

BRC-Canada

Submission to Module A of the Alberta Utilities Commission inquiry into the ongoing economic, orderly and efficient development of electricity generation in Alberta

Contents

Introduction.....	3
About BRC-Canada.....	3
Alberta’s renewable energy offtake market.....	3
Key principles to guide policy conversations.....	4
Approach of this submission.....	5
[1] Reclamation Security.....	6
Recommendations:.....	6
Justification:.....	6
Questions.....	8
[2] Development on Agricultural and Environmental Lands.....	15
Recommendations:.....	15
Justification.....	15
Questions.....	18
[3] Development on Provincial Crown Land.....	22
Recommendations.....	22
Justification.....	22
Questions.....	23
[4] Pristine Viewscapes.....	24
Recommendations.....	24
Justification.....	24
Questions.....	25
Appendix A.....	27
Reclamation Security Requirement Jurisdiction Comparison.....	27
Appendix B.....	52
Renewable Energy and Agricultural Land Use In Alberta 2019-2021.....	52

Introduction

BRC-Canada appreciates the opportunity to provide input into the AUC's inquiry into the ongoing economic, orderly and efficient development of electricity generation in Alberta.

About BRC-Canada

The Business Renewables Centre-Canada (BRC-Canada) is an initiative of the Pembina Institute. BRC-Canada exists to enable businesses and institutions to access renewable energy for their emissions reduction needs across Canada. This means working closely with buyers and developers of renewables and assisting them in shortening their learning curves as they figure out the best path to power purchase agreements. Our growing organization currently has about 60 participants from across all sectors of the Canadian economy.

Alberta's renewable energy offtake market

In Alberta, corporate and institutional buyers — such as businesses, institutions and municipalities — can purchase energy directly from generators. These mostly private-sector entities are wielding this consumer choice to procure renewable energy through contracting. Buyers can claim tangible credits for purchasing their power from new, additional clean or renewable sources, reducing the carbon footprint of their operations, and supporting the development of low-cost and lower-carbon energy production.

This market choice has provided an important opportunity for industrial operators and job-creators in Alberta to improve their competitiveness. Alberta's major employers and investors are subject to increasing scrutiny from the global financial sector over growing climate risks. Many are also motivated to mitigate the costs of Alberta's industrial carbon pricing system. Corporate procurement of renewable energy makes industrial players more competitive, allowing them to meet environmental, social and governance (ESG) commitments that appeal to creditors and investors while reducing carbon compliance costs. As such, this market choice helps attract new investment to Alberta from global companies looking for opportunities to sustainably supply their power needs and meet their commitments. In November 2021, Amazon chose Calgary for its \$4.3-billion cloud computing operation, crediting access to renewable energy in Alberta as a key factor.

The new renewable energy instigated by this industrial demand decreases the wholesale market price for electricity. Because renewable sources have no fuel costs and very few operating costs, they supply energy at very low prices. This in turn suppresses the overall

market price, resulting in lower costs for utility customers. Because renewable energy sources also generate a second commodity – the associated environmental attributes (offsets or RECs) – wind and solar energy are economic even at very low energy prices. In this way, corporate demand for the environmental benefits of renewable energy means more supply of low-cost electricity for all Albertans.

These projects also represent over \$5.5 billion of new capital investment and provide jobs for nearly 5,900 people. Once operating, they will support ongoing local economic activity, such as spending for operations and maintenance, including over \$28 million per year in municipal property tax payments and over \$10 million in annual lease payments to rural landowners. With more deals and new projects, these economic development benefits will only grow.

Key principles to guide policy conversations

BRC-Canada offers comments on the topics under Module A of the Inquiry pursuant to the following overriding principles:

- Market choice for consumers: consumers should be allowed to continue to choose their preferred generation option, thereby enabling corporate competitiveness around environmental, social and governance (ESG) requirements from capital markets and carbon pricing cost mitigation.
- Fair, efficient and open market competition: government should not single out certain generation technology types through policy; such can be characterized as discriminatory practice as it undermines the fair, efficient and open competition (FEOC) operation of the energy market.
- Respect for private property interests: government policy should not add unnecessary complexity or hindrance on private property owners' free enjoyment and use of their land within comprehensive land-use frameworks.
- Local stakeholder engagement and accommodation: local and municipal input should be heard, and municipal land-use planning should be accounted for in public interest regulatory reviews.
- Enabling and fostering informed market transactions: government policies and programs should support the informed participation of landowners in their decisions around the disposition of their land for renewable energy use.
- Repairing market failures: when considering government policy in an area of free and open market transaction, government intervention should be used to repair identifiable and clearly articulated market failures.
- Strong regulatory systems and continuous improvement: Alberta should strive for leading regulation across all industries to protect ecologically sensitive land and

ensure reclamation and restoration of land for future productive use while reasonably mitigating temporary impacts on productive use.

Approach of this submission

BRC-Canada has reviewed below, under separate subsections, each of the topics pertaining the AUC Inquiry. Prior to answering the AUC's questions from the AUC Question Matrix, BRC-Canada provides the following general comments with respect to each of the topics:

- an initial overview of how the current regulatory apparatus and market operates with respect to that issue and what evidence there is that change is needed;
- a short list of recommendations for improving market performance on the topic and justification for those recommendations, followed by;
- explicit responses to the AUC's list of enumerated questions within each section.

The purpose of these preliminary, general comments is to explain BRC-Canada's opinion that the existing regulatory framework in Alberta for renewable energy is not flawed and, therefore, does not need fixing. In BRC-Canada's view, the AUC-commissioned expert reports, as well as several questions from the Question Matrix, assume policy and regulatory issues with the existing regulatory framework for renewable energy development in Alberta. None of the AUC-commissioned reports, however, substantiate this premise or empirically demonstrate these presumed flaws.

BRC-Canada addresses below why assuming the existence of regulatory flaws as a starting point for the AUC Inquiry in Module A is problematic. To support its position, BRC-Canada includes a third-party expert report, *Renewable Energy and Agricultural Land Use in Alberta 2019-2021* (attached as Appendix B), demonstrating that renewable energy development is not the driver for agricultural land loss in Alberta. This report shows that solar projects do not occupy high-quality agricultural land, and wind projects have only a marginal impact on high-quality agricultural land (limited to 63 hectares of land). In contrast, industrial activity, mines and urban expansion have all expanded into primarily high-quality agricultural land.

[1] Reclamation Security

Recommendations:

1. Work with industry, landowners and municipalities on publishing options for model contract provisions (with an assessment of advantages and disadvantages between options) for reclamation security for landowners.
2. Increase public funding for programming, materials and educational initiatives by the Farmers' Advocate Office to support landowner awareness around reclamation requirements and costs, liability risks and the model contract options.
3. Develop a public disclosure requirement and public registry or database of project-specific reclamation costs and of reclamation security provisions in land lease contracts, with appropriate protections for commercially sensitive terms.

Justification:

- Alberta has a functional marketplace guiding land use for renewable energy, where landowners – the best decision-makers regarding the use of their land – are freely able to reject renewable energy development on their land.
- There is no compelling reason to interfere with landowner rights and their autonomy to decide on how to apply their land to its optimal use. Landowners are best placed to balance trade-offs in the use of their land, including balancing between tying capital up in reclamation security versus realizing other interests, like higher lease payments or other conditions and design requirements.
- Any public requirement for financial security could interfere with existing contractual arrangements (including existing financial security provisions) and contradict landowner preferences. Changes to financial security requirements for reclamation must apply only to projects submitted after the changes are enacted to protect investor certainty in Alberta. Maintaining current requirements for existing and submitted projects is in line with the approach in other jurisdictions, such as Texas's 2021 Senate Bill 760 reclamation regulation.

- It is clear from the public discourse on this topic that landowners are aware of reclamation liability risk and have, in fact, commonly secured reclamation security through negotiations with developers. This is evidence of a functioning market for land use with informed market participants.
- There is no reason to believe that any anecdotal examples of unsecured reclamation obligations are evidence of a policy gap, for two reasons:
 - Landowners are free to choose how to balance trade-offs in negotiating the use of their land, between benefits and risks; and
 - Renewable energy projects have considerable value in generating revenue and are tangible assets in terms of salvage value (material recycling and component resale or repurpose). As such, it is entirely reasonable for landowners to choose not to secure reclamation obligations, particularly until closer to end-of-life.
- There is no known example of outstanding reclamation obligations for or abandonment of wind and solar facilities in Alberta. No example has been cited in the documents accompanying the government's announcement and justification of the AUC Inquiry or the AUC's expert reports. The government's FAQ explaining the Inquiry and pause points vaguely to "concerns" but says nothing more to explain or support these concerns.¹ Policy development in this area seems to be creating "solutions in search of a problem" while adding risks of government interference with landowner interests, unintended consequences and red tape.
- Unnecessary additional costs and red tape for new power plants creates a barrier to investment in new electricity supply, requiring a stronger energy price signal for new investment. This means higher electric energy costs for consumers, with no clear policy problem or gap identified, meaning no rationale for imposing these additional costs on consumers.
- The only market failures identified are informational and addressable without regulatory changes. Issues of landowner information gaps, etc., can be resolved through landowner education and model contracts facilitated through the Farmers' Advocate Office, as well as supporting access to competent legal counsel.

¹ Government of Alberta, *Frequently asked questions: Alberta's Renewables Inquiry and the Related Pause* (2023), 5.

Questions

1.1 Should Alberta impose mandatory reclamation security requirements on all types of power plants?

Answer: No.

Solution: Increase landowner education and support programs and initiatives to overcome information barriers for landowners.

Rationale:

- 1) Alberta has a functioning marketplace with no market failure and any existing issues can be resolved through education and information; and
- 2) Landowner interests would be infringed by public regulatory requirements respecting the use of their land.

Given this, public regulatory requirements will only interfere with the efficient function of the marketplace for land use and with the landowners' ability to protect the long-term productivity and value of their land (landowners), worsening societal outcomes. As the Ecoventure report² noted, "jurisdictions that required financial assurance for decommissioning costs prior to construction and operation had increased capital costs, which resulted in delayed construction and project development"³

Neither expert report prepared for the inquiry addressed the underlying question that should precede any solution-finding: is there an empirical reclamation problem with wind and solar in Alberta? When considering end of life for projects, both reports highlight that options such as repowering or rebuilding on the same site are important considerations in the renewable energy industry. However, both reports explicitly exclude these options from the analysis and move forward under the assumption that a mandated system is needed. Without a fulsome analysis of the current state of reclamation in the province that demonstrates a clear problem with the existing landowner-centred reclamation approach, there is a strong likelihood that new regulatory requirements will introduce more costs and harms than benefits. This is particularly the case given the risk of creating unintended consequences by imposing a one-size-fits-all centralized, government-heavy reclamation scheme.

² Ecoventure Inc. (2023) "Consideration of Implementing Mandatory Reclamation Security Requirements for Power Plants." <https://www.auc.ab.ca/featured/auc-inquiry-into-the-ongoing-economic-orderly-and-efficient-development-of-electricity-generation-in-alberta/>

³ Ibid

1.2 Do private contracts between project owners and landowners provide a sufficient level of reclamation security? Should private contracts between project owners and landowners regarding reclamation security be standardized?

Answers: Yes, private contracts provide a sufficient level of reclamation security; no, they should not be standardized.

Solution: Publish a set of model contract provisions, annotated to summarize the advantages and disadvantages of each option for the landowner, supported by industry-funded legal support for landowners in lease negotiations.

Rationale: Examples of model contracts with clear articulation of trade-offs between options and support for legal advice provides sufficient support to address the only barriers to a functional market, which are informational; and standardization will only restrict innovation in the marketplace and impede the landowners' free use of their land. Moreover, standardized contracts are too inflexible to accommodate the full range of land types and land ownership structures, undermining the appropriate function of a marketplace that prioritizes the "landowner as knowing best."

1.3 If new security requirements are imposed, should they only apply on a go-forward basis to new projects, or should they also apply to existing and approved projects?

Answer: They should only apply to new projects that have not yet completed their AUC application.

Rationale: There is no reason to apply retroactive reclamation security requirements and doing so would create a harmful investment chill in Alberta, within and outside electricity generation, for the following reasons:

- 1) A comprehensive engagement and policy development around the reclamation standard for wind and solar was undertaken and implemented only five years ago without government-mandated reclamation security (despite that this could have been implemented at that time), and developers have been justified in relying on the regulatory scheme in place.
- 2) Developers have continued to negotiate with landowners in good faith around reclamation security on the basis of these recently-developed and implemented reclamation requirements, including projects that have applied for, but not yet received, approval, and such projects have put substantial resources, effort and relationship credit into these agreements by the point of submitting their application.

- 3) Confidence in the province's regulatory regime for all industries requires that at least all projects with approvals are allowed to proceed on the basis of their approvals and the regulations in place at the time of receiving their approval, unless there is a compelling reason to apply new regulations to operations (though even newly-applied regulations typically impact operations and do not require new capital allocation).
- 4) No example has been cited in the documents accompanying the government's announcement and justification of the AUC Inquiry or the AUC's expert reports concerning unmet reclamation obligations for renewable energy, so there is no reason to override the customary practice of applying new regulations only to pre-application projects.

As such, any regulatory changes in this area should only be applied prospectively.

1.4 What type of security should be required (e.g., cash, letter of credit, surety bond, insurance, etc.)?

Answer: No form of government-mandated security should be required.

Solution: Options for the type of security required, and their advantages and disadvantages for landowners, should be published as part of the Farmers' Advocate's model reclamation contract provisions.

Rationale: See above, question 1.1.

1.5 How should the amount of security be determined?

Answer: The amount of security for reclamation should be determined based on negotiations with the landowner, not mandated by government.

Solution: In rare instances where there is a compelling public interest reason for government to step into the role of representing the long-term interest of the land (e.g., development on public land), the amount of security required should be calculated on the basis of net liabilities, with an estimate of reclamation costs to meet the province's reclamation standard, subtracted by the remaining value in the asset, which is a sum of: expected revenue to be earned; and expected salvage value (resale or repurposing of equipment and recycling of materials), as determined by an independent consultant.

With respect to typical development on private land, there is a compelling public interest in ensuring the landowner is protected from informational disadvantage. The AUC's Rule 007 process could require a third-party expert assessment of the reclamation cost and estimated salvage value as an additional requirement alongside the project's reclamation plan. The report should be publicly available as part of the facility application proceeding, enabling transparency for, and scrutiny by, stakeholders. This will further support the landowners' information and confidence in the veracity of the estimates.

Rationale: The stated rationale for financial security is specifically to guard against assignment of ownership of the project (including assets and liabilities) at the end of the project life to a judgment proof (typically, insolvent) entity, as has been observed with the oil and gas industry. Unlike for oil and gas, landowners have the authority and agency to require the security to guard against this risk from renewable energy development, because they can deny a lease for development on their land. Moreover, reclamation costs should be manageable within project financials. A cashflow analysis for a hypothetical \$500 million wind project found an internal rate of return of 8% with a reclamation cost assumption of 2% of capital and a conservatively assumed zero salvage value.⁴

However, where that dynamic is not in place (such as where the government represents the landowner and therefore has to institute a reclamation security requirement, as with Crown land), the reclamation security required should be tailored to address the purported rationale, which means ensuring sufficient equity is held with the project itself to ensure reclamation. If there is more equity in the project than the estimated cost of reclamation, no security is necessary.

Moreover, information disclosure, transparency, and opportunity for scrutiny, through Rule 007 disclosure, will facilitate informed choices by landowners and greater understanding for stakeholders such as municipalities.

1.6 When in the project lifespan should the security be required?

Answer: The landowner should determine when security should be required, not mandated by government.

Solution: In rare instances where there is a compelling reason for government mandates for reclamation security (e.g., development on Crown land, where the government represents the landowner), the security should be required when there are net liabilities in the project (i.e., when estimated reclamation costs exceed the expected revenue remaining to be earned by plus the expected salvage value of the project).

Rationale: See response to question 1.5, above.

⁴ Thomas Holloway, "Towards a Consensus Alberta Wind Power Cash Flow Model." <https://medium.com/@Zerodown0/towards-a-consensus-alberta-wind-power-cash-flow-model-c19ef9a9097f>

1.7 Should the security be independently reviewed and updated during the life of a project to ensure it is adequate, and if so, how often should that be done?

Answer: The landowner should determine whether and when security should be independently reviewed, how security is demonstrated, and how security is structured.

Rationale: See response to question 1.5 above.

1.8 How should the power plant owner demonstrate security is in place?

Answer: The landowner should determine whether and when security should be independently reviewed, how security is demonstrated, and how security is structured.

Rationale: See response to question 1.5 above.

1.9 How should the security be structured to address the risk of bankruptcy or default by the power plant owner?

Answer: The landowner should determine whether and when security should be independently reviewed, how security is demonstrated, and how security is structured.

Rationale: See response to question 1.5 above.

1.10 Who should hold and have oversight of the reclamation security program and the disbursement of funds in the event of a default (e.g., Alberta government, municipality, landowner, AUC, other)?

Answer: The landowner should determine who should have and hold oversight of the reclamation security and disbursement of funds.

Rationale: See response to question 1.5 above. In addition, landowners may find opportunity to generate value from the security where, for instance, they choose to pursue repowering with the same or a new developer at the end of project life. This should be for the landowner to decide and benefit from the security posted.

1.11 Are there Alberta reclamation security programs in place for other sectors that could be adopted for power plants?

Answer: Reclamation requirements in Alberta have been developed for specific industries based on industry-specific requirements and risks. A direct comparison with other reclamation frameworks within the province is not helpful. To ensure that Alberta remains competitive with other renewable energy markets, it is critical that Alberta's reclamation requirements not place unnecessary burdens on development and instead tailor the requirements to the specifics of the renewable energy sector itself.

Frequent comparisons made to the oil and gas sector in public commentary on this topic are inappropriate because the legal framework for oil and gas development and the relationship between subsurface rights holders and landowners is wholly distinguishable from those for renewable energy development.

Solution: Learn from the failures of reclamation obligations in the oil and gas sector by avoiding government-mandated reclamation security regimes and, instead, strengthen the capacity that landowners already have to require reclamation security through their complete authority over renewable energy development on their land.

Rationale: There is a clear market failure around optimal land use decisions and a need to protect landowner interests with respect to oil and gas development, but these same particulars that compel regulation in the public interest are absent for renewable energy:

- The surface landowner has no veto over surface access for submineral rights holders. In other words, in the absence of a public regulatory solution, there would be insufficient protection of landowner rights, with no opportunity for landowners to require reclamation security. This is *not* the case for renewable energy development, where landowners have an absolute veto over development.
- In the context of oil and gas with surface access rights under Alberta law, regulatory requirements protect the landowner's free enjoyment of their land by preventing the subsurface rights holder from excessive burden and harm to the landowner. However, in the context of renewable energy with an absolute landowner veto, regulatory requirements interfere with the landowner's free enjoyment of their land and their discretion to put their land to the highest value use, including their discretion to weigh priorities around conditions on development, such as reclamation security, versus other priorities, like lease payments.
- There is no renewable energy proponent asking for surface access rights for renewable energy development, so there is no justification for the government to draw an analogy with oil and gas development. We absolutely recommend against providing surface access rights for renewable energy development, as the oil and gas experience has demonstrated that this leads to negative landowner consequences, has a deleterious effect on local social licence, and results in negative outcomes with respect to municipal tax payments or reclamation.
- Once oil and gas operations are at end-of-life, the resource is exhausted, leaving no remaining value in the asset. For wind and solar, at end-of-life, the project can be repowered for valuable electricity production, with only greater certainty in the resource, as the operations of the initial project have proven the resource.

Not only is there no compelling public interest in government-mandated reclamation security for renewable energy like there is for oil and gas, but there is every reason to believe that a hands-off approach that leaves reclamation security to landowner discretion

and control, allowing for local and context-specific outcomes and ensuring that the landowner is prioritized, will prove more successful.

1.12 Are there other jurisdictions that have reclamation security in place for power plants that should be considered in Alberta?

Answer: It is premature in the policy development lifecycle to select a single jurisdiction's approach to reclamation security for power plants.

Solution: Alberta government reclamation policy experts should undertake a comprehensive jurisdictional analysis in collaboration with stakeholders to identify workable policy options that are applicable to and appropriate for Alberta. Starting with the jurisdictional research in the AUC's expert reports, summarized in Appendix A to this submission, a collaborative engagement outside of the overly formal and adversarial AUC process would better enable policy selection and design that creates win-win outcomes appropriate to Alberta's unique setting.

Rationale: The jurisdictional scans of the AUC expert reports have helped to list approaches to reclamation security, which BRC-Canada has summarized in Appendix A. Through this work, we can conclude:

- The reports have identified no example of a jurisdiction in Canada where reclamation security is required for projects on private land.
- Jurisdictions in the United States and abroad vary widely in their requirements for reclamation security. Examples where reclamation security is required for projects on private land tend:
 - to be found in jurisdictions with different land constraints from Alberta (e.g., much higher population densities, such as Connecticut and New York); and
 - to include considerable flexibilities that centre the landowners' preferences in the design of the security requirements.

However, the AUC Inquiry process has not enabled a real-time back-and-forth sharing of perspectives that is common in well-designed collaborative engagements that could support identification of win-win policy outcomes appropriate for Alberta.

[2] Development on Agricultural and Environmental Lands

Recommendations:

- Undertake comprehensive assessments to enable the province's land-use framework to function properly to balance competing land uses:
 - Undertake a comprehensive assessment of agricultural and environmental land-use displacement under the Alberta Electric System Operator (AESO) Net-Zero Pathways scenarios and compare against land use displaced by other sectors and other development pressures on agricultural land.
 - With these results, assess the viability of Alberta's various agricultural product sectors in terms of volume necessary to sustain economies of scale for these sectors, recognizing that water diverted from irrigated land can be deployed to support agriculture elsewhere.
 - Use this analysis to assess impacts to species habitat.
 - Use these analyses to inform land-use decisions within the comprehensive Alberta Land Use Framework, including cumulative impacts alongside other economic sectors, and apply this approach holistically to this and other economic sectors.
- Support the Farmers' Advocate Office in providing clear, accurate information about the impacts of different types of power plant developments (including different types of footings, foundations, pilings, pads, etc.) on agricultural productivity during power plant operations and after decommissioning.

Justification

- There is a functional marketplace guiding land use for renewable energy, and there is no market failure to impede the marketplace's function to realize an optimal use of agricultural land.
- There is no compelling reason to interfere with landowner decisions and free determination of landowners to use their land as they see fit. Landowners are in the best position to determine how to protect and sustain their agricultural operations on their land and can account for the greater opportunity cost of development on

higher-yield agricultural land through higher lease rate expectations. In this way, the quality of agricultural land is reflected in this properly functioning market.

- A third-party analysis of agricultural land pressures conducted on behalf of BRC-Canada included as Appendix B found that:
 - Total agricultural land in Alberta grew by net 38,227 hectares (0.28%) between 2019-2021.
 - Agricultural land in every economic region expanded.
 - Pipelines were the largest driver of agricultural land loss, removing 1,858 hectares of land between 2019-2021.
 - Industrial sites are the second largest driver of agricultural land loss at 1,606 hectares of agricultural land.
 - In comparison, solar and wind projects are a minor driver of agricultural land loss. In total, renewable energy projects have occupied 1,037 hectares of agricultural land.
 - Renewable energy projects primarily impacted low- to moderate-suitability agricultural land.⁵ Solar projects impacted no high-suitability agricultural land and wind projects only impacted 63 hectares. The vast majority of renewable energy projects are located on low-suitability agricultural land.
 - In contrast, the primary drivers of agricultural land loss (pipelines and industrial expansion) all primarily remove high- to moderate-suitability agricultural land, including 864.2 hectares of high-suitability land.
- As shown above, there is no market failure alleged around the market's ability to select highest-value land uses. Landowners are best placed to assess the highest-value purpose for their land, recognizing the entire constellation of factors, including:
 - the revenues from renewable energy project leases;
 - the opportunities to farm alongside the renewable energy project;

⁵ The analysis used the Land Suitability Rating System (LSRS) for spring-seeded small grains, alfalfa, brome and canola, which uses crop suitability classes 1 (highest suitability) through 7 (lowest suitability). To assign a particular parcel of land, the analysis used the "best" rating among all of the different crops (i.e., if an area was rated as class 1 for canola and class 2 for alfalfa, that area was designated as class 1). The 7 classes were then grouped into "high suitability" (classes 1 and 2), "moderate suitability: (class 3), and low suitability (classes 4-7).

- the future market for agricultural products and how to weigh the risks of those market prices against the certainty of land lease payments from renewable energy projects;
- the effort and labour involved in agricultural production;
- the diversification of revenues to mitigate risks of relying on any one sector; and
- many other complex and context-specific factors that centralized command-and-control government regulation is ill-suited to identify, assess, and balance.
- Many landowners with renewable energy projects have credited these lease payments as a stable revenue source for their family farm.
 - To different degrees, renewable energy development is compatible with agricultural activities on the same piece of land.
 - Renewable energy leases provide stable revenues for landowners, often at much higher rates than other industrial development like oil and gas operations.
 - Landowners are best-placed to assess and balance these trade-offs on their own, unique piece of land and given their particular financial circumstances.
 - Centralized command-and-control decision-making in this regard can only restrict landowners' discretion, undermining landowners' options to generate revenue on their land, and aggravate corporate consolidation of land in Alberta.
- There is no compelling public policy rationale to replace the landowners' decisions around these complex determinations with a government decision.
- Environmental impacts like habitat loss and displacement of species suffer from the market failure of externalized costs.
 - For this reason, there is a compelling reason to continue to assess the cumulative impacts of renewable energy development, alongside other industrial and housing development, on vulnerable species, as already takes place under Environment and Protected Areas' wildlife referral process. These protections should continue and should be strengthened for other economic sectors and land use dispositions such as housing developments.
 - Restrictions on higher-yield agricultural land (which tends to have very little ecological value for native species) will force development into more marginal agricultural land that often has higher ecological value. As such,

where there is a compelling public interest in stronger land use restrictions (ecological impact), restrictions based on class of agricultural land will only exacerbate those impacts. Government interference to preserve high-yield, monoculture agricultural land would likely cause unintended consequences by adding land use pressures on more ecologically sensitive lands.

- o Applying sector-specific land use regulations outside of the province's land-use frameworks will only undermine public and industry confidence in the land-use framework.

Questions

2.1 Are there certain categories of agricultural land or environmentally sensitive lands where power plant development should not be permitted?

Answer: No, there is no broad or general category of agricultural land where power plant development should be prohibited by the provincial government; however, yes, there are environmentally sensitive lands where power plant development should not be permitted.

Solution: Environment and Protected Areas should continue to develop, refine and apply its risk ratings for wildlife impacts; and more policy development should take place, with stakeholder consultation within the Land-use Framework, to identify thresholds for cumulative impacts from *all industrial sectors* beyond which habitat for vulnerable species is at risk.

Rationale: See above. With respect to agricultural land, there is no market failure or compelling public interest to justify government intrusion with private landowners' free use of their land with respect to agricultural output. It is unclear why a government valuation of agricultural land should replace the landowners' own market-based assessment.

With respect to environmentally sensitive lands, there is a compelling public interest in protecting Alberta's ecosystem from cumulative impacts from all development pressures. However, to apply uneven restrictions between economic sectors – targeting one sector for heightened environmental scrutiny while allowing other sectors to continue to worsen the cumulative impact on ecologically-sensitive land – would unwind the 15 years of work invested in the province's Land-use Framework and overall worsen cumulative impacts on the province's ecosystems.

2.2 Are there land or soil classifications/classes where power plant development should not be permitted?

Answer: No.

Solution: Landowners should be provided with accessible, accurate information about the impacts of different developments on soil and agricultural productivity during operations and after decommissioning. This information should be developed through the Farmers' Advocate Office, with increased funding to the Office for this initiative and for the dissemination and educational programming for landowners.

Rationale: See above and answer to question 2.1. Moreover, the reclamation standard already requires that land be returned to equivalent productivity, so the long-term impacts on land use are already addressed by existing law and policy.

2.3 Should certain lands be set aside in Alberta for only agricultural uses now and in the future? If so, how should these lands be identified?

Answer: Only in specific and limited circumstances, but this should not be targeted to electricity generation development and should consider cumulative impacts on ecosystems from all development types and land use pressures.

Solution: Alberta's land-use framework should be strengthened to limit development in locations where habitat loss impacts local or regional ecosystem services (such as pollinators, water filtration, flood control, etc.) for low-impact (typically, lower-yield) agricultural production that is compatible with ecosystem services.

Rationale: See above. There is no market failure requiring the preservation of agricultural production. Moreover, other economic sectors and land use pressures have much more impact on agricultural land than renewable energy. As described above, not only is available agricultural land in the province expanding, renewable energy projects have a much smaller impact on agricultural land in Alberta than pipelines and other industrial and activities. Further, the land used for renewable energy projects is predominately low-suitability land, indicating that the market is functioning to prioritize development in areas with the least disruption to agriculture. This is contrasted with the major drivers of agricultural land loss such as pipeline and industrial development, which have displaced over 13-times as much high-suitability agricultural land as wind and solar combined.

2.4 Should there be a streamlined and/or prioritized approval process for power plant development on certain types of lands, provided there are no outstanding concerns related to reclamation security, viewscales, valued environmental features, compliance with existing rules, etc.? For example: a) Lands owned or controlled by a government or government agency (provincial or municipal). b) Land zoned by a municipality for commercial or industrial development. c) Land already disturbed or with development already in place.

Answer: In specific and limited circumstances

Solution: Land with limited ecological value (such as brownfield sites and high-intensity monoculture agriculture) could be identified as streamlined “go-zones” for power plant development that has less and less-complex environmental impacts. However, the streamlined process cannot be used as a justification for more red tape on other projects.

Rationale: Further to the above, streamlining of regulatory process and greater certainty in regulatory standards are needed, but this is not unique to certain types of lands that the government seems to prefer to develop for power plants.

2.5 What municipal planning information should the AUC review when considering a power plant development?

Answer: The AUC can review municipal plans and siting bylaws as one factor in the public interest determination, as under existing regulatory process.

Solution: Provide greater clarity on how the AUC factors municipal land use planning in its consideration of the public interest when deciding whether to approve power plant facilities applications. facilities approvals determinations around public interest.

Rationale: It is inappropriate to create a patchwork quilt of zoning bylaws across the province with respect to an industry that is necessary for a province-wide electricity system. However, compelling municipal planning rationales to restrict power plant development on certain lands can be factored into the AUC’s public interest regulatory review. Greater clarity around how the AUC incorporates these factors will enable improved project siting by developers.

2.6 For power plants that do not align with approved municipal land use plans or zoning, how should the AUC consider this within its public interest determination?

Answer: The AUC should inquire as to the public interest reasoning for the land use or zoning determination and factor that rationale into the overall public interest determination – it is not dispositive, but a relevant factor if the justification for the land

use plan or zoning is sound and compelling. Moreover, the land use plans should be long-term and stable.

Solution: Continue to factor municipal land use plans and zoning into the public interest determination, weighting it more strongly for land use plans that have been consistent over time and that have compelling and sound justifications.

Rationale: See answer to question 2.5. Land use plans or zoning bylaws that change suddenly would have a deleterious effect on investor confidence and chill new project origination. Greater weight should be given to plans or bylaws that have been predictable and stable, and less weight should be given to plans or bylaws that have been amended discriminatorily to impact projects that have already applied for approval.

2.7 The AUC requires power plant developers to provide a summary of their consultation with local jurisdictions (e.g., municipal districts, counties). Should the requirement to consult with local jurisdictions be enhanced, and if so, how?

Answer: No.

Solution: Municipal councils should utilize the existing consultation processes and municipal administration officials should keep councils fully apprised of those consultations.

Rationale: Many projects with strong municipal relationships have seen that municipalities are satisfied with existing consultation and some do not have the bandwidth to engage meaningfully in additional consultation process.

[3] Development on Provincial Crown Land

Recommendations

- There should not be an outright prohibition on power plant development on Crown land. Alberta Environment and Protected Areas should develop and implement a Crown land disposition application process for all power plant and energy storage types.
- As the representative of the landowner (the public), Alberta Environment and Protected Areas should develop policies around lease rates and reclamation security that reflect, and do not undercut, the private landowner market for renewable energy land leases.
- Alberta Environment and Protected Areas should establish no-go zones where land is reserved for other incompatible uses or for ecological preservation.
- Renewable energy developers should have the onus of negotiating and executing agreements with existing prior-in-time leaseholders, permit holders and licence holders.

Justification

- Enabling access to Crown land for power plant development would enable efficiencies and system optimizations, including:
 - accessing improved, lower-cost energy resources;
 - diversifying the location of generation, mitigating alignment in generation profile and improving availability of generation; and
 - mitigating transmission need and congestion.
- Crown land is *not* an alternative to privately held agricultural land for power plant development. Such a “trade-off” would:
 - undermine the opportunities for private landowners to generate income from renewable energy land leases, reserving that privilege to the government;
 - undermine the grid benefits that derive from flexibility and diversity in generation siting; and

- undermine the proper functioning of a free market for renewable energy land lease rates and conditions by placing too much market power in a single, state market participant, the government.

Questions

3.1 Should there be development of power plants on Crown land? Should there be limitations or special constraints on the amount or types of Crown land available for development?

Answer: Yes, there should be opportunity for the development of power plants on Crown land; this opportunity should be constrained per the wildlife review process that exists and through clear restrictions under land-use frameworks.

Solution: Develop a clear land use plan around Crown land that can be leased for power plant development, including protection for sensitive habitat and reclamation security requirements in line with those proposed in section 1, above.

Rationale: Any restrictions on Crown land for power plant development should follow the same principles and processes as for other industrial development on Crown land, which is very common in Alberta. To the extent stronger restrictions on industrial development are necessary or justified, that should be accomplished holistically, with a view to cumulative impacts across all sectors, and applied evenly across those sectors.

3.2 What considerations should factor into the Commission's public interest determination? For example, how should impacts to existing Crown leaseholders, permit holders, or license holders etc. (e.g., grazing leaseholders, timber permit holders) be considered? How should impacts to recreational users be considered?

Answer: The AUC should not need to consider the impacts to existing leaseholders, permit holders or licence holders. The AUC should consider the impacts to recreational users per the overall public interest test, as a consideration in the facility approvals process.

Solution: Renewable energy developers should have the onus of negotiating and executing agreements with existing prior-in-time leaseholders, permit holders and licence holders.

Rationale: Renewable energy developers are able to negotiate privately with existing Crown land leaseholders, permit holders or licence holders, to set compensation rates for the displacement of their prior-in-time interests in the land. As with private land lease agreements, the AUC should not have to determine the sufficiency of those agreements with a command-and-control approach.

[4] Pristine Viewscapes

Recommendations

- The regulator should not include “viewscapes” as a consideration in the project review.
- Continue to allow interveners to raise visual impacts in the facility application process and to include this as one consideration within the AUC’s public interest review, without diluting other elements of public interest or allowing this consideration to serve as an impediment to market competition.

Justification

- Viewscope impacts are unable to be accurately quantified and applied as a project criterion. As noted in the Nichols Applied Management report on the Impact of Power Plant Development on Viewscapes prepared for the AUC inquiry, there is not a defined method of assessing viewscope impacts in isolation. The most common research method, impact on property values, will “also include other real and perceived impacts.”⁶
- The literature review conducted by Nichols found a limited body of evidence supporting viewscope impacts. Of the studies reviewed, 13 out of 20 on wind generation sites found little to no evidence of viewscope impacts. Of the nine studies conducted in the North American context, all nine studies found little to no impact⁷.
- There is no evidence of viewscope impacts within the Alberta context and a lack of data to conduct such an analysis. As the Nichols report notes, the province should conduct “primary analysis to better understand the preferences and values of Albertans.”⁸ Further, the ability to conduct such an analysis may not be feasible given methodological and data limitations. Enabling a regulatory standard without sufficient evidence or analysis could lead to significant unintended consequences.
- Creating regulatory impediments to new generation supply on the basis of a subjective and nebulous concept of “pristine viewscapes” would be susceptible to

⁶ Nichols Applied Management Inc. (2023) “Impact of Power Plant Development on Viewscapes – A Literature Review” <https://www.auc.ab.ca/featured/auc-inquiry-into-the-ongoing-economic-orderly-and-efficient-development-of-electricity-generation-in-alberta/>

⁷ Ibid

⁸ Ibid

nefarious opposition by competitors, seeking to limit their competition and to increase their revenues.

Questions

4.1 How should “pristine viewscape” be defined?

Answer: Pristine viewsapes can only be defined as those landscapes that are in their “original condition,” which is effectively limited to only a small set of protected landscapes that have never been impacted by agriculture, forestry, industry, tourist activity, wildfire suppression or other anthropogenic activities. Given the extreme limitations of this definition on all forms of development, pristine viewsapes should not be defined or included in a regulatory approach.

Rationale: The plain meaning and dictionary definition of “pristine” is: “in its original condition; unspoiled.”

4.2 What criteria, if any, should be used to assess the impact of a power plant development on a “pristine viewscape”?

Answer: No criteria should be defined to assess the impact on a vague, subjective term like “pristine viewscape.”

Solution: If there are locations that should not be developed because of sensitive or vulnerable ecosystems, wildlife, or historical, cultural and heritage sites, those should be listed, defined and prohibited for any industrial, agricultural, or building development (e.g., coal mines, natural gas extraction, housing developments).

Rationale: The aesthetic impact of any industrial development is entirely subjective, beyond the scope of assessment for an objective determination.

4.3 How should the impact on viewsapes be balanced against other impacts (positive and negative) when assessing the public interest of a power plant? Does the response differ depending on the type or characteristics of the viewscape?

Answer: The impact on viewsapes, which is a vague and subjective term that defies common definition, should have no weighting in these determinations.

Solution: Continue to regulate in the public interest, balancing clear, objective public interest factors, which warrant greater weighting and should not be diluted in favour of a nebulous subjective determination.

Rationale: There are far more relevant and important public interest considerations, which would be diluted by a focus on a subjective and unclear determination like “viewsapes.”

Restrictions based on a vague determination such as this will increase consumer electricity costs and undermine other public interest factors that are sensitive to siting, such as ecosystem impacts and mitigation of transmission need. Moreover, according to many subjective considerations, energy infrastructure, including wind and solar, can enhance viewscales, as demonstrated by the large number of photographs taken with strong foreground visual elements, like solar panels and wind turbines, which are striking visual features and represent progress and environmental action. Privileging any one subjective preference around aesthetics opens the door to ideological discrimination against particular industries or, worse, using the nebulous concept of “pristine viewscales” to limit competition and increase profits for competitors.

4.4 Do wind and solar power plants have the same impact on viewscales? How do they compare to the impact on viewscales from non-renewable power plants?

Answer: This is impossible to answer because of the uncertain and subjective concept of “viewscales.”

Solution: Do not regulate based on a subjective and nebulous concept.

Rationale: Many people find that wind and solar power can enhance viewscales. Moreover, all industrial activity and housing development can have an impact on unique mountain viewscales, such as coal mines, the Milner power plant, and the Waterton gas plant. Regulating on this basis would destroy investor certainty and regulatory clarity across all industries.

Appendix A

Reclamation Security Requirement Jurisdiction Comparison

Country	State/Province	Applies to	Financial Security Required	Acceptable forms of security	Amount of Security required	Gradual/Upfront	Notes
Canada	British Columbia	Public and Crown Land	Yes	<ul style="list-style-type: none"> • Irrevocable letter of credit • Cash • Surety bonds 	Depending on the risk level, security amounts range from minimum to 60-100% of the estimated decommissioning costs	Gradual or phased in financial assurance can be used for large projects	Reclamation plan is made five years prior to the decommissioning
Canada	Sask.		No				No specific guidelines for the decommissioning and reclamation processes of renewable energy

Canada	Municipality of the County of Colchester, Nova Scotia, Canada	Municipal Jurisdiction (Onshore wind)	Applied to select projects	<ul style="list-style-type: none"> • A bond • Comparable other form of surety acceptable to the Municipality in its sole discretion. 	The Bond is in the amount of not less than 125% of the estimated present-day cost to decommission the Wind Power Project, less the estimated present-day scrap value of the Wind Power Project.	<ul style="list-style-type: none"> - The bond does not take into consideration any increase in decommissioning costs or any decrease in the value of the infrastructure. - The estimated values are provided by a licensed engineer licensed to practice in Nova Scotia and/or by another individual deemed appropriate by the regulator
--------	---	---------------------------------------	----------------------------	--	---	--

Canada	Ontario	Crown land (Renewable Energy)	Applied to select projects	<ul style="list-style-type: none"> • cash • a letter of credit from a bank • negotiable securities issued or guaranteed by the Government of Ontario or the Government of Canada • a personal bond accompanied by collateral security • the bond of an insurer • a bond of a guarantor, (other than an insurer) • an alternative agreement 	Calculated on a project-by-project basis	<p>Should be obtained in satisfactory form before a facility begins operation or as otherwise directed by the Program Director.</p> <p>Projects that have longer planning periods can provide an initial financial assurance and then gradual payments till the final required amount is reached.</p>	<p>- A Decommissioning Plan Report is required as part of the application. For approved projects, the applicant will be required to submit an updated and comprehensive decommissioning plan within six months of commencing decommissioning activities.</p> <p>- No mandatory requirement for security; currently discretionary. Financial security is required for “most” renewable energy projects and is calculated on a project-by-project basis</p>
--------	---------	-------------------------------	----------------------------	---	--	---	---

United States	Federal	Federal Land (Wind and Solar)	Yes	<ul style="list-style-type: none"> • bond, or - cash, - cashier's or certified check, - certificate or book entry deposits, - negotiable U.S. Treasury securities, - surety bonds from the approved list of sureties payable to the Bureau of Land Management (BLM) - irrevocable letters of credit payable to the BLM - an insurance policy can also qualify, provided that the BLM is a named beneficiary of 	<p>Within Designated Leasing Area: Solar: a bond in the amount of \$10,000 per acre prior to written approval to proceed with ground disturbing activities. Wind: a bond in the amount of \$10,000 per authorized turbine less than 1 MW in nameplate capacity or \$20,000 per authorized turbine equal or greater than 1 MW in nameplate capacity prior to written approval to proceed with ground disturbing activities.</p>	Bonds to be provided before construction begins.	<p>Outside Designated Leasing Areas: bond amount determined based on a Reclamation cost estimate required to be prepared and submitted by the regulatee to prepare and submit. when determining the bond amount, BLM may also consider factors such as salvage value.</p> <p>For leases in 'designated leasing areas', the bonds are standardized and not directly related to the costs of reclamation. This can result in cases of insufficient funds, therefore increasing</p>
---------------	---------	-------------------------------	-----	--	--	--	--

				the policy • other security, satisfactory to the Secretary	Bond values are adjusted, albeit only every 10 years.		the risk of abandonment.
--	--	--	--	---	---	--	--------------------------

United States	Outer Continental Shelf	(Renewable energy projects)		<ul style="list-style-type: none"> • Surety bond issued by an approved surety • Certificates of deposit or savings accounts • Negotiable U.S. Government, State, and municipal securities or bonds having a market value of not less than the required dollar amount • Financial strength and reliability to meet financial assurance requirements. 	<ul style="list-style-type: none"> - Three levels of security provision catered for: (i) an industry-wide minimum-security requirement of \$100,000 minimum; (ii) one relating to the SAP; and (iii) one related to the COP - These amounts are determined by the Bureau of Ocean Energy Management (BOEM) based on anticipated decommissioning costs which is done on a case-by-case basis. The amount of the financial assurance must be no less than the amount required to meet 	Security is required before installation of facilities.	<ul style="list-style-type: none"> - The regulator is the Bureau of Ocean Energy Management (BOEM) - Little to no detail provided on how reclamation is to be costed; this is left to the discretion of the regulator.
---------------	-------------------------	-----------------------------	--	---	---	---	--

					all lease obligations, including the estimated cost of facility decommissioning		
--	--	--	--	--	---	--	--

United States	Connecticut	Public and Private land (Only Onshore Wind)	Yes	<ul style="list-style-type: none"> • a performance bond, • surety bond, • letter of credit, • corporate guarantee, • escrow, • deposit, • insurance, • certificate of deposit, • domestic security, • trust, • any combination of such financial devices, • any other form of financial device that is acceptable to the Council to ensure sufficient funds are available 	<p>The amount of security is not detailed. However, the total cost of implementing the decommissioning plan is calculated by a certified professional engineer based on the projected useful life and the projected salvage value of the facility</p>		<ul style="list-style-type: none"> - Only Onshore Wind, Connecticut does not have similar regulations for solar. - any application for a certificate for a wind turbine facility or petition for a declaratory ruling for a wind turbine facility shall contain a decommissioning plan - No specification on the certified engineer (if they need to be independent or could be with the regulatee). This can create issues in finding the accurate decommissioning costs
---------------	-------------	---	-----	---	---	--	--

				for decommissioning the facility.			
United States	West Virginia	Public and private land (Onshore wind and solar projects)	Yes	<ul style="list-style-type: none"> • a surety bond • letters of credit • escrow accounts • any other arrangement 	The bond value will be based upon the total disturbed acreage of land upon which the wind generation or solar generation facility is operated, less salvage value: Provided, That the amount of the bond required	Upfront (have time till after 12 months after the facility has commenced operations)	- The information on security or bond requirements needs to be provided within 12 months of a wind generation facility or solar generation facility commencing commercial operation to the Department of Environmental Protection (DEP)

					shall not exceed the total projected future cost of decommissioning, less salvage value		with any other necessary information. - Security requirements has to be reassessed at 5 yearly intervals, meaning that security requirements could be increased if required.
--	--	--	--	--	---	--	---

United States	Tennessee	Private land (Solar Projects)	Yes	<ul style="list-style-type: none"> • surety bond • collateral bond • irrevocable letter of credit • parent guaranty • cash • cashier's check • certificate of deposit • bank joint custody receipt • a combination of the above. • approved negotiated instrument 	<p>It is a legislatively mandated requirement that reclamation security must be provided to the landowner in the following amounts:</p> <ul style="list-style-type: none"> - No less than 5% of the decommissioning cost on the date the solar power facility commences commercial operation. - No less than 50% of the decommissioning cost on 10th anniversary of the date the solar power facility commences commercial operation. - No less than the 	Gradual	<ul style="list-style-type: none"> - As the security is provided to the landowner, the regulator may not have access to it, so there is a risk of abandonment in case the landowner may not be in a position to perform decommissioning.
---------------	-----------	-------------------------------	-----	---	---	---------	---

					decommissioning cost (i.e., 100%) on the 15th anniversary of the date the solar power facility commences commercial operation.		
United States	California	Private and public land (Solar)	Yes	<ul style="list-style-type: none"> • Performance bonds; • Surety bonds; • Irrevocable letters of credit; • Trust funds; 		Upfront	Financial security must be paid prior to construction

				<ul style="list-style-type: none"> • Corporate guarantee; or • Any other form approved by local jurisdiction. 			
United States	Texas	Private land (Solar and wind)	Yes	<ul style="list-style-type: none"> • Parent company guarantee • Letter of credit • Bond • Another form of financial assurance reasonably acceptable to the landowner 	<p>Solar: Must equal at least the cost of decommissioning and reclamation that exceeds the salvage value and less any portion of the value pledged to secure outstanding debt.</p> <p>Wind: Must equal at least the cost of decommissioning and reclamation that exceeds the salvage value and less any portion of the value pledged to secure outstanding debt.</p>	Gradual	<ul style="list-style-type: none"> - Decommissioning plans must be included in an agreement with landowners - For solar, the agreement must indicate that financial assurance will be delivered no later than the date the agreement is terminated, or the 20th anniversary of operations (whichever is earlier) and for wind, it should be delivered no later than the date the agreement is terminated, or the 10th anniversary

							<p>of operations (whichever is earlier).</p> <ul style="list-style-type: none"> - The financial assurance would change based on updated costs after the periodic re-evaluation of the facility throughout its operational lifespan.
United States	Hawaii	Private land (Solar)	Applied to select projects				<p>Decommissioning requirements in Hawaii for solar facilities on agricultural land are dependent on land classification, specifically on soil productivity. In some cases, there are no decommissioning requirements and in others, the requirements are strict and need to</p>

							occur within 12 months of facility's end of life, and operator is responsible.
United States	New York	Private and public land (solar)	Applied to select projects	<ul style="list-style-type: none"> • Guarantee • Security agreement 			
United States	North Dakota	Private and public land (Solar and wind)	Yes	<ul style="list-style-type: none"> • performance bond • cash escrow • surety bond • guarantee 	Must equate to 5% of the estimated decommissioning cost		Decommissioning must be completed within 12 months of abandonment or within 24 months of the end of facility's useful life
United States	Illinois	Private land (solar)	Yes		Financial Assurance should cover; - 10% of estimated costs on or before the 1st year of operations - 50% of the estimated costs on or before the	Gradual	Decommissioning must occur within 12 months of end of operational life

					6th year of operations - 100% of the costs on or before the 11th year of operations		
United States	Washington	Private land (solar)	Applied to select projects				At least 90 days prior to the start of site activities, an initial site restoration and decommissioning plan must be provided that details the plan at the facility's end of life and includes the proof of financial assurance. Again, following end of life, a detailed site restoration plan must be submitted within 90 days.

United States	Virginia	Private land (solar)	Applied to select projects	<ul style="list-style-type: none"> • Trust funds. • Cash escrow. • Letter of credit. • Surety bond. • Insurance. • Guarantee by an investment-grade entity. • Parent guarantee. • Promissory note. 		Gradual	The State of Virginia requires licensees to enter into a decommissioning agreement with the local jurisdiction, however, it is up to each jurisdiction to codify specific decommissioning standards.
United States	Maine	Solar Projects	Yes	<ul style="list-style-type: none"> • performance bond, • surety bond, • irrevocable letter of credit or • 'other form of financial assurance' acceptable to the environmental permitting entity. 			Security requirements to be reassessed at year 15 and then at 5 yearly intervals, meaning that security requirements could be increased if required.
United States	New Jersey		No				Has state policies and requires

							decommissioning plans but does not require financial assurance
United States	Wyoming		No				Has state policies and requires decommissioning plans but does not require financial assurance
Australia	New South Wales	Onshore Wind	Applied to select projects	<ul style="list-style-type: none"> • A bank guarantee • A bond (e.g., surety bond) • Another form of security that the appropriate regulatory authority 'considers appropriate' and specifies in the condition. 	The licensee will have to conduct an independent assessment which will be used by the EPA to determine an appropriate amount	Gradual payments are accepted if the regulatee can demonstrate 'financial hardship' in meeting their financial assurance requirements	<ul style="list-style-type: none"> - Financial assurance is not mandatory, but the EPA can take a risk-based approach to decide if it is needed. Risk-based licensing - It is not applicable to solar facilities

Australia	Queensland		Applied to select projects	<ul style="list-style-type: none"> • bond, • deposit of an amount as security, • guarantee, • indemnity or other surety, • insurance, • mortgage and • undertaking 	<p>- The costs are assessed using an independent assessment.</p> <p>- Project management costs must be included in the total reclamation liability, with 10% recommended</p> <p>- If applicable, a discount can be applied (max 30%) in case of lower risk of environmental harm or good environmental performance and any other listed criteria.</p> <p>-Another 10% discount is applicable under the financial category, for example if the regulatee</p>	Immediately payable on demand	<p>- Security is not mandatory for every regulatee. The regulator retains discretion to exercise its legal powers to require security. The regulator takes a risk-based approach to deciding whether security is likely to be required</p> <p>- Value inherent in the infrastructure (e.g., salvage/resale) cannot be used to reduce the level of security to be provided.</p>
-----------	------------	--	----------------------------	---	---	-------------------------------	--

					demonstrates good financial health		
Australia	Victoria	Marine and Coastal Crown land	Applied to select projects	<p>Has to be a bond:</p> <ul style="list-style-type: none"> • to deposit with the Secretary a sum of money fixed by the Minister within a specified period of time and, • to 'give an undertaking' to pay that sum with security 'in a form determined by or in accordance with the consent'. 	Fixed by the minister		

New Zealand			Applied to select projects	The regulator retains discretion to determine the instruments to be used.	Value of the bond is based on the estimated cost of the works subject to the bond. The regulator retains discretion to calculate the amount of security to be provided, therefore the security is decided on a case-by-case basis.	The regulator maintains absolute discretion in relation to how the value of the bond is to be calculated, raising issues of transparency for stakeholders and certainty for regulatees.
England		Private and public (solar and wind)	Applied to select projects	There is no central government guidance on acceptable forms of security, nor do the local authorities publish their own guidance but the most commonly accepted		<ul style="list-style-type: none"> - There is no central government guidance on need for reclamation security for onshore wind and solar projects in England. - But local planning authority (LPA) gives permission and requires security from regulatees as they see fit

				<p>security instruments are:</p> <ul style="list-style-type: none">• Cash deposit• Letter of credit• Bank guarantee/bond• Surety bond• 'Other financial arrangement' (sometimes this catch-all category included parent company guarantees).			
--	--	--	--	--	--	--	--

France		Private and public (Wind)	Applied to select projects	<p>One of the following guarantees:</p> <ul style="list-style-type: none"> • a written undertaking by a credit institution, a finance company, an insurance undertaking or a mutual guarantee company; • a deposit in the hands of the Caisse des dépôts et consignations; • a private guarantee fund, • the written commitment, providing an independent guarantee, of the legal person which 	<p>Formula for calculating the initial amount: The initial amount (M) will correspond to the sum of the flat-rate unit cost (Cu) of each wind turbine component of that installation; $M = \sum (Cu)$. The flat-rate unit cost of the turbine (Cu) will be 50,000, if the unit capacity of the turbine is less than or equal to 2MW; if it is greater, then $Cu = 50,000 + 10,000 * (P-2)$, where P is the installed unit capacity of the wind turbine.</p>	Gradual	<p>-Financial guarantees take into account inflation</p> <ul style="list-style-type: none"> - The use of a formula eliminates the scope for regulatees to underestimate their reclamation costs and overstate the salvage/resale value in the infrastructure is eliminated. - Where the regulatee default on their obligations, the liability of the parent company may be sought - The amount of security is a 'one size' fits all approach to setting the level of the guarantee, which ensures an industry minimum level of security to be provided by
--------	--	---------------------------	----------------------------	--	---	---------	--

				owns more than half of the capital of the operator or which controls the operator (e.g., the regulatee's parent company).			regulatees. - Guarantee is only needed from the start of production, therefore, there is a risk of abandonment if the regulatee were to enter bankruptcy after erecting the turbines.
Sweden		Private and public (solar and wind)	Applied to select projects	<ul style="list-style-type: none"> • A pledge • Guarantee 	The regulator retains a high level of discretion to determine the requisite amount of security.		<ul style="list-style-type: none"> - Additional security can be required if the existing level is not sufficient. - No real detail on how the security is calculated; the regulator retains a high level of discretion to determine this. <p>Although discretion</p>

							can attract investors by setting low (or no) requirements for security, it is not always helpful to reduce abandonment risk.
--	--	--	--	--	--	--	--

Appendix B

Renewable Energy and Agricultural Land Use In Alberta 2019-2021



RENEWABLE ENERGY AND AGRICULTURAL LAND USE IN ALBERTA 2019-2021

ANALYSIS OF FOOTPRINT AREA



REPORT PREPARED BY DR OSCAR VENTER
PROFESSOR AND FRBC WEST FRASER RESEARCH CHAIR
DEPARTMENT OF ECOSYSTEM SCIENCE AND MANAGEMENT
UNIVERSITY OF NORTHERN BRITISH COLUMBIA
DECEMBER 1, 2023
REPORT COMMISSIONED BY BRC-CANADA

Report Objective

The primary objective of this report is to provide an assessment of the direct footprint area occupied by wind and solar energy developments within agricultural land in Alberta over the 2019-2021 period. Additionally, an assessment is made of all other forms of human footprint (e.g., industrial and urban land uses) within agricultural land, as well as the agricultural capability of farmlands which have been utilized for the development of renewable energy and other land uses.

Data inputs

For this assessment, the primary source of data to map the extent of agricultural land occupied by wind turbines was the Alberta Biodiversity Monitoring Institute's (ABMI) Human Footprint Inventory for 2021¹. Data regarding the agricultural lands occupied by solar arrays was obtained from the Alberta Utilities Commission (AUC) website². Additional data on the dates of wind and solar developments were derived from the Business Renewables Centre Canada (BRC-Canada) from data from the Alberta Electrical System Operator (AESO) and the AUC³. We accessed data on crop suitability through the Agricultural Regions of Alberta Soil Inventory Database (AGRASID)⁴ and the Land Suitability Rating Systems (LSRS)⁵.

Analyses

To establish a date of development for each mapped wind turbine in the ABMI Human Footprint Inventory, we overlaid the turbine polygons with AUC data on wind energy projects to establish a project name, which was then used to extract a date of turbine development from BRC-Canada data on tracked renewable energy projects. For wind turbines that did not overlay with the AUC data, we extracted the year it was first observed in SPOT imagery in the ABMI Human Footprint Inventory. For solar projects, we extracted only 'in service' projects from the AUC dataset, and then used the project name to extract an establishment year the BRC-Canada dataset. To ensure that the AUC polygons for solar arrays did not have high commission errors, we uploaded the solar polygons into Google Earth Engine and overlaid them with the latest Sentinel-2 satellite imagery. We visually validated every mapped solar project against the sentinel imagery and found that 23 out of the 25 projects had a tight agreement between the AUC polygon and the actual array observed in the imagery, while two solar array projects' footprints were overestimated by about 15%.

Agricultural lands were mapped using the Human Footprint Inventory employing a definition of agriculture as all areas of annual or perennial cultivation, including crops, tame pasture, confined feeding operations, and other high-density livestock areas and mines, which are areas of surface disturbance mined for peat which is used in gardening. This definition is adopted to align with ABMI reports⁶. To assess the agricultural suitability of land occupied by renewable energy projects and other forms of human footprint, we used the Land Suitability Rating Systems (LSRS) for spring-seeded small grains, alfalfa, brome, and canola⁵. Crop suitability classes range from 1 to 7 for each crop, with higher values indicating lower suitability. When evaluating a particular parcel of land, we assigned the lowest soil class rating (most agriculturally suitable) across all evaluated crops. For instance, if an area was rated as class 1 for canola and class 2 for

alfalfa, we designated it as class 1. We amalgamated the seven classes into three suitability groups: high suitability (class 1 and 2), moderate suitability (class 3), and for low suitability (classes 4-7).

We note that our analyses are limited to measuring only the direct footprint of wind turbines and solar arrays. This direct footprint does not include related infrastructure, most notably access roads and overhead connecting powerlines, or the other effects such as those on viewsapes and direct turbine mortality on birds and bats. For wind turbines, the direct footprint area is measured by ABMI using visual interpretation of high-resolution imagery in the year the turbine is constructed. This can result in an over-estimate of the direct footprint, as the area disturbed below the turbine during construction can often recover and return to agricultural use after construction is complete. All GIS analyses were performed in ArcPRO using the projection NAD 1983 10TM AEP Forest.

Results

1) Extent of agricultural land in Alberta 2019 – 2021

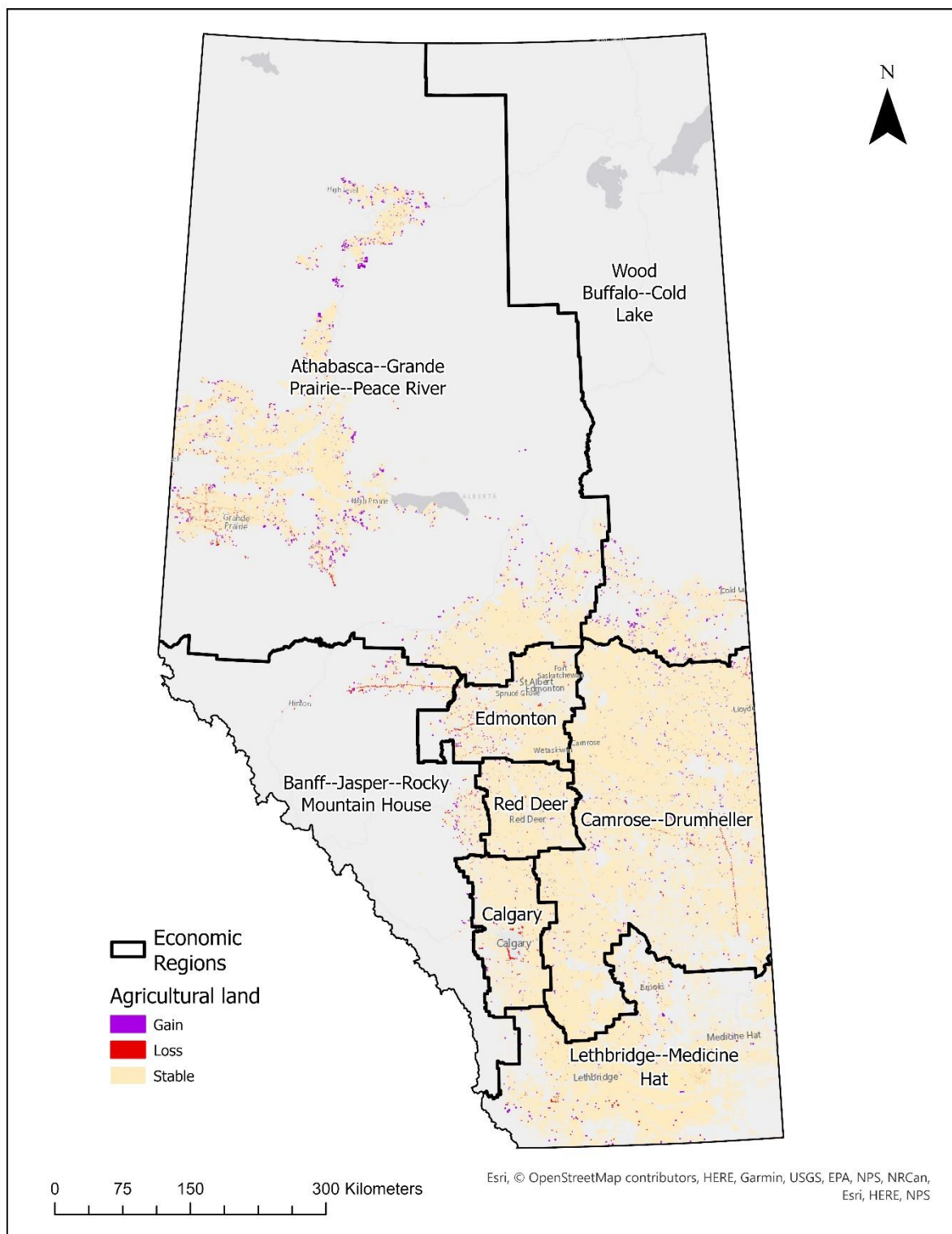


Figure 1. Agricultural land 2019 – 2021 across economic regions of Alberta, mapped using Alberta Biodiversity Monitoring Institute’s Human Footprint Inventory¹.

In 2021, Alberta had 13,664,828ha of active agricultural land, which represents a net increase of 0.28% from the 13,626,000ha of agricultural land in 2019 (Table 1). All economic regions of Alberta saw a net increase in agricultural lands over the study period except Calgary, which saw a small net decrease in agricultural land of 607 ha or 0.09% of its 2019 agricultural extent. The largest net increases in agricultural land occurred in the Athabasca-Grande Prairie-Peace River region (25,617ha) and Camrose-Drumheller region (6,094ha). Even though almost all regions saw net increases over the study period, there were still areas of farmland loss, with the largest gross losses experienced in the Camrose-Drumheller region (1,611 ha) and Lethbridge-Medicine Hat region (1,492 ha). Note that the areas summarized by economic region presented in Table 1 differ slightly (approximately 0.035% disagreement) from areas presented in the total of the province for 2021 because of slight misalignment in the spatial data representing economic regions.

Table 1. Extent of agricultural land in Alberta 2019 and 2021 by Economic Regions. Mapped by ABMI Human Footprint inventory. Percentages pertain to agricultural land 2019.									
	Economic Regions								*Total province
	Athabasca Grande Prairie Peace River	Banff Jasper Rocky Mountain	Calgary	Camrose Drumheller	Edmonton	Lethbridge Medicine Hat	Red Deer	Wood Buffalo Cold Lake	
2019 Agricultural land (ha)	3,097,497	281,894	701,758	5,044,494	824,323	2,384,565	699,946	591,523	13,626,000
2021 Agr. land (ha)	3,123,113	283,404	701,150	5,050,589	824,659	2,385,820	700,651	594,840	13,664,828
Gross loss of agr. land 2019-2021	-1,624	-316	-1,267	-1,611	-863	-1,492	-224	-95	-7,492
(ha and %)	-0.05%	-0.11%	-0.18%	-0.03%	-0.10%	-0.06%	-0.03%	-0.02%	-0.05%
Gross gain of agr. land 2019-2021	27,241	1,825	660	7,705	1,199	2,747	929	3,413	45,719

(ha and %)	0.88%	0.65%	0.09%	0.15%	0.15%	0.12%	0.13%	0.58%	0.34%
Net Change in Agr. land 2019-2021	25,617	1,509	-607	6,094	336	1,255	705	3,318	38,227
(ha and %)	0.83%	0.54%	-0.09%	0.12%	0.04%	0.05%	0.10%	0.56%	0.28%

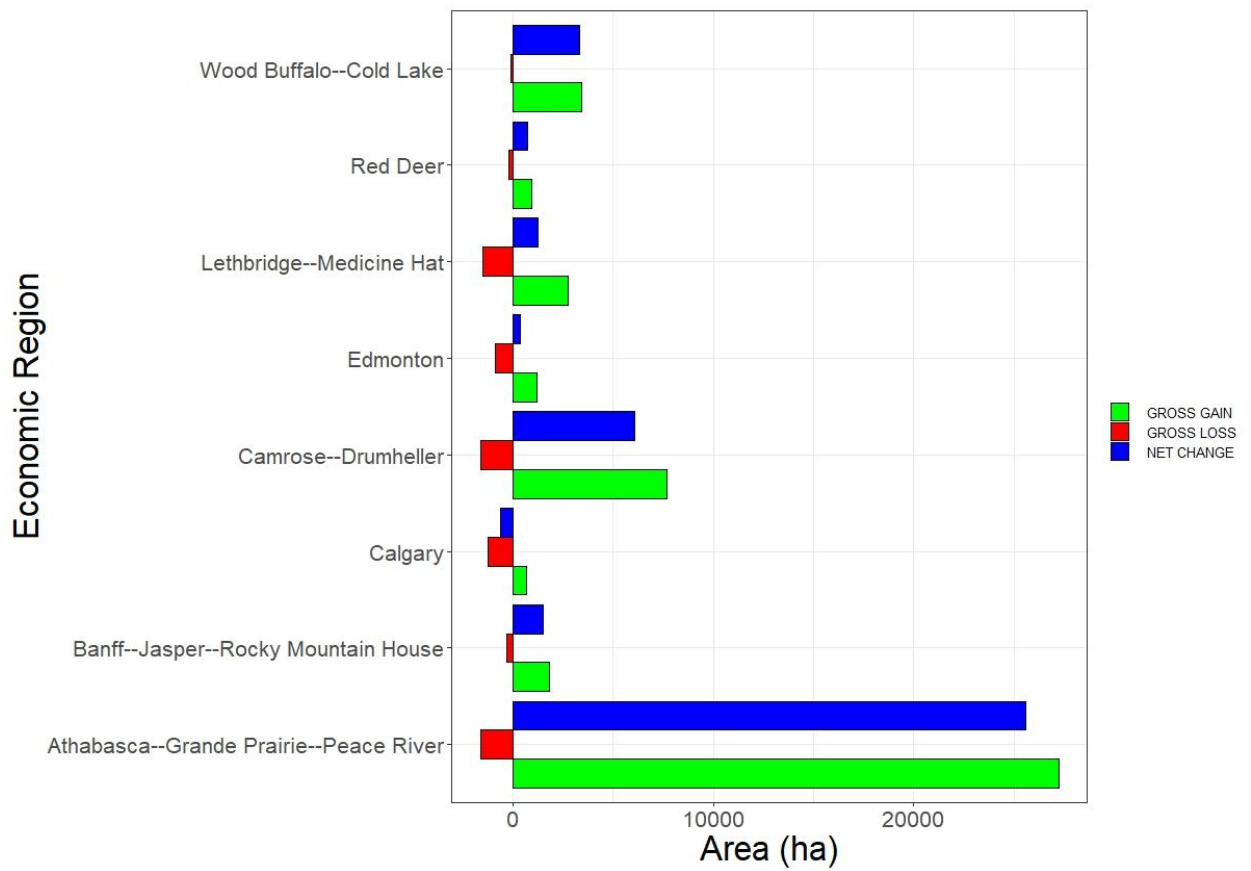


Figure 2. Gross gain, gross loss and net change of agricultural land in Alberta 2019-2021. Mapped by Alberta Biodiversity Monitoring Institute's Human Footprint Inventory.

2) Human Footprint drivers of agricultural loss

Over the 2019-2021 period, the largest driver of loss in agricultural land in Alberta was the expansion of pipelines and industrial sites, which replaced 1,859 ha and 1,607 ha of agricultural land respectively (Table 2). Solar arrays were the third largest driver of agricultural loss, occupying 833 ha of agricultural land over the study period, or roughly a quarter of the land that was lost to pipelines and industrial sites over the same period. It should be noted that the total gross loss of agricultural land by all drivers still only amounts to 0.05% of 2019 agricultural extent, and the net change in agricultural land is still an expansion of 0.28% (Table 1).

Table 2. Drivers of agricultural loss between 2019 -2021. Mapped by ABMI human footprint and AUC data. Percentages pertain to agricultural land in 2019. For full definitions of all drivers see ABMI¹.

DRIVER	AREA 2019-2021 (ha)	% Loss 2019-2021 of Agriculture Land 2019
PIPELINE	1,858.76	0.014%
INDUSTRIAL SITES	1,606.54	0.012%
SOLAR	833.12	0.006%
URBAN RESIDENTIAL	821.04	0.006%
MINE SITES	732.17	0.005%
WELLSITES ACTIVE	423.49	0.003%
VERGE	331.23	0.002%
ROADS	290.44	0.002%
WINDMILLS	204.83	0.002%
BORROW PITS, SUMPS, DUGOUTS AND LAGOONS (BPSDL)	160.67	0.001%
VEGETATED FACILITIES RECREATION	65.57	0.000%
LANDSFILL	43.298	0.000%
CANAL	33.146	0.000%
WELLSITES ABANDONED	24.694	0.000%
SEIMIC LINES	24.674	0.000%
RAILWAYS	19.45	0.000%
RESERVOIRS	11.12	0.000%
FOREST HARVEST AREAS	7.896	0.000%
TOTAL LOSSES	7,492.2	

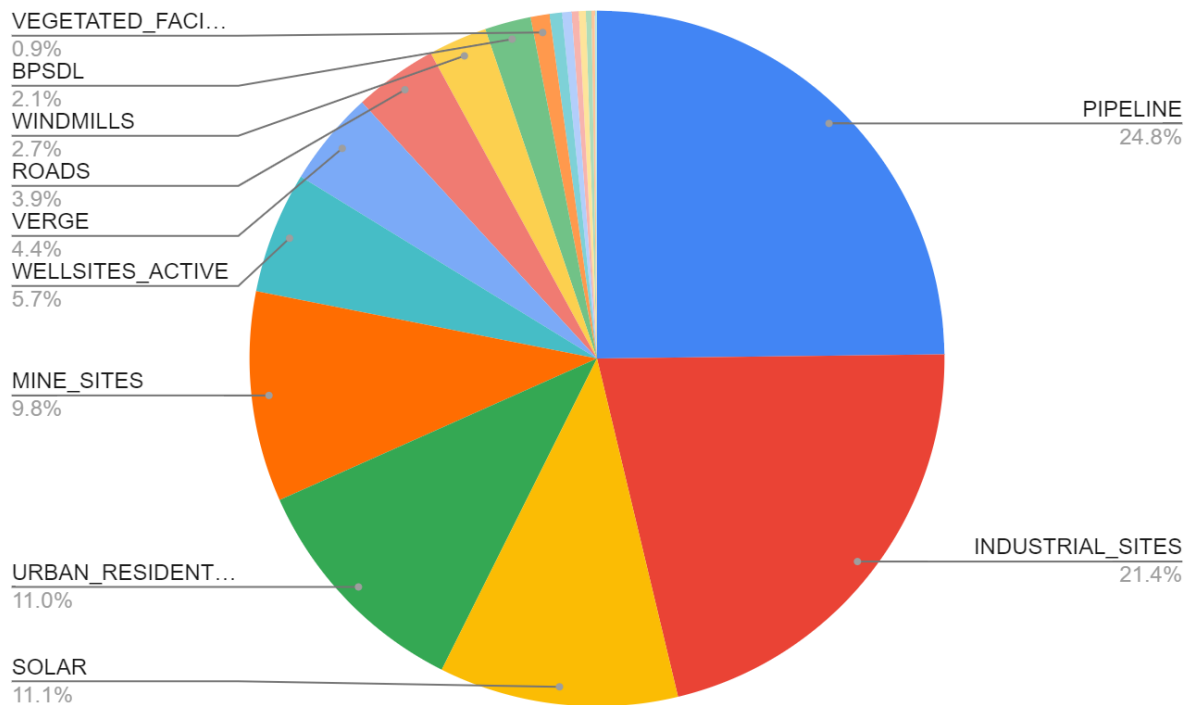


Figure 3. Drivers of agricultural loss 2019-2021. Percentages pertain to the gross loss of 2019 farmland.

Over the period from 2019 to 2021, economic regions exhibit distinct primary drivers of loss in agricultural land. Among the eight economic regions studied, pipeline expansion emerges as the leading factor for four of them (Figure 5 and Table 3). Also, industrial sites emerge as an important driver in all economic regions. Notably, in the Lethbridge - Medicine Hat region, solar arrays were the predominant driver of agricultural transformation, contributing approximately 45% to the total agricultural loss in that economic region.

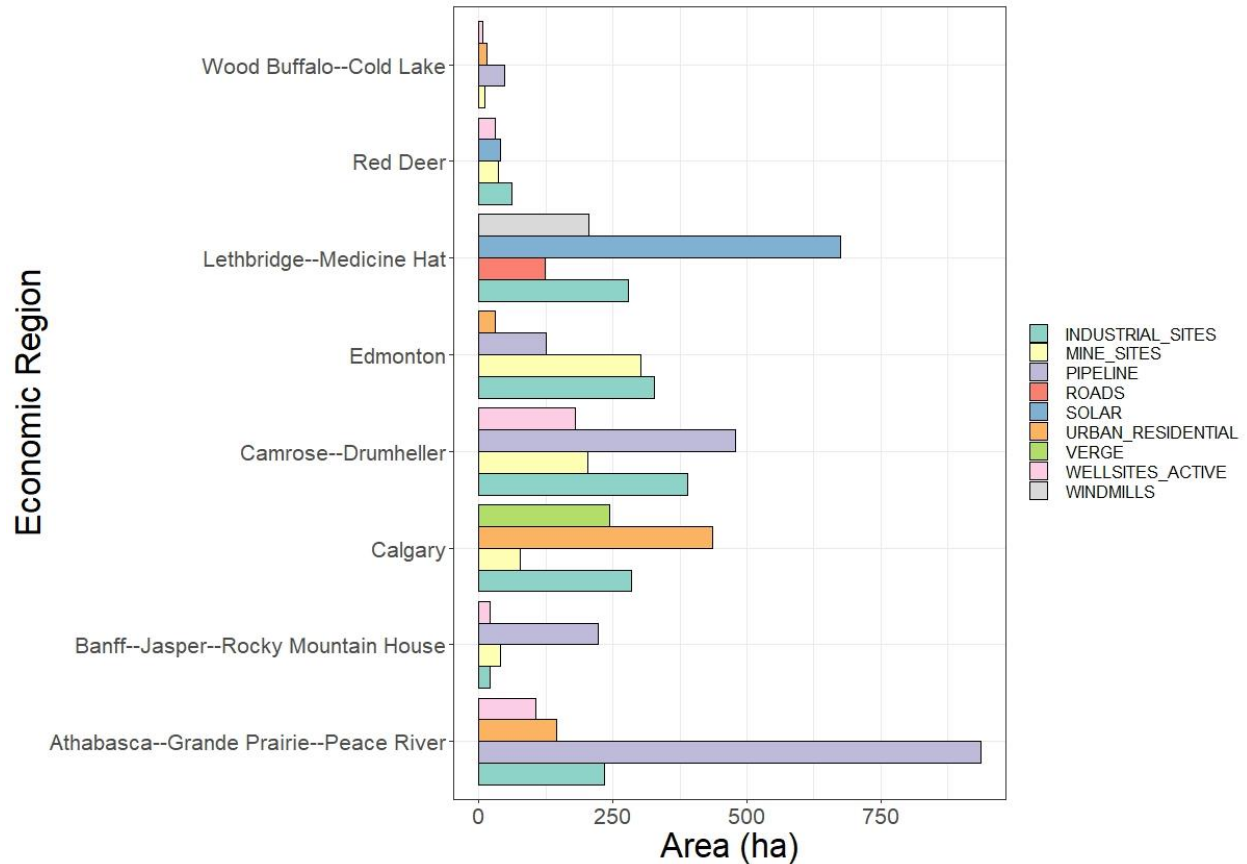


Figure 5. Top 4 drivers of agricultural loss 2019-2021 by Economic Regions in Alberta. Category “Others” was omitted as this category is primarily made of remote sensing and interpretation errors. See Table 3 for the full name of the driver categories.

Table 3. Drivers of agricultural loss 2019-2021 by Economic Regions (Area in ha). Bold numbers indicate the four largest drivers for the economic region. (Table sorted by "Total by DRIVER")

DRIVER/ECONOMIC REGION	Athabasca--Grande Prairie--Peace River	Banff--Jasper--Rocky Mountain House	Calgary	Camrose--Drumheller	Edmonton	Lethbridge--Medicine Hat	Red Deer	Wood Buffalo--Cold Lake	TOTAL BY DRIVER
PIPELINE	937.2	222.5	7.6	479.4	125.4	38.0	0.9	47.8	1858.8
INDUSTRIAL SITES	235.3	21.3	285.4	390.0	328.0	278.6	61.5	6.5	1606.5
SOLAR	0.0	0.0	46.5	73.2	0.0	673.8	39.6	0.0	833.1
URBAN RESIDENTIAL	145.3	7.3	435.4	104.5	29.9	55.4	28.1	15.1	821.0
MINE SITES	21.0	40.0	77.1	203.4	301.7	41.2	37.3	10.5	732.2
WELLSITES ACTIVE	106.1	20.8	34.5	181.0	17.9	23.8	31.1	8.3	423.5
VERGE	34.6	1.2	244.5	35.7	13.5	0.0	0.6	1.2	331.2
ROADS	30.5	0.9	66.2	41.3	19.9	124.4	5.0	2.2	290.4
WINDMILLS	0.0	0.0	0.0	0.0	0.0	204.8	0.0	0.0	204.8
BORROW PITS, SUMPS, DUGOUTS AND LAGOONS (BPSDL)	59.2	1.0	12.6	28.9	20.3	33.6	3.4	1.7	160.7
VEGETATED FACILITIES RECREATION	8.8	0.0	47.2	8.8	0.0	0.0	0.8	0.0	65.6
LANDSFILL	28.2	0.0	0.0	0.0	0.0	6.4	7.7	1.0	43.3
CANAL	1.3	0.0	0.4	29.7	0.9	0.5	0.3	0.0	33.1
WELLSITES ABANDONED	0.0	0.0	0.0	11.3	5.0	1.0	7.4	0.0	24.7
SEIMIC LINES	9.1	0.3	0.9	5.0	1.1	7.4	0.0	0.8	24.7
RAILWAYS	0.0	0.0	5.0	14.5	0.0	0.0	0.0	0.0	19.5
RESERVOIRS	0.0	0.0	3.8	4.2	0.0	3.1	0.1	0.0	11.1
FOREST HARVEST AREAS	7.6	0.3	0.0	0.0	0.0	0.0	0.0	0.0	7.9

3) Agricultural suitability of farmland lost to human footprint 2019-2021

Wind and solar projects tend to differ substantially from other forms of human footprint in the types of agricultural land that they impact (Table 4). Over the 2019-2021 period, solar arrays did

not occupy any high suitability farmland (class 1-2), and occupied only 194 ha of moderately suitable farmland (class 3), with the bulk (593 ha) of solar projects being on low suitability farmland (class 4-7). Wind turbines were also primarily located on low suitability farmland (119 ha), but were also established on moderate and high suitability areas (23 and 63 ha respectively). However, other human footprint drivers not only replaced more farmland (Table 2), but also tended to replace more high suitability farmland than wind and solar did. For instance, industrial sites, mine sites and urban and residential areas all primarily expanded into highly suitable farmland over the 2019-2021 period, a trend that was responsible for a combined 1,428.9 ha of loss of highly suitable farmland over this period.

Table 4. Gross loss 2019-2021 by driver and agricultural suitability of land. Mapped by AMBI HFI ¹ and LSRS ^{4,5} . (Table sorted by High Suitability)				
DRIVER	Suitability of agricultural land			
	High	Low	Moderate	Not Rated
INDUSTRIAL SITES	731.7	566.0	288.7	20.2
URBAN RESIDENTIAL	393.4	302.4	110.4	14.8
MINE SITES	303.8	193.8	231.0	3.6
PIPELINE	132.5	798.3	901.8	26.2
WELLSITES ACTIVE	124.1	202.3	94.1	3.0
ROADS	66.2	67.6	128.9	27.8
WINDMILLS	62.5	23.0	119.3	0.0
VERGE	51.8	111.9	104.6	63.0
BORROW PITS, SUMPS, DUGOUTS AND LAGOONS (BPSDL)	34.6	76.5	48.6	0.9
RAILWAYS	14.3	1.7	3.5	0.0
WELLSITES ABANDONED	13.9	10.8	0.0	0.0
LANDSFILL	11.2	27.7	4.4	0.0
VEGETATED FACILITIES RECREATION	9.5	55.9	0.1	0.0
CANAL	9.4	21.4	1.9	0.5
SEIMIC LINES	5.2	5.7	12.9	0.8
FOREST HARVEST AREAS	0.0	1.9	0.0	6.0
RESERVOIRS	0.0	6.5	4.6	0.0
SOLAR	0.0	193.6	593.0	46.5
TOTAL	1964.1	2667.0	2647.8	213.2

References

¹Alberta Biodiversity Monitoring Institute Human Footprint Inventory. Downloaded November 13, 2023, from <https://abmi.ca/home/data-analytics/da-top/da-product-overview/Human-Footprint-Products/HF-inventory.html>

²Alberta Utilities Commission Wind and Solar Energy Developments Interactive Web Map. Downloaded November 13, 2023, from <https://www.auc.ab.ca/what-is-renewable-power-generation/>

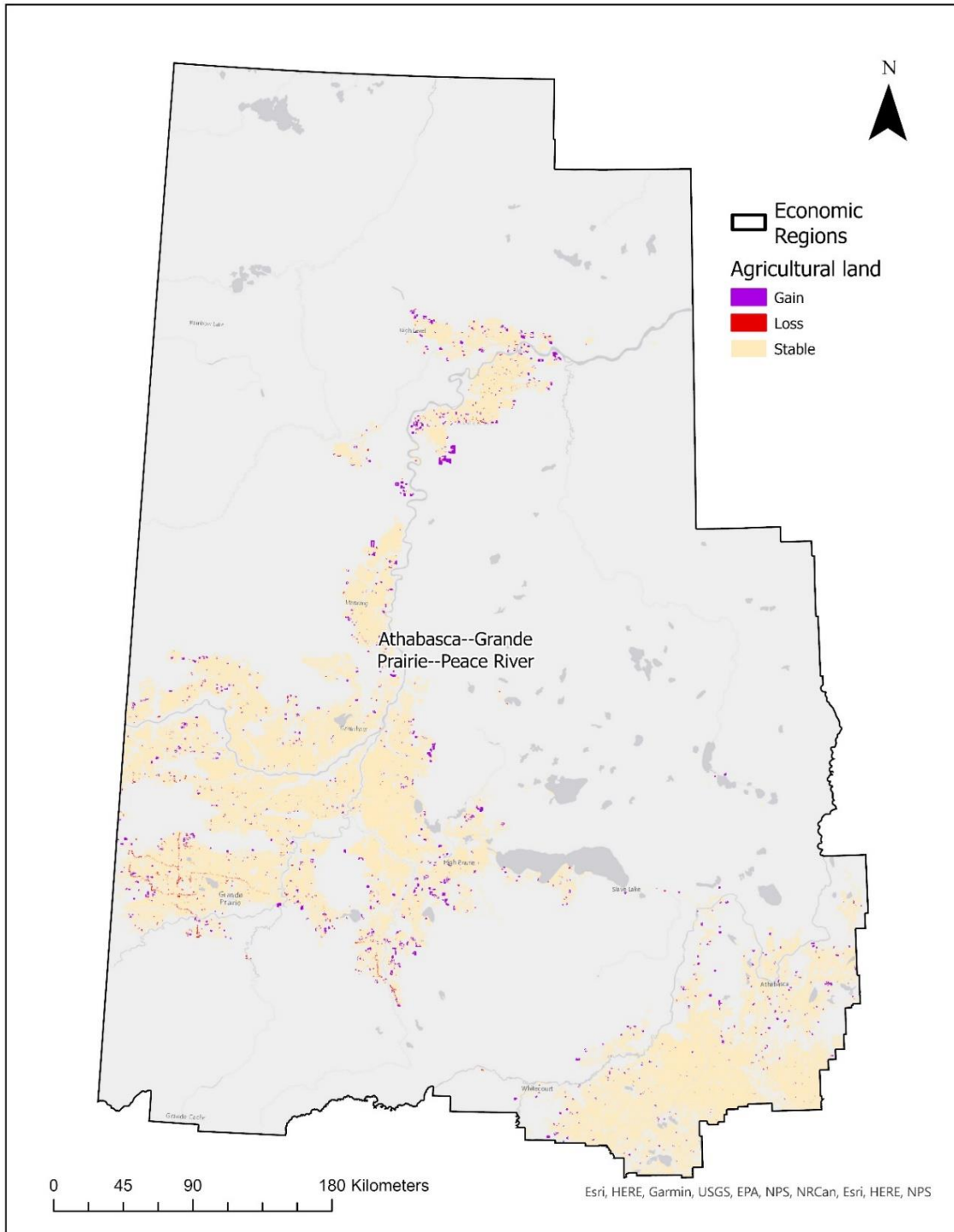
³AESO (Category "projects by stage", operational projects are stage 6) :
<https://aes0.maps.arcgis.com/apps/webappviewer/index.html?id=959d842b42544cac9035839380b68413>
By AUC:
<https://abutilcomm.maps.arcgis.com/apps/webappviewer/index.html?id=81809f0f929c41f4b95d9abebba2e4fe>

⁴Agricultural Regions of Alberta Soil Inventory Database (AGRASID). Downloaded November 15, 2023, from <https://geodiscover.alberta.ca/geoportal/rest/metadata/item/db848869ef74446e93fd0d9622d5b259/html>

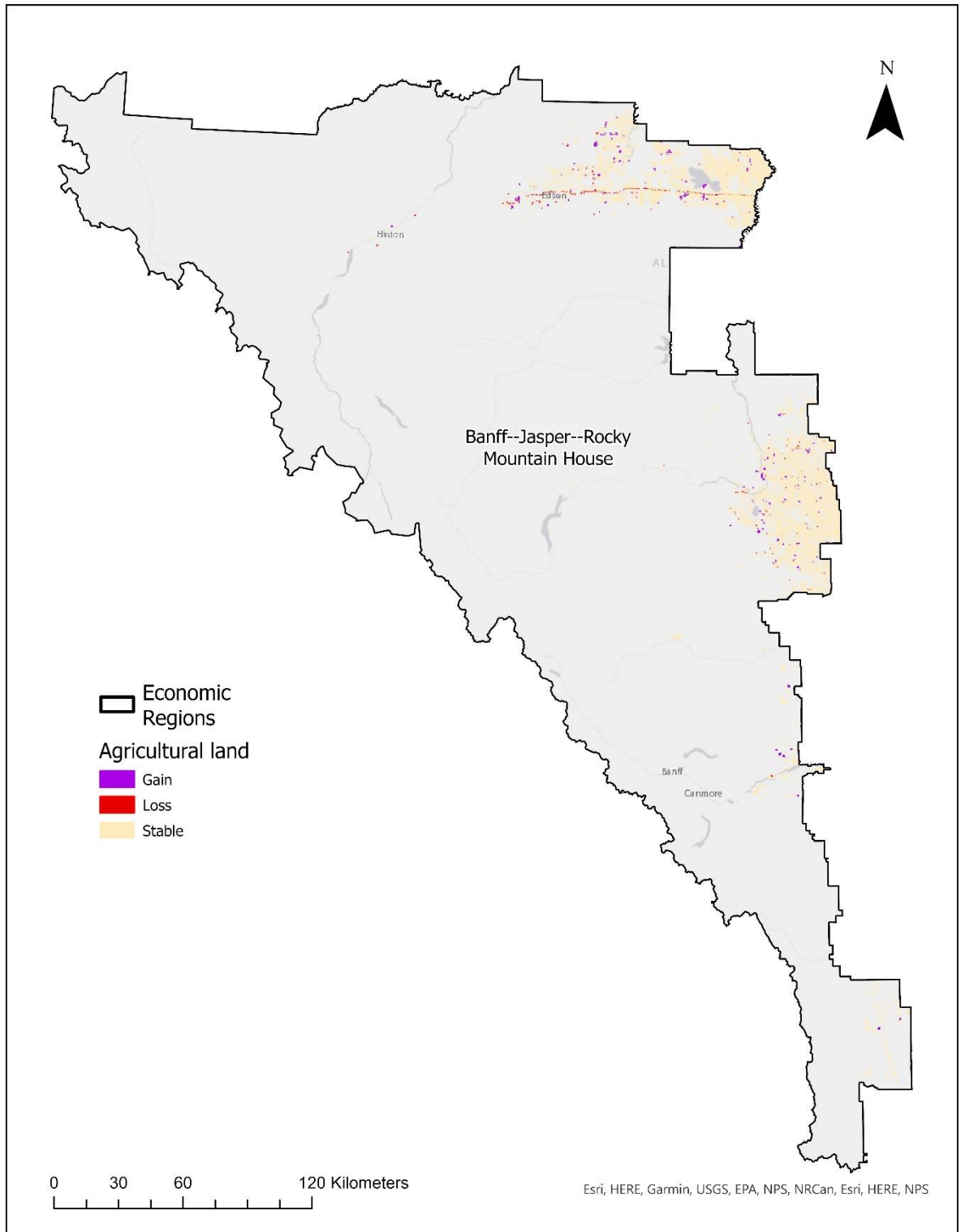
⁵Tannas S., Shorter M., Beamish B., Piccin J., Conrad J. 2023. Agricultural land evaluation report for energy projects. Alberta Utilities Commission. Tannas Conservation Services Ltd. Cremona, AB. Available at: https://www.auc.ab.ca/regulatory_documents/reference/

⁶[The status of Human Footprint in Alberta. Retrieved November 13, 2023.](https://abmi.ca/home/reports/2023/human-footprint) Available at: <https://abmi.ca/home/reports/2023/human-footprint>

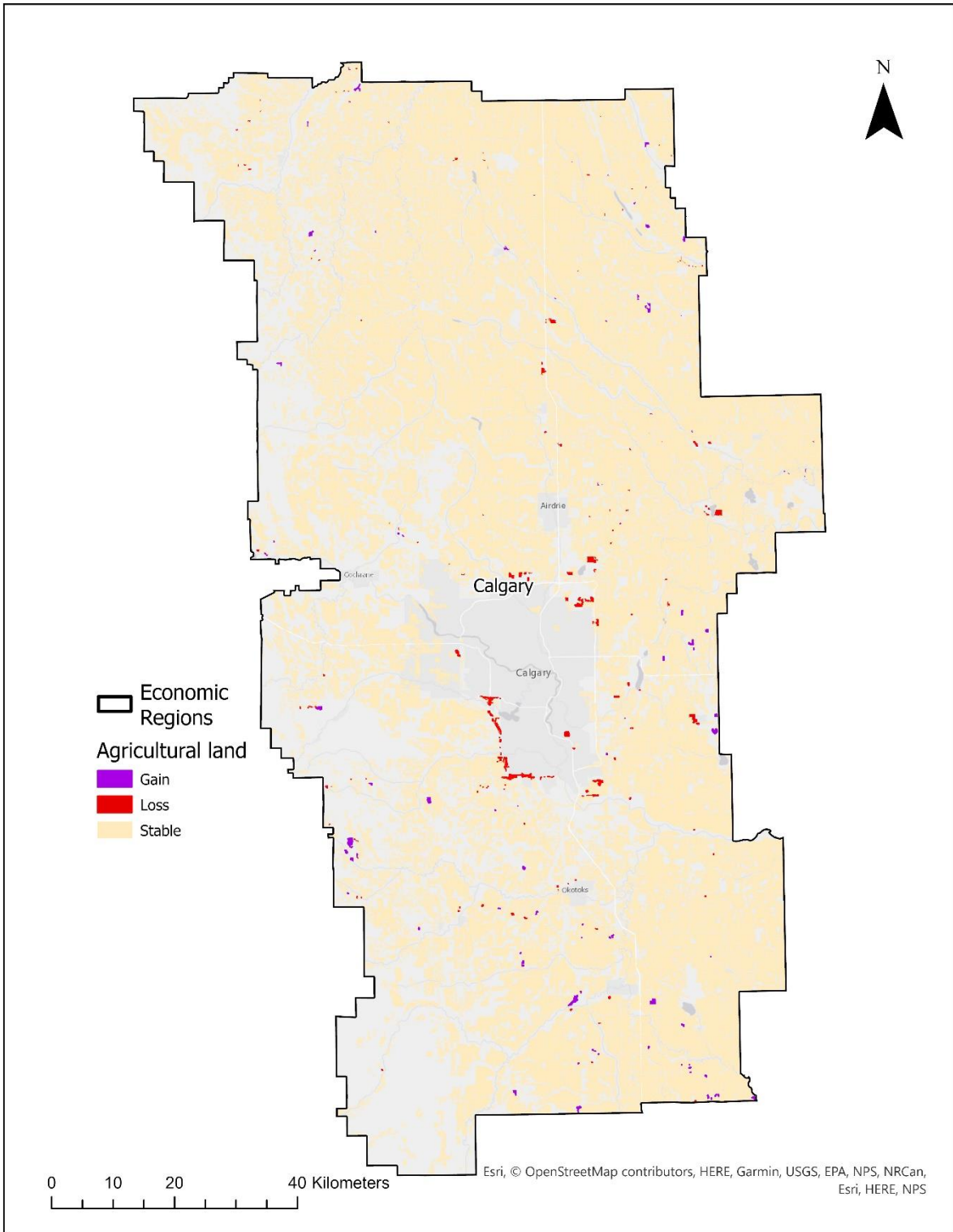
Appendix 1. Agricultural Losses 2019-2021 by economic regions of Alberta



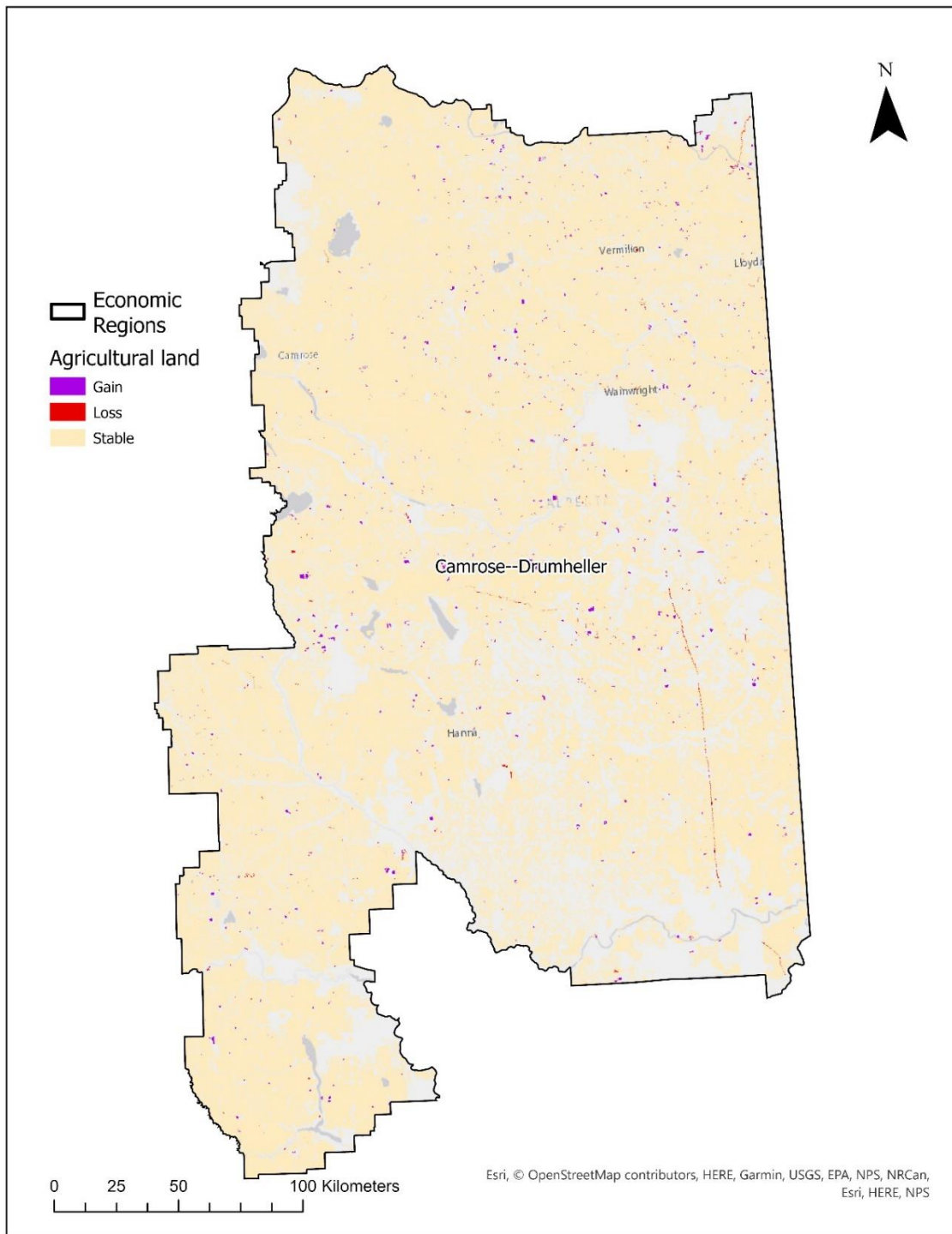
ATHABASCA - GRANDE PRAIRIE - PEACE RIVER



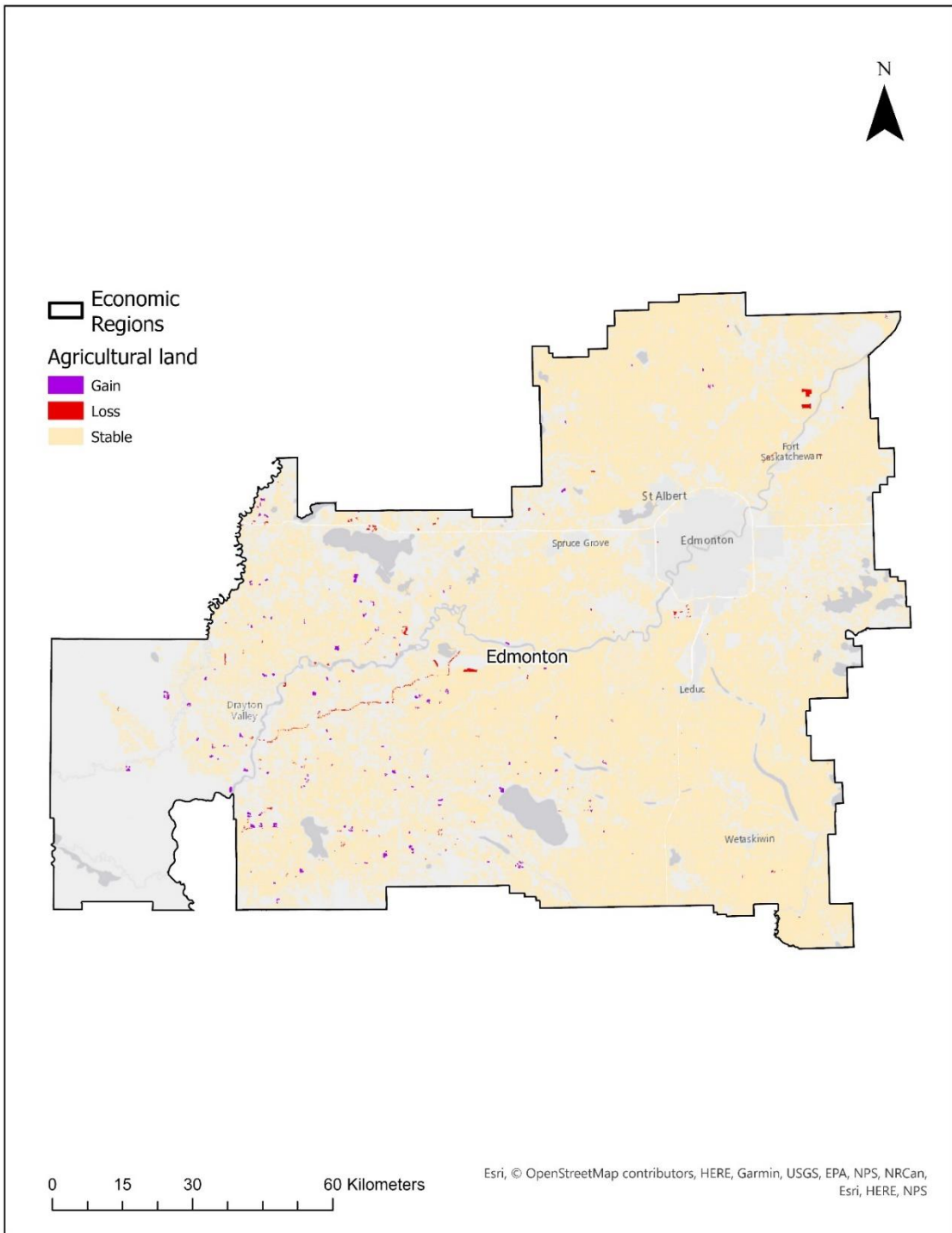
BANFF - JASPER - ROCKY MOUNTAIN HOUSE



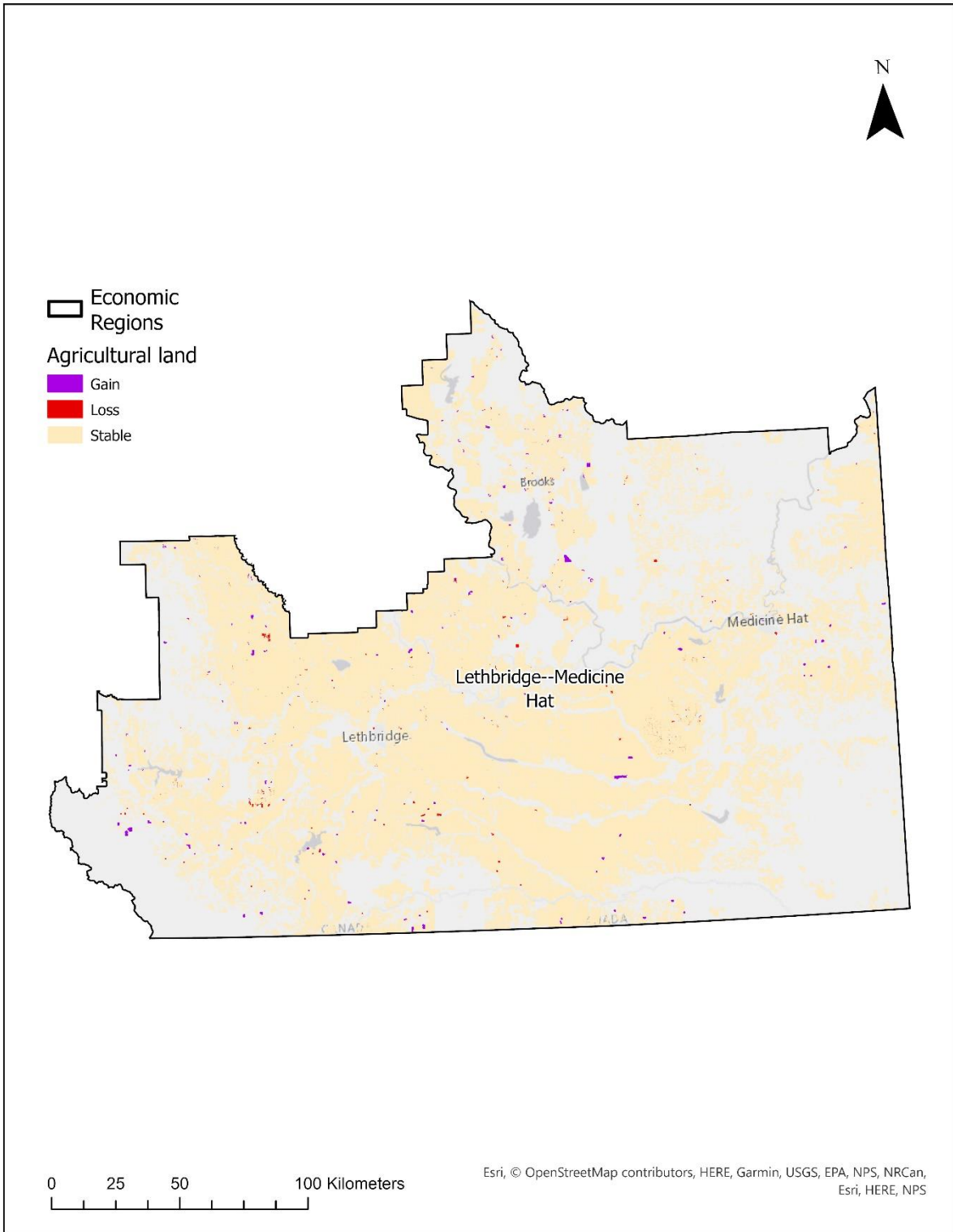
CALGARY



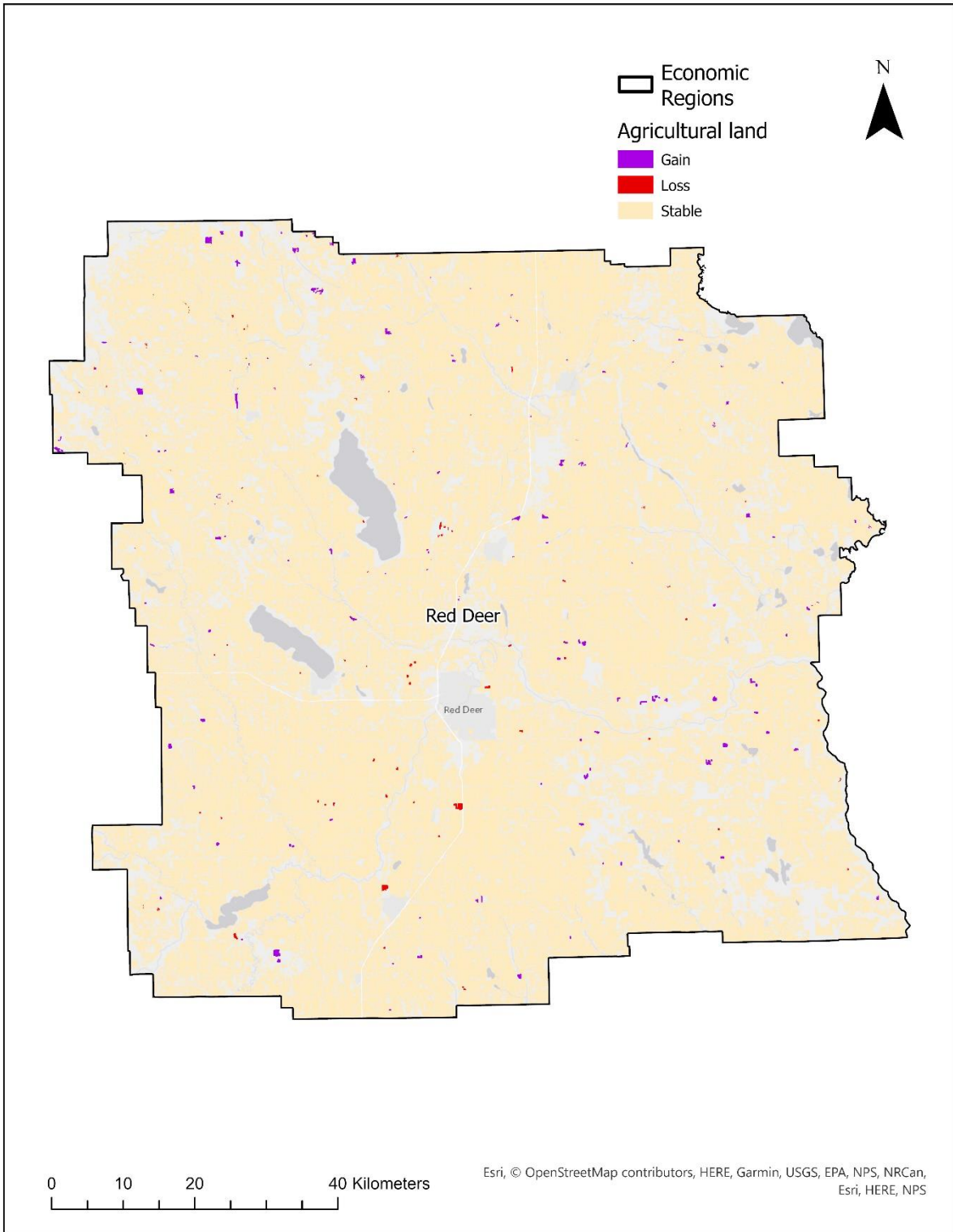
CAMROSE - DRUMHELLER



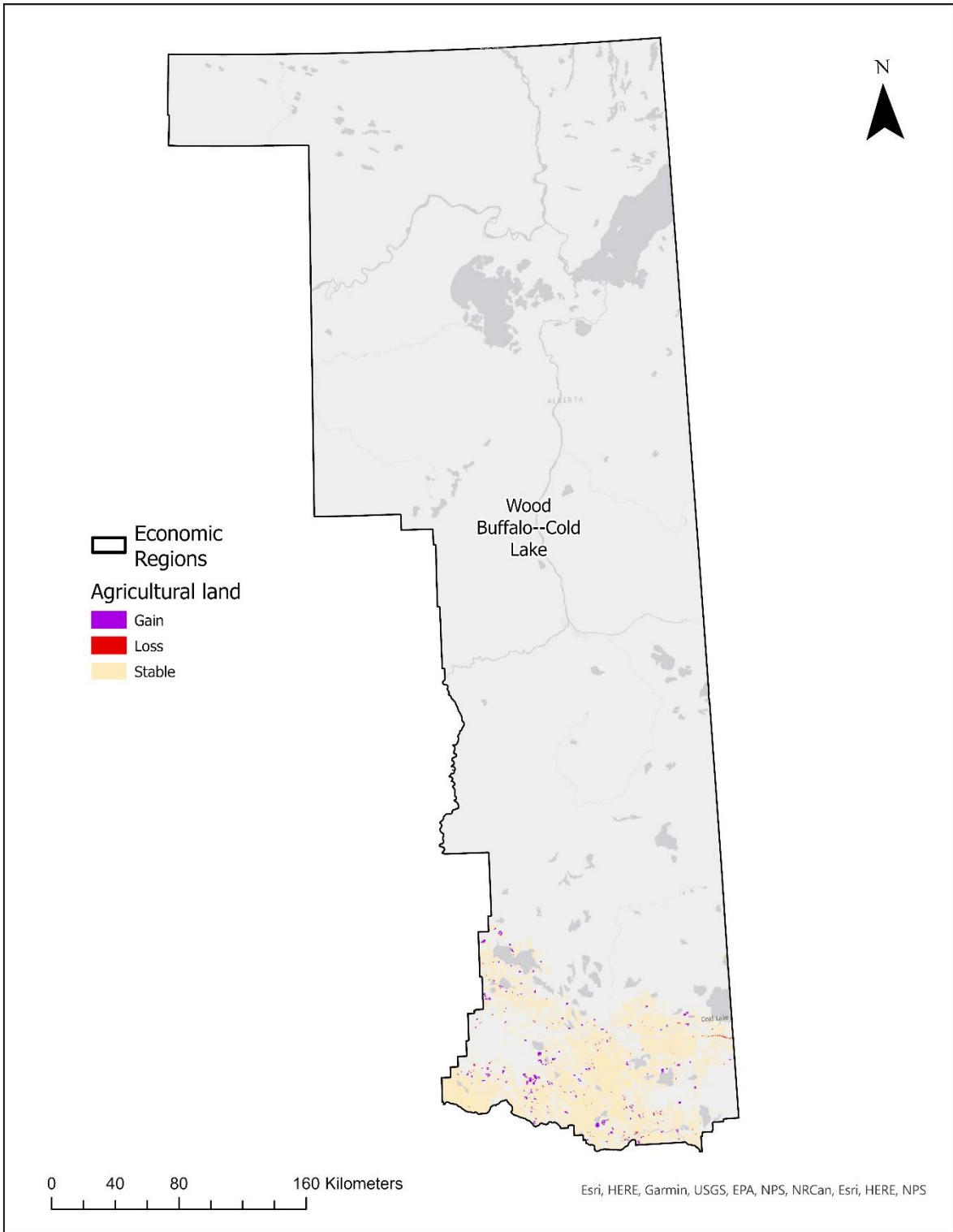
EDMONTON



LETHBRIDGE – MEDICINE HAT



RED DEER



WOOD BUFFALO – COLD LAKE