



A leading voice for a healthy and environmentally sustainable community

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TO: Director, Environmental Assessment, Regulatory Assurance,
Alberta Environment and Protected Areas
E-mail: environmental.assessment@gov.ab.ca

FROM: Cheryl Bradley, Secretary
Southern Alberta Group for Environment
E-mail: cebradley@shaw.ca

Re: Review comments on *Proposed Terms of Reference, Environmental Impact Assessment Report, for St. Mary River Irrigation District Proposed Chin Reservoir Expansion Project*

Southern Alberta Group for the Environment (SAGE) is a non-profit organization based in Lethbridge whose mission is to serve as a leading voice for a healthy and environmentally sustainable community. For over 35 years SAGE has worked to protect and restore rivers and watersheds in the Oldman River basin and beyond. SAGE researches environmental concerns and issues and writes letters, briefs and articles to inform the community, including elected decision-makers. SAGE members have been active participants in multi-stakeholder efforts to improve water management including the work of the Oldman River Basin Advisory Committee to develop the *South Saskatchewan River Basin Water Management Plan (2006)*, the Oldman River Basin Water Quality Initiative and the Oldman Watershed Council. SAGE engages in regulatory and appeal processes when it is the only responsible avenue available to influence key decisions affecting environmental sustainability.

We have reviewed the *Proposed Terms of Reference, Environmental Impact Assessment Report, for St. Mary River Irrigation District Proposed Chin Reservoir Expansion Project* posted on Nov 15, 2022 to [Environment and Protected Areas](#) website. We provide the following written comments for your consideration to assist in achieving a comprehensive assessment of project impacts that will provide a solid basis for a public interest determination by the Natural Resources Conservation Board.

Please don't hesitate to contact me if you have questions about these comments.

Sincerely

Cheryl Bradley

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CC: David Westwood, General Manager, SMRID & Director, Irrigating Alberta Inc. dwestwood@smrid.ab.ca
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Comments are provided in two parts. Part 1 includes general comments on definition of the project and local and regional study area that apply to all sections of the *Proposed EIA Terms of Reference*. Part 2 are comments on specified sections of the *Proposed EIA Terms of Reference* and are suggestions for augmenting or revising content of those sections.

PART 1: GENERAL COMMENTS

GENERAL COMMENTS ON PROJECT AND LOCAL STUDY AREA

The EIA Terms of Reference focuses assessment of environmental impact to the direct effects of proposed expansion of Chin Reservoir, referred to as the “Project”. It does not include the necessarily incidental effects of proposed expansion of up to 80,000 irrigation acres within SMRID that would not occur without reservoir expansion.

The *SMRID Proposed Irrigation Expansion Information Package* [here](#) states “In total, the 40,000 acres of water savings from efficiency gains plus the 40,000 acres of additional storage from an expanded Chin Reservoir will allow for 80,000 additional irrigation acres within the District”. In entering into a funding agreement for a loan from the Canada Infrastructure Bank, SMRID is relying on approval of the Chin Reservoir expansion and revenue generated from capital asset charges on the resulting irrigation expansion to pay for the reservoir and other irrigation infrastructure improvement projects. Raymond Irrigation District would share additional irrigation acres from Chin Reservoir Expansion.

Effects of expanded irrigation acres are **necessarily incidental** to permitting the reservoir expansion. According to the *Impact Assessment Act* “direct or incidental effects means effects that are directly linked or necessarily incidental to a federal authority’s exercise of a power or performance of a duty or function that would permit the carrying out, in whole or in part, of a physical activity or designated project, or to a federal authority’s provision of financial assistance to a person for the purpose of enabling that activity or project to be carried out, in whole or in part”.

Alberta Environment and Protected Areas and the Natural Resources Conservation Board are familiar with the concept of effects that are necessarily incidental to a project application. For example, there is the requirement to include the land base for manure and compost application in an application to the Natural Resources Conservation Board for approval of a confined feeding operation ([here](#)).

Potential environmental impacts of expanding irrigated acres will not be assessed in any other decision-making process. In making a decision to add a parcel to the assessment roll of an irrigation district under the *Irrigation Districts Act* (section 95 (1)), the irrigation district must determine whether the land is suitable for irrigation purposes according to provincial land classification standards (topography and soil characteristics), whether there is sufficient water supply, whether there is drainage available if required and whether the expansion limit of the district would be exceeded. The full suite of potential environmental impacts, for example on native vegetation and wildlife (including Species at Risk) or greenhouse gas emissions, are not assessed.

The definition of the Project area must include not only the expansion of Chin Reservoir but also increased irrigated acres.

The *SMRID Proposed Irrigation Expansion Information Package* [here](#) states “New acres delivered from the expansion of Chin Reservoir will require increased flows” through Irrican hydroelectric plants at Raymond Reservoir, Chin Reservoir and on the SMRID Main Canal west of the town of Raymond. Revenue generated would help stabilize water rates for irrigators. Environmental impacts of increased flows for hydroelectric generation at Irrican hydroelectric plants are necessarily incidental to approval of Chin Reservoir expansion.

Water supply for the project is the St. Mary River, Belly and Waterton Rivers through the Waterton-St. Mary Headworks System and the Milk River Ridge Reservoir. Water quality issues in the Milk River Ridge Reservoir should be considered as part of the project assessment. Runoff and return flows from SMRID and RID enter streams and river reaches of the Oldman and South Saskatchewan River subbasins from the confluence of the Oldman and St. Mary rivers downstream to Medicine Hat.

According to the *Environmental Assessment Program Guide to Preparing Environmental Impact Assessment Reports in Alberta* [here](#), “the Local Study Area is the area surrounding and including the Project Area, where there is a reasonable potential for immediate environmental impacts due to ongoing project activities”. Local study area for environmental assessment of potential impacts, direct and necessarily incidental, on air quality, hydrogeology, surface water quality and quantity, aquatic environment, terrain and soils, vegetation, wildlife and wildlife habitat, climate change, land use and management and historical resources logically would include:

- Chin Coulee and its drainage area/watershed.
- Area within the boundaries of St. Mary River ID and Raymond ID that includes the irrigation infrastructure that would service proposed new irrigated acres, the four development blocks proposed by SMRID for expansion ([here](#)), as well as waterways that drain these acres and carry return flows to the Oldman and South Saskatchewan rivers as far east as Medicine Hat.
- St. Mary River headworks and canal system, including Milk River Ridge Reservoir.
- St. Mary River, Belly River and Waterton River which are water supply for the project.
- River reaches downstream of water diversions for the project including lower St. Mary, Belly and Waterton rivers and the Oldman River below the confluence with its southern tributaries.
- Reaches that receive runoff and return flows from RID and SMRID including but not limited to Pothole Creek, the lower St. Mary River, the Oldman River from the confluence with the St. Mary River to the confluence of the South Saskatchewan River and the South Saskatchewan River to Medicine Hat.

GENERAL COMMENTS ON REGIONAL STUDY AREA

According to the *Environmental Assessment Program Guide to Preparing Environmental Impact Assessment Reports in Alberta* ([here](#)), “the Regional Study Area is the area where there is the potential for cumulative and socio-economic effects, and that will be relevant to the assessment of any wider-spread effects of the project”. We suggest the regional study area for cumulative effects assessment is that encompassed by the “historic expansion of Alberta irrigation” first announced in Fall, 2020 and a subsequent announcement in Fall 2021. Chin Reservoir expansion is a key component of this regional program across the South Saskatchewan River Basin in Alberta that has yet to receive assessment of potential environmental effects.

Information on projects proposed as part of the investment agreement(s) of Canada Infrastructure Bank, Government of Alberta and Irrigating Alberta Inc. are found on the Alberta WaterPortal Society Project information website ([here](#)). There is a map of approximately 90 irrigation infrastructure projects and three of four proposed new or expanded reservoirs, including Chin Reservoir, located across nine irrigation districts in the South Saskatchewan River Basin that rely on water supply from rivers in the Oldman, Bow and South Saskatchewan river subbasins. Expansion of over 200,000 acres is proposed. At least 40% of that irrigated expansion is proposed in the St. Mary River Irrigation District.

The WaterPortal Society website includes an analysis of the economic impacts of irrigation across all irrigation districts and several municipalities in southern Alberta including crops grown by farm enterprises on irrigated land, value-added food production in agri-food processing facilities, and businesses that sell inputs to producers on irrigated land. This appears to be the regional study area defined by program proponents for identifying socio-economic benefits and justifying public investment in irrigation infrastructure. There has yet

to be an assessment of cumulative environmental effects of proposed irrigation expansion at this regional scale.

Chin Reservoir expansion is the first project requiring environmental impact assessment as part of the program for historic expansion of Alberta irrigation. Assessment of cumulative environmental effects regionally, particularly on river flows and biodiversity, is needed to inform public interest decisions regarding proposed new and expanded reservoirs and a proposed 15% expansion of irrigation acres in the South Saskatchewan River Basin of southern Alberta.

PART 2: COMMENTS ON SPECIFIED SECTIONS OF THE PROPOSED TERMS OR REFERENCE

SCOPE OF THE EIA REPORT

The EIA report will examine **environmental and socio-economic** effects. Preparation of the EIA report requires “considering the applicable provincial and federal legislation, codes of practice, guidelines, standards, policies, and directives”. A listing of these would be useful. Our understanding is that the following apply:

Indigenous/Aboriginal Consultation

- Duty to Consult Indigenous Groups

While ultimately the provincial and federal Crown have the duty to consult with Indigenous groups, the SMRID may carry out some consultation activities with affected Indigenous groups. SMRID should be required to demonstrate how they have complied with guidance from the Alberta Aboriginal Consultation Office.

Intergovernmental

- *Master Agreement on Apportionment*

Federal Legislation

- *Canadian Environmental Protection Act*
- *Fisheries Act*
- *Impact Assessment Act*
- *Migratory Birds Convention Act*
- *Species at Risk Act*

Provincial Legislation

- *Alberta Soil Conservation Act*
- *Alberta Land Stewardship Act*
- *Environmental Protection and Enhancement Act*
- *Freedom of Information and Protection of Privacy Act*
- *Historical Resources Act*
- *Irrigation Districts Act*
- *Natural Resources Conservation Board Act*
- *Public Lands Act*
- *Water Act*
- *Weed Control Act*
- *Wildlife Act*

Plans, Directives, Orders, Policies and Guidelines

- *South Saskatchewan Regional Plan*

- *South Saskatchewan River Basin Water Management Plan*
- *Municipal Plans for Lethbridge County, County of Warner and Municipal District of Taber*
- *Alberta Wetland Policy*
- *Alberta Dam and Canal Safety Directive*
- *Bow, Oldman and South Saskatchewan River Basin Water Allocation Order*
- *Water for Life strategy and action plan*
- *Canadian Water Quality Guidelines for the Protection of Aquatic Life*
- *Environmental Quality Guidelines for Alberta Surface Waters*
- *Guidelines for Conservation of Native Grasslands*
- *Wildlife Land Use Guidelines*
- *Fish Conservation and Management Strategy for Alberta*
- *Prairie Conservation Action Plan*
- *Recovery plans for species at risk*
- *Canada's climate plans and targets*
- *Alberta's climate leadership plan*

Guidelines for impact assessments

- *Environmental Assessment Guide to Preparing Environmental Impact Assessment Reports in Alberta*
- *Cumulative Effects Assessment in Environmental Impact Assessment Reports under the Alberta Environmental Protection and Enhancement Act*
- *Practitioner's Guide to Federal Impact Assessments*

CONTENT OF THE EIA REPORT

1 PUBLIC ENGAGEMENT AND INDIGENOUS CONSULTATION

[A]

- Specify at what point the public engagement program begins. Since the “historic expansion of Alberta irrigation” (including Chin Reservoir) was announced in Fall 2020, SAGE and other environmental interests through correspondence and meetings have communicated with SMRID and other irrigation districts, relevant provincial and federal government ministers and staff, as well as Canada Infrastructure Bank, in an attempt to obtain information on what is proposed and to engage in discussion about our concerns.
- We are willing to provide all correspondence and meeting notes to SMRID for their documentation of public engagement and also to the EPA Director for the record.
- The Proponent has not been interested in engaging in conversations regarding environmental flows.
- A FOIP request submitted November 2021 to Alberta Agriculture for a copy of the Dec 18, 2020 Agreement between GoA, CIB and Irrigation Districts (incorporated as Irrigating Alberta Inc.) has yet to be fulfilled.

2 PROJECT DESCRIPTION

2.1 OVERVIEW

[A] There is more than one legal entity that is a champion. Not only St. Mary River Irrigation District (SMRID), but also Raymond Irrigation District (RID), are invested in the project and plan to benefit from it. History of project development suggests that Alberta Agriculture and Irrigation played a major role in prioritizing the project for public resources and providing grant assistance. Canada Infrastructure Bank may also be considered a champion through providing low-interest loan(s). Irrigating Alberta Inc. is a party to funding agreements. Explain the roles and responsibilities of these legal entities with respect to the project and the process that led to decisions to invest in the project.

[B] Purpose and rationale

- Address the findings of a 2014 AMEC report on water storage opportunities in the Oldman Sub-basin of the SSRB ([here](#)) that concluded Chin Reservoir expansion is not justified as it does not improve achieving WCO or meeting commitments to junior licence-holders and First Nations.
- Reference the 2016 WaterSmart report on water management in the SSRB ([here](#)). It links Chin Reservoir expansion to changes in operations of upstream reservoirs. What changes are required and are they being considered for implementation as part of this project proposal?
- Reference AIDA's 2019 *Report on Proposed Irrigation Storage Reservoir Ranking* and its shortcomings for broad-based water management planning. The goal of the ranking process was to identify additional storage with greatest benefit to the irrigation sector. There was not river flow modelling or assessment of impacts on instream flows or other assessment of environmental impacts or implications for Indigenous rights to water or water for junior licence holders.
- Discuss the rationale for Chin Reservoir Expansion put forward in the *SMRID Proposed Irrigation Expansion Information Package* (Nov 2022) that it would reduce the potential for regulatory reductions to licenses through a possible "Use It or Lose It" initiative.

[C] Current need

- Include justification for expansion of the reservoir and of irrigated acres (both are part of the project). Is there justification for expansion of the reservoir without expansion of irrigated acres? According to *SMRID Proposed Irrigation Expansion Information Package* (Nov 2022) the two are linked. Capital asset charges on expanded irrigation acres are being relied on to pay back the CIB loan for infrastructure improvements and reservoir expansion.
- Project need is linked to drought mitigation and increased climate resiliency. This assumption needs to be tested against climate change scenarios. Who will benefit and who will not (junior water licence holders, First Nations, residents and users of riparian areas adversely affected by reduced instream flows, fish and wildlife)? Expansion of irrigated acres may result in risk to more farmers and other water users given modeling that concludes "...more than one year of drought would deplete reservoir storage and streamflow leading to great harm to fisheries and environmental conditions generally and to significant shortages for both rural and urban water users" (Chernos et al. 2021) ([here](#)).

[D] Trends in water demand

- Consider for both the local and regional Project areas. What demand is there for water allocation transfers in the Oldman River subbasin?
- Discuss intensification of water use by SMRID and RID and how it addresses growing water demand in the Region. Will potential new users of water be required to locate in irrigation districts to obtain an allocation of water? How will this affect settlement/development trends?
- Include a discussion of the International Joint Commission study to look at improving water apportionment on the St. Mary and Milk Rivers as the outcome may result in reduced flows in the upper St. Mary River given US demand for its full share.
- Discuss potential Indigenous demand for water and how that will be accommodated.
- Discuss existing and future demand for flows to sustain healthy aquatic ecosystems (e.g. *Water for Life* strategy and action plans, *South Saskatchewan River Basin Water Management Plan (2006)* and the WPAC review of its implementation (2018) (<https://landusehub.ca/review-of-the-ssrb-water-management-plan/>) and the *South Saskatchewan Regional Plan 2014-2024* objectives to support healthy ecosystems in managing Water and conserving Biodiversity & Ecosystems). Identify actions in the SSRB WMP (Sec 2.8.4) recommended to promote flow restoration and discuss any progress on these actions (e.g. improved dam management, voluntary restoration actions and restrictions, research on flow restoration benefits, and assessment of operating licences for government dams and WCO conditions).

[E] Maps and drawings of project components

- Map areas where expansion of irrigated acres is anticipated with Chin Reservoir expansion (e.g. four development blocks proposed by SMRID for expansion ([here](#)) and proposed by RID for expansion.
- Irrican Power plants on the SMRID main canal are part of the project. Increased power generation revenue from increased flows to supply new irrigation acres would be used to stabilize water rates to irrigators during pay-back of loans for the project (*SMRID Proposed Irrigation Expansion Information Package* (Nov 2022)).
- Map sources of water supply for the project, water conveyance system, and return flow locations.

[F] Project phasing

- A phased approach to expansion of irrigated acres is proposed in the *SMRID Proposed Irrigation Expansion Information Package* (Nov 2022). Expansion progress would be tied to demonstrated and verified capacity gains. Describe the process by which this be accomplished and applied in decisions.

[G] Alternatives for the Project

- Some alternatives to consider:
 - a) no reservoir expansion and no irrigated acre expansion
 - b) no reservoir expansion and some irrigated acre expansion using a portion of water saved through efficiencies for achieving Water Conservation Objectives and improving health of aquatic ecosystems in the southern tributaries and Oldman River while reducing risk to current irrigators, junior licence holders and First Nations
 - c) reservoir expansion and no or some irrigated acre expansion using a portion of water saved through efficiencies for achieving Water Conservation Objectives and improving health of aquatic ecosystems in the southern tributaries and Oldman River while reducing risk to current irrigators, junior licence holders and First Nations

[I] Overall economic, environmental and social impacts vs benefits

- Clarify the purpose, scope and level of detail of the cost:benefit analysis.
- Include results and discussion of an economic analysis of the proposed public investment to determine if resources would be used efficiently. Compare quantifiable projected benefits with quantifiable projected costs into the foreseeable future. Evaluation criteria would include benefit-cost ratio, net present value of incremental socio-economic benefits, internal rate of return and pay-back period.
- Include discussion of results of the regional socio-economic assessment required in section 7.
- Include discussion of results of the local environmental impact assessment required in section 3 and of the regional cumulative effects assessment in section 10.

2.2 CONSTRAINTS

[A] Consistency with objectives and goals of Laws, Plans, Policies and Guidelines.

- Include discussion of the following:
 - *Master Agreement on Apportionment*, including Water Quality Agreement
 - *Impact Assessment Act*, Chin Reservoir was not designated for federal assessment partly because potential adverse environmental effects within federal jurisdiction would be managed through provincial EIA <https://iaac-aeic.gc.ca/050/evaluations/document/144264>
 - *Fisheries Act* directives for protection and management of fish and fish habitat
 - *Migratory Birds Convention Act* and regulations to protect migratory birds
 - federal *Species at Risk Act* to prevent extinction of species
 - provincial *Wildlife Act* that designates species at risk
 - *Canadian Environmental Protection Act* that controls and abates environmental pollution

- *South Saskatchewan River Basin Water Management Plan*
- *Review of Implementation of the Approved Water Management Plan for the SSRB*
- *Bow, Oldman and South Saskatchewan River Basin Water Allocation Order*
- *South Saskatchewan Regional Plan*
- *Municipal Plans for Lethbridge County, County of Warner and Municipal District of Taber*
- *Water for Life strategy and action plan*
- *Canadian Water Quality Guidelines for the Protection of Aquatic Life*
- *Environmental Quality Guidelines for Alberta Surface Waters*
- *Alberta Wetland Policy*
- *Guidelines for Conservation of Native Grasslands*
- *Prairie Conservation Action Plan*
- *Wildlife Land Use Guidelines*
- *Fish Conservation and Management Strategy for Alberta*
- *Recovery plans for species at risk (e.g. Alberta lake sturgeon recovery plan 2011-2016)*
- *Canada's climate plans and targets*
- *Alberta's climate leadership plan*

- Discuss information regarding achievement of Water Conservation Objectives established in the *South Saskatchewan River Basin Water Management Plan*.
- Discuss information contained in annual reports of the Water Quality Framework required under the *South Saskatchewan Regional Plan*.
- In discussing how the project is designed to meet the apportionment agreement with downstream provinces, include information on current risk (without the project) of meeting river flows required for apportionment and risk under climate change scenarios. Also include information on achieving water quality protection objectives of the Prairie Provinces Water Board ([here](#)).

[B] Process and criteria to select sites for Project components

- Include development blocks for expansion acres (see *SMRID Proposed Irrigation Expansion Information Package* (Nov 2022))

[H] Describe public lands and native grasslands (including wetlands) that may overlap with the Project including proposed expansion of irrigated acres

2.5 WATER MANAGEMENT

2.5.1 WATER SUPPLY

[A] Water supply requirements

- Water supply for the Project is from the southern tributaries of the Oldman River. Water is diverted through the Waterton-St. Mary Headworks System to the Milk River Ridge Reservoir (operated by Alberta Environment/Alberta Agriculture and Irrigation) and from there diverted into the SMRID main canal.

Source of Water Supply	ID & Licence #	Allocation amount (acre-feet)	Priority
St. Mary River	SMRID 44592	168,173	1899
St. Mary, Waterton & Belly Rivers	SMRID 44591	331,827	1950
St. Mary, Waterton & Belly Rivers	SMRID 44590	220,000	1991
St. Mary River	Taber ID 45444	34,000	1899
St. Mary River	Taber ID 45444	33,500	1950
Belly River	Taber ID 45444	15,000	1950
Waterton River	Taber ID 45444	67,500	1950
St. Mary, Waterton & Belly Rivers	Taber ID 45441	8,000	1991
St. Mary River	Raymond ID 44962	12,240	1899
St. Mary River	Raymond ID 44962	12,510	1950
Belly River	Raymond ID 44959	5,500	1950
Waterton River	Raymond ID 44959	24,750	1950
St. Mary River	Raymond ID 44959	26,000	1991

- Identify which licence(s) contribute to water supply for the Project. Identify which licence(s) would have Project plans attached if approved. Note that plans for Chin Reservoir without expansion and other reservoirs in SMRID are attached to licence #44592.
- Include a summary of monthly and annual volume of water diverted and total area irrigated since 1982 for each water licence based on data filed in the Water Use Reporting System.
- Predict change in diversions (volume and pattern) and in total area irrigated with the Project.
- Discuss increased flows through Irrican Power plants predicted from the Project (*SMRID Proposed Irrigation Expansion Information Package (Nov 2022)*).
- Identify water losses throughout the St. Mary system from leakage, evaporation (including Chin Reservoir) and runoff. What are losses predicted to be in future?
- Discuss location and volume of return flows, past trends and predicted future trends.
- Discuss the proportion of water diverted for irrigation that is actually applied to crop.

2.7 CONSERVATION AND RECLAMATION

[B] Conservation and reclamation plan

- Refer to Alberta Guidelines for native grasslands [here](#) including *Conservation Assessments in Native Grasslands; Principles, Guidelines and Tools for all Industrial Activity in Native Grasslands in Prairie and Parkland Landscapes of Alberta; Revegetation Using Native Plant Materials: Guidelines for Industrial Development Sites; Recovery Strategies for Industrial Development in Native Prairie - Dry-Mixed-grass Natural Subregion; and Recovery Strategies for Industrial Development in Native Prairie - Mixed-grass Natural Subregion.*

3 ENVIRONMENTAL ASSESSMENT

3.1 AIR QUALITY AND NOISE

3.1.1 Baseline Information

- This section assumes the study area is limited to the area of construction and construction activities during reservoir expansion. See General Comment above.
- Consider that storage reservoirs emit methane, carbon dioxide and nitrous oxide, all greenhouse gases.

- Consider air pollution occurring from activities associated with irrigation agriculture. These pollutants include greenhouse gases (carbon dioxide, methane, nitrous oxide) produced from burning of fossil fuels, ammonia from fertilized fields, air-borne particulate matter from soil erosion, and air-borne pesticides.

3.1.2 Impact Assessment

- Identify and discuss air pollutants that would be produced by the expanded reservoir.
- Identify and discuss air pollutants that would arise from an increase in irrigated acres and activities associated with irrigation agriculture vs dryland farming or native grasslands.
- Discuss potential increase in GHG emissions and how that relates to Alberta's and Canada's emissions reduction targets.

3.2 HYDROGEOLOGY

3.2.1 Baseline Information

[A] Overview

- see General Comments
- Document groundwater quality risk throughout SMRID and RID relative to existing and potential (including expansion development blocks) impacts from irrigated crop production and agrochemical use.

3.2.2 Impact Assessment

- Assess effects of canal rehabilitation and conversion of canals to pipelines on groundwater recharge and levels and on groundwater quality.
- Assess potential effects of irrigation on groundwater in blocks proposed for expansion.

3.3 SURFACE WATER QUALITY AND QUANTITY

3.3.1 Baseline Information

[A] Define and map local and regional study areas

- See General Comments

[C] Baseline surface water quality

- Identify and summarize available information on surface water quality within the local study area including for sources of water supply (southern tributaries), the irrigation water distribution system, return flows and water bodies receiving return flows. Among others, refer to reports of the Water Quality Section in Alberta Agriculture and online Irrigation District Water Quality Tool (<http://www.idwq.ca/>) and annual reports of the SSRP Water Quality Framework.
- Discuss any water quality issues in Milk River Ridge Reservoir.

[D] Baseline surface water quantity

- Provide information on flows in river reaches downstream of water diversions for the Project including lower St. Mary, Belly and Waterton rivers and the Oldman River below the confluence with its southern tributaries. Compare actual flows with natural flows. Analyse trends and assess degree of hydrological change due to withdrawals.

3.3.2 Impact Assessment

[A] Identify project activities

- Specify that expanded irrigation acres is a project activity with potential impact on surface water. Also hydroelectric generation.

- Discuss past diversions to SMRID and RID relative to other diversions and recorded and natural flows and WCO in the St. Mary, Waterton and Belly Rivers. Assess impact of predicted increased diversions.

[G] Impacts on wetland hydrology

- Discuss potential loss of wetlands from expanded irrigation acres.

3.4 AQUATIC ENVIRONMENT

3.4.1 Baseline Information

[A] See General Comments

- Discuss the interrelationships of hydrology (range of variability), water quality, fish habitat, and riparian health.
- Provide information on condition of the aquatic environment in river reaches downstream of water diversions for the Project including lower St. Mary, Belly and Waterton rivers and the Oldman River below the confluence with its southern tributaries and downstream in the South Saskatchewan River. Available information includes Instream Flow Needs Determinations for the SSRB (2003), SSRB WMP Background Report (2003), Aquatic and Riparian Condition Assessment of the SSRB (2007), results of University of Lethbridge research and any other more recent information on condition of the aquatic environment.
- Among fish species at risk from large volumes of withdrawal for irrigation is Lake Sturgeon listed At Risk under the Alberta *Wildlife Act* and considered Endangered by COSEWIC.
- Discuss changes in the aquatic environment with predicted climate change scenarios.

3.4.2 Impact Assessment

- Discuss the potential of the project to exacerbate the effects of climate change on the aquatic environment downstream of the diversion from the St. Mary River.

3.5 TERRAIN AND SOILS

3.5.1 Baseline Information

[A] See General Comments.

- Soils that could be affected by the project include those on parcels where irrigation expansion is proposed to occur within SMRID and RID.

3.5.2 Impact Assessment

- Discuss changes in soils when converted to irrigated cropland from native grassland and dryland cropland.
- Discuss current information on soil erosion of irrigated land in southern Alberta growing specialty crops (potatoes, sugar beets, soy beans) that are harvested too late to plant an overwintering cover crop (e.g. extensive soil erosion within irrigation districts occurred during strong wind events in the dry fall of 2021 <https://lethbridgenewsnow.com/2021/10/01/tillage-is-problematic-on-the-prairies/>)

3.6 VEGETATION

3.6.1 Baseline Information

[A] See General Comments

[B] Describe and map vegetation communities

- Focus on native grassland, wetlands, and riverine riparian vegetation
- Identify vegetation communities on the ACIMS listing of tracked ecological communities that are present. <https://open.alberta.ca/opendata/tracked-ecological-communities-alphabetical-listing-with-natural-subregions>

Native Grassland

- Discuss intent within the South Saskatchewan Regional Plan to sustain intact native grasslands, and their role in maintaining biodiversity and long-term ecosystem health and resilience. Consider importance as nesting habitat for migratory bird species.
- Map areas of native grassland within SMRID and RID, including within blocks proposed for irrigation expansion.

[F] Wetlands

- Include wetlands within blocks proposed for irrigation expansion.

Riverine Riparian Vegetation

- Provide information on riparian condition in river reaches downstream of water diversions for the Project including lower St. Mary, Belly and Waterton rivers and the Oldman River below the confluence with its southern tributaries. Available information includes SSRB WMP Background Report (2003), SORAC report 2007, University of Lethbridge research, and achievement of Water Conservation Objectives.
- Consider importance of cottonwood forests as nesting habitat for migratory bird species.

3.6.2 Impact Assessment

Native Grassland

- Identify areas of native grassland that are at risk of conversion as they lie within a feasible distance from SMRID and RID infrastructure to be delivered water through existing and modernized irrigation infrastructure and with proposed expansion of Chin Reservoir.
- Discuss considerations regarding sustaining native grasslands made by irrigation districts when considering requests to add new irrigated parcels.
- Discuss measures that might be taken to minimize risk to native grasslands from the Project.

Riverine Riparian Vegetation

- Assess potential impacts of the Project to riparian condition, including cottonwood forests, along the St. Mary, Waterton and Belly rivers below irrigation diversions and the Oldman River and the South Saskatchewan River. Impacts may be from changes to river flows (e.g. increased diversion into IDs that reduce current river flow)
- Identify and discuss measures that might be taken to avoid impact on riparian areas from the Project and to monitor and improve riparian condition along the southern tributaries, the Oldman River and the South Saskatchewan River

3.7 WILDLIFE AND WILDLIFE HABITAT

3.7.1 Baseline Information

[A] See General Comments

- discuss the Alberta Prairie Conservation Action Plan 2021-2025. Note that Chin Coulee is identified as a high value landscape for native biodiversity in Prairie and Parkland Alberta as are other areas potentially affected by the project, locally and regionally (PCAP Fig 4).

3.7.2 Impact Assessment

- Identify wildlife habitats including movement corridors that will be lost or altered by the project
- Discuss implications of reduction in instream flows for biodiversity in aquatic and riparian environments

3.8 CLIMATE CHANGE

3.8.1 Baseline Information

- Discuss future projections of climate norms and variability based on climate scenarios for Alberta (e.g. www.albertaclimaterecords.com)
- Identify and discuss computer modelling used to assess risk of a water shortage in preparing the rationale for irrigation expansion in SMRID and RID, including shortcomings in that climate change projections were not considered. (<https://smrid.com/smrid-proposed-irrigation-expansion-information-package/>)
- Identify and discuss GHG emissions from existing Chin reservoir, other reservoirs and from irrigation agriculture activities

3.8.2 Impact Assessment

- Using climate change scenarios assess risk of water shortage for irrigators in SMRID and RID without and with Chin Reservoir expansion.
- Using climate change scenarios assess risk to achieving WCOs in the southern tributaries, Oldman River and South Saskatchewan River.
- Discuss contribution of the Chin Reservoir and expansion of irrigated acres to GHG emissions from the reservoir itself and from changes in soil biology, fertilizer use, crop mixes, livestock production and use of fossil fuels. How does this contribute or hinder achieving Canada's 2030 Emissions Reduction Plan and commitment to be net-zero emissions by 2050?
<https://www.canada.ca/en/services/environment/weather/climatechange/climate-plan/net-zero-emissions-2050.html>

7 SOCIO-ECONOMIC ASSESSMENT

- Include consideration of the socio-economic value of natural biodiversity, natural ecosystem functions (e.g. provided by native grasslands, wetlands and riparian areas) and nature-based recreation (e.g. canoeing rivers).
- Discuss socio-economic implications of drought, both currently and with climate change. Reference the Alberta Water Council *Memorandum of Results Drought Simulation Exercise Final Report* (2022) ([here](#))

10 CUMULATIVE EFFECTS

See General Comments regarding Regional Study Area

- Modelling and simulation software is available to understand the outcomes of our collective land use and resource management decisions, including [ALCES](#). Visual representation of data layers on rivers and streams, lakes and wetlands, water infrastructure, soils, precipitation, natural area, land use footprint (including agriculture), water use and water quality indicate that the Oldman River Basin has experienced major transformation in structure and function beginning in 1910 (see <https://oldmanwatershed.ca/search?q=alces>). The trend is projected to increase into the future unless we collectively make decisions to optimize social, economic and ecological indicators. This type of cumulative modelling can be undertaken for the region in order to understand if critical limits on water withdrawals have been exceeded and if the ability of rivers to dilute pollution from all the activity currently on the landscape has been surpassed. Will proposed expansion of irrigation agriculture make our future less sustainable? Should our efforts and resources instead be focused on addressing major issues in land and water management, especially with predicted climate change?