A Case for No Coal Mining in Alberta
Southern Alberta Group for the Environment (SAGE), June 2021

Executive Summary:

SAGE is a leading voice for a healthy and environmentally sustainable community in Lethbridge, and honours the traditional territory of the Blackfoot / Niitsítapi Confederacy. We are indebted to the Indigenous Peoples of the Canadian Plains for the stewardship of this land: past, present and future. There is a good case for eliminating coal mining development in Alberta, including: 1) meeting international targets in reducing greenhouse gas emissions in the near term; 2) protecting water quality and maintaining water flows to meet municipal needs, to meet existing industrial demands, and to sustain the integrity of aquatic and riparian habitat; and, 3) preserving opportunities for expanding tourism, as well as recreational and educational activities for Albertans. If a new Coal Policy were to be developed: 1) this policy should be integrated into Regional Plans along the Eastern Slopes and should consider the current science around water quality and cumulative effects; 2) the policy should consider competing water uses and create a fair mechanism for water allocation and transfers, including respecting inter-provincial agreements for water quantity and quality; and, 3) take the time required to do a good job – that is, robust public consultation, a thorough evaluation of current science, a deeper evaluation of competing government policies and goals and, finally, meaningful consultation with Indigenous Peoples.

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The recent decision by the UCP government in Alberta to rescind the 1976 Coal Policy alerted Albertans to the complacency in recent land-use management planning regarding coal exploitation along the Eastern Slopes of the Rockies. Following the rescinding of the Coal Policy, a hasty process for leasing 186,187 ha[1] of Category 2 land was initiated. Category 2 land was formerly protected from exploration (unless strictly controlled) and surface-mining operations were restricted. The Coal Policy states: "In addition this category contains local areas of high environmental sensitivity in which neither exploration or development activities will be permitted."

Coincident with these events, two inactive coal mines were in the process of applying for re-commissioning the mines at an expanded capacity. These mines include Grassy Mountain Coal Project initiated by Riversdale Resources (Benga Mining Ltd.) and Tent Mountain Mine Redevelopment Project initiated by Montem Resources. Both of these mines are being evaluated for approval, Grassy Mountain by the federal Minister of Environment and Climate Change, and Tent Mountain by the AER, though a decision for federal oversight is pending.

There are many reasons that the Government of Alberta should consider this an opportunity to eliminate coal mining in the province and redirect the economy to one that has a future. This opportunity has some public support based on the results of the Coal Policy Survey results as summarized: "Ninety per cent of people who participated believe that areas that were previously protected, that means the Rockies, the Foothills, wildlife corridors, areas near watersheds, ecologically sensitive areas, areas close to ranchers and farms, should be protected, and are not appropriate for coal exploration and development."[2]

SAGE has been a leading voice for a healthy and environmentally sustainable community in Lethbridge since 1984. We believe that the prospect of coal mining along the Eastern Slopes of the Rockies fails at multiple levels: economically, environmentally, socially and ethically. We ask: What is the medium- to long-term demand for metallurgical and thermal coal, globally? Where will the water come from in basins already experiencing competing uses? What will the impact of water contamination be on species-at-risk and downstream agricultural livelihoods and industries? What are the climate impacts of continuing to use coal in industrial processes? What rights of First Peoples for traditional uses in this region are being ignored? What rights of First Peoples for water are not being addressed? What are our obligations to the natural environment for maintaining ecosystem health, integrity and diversity? What are our obligations to future generations for clean air and water? What could be better than being coal-free in Alberta? These are not rhetorical questions. These questions need answers.

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[1] CPAWS. *Albertans for Coal Free Rockies* (https://cpawsnab.org/coal_campaign/?sfw=pass1621613902)
[2] The Lethbridge Herald (May 21, 2021). *Lethbridge MLAs Weigh in on Coal Policy Survey Results* (https://lethbridgeherald.com/news/lethbridge-news/2021/05/21/lethbridge-mlas-weigh-in-on-coal-policy-survey-results/)

We respectfully submit to the Coal Policy Committee the following perspectives and concerns that represent our position on coal mining along the Eastern Slopes.

I. Net-Zero Emissions by 2050

The Government of Canada has recently passed Second Reading of the Canadian Net-Zero Emissions Accountability Act (Bill C-12)[3]. This Act commits Canada to meet the Paris Agreement targets, reducing or offsetting greenhouse gas emissions to net-zero by 2050. Canada joins 120 other countries including all of the G7 members[4] in this response to limit global warming and, hopefully, limit serious impacts to environmental stability. To date, there has been too much of a climate-burden put on future generations without taking enough responsibility in the present. A net-zero emission plan must take into consideration both those produced within the nation and those produced from exporting fossil fuels to other nations.

A recent report published by the International Energy Agency, *Net Zero by 2050: A Roadmap for the Global Energy Sector*[5], provides some insights on the role coal is expected to have in a future economy. In the introduction, the authors state:

> We are approaching a decisive moment for international efforts to tackle the climate crisis – a great challenge of our times. The number of countries that have pledged to reach net-zero emissions by mid-century or soon after continues to grow, but so do global greenhouse gas emissions. This gap between rhetoric and action needs to close if we are to have a fighting chance of reaching net zero by 2050 and limiting the rise in global temperatures to 1.5 °C.
>
> Doing so requires nothing short of a total transformation of the energy systems that underpin our economies. (p.3)

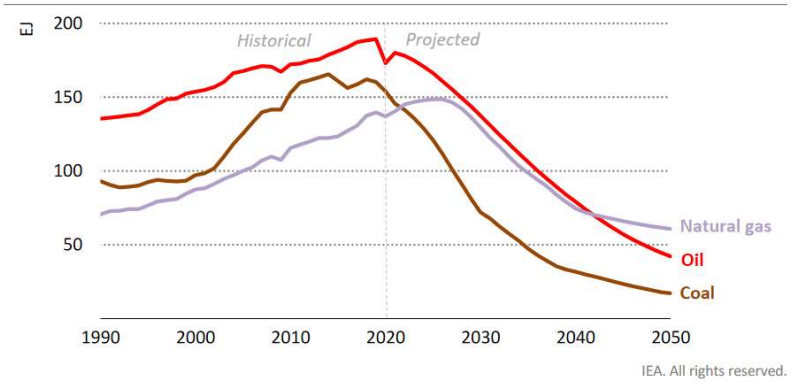
[3] Government of Canada. *Canadian Net-Zero Emissions Accountability Act*. (https://www.canada.ca/en/services/environment/weather/climatechange/climate-plan/net-zero-emissions-2050/canadian-net-zero-emissions-accountability-act.html)

[4] Government of Canada. *Net-Zero Emissions by 2050*. (https://www.canada.ca/en/services/environment/weather/climatechange/climate-plan/net-zero-emissions-2050.html)

[5] International Energy Agency (IEA). Net Zero by 2050: A Roadmap for the Global Energy Sector. (https://iea.blob.core.windows.net/assets/ad0d4830-bd7e-47b6-838c-40d115733c13/NetZeroby2050-ARoadmapfortheGlobalEnergySector.pdf)

The IEA report suggests that to achieve these emission reduction targets, coal production will drop by 90% over the next three decades.

Figure 3.2 ▷ Coal, oil and natural gas production in the NZE



Between 2020 and 2050, demand for coal falls by 90%, oil by 75%, and natural gas by 55%

The report concludes: "No new coal mines or extensions of existing ones are needed in the NZE as coal demand declines precipitously. Demand for coking coal falls at a slightly slower rate than for steam coal, but existing sources of production are sufficient to cover demand through to 2050" (p.103).

Specifically, as it relates to metallurgical (coking) coal, the IEA report predicts a replacement of coal in steel making "based largely on a major shift from coal to electricity. By 2050, electricity and other non-fossil fuels account for nearly 70% of final energy demand in the sector, up from just 15% in 2020. This shift is driven by technologies such as scrap-based electric arc furnaces (EAF), hydrogen-based direct reduced iron (DRI) facilities, iron ore electrolysis and the electrification of ancillary equipment" (p.126).

Based on the growing commitment of world governments to address the risks of climate change caused by the emissions of greenhouse gases, there is an urgency to reduce the use of fossil fuels. The IEA report clearly states that there is enough coal for current uses (including metallurgical coal) without opening up new mines.

Conclusion 1: *Opening Alberta to coal mining is unnecessary and imprudent as coal demand drops 'precipitously' over the next three decades.*

The following is an article by SAGE published in The Lethbridge Herald (March 24, 2021) in response to a misconception that metallurgical coal is more benign than thermal coal.

What is Metallurgical Coal Good For?

> The eastern slopes region of Alberta is the source of the headwaters providing fresh water for wildlife and prairie communities living downstream. It has been a highly desirable destination for tourism and year-round recreational activities like camping, hiking and skiing, attracting residents and revenue. Despite vague assurances from the UCP government, allowing coal mining along the eastern slopes is still very much under consideration.
>
> We have become more aware of the environmental impacts of mountaintop removal methods of coal extraction – risk to endangered wildlife, noise, air pollution and water pollution – but we haven't heard much about greenhouse gas emissions. There is the perception being circulated that 'metallurgical' coal is somehow different and less damaging to the environment compared to 'thermal' coal. This is not the case. Coal is classified from high-carbon anthracite, to bituminous, to subbituminous, to lower carbon lignite. The final application (steel making, cement making, electricity generation, etc.) of coal depends on process requirements and economics. Steel making has traditionally used the higher-grade bituminous coal which is further processed into a porous mass with fewer impurities – this is called coking coal. In the end, however, the coal is burned and emissions are generated.
>
> The dominant method of making steel is the blast furnace/basic oxygen furnace process. Coking coal is used to reduce iron ore in a blast furnace to make pig iron. The carbon remaining in the pig iron is then burned off using oxygen to make steel. For each tonne of steel about 770 kg of metallurgical coal is consumed, resulting in 1.73 tonnes of carbon dioxide emitted to the atmosphere. Worldwide, this amounts to over 2 billion tonnes of CO2 emitted for steel making each year. This sector is the second highest emitter of greenhouse gases in the world (after concrete making).
>
> The Grassy Mountain Coal project alone (and there may be others) is expected to produce 4.5 million tonnes of coal each year for the next twenty-five years. This mine will ultimately contribute roughly 8 million tonnes of CO2 emissions each year – equivalent to almost 2 million cars. Opening up Alberta for coal mining is incongruous with global efforts to achieve net-zero greenhouse gas emissions within thirty years (let alone reducing emissions by 40% by the end of this decade). The UN Environmental Programme has recently stated that coal use must be phased out in all sectors to moderate the emerging climate crisis.

Are there alternatives? Yes. Though steel is a highly recycled material, still over 20% of it ends up in the landfill. Recycled steel contributes considerably fewer emissions. Also, new technologies for steel making are replacing metallurgical coal with hydrogen as a fuel. It still takes energy to make hydrogen, but it is cleaner to use overall than metallurgical coal. Using traditional electricity sources to make hydrogen, emission reductions of 20 to 30 percent are immediately achievable. Using renewable energy technologies to produce hydrogen for steelmaking can potentially reduce emissions by 80%. These technologies are operating in pilot phases in German, Sweden and Finland.

With the world turning its attention to meeting reduction targets in greenhouse gas emissions, it is an inauspicious time to begin to open up our eastern slopes to coal mining. The steelmaking industry is directing its attention to reducing its emissions by using new technologies that no longer rely on metallurgical coal. This is yet another reason it is not the time for Alberta to engage in coal exploitation. Alberta needs a future-oriented economy.

Conclusion 2: *Metallurgical coal creates 1.73 tonnes of $CO_{2(eq)}$ for each tonne of steel produced. This does not include fugitive emissions during mining operations. There are options.*

II. Water Abstractions & Species-at-Risk

The Eastern Slopes represents ecologically important habitat that will potentially be impacted by reduced headwater stream flows, water contamination, traffic and noise disruption, degradation and fragmentation, as well as the direct loss of land. The region represents important remaining migration corridors for species from Yellowstone to the Yukon.

Species at risk that are likely to be impacted includes the Westslope Cutthroat Trout, designated as Threatened in Schedule 1 of the federal *Species at Risk Act*[6]. Furthermore, the Bull Trout and Grizzly Bear are listed as a species of special concern under Part 4 of the *Species at Risk Act*; and the Whitebark pine is listed as an Endangered Species under Part 2 of the *Species at Risk Act*. This project may adversely impact these species and others in this ecologically important region of the Crown of the Continent in southern Alberta.

Water is of special concern with respect to the potential for coal mining along the Eastern Slopes, as this region represents the source of most of the seasonal flows within the province and inter-provincially. Water is a foundation not only for environmental

[6] Government of Canada. *SARA Species Search* (https://species-registry.canada.ca/index-en.html#/species?sortBy=commonNameSort&sortDirection=asc&pageSize=10)

integrity, but also as a source of drinking water and an essential basis for much of Alberta's economy, including industrial agricultural and livestock operations. Though the predicted volume of water required for coal mining operations may not be a substantial percentage of the total water flow in the major rivers, it may be an important volume when taken from headwater streams. And these are the tributary streams that support many of the Species-at-Risk mentioned above – withdrawing small volumes may pose significant adverse risk to aquatic ecosystems and native trout species.

It is also a matter of timing for water abstractions which would be continuous with coal mining operations, despite late summer flows that are typically much diminished. This is also the period when downstream agricultural and livestock operations have greater demands. There are limits to the volume of water that can be abstracted at any one time while maintaining the health of aquatic ecosystems. Furthermore, climate change modelling suggests that Southern Alberta can expected diminishing water flows in the future[7], with the potential for greater annual variance[8]. The question of who will get the water in this scenario is paramount[9].

According to the recent *Review of the Implementation of the Approved Water Management Plan for the South Saskatchewan River Basin*[10], the current licensed allocation in the Oldman River Basin is at 68% of the average annual flow, most of it being directed to irrigation agriculture. A major concern for those holding water licenses (in a basin closed to further allocation), is the fairness of making water freely available to the coal mining industry, thus bypassing the requirement of other users to engage in costly transfers. It is interesting to note that the UCP government of Alberta is also promoting the expansion of 208,000 acres for irrigation in an already-stressed region while pursuing industrial water users like coal mining operations. In addition, water rights for First Nations have yet to be settled, and there has been little consideration given to inter-provincial agreements (Master Agreement on Apportionment) in meeting downstream water supplies.

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[7] Byrne, et. al. (2006). Current and future water issues in the Oldman River Basin of Alberta, Canada. *Water Science & Technology* Vol53, No10 (pp.327-334).
(http://scholar.ulethbridge.ca/sites/default/files/danjohnson/files/current_and_future_water_issues_in_the_oldman_river_basin_of_alberta_canada.pdf?m=1491417143)
Sauchyn, et. al. *Prairie Hydroclimate Time Series: Tends and Variability*
(http://www.usask.ca/dri/09annual/pdf/session6/sauchyn.pdf)
Schindler, D.W. & Donahue, W.F. (2006). *An impending water crisis inn Canada's western provinces.*
(https://www.researchgate.net/publication/7172895_An_impending_water_crisis_in_Canada%27s_western_prairie_provinces)

[8] South Saskatchewan River Basin in Alberta Water Supply Study (2009).
(https://www1.agric.gov.ab.ca/$Department/deptdocs.nsf/all/irr13053/$FILE/ssrb_main_report.pdf)

[9] University of Calgary. Faculty of Law ABLawg.ca. *Water for Coal Developments: Where Will it Come From?*
(https://ablawg.ca/2020/12/04/water-for-coal-developments-where-will-it-come-from/)

[10] *Review of the Implementation of the Approved Water Management Plan for the South Saskatchewan River Basin*
(https://landusehub.ca/review-of-the-ssrb-water-management-plan/)

The following is an article by SAGE published in The Lethbridge Herald on February 25, 2021 on the topic of the allocation of scarce water supplies:

It's Our River, But Who Gets the Water?

Water should be a top priority for everyone living in semi-arid southern Alberta. How much do you know about our water supply? Most of us know that residents of Lethbridge pay the city to pump, filter and chlorinate water from the Oldman River so that it flows from our taps on demand. We pay for it, so it's ours, right? Nope. Technically, the water belongs to the crown and we are water 'users', not 'owners'. Over many years, our government has developed rules for sharing this limited resource. With minor exceptions, you need a license to take water out of the river. Currently, in an average year, 68 percent of the Oldman River's water is allocated for diversion. Since at least 50 percent has to pass into neighboring Saskatchewan, we often rely on water stored in reservoirs from the previous year. A series of dry years means water shortages for license-holders. This has important consequences for us and the health of our environment.

To fully understand our situation, a brief history lesson is in order. Originally, early settlers came from wetter regions accustomed to being governed by 'riparian rights' where you could use any water adjacent to your property as long as supply downstream wasn't changed much. The arrival of the CPR brought major agricultural settlement in the early 1880's. Partly due to a severe drought in 1887, urgent interest in irrigated agriculture drove the need to formalize water regulations. The federal *Northwest Irrigation Act* of 1894 recognized 'prior appropriation', and assigned water rights according to the seniority of a diversion with some government discretion. An assortment of early irrigation companies and co-operatives staked claim to water allotments. The province took over jurisdiction in 1930 (just in time for another drought), and the *Water Resources Act* was enacted in 1931. This act set rules for water licensing allocations and priority ('first in time, first in right') with each license specifying a purpose for use of the water, the point of diversion, and the rate or total volume of the diversion.

For the next 60+ years, allocations continued to be licensed, mostly for irrigation agriculture, without much thought given to supply limits or environmental impacts. In 1969 an interprovincial agreement was reached that requires Alberta to pass one-half of the natural flow of east-flowing rivers and streams to Saskatchewan. In 1991, when water managers grew concerned that we may not be able to honour that agreement, a cap was placed on allocations within southern Alberta rivers. The *Water Act* was revamped in 1999 so that the province could close basins to new licenses and allow the transfer of allocations among different users, with a provisional 10% holdback for conservation of rivers whose health was degraded by over-allocation.

The next prairie drought in 2001/2002 highlighted situations of over-allocation and helped spawn the *Water for Life Strategy* in 2003 to address issues of un-sustainability, particularly drawing attention to environmental degradation. The *South Saskatchewan River Basin (SSRB) Water Management Plan* (WMP) was released in 2006 along with closures to new allocations from the Oldman, Bow and South Saskatchewan rivers and their tributaries except through transfers from existing licenses. This new water marketing opportunity activated the transfer of unused allocations, effectively intensifying water use with minimal environmental benefit.

Scientists, multi-stakeholder groups, and all forms of special interest alliances have been trying for years to stretch our shared water to supply every conceivable use. So, here we are in 2021, and water managers have their work cut out for them. We urgently need to appreciate the value and limitations of our water supply and the growing market pressure it is under. Now is the time to prioritize conserving instream flows to protect river health as an essential part of managing long-term sustainability.

Conclusion 3: *Average water flows in the rivers of southern Alberta are decreasing with climate change, with more annual and seasonable variability. Adding industrial water consumption from coal mining challenges the long-term health of aquatic systems and existing downstream economies. It also raises concerns of meeting inter-provincial obligations in meeting water supplies.*

In addition to concerns around diminishing flows for water users is the impact of contaminants which increase in concentration as there is less water for dilution. These contaminants are also more likely to settle during periods of low flow raising the risk for contamination buildup, including pathogens that may affect human health[11]. The authors conclude: "With disruption of natural flow rates for water resulting from environmental change caused by global warming and/or human intervention, increased attention needs to be paid to use of best management practices which maintain scouring, dredging and/or treatment of critical water sources where contaminate build-up is likely, and to maintain adequate water for urban and rural applications within the Oldman River Basin." (p.333).

Coal mining risks provincial water quality contaminant thresholds, which is a consideration in the interprovincial Master Agreement on Apportionment. This poses potentially serious results for downstream aquatic ecosystems, municipalities, and agricultural industries, intensive livestock operations, and ranching operations.

[11] Byrne, et. al. (2006). Current and future water issues in the Oldman River Basin of Alberta, Canada. *Water Science & Technology* Vol53, No10 (pp.327-334). (http://scholar.ulethbridge.ca/sites/default/files/danjohnson/files/current_and_future_water_issues_in_the_oldman_river_basin_of_alberta_canada.pdf?m=1491417143)

Amongst the many potential contaminants released to stream and rivers from coal mining operations, selenium is perhaps of highest concern[12]. Recent experience in both selenium contamination and the failure of coal mining companies to adequately treat water and solve contamination problems has been illustrated in the Elk Valley of southeastern British Columbia[13]. This example, current and regional, should demonstrate the importance of raising the precautionary principle in decision making, as the industry touted 'adaptive management' approach has failed in this regard to date.

The Precautionary Principle is defined by the United Nations Educational, Scientific and Cultural Organization (UNESCO) 2005[14] as: "When human activity may lead to morally unacceptable harm that is scientifically plausible but uncertain, actions shall be taken to avoid or diminish that harm. Morally unacceptable harm refers to harm to humans or the environment that is: threatening to human life or health, serious and effectively irreversible, inequitable to present or future generations or imposed without adequate consideration of the human rights of those affected". The Precautionary Principle is not about 'paralysis', as the coal industry has warned. It is about experimentation, moving slowly, observation, and a willingness to stop. Adaptive management, by comparison, is a promise to try to fix things on the fly. There is no commitment to stop. There is no accountability for failure.

The following articles, published in The Lethbridge Herald by SAGE express these concerns around water contamination from coal mining operations:

Selenium's Impact on the Environment (October 23, 2020)

> As residents living along the Oldman River anticipate the impacts of open-pit coal mining in our headwaters, we should know more about the potential changes in water quality and their effects on river health and, therefore, our health.
> Open-pit coal mining involves the removal of rock that sits above the coal seams that the mining company targets for extraction. This rock, or overburden, is typically dumped into the river valleys near the mine where it is exposed to weathering. It is the weathering process that releases pollutants like cadmium, nitrate, sulphate, iron, uranium and selenium into the environment over time – in the form of particulates in the air but, more significantly, into river systems.

[12] Yale School of Environment. *From Canadian Coal Mines, Toxic Pollution that Knows No Borders.* (https://e360.yale.edu/features/from-canadian-coal-mines-toxic-pollution-that-knows-no-borders)
[13] The Narwhal. *For Decades B.C. Failed to Address Selenium Pollution in the Elk Valley. Now No One Knows How to Stop It.* (https://thenarwhal.ca/for-decades-b-c-failed-to-address-selenium-pollution-in-the-elk-valley-now-no-one-knows-how-to-stop-it/)
[14] UNESCO (2005). *The Precautionary Principle* (https://unesdoc.unesco.org/ark:/48223/pf0000139578)

Like some other elements, selenium is biphasic which means that it is necessary for life in small concentrations but becomes toxic to aquatic species in concentrations as low as 1.5 mg/l[15]. Selenium ions are soluble in water, so they don't settle in containment ponds. When released to the environment, selenium (as selenite and selenides) bioaccumulates in the aquatic system. That is, the selenium increases in concentration as it passes from plankton to aquatic invertebrates to fish that live higher in the food web. As such, fish are an important indicator species for water contamination of this type. Species that consume fish along the food chain, like birds and even humans, are also at risk of the health impacts resulting from higher selenium accumulating in their bodies.

You may have heard about the long-term environmental damage and health impacts in Appalachia or in the coal mining regions of Australia. Closer to home, however, look across the continental divide, to the Elk Valley, where mountaintop coal mining has been conducted for many years. Industry water quality reports have indicated a steady rise of selenium and other pollutants in rivers downstream of these coal mining operations. It is no surprise that the Regional Aquatic Effects Monitoring Program (RAEMP) has measured increased levels of selenium in aquatic species that pose greater risks for birth defects and reproductive failures. Trout populations downstream of Tech coal mines have reportedly collapsed in recent years[16].

In response to this issue, the United States has very recently set selenium standards for transboundary waters, an issue that British Columbia has shown a reluctance to address[17]. This is complicated by the admission of major coal operators that they are unable to control the release of selenium pollution. In other words, once the damage is done, it is virtually impossible to contain, and it persists for decades.

In summary, selenium is one of a number of water pollutants that can be expected from mountaintop removal techniques of coal mining in Alberta's eastern slopes.

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[15] US National Library of Medicine. *Acute Selenium Toxicity.*
(https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3225252/)
Screening assessment Selenium and its compounds. Government of Canada (2017).
https://www.canada.ca/en/environment-climate-change/services/evaluating-existing-substances/screening-assessment-selenium.html
Understanding and Documenting the Scientific Basis of Selenium Ecological Protection in Support of Site-Specific Guidelines Development for Lake Koocanusa, Montana, U.S.A., and British Columbia, Canada. U.S. Geological Survey (2020).
https://pubs.er.usgs.gov/publication/ofr20201098

[16] *Deadly Waters: Trout Populations Collapse Below Tech Coal Mines* (March 19, 2020).
(https://wildsight.ca/blog/2020/03/19/deadly-waters-trout-population-collapse-below-teck-coal-mines/)
Elk River Watershed and Lake Koocanusa British Columbia, Aquatic Environment Sythnesis Report (2014)
https://www2.gov.bc.ca/assets/gov/environment/waste-management/industrial-waste/industrial-waste/mining-smelt-energy/area-based-man-plan/annexes/elk_river_aquatic_env_synthesis_report_oct_2014.pdf

[17] *EPA Weighs in on Teck Water Treatment Closure. Montana Watershed Coordination Council.*
https://mtwatersheds.org/app/news-item/epa-weighs-in-on-teck-water-treatment-closure/

We have a current example of rising selenium levels in the Elk and Fording Rivers using the same techniques in similar bedrock as is proposed in our headwaters. And, the technology is not available to control the release of selenium into rivers nor address pollution over the long term after it happens.

The Government of Alberta recently changed the Coal Policy to allow open pit coal mining along the eastern slopes, with the exception of Category 1 land. This, in effect, was in direct response to the expressed desires of mining companies to streamline the application process. Though these sorts of projects may create some employment in the short term, there seems to be little consideration of the environmental impacts in the long term. Residents along the Oldman River rely on safe water for an agriculturally-based economy, including water demand for irrigation and livestock operations, not to mention human use. There is mounting opposition to the unilateral decision to change the Coal Policy that allows these sorts of coal mining operations to operate in our region – your MLA may want to hear your opinion.

Coal, Calcite and Cutthroats (November 26, 2020)

Calcite build-up on streambeds is an environmental hazard of open-pit mountaintop coal mining proposed in the headwaters of the Oldman River. As with selenium pollution, described in a previous article, water flowing through waste rock accumulated during the coal mining process dissolves calcium carbonate and carries it downstream. Unlike selenium, calcium carbonate is not considered a toxic pollutant in water. However, when calcium carbonate reaches a high enough concentration, it solidifies into calcite. The process is similar to the buildup that forms in tea kettles and humidifiers. Calcite coats the stream bottom and, in effect, turns it into concrete. In some cases, streambed sands and gravels can only be broken free with hammer blows.

Where calcite accumulates, the stream bottom becomes uninhabitable to invertebrates that form the base of the aquatic food chain. Aquatic plants are smothered. Trout that use an undulating movement to flush sediment and excavate hollows in loose gravels for laying eggs, referred to as redds, can no longer spawn. This is especially devasting to native cutthroat and bull trout, both “threatened” species, federally and provincially.

In reaches where a stream bottom becomes cemented, bank erosion increases causing more sediment to be released and the stream to over-widen. This impact on streams has previously been observed in Eastern Slopes watersheds experiencing a high degree of surface disturbance from logging and other industrial development, including Racehorse Creek and Dutch Creek. Adverse effects on reproduction of native trout have been noted.

Calcite formation is occurring downstream of coal mines operated by Teck Resources Limited in southeastern BC in the Elk River valley. Monitoring has detected increase in calcite over time with 30% of the river and stream channels surveyed in 2018 impacted by calcite at levels higher than background. Recent studies to assess effects on Westslope Cutthroat Trout, a Species at Risk, found density of redds decreased as calcite concentration increased in stream reaches.

Teck, under its permit to operate, is required by Environment and Climate Change Canada to reduce calcite levels in mine-affected streams in the Elk Valley. This direction is issued under the federal *Fisheries Act*. Since October, 2017 the company is experimenting with adding anti-scalant (a chemical that inhibits formation and precipitation of crystallized mineral salts) to a stream to inhibit formation of calcite. A geo-synthetic cover over waste rock is also being tried to prevent water leaching of calcium carbonate. Cost of these mitigation measures is estimated to be several hundred million dollars.

The proposed Grassy Mountain Mine north of Blairmore straddles the valleys of two streams that are habitat for Westslope Cutthroat Trout – Blairmore Creek and Gold Creek, tributaries of the Crowsnest River. This native species once inhabited most streams in southwestern Alberta from the alpine to the prairies, but now occupies only a small fraction of its original distribution. A strategy for recovery of its habitat has been developed and is in the process of being implemented. If the mine is allowed to proceed, recovery efforts will be undercut and calcite build-up in spawning habitat would become one more risk pushing this threatened species to the brink of extinction.

Conclusion 4: *The risk of selenium and calcite contamination has not met any expected standards set by the precautionary principle. Potential impacts to downstream ecosystems (including species-at-risk), municipalities and existing agricultural livelihoods and industries warrant extreme caution, given the current state of water treatment technologies and processes.*

III. Regulation

> "I think that's how we have run into this issue with high liability, not enough security and a mistrust in the system. While this may be the cost of doing business – and I'm not an economist and I can't say whether the risks outweigh the liabilities or the benefits outweigh the liabilities or vice versa – I can say it's not entirely a world class system as we're hearing touted by the government. It's not entirely risk-based and it's not balance-approached."
>
> Mandy Olsgard
> Former environmental toxicologist with the AER

There are a number of regulatory concerns that should be addressed in the deliberations for a Coal Policy. These include the *South Saskatchewan Regional Plan* (SSRP) 2012-2024, an approved plan under the *Alberta Land Stewardship Act* that supports the *Land-Use Framework*; the *South Saskatchewan River Basin Water Management Plan* (2006), an approved plan under Alberta's *Water Act* that provides guidance to decisions of Watershed Planning Advisory Councils (WPACS) and others; the *Liv-PH Land Footprint Management Plan,* an approved subregional plan under ALSA that defines limits to surface disturbance*;* Alberta Government *Wildlife Land Use Guidelines*; and interprovincial agreements on water, like the *Master Agreement on Apportionment*.

The SSRP aspires to apply a cumulative effects management approach that balances economic, social and environmental goals. With respect to the management philosophy, "There will be a focus on priority areas for the eastern slopes based on criteria including the following: key headwaters areas, areas of sensitive terrestrial and aquatic habitat and other areas of high biodiversity value including for connectivity." Furthermore, the plan states: "The intent is for the SSRP and implementation strategies of the regional plan or future associated subregional or issue-specific plans within the region to supersede the coal categories for the purposes of land use decisions about where coal exploration and development can and cannot occur in the planning region" (p.61). As such, Integrated Resource Plans and the 1976 Coal Policy are to be integrated into the regional plans which consider competing uses including maintaining ecosystems.

The principal recommendations of the *SSRB Water Management Plan* are: to no longer accept applications for new water allocations in the Bow, Oldman and South Saskatchewan River sub-basins; to hold unallocated water in Crown Reservation for water conservation, water storage to mitigate impacts, and First Nations Reserves; and, to establish Water Conservation Objectives for instream flows.

A 10-year review of the management plan[18] outlined the following emerging themes related to water management in the South Saskatchewan River basin:

- More needs to be done for long-term protection and preservation of aquatic environments.
- More data collection, monitoring, modeling and evaluation is required to assess water management plans and policies.

Cumulative effects on water quantity and quality should be central to the assessment of applications for coal removal from the eastern slopes. Instream Flow Needs (IFN) assessment for tributaries, water licensing and allocation agreements and inter-provincial agreements for water flow must be evaluated. Groundwater mapping should be developed and potential impacts on surface water quality and flow, as well as impacts on riparian ecosystems, be assessed. Potential water quality concerns (including selenium, arsenic, calcites, and other heavy metals) and their impact on at-risk species, municipal drinking water, and downstream industrial users should be within the purview of the mandate of Alberta Energy Regulator, which "includes allocating and conserving water resources, managing public lands, and protecting the environment while providing economic benefits for all Albertans."

Economic benefits would take into consideration a full accounting of opportunity costs of environmental damage, climate change, and costs to impacted downstream industries. A coal policy integrated within sub-regional plans along the Eastern Slopes should establish environmental thresholds and limits, effective monitoring programs, and any enforcement or additional measures to be applied when critical thresholds are being approached or exceeded. Per the precautionary principle, unproven processes should not be implemented at full scale until adequately piloted, and there should be mechanisms to suspend coal production to protect the ecosystem and other economic interests from further impact, particularly for contaminants that will persist (or continue to accumulate) for long periods of time.

Conclusion 5: *Coal Policy should be integrated into robust land-use planning along the Eastern Slopes.*

Conclusion 6: *More data collection, monitoring, modelling and evaluation of long-term cumulative effects of industrial uses along the Eastern Slopes are required prior to the development of a Coal Policy.*

[18] Final Report – Review of the Implementation of the SSRB Water Management Plan (https://brbc.ab.ca/brbc-documents/publications/285-final-report-review-of-the-implementation-of-the-approved-wmp-for-the-ssrb) Appendices (https://brbc.ab.ca/brbc-documents/publications/286-appendices-review-of-the-approved-water-management-plan-for-the-ssrb)

A Coal Policy should consider foreseeable and negative impacts to biodiversity and watershed integrity including potential exceedances of regional footprint limits for surface disturbance defined in the *Liv-PH Land Footprint Management Plan*[19], define a risk management approach that prioritizes the preservation of native vegetation (e.g. rough fescue grasslands, whitebark or limber pine woodlands), riparian areas/wetlands, and habitats for rare and sensitive plant and animal species as per Alberta Government *Wildlife Land Use Guidelines.*[20]

A Coal Policy should ensure a mitigation and restoration/reclamation strategy be completed before operations begin. A plan for restoration/reclamation of disturbance considering principles and guidance provided by government including *Recovery Strategies for Industrial Development in Native Grassland for the Foothills Fescue, Foothills Parkland and Montane Natural Subregions of Alberta (2018).*[21] Other components might include erosion and sediment control measures, traffic management plan, waste management plan, adverse weather plans, contaminated soils and spill plan, weed management plan, seed mixes, and reclamation monitoring plan.

Corporations should provide proof of secure and sufficient funds (such as a trust or Surety Bond) to cover the full costs of operating impacts due to tailing pond breaches and other catastrophic failures of production, as well as end-of-project abandonment and reclamation costs. Considering the extended periods expected for leaching of waste rock dumps (decades, if not centuries[22]), long-term plans and secure funding should be expected. The effectiveness of past reclamation/revegetation efforts based on soil exposure and slope erosion rates should be evaluated and expectations raised for future projects to reduce erosion transports sediment to streams.

Conclusion 7: *A robust plan for the life-cycle of industrial operations should be completed prior to approval, including the identification and mitigation of cumulative effects and restoration/reclamation.*

[19] *Liv-PH Land Footprint Management Plan* (https://open.alberta.ca/publications/9781460139660)
[20] *Wildlife Land Use Guidelines* (https://www.alberta.ca/wildlife-land-use-guidelines-overview.aspx#jumplinks-0)
[21] *Recovery Strategies for Industrial Development in Native Grassland for the Foothills Fescue, Foothills Parkland and Montane Natural Subregions of Alberta (2018)* (https://open.alberta.ca/publications/recovery-strategies-for-industrial-development-in-native-grassland-for-foothills-and-mont ane)
[22] Essilfie-Dughan, J., et al., Geochemical and mineralogical characterization of sulfur and iron in coalwaste rock, Elk Valley, British Columbia, Canada, Sci Total Environ (2017), (http://dx.doi.org/10.1016/j.scitotenv.2017.02.053)

IV. Opportunity Costs

The South Saskatchewan Regional Plan (SSRP) states: "There is great potential for increased tourism development in the region, as it is home to a rich and diverse natural and cultural heritage and other numerous tourism and recreation features. Additional tourism opportunities would increase the amount of tourism and recreational expenditures retained in Alberta and would support economic diversification in the region. A competitive tourism industry depends on a sufficient supply of land where the integrity of attractive features, settings and scenery are maintained and long-term access is provided" (p.51). Furthermore, *Alberta's Tourism Framework*[23] focuses on "preserving and enhancing the quality of our existing tourism experiences" with a commitment to align tourism priories with existing government policies.

Tourism is a major contributor to the Alberta economy and is largely premised on iconic landscapes like the Rocky Mountains. These regions not only attract international travellers, but provide various recreational and educational opportunities for many Albertans. Industrial uses are incongruous with tourism and recreation.

Conclusion 8: *A Coal Policy should be aligned with goals for recreation and tourism in the province. Regional benefits, costs and long-term liabilities of revenues and employment should be evaluated: that is, jobs created, jobs lost, and future job opportunities foregone.*

[23] *Alberta's Tourism Framework* (https://open.alberta.ca/dataset/d09f7c94-19e7-4df0-a4da-6ea910949312/resource/a7514fc6-5d0a-44f3-92c1-0d4d907a02a5/download/tourismframework-condensed.pdf)

V. Summary

The notion that Alberta needs to pursue coal extraction is obsolete. Coal has no future in a world that is beginning to address the risks of climate change largely caused by the burning of fossil fuels. The Eastern Slopes has more economic value in its preservation than its destruction.

Furthermore, the Eastern Slopes represent our main source of fresh water, and important habitat supporting biodiversity in the province, including many species-at-risk. Coal mining threatens the long-term quality of both.

Clean, fresh water is also a non-fungible input to downstream industry. Risking the quality and seasonable availability of water, risks the viability of established industries central to our provincial economy.

Finally, and with respect, the UCP government has allotted more time and resources to Steve Allan's public inquiry into 'anti-Albertan' energy campaigns than what has been provided to redesign a Coal Policy. This is simply wrong-headed. The 1976 Coal Policy was ahead of its time and deserves to be respected, not gutted. Albertans' support for protecting the Eastern Slopes has grown stronger over the past 45 years. Scientific knowledge has increased enormously over this same period - on water quality and quantity in the region; health impacts of air and water pollution on human and non-human populations; and the interrelationships of economic integrity with ecological well-being. SAGE expects more progressive thinking from our political leaders and from you, esteemed Coal Policy Committee members.