



PRODUCERS

Ammolite	1	Aurora-Power Pole
Fly ash (by-product of oil and gravel processing)	2	St. Mary River
Gold (placer) (by-product of sand and gravel processing)	3	Battle River (Forestburg) power plant
	4	Genesee power plant
	5	H.R. Miner power plant
	6	Keeghills power plant
	7	Sherrone power plant
	8	Sundance power plant
	9	Onoway
	10	Villeneuve
	11	WestMET Ag
Humate	12	Clearwater
Limestone and/or dolomite	13	Cougar Ridge (Prairie Creek)
	14	Exshaw
	15	Fiske Creek (Nordegg)
	16	Fort Hills
	17	Fort McMurray west
	18	Gap
	19	Horizon
	20	McLeod (Cadomin)
	21	Muskeg
	22	Parsons Creek
	23	Steepbank
	24	Summit Lake
	25	Grande Cache
Calcium chloride	26	Calling Lake
	27	Misau
	28	Sumnyook
Shale	29	Drift Pit
	30	Racoon
	31	Seebe
	32	Kakwa
	33	Fickle Lake
Silica sand	34	Peace River Silica
	35	Broderheim plant
Building stone	36	Bay Tree
	37	Beaverdam
	38	Edo Hill
	39	Jura Creek
	40	Lundbreck Falls
	41	Oldman River
	42	Pigeon Mountain
	43	Rundle Stone
	44	Sheep Creek
	45	Spray Falls
	46	Summerview
	47	Victory
	48	Yamaska
Sulphur (by-product of oil and gas processing)	49	Gas plant
	50	Oil sands processing plant
Sand, gravel, peat, or marl and/or tufa	×	Industrial pit

PAST PRODUCERS

Ammolite	▲	Lead-zinc-silver	▲
Bentonite	▲	Limestone and/or dolomite	▲
Building stone	▲	Marl and/or tufa	▲
Calciummagnesium chloride	▲	Metallurgical coal	▲
Clay	▲	Pumice	▲
Copper	▲	Salt and storage caverns	▲
Fly ash	▲	Silica sand	▲
Humate	▲	Sodium sulphate	▲

SELECTED EXPLORATION PROJECTS

Diamond	A	Buffalo Head Hills
	B	Calling Lake
Iron-vanadium	C	Rambling Creek-North Whiteland River *
Limestone and/or dolomite	D	Baseline Ridge
	E	Brazeau
	F	Idelwild Mountain
Lithium	G	Boardwalk *
	H	Clear Hills *
	I	Clearwater *
	J	Drumheller *
	K	Exshaw West *
	L	Fox Creek West *
	M	North Rocky *
	N	Peak Place *
	O	Peace River *
Magnetite (heavy minerals)	P	Siletto Ridge
Metallurgical coal	Q	Grassy Mountain
Phosphate	R	Crownest
Potash	S	Alberta Potash Project - North
	T	Provost
Uranium	U	Dragon Lake
Zinc-vanadium-nickel-REEs	V	Buckton *

SELECTED PROSPECTIVE AREAS

Am	Ammolite	MT	Magnetite
Bn	Bentonite	MC	Metallurgical coal
Ca	Calciummagnesium chloride	Ph	Phosphate
Cu	Copper	P	Potash
Di	Diamond	REEs	Rare-earth elements (REEs)
Au	Gold	S	Salt (NaCl and storage caverns)
Gy	Gypsum	Ss	Silica sand
Hu	Humate	TZ	Titanium-zirconium-REEs
Fe	Iron-vanadium	U	Uranium
Pb	Lead-zinc	V	Vanadium-nickel
Lm	Limestone and/or dolomite	Zh	Zinc-vanadium-nickel-REEs
Li	Lithium		

Basemap Legend

Urban area	•
City	•
Park and protected area	•
Major road and highway	•
Railway	•
River	•
Lake	•

This map presents a current view of producers, past producers, selected exploration projects, and geological areas prospective for the exploration of mineral deposits. Materials included are metallic and industrial minerals, diamond, ammolite, metallurgical coal, and humate, as well as minerals that may be recoverable as by-products of industrial processes such as sulphur.

Fundamentally, this map serves as an updated version of AGS Map 590, originally published in 2020. The producers, past producers, and selected exploration projects information has been revised to reflect changes in industry production and mineral exploration in the province since the publication of Map 590. Additionally, new datasets, both published by the AGS and released to the public by industry, have refined the understanding of mineral potential in the province which prompted an update of the selected prospective areas information on the map.

This map is a view of more detailed digital files that include additional mineral occurrences and materials, such as peat, bromine, iodine, building stone and sand and gravel, and subdivides the prospective areas based on deposit type, geological unit, depth, exploration stage and other attributes. The digital files should be consulted to resolve boundary edges on overlapping regions. No attempt was made to quantify or rank mineral prospectivity or potential.

Producer: a mineral concentration from which ore grade material currently is being extracted. Public and private surficial dispositions for material extraction are included for completeness and are labelled as industrial pits.

Past producer: a mineral concentration from which ore grade material has been extracted in the past.

Exploration project: an exploration project with a mineral concentration that has been drilled or investigated and may warrant further exploration or development. May or may not have a mineral resource estimate.

Prospective area: a mineral geologically favourable to host mineral occurrences and therefore, favourable for the exploration of mineral deposits. Prospective areas were qualitatively defined using geological unit extents from geological maps and 3D geological models and informed by mineral occurrence datasets, geochemical data, mineralogy data, resource estimates, mineral tenure agreements, and satellite imagery.

Detailed methodology, data sources, descriptions, and bibliography are provided in the Map Information PDF document available for download with the map and digital files.

Digital files for this map and mineral occurrence data are available for viewing or download at <https://ags.alberta.ca>, through the Alberta Interactive Minerals Map (AIMM) and on the AGS Open Data Portal.

Information related to minerals permits, leasing and maintenance can be found at [Alberta Energy and Minerals](https://ags.alberta.ca).

DESCRIPTIONS

The geological units mentioned here are described in the Alberta Table of Formations and the Bedrock Geology of Alberta and Surficial Geology of Alberta maps which are available at the Alberta Geological Survey's website <https://ags.alberta.ca>.

AMMOLITE has been extracted by surface collecting or open-pit mining for jewelry and specimen collection in the province since the 1960s. Currently, ammolite is extracted by mechanized open-pit mining near Lethbridge. Prospective areas for ammolite are the Upper Cretaceous Bearpaw Formation shale beds along river valleys in southern Alberta.

BENTONITE has been mined west and southeast of Edmonton and near Drumheller for use as a drilling mud additive, foundry sand, iron ore pellets, pet waste absorbent, agricultural chemical carriers, geotechnical barriers, and cosmetics. Bentonite is found in the Cretaceous Wapiti Formation in the northwest (Swan Hills project). Prospective areas for bentonite are in near-surface Upper Cretaceous Horseshoe Canyon, Bearpaw, Faskapo, and Wapiti formations throughout Alberta.

BUILDING STONE is mined in west-central to southwestern Alberta. Rock types include shale, sandstone, granite, limestone, and dolomitic siltstone.

CALCIUM/MAGNESIUM CHLORIDE and associated compounds containing potassium and bromine are found in calcium-rich formation brines. Currently, calciummagnesium chloride is extracted from brines pumped to the surface from the Middle Devonian Keg River and Winnipegosis formations (Calling Lake, Misau, and Sunmyook mines). Primary uses include anti-icing, de-icing, dust control, road stabilization, and in manufacturing of fluids. Prospective areas for calcium/magnesium chloride include the Upper Devonian Beaverhill Lake Group in southern Alberta, and the Middle Devonian Elk Point Group in north-central Alberta.

CLAY AND SHALE were extracted at various times for manufacturing bricks, ceramics (e.g., tile, pottery, and crockery), and lightweight aggregate. Today, clay and shale are mainly produced from surface industrial pits for construction and cement manufacturing near Edmonton and Calgary.

COPPER occurs in different types of deposits associated with other metals throughout Alberta. Copper-silver occurrences were found in stratabound, stringer, and disseminated occurrences in quartzite, quartz arenite, and green argillite conglomerate of the Mesoproterozoic Grinnell Formation, and less frequently in the Mesoproterozoic Appikun, Sybil, Sheppard, Gateway, and Rossville formations in the Rocky Mountains and Alberta Rocky Mountain Foothills. The Grinnell Formation is highly prospective for copper-silver because mineable deposits occur within an equivalent stratigraphic unit in Montana. Copper-gold occurrences are reported in sulphide-bearing amphibolite within the Paleoproterozoic Wapiti graben in the Precambrian shield of northeastern Alberta of which the most prospective area is along the Leland Lakes shear zone. Copper-lead-zinc occurrences have been documented in dolomite-siltstone basalts in the Rocky Mountains southwest of Lethbridge. Small-scale copper, lead, and zinc mining occurred between 1900 and 1910 in a basaltic dike at Coppermine Creek, now within Waterton Lakes National Park. Prospective areas for copper-lead-zinc deposits are in the Mesoproterozoic Purcell Group lavas and intrusions in southwestern Alberta.

DIAMONDS are found in kimberlite and related ultrabasic alkaline rocks, which occur as clusters of prolytic and volcanoclastic rocks, as well as dikes and sills of Late Cretaceous to Paleocene age. Prospective areas are within the known diamond-bearing kimberlite fields in the Buffalo Head Hills and Calling Lake areas, where alluvial diamond occurrences were previously found, as well as where the chemistry of kimberlite-indicator minerals (such as garnet, clinopyroxene, zircon, and chromite), collected from glacial and alluvial sediments, suggest a nearby kimberlite source.

FLY ASH powder was produced as a by-product of coal-fired power generation. Although coal-fired power generation has ceased in Alberta, fly ash is still available from stockpiles to use in the manufacturing of cement and concrete for building construction and cementing of oil and gas wells. Fly ash may also contain concentrations of rare-earth elements.

GOLD occurs in different types of deposits throughout Alberta. Gold occurs in placer deposits as very fine grains (i.e., four gold) usually in association with other economic metals such as silver and platinum-group elements (PGE). Placer gold is often found along a stretch of the North Saskatchewan River near Edmonton. Elsewhere in Alberta, placer gold occurs in active streambed sediments in the Peace, Athabasca, and Red Deer rivers and preglacial sand and gravel in northern and central Alberta, and paleoplacer gold occurs in clastic sedimentary rocks in central and southwestern Alberta. Placer gold is currently being recovered as a by-product in two sand and gravel operations west of Edmonton. Gold, accompanied by base metals, occurs in quartz-kimberlite veins, stockworks, and massive, spatially related to granitoids or shear zones in metasedimentary rocks in northeastern Alberta. Prospective areas for gold-base metal deposits are in the Paleoproterozoic Waugh Lake complex and in the Leland Lakes shear zone in the Canadian Shield. Gold, silver, and PGE geochemical anomalies have been reported in the Upper Devonian Waterways and Lower Cretaceous McMurray formations northeast of Fort McMurray.

GYPSUM deposits are widespread in the province and occur as extensive beds or lenses in Devonian and Triassic evaporite units. However, no development has occurred because of depth or remoteness of the resource. Prospective areas for gypsum are in near-surface Devonian Elk Point Group and Fort Vermilion Formation strata in the northeast.

HUMALITE is extracted from open-pit, sub-bituminous coal mines and processed into liquid and dry soil conditioners and drilling fluid additives. Prospective areas for humalite are in shallow coal zones of the Upper Cretaceous Horseshoe Canyon Formation in central to southern Alberta.

IRON-VANADIUM ironstone deposits were evaluated by industry in northwestern Alberta (Clear Hills project) for producing carbonyl iron powder and vanadium electrolyte. Several other iron-rich ironstone occurrences were found near the surface in the region surrounding Clear Hills. Prospective areas for the exploration of additional iron-vanadium ironstone deposits are in the Upper Cretaceous Bad Heat and Dunevang formations in northwestern Alberta.

LEAD-ZINC occurrences were found in carbonate rocks at surface in the Rocky Mountains, most notably the Oldman River occurrence in British Columbia in southwestern Alberta. Other occurrences in carbonate rocks were found in core from oil and gas wells in northwestern Alberta. Prospective areas for lead-zinc deposits include Devonian carbonate platform strata near documented lead-zinc occurrences in the Precambrian shield and Cambrian and Devonian carbonate platform cropping out in the Rocky Mountain fold-and-thrust belt. The existence of hydrothermal dolomitization, spatially related to regional structures, is another important factor when considering the prospectivity for carbonate-hosted lead-zinc deposits. Other types of lead-zinc occurrences were reported in siliciclastic rocks in the Mesoproterozoic Appikun, Sybil, and Sheppard formations in the mountains of southwestern Alberta. Alberta is considered prospective for lead-zinc because mineable lead-zinc deposits occur within equivalent stratigraphic units of the Western Canadian Sedimentary Basin in British Columbia and Northwest Territories.

LIMESTONE and/or DOLOMITE are mined from several locations in the Rocky Mountains, Foothills, and in the Fort McMurray area. Limestone is used to manufacture high-calcium quicklime (for cement), hydrated lime, pulverized limestone, screened limestone, building stone, and crushed rock aggregate. Dolomite is primarily used for aggregate, building stone, neutralizer, desulphurization, and filler. Prospective areas for limestone and dolomite are in Cambrian-Triassic carbonate strata in the Rocky Mountains and Foothills, and in Devonian strata in northeastern Alberta.

LITHIUM is a dissolved constituent of some oil field brines in Alberta. After hydrocarbon extraction, the remaining lithium-rich brine is typically rejected into the subsurface as wastewater. In western Alberta, lithium brines have been identified in the Middle to Upper Devonian Swan Hills Formation, Upper Cambrian Leduc and Niisku formations, and Wabamun Group. Upper Devonian aquifers extend across geological formation boundaries in some areas. In the northwest, brines from reservoirs in the Middle Devonian Keg River Formation and the Triassic Montney Formation contain lower lithium concentrations. However, these concentrations could become economically viable with improved extraction techniques.

MAGNETITE and other heavy minerals, such as titanium dioxide, occur in sand and sandstone beds found near surface along the Foothills west of Lethbridge and north of Calling Lake. The Burns project area located in the Foothills has been explored as a potential source of iron ore for steelmaking, and magnetite for use in the coal industry. The Foothills Mountain project area was explored as a source of titanium oxide. Prospective areas for magnetite and heavy minerals are in the Upper Cretaceous Belly River Group in southwestern Alberta and the Upper Cretaceous Wapiti Formation in north-central Alberta.

MARL and/or TUFFA are mined in Alberta for cement and agricultural liming. Both marl and tufa contain calcium bicarbonate derived from glacial drift or bedrock; marl generally forms in freshwater at ponded spring discharge sites, and tufa forms at well-drained sites. Marl and tufa are produced from surface industrial pits.

METALLURGICAL COAL is currently mined near Grande Cache. It is primarily used in iron smelting and steel making. An open-pit metallurgical coal mine is proposed in southwestern Alberta (Grassy Mountain project). Prospective areas for metallurgical coal are in bituminous coal fields along the Rocky Mountains and Foothills.

PEAT has been harvested in Alberta for horticultural purposes since the 1960s. Active peat harvesting pits exist in many areas of central and northern Alberta. Prospective areas for peat are wetlands throughout northern Alberta that contain partially decomposed organic materials.

PHOSPHATE occurs in sedimentary rock beds that may extend over tens to hundreds of kilometers along the Rocky Mountains and Foothills. Prospective areas are in the Upper Devonian-Mississippian Exshaw Formation, Permian Johnson Canyon and Ranger Canyon formations, Triassic Spray River Group, and Jurassic Fernie Formation. The province is considered highly prospective for phosphate because potentially mineable phosphate beds in British Columbia extend into Alberta.

POTASH occurrences were found in oil and gas wells and during mineral exploration drilling. Alberta is prospective for potash because mineable deposits occur within the same strata in Saskatchewan. Prospective areas for potash occur in the Devonian Prairie Evaporite Formation in east-central and southeastern Alberta. In particular, industry has identified potash intersections that warrant further exploration near Provost.

RARE-EARTH ELEMENTS (REEs) are documented in various alkaline granite and pegmatite units in the Canadian Shield. Rare-earth elements also occur as a secondary commodity in other mineral deposits such as phosphate and Zn-V-Ni-REE black shales. Prospective areas for REEs are the Mesoproterozoic-Paleoproterozoic Taltson basement and Marguerite River complexes in the Canadian Shield, Permian-Jurassic phosphate-bearing strata in the Rocky Mountains and Foothills, the Cretaceous Fish Scale Formation in the north, near-surface Zn-V-Ni-REE black shale deposits in the Upper Cretaceous Second White Specks Formation in the northeast, in the Lower Cretaceous Loon River Formation in the northwest, and Jurassic Fernie Formation shales and Devonian-Mississippian shales of the Exshaw and Banff formations in the Rocky Mountains and Foothills. Also, REEs occur in oil sands tailings and coal fly ash.

SALT is used for de-icing, water softening, and preserving food product. Salt is also extracted to create artificial caverns for storage of petroleum products by the upstream petroleum industry in east-central and northeastern Alberta. Prospective areas for salt production and the creation of caverns are in the Lower-Middle Devonian lower and upper Lobenberg, and Prairie Evaporite formations in northeastern and east-central Alberta.

SAND AND GRAVEL are the primary source of aggregate in Alberta with over 2500 sand and gravel quarries operated by private companies and public works departments. Primary sand include road construction and maintenance, snow and ice control, abrasives, filtration beds, concrete, and landscaping. Prospective areas for sand and gravel are in preglacial, glacial, glaciolacustrine, fluvial, and eolian deposits throughout the province.

SILICA SAND is produced from Lower Cretaceous sandstone in the Peace River area and from unconsolidated sand deposits northeast of Edmonton. Industrial uses include glass, firebricks, and proppant (for hydraulic fracturing). Prospective areas for silica sand are in the Lower Cretaceous Pelly Member of the Peace River Formation in the northwest, silicified unconsolidated sand deposits at shallow depths in central Alberta, the Lower Cretaceous McMurray, Grand Rapids, and Pelican formations in the northeast, and sand dunes and glaciolacustrine sediments throughout the province.

SODIUM SULPHATE was mined in southeastern Alberta for manufacturing kraft paper, glass, detergents, textiles, and chemicals, but production stopped in 1991.

SULPHUR is extracted during crude oil and natural gas processing. It is primarily used for producing fertilizer and secondarily for metallurgical purposes. It occurs naturally in conventional natural gas, crude bitumen, crude oil, and coal. Current production is largely derived from hydrogen sulphide (H₂S)-rich natural gas. Oil sands deposits also contain significant amounts of sulphur, which is either recovered during upgrading in the form of elemental sulphur or remains in the coke.

TITANIUM-ZIRCONIUM-RARE-EARTH ELEMENTS naturally occur in small quantities in oil sands, but they are concentrated during the bitumen extraction process and can potentially be extracted from the tailings. The objective of a current industry project is to design a process to recover titanium, zirconium, and monazite (source of REEs) from the froth treatment tailings before they are discarded.

URANIUM occurs extensively in the Athabasca Basin and Canadian Shield. In several types of deposits related to granitic pegmatites, metamorphic rocks, and structures such as unconformities, shear zones, and veins. The most notable occurrence is the Maybelle River project where historical drilling intersected a high-grade uranium zone in the Late Paleoproterozoic Fair Point Formation, along the Maybelle River shear zone and above the unconformity between the Athabasca Group and basement rocks. Since large, mineable, unconformity-related uranium deposits occur in the Athabasca Basin in Saskatchewan, it is expected that similar deposits may also occur in the Alberta side of the basin. Prospective areas for unconformity-related uranium deposits are in the Late Paleoproterozoic-Early Mesoproterozoic Athabasca Group or underlying basement rocks, particularly along shear zones, and in the Mesoproterozoic-Paleoproterozoic Canadian Shield. Uranium occurrences are also documented in Cretaceous sandstone units south and west of Lethbridge. Prospective areas are in the Upper Cretaceous St. Mary River and Willow Creek formations in southern Alberta.

VANADIUM-NICKEL, molybdenum, and rhenium also naturally occur in oil sands. Elevated concentrations of these elements occur in the organic fraction and are concentrated in waste and by-products, such as petroleum coke and petroleum coke fly ash, during the bitumen upgrading process for both mined and in situ oil sands production.

ZINC-VANADIUM-NICKEL-RARE EARTH ELEMENTS occur in thin metalliferous horizons in laterally extensive organic-rich marine black shale. Other metals present include copper, cobalt, uranium, and silver. The Buckton near-surface deposit in the Upper Cretaceous Second White Specks Formation north of Fort McMurray was evaluated for copper-zinc-nickel-cobalt sulphides, dry uranium oxide, and REE concentrate. Prospective areas for zinc, vanadium, nickel, REEs, and other base metals are in the Lower Cretaceous Loon River Formation in the northwest, the Upper Cretaceous Second White Specks Formation in the northeast, the Jurassic Fernie Formation in the west, and the Devonian-Mississippian Exshaw Formation in southwestern Alberta.

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