.g. World Rainforest Movement, Sierra Club and Friends of the Earth), have designated Central America as one of the regions they want to "save" from mining citing the region's ecological diversity.

Another challenge endemic not just to Central America, but to most of the world's poor countries, is corruption among politicians and public officials. Transparency International, which publishes an annual corruption perception index (CPI) based on opinions of business people, academics and risk analysts, ranks the countries of Central America well down on the index. Costa Rica, a relatively wealthy democracy, ranks a respectable 50th out of 133 countries on the CPI for 2003. But the worst scores in the region were handed to Guatemala and Honduras, ranked 100th and 106th respectively. By comparison, Chile and Peru – rival mining jurisdictions in Latin America - ranked 20th and 59th. Gold mining in Central America is undergoing an unprecedented resurgence.

With the start of Glencairn's Bellavista next year and Glamis' Marlin in late 2005, production by Canadian-listed companies is expected to reach 565,000 ounces annually. Over the next couple of years, Pacific Rim's El Dorado project, Vanessa's Cerro Crucitas and RNC's Cerro Quema could add to that growing list. And if current exploration efforts are as successful as the companies hope, that figure is expected to expand even more rapidly in the years to come.

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Virginia Heffernan (www.geopen.com) researches and writes for and about the mining sector. She is the author of two comprehensive reports on the industry published by Financial Times Energy, and is a regular contributor to publications such as The Northern Miner, Investment Executive and Engineering & Mining Journal. Virginia recently visited the Bellavista project in Costa Rica and the El Limon mine in Nicaragua. She does not hold shares in any of the companies listed above.