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Mining versus Indigenous Protected and Conserved Areas: Traditional Land Uses of the Anisininew in the Red Sucker Lake First Nation, Manitoba, Canada

Chima Onyeneke [1], Bruce Harper [2] and Shirley Thompson [1,*]

[1] Natural Resources Institute, University of Manitoba, Winnipeg, MB R3T 2M6, Canada; onyenekn@myumanitoba.ca
[2] Red Sucker Lake First Nation and Natural Resource Institute, University of Manitoba, Winnipeg, MB R3T 2M6, Canada; harperb7@myumanitoba.ca
* Correspondence: s.thompson@umanitoba.ca; Tel.: +1-204-291-8413

Abstract: Indigenous traditional land uses, including hunting, fishing, sacred activities, and land-based education at the Red Sucker Lake First Nation (RSLFN) in Manitoba, Canada, are impacted by mining. The Red Sucker Lake First Nation (RSLFN) people want their territories' land and water to be protected for traditional uses, culture, and ecological integrity. Towards this goal, their Island Lake Tribal Council sought support for an Indigenous-protected and conserved area (IPCA) in their territory, outside of existing mining claims, but without success. The two-eyed seeing approach was adopted in this study. Traditional land use mapping and interviews were undertaken with 21 Indigenous people from the RSLFN, showing that many traditional land uses are concentrated on greenstone belts. The interviews revealed that mining exploration has resulted in large petroleum spills, noise distress, private property destruction, wildlife die-offs, and animal population declines. These issues negatively impact RSLFN's traditional land use practices, ecosystem integrity, and community health. Governments need to partner with Indigenous communities to reach their biodiversity targets, particularly considering northern Canada's peatlands, including those in the RSLFN territory, surpassing Amazon forests for carbon storage. The role of critical minerals in renewable energy and geopolitics has colonial governments undermining Indigenous rights, climate stabilization, and biodiversity to prioritize extractivism. Mining at the RSLFN has environmental impacts from exploration to decommissioning and after, as well as the massive infrastructure required that includes roads, hydro, and massive energy supplies, with a proposed multimedia national Northern Corridor to export RSLFN's resources and other resources to six ports.

Keywords: mining impacts; indigenous knowledge; traditional land use; land conservation; land-back; indigenous rights

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1. Introduction

Should gold mining be favored over Indigenous protected and conserved areas (IPCA) when land use planning? Indigenous people have protected four-fifths of global biodiversity and a third of old-growth forests, despite making up only one-twentieth (6%) of the world's population [1–3]. This biodiversity concentrated on Indigenous-protected land demonstrates the effectiveness of Indigenous peoples as environmental guardians [2,4]. By observing Indigenous protocols and natural laws, Indigenous peoples' ecosystems have operated within ecological limits for millennia [5,6]. This paper documents the Red Sucker Lake First Nation's (RSLFN) traditional land uses and their efforts towards biodiversity conservation in their Indigenous territory in the Anisininew's Island Lake area of Manitoba, Canada, considering the impact of the competing land use of mining.

Indigenous peoples' knowledge is deemed critical in adapting and mitigating the biodiversity and climate change crises [3,7] for human survival on Earth. Permanently

passing the 'survival target' of 1.5 °C is close at hand with record heat waves, forest fires, droughts, storms, and water scarcity in 2023. That year, temperatures averaged 1.48 °C and 1.5 °C for twelve consecutive months until February 2024 [8]. If global warming surpasses 1.5 °C, concurrent heatwaves with droughts, compound flooding, and/or fire weather in many regions are predicted [8]. Climate change and land use changes are the largest extinction threats [9]. Biodiversity loss threatens one million species with extinction, many at risk over the next few decades [3,7]. Nature is on the verge of collapse with 50% biomass reduction and 40% of plants endangered [4,7]. The United Nations' global biodiversity target has each country striving for the ambitious conservation target of 30% land and water conservation by 2030, related especially to many sustainable development goals (SDGs), particularly climate action (goal 13), life on water (goal 14), life on land (goal 15), and partnerships (goal 17) [7,9]. This conservation goal is considered to be impossible in Canada without Indigenous people actively protecting Native land through Indigenous conserved areas [10,11].

Mitigating the root causes of climate change, biodiversity, and ecological collapse requires addressing their colonial roots, according to Indigenous people [12]. Colonial power dynamics have shaped climate change and biodiversity loss so that a shift from carbon to renewables will not solve the crisis [12]. Despite an increased renewable electricity share, greenhouse gas emissions reached a new record high in 2023 [12]. Colonialism is when a foreign power controls economic, political, social, and cultural aspects of people's lives in a colonized nation [13]. Settler-colonial states largely ended during the national liberation movement era post-World War II, but not for Indigenous people in Canada and in several other countries. Indigenous people continue to struggle for self-determination and Native land protection against colonial intrusion, including critical mineral development in RSLFN's ancestral territory [14,15].

This paper discusses the role of self-determination and traditional land uses [16] for biodiversity and conservation in the RSLFN territory, through a two-eyed seeing approach [17–21]. The literature on self-determination, two-eyed seeing, resource curse, mining, Indigenous protected and conserved areas (IPCAs), and traditional land uses are explored in this paper. We examine if IPCAs can protect biodiversity and traditional land uses [22]. The impacts of mining and other extractive industries [23], including the resource curse brought to First Nation people [23], who are the Indigenous people in Canada governed under the Indian Act, are reviewed. RSLFN's remote location, population size, Anisininew culture, and economic hardships are profiled [24]. In the method, the two-eyed seeing process is adopted in collecting, mapping, and analyzing stories and traditional land use. Interviews and maps reveal the importance of the land and the impacts of mining in the findings. Finally, we analyze the intersection of mining and traditional land uses using maps, and what that means for self-determination and biodiversity. Further, the discussion considers the importance of land rights to the RSLFN people and the role of an IPCA in biodiversity conservation and climate goals, compared to mining's impacts. The limitations of this study and future research areas are identified in the discussion section before concluding.

Indigenous Self-determination

The International Covenants on both Civil and Political Rights and Economic, Social and Cultural Rights, Article 1 states: "All people have the right to self-determination" [25]. Self-determination is defined as: "the right to live a particular way of life, to practice a specific culture or religion, to use own languages, and the ability to determine the future course of economic development" [25]. Indigenous peoples possess the right to define and govern their knowledge, social, economic, cultural systems, and ecosystems [5]. Self-determination is a way of life determined by the creator, not one dictated by colonial government [6]. The RSLFN people's Anisininew word for a good life, as defined by the creator, is Mino Bimaadiziwin [6].

The United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP) affirms Indigenous peoples' rights to self-determination of their lands, territories, resources,

and cultural identity [26]. In 2007, UNDRIP was signed by 144 countries [27]. Three years later, in 2010, UNDRIP was signed by the settler-colonial states of Canada, the United States, Australia, and New Zealand [27]. Specifically, UNDRIP's Article 3 states: "Indigenous peoples have the right to self-determination. By virtue of that right, they freely determine their political status and freely pursue their economic, social, and cultural development" [26]. Rather than the United Nations conferring the implementation of UNDRIP to Indigenous people, problematically, UNDRIP's devolution of power is to nation-states. In Canada, the colonial state is tasked with UNDRIP's progress on Indigenous self-determination, which conflicts in many ways with national interests [28].

Free, Prior, and Informed Consent (FPIC) of Indigenous people is affirmed in UNDRIP, which reads: "States shall consult and cooperate in good faith with the Indigenous people concerned through their representative institutions to obtain their free, prior and informed consent before adopting and implementing legislative or administrative measures that may affect them [26]". Consultation with Indigenous people is to occur before development or using resources on Indigenous territory [29,30]. Articles 26-1,-2 of UNDRIP declare that Indigenous people have a right to control their traditional lands, territories, and resources: "Indigenous peoples have the right to the lands, territories and resources, which they have traditionally owned, occupied or otherwise used or acquired. . .[and] the right to own, use, develop and control the lands, territories and resources [26]".

Self-determination principles apply to Indigenous research. Research partnerships with Indigenous people and nations must apply self-determination principles in an ethical process. Self-determination requires the ownership, control, access, and possession (OCAP) of data and research by the First Nations engaged in the research [31]. Self-determination for Indigenous people, and coexistence, necessitates researching how to shift colonial policies, which benefits from a two-eyed seeing approach [32].

Two-eyed seeing

Two-eyed seeing harnesses the insights of Indigenous and Western ways of knowing in a complementary fashion [16–18]. Two L'nu Elders, Drs. Albert and Murdena Marshall, conceived of the two-eyed seeing approach in research to decolonize research and advance the self-determination of Indigenous communities [16]. Two-eyed seeing shifts the narrative from subjugating and colonizing Indigenous knowledge to the co-existence and integration of different knowledge systems [16–18]. Indigenous and Western systems have distinct values, purposes, protocols, methods, data collection, and outcomes that offer different insights [16–18].

Western knowledge has long been considered universal knowledge, obliterating other ways of seeing the world [16–18]. Western knowledge has Euro-centric values and worldviews [33,34]. Western knowledge makes philosophical assumptions guided by theories, power structures, and hierarchies. Western science tends towards a narrow view by isolating factors and disciplines, and this view is often over a short timeframe [33]. Hill [5] calls Western knowledge "industrial knowledge", with its focus on serving capital accumulation and modernization.

Indigenous knowledge operates within the Indigenous cosmovision that the world is alive and sacred [5]. Indigenous knowledge is learned from stories, language, culture, and the land [34,35]. Place-based, experiential knowledge, and spirituality are valued and considered a core aspect of Indigenous identity and health [34]. Ecosystem integrity and human well-being are not isolated within different disciplines, but are considered inseparable and a part of natural law [36]. Through ancient knowledge of their ecosystem, Indigenous land protocols and traditional land uses were aligned to follow natural laws [5]. This ecological knowledge values a stewardship relationship with land and wildlife, rather than an extractivist view [3,5].

Traditional Land Uses

Through traditional land uses, Indigenous people continue to derive many of their basic needs from the land, including food, water, and medicines [2,5,6]. Traditional land uses are undertaken in a sustainable, regenerative way, based on a strong reciprocal

relationship with the land and water, and a culture of stewardship [5,6,32]. Traditional land uses include hunting, gathering, farming, fishing, ceremony, spirituality, education, and land stewardship [14,15].

Traditional land uses, such as wildlife harvesting and ceremonies, represent Indigenous spiritual and physical connection with the land. These practices heal trauma and protect biodiversity [6,36]. However, Indigenous land stewardship systems and traditional land uses have been under attack for centuries by colonial policies negatively impacting culture, ecosystem integrity, land access, and human health [5]. Elders blame the skyrocketing rates of addictions and suicides on spiritual and physical disconnection from the land [36].

Land stewardship and other traditional land uses represent Indigenous peoples' cultural identity. From the land, sustenance requires knowledge of traditional foods [6]. Teaching youth about traditional land uses, including food harvesting, storage, and processing, is typically done within the family [6]. However, this intergenerational knowledge transfer of traditional land use and food was disrupted by the Canadian government taking children away from their families, culture, and communities to residential schools [36–38]. At residential schools, Indigenous children were indoctrinated into the settler society and often abused [36–41]. Households with adults affected by residential schools have a significantly higher rate of severe food insecurity for the residential school attendees, their children, and their grandchildren, with elevated rates of 10%, 9%, and 5%, respectively [39,40]. Residential schools are partly blamed for the high prevalence of food insecurity and diminished traditional land use among First Nation people, which is creating a population-level health crisis and cultural genocide [39–41].

The drop in traditional foods eaten stems from a lack of access to land. Colonial land uses for settlement and extractive industries conflict with traditional land uses, reducing wildlife [41,42]. Their decline in traditional food use results in First Nation peoples having higher rates of heart disease, obesity, diabetes, cancer, osteoporosis, infections, and tooth decay [41,42]. These negative outcomes of the extractive industry are part of the resource curse that befalls Indigenous communities.

Resource Curse

A resource curse is defined as the largely negative impacts felt by a community proximate to abundant natural resources, when resources are extracted by outsiders [23,42]. Also known as the "paradox of plenty", a resource curse occurs when mainly negative impacts are felt by local people from resource extraction [23]. The resource curse most often befalls isolated or remote marginalized communities [42,43]. Isolated and marginalized describes many First Nation communities in Canada, including the RSLFN.

The Indian Act makes First Nation communities highly vulnerable to the resource curse [23]. The Indian Act (1876) made First Nations' people wards of the state, thereby placing Native lands and resources under the Crown's trust laws [28,44]. In this way, the Crown trustee gained legal authority over land, resources, and people [28,44]. The Crown permits industrial extraction and settler development on Native land: "Provincial and federal authorization for extraction and development on Indigenous territories take place without Indigenous consent [44] (p. 44)".

Resource wealth from Indigenous territories does not flow to First Nations people [23,45,46]. Since Canada's confederation, the Crown usurped billions in profits from Native land, timber, energy, gold, and other resources [23,45]. For example, the Crown collected $50 million in energy royalties from oil patch activity as the trustee of the Bearspaw First Nation's territory in Alberta [45]. Also, this racialized law results in inequitable human rights, services, and infrastructure. For example, most First Nations lack hospitals, with only one hospital in 63 First Nation communities in Manitoba. Further, 122 First Nation communities in Canada are without all-season access roads, including large communities of four thousand [47,48].

Canadian courts limit the power of First Nations to protect or benefit from Native land: "First Nations are radically constrained in negotiations for their rights and by the oppressive socio-economic structures of settler society, where industry interests often

drive politics [44] (p. 13)". This explains why the fight of First Nation people for the environmental protection of their territory has been a losing battle. First Nations people's injunctions against the Canadian government and corporations were mostly denied, with only 18% granted, while 76% of corporation's injunctions were successful [44]. For example, in 2019, Coastal GasLink Ltd. was granted an injunction against Wet'suwet'en members protesting pipeline construction on their Native land [23]. A 2013 example occurred in the RSLFN territory when the RSLFN chief delivered an eviction notice to the mining company at Monument Bay. In response, the mine was granted a court injunction to evict RSLFN. Despite Monument Bay being part of RSLFN's territory, the Manitoba Courts authorized the mining company to arrest anyone obstructing, trespassing, or creating a nuisance or "engaging in any act which interferes with the operations of the Monument Bay project [49]".

Mining

Mining extracts non-renewable geological resources for industrial purposes. Minerals, particularly critical minerals, are considered essential for modern industrial society for the green and digital economy, which creates strong government support for their development [50–52]. Mining is connected with nation-building and wealth generation [50]. With renewable energies dependent on critical minerals for generation and storage, critical minerals are replacing oil to define geopolitics [53]. Critical minerals have become the new energy resource, with the shift to renewable energy [53].

A rapid global energy system transition to renewable energy from fossil fuels is deemed necessary to prevent catastrophic climate change [52–56]. That demands massive amounts of critical minerals. Critical minerals include tungsten, cobalt, copper, lithium, nickel, and rare earth elements. These critical minerals are required for photovoltaic cells, electric vehicles, batteries, wind turbines, and electrical grid connectivity [57–59].

Mineral demand has skyrocketed with the shift to renewable technologies from fossil fuels. Since 2010, minerals required per new unit of power generation capacity increased on average by 50% as renewable shares grow [54]. Wind farms, electric vehicles (EVs), and solar photovoltaics (PVs) take more minerals to build than their fossil fuel-based counterparts. An EV takes six times more minerals than a conventional energy vehicle and nine times for onshore wind over a gas-fired plant [57,58].

Mining requires massive development to create the necessary infrastructure to operationalize the mine, providing a burst of short-term employment [55,60,61]. Industrial mining projects generally require utility corridors, access roads, transfer stations, site preparation (e.g., draining of lakes), flying skilled workers in, and tailing ponds [62]. For example, to facilitate mining extraction and export in Canada, a northern multi-modal corridor is proposed to transport resources to six ports [63–65]. Industry and the Canadian Senate Committee support the Northern Corridor idea. The Northern Corridor is being devised to access mineral and oil deposits in Island Lake, the Ring of Fire, Saskatchewan's potash, and tar sands in northern locations to transport to six ports. Greenstone belts are a geologic term for an ore deposit associated with high concentrations of precious and critical metals. This proposed northern corridor nominal route crosses many greenstone belts and many areas proposed as Indigenous Protected Conservation Areas (IPCA), including in the Island Lake region, near the RSLFN. An IPCA was proposed by the Island Lake Tribal Council (ILTC) to protect lands.

Indigenous Protected and Conserved Area (IPCA)

An IPCA designation is described as "lands and waters where Indigenous governments have the primary role in protecting and conserving ecosystems through Indigenous laws, governance and knowledge systems" [66] (p. 4). The IPCAs differ from typical state-run parks and conservation initiatives. State-run parks have historically denied Indigenous people a role in land management decisions, resulting in Indigenous dispossession and exclusion from their territory [10,11,22].

Canada has advanced a colonial narrative about land management and conservation. This narrative disregarded Indigenous knowledge, purporting that traditional land uses

harm natural habitats [11]. Oppositely, IPCAs recognize the reciprocal relationships that Indigenous people have with their lands and water [10]. The IPCAs recognize, under an Indigenous cosmovision, that traditional land uses of harvesting, hunting, ceremony, education, living, and sustainable industrial activity are beneficial [10,22]. Thus, IPCAs fulfill Indigenous people's cultural, educational, and spiritual purposes, as well as Canada's conservation goals. Youth mentored by traditional knowledge keepers are employed as Indigenous Land Guardians to monitor and manage environmental programs, thus providing jobs, biodiversity protection, and knowledge transfer [66,67].

The Intergovernmental Panel on Climate Change (IPCC) found that land rights for Indigenous peoples are vital for biodiversity, land protection, and climate mitigation [68]. The IPCC recognized that securing Indigenous tenure is highly cost-effective in reducing deforestation and improving land management [68]. Recognizing the tenure of Indigenous communities is important, "particularly those that authorize and respect Indigenous and communal tenure", [68] (p. 6), which improves the management of carbon-dense forests.

In Canada, Indigenous-led conservation initiatives have made the biggest advances in protecting land and water [68]. The Łutsël K'e Dene First Nation protected 26,376 km^2 in the Northwest Territories called Thaidene Nëné ("land of the ancestors") under Dene laws [69]. Thaidene Nëné is one of the largest protected areas in North America. This IPCA managed by the Dehcho First Nations is a partnership with Canada [69].

Canada will fall short of this global UN biodiversity goal without Indigenous leadership in biodiversity conservation. From 2010 to 2020, Canada achieved 12.2% of land and inland water in protected areas, falling short of its 17% goal [68]. Reaching 25% of protected areas by 2025 requires speeding up the process to more than double existing protected areas by 2025 [69]. Canada has recognized and turned to IPCAs to fill gaps. In June 2023, Environment and Climate Change Canada funded studies on 59 Indigenous-led conservation area proposals, but only recognized three across Canada [70]. Many more proposals than the 59 were not funded, including Island Lake Tribal Council, which includes the Indigenous territory of the RSLFN, despite having many at-risk species in an intact ecosystem with rich peatlands. Indigenous people want to commit to IPCAs and conservation, but Canada is reticent. Despite global recognition of the positive role that IPCAs play in biodiversity conservation and climate change, Canada remains slow to commit [3,4,7].

The three established IPCAs are in the boreal forest and have rich peatlands. Peatlands are critical wetlands for mitigating climate change and preserving biodiversity, among other ecological roles [70]. Peatlands constitute the largest natural terrestrial carbon store, holding more carbon than all other vegetation types in the world combined and representing up to 44% of all soil carbon [70]. Canada has 25% of global peatlands, which store at least five times more carbon than tropical forests. These peatlands store carbon for 50 to 100 times longer, at 10,000 years for peat, compared to 100 to 500 years for tropical forests. Canada is the largest peat reservoir of carbon in the world, with the richest peat stored in the northern boreal forests of Ontario and Manitoba. Canada's peatlands are a priority for protection, as damaged peatlands are a major greenhouse gas emitter responsible for almost 5% of global anthropogenic CO_2 emissions [70].

Red Sucker Lake First Nation Community Profile

The Red Sucker Lake First Nation (RSLFN) is one of four Anisininew Island Lake communities in northeast Manitoba. The 953 people living in RSLFN, a population density of 15.4/km^2, are a young, fast-growing population, with one-third of its population below the age of 15 years [24,71]. The RSLFN community is in the pristine Hayes River Watershed, which is one of two watersheds in Manitoba that flows naturally without water control structures or dams. The RSLFN territory is covered in boreal forests and peatlands [70]. The Canadian Shield is the oldest volcanic mountain range in the world, worn down by time and rich in minerals, with many greenstone belts identified in the Island Lake region. Figure 1 shows that the RSLFN is located near the Manitoba-Ontario border with many mining claims, including the very large claim at Monument Bay in Manitoba.

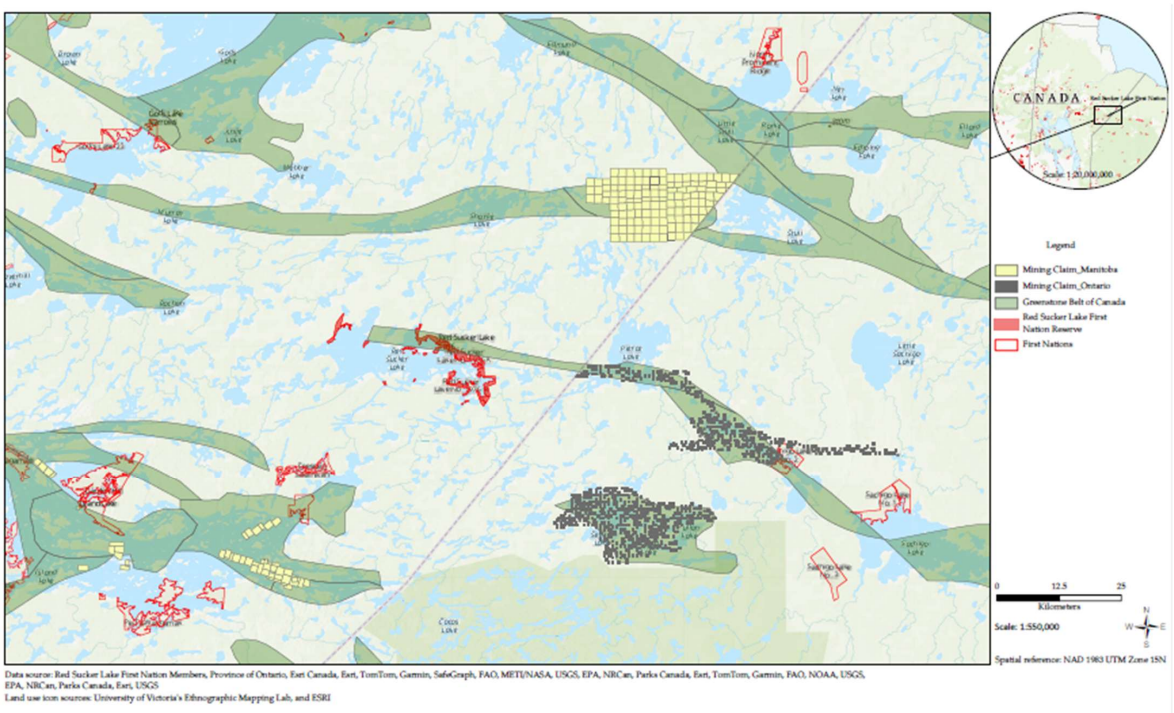

Figure 1. Map showing mining claims within the Red Sucker Lake First Nation traditional territory.

The Red Sucker Lake First Nation is isolated, without any access road to service centers. The community is located 350 air kilometers (km) northeast of Winnipeg and 285 air km southeast of Thompson. The community lacks services, without any hospitals, banks, colleges, or retail options.

The limited infrastructure and services create regional unemployment and a lack of opportunities. Table 1 shows many depressing indicators that RSLFN has, compared to Manitoba and other First Nations, despite having a billion-dollar gold mine on its territory. Table 1 shows the high rates of overcrowded housing, with the average household size in the RSLFN of 4.4 people compared to 2.5 for the total Manitoba population [71]. Houses are often overcrowded due to the colonial government's underfunding of First Nation housing. In the RSLFN, the education attainment is very low, with 5.3% of RSLFN members over 15 years of age having a post-secondary degree and 20% graduating from high school [71]. At seven times lower rates than for Manitoba, 43.5% of RSLFN people over 15 have no certificate, diploma, or degree [71]. This is blamed on the lack of funding available for post-secondary education and access barriers. The unemployment rate in the RSLFN stands at 23%, which is five times the unemployment rate in Manitoba of 4.6% [71]. Employment rates at 36% are roughly half that of Manitoba at 63% [71]. The RSLFN employment, education, and poverty rates are much worse than for the average First Nation in Canada as well.

Table 1. Comparison of economic and educational indicators for the Red Sucker Lake First Nation compared to Manitoba and all First Nations in Canada.

	Manitoba	**Red Sucker Lake FN**	**First Nations**
	General Population		**In Canada**
Average household size (number of people)	2.5	4.4	3.7
Population without formal education (%)	6.8%	43.5%	28.9%
Employment rate (%)	63.1%	35.6%	46.8%
Unemployment rate (%)	4.6%	22.5%	18.0%

Data Source: [24].

2. Materials and Methods

A two-eyed seeing approach applied Indigenous and Western knowledge to the RSLFN case study of traditional land use. In Figure 2, a two-eyed seeing process displays a process to bring Indigenous and Western knowledge together, despite their differences. In this research, Anisininew knowledge keepers, primarily the late Elder Norman Wood and Bruce Harper, guided this research. They defined how research would be conducted, following an approved ethical protocol based on the Indigenous community's consent. Bruce Harper served as the community coordinator, translator, researcher, and protocol expert, participating in guiding the interviews.

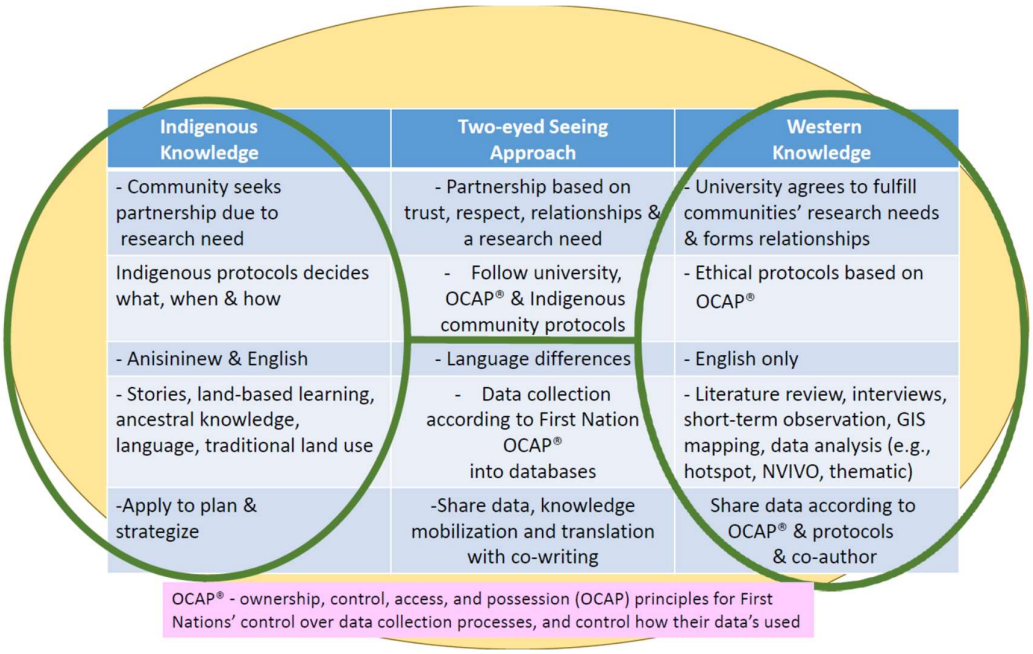

Figure 2. Two-eyed seeing process diagram to incorporate Indigenous and Western views.

The two-eyed seeing journey began with a request from Norman Wood to Dr. Shirley Thompson to help with traditional land use mapping. Dr. Thompson had worked with Island Lake communities, including RSLFN, on other projects and was able to obtain the matching funding required by the funder, Yamana Gold Inc., through MITACs. Two-eyed seeing demanded the academic researchers, who were newcomers to Canada, to undertake a large learning curve, having limited experiential knowledge of RSLFN land, culture, and language.

Ownership, control, access, and possession (OCAP) principles were applied. Control over data collection processes and controlling how their data was applied was provided to the RSLFN. Two First Nation representatives approved Onyeneke's master thesis content [72] after presentations and receiving the content, which this paper presents. The database with all the information, Excel data, and maps are on a protected, shared Teams site, accessible by community members and their GIS experts at Maawandoon Inc., located in Fort William First Nation, Canada.

Indigenous knowledge research, specifically traditional ecological knowledge (TEK) interviews and traditional land use mapping, was undertaken with the RSLFN from 22–24 September 2023. Thompson, Onyeneke, Harper, and Thapa documented the traditional land use interviews with 21 Indigenous people. Each RSLFN participant's shared stories, mapping, and photos provided Indigenous knowledge of the land. These data were recorded on maps and videos or audio tapes, based on the participant's preferences [72–74]. Territorial maps of Manitoba and Ontario at the 1:50,000 scale were used.

Interviewees were asked questions about mapping, hunting, fishing, berry picking, medicinal plant gathering, timber harvesting, community/recreational areas, cul-

tural/sacred sites, and youth training areas. An interview guide and protocol with 64 questions were adopted, as had been approved previously by the RSLFN and the Island Lake Tribal Council (ILTC) [15,72]. The interviews were recorded and transcribed. The periods for interviews ranged from 1 to 3 h. The interviewees consisted of 16 males and five females. All participants were adults over 18 years of age, and three were Elders 65 years of age or older. Interviews were coded to provide confidentiality to participants [72].

The Canada Impact Assessment Registry [62] was reviewed on Feb 10th, 2024 to determine potential mining impacts. The new IAA, 2019 is a pertinent upgrade to the defunct EAA, 2012 of Canada, particularly in its attempt to incorporate Indigenous peoples' ideas and knowledge in the assessment process. The provinces, territories, and Indigenous jurisdictions, in collaboration with the Impact Assessment Agency of Canada, support a single impact assessment, and this reduces duplication of efforts (one project, one assessment) and promotes efficiency, rigor, certainty, and a robust registry [62]. Assessed sites similar to the RSLFN were chosen to review the impacts of mining. The sites considered were those with gold mining in the boreal forest of Northern Canada with nearby Indigenous people.

Western Science

Western science approaches were used to analyze the data. Onyeneke transcribed the audio recordings of the participants' interviews using artificial intelligence (AI) by Otter.ai to generate transcripts, which were corrected by relistening to the audio [72]. NVIVO's description-focused coding method was used with the final transcripts. During the coding process, information related to the research objectives was identified and placed into nodes/containers in NVIVO to categorize these codes into themes and sub-themes [72,75].

Interviewees' land use data were digitized on ArcGIS Pro, applying the North American Datum 1983 (NAD 83) Universal Transverse Mercator (UTM) Zone 15 projection system. We applied the ESRI geographical information system (GIS). A map biography for each interviewee was prepared using shapefiles from the digitized maps [72–74]. Data from all 21 interviews were mapped into thematic maps, hotspot maps, density maps, and summary maps [15,72]. The spatial analysis tool calculated the aerial distance for different land use locations [72,76].

We overlapped GIS layers for traditional land uses with mining greenstone belts and claims layers [72,77,78]. Further, the kernel density formula [72,79] and hotspot function [72,79,80] were applied to land use data and mapped with greenstone belts. The kernel density mapping approach was applied to analyze the density of traditional land uses. The kernel function created regular density areas from all the traditional land use point data in raster form. Mapping [72,81,82] applied the following Kernel function formula:

$$\text{Kernel function } f(x,y) = \frac{1}{nh^2}\sum_{i=1}^{n} K\left(\frac{di}{h}\right)$$

where h is the bandwidth, d_i is the distance of the variable from the center in the bandwidth, k is the kernel density function, and n is the number of observations [72,79,80].

Optimized hot spot mapping was applied, using the hotspot function to identify whether the distribution of land use spots is random or statistically significant at the 95% level. The null {H_0} and alternative {H_1} hypotheses were:

H_0. *The distribution of land use features of the 21 RSLFN members was random.*

H_1. *The distribution of land use features was statistically significant.*

The optimized hot spot analysis used land use spots to create a map of statistically significant high TLU and medium TLU spots using Getis-Ord Gi statistics [72,76,79,80].

3. Results

3.1. Land Use of Red Sucker Lake First Nation Community Members

Many traditional land use activities occur throughout the RSLFN territory. Land use activities of 21 RSLFN members include bird and egg harvesting, cultural sites, fishing, hunting, overnight stay, plants/wood/earth materials harvesting, sacred sites, and trapping. In Figure 3, the summary map biography, all traditional land uses from the 21 interviewed community members' map biographies are compiled. The many land use locations are only a tiny fraction of the entire community's land use sites, being only 21 out of the 953 community members [72,83,84]. If more people were interviewed, the result would be the identification of more traditional land use sites (TLUs), covering a wider region, as indicated by the 2018 RSLFN study [81]. The 2018 study in RSLFN involved 14 different community members and showed many TLUs on different lakes to this study. Traditional land use areas peculiar to the 2018 study include Namapanis Lake, Moose Lake, Mistune Lake, Sakwasi Lake, Robson Lake, Erin Lake, York River, Mukataysip Lake, and Jeffers Lake. Both studies recorded different TLUs around these same lakes, namely: Kistigan Lake, Pierce Lake, Seeber Lake, Rorke Lake, Sharp Lake, Richardson Lake, Stull Lake, and Lenover Lake [81].

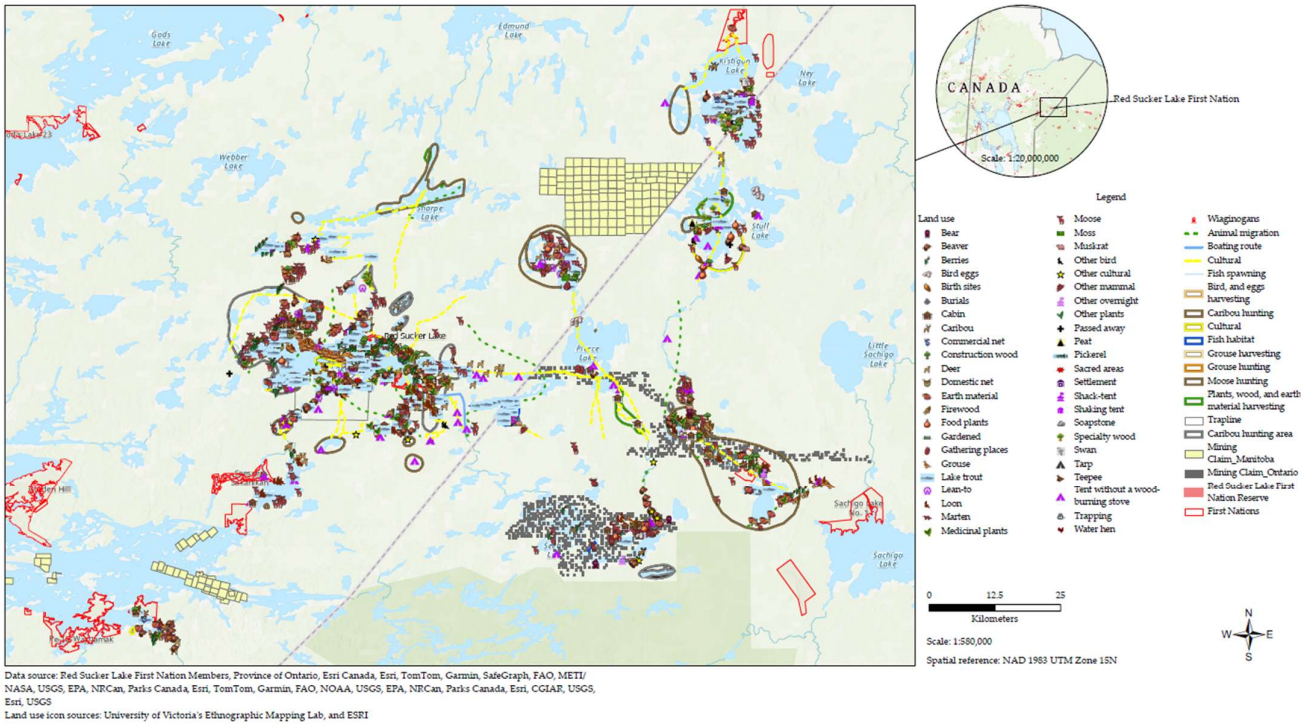

Figure 3. Summary of land use activities of 21 Red Sucker Lake First Nation members in their traditional territory and mining claims.

Hunting, fishing, and gathering is a way of life for the Anisininew people. The land was described as a source of irreplaceable medicines, food, teachings, and healing by an Elder:

> "Aside from traditional food, berries, and medicine, being out on the land has healing from the problems that we face because of Western or European influence. Being out in the wild brings healing. Healing of the mind, tranquility, if we're getting problems and you recoup, you can build yourself up. Having peaceful scenery."

Indigenous people learn from the land, which requires Indigenous-led land conservation to glean the messages from the creator to sustain their culture and well-being. The

land provides both sustenance and traditional teachings that bring wisdom, according to another Elder:

> "It (The land) provides sustenance. The traditional teachings...work smart, not hard. My grandfather and uncles used to teach us how to do things, how to set snares, how to trap, and how to hunt moose. I mean you don't just go to the bush and make some noise to scare everything away. The teachings are in the land."

The land is important to the 21 RSLFN interviewees in diverse ways related to their levels of connection to the land and sustenance needs, including hunting, gathering, and other cultural activities. Many expressed having a spiritual connection to the land. The land, like a baby, was considered priceless and alive to be cared for and loved. The land, like a baby, was not to be sold or harmed. An RSLFN member talked about how the creator had given them this land to protect:

> "Because it was given to me...it was given to my family. Man did not give it to us- God gave it to us. That's why it's important to me. And it's a gift, we can't put a price on it...we can't put value on it in terms of money thinking. It's the same thing as you getting a gift. If you get a new baby from your wife, can you sell him- your baby? Can you imagine making a baby so that I can sell it? It's the same thing- it's given to us, not to sell. We have to take care of it. And all the animals. The trees are not given to us but we are entrusted as caretakers. No man gave it to me, God gave to me- my land, my language, my heritage."

Every interviewee emphasized the importance of the land for food and other sustenance. One Elder explained that living off the land was the healthiest way to live:

> "It's a way of providing sustenance, food. . .There are no organic materials that are better than the animals that are here."

Another Elder explained the community's dependence on traditional food, how he got all his meat from the land, not the food store:

> "I don't really buy any meat from the Northern store because I mostly use wild food. That's the number one important thing."

The TLUs of the 21 RSLFN members encircle lakes and rivers. Figure 3 signals the importance of pristine water for trapping beaver, fishing, water birds, and moose for the sustenance of the RSLFN people. Cabins on the trapline are always located adjacent to water bodies to haul water for drinking, cooking, and cleaning. Also, lakes and rivers are their primary travel routes, using canoes, motorboats, and float planes. People travel great distances to reach harvesting and cultural sites. RSLFN members travel aerial distances of 90 km within their traditional territory for traditional land uses. Due to the many bends in the river and portages, the distance travelled in canoes or motorboats is much longer.

Without access to roads, RSLFN people typically travel to their traditional home by canoe when the rivers and lakes are free from ice. One of the interviewees narrated how canoeing took several days from the RSLFN, through Pierce Lake to Ponask Lake (both in Ontario) and back home, with their canoe heavy-laden with harvests:

> "I remember when we took the boat to Rorke Lake. Oh, from Red Sucker Lake to Pierce Lake to Richardson, Twin Lakes, then to Stall Lake. . .there's Kistigan River, then to Rorke Lake. That portage is about 6 miles. We took a boat, gasoline, food, guns, and our clothing. It took three days to get to our destination."

The ability of community members to traverse the land in their territory without access to roads indicates their deep knowledge of the land. Their long trips to harvest food and visit often required overnight stays. On the land, they would stay in cabins, tents, other camping structures, or under the stars.

Traditional land uses of RSLFN people cross the Ontario border. The spatial distribution of land use sites extends beyond RSLFN's reserve areas, traplines, and provincial

boundaries to the North Prominent Ridge. The territory goes into Ontario beyond Monument Bay and Stull Lake in the north-east direction, and beyond Ponask Lake near Sachigo Lake area in the south-east direction. Banksian River runs towards Island Lake in the south-west direction. Figure 3 shows the spatial extent of traditional land uses, going 84 km aerially to Sachigo Lake in Ontario. These measurements show the large traditional land use area, with RSLFN harvesting fish "all over" their traditional territory.

3.1.1. Traditional Land Uses Heavily Impacted by Exploration and Mining Activities

Mapping the geological layer of greenstone belts with traditional land uses shows many overlapping areas. Figure 3 shows many traditional land uses nearby mining claims. This proximity or overlap shows a conflict of land uses between mining and traditional land uses of Indigenous people. This conflict is evident in RSLFN participants' descriptions of wildlife and themselves being negatively affected. Figure 4 shows the proximity of distances to the current major mining or exploration areas in operation.

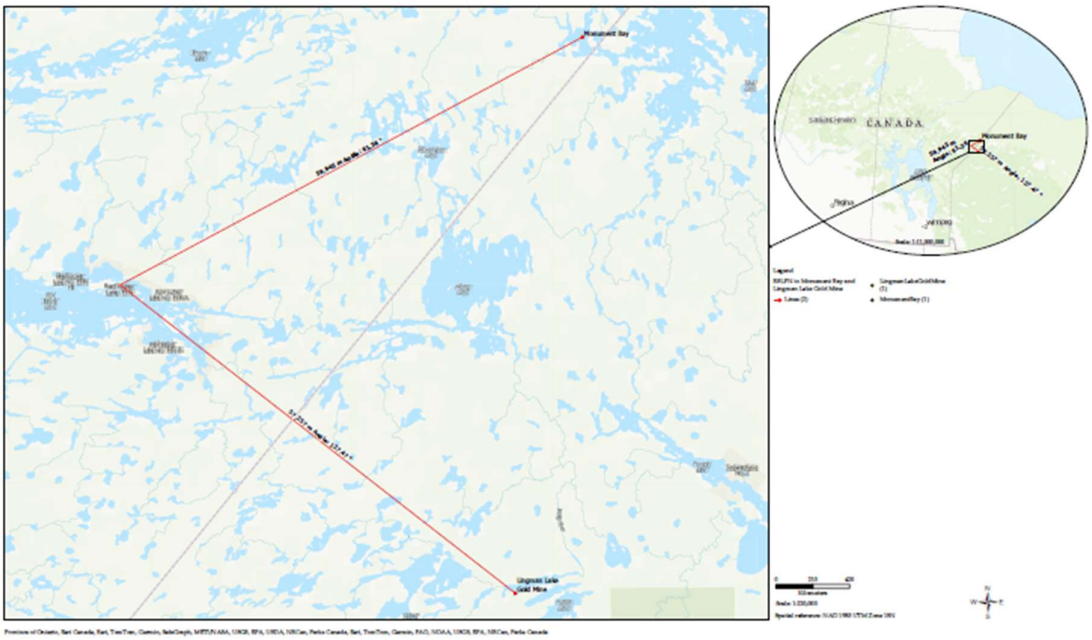

Figure 4. The Red Sucker Lake First Nation community's proximity to the gold exploration site at Monument Bay (60 km away) and the gold mine at Lingman Lake, owned by Signature Resources Ltd. (57 km away).

The RSLFN people reported that mining reduces wildlife populations, undermining wild food procurement. The frequent flights of helicopters and float planes for mining purposes at the RSLFN airport and mining explosives disrupt wildlife behavior and traditional land uses. People complained about moose and other wildlife being driven away by the constant noise of the helicopters flying back and forth shipping goods, fuel, and people.

This affects the availability of traditional food, according to an RSLFN Elder:

> "So much disturbing the land by this mining. Yamana (now Agnico Eagle), they had choppers going from here to Lingman and Twin Lake. I remember that winter all the moose were coming from the north side, heading south. That trail to Pierce Lake, there was a track of moose. . . They were heading south...away from the sound. I remember last year when they were flying from here to Lingman Lake I don't think they killed anything there when they went moose hunting. Then at Pierce Lake, Irene's camp, there's been a lot of disturbance from the choppers hauling their equipment for the mining."

Explosives from mining exploration and operations are also disrupting hunting. A community member complained about the large noise and disruption made by mining explosives, which waged war with animals:

> "There was a lot of prospecting, and they would fly [explosive] materials there. There is a lot of it I've seen, even in the deep-water areas, and the problem is when they're heated. And then explode, they make a loud noise. And that would scare the animals away. And it's just all over."

A male Elder, when asked about the impacts of mining in his community, described the great loss of wildlife due to mining impacts:

> "So, all that scares away the animals- moose. So, there's not much. There used to be a lot of moose there before. ...The birds too- ducks, geese, and beavers die there on the water. We pull them [the dead carcuses] out of the water because they'll damage the river."

Another respondent opined that mining would result in the land being destroyed and lost:

> "Well, like if this mine starts up. . .I know for a fact that we are going to lose the whole area. People are going to come in and destroy...So, it'll be flights in and out. It will be oil and gas. It'll be maybe hydro development."

Talking about the environmental pollution impact of mining on the community, another respondent talked about a spill of oil he discovered, and that oil spills were common:

> "Yes, and you don't know where they [mining explorers] left maybe gas or other materials and it's leaking out into the land...Animals take that up. . .. I remember we were hunting...and we checked and there were [gas] barrels there. Rechecked next day, and there's a spill there, needing clean up."

Another RSLFN member shared his experience of how diesel from mining contaminates whole areas:

> "I used to work for a mine. Twin Lake. I do not want any kind of mining or development in this area, because I've seen how they do things. They bring in these big bladders for diesel. They fly in these big bladders and sometimes those bladders are on the ice...these little barriers....it wouldn't contain the spill. It will just contaminate the whole area. One of those bladders ruptured. No, I don't want anything like that around here."

Mining in the RSLFN territory is changing intergenerational use of land and wildlife abundance. The people of RSLFN are impacted by Monument Bay, which is 60 km northeast and Lingman Lake, which is 57 km southeast (Figure 4). Moose used to be abundant but are no longer. An Elder described killing his first moose at age 17, compared to his son at age 35. The Elder attributed this difference in the 'first moose kill age' to a decrease in wildlife abundance due to industrial development. As killing a moose in Anisininew culture is a sign of manhood and maturity, these rights of passage are slowing or dying. The interviewees' perspectives concerning land protection priorities were unanimous. All 21 community members wished that their entire traditional lands be protected from all forms of industrial development, which is clearly stated by one RSFLN member saying:

> "In future, where my grandchildren.., I would like to see the protection of all this- all around Red Sucker. All this territory."

Another person said he wanted 'everywhere' in the RSL territory to be protected. RSLFN people's perspectives towards mining varied from person to person, especially between age groups. However, nobody wanted mining companies or exploration on their RSLFN traditional territory. This is summarized by one interviewee saying:

> "I don't think anybody wants their traditional lands to be disturbed, you know, to be destroyed, or altered in any way."

The Elders unanimously disapproved of mining, concerned about the negative impacts of mining. Youths had mixed views of mining, without awareness of their impact on the land [85]. The respondents' opinions on the impacts of mining reveal different levels of land knowledge.

3.1.2. Overlap of Traditional Land Use Hotspots and Greenstone Belts

Figure 5 shows the highest density regions for TLUs as yellow to lime green, with moderate density shown as purple. This map shows that most high-density TLU spots are located on greenstone belts. All but one of these medium to high-density TLU spots are on greenstone belts. The high-density TLU spots are located around Red Sucker Lake, Rorke Lake, Lenover Lake, and Ponask Lake. Moderate land use density of TLUs exist around Richardson Lake, Stull Lake, Sachigo Lake, Banksian River, Angling Lake, Seeber River, Pullan Lake, and Durell Lake.

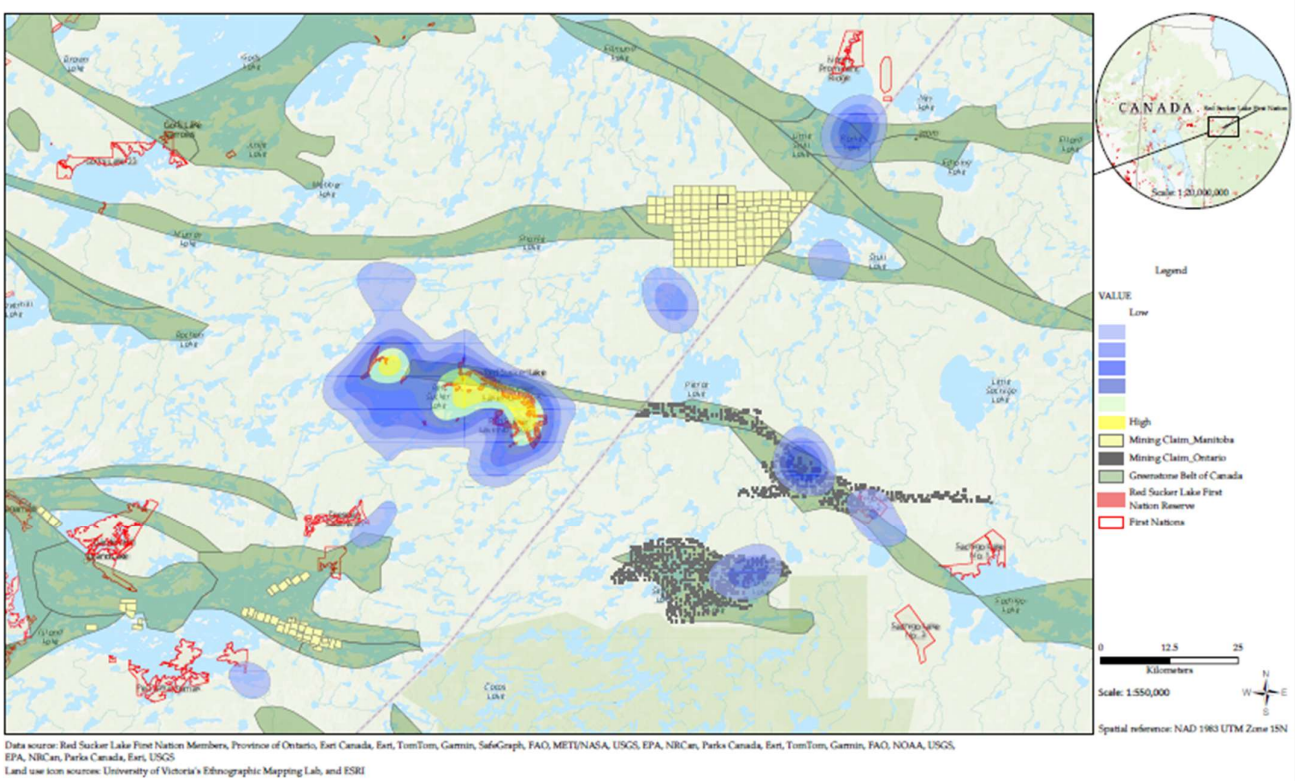

Figure 5. Summary heat map of the land uses of 21 Red Sucker Lake First Nation members.

The optimized hot spot map in Figure 6 identified statistically significant land use locations on/within greenstone belts. Significance levels with 90%, 95%, and 99% confidence, whether high or medium-density TLU spots, imply non-random land use. Statistically significant clusters of high and low incident counts of land uses are identified by lime green output features, while fuchsia pink output features represent medium TLU spots.

Figure 6 shows that statistically significant TLUs were all located on lakes in greenstone belts. These lakes with statistically significant TLUs were Red Sucker Lake (high), Pierce Lake (medium), Stull Lake (medium), Seeber Lake (medium), and Angling Lake (medium). High-density TLU spots were statistically significant for bird/egg harvesting, fishing, hunting, plants/wood/earth materials harvesting, and trapping.

All land and traditional land use areas are considered to be culturally and environmentally significant. 'Not statistically significant' does not mean 'not traditionally important or significant'. The summary land use map (Figure 3) shows that many culturally and traditionally important land uses occur in areas not considered to be significant hotspots. The 'not significant' spots refer to incident counts (of land use activities other than travel

routes) that are not statistically significant based on False Discovery Rate (FDR) correction for multiple testing and spatial dependence.

The small sample size of this research means the traditional land uses do not represent the entire community and miss many hotspots. Also, we cannot be sure that the research captured all of the traditional land uses for the 21 interviewees, as community members may withhold information on certain landscapes/land use [83,84]. Documenting the land uses of more community members would have produced higher land use densities and much more statistically significant output clusters, as evidenced by the 2018 TLU study, which involved 14 community members different to those selected for this research [81]. While both studies recorded some TLU areas in common, each study also recorded distinct TLU areas, as community members' traplines differ.

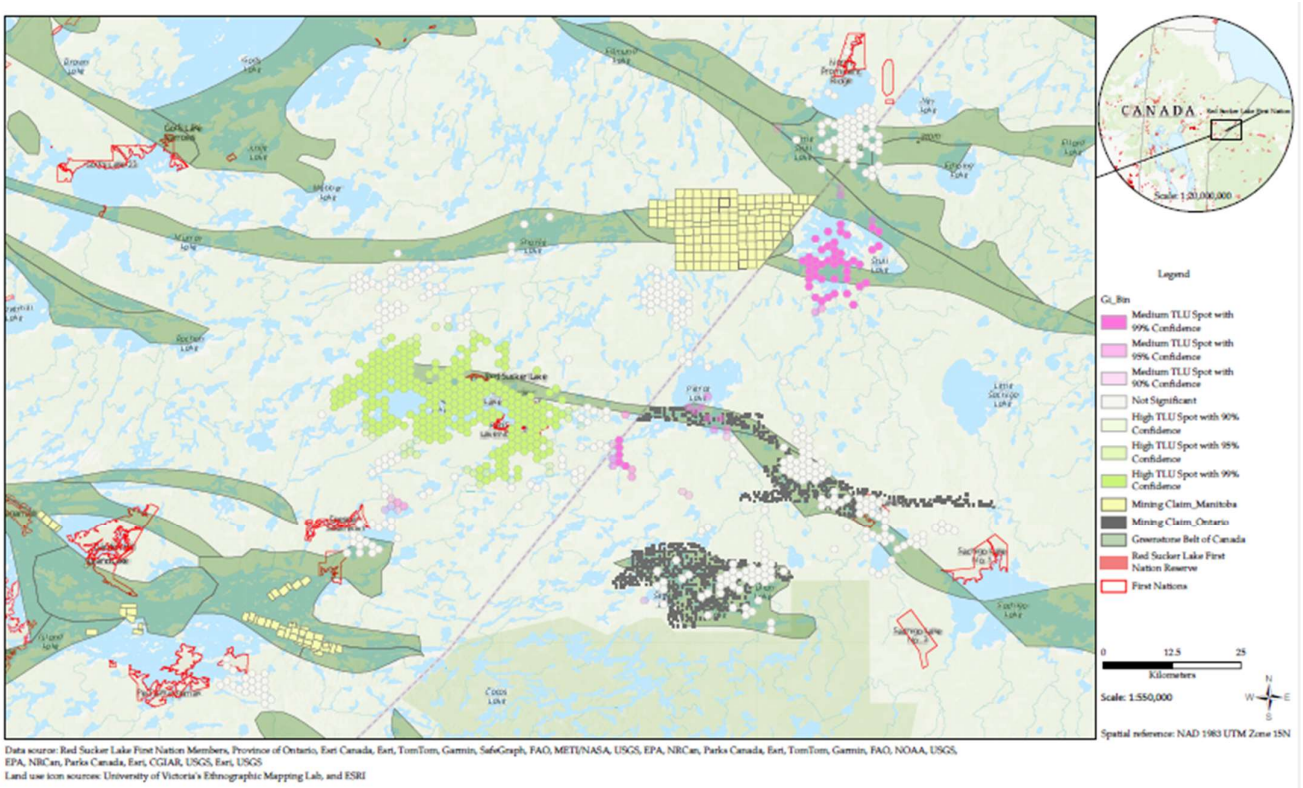

Figure 6. Traditional land use hotspots of 21 Red Sucker Lake First Nation members on greenstone belts.

3.2. Mining versus Protection

The RSLFN territory and land uses include the many mining claims in Monument Bay. Monument Bay in the Island Lake region has high-grade gold-tungsten, with tungsten being a critical mineral [59,60]. High-grade gold-tungsten ore at Monument Bay is worth an estimated one billion dollars [59]. The mining claims at Monument Bay are owned by Agnico Eagle Mines Limited (previously Yamana Gold Inc. until 2023), a Canadian-based multinational company.

Island Lake contains many greenstone belts. Canadian mineral tenure law and Manitoba's Planning Regulations dictate that mining is the only land use designation possible for greenstone belts [82] and neighboring land. Even with no mining claims, greenstone belt areas and their surrounding lands are deemed ineligible for IPCA funding or protection by Canada's colonial governments.

Referring to the territory of RSLFN's traditional land that he wishes to protect, one of the interviewees simply said- 'everywhere'. Community members also revealed that the mining companies, contractors, explorers, and colonial governments did not respect the duty to consult. According to the UNDRIP [27,28], RSLFN community members have the

right to free, prior, and informed consent (FPIC) regarding developmental activities in their traditional territory, but that right is not being respected, creating conflict and discord [82].

An Elder also commented on prospectors' camps in the RSLFN territory as having many negative impacts. The respondent called prospectors 'invasive', as prospectors invade their territory:

> "Invasive. . . that's prospecting. We don't like it. It's not appreciated. It [prospecting] is like walking into somebody's house and sitting down...turning on the TV, without permission. This trapline. . .nobody should be there at all when we are not there unless they ask. They need to get permission first."

When asked if the community was consulted before such prospecting activities, he answered "no":

> "No, they don't [ask or consult] but we see those camps. There is supposed to be a consultation. . . But they don't do that."

Mining claims and greenstone belts overlap TLU hotspots at Monument Bay and Lingman Lake. As a result, mining is in direct conflict with RSLFN's traditional activities and the livelihoods of the RSLFN people and already created exclusion zones. At Monument Bay, RSLFN Indigenous people have a court injunction keeping them from using this territory. As RSLFN's territory reaches over two provinces with different regulators, the policy implications extend to both the provincial and federal levels of the Canadian government. Mining puts RSLFN's traditional land uses, culture, and ecosystem integrity at risk.

The RSLFN people want their land unspoiled by industrial developments, including hydro development and mining. The view is that the land is perfect the way the creator made it. The RSLFN people intend to fulfill their sacred role as guardians of the pristine nature of their forests and lakes. Their wish is to create land-based education to teach youth to live on the land, while monitoring wildlife abundance, the quality of environmental media, and natural cycles.

A review of the Impact Assessment Agency of Canada [62] database listed mining impacts for gold mines near First Nation communities. The many negative environmental impacts of mining provide the potential risks for mining development at the RSLFN [62]. Mining impacts watersheds during site preparation and operation with heavy water usage, causing groundwater drawdown and impacting surrounding wetlands. Mining worsens water quality through sediment loading, erosion of suspended solids, acid mine drainage, and metal leaching, including leaching of radioactive metals, such as uranium. Mining operations use massive equipment that contributes to noise and toxic pollution, which lowers air quality. The reduced abundance of wildlife in the area, especially moose, is an example of traditional food availability affected by mining operations. Potential spills from mining operations pose safety and health challenges to humans and wildlife, altering the availability and acceptability of traditional food [62].

Mining destroys natural habitats [62]. Mining causes environmental pollution, biodiversity loss, and the decimation of wildlife, including species at risk of extinction [62]. Mining also reduces the abundance of valuable species to Indigenous people by destroying habitat, important breeding sites, migration paths, and poisoning wildlife [62]. Changes in terrestrial and wetland environments alter landscapes, upset ecosystem dynamics, reduce biodiversity, and diminish the abundance of species at all levels of the food web, including species at risk [62].

Mining development and operations negatively impact human health and Indigenous rights in many ways [62]. Mining encroaches on Indigenous rights by curtailing or limiting fishing, hunting, trapping, medicinal plant harvesting, cultural, educational, and economic aspects with ceremonies and local language aspects [63]. Mining eliminates the availability of nearby freshwater bodies and land for traditional food production and harvesting [62]. Opportunities for Indigenous knowledge sharing and community interactions diminish due to habitat destruction and land use changes from mining-related activities [62]. Mines

also result in an increasing loss of traditional food choices [63]. An inability to maintain food sustenance undermines Indigenous food sovereignty and leads to a continual decrease in food security [62]. Mining also creates inequity between genders by employing mainly settler males, which has resulted in gender violence toward Indigenous women [63]. The benefits of mining projects for Indigenous communities are often conditional, including potential employment, training, and some funding to the First Nation, if a negotiated benefit agreement occurs [62].

Mining requires massive supportive infrastructure, including rail, roads, and reliable energy access, with a big ecological footprint. A proposed multi-modal right-of-way, encompassing road, rail, pipelines, and transmission lines [63], is proposed that is connected with mining and trade [63–65]. The Canadian Senate Committee on Banking, Trade and Commerce endorses, based on the enhancement of commerce and trade, this Northern Corridor as indicated by their title 'National Corridor Enhancing and Facilitating Commerce and Internal Trade'. The nominal route shown in Figure 7 links greenstone belts with ports to facilitate their export after extraction. The route is not designed to provide access roads to those 122 First Nation communities lacking access to roads, being nearby to only seven First Nations [63]. This route is 25 km from three Island Lake First Nations (a little farther to RSLFN), North Spirit Lake, and Cat Lake First Nations, proximate to the greenstone belts and many mining claims.

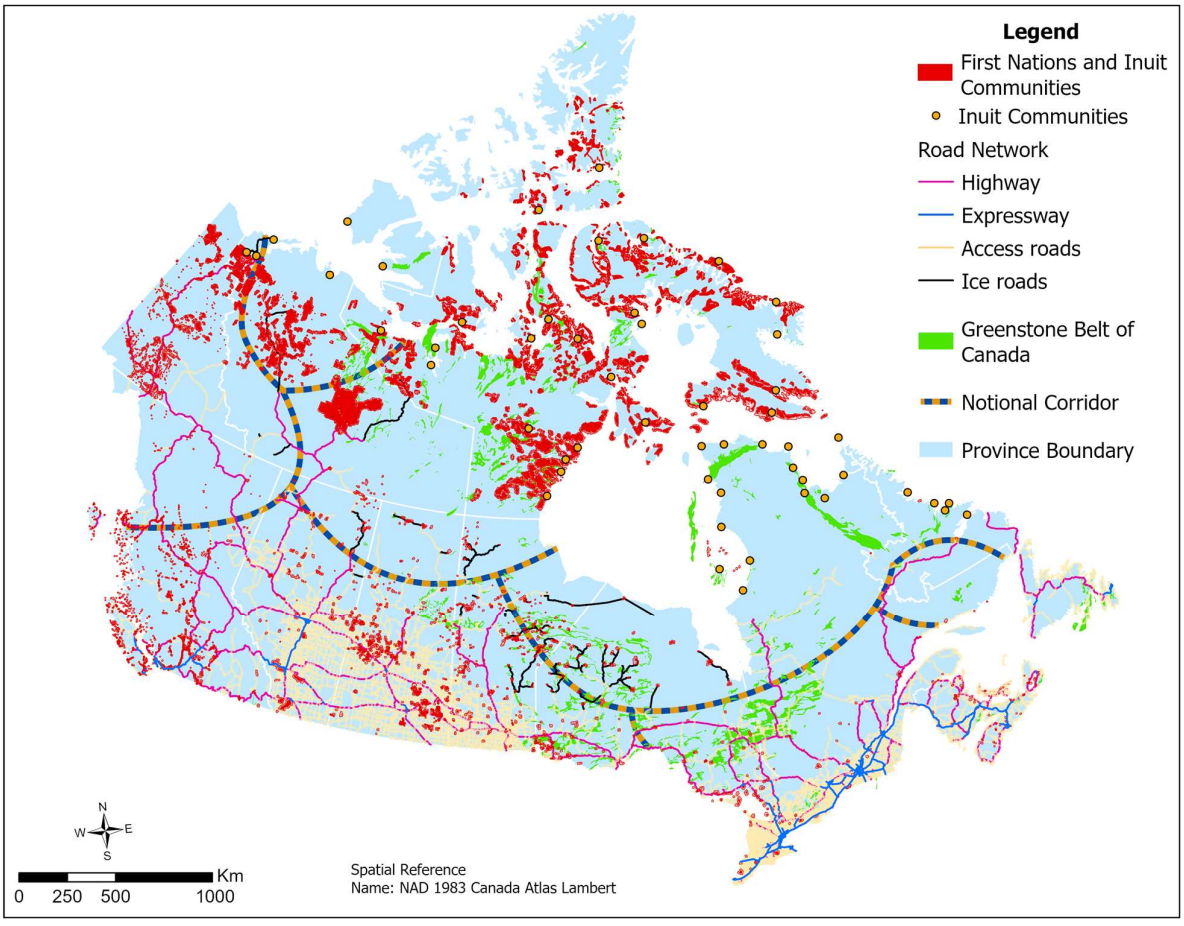

Figure 7. National northern corridor notional route linking greenstone deposits to ports through the Island Lake region. Data Source: [23].

The Island Lake Tribal Council for the RSLFN and the other three First Nations in Island Lake applied for funding towards making 500,000 hectares of their territory an IPCA. This area proposed for an IPCA is shown in Figure 8 marked in green. This area is all

within the Anisininew traditional territory marked in blue. Their IPCA proposal purposely avoided mining claims to abide by the only criteria listed, which is that the land must be free of claims. This IPCA funding application [83] reads:

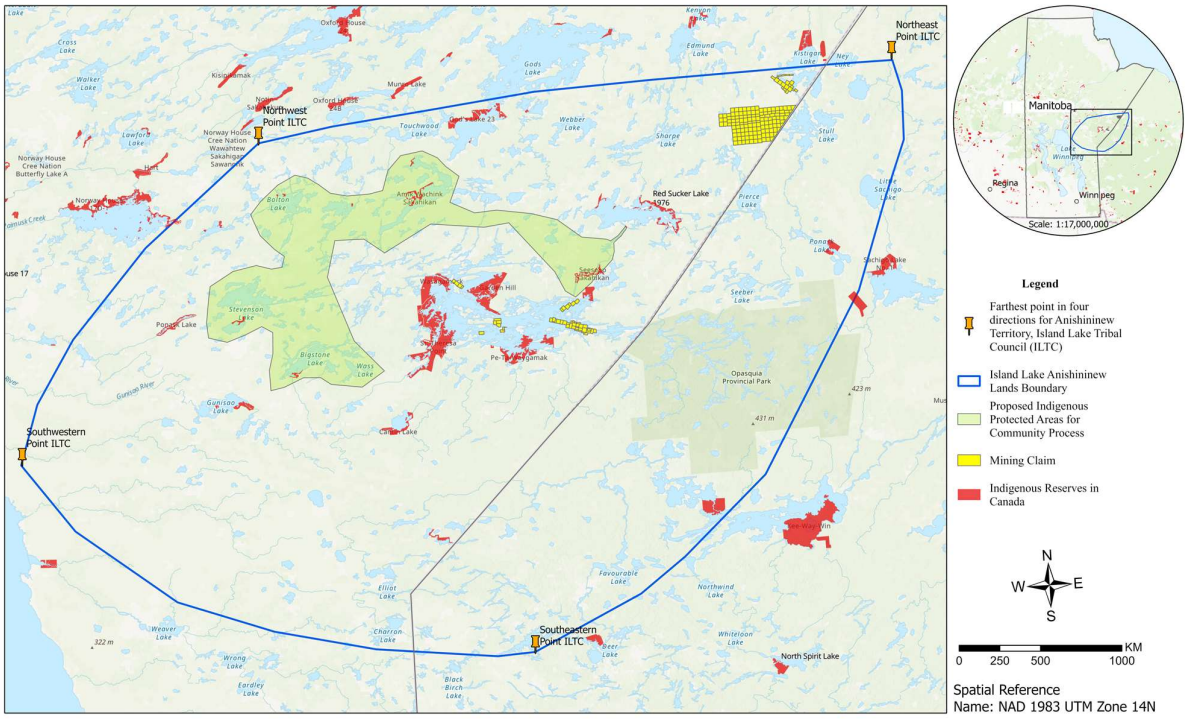

Figure 8. Island Lake Tribal Council's proposed 500,000 hectares of Indigenous protected conservation area in their Anisininew Territory. Data Source: [83].

> "The Island Lake Anisininew leaders and communities are dedicated to keeping their aki (land) sacred as the Creator made it. We want to protect the Hayes Watershed in the Island Lake region (3 million hectares) but focus this proposal on ecosystem conservation of 500,000 hectares for preserving our aki, culture, biodiversity, sustainable livelihoods, and threatened species. The overall aim is to protect aki according to Anisininew ways, with Indigenous-led land-based conservation education and protocols. Through this project, the four Island Lake First Nations will educate to protect their traditional territory to sustain the benefits of conservation and traditional land use for future generations."

The IPCA aimed to foster land stewardship by Elders teaching youth the ways of the land, according to their IPCA application, which states:

> "Elders and elders-in-training will teach the practice and theory of land guardianship, Anishininew culture, language, respect for aki, traditional protocols, and traditional land uses. The community youth hired will be called land guardians and taught to survive on the land, monitor ecosystems, feed the community, and build permaculture camps to monitor and educate others. . .. [The teachings] will provide Anishininew worldview programming that considers holistic traditional territory protection to achieve mino bimaadiziwin (the good life) for the present and future generations of Island Lake First Nations."

4. Discussion

Indigenous people in the RSLFN and Island Lake want their traditional land uses and land protected. To this end, the Island Lake Tribal Council for the RSLFN and the other Island Lake communities carefully devised an IPCA area without including existing mining claims or other incumbrances. Given the pressing issues of climate change and

biodiversity loss, the proposed IPCA offers global benefits. Supporting IPCAs for Island Lake and other IPCAs designated by Indigenous governments would advance Canada's target for biodiversity, preserve peatlands, ensure traditional land uses, protect endangered species, and restore ecosystem balance [7,86]. More research is required but this Island Lake IPCA appears to meet the requirements for a protected area. However, mining interests are interfering with this IPCA. Although Manitoba and Canada proclaim wanting to conserve biodiversity and peatlands, the Island Lake IPCA was not funded to conduct IPCA research due to mining interests [53].

Critical minerals are considered of national importance. Mining, as a result, typically trumps other land uses. For example, in Manitoba, regulations dictate that greenstone belts can only be used for mining. Mining is the polar opposite of an IPCA. Mining creates environmental destruction and obliterates traditional land uses, being an incompatible land use. Most high- and medium-density spots were found to be on greenstone belts, with these land uses in conflict.

Many negative impacts occur from mining, including pollution and habitat loss. Large-scale development of roads and power lines is required as part of a large mining operation in a remote area [3,62,87]. These impacts are felt by the local community, even at the exploration phase. Many RSLFN people complained about mining destroying their livelihoods, wild food supply, traditional land uses, and displacement [3,62,87], without economic benefits. Large spills and noise impacting wildlife in the exploratory phase foreshadow larger impacts when the mine starts.

Maps and statistics clearly show the overlap of TLUs with greenstone belts in RSLFN's territory. RSLFN members complain about mining's many negative impacts on their TLUs. Mining supplies continuously fly in and out of the airport adjacent to the RSLFN in helicopters and planes. The constant noise is disruptive to wildlife and requires some no-fly zones or times to protect wildlife. Amidst these adverse impacts of mining activities on the community, RSLFN members are denied meaningful consultation and reasonable economic benefits during the exploration phase for Monument Bay.

Colonial governments support mining, undermining Indigenous people's self-determination. These colonial governments evicted the RSLFN chief and members from their Native land at Monument Bay and sacked the RSLFN-supported IPCA application, due to mining interests. The Manitoba provincial laws restrict greenstone belts for mining land uses only [82]. Manitoba's Land Use Planning Act Regulation 81/2011 dictates that mining comes before all other interests, stating: "the best and only use of greenstone belts is mining and greenstone belts . . . must be identified and protected from conflicting surface land uses that could interfere with access to the resources" [82] (pp. 39–40). The rich deposits in the RSLFN, indicated by greenstone belts, and the Indian Act resulted in a natural resource curse on RSLFN. This resource curse sank their IPCA proposal, which was to safeguard their land for traditional land uses and give their youth jobs as land guardians.

Canada has laws to reduce the impacts of mining and other developments. Canada's Impact Assessment Act provides a forum to discuss and mitigate mining impacts, but seldom prevents unwanted projects. Further, the Canadian Environmental Protection Act (1999) has a legislative basis for a range of federal environmental and health protection programs that require managing industrial risks.

Mining impacts are expected to ramp up after the exploration stage in the RSLFN, causing more extensive ecosystem damage and impacts to traditional land uses. An onslaught of exploration and mining is expected globally, with an estimated six-fold increase in mineral resources (e.g., lithium, graphite, cobalt, etc.) from 2020 levels to 'net zero' by 2050 [52].

This study expands on Onyeneke's master's thesis with a limited sample size (n = 21). Due to the limitations of this study, further research to determine the coexistence possibilities of industrial mining and IPCAs is needed.

5. Conclusions

Two-eyed seeing provides a way for Indigenous knowledge to guide land use planning to consider IPCAs, biodiversity, and climate mitigation. A two-eyed seeing approach to research prioritizes Indigenous self-determination, with RSLFN wanting to protect its territory in the pristine Hayes watershed. The Island Lake Tribal Council (ILTC) with the RSLFN proposed an IPCA to protect their sacred relationship with the land. The 500,000 hectares of land for protection were carefully chosen around existing mining claims to balance the protection of land in Island Lake with other interests. This IPCA is a way for Canada to meet biodiversity and climate change commitments, through Indigenous traditional ways of environmental stewardship [7,67,88,89] in an area rich in peat.

Climate stabilization and biodiversity require careful planning to balance the economic engine of renewables, which require critical minerals, with land protection for biodiversity, climate stabilization, and Indigenous peoples' livelihoods. Renewables are part of the solution to ecological collapse, if done sustainably, but so are IPCAs. The IPCAs provide a pathway for self-determination, traditional land uses, climate change stabilization, and biodiversity, considering that mining is already heavily impacting their way of life [13].

Mining is an unsustainable activity. Yet, Manitoba's laws state that mining is the best and only 'sustainable' use of greenstone belts. This blanket approach to planning development proximate to greenstone belts undermines the self-determination and IPCA proposal of the RSLFN and Island Lake. This unsustainable broad approach of prioritizing mining counteracts Canada's stance as a global leader in the green economy [90]. Land use planning on greenstone belts need not obliterate the sacred, cultural, and livelihood sites in the RSLFN homeland. More careful planning laws need to consider TLUs, IPCAs, and Indigenous self-determination, not only the mining of precious and critical minerals.

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