

# REPORT FROM THE ECONOMIC DEVELOPMENT OFFICER

## Coal mining in Clearwater County

March 9, 2021



[clearwatercounty.ca/ecdev](http://clearwatercounty.ca/ecdev)

# **Coal Mining in Clearwater County**

**Prepared For  
Clearwater County Council  
March 9, 2021**

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## **Preface**

The majority of this report has been created using multiple sources. Where material has been quoted directly the text is indented on the page. Sources are cited throughout the report.

This report tries to focus specifically on activity within Clearwater County.

## **Brief History of Coal Mining in Clearwater County Before 1976**

Brazeau Collieries Coal Mine at Nordegg, mined for thermal coal, 1912 – 1955

Bighorn and Saunders Creek Collieries at Saunders Creek, mined thermal coal, 1913 – 1954

Alexo Coal Company at Alexo, mined thermal coal, 1920 - 1955

Many other sites were claimed, and some even had work, but I did not find company listings for other old mine sites.

Martin Nordegg was originally looking in the Bighorn Falls (now Crescent Falls) area to mine thermal coal but opted for the Nordegg site because of easier access to Rocky Mountain House.

## **The 1976 Coal Policy**

In 1976 the Government of Alberta adopted policy named *A Coal Development Policy for Alberta* which has become more commonly known as the Coal Policy. The following are excerpts from the Coal Policy.

### *General Statement or Summary*

The Government's overall policy for the development of Alberta's coal resources is designed to bring and maintain the maximum benefits, now and in the future, to the people of Alberta who own this resource. Exploration and development will be encouraged in a manner that is compatible with the environment and at times which will best suit Alberta's economy and labour force.

No development will be permitted unless the Government is satisfied that it may proceed without irreparable harm to the environment and with satisfactory reclamation of any disturbed land. Neither exploration nor development will be permitted in certain designated areas. Limited exploration and development will be permitted in other areas while some areas will be broadly open for both exploration and development under controlled conditions.

On private lands right of entry to the surface will continue to be based on negotiation between the surface owner and the developer. If agreement is not reached, application may be made to the Surface Rights Board which may grant the right of entry setting the appropriate compensation.

Development will be first for the purpose of meeting Alberta's own growing demands for electric energy and serving its other industrial requirements. Constant surveillance will be maintained to ensure a long-term adequacy of supply for all Alberta uses.

The Government will ensure that a fair price is received for this depleting non-renewable resource and that the people of Alberta, by way of a royalty on Crown-owned coal and a tax on freehold coal, obtain a proper share of this revenue while leaving attractive returns to the industry as an incentive to explore for and develop the resource.

All future developments will be required to make the maximum practical use of Alberta's skilled and professional manpower, Alberta services and Alberta materials and equipment.

All operations will be under strict inspection and regulation to ensure full compliance with standards and requirements relating to safety and industrial health, environmental protection and resource conservation.

Wherever appropriate opportunities will be made available for Albertans to participate in the equity ownership of future projects.

The Government's policy will continue to be administered by the Department of Energy and Natural Resources, the Energy Resources Conservation Board and the Department of the Environment, with other Government departments participating as appropriate. Modifications to the procedure of considering applications for new developments will result in a four-step screening and evaluation process:

1. Preliminary disclosure of a development proposal to the Government, and the Government's initial response.
2. Disclosure and detailed descriptions of the proposal by the applicant to the public.
3. Consideration of formal applications including the basic Technical Application, a Cost-Benefit and Social Impact Analysis, an Environmental Impact Assessment and a Land Surface Reclamation Plan through a public hearing.
4. Final decision by the Government in the light of the findings of the Energy Resources Conservation Board, the Department of the Environment and the other concerned departments.

*General Statement or Summary, pages 3 -4, A Coal Development Policy for Alberta, June 15, 1976*

#### *Classification of Lands for Coal Exploration and Development*

Having regard to the questions of environmental sensitivity, alternate land uses, potential coal resources and the extent of existing development of townsites and transportation facilities, the Government has classified Provincial lands into four categories with respect to coal exploration and development:

*Category 1* in which no exploration or commercial development will be permitted. This category includes National Parks , present or proposed Provincial Parks, Wilderness Areas, Natural Areas , Restricted Development Study Areas, Watershed Research Study Basins , Designated Recreation Areas, Designated Heritage Sites , Wildlife Sanctuaries , settled urban areas and major lakes and rivers. These are areas for which it has been determined that alternate land uses have a higher priority than coal activity. Category 1 also includes most areas associated with high environmental sensitivity; these are areas for which reclamation of disturbed lands cannot be assured with existing technology and in which the watershed must be protected.

*Category 2* in which limited exploration is desirable and may be permitted under strict control but in which commercial development by surface mining will not normally be considered at the present time. This category contains lands in the Rocky Mountains and Foothills for which the preferred land or resource use remains to be determined, or areas where infrastructure facilities are generally absent or considered inadequate to support major

mining operations. In addition, this category contains local areas of high environmental sensitivity in which neither exploration or development activities will be permitted. Underground mining or in-situ operations may be permitted in areas within this category where the surface effects of the operation are deemed to be environmentally acceptable.

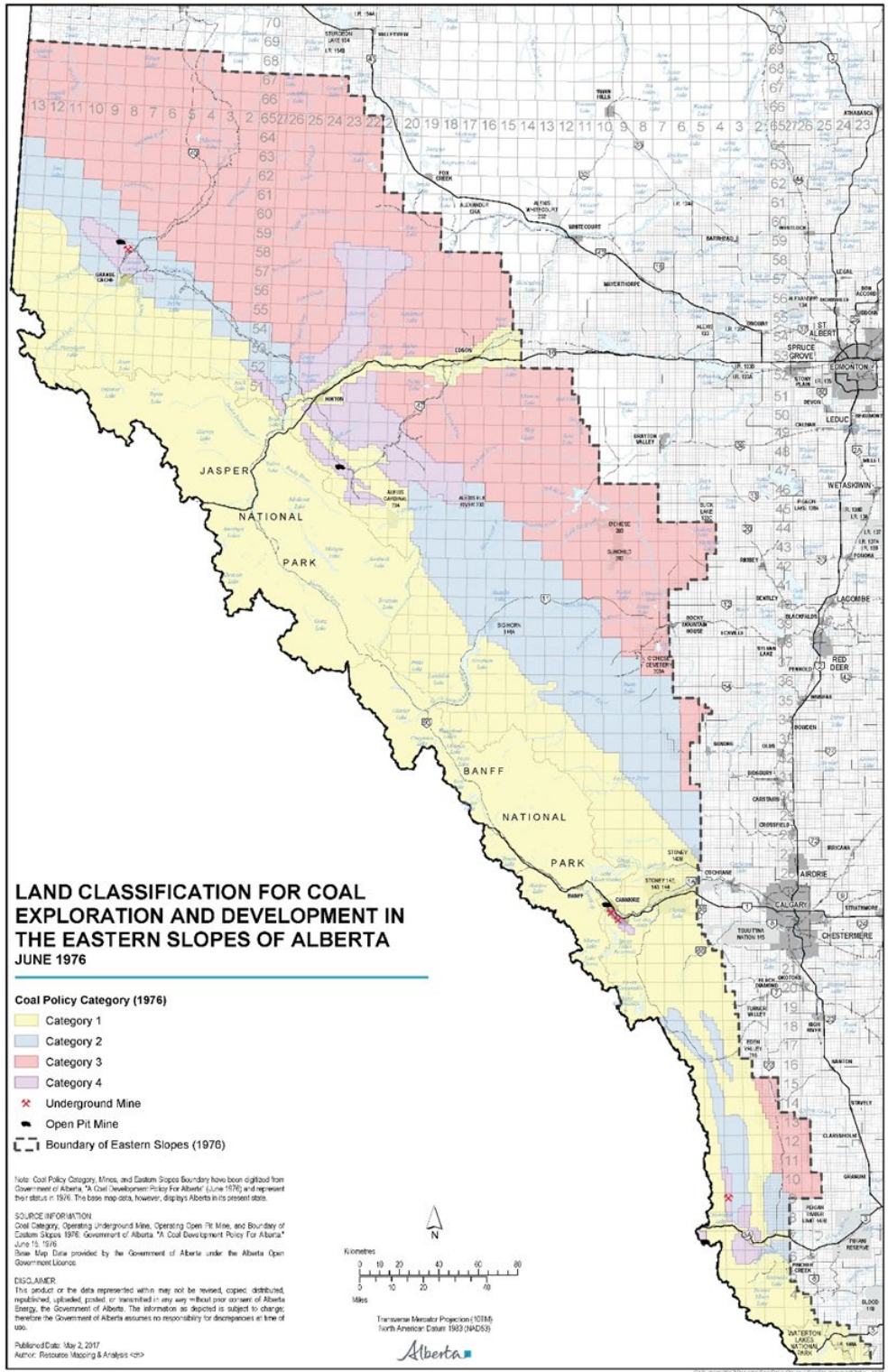
*Category 3* in which exploration is desirable and may be permitted under appropriate control but in which development by surface or underground mining or in-situ operations will be approved subject to proper assurances respecting protection of the environment and reclamation of disturbed lands and as the provision of needed infrastructure is determined to be in the public interest. This category covers the Northern Forested Region and eastern portions of the Eastern Slopes Region shown in Map 1 of Appendix 2. It also includes Class 1 and Class 2 agricultural lands in the settled regions of the Province. Although lands in this category are generally less sensitive from an environmental standpoint than the lands in Category 2, the Government will require appropriate assurances, with respect to surface mining operations on agricultural lands, that such lands will be reclaimed to a level of productivity equal to or greater than that which existed prior to mining.

*Category 4* in which exploration may be permitted under appropriate control and in which surface or underground mining or in-situ operations may be considered subject to proper assurances respecting protection of the environment and reclamation of disturbed lands. This category covers the parts of the Province not included in the other three categories.

pages 14 - 16, *A Coal Development Policy for Alberta*, June 15, 1976

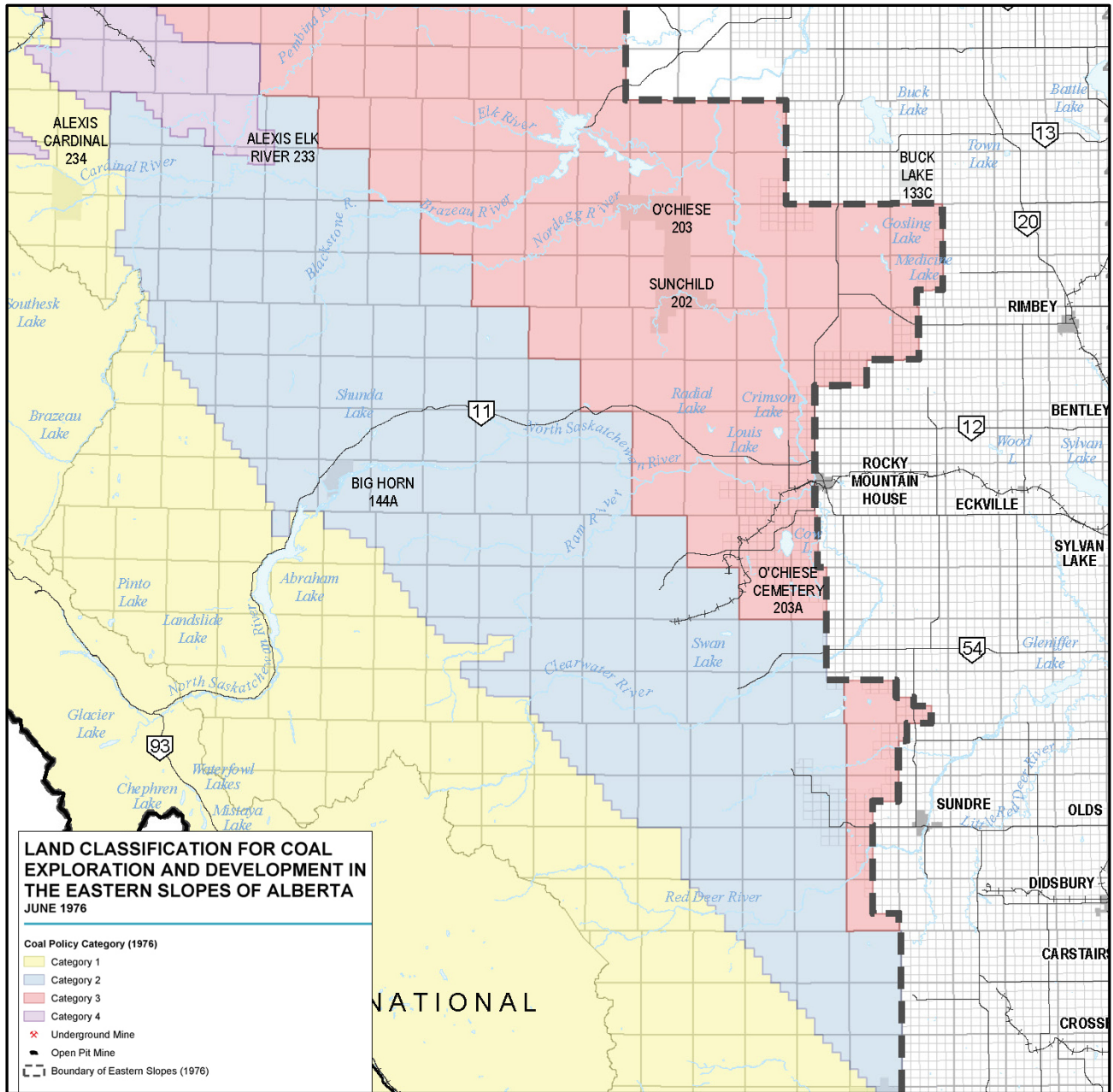
# Land Classifications as Set Out in the 1976 Coal Policy

<https://open.alberta.ca/dataset/cc40f8f5-a3f7-42ce-ad53-7521ef360b99>





## Close up of Land Categories



## Types of Coal

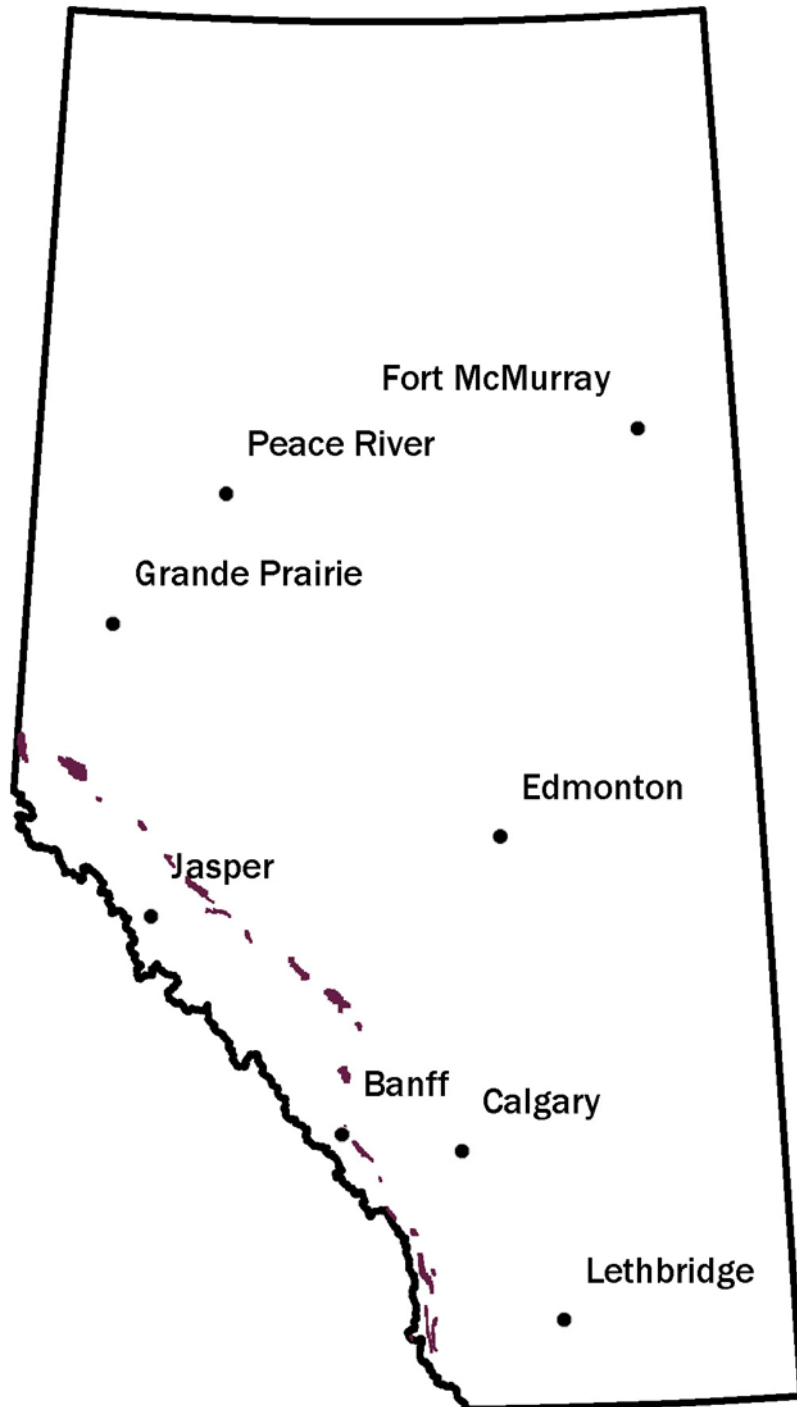
Two types of coal are mined in Alberta: thermal coal and metallurgical coal.

- Thermal coal is burned to run steam turbines for generating electricity. It is also used to heat homes.
- Metallurgical coal, which is harder than thermal coal, burns at higher temperatures and is used for smelting iron and making steel.

## Where is Metallurgical Coal In Alberta

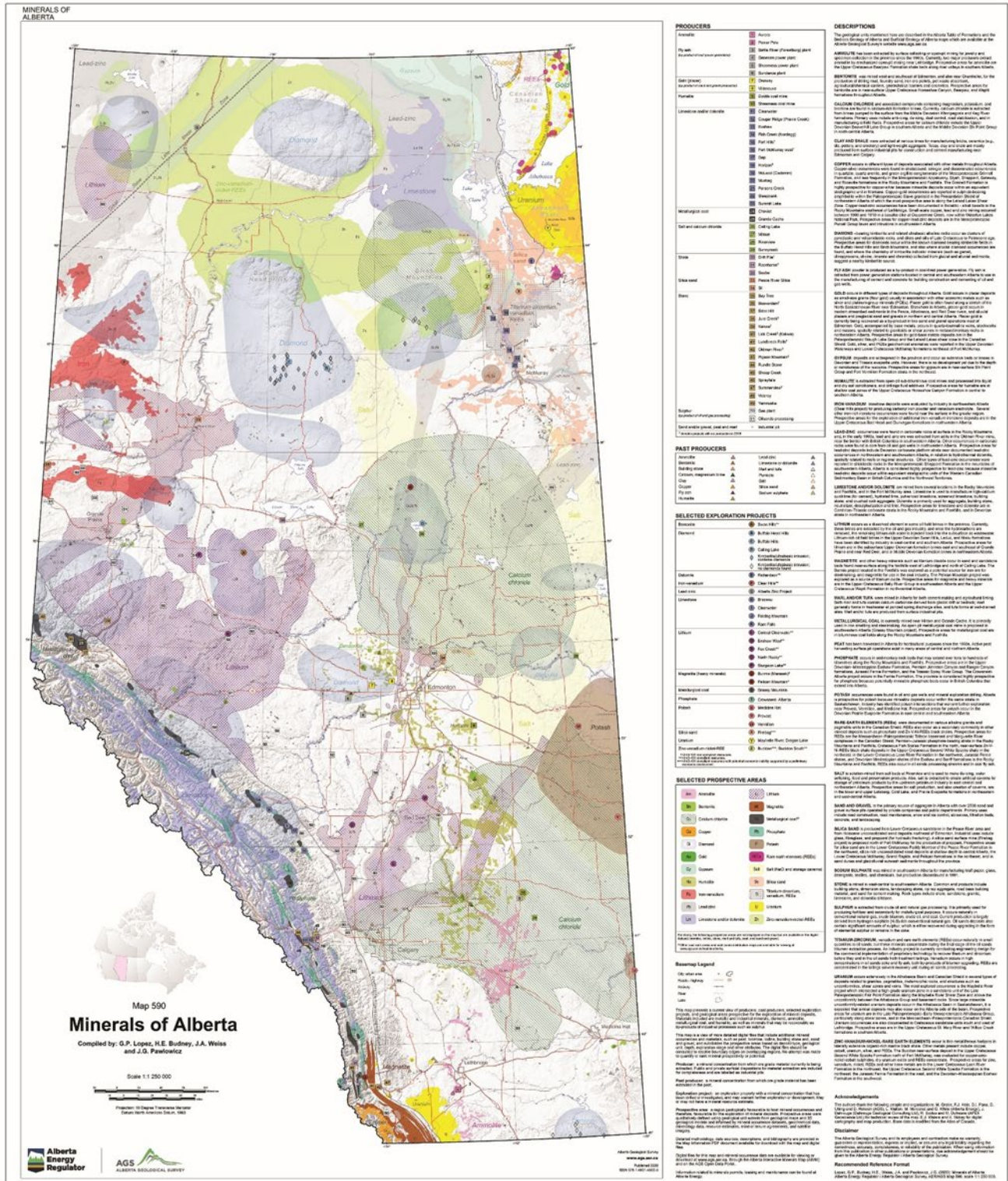
Map from University of Alberta, Faculty of Science, Department of Earth and Atmospheric Sciences

<https://www.ualberta.ca/earth-sciences/facilities/collections-and-museums/minerals-of-alberta/metallurgical-coal.html>



# Minerals of Alberta – Map from Alberta Energy Regulator and Alberta Geological Survey, 1983 data

<https://ags.aer.ca/publication/map-590>



**PRODUCERS**

**DESCRIPTIONS**

**PAST PRODUCERS**

**SELECTED EXPLORATION PROJECTS**

**SELECTED PROSPECTIVE AREAS**

**Reservoir Legend**

**Acknowledgements**

**Disclaimer**

**Recommended Reference Format**

**Map 590**  
**Minerals of Alberta**  
 Compiled by G.P. Lopez, H.E. Budney, J.A. Wells and J.G. Pawtovic

Scale 1:1 250 000

Alberta Energy Regulator  
 AGS ALBERTA GEOLOGICAL SURVEY

# Legend for Mineral Map – Top

## PRODUCERS

Ammolite	1	Aurora	
	2	Power Pole	
	Fly ash <i>(by-product of coal power generation)</i>	3	Battle River (Forestburg) plant
		4	Genesee power plant
		5	Sheerness power plant
		6	Sundance plant
Gold (placer) <i>(by-product of sand and gravel production)</i>	7	Onoway	
	8	Villeneuve	
Humalite	9	Dodds coal mine	
	10	Sheerness coal mine	
Limestone and/or dolomite	11	Clearwater	
	12	Cougar Ridge (Prairie Creek)	
	13	Exshaw	
	14	Fish Creek (Nordegg)	
	15	Fort Hills†	
	16	Fort McMurray west†	
	17	Gap	
	18	Horizon†	
	19	McLeod (Cadomin)	
	20	Muskeg	
	21	Parsons Creek	
	22	Steepbank	
	23	Summit Lake	
	Metallurgical coal	24	Cheviot
25		Grande Cache	
Salt and calcium chloride	26	Calling Lake	
	27	Mitsue	
	28	Riverview	
	29	Sunnynook	
Shale	30	Drift Pile†	
	31	Racehorse†	
	32	Seebe	
Silica sand	33	Peace River Silica	
	34	Sil	
Stone	35	Bay Tree	
	36	Beaverdam†	
	37	Eddo Hill	
	38	Jura Creek†	
	39	Kakwa†	
	40	Lick Creek† (Kakwa)	
	41	Lundbreck Falls†	
	42	Oldman River†	
	43	Pigeon Mountain†	
	44	Rundlet Stone	
	45	Sheep Creek	
	46	Sprayfalls	
	47	Summerview†	
	48	Viceroy	
	49	Yamnuska	
	Sulphur <i>(by-product of oil and gas processing)</i>	50	Gas plant
51		Oil sands processing	
Sand and/or gravel, peat and marl	×	Industrial pit	

† denotes projects with no production in 2018

## PAST PRODUCERS

Ammolite	▲	Lead-zinc	▲
Bentonite	▲	Limestone or dolomite	▲
Building stone	▲	Marl and tufa	▲
Calcium, magnesium brine	▲	Pumicite	▲
Clay	▲	Salt	▲
Copper	▲	Silica sand	▲
Fly ash	▲	Sodium sulphate	▲
Humalite	▲		

## SELECTED EXPLORATION PROJECTS

## 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 [www.ags.aer.ca](http://www.ags.aer.ca).

**AMMOLITE** has been extracted by surface collecting or open-pit mining for jewelry and specimen-collection in the province since the 1960s. Currently, two major producers extract ammolite 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** was mined west and southeast of Edmonton, and also near Drumheller, for the production of drilling mud, foundry sand, iron ore pellets, pet waste absorbent, agricultural/chemical carriers, geotechnical barriers and cosmetics. Prospective areas for bentonite are in near-surface Upper Cretaceous Horseshoe Canyon, Bearpaw, and Wapiti formations throughout Alberta.

**CALCIUM CHLORIDE** and associated compounds containing magnesium, potassium, and bromine are found in calcium-rich formation brines. Currently, calcium chloride is extracted from brines pumped to the surface from the Middle Devonian Winnipegosis and Keg River formations. Primary uses include anti-icing, de-icing, dust control, road stabilization, and in manufacturing oilfield fluids. Prospective areas for calcium 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 light-weight 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 stratobound, stringer, and disseminated occurrences in quartzite, quartz arenite, and green argillite conglomerate of the Mesoproterozoic Grinnell Formation, and less frequently in the Mesoproterozoic Appekunny, Siyeh, Sheppard, Gateway, and Roosville formations in the Rocky Mountains and 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 Slave granitoid 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 tholeiitic - alkali 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.

**DIAMOND**-bearing kimberlite and related ultrabasic alkaline rocks occur as clusters of pyroclastic and volcanoclastic rocks, and dikes and sills of Late Cretaceous to Paleocene age. Prospective areas for diamonds occur within the known diamond-bearing kimberlite fields in the Buffalo Head Hills and Birch Mountains, and also where alluvial diamond occurrences are found, and where the chemistry of kimberlite indicator minerals (such as garnet, clinopyroxene, olivine, ilmenite and chromite) collected from glacial and alluvial sediments, suggest a nearby kimberlite source.

**FLY ASH** powder is produced as a by-product in coal-fired power generation. Fly ash is collected from power generation stations located in central and southeastern Alberta to use in the manufacturing of cement and concrete for building construction and cementing of oil and gas wells.

**GOLD** occurs in different types of deposits throughout Alberta. Gold occurs in placer deposits as small-size grains (flour gold) usually in association with other economic metals such as silver and platinum-group minerals (PGEs). Placer gold is often found along a stretch of the North Saskatchewan River near Edmonton. Elsewhere in Alberta, placer gold occurs in modern streambed sediments in the Peace, Athabasca, and Red Deer rivers, and alluvial placers and preglacial sand and gravels in northern and central 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-tourmaline veins, stockworks and masses, spatially related to granitoids or shear zones in metasedimentary rocks in northeastern Alberta. Prospective areas for gold-base metals deposits are in the Paleoproterozoic Waugh Lake Group and the Leland Lakes shear zone in the Canadian Shield. Gold, silver, and PGEs geochemical anomalies were 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, there is no development yet due to the depth or remoteness of the resource. Prospective areas for gypsum are in near-surface 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 drillings 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 greater region. Prospective areas for the exploration of additional iron-vanadium ironstone deposits are in the Upper Cretaceous Bad Heart and Dunvegan formations in northwestern Alberta.

**LEAD-ZINC** occurrences were found in carbonate rocks at surface in the Rocky Mountains, and, in the early 1900s, lead and zinc ore was extracted from adits in the Oldman River mine, near the border with 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 northwestern and southwestern Alberta, in relation to hydrothermal dolomite, spatially related to reefs or regional structures. Other types of lead-zinc occurrences were reported in siliciclastic rocks in the Mesoproterozoic Sheppard Formation in the mountains of southwestern Alberta. Alberta is considered highly prospective for lead-zinc because mineable lead-zinc deposits occur within equivalent stratigraphic units of the Western Canadian Sedimentary Basin in British Columbia and the Northwest Territories.

**LIMESTONE AND/OR DOLOMITE** are mined from several locations in the Rocky Mountains and 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, desulfurization 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.

**SELECTED EXPLORATION PROJECTS**

Bentonite	<b>A</b> Swan Hills**
Diamond	<b>B</b> Buffalo Head Hills
	<b>C</b> Buffalo Hills
	<b>D</b> Calling Lake
	<b>D</b> Kimberlite/ultrabasic intrusion; contains diamonds <b>D</b> Kimberlite/ultrabasic intrusion; no diamonds found
Dolomite	<b>E</b> Richardson**
Iron-vanadium	<b>F</b> Clear Hills**
Lead-zinc	<b>G</b> Alberta Zinc Project
Limestone	<b>H</b> Brazeau
	<b>I</b> Clearwater
	<b>J</b> Folding Mountain
	<b>K</b> Ram Falls
Lithium	<b>L</b> Central Clearwater**
	<b>M</b> Exshaw West**
	<b>N</b> Fox Creek**
	<b>O</b> North Rocky**
	<b>P</b> Sturgeon Lake**
Magnetite (heavy minerals)	<b>B</b> Burmis (Marasek)* <b>P</b> Pelican Mountain*
Metallurgical coal	<b>S</b> Grassy Mountain
Phosphate	<b>T</b> Crownsnest-Alberta
Potash	<b>U</b> Medicine Hat
	<b>V</b> Provost <b>W</b> Vermilion
Silica sand	<b>X</b> Firebag***
Uranium	<b>Y</b> Maybelle River, Dragon Lake
Zinc-vanadium-nickel-REE	<b>Z</b> Buckton***, Buckton South**

\*\* Ni 43-101 non-compliant resources.  
\*\*\* Ni 43-101 compliant resources.  
\*\*\*\* Ni 43-101 compliant resources with potential economic viability supported by a preliminary economic assessment.

**SELECTED PROSPECTIVE AREAS**

<b>Am</b> Ammolite	<b>L</b> Lithium
<b>Bn</b> Bentonite	<b>Mt</b> Magnetite
<b>Cc</b> Calcium chloride	<b>Mc</b> Metallurgical coal††
<b>Cu</b> Copper	<b>Ph</b> Phosphate
<b>Di</b> Diamond	<b>P</b> Potash
<b>Au</b> Gold	<b>REEs</b> Rare earth elements (REEs)
<b>Gy</b> Gypsum	<b>S</b> Salt (NaCl and storage caverns)
<b>Hu</b> Humalite	<b>Ss</b> Silica sand
<b>Fe</b> Iron-vanadium	<b>TZ</b> Titanium-zirconium, vanadium, REEs
<b>Pb</b> Lead-zinc	<b>U</b> Uranium
<b>Lm</b> Limestone and/or dolomite	<b>Zn</b> Zinc-vanadium-nickel-REEs

For clarity, the following prospective areas are not displayed on the map but are available in the digital dataset: bromine, iodine, stone, marl and tufa, peat, and sand and gravel.  
†† Other coal rank areas and coal zones distribution maps are available for viewing at [www.sgs.aec.ca/coal-in-alberta](http://www.sgs.aec.ca/coal-in-alberta).

**Basemap Legend**

- City, urban area
- Roads - 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, diamonds, ammolite, metallurgical coal, and humalite, as well as minerals that may be recoverable as by-products of industrial processes such as sulphur.

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 property 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 region 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.

strata in northeastern Alberta.

**LITHIUM** occurs as a dissolved element in some oil field brines in the province. Currently, these brines are extracted by the oil and gas industry, and once the hydrocarbons are removed, the remaining lithium-rich water is injected back into the subsurface as wastewater. Lithium-rich oil field brines in the Upper Devonian Swan Hills, Leduc, and Nisku formations have been identified by industry in west-central and southern Alberta. Prospective areas for lithium are in the subsurface Upper Devonian formation brines east and southeast of Grande Prairie and near Red Deer, and in Middle Devonian formation brines in northeastern Alberta.

**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 Burmis project located in the Foothills was explored as a potential source for iron ore for steelmaking, and magnetite for use in the coal industry. The Pelican Mountain project 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 TUFA** were mined in Alberta for both cement making and agricultural liming. Both marl and tufa contain calcium carbonate 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/or tufa are produced from surface industrial pits.

**METALLURGICAL COAL** is currently mined near Hinton and Grande Cache. It is primarily used in iron smelting and steelmaking. 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 surface pit operations exist in many areas of central and northern Alberta.

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

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

**RARE-EARTH ELEMENTS (REEs)** were documented in various alkaline granite and pegmatite units in the Canadian Shield. REEs also occur as a secondary commodity in other mineral deposits such as phosphate and Zn-V-Ni-REEs 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, Cretaceous Fish Scales Formation in the north, near-surface Zn-V-Ni-REEs black shale deposits in the Upper Cretaceous Second White Specks shale in the northeast, in the Lower Cretaceous Loon River Formation in the northwest, Jurassic Fernie shales, and Devonian-Mississippian shales of the Exshaw and Banff formations in the Rocky Mountains and Foothills. REEs also occur in oil sands processing streams and in coal fly ash.

**SALT** is solution-mined from salt beds at Riverview and is used to make de-icing, water softening, food and preservation products. Also, salt is 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 also creation of caverns, are in the lower and upper Lottsberg, Cold Lake, and Prairie Evaporite formations in northeastern and east-central Alberta.

**SAND AND GRAVEL** is the primary source of aggregate in Alberta with over 2500 sand and gravel surface pits operated by private companies and public departments. Primary uses include road construction, road maintenance, snow and ice control, abrasives, filtration beds, concrete, and landscaping.

**SILICA SAND** is produced from Lower Cretaceous sandstone in the Peace River area and from Holocene unconsolidated sand deposits northeast of Edmonton. Industrial uses include glass, fiberglass, and proppant (for hydraulic fracturing). A silica sand surface mine (Firebag project) is proposed north of Fort McMurray for the production of proppant. Prospective areas for silica sand are in the Lower Cretaceous Paddy Member of the Peace River Formation in the northwest, silica-rich unconsolidated sand deposits at shallow depth in central Alberta, the Lower Cretaceous McMurray, Grand Rapids, and Pelican formations in the northeast, and in sand dunes and glacioluvial outwash sediments throughout the province.

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

**STONE** is mined in west-central to southwestern Alberta. Common end products include building stone, dimension stone, landscaping stone, rip rap aggregate, road base building material, and sand for cement making. Rock types include shale, sandstone, granite, limestone, and dolomitic siltstone.

**SULPHUR** is extracted from crude oil and natural gas processing. It is primarily used for producing fertilizer and secondary for metallurgical purposes. It occurs naturally in conventional natural gas, crude bitumen, crude oil, and coal. Current production is largely derived from hydrogen sulphide (H<sub>2</sub>S)-rich conventional 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, vanadium and rare earth elements (REEs)** occur naturally in small quantities in oil sands, but these minerals concentrate during the final stage of the oil sands bitumen extraction process. An industry project is currently conducting engineering design for the commercial implementation of proprietary technology to recover titanium and zirconium before they and in the oil sands froth treatment tailings. Vanadium occurs in high concentrations in oil sands coke and fly ash, both by-products of bitumen upgrading. REEs are concentrated in the tailings solvent recovery unit during oil sands processing.

**URANIUM** occurs extensively in the Athabasca Basin and Canadian Shield in several types of deposits related to granites, pegmatites, metamorphic rocks, and structures such as unconformities, shear zones and veins. The most explored occurrence is the Maybelle River project which intersected a high-grade uranium zone in a sandstone unit of 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 on the Alberta side of the basin. Prospective areas for uranium are in the Late Paleoproterozoic-Early Mesoproterozoic Athabasca Group, 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.

**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, silver, and REEs. 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 REEs 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 the southwest.

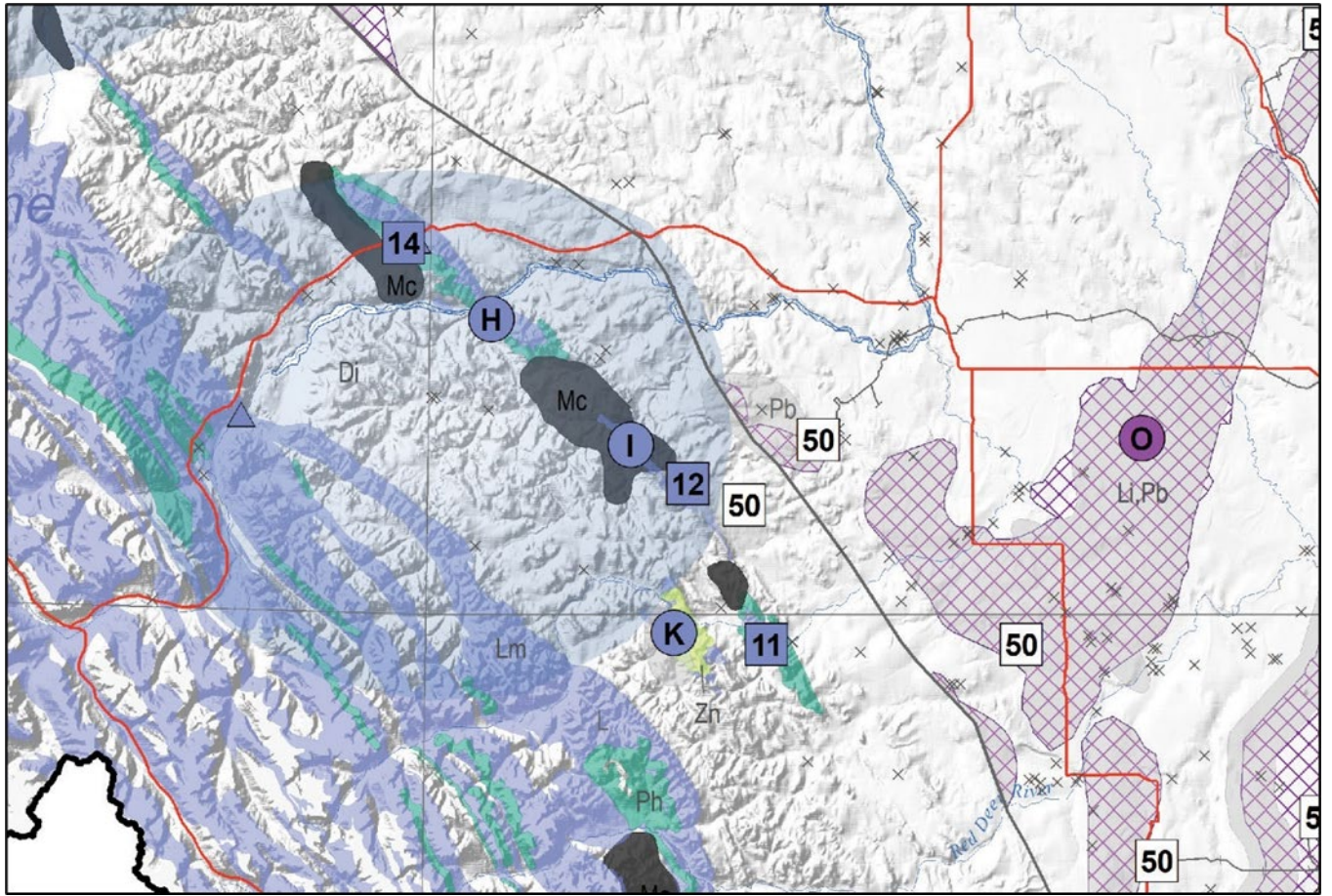
**Acknowledgements**

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**Disclaimer**

**Legend for Mineral Map – Bottom**

Close up of Minerals of Alberta map



## Types of Coal Mining

### *Underground Mines*

**Room and Pillar** The room-and-pillar method involves cutting rooms into the coal seam and leaving a series of large pillars at regular intervals to support the mine roof. At each level where coal is present, the shafts connect to a grid of huge galleries (10- to 20-square-meter sections) that can extend over dozens of kilometers.

**Longwall** The longwall method involves using a machine called a shearer that looks like a huge plow. The shearer slowly pushes and cuts through the coalface. It recovers the loosened ore as it advances and lets the roof collapse behind it. This is called caving. Sometimes buildings or roads located above the mine can be damaged as a result. This problem can be solved by backfilling, which consists of using mine waste to support the roof after the coal has been removed. However, this is very expensive.

Conveyors or cars (railway wagons) transport the coal to vertical shafts for removal from the mine. After the coal is brought up to the surface by conveyors, it undergoes a process that removes sand and mud by immersing the coal in a solution of water and tiny magnetite particles. The different elements separate naturally. The coal floats while the other ores, called tails, sink to the bottom.

In mountainous regions, galleries can be drilled horizontally into the side of the slope, eliminating the need to build special infrastructure to bring the coal back up to the surface.

### *Surface*

**Open - Pit Mining** An open-pit coal mine is a huge hole in the ground with terraces along which earth-moving vehicles excavate seams. It looks a bit like a sports stadium. The largest open-pit mines are several kilometers long and hundreds of meters deep.

First of all, the layer of earth – overburden – above the first coal seam has to be removed. (The seam can be up to 200 meters below the surface.) All the earth around the base of the seam is removed before extraction begins. When the hole is large enough, the miners dig down to the next layer of coal. Each layer is called a bench.

Huge excavators extract the coal. The biggest of these machines is 240 meters long (longer than two soccer stadiums) and 96 meters high (equivalent to a 38-story building). The buckets on the excavators can hold up to 300 metric tons of rock.

<https://www.planete-energies.com/en/medias/close/underground-and-surface-mines?#>

## Strip Mining

Strip mining gets its name from the fact that the process involves stripping the surface away from the mineral that's being excavated (usually coal). Soil, rock, and vegetation over the mineral seam is removed with huge machines, including bucket-wheel excavators.

This type of mining makes sense when the mineral is near the surface. If the ore is too far under the surface, the process of strip mining becomes impractical and needlessly damaging to the terrain.

Two types of strip mining exist, depending on the amount of ore under the surface, and the surrounding terrain. They are:

Area Stripping extracts ore over a large, flat terrain in long trips. The overburden of rocks and soil is dropped in the previous strip so that long gaps aren't left in the earth after mining is complete.

Contour mining is a version of strip mining that follows the contours of outcrops and hilly terrains. Usually, the mineral seam follows the contour of the outcrop, and the overburden is removed carefully along the seam in much smaller and custom shaped excavations rather than long strips.

## Mountaintop Removal

Mountaintop Removal Mining is highly controversial, and best suited for retrieving mass amounts of minerals, usually coal, from mountain peaks. The process involves blasting the overburden with explosives above the mineral seam to be mined. The broken mountaintop is then shifted into valleys and fills below.

This type of mining is used when the ore to be retrieved is 400 feet or deeper. Controversy surrounds the permanent alteration of ecosystems and entire landscapes by removing mountaintops, however, advocates point out that after completion the mining process leaves a flat terrain where there wasn't one when reclamation is complete.

<https://americanmineservices.com/types-of-surface-mining/>



## Since the 1976 Coal Policy

Exploration continued in Clearwater County in Category 2 areas as the Coal Policy did not prevent this activity. Multiple leases and/or applications for a lease have existed for decades on land around Nordegg, Crescent Falls, Wapiabi, Saunders, Alexo, Baseline Mountain and the Tay River. Some leases and applications were dropped as companies changed priorities, and others' rights were purchased.

From correspondence with Micheal Moroskat, Director, Coal and Mineral Development, Alberta Energy, dated February 25, 2021:

Please find the following information in regards to your request about coal leasing and exploration in Clearwater County, most of which is designated as coal category 2.

As explained further below, the impacts of the rescission of the 1976 Coal Policy (effective June 1, 2020) and the reinstatement of the Coal Policy (February 8, 2021) have had minimal impact on coal activities in Clearwater County.

The most significant difference is that a number of coal lease applications – which were received when the Coal Policy was in effect – were converted to leases in 2020. Other leases in the area, as outlined below, pre-date the 1976 Coal Policy. But, to be clear, leases do not give companies a right to develop. A lease only gives a proponent coal rights in that parcel of land, which they can only produce after and if they get all the requisite regulatory approvals. These approvals are issued by the Alberta Energy Regulator.

In terms of exploration, approvals for any recent or ongoing exploration within Clearwater County were also issued while the Coal Policy was in effect.

As you are likely aware, on February 8, the Minister of Energy announced that no new coal leases would be issued and no new coal exploration activity would be approved in coal category 2, pending widespread public consultations with Albertans on a modern coal policy. The Minister announced that public consultations will begin on March 29.

There are three main coal leaseholders in Clearwater County: Ram Coal, Valory Resources/Black Eagle Mining, and Oros Coal Canada.

- Ram Coal holds leases that have been in existence since the 1970s that make up its Aries property. These leases pre-date the 1976 Coal Policy. The latest exploration work was conducted around 2017.
- Black Eagle Mining/Valory Resources holds coal leases that were issued in 2020 after the coal policy was rescinded—these leases were previously coal lease applications that were submitted in 2012. The leases make up the Blackstone property. The AER issued a coal exploration program to Valory in February 2020, prior to the coal policy being rescinded, while the coal leases were still applications.
- Oros Coal Canada also had its leases issued in 2020 from applications that were submitted in 2012.

## The Coal Policy was Rescinded in May, 2020

The following information letter announced the rescission of the Coal Policy.

May 15, 2020

INFORMATION LETTER 2020-23

Subject: Rescission of A Coal Development Policy for Alberta and new leasing rules for Crown coal leases

A Coal Development Policy for Alberta, more commonly known as the 1976 Coal Policy (Coal Policy), has been rescinded effective June 1, 2020.

The only mechanism left in effect from the Coal Policy before rescission was the land use classification system comprising four coal categories. Other mechanisms, such as provisions pertaining to royalties, labor requirements, environmental protection, and Crown equity participation, were superseded or not enforced.

The coal categories are no longer required for Alberta to effectively manage Crown coal leases, or the location of exploration and development activities, because of decades of improved policy, planning, and regulatory processes.

Those interested in acquiring Crown coal leases and pursuing exploration and development opportunities will now face the same restrictions as other industrial users. These restrictions include but are not limited to: the South Saskatchewan Regional Plan, including the subregional Livingstone-Porcupine Hills Land Footprint Management Plan; the Integrated Resource Plan zoning that remains in effect throughout much of Alberta's Eastern Slopes; and regulatory instruments (e.g., reservations and notations) applied under the Public Lands Act. Regulatory approval requirements to conduct coal exploration and development activities remain in effect.

Coal leases

With the rescission of the Coal Policy, all restrictions on issuing coal leases within the former coal categories 2 and 3 have been removed. Alberta will continue to restrict coal leasing, exploration and development within public lands formerly designated as coal category 1. This prohibition on coal activities is being continued to maintain watershed, biodiversity, recreation and tourism values along the Eastern Slopes of Alberta's Rocky Mountains.

Alberta Energy will be offering the right of first refusal to the holders of active coal lease applications. While Alberta Energy works through the coal lease applications, no new coal lease applications will be accepted for a 120-day period beginning May 15, 2020. Coal Information Bulletin 2020-02 provides details on this process.

Alberta Energy website, Information Letters, <https://inform.energy.gov.ab.ca/Documents/Published/IL-2020-23.pdf>

Associated with the announcement was an Information Letter explaining new leasing rules.

May 15, 2020

#### COAL INFORMATION BULLETIN 2020-02

Subject: New leasing rules for Crown coal rights

This Information Bulletin describes how Alberta Energy will manage Crown coal rights, including existing coal lease applications, after rescission of A Coal Development Policy for Alberta (Coal Policy). The rescission is described in Alberta Energy Information Letter 2020-23.

#### Coal lease applications

Alberta Energy is holding coal lease applications in the application stage because the Coal Policy restricted the issuance of coal leases in coal categories 2 and 3.

With the removal of the coal categories, all current coal lease applicants will be given the right of first refusal for the coal lease applications they hold. Alberta Energy will be sending a notification—with a list of their eligible coal lease application(s) and their options to proceed to lease or cancel the application(s)—to each applicant.

If an applicant chooses to proceed to a coal lease, they will be required to fulfill the annual rental obligation on the date that the lease is issued and each anniversary date thereafter.

If an applicant chooses to cancel their application, Alberta Energy will refund any first-year rental that is being held by the department.

Each applicant will have 60 days from the date of their notice to respond. If no response is received, the coal lease application(s) listed in the notice will be cancelled and any first-year rental held by the department will be refunded.

#### Moratorium on new coal lease applications

Effective May 15, 2020 Alberta Energy is placing a 120-day moratorium on all new applications for coal rights while the department resolves all existing coal lease applications.

#### New coal lease applications

Once the above noted moratorium is lifted, new coal leases will be accepted and will be considered requests for public sale. New rights will be issued through public offering and will be granted to the highest bidder as has been the process for coal rights in coal category 4.

Alberta Energy website, Information Letters, <https://open.alberta.ca/dataset/fcd6d925-6f08-490c-a55d-335542a81df7/resource/4356687b-4281-49a4-9c00-8bdda69353a1/download/energy-coal-information-bulletin-2020-02-coal-policy-rescission.pdf>

- **Legislation and Regulations that Govern Coal Mine Applications**
- Responsible Energy Development Act  
[https://www.qp.alberta.ca/1266.cfm?page=r17p3.cfm&leg\\_type=Acts&isbncln=9780779784073](https://www.qp.alberta.ca/1266.cfm?page=r17p3.cfm&leg_type=Acts&isbncln=9780779784073)
- the Coal Conservation Act  
[https://www.qp.alberta.ca/1266.cfm?page=c17.cfm&leg\\_type=Acts&isbncln=9780779772544](https://www.qp.alberta.ca/1266.cfm?page=c17.cfm&leg_type=Acts&isbncln=9780779772544)
- the Environmental Protection and Enhancement Act  
[https://www.qp.alberta.ca/1266.cfm?page=E12.cfm&leg\\_type=Acts&isbncln=9780779801657](https://www.qp.alberta.ca/1266.cfm?page=E12.cfm&leg_type=Acts&isbncln=9780779801657)
- the Public Lands Act  
[https://www.qp.alberta.ca/1266.cfm?page=P40.cfm&leg\\_type=Acts&isbncln=9780779786367](https://www.qp.alberta.ca/1266.cfm?page=P40.cfm&leg_type=Acts&isbncln=9780779786367)
- the Water Act  
[https://www.qp.alberta.ca/1266.cfm?page=W03.cfm&leg\\_type=Acts&isbncln=9780779805570](https://www.qp.alberta.ca/1266.cfm?page=W03.cfm&leg_type=Acts&isbncln=9780779805570)
- Mines and Minerals Act  
[https://www.qp.alberta.ca/1266.cfm?page=m17.cfm&leg\\_type=Acts&isbncln=9780779796021](https://www.qp.alberta.ca/1266.cfm?page=m17.cfm&leg_type=Acts&isbncln=9780779796021)
- Mine Reclamation Requirements <https://www.aer.ca/regulating-development/project-closure/reclamation/mine-reclamation-requirements>

### **What Happened After the Recission of the Coal Policy**

Multiple lease applications that had been in place for years became leases in 2020.

This change in policy resulted in public discussion and attention on potential mining impacts to land, water and local economies. Of particular concern is that the recission of the policy could allow for open pit mining in former Category 2 lands. Underground mining or in-situ operations had been permitted where the surface effects of the operation were deemed to be environmentally acceptable.

Clearwater County Council and Administration received a variety of correspondence from both residents and non-residents about:

- any type of mining at Nordegg,
- open pit mines in the Ram and Tay Rivers area,
- watersheds and water sources for people and livestock,
- changes or restrictions to recreation and tourism activities,
- and impacts on the local economy.

Many municipalities announced that they were desiring consultation on the change and a discussion of potential impacts could have on water, agriculture, tourism, and the local economy.

The O'chiese First Nation has written a letter asking for consultation on the 1976 Coal Development Policy as a whole. The Town of Edson is requesting that the province allow old mines to be reopened instead of opening new ones. Brazeau County is requesting public consultations regarding current relevant legislation and the Coal Policy.

## The Coal Policy Was Reinstated February 8, 2021

February 8, 2021

INFORMATION LETTER 2021-07

Subject: Reinstatement of the 1976 Coal Policy

Alberta Energy has reinstated the 1976 A Coal Development Policy for Alberta as it was on May 31, 2020. In accordance with this reinstatement, the Alberta Energy Regulator will:

- consider the coal categories and associated requirements in its decision-making processes related to the exploration for and development of coal;
- enhance engagement with the public in connection with coal exploration applications on Category 2 lands;
- ensure that all coal approvals consider all restrictions on surface mining in Category 2 lands and do not involve mountain top removal; and
- cease issuance of any new coal exploration approvals on Category 2 lands pending widespread consultations on a new coal policy.

A copy of the direction to the AER is attached. A map of the coal categories in the Eastern Slopes area is attached.

Alberta Energy will be implementing a plan to engage with Albertans in the first half of 2021 about the long-term approach to coal development in Alberta.

Alberta Energy, Information Letters, <https://inform.energy.gov.ab.ca/Documents/Published/IL-2021-07.pdf>

Energy Minister Sonya Savage stated:

“What we’re doing today, keeping the 1976 coal policy in place and committing to consult on a modernized policy, is what we should have done in the beginning. We didn’t do it then but we’re going to do it now,” Savage said.

“We intended to manage coal on an equal footing with other mineral resources, like oil and gas. We felt that this would streamline regulatory matters, and provide more certainty for governments and stakeholders,” Savage said Monday.

“However, Albertans’ views are clear. They expect us to manage coal differently.”

“That means that the 1976 coal policy did not preclude coal lease exploration. And it also means that putting it back won’t necessarily end exploration. Further, reinstating this policy does not affect current coal exploration and mining on any other categories of land,” Savage said.

A temporary halt on coal lease sales on Category 2 lands, announced in January, remains in place.

*Alberta government reinstating 1976 coal mining policy, Ashley Joannou, Feb 09, 2021*

<https://edmontonjournal.com/news/politics/update-on-coal-policy>

Alberta says public consultations on coal mining will begin March 29 but there's no decision yet on how they will go ahead.

"I have directed my department officials to bring forward a comprehensive consultation plan that is by Albertans and for Albertans," Energy Minister Sonya Savage said Tuesday in a release.

"The details of the process will be announced before consultations begin."

"With the input of Albertans, a modern coal policy will protect the areas Albertans cherish while allowing responsible resource development in the appropriate places," Savage said Tuesday.

*Alberta energy minister announces date for start of coal consultations, no other details*, Bob Weber, The Canadian Press, February 23, 2021, <https://globalnews.ca/news/7658369/coal-consultations-alberta-march-2021/>

## **Where do Coal Leases Stand Today**

The Ram Coal leases have been in place for many years.

Valory Resources has purchased Black Eagle Mining which held leases for many years for the Blackstone Mining Project.

While there are many other leases, these are the only two projects that have provided information on plans for their projects

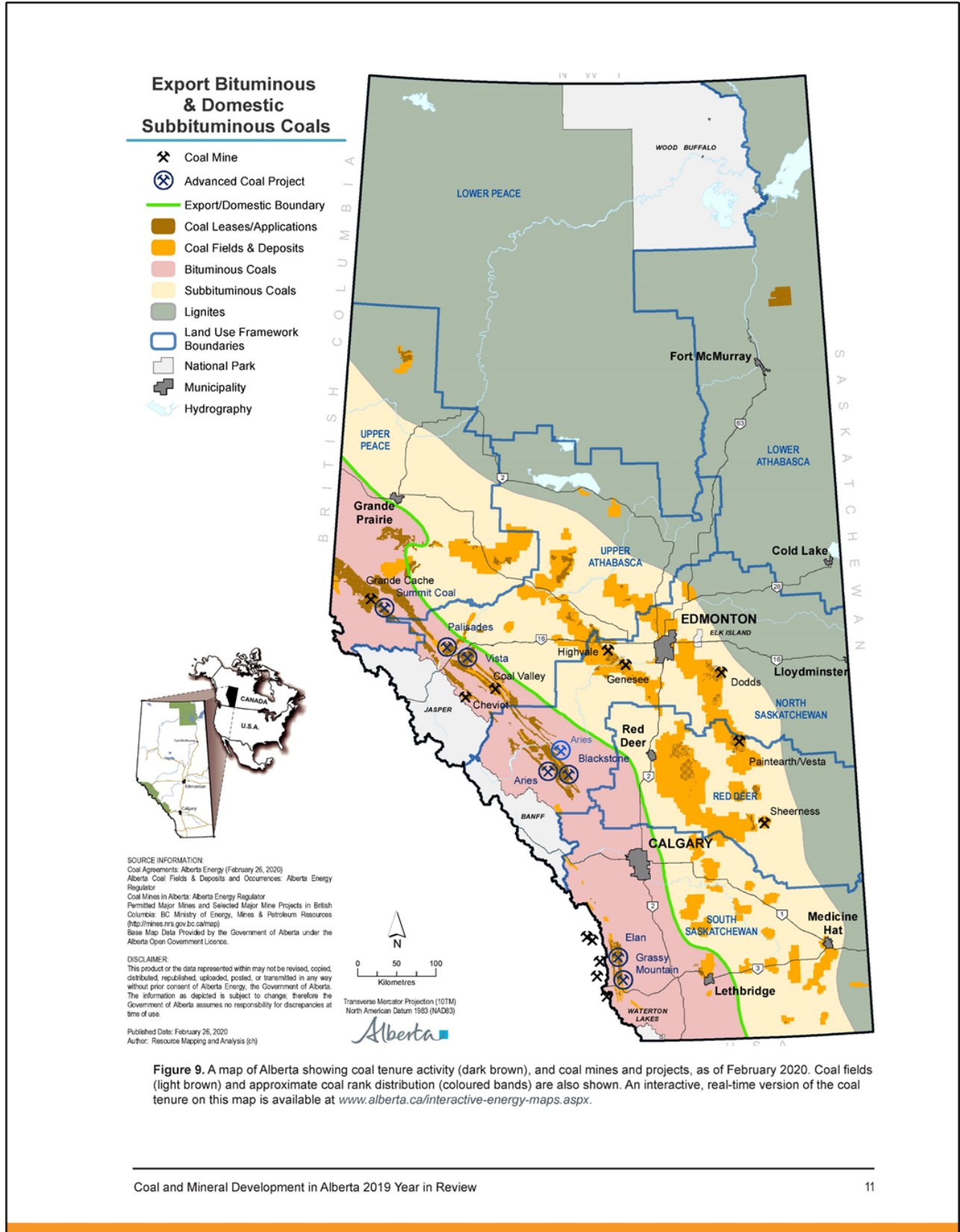
The following comes from "*Coal and Mineral Development in Alberta, 2019 Year in Review*" produced by Alberta Energy. <https://open.alberta.ca/publications/2291-1553>

Ram River Coal Corp. did not report any new work on its Aries metallurgical coal project in 2019. The company previously completed a NI 43-101 technical report and prefeasibility study on the property. Over the past several years, Ram has conducted baseline environmental monitoring work.

Black Eagle Mining was acquired by Valory Resources in 2019 with the intent of restarting work on the Blackstone metallurgical coal property south of Rocky Mountain House. The last major drilling on this property was completed in 2012. In 2018, the NI 43-101 compliant resource was converted to a Joint Ore Reserves Committee (JORC) compliant resource. Valory has raised funds and it has planned new exploration work and will recommence baseline environmental monitoring. Planned work includes 20,000 metres of drilling and 100 kilometres of 2D seismic surveys over the property in order to expand the Indicated and Inferred Resources for a future pre-feasibility study.

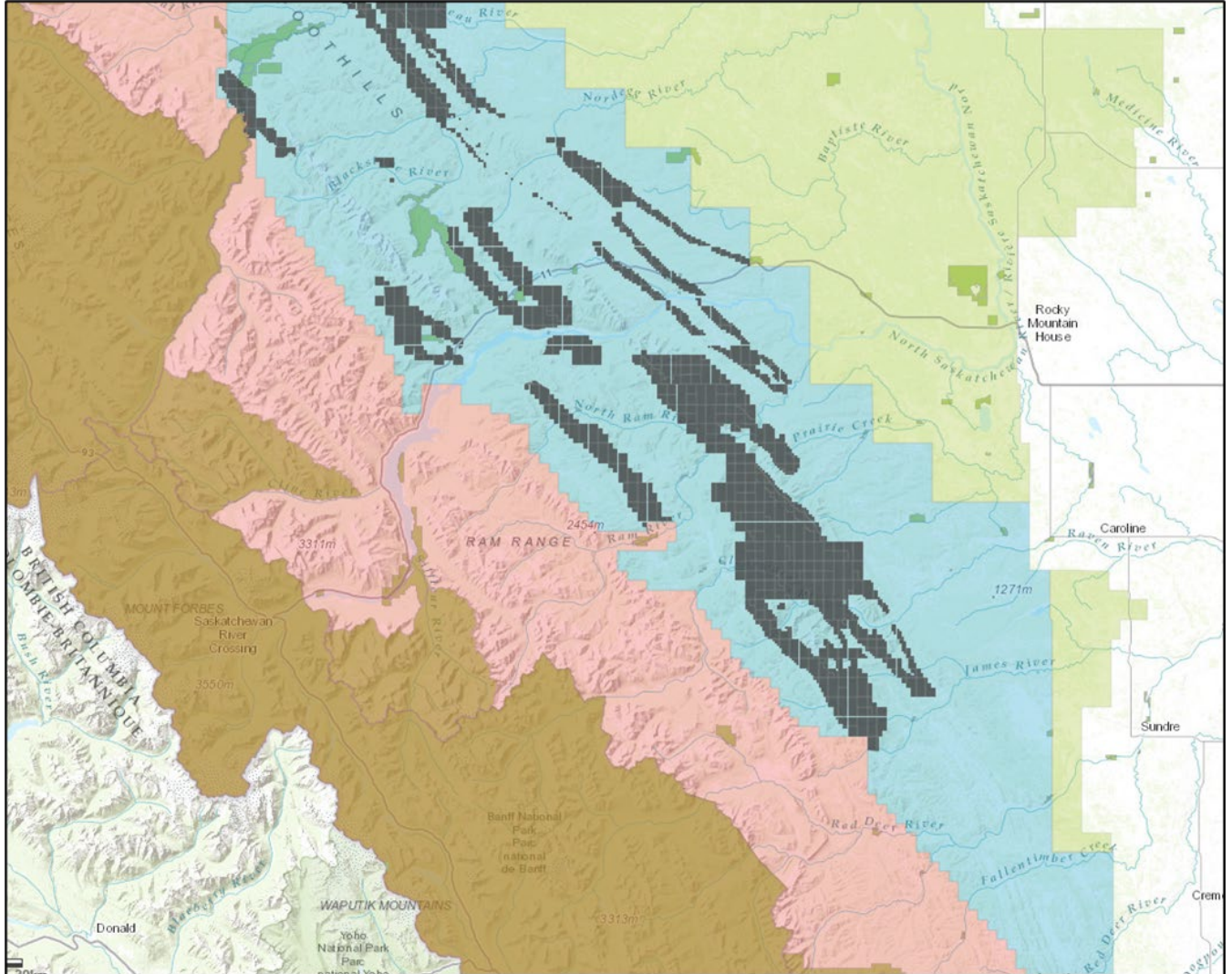
The primary target of the Blackstone project are two of four coal seams within the Gates formation of the Luscar group.

Map of Coal Mining Activity from "Coal and Mineral Development in Alberta, 2019 Year in Review"



## Coal Leases in Clearwater County

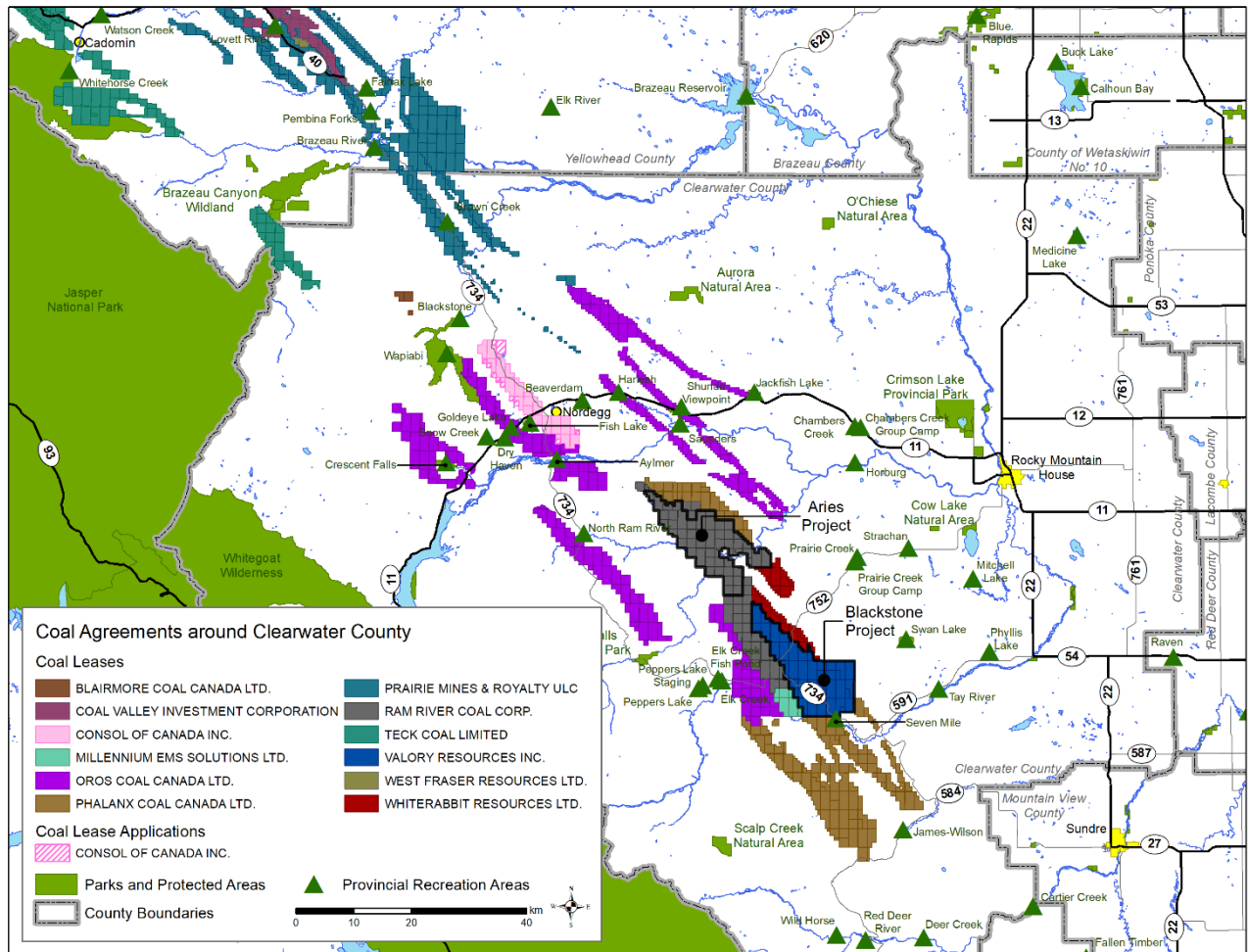
The following map shows coal leases in Clearwater County with information sourced from <https://www.arcgis.com/home/webmap/viewer.html?extent=-122.7476%2C48.6463%2C-106.5208%2C55.0585&webmap=a717811c073b42af99e9727e6b10cc8c>



Grey shows coal leases in January, 2021



The Canadian Parks and Wilderness Society for Northern Alberta has listed the leaseholders or applicants on the following map. The Black Eagle area is now Valory Resources.



<https://cpawsnab.org/coal-in-clearwater-county/>

## Considerations

### Ongoing Coal Projects

#### Ram River Coal Corp. and the Airies Project

The Ram Coal 2 main projects (North and South Blocks of the Aries Project) estimate having over 400,000 KTonnes of in-place coal. The surface mine proposed for the North Block has a potential for over 215,000 Ktonnes and about a 30 year lifespan. There is underground mine potential for the South Block of 105,000 KTonnes. The lease area is over 20,000 hectares.

The report estimates the mine will employ about 600 people, with a peak workforce up to 800 during the construction of the site.

*Technical Report Aries Coal Project, By Norwest Corporation, 2017*

Estimated property taxes the County could be \$1 million to \$1.5 million per year, based on comparisons to the Benga Mine proposal in the MD of Ranchland.

#### Valory Resources and the Blackstone Mine Project

The Black Stone project has an estimated 170,000 KTonnes of in-place coal with an estimated 20 year lifespan. The lease is approximately 14,500 hectares. Mining methods include underground longwall and/or bord and pillar with potential for open cut and highwall mining.

*Valory Resources Inc., Investor Presentation, October 2019*

The estimated number of employees would be about 350 to 400 people and property taxes could be \$750,000 to \$1 million per year based on comparisons to other projects.

### **The following information comes from articles on the Oldman Watershed Council website.**

#### *Water Quality*

One of the main concerns regarding coal mines is the potential for contamination of our water sources. Mining companies intend to impound all waste water on-site and treat it so that it does not harm the environment. However, because the mountains are steep and can receive heavy precipitation and snowmelt runoff, these impoundment structures can fail. If they fail or are not operating as expected, contaminated water and sediment is released into nearby creeks and rivers. Of the known issues, selenium, nitrate and sediment contamination are the most concerning in regard to water health.

The issues of water contamination are being experienced just across the provincial border on the western slopes in British Columbia by Teck. Teck currently operates a complex of five mines near Elkford, Sparwood and Fernie, and have an active application to open a sixth. The severity of water contamination is perhaps best represented in the hundreds of millions of dollars Teck is spending on water treatment processes.

While Teck has made progress and their latest treatment process is showing promise, finding a reliable and effective solution has been a challenge. Currently, a scientifically proven solution to deal with water contamination of this type and at this scale does not exist. Teck is in the process of building a new water treatment facility in eastern British Columbia, which is scheduled for completion in late 2020. The new facility should help reduce selenium and nitrate contamination of nearby rivers. The American Environmental Protection Agency is also watching and demanding Canada act more responsibly. The contaminated water from Canada flows into the cross-border Koochanusa Reservoir and eventually into other US rivers. A Selenium Modelling Framework has been established to model the long term effects as selenium builds up over time in water.

One of the key questions is whether selenium and nitrates produced as a result of having a mine in the eastern slopes of Alberta would be diluted enough by the Oldman Reservoir to buffer the negative impacts to all those who live downstream. While we currently do not know the answer, we can look at the Koochanusa Reservoir downstream of the Teck mining complex for an indication of what we would expect if the aforementioned mining projects are approved. A recent study by the US Geological Survey found elevated levels of selenium and nitrates in the Kootenai River, downstream of the Koochanusa Reservoir. However, further downstream from the mine it was found that levels were much lower—sometimes even below scientific guidelines for flowing water—than they were immediately downstream of the mining complex, thanks to dilution. When considering and extrapolating this example to our situation in Alberta, it must be considered that the Koochanusa Reservoir is substantially larger than the Oldman Reservoir. Our water system also has different dynamics than that of our neighbours, so we do not know exactly how water quality downstream on the Oldman River would be affected, along with the those who rely on the water for daily use, agriculture, industry, and habitat.

The University of Lethbridge is also planning a study which will look at how to reduce selenium and extreme water hardness in our region. They are in the process of hiring several graduate students to complete this work.

### *Fish*

Too much selenium in a river is known to cause deformities and reproductive failure in fish. In March of 2020, Teck completed a study of fish health near their work sites and found major declines in fish populations living immediately downstream of their mining operation. Some fish species, like westslope cutthroat trout and bull trout, are already at risk of extinction from Alberta so this added challenge could be a serious problem for their survival.

Selenium is also known to cause health problems for humans, however, fish act like the “canary in the mine” as their tolerance to selenium is much lower than that of a human. Much like invertebrates in the headwaters, fish are an indicator species for water health.

### *Habitat Loss and Linear Footprint Density*

Open-pit coal mines require complete de-forestation and removal of all vegetation, small creeks, and intermittent streams on-site. This means that all of that habitat for aquatic species and terrestrial wildlife must be removed until the mining company closes the operation— and hopefully—reclaims and restores the land.

Linear footprint density (a standard measure of all the roads, trails, pipelines, etc.) is a concern in the mountains because fish and wildlife populations, as well as water quality, tend to decline as the linear footprint density increases. Many kilometres of new roads are already being built for coal exploration and more would likely be needed if mines become operational. New rail lines would also be required to load and transport the coal, in a region that is already above the density thresholds for healthy fish and wildlife populations.

The Alberta Energy Regulator (AER) is required to abide by the Livingstone and Porcupine Hills Land Footprint Management Plan. This plan sets limits on linear features density and is legally binding within the South Saskatchewan Regional Plan (SSRP) regulations. Alberta Environment and Parks and the AER are working to finalize a “cumulative effects management decision-making tool” that will identify the current linear features density (in relation to the regulatory limits) and how newly proposed projects would impact the density.

### *Water Quantity*

The Oldman watershed has been closed to new water licenses for years because the available water has already been allocated. Thus, any new coal mine will likely need to purchase an existing water license from an existing license holder in order to access the amount of water required to mine and process coal. Another option is an existing industrial allocation held by Alberta Environment and Parks from the Oldman Reservoir but it is unclear how much water is available versus how much is required for these proposed mines throughout their life cycle. While it is impossible to predict potential impacts on water quantity without more data, the fact that the Oldman watershed is semi-arid and prone to extreme weather events, indicates that drought and flood should be a concern for mine sustainability.

## **Impacts on Key Sectors**

### *Municipalities*

Well over 111,000 people live directly downstream from the proposed coal mines. The risk to their drinking water supply caused by a new coal mine is difficult to predict without more research and detailed computer modelling. Looking again to our neighbours in BC, it is concerning that Sparwood had to close down one of its water wells because of selenium contamination from nearby coal mines. Water treatment plants along the Oldman River are not currently equipped to easily remove selenium, although they do have the capability to remove nitrates. Unlike British Columbia, Southern Alberta does not have other rivers or lakes nearby to draw water from in the event that an alternative source is needed. The Oldman River is the only option for several municipalities, and as

such, any who rely on it as a water source are particularly vulnerable to potential upstream contamination.

### *Agriculture*

Downstream of these proposed mines is one of Canada's most valuable agricultural regions. Throughout the Oldman watershed, we use water for primary industries including the irrigation of specialty crops, food processing, and livestock production. Contamination of the water supply—or even a perception of dangerous or unhealthy water—would create a new and significant challenge for the agricultural industry, which is the foundation of our current economy. Farmers, irrigation districts, and taxpayers have invested hundreds of millions of dollars in agricultural infrastructure, research, and technology. If water contamination led to the loss of some agricultural production in Southern Alberta, this would have a negative impact on the livelihood of local residents, as well as the economy of Alberta.

<https://oldmanwatershed.ca/blog-posts/2020/7/30/coal-mining-in-the-oldman-watershed>

### **Investment in Clearwater County**

Tourism is an important part of Clearwater County's economy, especially along the David Thompson Highway running from Rocky Mountain House past Nordegg and Abraham Lake to the Banff National Park Boundary. The Government of Alberta completed David Thompson Corridor Integrated Resource Plan in 1992 that identified five Development Nodes along the corridor, each with a potential for a range of tourism / recreational pursuits, along with associated services and activities. These Nodes are Saunders/Alexo, Shunda/Goldeye, Bighorn Canyon, Whitegoat Lakes, and the historic town site of Nordegg.

Clearwater County has invested in Nordegg by building a new water supply system, a wastewater system, roads, a new municipal services building, upgrading the Nordegg Discovery Centre and the Brazeau Collieries Mine Site, developing cottage and residential lots, an industrial park, and improving the historic Main Street. Growth in visitors to the area has resulted in investment by individuals in the construction of many cottages, and investment by businesses in new services and amenities, growing from 218 taxable properties in 2010 to 274 in 2020.

Nordegg and Abraham Lake are known for their beautiful surroundings and wildlife, and people from all over the world travel here to enjoy hiking, camping, horseback trailrides, canoeing, and OHV trails. The most common concern raised by Clearwater County residents and non-residents over any changes to the Coal Policy have been regarding potential impacts to nature and recreation in the Nordegg and Abraham Lake area.

A mine of any type would alter the economy in the County, but especially around Nordegg. With an influx of over 400 jobs to the region there would like be a need for multi-family housing developments and additional services like a grocery store, auto mechanic, and a school, even if only a fraction of workers

chose Nordegg as their home. Many would choose to live in Rocky Mountain House, Caroline, or the County closer to the urban centres, increasing the need for housing and services there.

Typically, from an economic point of view, industry jobs pay more in wages and property taxes than tourism sector jobs and businesses. However, mine activity follows the ups and downs of global markets, and may be open for 5 years, and then shut down for a few years, and then open again, which can create a volatile real estate market, job market, and uneven economy for other amenities, investors or developers in the County. We have seen an example of this with the metallurgical coal mine in Grand Cache.

Industrial sectors are important for taxes and jobs in Clearwater County. Oil and gas, forestry, strong reserves of gravel, limestone, and the potential for diamond and lithium exploration means that natural resource extraction or processing will continue to play a large role in the local economy.

Tourism has the advantage of not being tied directly to the ups and downs of natural resource industries. It attracts international visitors even when forestry or energy markets are low, which helps soften the bumps in other sectors. However, mines, in particular surface mines, would not be compatible with our nature focused tourism industry. A surface mine located along Highway 11 would likely have a negative impact on current and potential tourism investment in and around Nordegg beyond the life of the mine.

### **Other Resource Extraction Industries in Clearwater County**

While the 1976 Coal Policy refers to a specific mining activity, any potential changes to mining regulations, land categories, or land use legislation may also impact other activities, such as potential diamond exploration, lithium exploration, oil and gas exploration, forestry, limestone quarries and gravel quarries.