

Zinc

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World zinc consumption reached 7.8 Mt in 1998, according to preliminary figures from the International Lead and Zinc Study Group (ILZSG), a total that was slightly less than world refined metal production of 7.9 Mt. Western World zinc demand exceeded production by 731 000 t. This supply deficit was largely offset by net exports of zinc metal to the West by Eastern countries. Zinc metal stocks held on the London Metal Exchange (LME) fell steadily throughout the year to 317 000 t, a decline of 175 000 t since the end of 1997.

Despite what should have otherwise been improved market conditions over 1997, the overlying uncertainties related to the turmoil in Southeast Asian currency markets and the overall economic downturn in Asian, and particularly Japanese, markets overshadowed the market fundamentals for zinc, resulting in weaker prices throughout the year. Zinc cash settlement prices on the LME averaged US\$1023/t in 1998, a 22% decrease over 1997.

CANADIAN DEVELOPMENTS

Zinc mine production in Canada totalled 1 062 812 t in 1998, about 1% lower than in 1997. The closure of Anvil Range's Faro operations and Breakwater Resources' Caribou and Restigouche mines in mid-year was offset somewhat by increased production at existing mines and the start-up of the zinc circuit at Agnico-Eagle's existing gold mine in late September. For 1999, a 2% increase in zinc mine production is forecast as mines that opened late in 1998 complete a full year of production.

Zinc metal production in Canada was up 5% from 703 798 t in 1997 to 743 170 t in 1998, primarily as a result of the completion of the 20 000-t/y expansion

projects at Cominco's Trail operations in British Columbia and at Noranda's Valleyfield zinc refinery in Quebec.

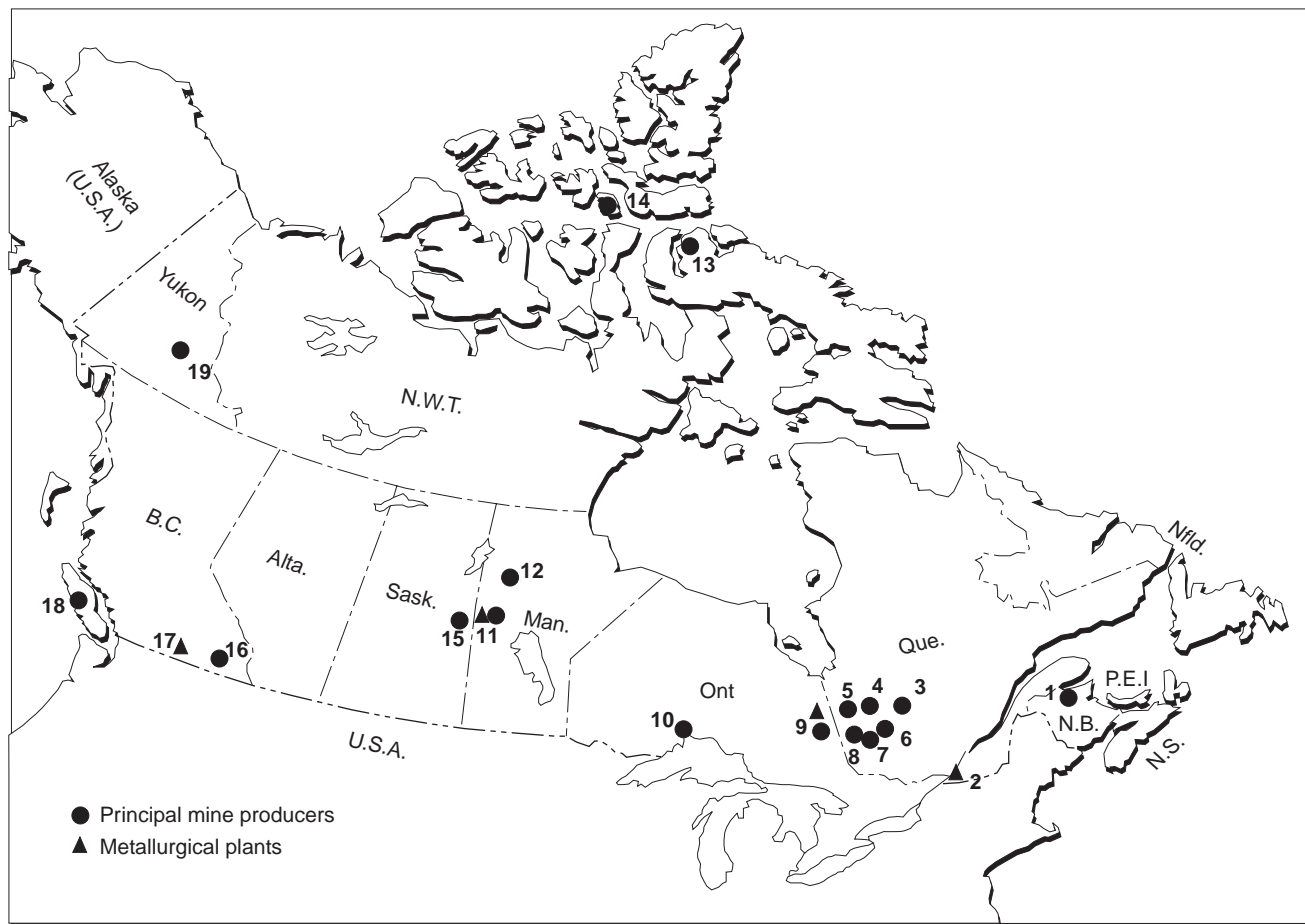
British Columbia

In February 1998, Boliden Limited successfully acquired the assets of Vancouver-based Westmin Resources Limited for approximately US\$360 million, including the Myra Falls underground polymetallic zinc-copper mine on Vancouver Island, British Columbia. In November, Boliden announced that it was temporarily suspending production at Myra Falls in mid-December to implement a plan designed to address challenging ground conditions in the Battle Zone of the mine. Full production is scheduled to resume by April 1, 1999. Milling will continue at 50% capacity throughout the suspension period to process waste rock for use as backfill.

In March, following a three-year environmental assessment, Redfern Resources received approval from the B.C. and federal governments to re-open the Tulsequah Chief mine in northwestern British Columbia subject to the fulfilment of certain conditions by Redfern. The mine has been shut down since 1957. Prior to closure, the ore was shipped out to sea by barge, passing through the Alaska panhandle. Despite the involvement of the state of Alaska and the U.S. government in the environmental assessment process, the United States has asked Canada to agree to the International Joint Commission (IJC) holding a review of the project because of Alaska's continuing concerns that liquid effluent from the mine could harm salmon and trout in the nearby Taku River, which flows across the border into Alaska.

An expansion project at Cominco's zinc plant at Trail, British Columbia, increased capacity by 20 000 t/y of refined zinc in 1998 for a total capacity of 290 000 t/y. In June, Cominco's Trail operations won the "Ethics in Action" award for ethical decision-making. The award is sponsored by a group of businesses and groups in the Vancouver area to recognize and encourage organizations who go beyond basic economic and legal responsibilities, and who act in a manner that fairly balances competing needs and values in the interests of their communities and stakeholders.

Figure 1
Zinc Producers in Canada, 1998



Numbers refer to locations on map above.

ZINC-PRODUCING MINES

1. Brunswick #12	Noranda Mining and Exploration Inc.	11. Flin Flon	Hudson Bay Mining and Smelting Co., Limited
Heath Steele	Noranda Inc.	Callinan	Hudson Bay Mining and Smelting Co., Limited
Caribou/Restigouche	Breakwater Resources Ltd. (suspended Aug. 98)	Trout Lake	Hudson Bay Mining and Smelting Co., Limited
3. Gonzague-Langlois	Cambior Inc.	12. Ruttan	Hudson Bay Mining and Smelting Co., Limited
4. Isle Dieu	Bell Allard	13. Nanisivik	Breakwater Resources Ltd.
5. Selbaie	Les Mines Selbaie	14. Polaris	Cominco Ltd.
6. Louvicourt	Aur Resources Inc./Novicourt Inc.	15. Konuto Lake	Hudson Bay Mining and Smelting Co., Limited
7. LaRonde	Agnico Eagle Mines	16. Sullivan	Cominco Ltd.
8. Bouchard-Hébert	Audrey Resources Inc.	18. Myra Falls	Boliden Limited
9. Kidd Creek	Falconbridge Limited	19. Faro (Grum)	Anvil Range Mining Corporation (closed Feb. 98)
10. Winston Lake	Inmet Mining Corporation (closed Oct. 98)		

ZINC METALLURGICAL PLANTS

2. Valleyfield	Canadian Electrolytic Zinc Limited
9. Kidd Creek	Falconbridge Limited
11. Flin Flon	Hudson Bay Mining and Smelting Co., Limited
17. Trail	Cominco Ltd.

Yukon

Anvil Range announced in February 1998 that weak base-metal markets had forced it to shut down its wholly owned Faro lead-zinc operations in the Yukon. The Faro operations comprise a crushing, milling and concentrating facility and three base-metal deposits. Commercial production had been reactivated in November 1995, but the company suspended mining in December 1996, citing unexpectedly low metal prices, stripping delays and a strong Canadian dollar. Anvil Range re-opened the Faro operations again in November 1997. Faro has a capacity of 150 000 t/y of zinc and 98 000 t/y of lead in concentrate. The company went into receivership in April.

In December, the Supreme Court of British Columbia dismissed a legal challenge by Atna Resources against the proposed sale of Boliden's 60% interest in the Wolverine project to Expatriate Resources. Atna, which owns the remaining 40% interest in the project, claimed that its right of first refusal, contained in the joint-venture agreement with Boliden Westmin, had been triggered by the intended sale. The deal involves the sale of Boliden's mineral interests in the Finlayson Lake district of southeastern Yukon, including its 60% interest in the Wolverine joint venture and the wholly owned Tuchita property. The Wolverine deposit contains an estimated 6.2 Mt grading 12.66% zinc, 1.33% copper, 1.55% lead, 370.9 g/t silver and 1.76 g/t gold.

Saskatchewan/Manitoba

In September, Hudson Bay Mining and Smelting Company (HBM&S) opened the \$17.1 million Chisel North zinc mine project that effectively replaced the Photo Lake mine, which was closed due to ore exhaustion. The Chisel North mine is being developed in two phases with approval of the second phase dependent upon performance in Phase 1 and on final confirmation of the size of the orebody. The total cost of both phases is estimated at about \$50 million.

In November, HBM&S released information on its newest ore deposit near Flin Flon, Manitoba, called the Triple Seven deposit. The deposit is a volcanic hosted, massive sulphide located within the Flin Flon/Callinan mine horizon that contains three rich ore lenses totalling 13.36 Mt. Combined, the lenses grade 2.71 g/t gold, 37.71 g/t silver, 3.32% copper and 5.78% zinc.

Development of the Konuto Lake copper-zinc mine west of Flin Flon in northern Saskatchewan also continued in 1998, and it is expected to start commercial production in the first quarter of 1999. Konuto Lake will produce 3500 t/y of zinc.

Ontario

Inmet Mining announced in the third quarter of 1998 that it was suspending all operations at its Winston Lake mine as a result of low zinc prices. The company also announced that it had lowered its estimates for ore reserves in the lower Pick Lake zone. A decision on whether to permanently close the mine or put it on care and maintenance until zinc prices improve is expected in early 1999.

Quebec

Work continued during the year at Agnico Eagle's zinc circuit, which came on stream at the end of September. The zinc-rich zone is being developed in the existing LaRonde gold mine near the town of Cadillac in the Abitibi region of northwestern Quebec. Expenditures on the expansion program at LaRonde, including mill construction and shaft sinking, totalled \$11 million in the second quarter of 1998, leaving approximately \$193 million to spend over the next three and a half years. By the year 2000, LaRonde will produce 52 000 t/y of zinc in concentrate.

Noranda completed a \$32 million optimization of the hydro-metallurgical process at its Valleyfield zinc refinery. The project increased the plant's zinc refining capacity by 20 000 t/y. Development of Noranda's Bell Allard zinc-copper mine in the Matagami region of Quebec is on target for production start-up in the third quarter of 1999. The zinc-copper mine is expected to have a life of approximately five years with a milling capacity of 2000 t/d. The Bell Allard mine will benefit from Noranda's existing infrastructure in the Matagami region.

New Brunswick

Breakwater Resources announced in August that it would extend indefinitely the five-week shut-down at its Caribou zinc-lead mine in New Brunswick. The company cited metallurgical results that have been steadily improving but which had not reached the desired levels and weak metal prices as factors that led to the shut-down. The company recommissioned the Caribou underground mine in conjunction with the opening of the nearby open-pit Restigouche zinc-lead mine in the third quarter of 1997. At full production, the Caribou mill, which treated ore from both mines, had a production capacity of 67 000 t/y of zinc and 32 000 t/y of lead in concentrate.

WORLD DEVELOPMENTS

Total world mine production of zinc was 7.4 Mt in 1998, a slight increase of 1.1% from 1997. World zinc metal production reached 7.9 Mt, an increase of 2.2% over 1997, due largely to increased production in Kazakhstan and Russia.

According to ILZSG figures, Western World zinc mine production increased 1.8% in 1998 to a total of 5.58 Mt. In Europe, increases in Sweden were offset by declines in Ireland and Spain and the cessation of zinc mining in Norway due to mine closures. African output rose as a result of increased production in Morocco and the re-opening of Breakwater Resources' Bougine mine in Tunisia. North American output increased substantially as a result of the 15% rise in U.S. production from Cominco's Red Dog mine in Alaska. Latin American production fell 4% as a result of closures in Brazil and the suspension of operations at the El Toqui mine in Chile.

Western World zinc metal production rose for the fourth consecutive year by 2.4% to 5.7 Mt in 1998. The main increases were as a result of expansions in Canada, South Korea, Thailand and the United States.

United States

Rio Algom Limited announced in January the formation of a wholly owned subsidiary, Nicolet Minerals Company, to develop and operate the Crandon project in the northern U.S. state of Wisconsin. The company derives its name from Jean Nicolet, a French-Canadian explorer who explored the regions west of Lake Michigan and Wisconsin in the early 1600s. Rio Algom acquired 100% of the Crandon project, establishing the company as the sole owner and operator in early January. With an estimated resource of 55 Mt comprising 30 Mt grading 9.4% zinc and 0.4% copper, and 25 Mt grading 0.7% zinc

and 1.8% copper, the Crandon project is expected to produce 150 000 t of zinc in concentrate annually. A review of the project for state permitting continues. In December, Nicolet Minerals announced four major improvements in the mine design to help resolve public concerns about tailings and the treatment and discharge of water from the mine.

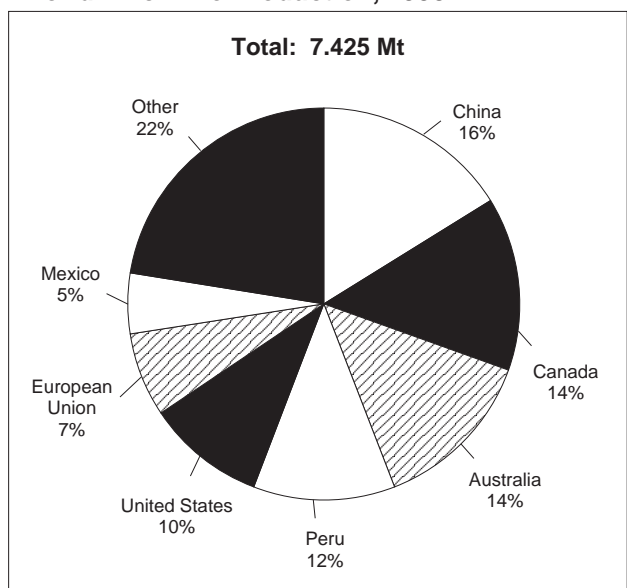
The Production Rate Increase project at Cominco's Red Dog mine was commissioned in the second quarter of 1998 and achieved its full design capacity on a sustainable basis in September. Upon completion of the project, Cominco expects that its annual production will exceed 900 000 t of zinc in concentrate and 150 000 t of lead in concentrate.

Latin America

The first phase of a two-phase expansion project was completed in October at the Sociedad Minera Refinería de Zinc de Cajamarquilla S.A. zinc refinery near Lima, Peru. The refinery, owned by Cominco of Canada (82%) and Marubeni Corporation of Japan (17%), expanded its production capacity to 120 000 t/y of refined zinc. The second phase will eventually double the plant's capacity to 240 000 t/y when completed. Engineering work on the second phase is more than 50% complete. Construction is scheduled to begin at the end of the first quarter of 1999 and the second phase is to be ready for start-up by the end of 2000.

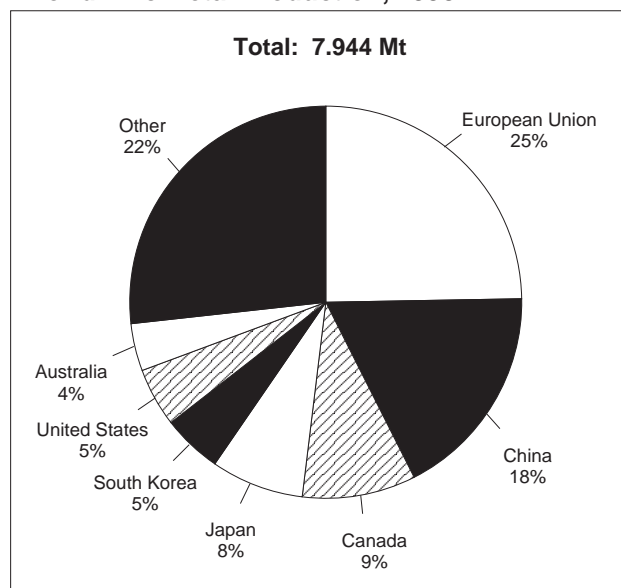
Rio Algom Limited, Noranda Inc. and Teck Corporation announced in September that they will proceed with plans to develop the US\$2.2 billion Antamina

Figure 2
World Zinc Mine Production, 1998



Source: International Lead and Zinc Study Group.

Figure 3
World Zinc Metal Production, 1998



Source: International Lead and Zinc Study Group.

copper-zinc mine project in Peru. Located in the Andes Mountains approximately 380 km north of Lima, Antamina is estimated to contain 500 Mt grading 1.2% copper, 1.0% zinc, 12 g/t silver and 0.03% molybdenum, and is expected to produce an average of 270 000 t/y of copper and 160 000 t/y of zinc over a 20-year mine life. Compañía Minera Antamina S.A., the Peruvian company created to develop and operate the Antamina project, is owned 37.5% by each of Rio Algom and Noranda and 25% by Teck. Antamina is expected to begin production in 2002 and to be among the world's largest producers of copper and zinc concentrates.

Breakwater Resources Ltd. announced in November that operations at its El Mochito mine in northwestern Honduras were temporarily interrupted due to record rainfalls and as a result of Hurricane Mitch, which caused heavy damage to roads and bridges throughout the country making the shipment of concentrate to Porto Cortez and the sending of materials and supplies back to the mine impossible. Heavy rains produced significantly higher-than-normal de-watering requirements in the underground operations at the mine, resulting in large accumulations of water in the lower levels. El Mochito produces 75 000 t/y of zinc in concentrate, 12 000-13 000 t/y of lead in concentrate and 1.2 million troy oz of silver.

In August, Breakwater Resources announced the temporary suspension of milling operations at its El Toqui mine in southern Chile. The temporary suspension allowed the company to implement plans to increase production and reduce costs. The plans included the continued development of the mine, upgrading and refurbishing mining equipment, changing the mine production and mine development method, and improving the throughput and metallurgical performance of the processing facility.

Industrial Minera México, S.A. (IMMSA), a subsidiary of Grupo México S.A. de C.V., signed an agreement to license Zinc Pressure Leach Technology from Dynatec Corporation of Richmond Hill, Ontario. IMMSA operates zinc mines throughout Mexico and a zinc refinery at San Luis Potosí. Dynatec owns and licenses metallurgical technologies previously held by Sherritt International Consultants Inc. The process produces by-product elemental sulphur rather than sulphur dioxide. The technology will be provided by the Metallurgical Technologies Division of Dynatec at Fort Saskatchewan, Alberta.

Europe

In April, the Aznalcollar tailings dam at the Los Frailes mine in Spain, which is owned by Boliden Limited's indirect, wholly owned subsidiary, Boliden Apirsa SL, failed, resulting in the release of acidic

water and tailings material into the local environment. Operations at the Los Frailes mine closed following the failure. In September, a technical report commissioned by the company to find the cause of the accident concluded that the accident was caused by surplus pressure in the interstitial water of the clays and by pressures due to the weight of the dam and the tailings deposited. By the end of November, Apirsa and the Spanish authorities had cleaned up most of the spill. In October and November, Apirsa applied for the licences and permits required to resume operations at Los Frailes, including the use of the depleted Aznalcollar open pit, located beside the Los Frailes mine, as a tailings disposal area. Apirsa anticipates that the required licences and permits will be issued during the first quarter of 1999.

Noranda Inc. signed joint-venture exploration agreements with Arcon International Resources Plc for properties near Arcon's zinc operations in Ireland. The two agreements cover three prospecting licences the company holds in County Offaly. Arcon continues to be the operator with exploration programs agreed to by Arcon and the Irish subsidiary of Noranda, which also signed the agreement. Noranda can earn a 51% interest in the three licences by spending a total of US\$1.6 million under the two agreements. Exploration has yielded positive new results in a new zone. Arcon increased its resource/reserve base by more than 60% to more than 10 Mt since it began its exploration program in 1995, increasing the Galmoy mine's anticipated life to 15 years from 10. The average grade of the new resources was about 15.44% zinc equivalent, compared with the previous average grade of 13.53%.

Asia

In October, India's Hindustan Zinc Ltd. announced plans to expand two of its existing electrolytic zinc smelters by 20 000 t/y and to study the feasibility of building another. A feasibility study is in progress for the establishment of a 100 000-t/y electrolytic zinc smelter.

In September, Pasminco Ltd. of Australia informed authorities in Pakistan that it no longer had plans to continue development work on a lead and zinc mining project in Dhuddar, Lasbela. The company also requested approval to sell its mining rights in Balochistan Province to a third party. Pasminco spent US\$10 million on the project during two years of exploration. The company cited the need to concentrate its efforts on the Century Zinc mining project in Western Australia for its decision to withdraw from Pakistan. The Dhuddar deposit contains proven and probable reserves of 6.86 Mt of ore, with another 10 Mt inferred, which is well short of Pasminco's target of 20 Mt.

South Korea's Korea Zinc Co. Ltd. expects to complete a 50 000-t/y production capacity expansion at its refinery in the southeastern city of Onsan, Korea, to 350 000 t/y in May.

In China, Baiyin Non-ferrous Metals Co. expects to start work on the Lijiagou lead-zinc project located in the western province of Gansu early in 1999. The Lijiagou mine contains proven reserves of more than 3.0 Mt that will add some 5000 t/y of lead and zinc in concentrate, raising the company's concentrate output to 32 000 t in 1999.

Africa

Anglo American Corporation announced plans to develop a US\$980 million zinc mine and smelter project at the Gamsberg deposit in South Africa's Northern Cape Province. The company agreed to buy the 55% interest in the Gamsberg deposit that it did not already own and 55.4% of the Black Mountain Mineral Development Co. Ltd. lead and zinc mine from Gold Fields of South Africa Ltd. A feasibility study is to be completed by the end of 1999 to determine the smelter's location and to assess potential export markets.

Billiton Plc announced in December that it hoped to resolve by year-end a number of issues affecting a proposed 250 000-t/y zinc smelter in South Africa. The project has been delayed as the government considers possible tax and other incentives to locate the project at the proposed deep-water port of Coega, east of the Indian Ocean city of Port Elizabeth. In early December, Japan's Mitsui & Co Ltd. withdrew from the project citing the economic problems in Japan and Asia as the reason for withdrawing its participation. Billiton confirmed that it will continue with the project, together with the other remaining partner, South Africa's Industrial Development Corp. The project is expected to start production in 2003.

Australia

South Korea's Korea Zinc Co. Ltd. intends to complete its US\$425 million Townsville zinc refinery by the end of 1999, despite current weak zinc prices and the slowing economy in Asia. The plant is expected to have an annual production capacity of 170 000 t of refined zinc and is owned by Korea Zinc's wholly owned unit, Sun Metals Corp. Pty Ltd.

Pasminco Ltd. resumed zinc production at its Port Pirie smelter in South Australia after a disruption caused by the failure of a spent acid tank wall in September. Following the start-up, the zinc plant operated at reduced capacity for six weeks while the previously planned installation of new equipment was completed. The two-week shut-down, together with the period of reduced capacity, resulted in a shortfall of about 2000 t of zinc.

Ausmelt Ltd. signed an agreement with Korea Zinc Co. that replaces an existing arrangement covering collaborative marketing of Ausmelt metal smelting technology for zinc residue treatment and slag fuming. The pact provides Korea Zinc with exclusive marketing rights to use Ausmelt's technology to process electrolytic zinc plant residue and fuming zinc and other metals from slag and other residues.

SECONDARY ZINC

Secondary zinc includes high-purity zinc refined from the treatment of electric arc furnace (EAF) dusts, remelted zinc with a purity less than 98.5% zinc, and scrap zinc used in the production of zinc alloys. According to ILZSG, the amount of secondary zinc recovered in the Western World has risen steadily in recent years, reaching 1.97 Mt in 1998.

The recycling of galvanized steel has become an important source of secondary zinc with processes developed to treat EAF dusts or to de-zinc steel before it is remelted. The Waelz kiln is the most common method of processing EAF dusts. Waelz oxides are treated in imperial smelting furnaces for the production of refined zinc. The requirement of Waelz kilns to be near their feed source, i.e., steel mill complexes, would suggest that treatment of these dusts will be most important in the United States, Japan and Western Europe.

Bioponic International announced in November that it was processing zinc-bearing scrap into a new metals reclamation facility in Butte, Montana, in the United States, where a chemical process converts it into a product for sale in the plant and animal nutrient market. The company claims that the process can be applied to a range of industries, including metal finishing and plating, electronics, steelmaking and mining, according to the plant operator. Bioponic International is using a process known as MR3, which incorporates 15 years of research and development, that processes the zinc-bearing scrap into a high-quality zinc sulfate monohydrate, a micro-nutrient product. The facility is expected to reach full production capacity by the first quarter of 1999 with an output of 350 t per month of zinc product.

Anglo-Norwegian construction and engineering group, Kvaerner ASA, announced in October that it had been awarded a US\$148 million contract by CalEnergy Minerals LLC to undertake a zinc recovery project in California. The Imperial Valley project, which includes the design and construction of four ion exchange plants, is expected to produce around 27 000 t/y of zinc.

CONSUMPTION AND USES

World zinc consumption grew by less than 1% in 1998 to reach 7.8 Mt. Preliminary figures for 1998 indicate that Western World demand changed little from 1997, reaching 6.43 Mt. Increases in Europe (up 2.8%) and the United States (up 3.2%) were offset by weaker demand in Asia, and particularly in Japan (down 10.9%).

Galvanic protection of steel has been the predominant end use of zinc in recent years and currently represents 47% of zinc consumption. Zinc is used extensively in the automotive and construction industries for corrosion protection and remains the most cost-effective means of protecting steel against corrosion. Zinc coatings act as a physical barrier and as an oxidant. The oxide, in turn, acts as a further barrier to corrosion.

The desire to reduce weight and improve fuel efficiency has led to increased use of galvanized steel in the automotive industry to protect the thinner gauges of steel from corrosion. In North America, the consumer trend towards all-purpose or sport utility vehicles has increased the consumption of zinc-coated automotive sheet. Both hot-dipped and electro-galvanized steel are used, the thicker coating of hot-dipped steel giving more corrosion protection to unexposed surfaces and the thinner coating of electro-galvanized steel providing a smoother finish for exposed painted surfaces.

Galvanized steel is also used in construction for structural components, roofing, siding and reinforcement bars. Nails and other building materials are often hot dip galvanized. Zinc and zinc-aluminum thermally sprayed coatings are used for the long-term corrosion protection of large steel structures such as bridges and hydro-electric transmission towers.

With the relatively high cost of lumber, fabricated hot-dipped structural steel is becoming cost-competitive for use in residential home construction. The number of steel-framed homes built yearly in the United States has risen steadily and was estimated at 250 000 in 1997. The U.S. steel industry hopes to capture 25% of the housing market (350 000 homes per year) by 2000, which would require 200 000 t/y of zinc.

Galvanized steel studs have a number of advantages over wood, including less volatile prices, less weight, immunity to warping or termites, fire resistance, and recyclability. However, disadvantages include their tendency to bend or dent if improperly handled and the need for specialized training and tools.

A number of zinc alloy coatings have been developed over the years with superior qualities over pure zinc

in specific applications. These include Galfan (90% zinc, 5% aluminum and the remainder rare earth elements) and Galvalume (55% aluminum, 43.4% zinc and 1.6% silicon), as well as zinc-iron and zinc-nickel alloys. Galfan, for example, exhibits higher formability and paintability than other coatings, and zinc-nickel alloys reduce the reactivity of high-silicon steels.

Canada's hot-dip galvanized steel and Galvalume capacity of 1 902 000 t/y is located in Ontario at the facilities of Dofasco Inc. and Stelco Inc. in Hamilton and DNN Galvanizing Corporation in Windsor, and in Quebec at Sorevco in Coteau-du-Lac.

The manufacture of brass and bronze is the second most important use of zinc, accounting for 19% of consumption. The consumption of brass and bronze is highly dependent on the performance of the construction industry as these alloys are used in plumbing fittings, heating and air conditioning components, and other products. The addition of zinc to copper alloys improves their machinability, strength and resistance to corrosion.

The third most important use of zinc, accounting for 14% of consumption, is in zinc-based alloys for the creation of die-cast products such as builders' hardware and automobile fittings. The goal of weight reduction in automobiles for increased fuel efficiency has led to a reduction in the use of zinc die castings, although in the last few years zinc-based alloys have regained some of their former market share. The major reasons for this have been the development of direct injection die castings, the popularity of zinc-aluminum die-casting alloys, and diversification away from over-reliance on the automotive sector.

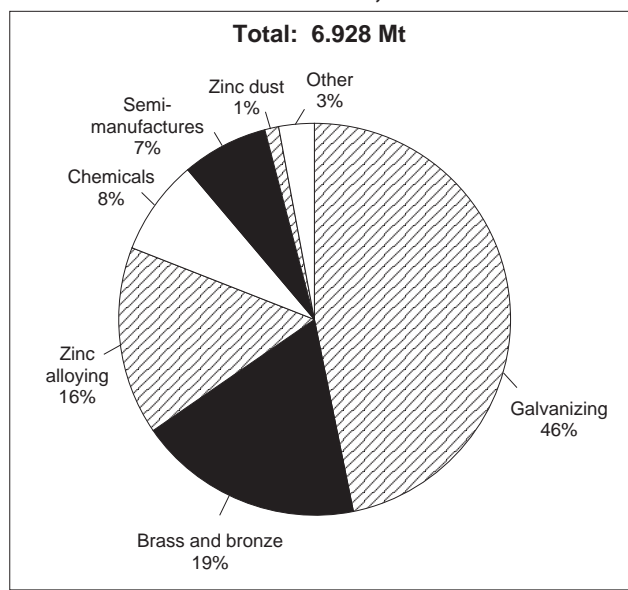
One promising series of alloys is ACuZinc, which contains 5-11% copper and 2.8-4.0% aluminum, with the balance being zinc. These alloys increase the durability and performance, and reduce the thickness, of automotive die castings compared to many other zinc alloys.

Zinc semi-manufactures represent about 8% of zinc consumption and include rolled zinc for roofing applications and the production of coinage. Rolled zinc roofing is especially popular in Europe.

The remainder of zinc consumption is for oxides and other chemicals and zinc dust. Zinc oxide has a variety of applications, the most important of which is as an accelerator in the curing of rubber. High-purity zinc oxide is used in the pharmaceutical industry, and zinc oxide-based salves and ointments have long been known for their healing properties. Other grades are used in the zinc plating industry, as an anti-corrosion agent in lubricants, and in paints, animal feeds and a variety of chemicals.

Zinc-air batteries are a promising development in the race to create viable electric vehicles. The zinc-air battery has a range three to four times that of comparatively sized lead-acid batteries. Its slow recharge time can be overcome by the introduction of replaceable cassettes that house a zinc anode and two cathodes that extract oxygen from air to fuel the chemical reaction. When removed, these cassettes can be taken to a regeneration facility where electrowinning cells turn zinc oxide back into zinc. Such a system is ideal for fleet vehicles that return to a centralized location each day, but for passenger vehicles the plan requires considerable infrastructure.

Figure 4
Western World Zinc Markets, 1998



Source: International Lead and Zinc Study Group.

Zinc-air batteries are being tested for use in electric vehicle fleets in Germany and Sweden. The Electric Power Research Institute (EPRI) in the United States agreed in June to introduce the zinc-air battery in North America. The EPRI will assess the performance, market acceptance and environmental impact of the battery, as well as the feasibility of establishing a zinc regeneration infrastructure in the United States.

INTERNATIONAL LEAD AND ZINC STUDY GROUP

The International Lead and Zinc Study Group (ILZSG) was formed in 1959 to improve market information and to provide opportunities for regular inter-governmental consultations on issues related to lead

and zinc markets. Particular attention is given to providing regular and frequent information on supply, demand, and the outlook for lead and zinc.

The Study Group is headquartered in London, England. In 1998, 27 countries, representing most of the world's major lead- and zinc-producing and consuming nations, were members of the Group. While it has an extensive information-gathering and dissemination role, the Group has no market intervention powers. As well as being an effective mechanism for increasing market transparency related to production, consumption and trade for lead and zinc, the Group is an important forum for communication among governments, among industry, and between governments and industry. It holds a general session each year in October. Member countries' delegations include industry representatives as advisors. Canada has been an active member of the Group since its inception.

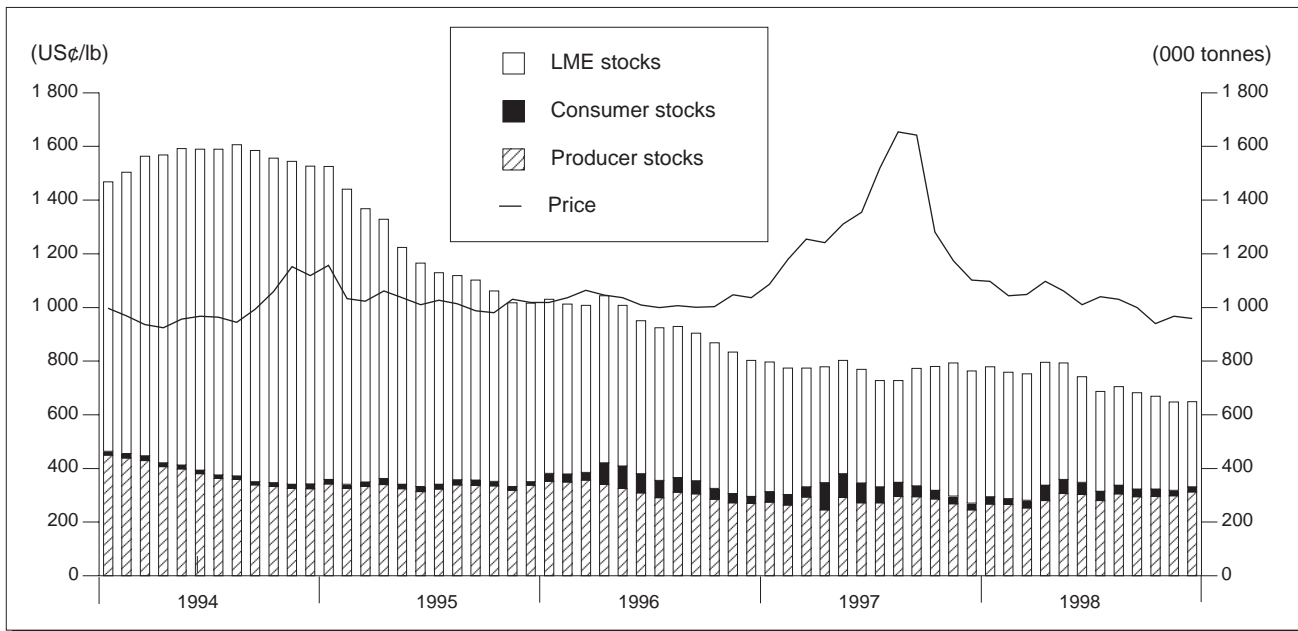
The 43rd Session of the Study Group was held in Marrakech, Morocco, in October 1998 and was attended by representatives of 25 member countries and observers from several nations and organizations. Canada hosted ILZSG's 7th International Recycling Conference in Toronto in May 1998. Entitled "Environmentally Friendly Lead and Zinc: The Challenge of the Recycling Millennium," the conference attracted some 150 participants, mainly from the business sector, with 25 countries represented. The conference examined the recycling of lead and zinc from the aspects of efficiency, competitiveness, and environmental responsibility towards the goal of sustainable development of metals.

PRICES AND STOCKS

Zinc cash settlement prices on the LME peaked early in the year at US\$1140/t (51.8¢/lb) followed by an overall downward trend to end the year at their lowest level of the year at US\$916/t (41.5¢/lb). Zinc cash settlement prices overall averaged US\$1023/t (46.4¢/lb), a decrease of about 22% from 1997. The forward three-month price averaged US\$1046/t, with the market remaining in contango throughout the year.

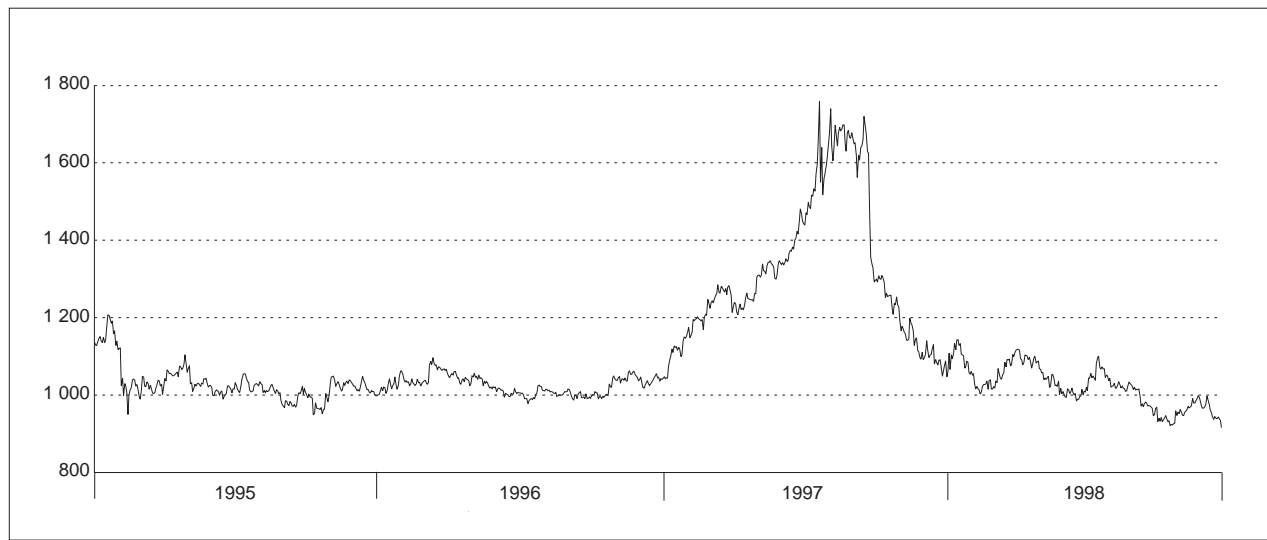
Changes in LME stock levels steadily declined throughout the year to finish at 317 000 t, or 175 000 t less than at the end of 1997. According to the ILZSG and in contrast to the sharp decline in LME stocks, stock levels reported by producers rose by 59 000 t in 1998 and peaked at 305 000 t by year-end.

Figure 5
LME Monthly Average Settlement Prices and Total Stocks, 1994-98



Source: International Lead and Zinc Study Group.

Figure 6
LME Daily Official Settlement Prices, 1995-98

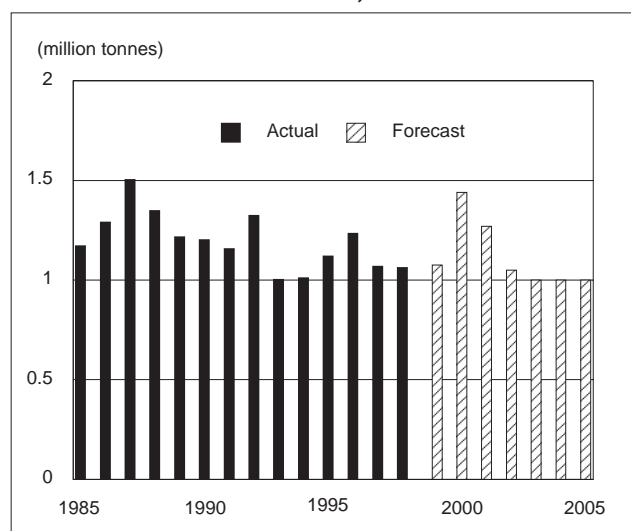


Source: Reuters.

OUTLOOK

Canada's mine production of zinc is expected to increase 2% in 1999 as mines that opened late in 1998 complete a full year of production. Beyond 1999, production is predicted to remain at a level of between 1 300 000 and 1 400 000 t/y to the year 2001. Mine production is then expected to gradually decrease as ore reserves at older mines become exhausted, unless exploration, including that within existing mine infrastructures, leads to additional mineable reserves.

Figure 7
Canadian Mine Production, 1985-2005



Source: Natural Resources Canada.

World zinc consumption is expected to increase 3% in 1999 to 7 990 000 t following the less than 1% increase in 1998. In 1999, the growth in North America (3.5%) and Europe (1.9%) is expected to continue with zinc demand expected to start to recover in Japan, South Korea and some Southeast Asian nations.

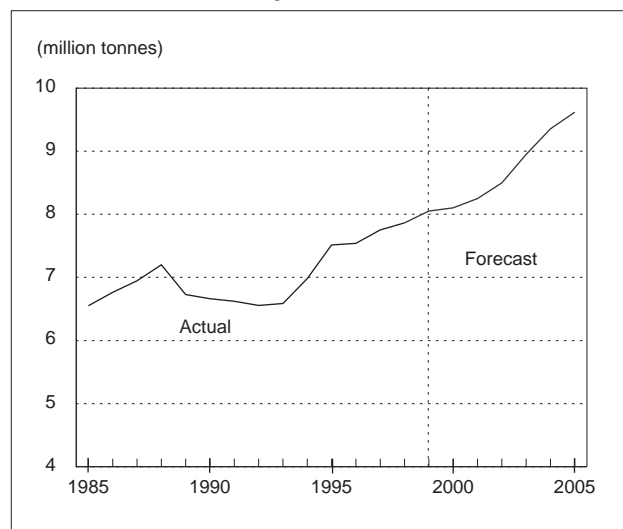
Zinc markets are expected to remain fairly balanced in 1999 with a slight deficit forecast overall. The continued market weakness in Japan and other Southeast Asian nations is expected to continue to exert a downward pressure on prices, at least for the first half of the year, averaging about US\$1000/t (45¢/lb) for 1999.

Beyond 1999, investments made in the zinc industry in recent years are expected to result in large increases in mine and smelter capacity near the turn of the century. Continued growth in galvanizing markets, combined with a gradual recovery in overall

markets, is expected in the remainder of the forecast period with zinc prices rising to US\$1200-\$1300/t (US55¢-60¢/lb) by 2005.

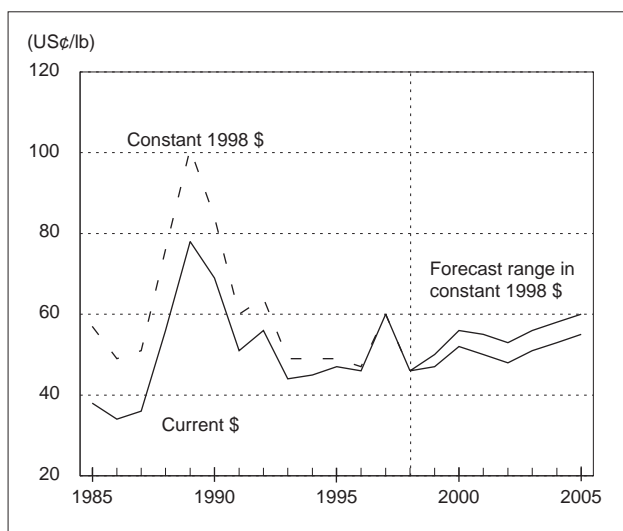
Notes: (1) For definitions and valuation of mineral production, shipments and trade, please refer to Chapter 65. (2) Information in this review was current as of April 6, 1999.

Figure 8
World Zinc Consumption, 1985-2005



Source: Natural Resources Canada.

Figure 9
Zinc Prices, 1985-2005
Annual LME Settlement



Source: Natural Resources Canada.

TARIFFS

Item No.	Description	Canada			United States	EU	Japan ¹
		MFN	GPT	USA	Canada	MFN	WTO
2603.00	Copper ores and concentrates						
2603.00.00.30	Zinc content	Free	Free	Free	Free	Free	Free
2607.00	Lead ores and concentrates						
2607.00.00.30	Zinc content	Free	Free	Free	Free	Free	Free
2608.00	Zinc ores and concentrates						
2608.00.00.30	Zinc content	Free	Free	Free	Free	Free	Free
2616.10	Silver ores and concentrates						
2616.10.00.30	Zinc content	Free	Free	Free	Free	Free	Free
26.20	Ash and residues (other than from the manufacture of iron or steel) containing metals or metal compounds containing mainly zinc						
2620.11	Hard zinc spelter	Free	Free	Free	Free	Free	Free
2817.00	Zinc oxide; zinc peroxide	Free	Free	Free	Free	8.8%	4.5%
28.33	Sulphates; alums; peroxosulphates (persulphates)						
2833.26	Of zinc	Free	Free	Free	Free	6.2%	4%
79.01	Unwrought zinc						
7901.11	Zinc, not alloyed: Containing by weight 99.99% or more of zinc	Free	Free	Free	Free	2.5%	5.04 yen/kg
7901.12	Containing by weight less than 99.99% of zinc	Free	Free	Free	Free	2.5%	5.04 yen/kg
7901.20	Zinc alloys:						
7901.20.00.10	Containing by weight 90% or more but less than 97.5% of zinc	Free	Free	Free	Free	2.5%	5 yen/kg
7901.20.00.20	Containing by weight less than 90% of zinc	Free	Free	Free	Free	2.5%	Free-5 yen/kg
7902.00	Zinc waste and scrap	Free	Free	Free	Free	Free	0.4%
79.03	Zinc dust, powders and flakes						
7903.10	Zinc dust	Free	Free	Free	Free	2.9%	3.6%
7903.90	Other:	Free	Free	Free	Free	2.9%	3.6%
7904.00	Zinc bars, rods, profiles and wires	Free	Free	Free	Free	5.6%	3.4%
7905.00	Zinc plates, sheets, strip and foil	Free	Free	Free	Free	5.6%	3.8%
7906.00	Zinc tubes, pipes, and tube or pipe fittings (for example, couplings, elbows, sleeves)	3%	Free	Free	Free	5.6%	3.4%
7907.00	Other articles of zinc						
7907.00.10	Anodes for electroplating	Free	Free	Free	Free	5.4%	3.6%
7907.00.20	Discs or slugs, containing by weight 90% or more of zinc; gutters, roof capping, skylight frames and other fabricated building components	3%	Free	Free	Free	5.4%	3.6%
7907.00.90	Other	3%	3%	Free	Free	5.4%	3.6%

Sources: Customs Tariff, effective January 1999, Revenue Canada; Harmonized Tariff Schedule of the United States, 1999; Worldtariff Guidebook on Customs Tariff Schedules of Import Duties of the European Union (38th Annual Edition: 1998); Customs Tariff Schedules of Japan, 1998.

¹ WTO rate is shown; lower tariff rates may apply circumstantially.

Note: Where there is a tariff "range," a complete match of the HS code was not available; therefore, the high and low for the product in question are shown.

TABLE 1. CANADA, ZINC PRODUCTION AND TRADE, 1997 AND 1998, AND CONSUMPTION, 1995-97

Item No.	1997		1998P		
	(tonnes)	(\$000)	(tonnes)	(\$000)	
PRODUCTION					
All forms ¹					
New Brunswick	270 240	492 378	285 233	429 561	
Northwest Territories	169 928	309 609	177 825	267 805	
Quebec	190 276	346 683	165 059	248 579	
British Columbia	159 152	289 975	153 612	231 340	
Ontario	116 692	212 612	95 890	144 411	
Manitoba	81 518	148 526	94 757	142 704	
Yukon	39 057	71 163	14 984	22 566	
Total	1 026 864	1 870 946	987 361	1 486 966	
Mine output ²	1 076 385	..	1 057 011	..	
Refined ³	703 798	..	743 623	..	
EXPORTS					
2608.00.30	Zinc content in zinc ores and concentrates				
	Sweden	43 800	101 700	47 868	73 295
	Germany	44 822	73 409	55 990	68 625
	Belgium	86 868r	87 664r	55 639	53 514
	Spain	97 545	90 767	52 692	43 296
	Finland	27 294	63 806	27 501	40 039
	Japan	39 068	37 650	49 618	36 985
	Italy	38 886	46 147	21 789	21 190
	Norway	23 826	36 394	17 708	18 975
	Other countries	87 264r	84 062r	62 327	54 124
	Total	489 373r	621 599r	391 132	410 043
2600.00	Zinc content in other ores and concentrates ⁴	324	25	-	-
2603.00.30	Zinc content in copper	-	-	-	-
2607.00.30	Zinc content in lead	324	25	-	-
2616.10.30	Zinc content in silver	-	-	-	-
2620.11	Ash and residues containing hard zinc spelter				
	United States	82	274	88	151
	Total	82	274	88	151
2620.19	Ash and residues containing mainly zinc, n.e.s.				
	United States	10 370r	9 947r	9 046	9 461
	India	165r	178r	99	100
	Other countries	95r	89r	52	70
	Total	10 630r	10 214r	9 197	9 631
2817.00	Zinc oxide; zinc peroxide				
	United States	33 003	60 855	32 952	53 922
	France	118	199	162	271
	Hong Kong	54	117	108	190
	Germany	493	565	20	24
	Japan	160	357	-	-
	Other countries	129	235	81	122
	Total	33 957	62 328	33 323	54 529
2833.26	Zinc sulphate				
	United States	59	164	206	169
	Total	59	164	206	169
7901.11	Zinc, not alloyed, unwrought, containing by weight 99.99% or more of zinc				
	United States	342 421r	645 088r	320 321	537 422
	Taiwan	9 124	17 087	10 505	16 898
	Indonesia	8 625	17 210	6 009	10 016
	Philippines	9 029	17 197	4 849	8 138
	Hong Kong	4 251	8 438	4 556	7 673
	Japan	6 193	11 320	4 420	7 237
	Singapore	1 266	2 308	2 364	3 818
	Malaysia	3 699	6 761	2 192	3 765
	Kenya	1 158	2 104	479	714
	Other countries	1 149	2 132	1 887	2 885
	Total	386 915r	729 645r	357 582	598 566

TABLE 1 (cont'd)

Item No.		1997		1998p	
		(tonnes)	(\$000)	(tonnes)	(\$000)
EXPORTS (cont'd)					
7901.12	Zinc, not alloyed, unwrought, containing by weight less than 99.99% of zinc				
	United States	128 803r	237 349r	185 487	314 744
	Hong Kong	2 684	5 516	6 120	11 365
	Philippines	4 886	10 012	5 221	8 413
	Japan	5 180	10 554	4 911	8 309
	Taiwan	7 674	14 872	4 889	8 090
	New Zealand	4 036	7 286	5 343	8 062
	Indonesia	3 580	6 849	1 575	2 651
	Other countries	3 206	6 993	5 798	10 570
	Total	160 049r	299 431r	219 344	372 204
7901.20	Zinc alloys, unwrought				
	United States	27	63	381	676
	Other countries	21r	37r	—	—
	Total	48	100	381	676
7902.00	Zinc waste and scrap				
	United States	26 276	18 159	26 635	22 366
	Taiwan	699	849	210	244
	India	161	130	195	206
	Other countries	159r	139r	59	24
	Total	27 295r	19 277r	27 099	22 840
7903.10	Zinc dust				
	United States	5 344	13 555	5 319	12 527
	Total	5 344	13 555	5 319	12 527
7903.90	Zinc powders and flakes				
	United States	2 604	7 424r	6 492	17 951
	Other countries	297	542	106	198
	Total	2 901	7 966r	6 598	18 149
7904.00	Zinc bars, rods, profiles and wire				
	United States	102	461	107	496
	Other countries	—	—	—	—
	Total	102	461	107	496
7905.00	Zinc plates, sheets, strip and foil				
	United States	59	508	73	324
	Total	59	508	73	324
7906.00	Zinc tubes, pipes and tube or pipe fittings (for example, couplings, elbows, sleeves)				
	United States	759	6 869	850	8 358
	Other countries	—	—	2	19
	Total	759	6 869	852	8 377
7907.00	Other articles of zinc				
	United States	2 802	16 406	2 032	16 929
	Other countries	38	204	29	261
	Total	2 840	16 610	2 061	17 190
IMPORTS					
2608.00.00.30	Zinc content in zinc ores and concentrates	187 547r	165 232r	210 495	129 035
2603.00.00.30	Zinc content in copper ores and concentrates	—	—	3	2
2607.00.00.30	Zinc content in lead ores and concentrates	699	614	269	443
2616.10.00.30	Zinc content in silver ores and concentrates	12 474	11 147	14 179	11 834
2620.11	Ash and residues containing hard zinc spelter	—	—	—	—
2620.19	Ash and residues containing mainly zinc, n.e.s.	375	289	1 963	2 103
2817.00	Zinc oxide; zinc peroxide	7 256	9 040r	4 420	5 896
2833.26	Zinc sulphate	3 707	2 602	4 336	3 199
7901.11	Zinc, not alloyed, unwrought, containing by weight 99.99% or more of zinc	6 072r	10 011r	2 072	2 783
7901.12	Zinc, not alloyed, unwrought, containing by weight less than 99.99% of zinc	1 144	1 737r	1 364	2 095
7901.20	Zinc alloys, unwrought	11 874r	22 533r	10 312	20 347

TABLE 1 (cont'd)

Item No.	1997		1998 ^p		
	(tonnes)	(\$000)	(tonnes)	(\$000)	
IMPORTS (cont'd)					
7902.00	Zinc waste and scrap	2 233	2 209	680	710
7903.10	Zinc dust	3 532	6 839	2 334	4 935
7903.90	Zinc powders and flakes	522	1 114 ^r	375	686
7904.00	Zinc bars, rods, profiles and wire	2 387	4 930	3 770	6 937
7905.00	Zinc plates, sheets, strip and foil	1 528 ^r	5 347 ^r	1 492	4 679
7906.00	Zinc tubes, pipes and tube or pipe fittings (for example, couplings, elbows, sleeves)	1 431 ^r	7 371 ^r	1 549	11 067
7907.00	Other articles of zinc	5 294 ^r	21 373 ^r	6 065	24 442
	Total Imports	248 075 ^r	273 388 ^r	265 678	231 193

	1995			1996 ^a			1997 ^{pa}		
	Primary	Secondary	Total	Primary	Secondary	Total	Primary	Secondary	Total
	(tonnes)								
CONSUMPTION^{5,6}									
Zinc used for or in the production of:									
Copper alloys (brass, bronze, etc.)	x	x	3 402	x	x	3 018	x	x	2 717 ^r
Galvanizing: electro	x	x	1 923	x	x	2 159	x	x	2 349
hot dip	x	x	72 419	x	x	79 047	x	x	77 034
Zinc die-cast alloys	x	x	28 973 ^r	x	x	25 229 ^r	x	x	22 924
Other products (including rolled and ribbon zinc, zinc oxides)	x	x	26 198 ^r	x	x	27 514 ^r	x	x	30 706
Total	130 770 ^r	2 145	132 915 ^r	132 439 ^r	4 528 ^r	136 967 ^r	133 212 ^r	2 518	135 730 ^r
Consumer stocks, year-end	8 515 ^r	60	8 576 ^r	7 595 ^r	292 ^r	7 887 ^r	10 133	65	10 198

Sources: Natural Resources Canada; Statistics Canada.

– Nil; . . Not available; n.e.s. Not elsewhere specified; ^p Preliminary; ^r Revised; ^x Confidential.^a Increase in number of companies being surveyed.

¹ New refined zinc produced from domestic primary materials (concentrates, slags, residues, etc.) plus estimated recoverable zinc in ores and concentrates shipped for export. ² Zinc content of ores and concentrates produced. ³ Refined zinc produced from domestic and imported ores. ⁴ Includes HS classes 2603.00.30, 2607.00.30 and 2616.10.30. ⁵ Consumer survey does not represent 100% of Canadian consumption and is therefore consistently less than apparent consumption. ⁶ Due to sensitivity in some end-use categories, a breakdown of primary and secondary sources is not provided in order to be consistent.

Note: Numbers may not add to totals due to rounding.

TABLE 2. CANADA, ZINC PRODUCTION AND EXPORTS,¹ 1975, 1980 AND 1986-98

	Production		Exports		
	All Forms ²	Refined ³	In Ores and Concentrates	Refined	Total
	(tonnes)				
1975	1 055 151	426 902	705 088	247 474	952 562
1980	883 697	591 565	434 178	471 949	906 127
1986	988 173	570 981	450 249	427 176	877 425
1987	1 157 936	609 909	613 185	441 227	1 054 412
1988	1 370 000	703 206	816 885	551 521	1 368 406
1989	1 272 854	669 677	614 223	495 061	1 109 284
1990	1 179 372	591 786	716 185	452 251	1 168 436
1991	1 083 008	660 552	566 815	520 508	1 087 323
1992	1 195 736	671 702	678 172	509 744	1 187 916
1993	990 727	659 881	455 953	493 264	949 217
1994	976 309	690 965	450 320	551 168	1 001 488
1995	1 094 703	720 346	609 575	533 179	1 142 754
1996	1 162 720	716 467	670 789 ^r	581 604	1 252 393 ^r
1997	1 026 864 ^r	703 798 ^r	489 697 ^r	546 964 ^r	1 036 661 ^r
1998 ^p	987 361	743 623	391 132	576 926	968 058

Sources: Natural Resources Canada; Statistics Canada.

^p Preliminary; ^r Revised.

¹ Beginning in 1988, exports are based on the new Harmonized System and may not be in complete accordance with previous method of reporting. Ores and concentrates include HS classes 2608.00.30, 2603.00.30, 2607.00.30 and 2616.10.30. Refined includes HS classes 7901.11 and 7901.12. ² New refined zinc produced from domestic primary materials (concentrates, slags, residues, etc.) plus estimated recoverable zinc in ores and concentrates shipped for export. ³ Refined zinc produced from domestic and imported ores.

TABLE 3. WESTERN WORLD, PRIMARY ZINC STATISTICS, 1994-98

	1994	1995	1996	1997	1998P
	(000 tonnes)				
Mine production (zinc content)	5 172	5 341	5 564	5 498	5 594
Metal production	5 375	5 463	5 496	5 566	5 715
Metal consumption	5 862	6 261	6 225	6 416	6 480

Source: International Lead and Zinc Study Group.
P Preliminary.

TABLE 4. WORLD MINE PRODUCTION OF ZINC, 1994-98

	1994	1995	1996	1997	1998P
	(000 tonnes)				
EUROPE					
Finland	17	16	27	32	31
Ireland	194	184	163	193	163
Poland	151	155	159	158	156
Russia	147	131	126	121	120
Spain	151	172	140	147	128
Sweden	160	169	160	155	167
Others	150	142	122	130	114
Subtotal	970	969	897	936	879
AFRICA					
Morocco	79	80	82	91	108
Namibia	33	30	35	37	42
South Africa	76	74	77	71	70
Others	17	50	38	6	-
Subtotal	205	234	232	209	253
OCEANIA					
Australia	928	882	1 008	972	1 013
AMERICAS					
Bolivia	101	146	145	155	147
Brazil	146	136	128	124	88
Canada	1 011	1 121	1 223	1 077	1 063
Mexico	381	364	378	379	370
Peru	690	692	761	865	869
United States	598	644	628	632	728
Others	81	94	103	103	85
Subtotal	3 008	3 197	3 366	3 335	3 350
ASIA					
China	990	1 011	1 121	1 210	1 200
India	147	154	154	142	176
Iran	75	78	76	77	80
Japan	101	95	79	72	68
Kazakstan	152	155	157	223	240
North Korea	90	90	80	60	48
Thailand	59	14	19	15	25
Turkey	34	65	68	64	60
Others	53	37	38	29	33
Subtotal	1 701	1 699	1 792	1 892	1 930
Total world	6 812	6 981	7 295	7 344	7 425
Total Western World	5 172	5 341	5 564	5 498	5 594

Source: International Lead and Zinc Study Group.
- Nil; P Preliminary.

TABLE 5. WORLD ZINC METAL PRODUCTION, 1994-98

	1994	1995	1996	1997	1998p
	(000 tonnes)				
EUROPE					
Belgium	211	211	207	203	205
Finland	173	177	179	176	199
France	309	314	324	317	321
Germany	360	322	328	318	334
Italy	256	260	269	268	232
Netherlands	212	208	207	201	218
Norway	137	131	135	136	138
Poland	158	165	165	173	175
Russia	138	166	172	189	196
Spain	296	364	363	378	370
Others	261	265	299	296	275
Subtotal	2 511	2 583	2 648	2 655	2 663
AFRICA					
Algeria	24	27	30	30	30
South Africa	94	99	101	110	112
Others	1	—	—	—	—
Subtotal	119	126	131	140	142
AMERICAS					
Argentina	35	36	36	39	38
Brazil	199	194	187	186	175
Canada	691	720	716	704	743
Mexico	209	223	222	230	233
Peru	161	159	173	174	184
United States	356	363	366	367	386
Subtotal	1 651	1 695	1 700	1 700	1 759
ASIA					
China	1 017	1 077	1 185	1 434	1 419
India	157	159	149	166	177
Japan	666	664	599	603	608
Kazakstan	172	169	169	185	242
North Korea	100	100	90	55	45
South Korea	271	279	287	336	390
Others	149	150	147	188	188
Subtotal	2 532	2 598	2 626	2 967	3 069
OCEANIA					
Australia	318	322	327	307	311
Total world	7 131	7 324	7 432	7 769	7 944
Total Western World	5 375	5 463	5 496	5 566	5 715

Source: International Lead and Zinc Study Group.

— Nil; P Preliminary.

TABLE 6. WORLD ZINC CONSUMPTION, 1994-98

	1994	1995	1996	1997	1998 ^p
	(000 tonnes)				
EUROPE					
Belgium	225	250	235	260	260
France	241	271	248	271	294
Germany	519	505	480	507	525
Italy	320	345	336	354	377
Russia	114	130	130	146	130
Spain	140	159	150	160	182
United Kingdom	206	224	226	224	219
Others	552	600	603	632	662
Subtotal	2 317	2 484	2 408	2 554	2 649
AFRICA					
South Africa	92	95	95	98	105
Others	55	61	60	57	61
Subtotal	147	156	155	155	166
OCEANIA					
Australia	173	180	177	176	178
New Zealand	22	20	20	20	21
Subtotal	195	200	197	196	199
AMERICAS					
Brazil	151	179	185	190	186
Canada	147	149	151	158	169
Mexico	132	119	152	178	186
United States	1 176	1 234	1 214	1 257	1 295
Others	138	138	151	159	161
Subtotal	1 744	1 819	1 853	1 942	1 997
ASIA					
China	655	750	829	830	885
India	192	202	214	220	231
Japan	721	752	736	746	659
South Korea	318	350	364	343	318
Taiwan	170	205	194	225	241
Others	520	595	589	544	518
Subtotal	2 576	2 854	2 926	2 908	2 852
Total world	6 979	7 513	7 539	7 755	7 863
Total Western World	5 862	6 261	6 225	6 416	6 480

Source: International Lead and Zinc Study Group.
^p Preliminary.

TABLE 7. CANADA, ZINC METAL CAPACITY, 1998

Company and Location	Annual Rated Capacity
	(000 tonnes of slab zinc)
PRIMARY	
Canadian Electrolytic Zinc Limited Valleyfield, Quebec	250
Falconbridge Limited Timmins, Ontario	133
Hudson Bay Mining and Smelting Co., Limited Flin Flon, Manitoba	95
Cominco Ltd. Trail, British Columbia	290
Total primary, Canada	768

Source: Natural Resources Canada.

TABLE 8. MONTHLY AVERAGE ZINC PRICES, 1997 AND 1998

	North American Special High Grade	LME Special High Grade Settlement
	(US\$/lb)	(US\$/t)
1997		
January	55.2	1 086.5
February	59.3	1 179.4
March	62.7	1 254.8
April	62.0	1 240.4
May	64.9	1 310.5
June	66.1	1 354.2
July	73.3	1 518.0
August	79.1	1 653.5
September	78.5	1 640.9
October	62.1	1 280.1
November	57.4	1 173.0
December	54.2	1 101.7
Yearly average	64.6	1 316.1
1998		
January	54.0	1 096.7
February	51.5	1 043.6
March	51.8	1 047.2
April	54.4	1 096.6
May	53.6	1 060.8
June	51.1	1 009.5
July	52.7	1 039.8
August	52.1	1 029.4
September	50.6	1 000.0
October	47.9	940.1
November	49.0	966.8
December	48.5	958.8
Yearly average	51.4	1 024.1

Sources: *Metals Week*; Reuters.