Staking a Claim: Mineral Mining, Prospecting Logics, and Settler Infrastructures

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ABSTRACT

Background: Various jurisdictions around the world have adopted online mineral staking platforms, designed to create a seamless process for acquiring mineral rights. This article considers how territory is mediated through staking practices and emerging digital prospecting procedures by tracing the implementation of Mineral Titles Online, Canada’s first web-based mineral title interface.

Analysis: The article draws on archival materials, explores legal cases, and analyzes the staking application to examine how this practice reconstructs settler colonial logics.

Conclusion and implications: The staking application operates as an infrastructure of ongoing colonial extractivism, yet is open to various forms of political intervention—as demonstrated by communities who undermine its intended use.

Keywords: infrastructure; extraction; geomatics; software; settler colonialism; Indigenous jurisdiction

Land theft is currently driven by an unsustainable, undemocratic, and fatal rush toward mass extinction through extraction, development, and capitalist imperatives. It is further enabled by a racist erasure of Indigenous law and jurisdiction.

—Yellowhead Institute (2019a, p. 8)

Good mines are rare golden eggs which a nation must protect with great care.

—Eugène Coste (1885, p. 13)

To stake a claim is to signify a relationship of possession or to declare a right to something. Often used figuratively, the expression grew out of mid-nineteenth century gold rushes, when prospectors registered claims to a plot of land and the minerals contained within it by marking it with stakes. Prospecting is both a practice and a form of rationality, where extractive and possessive logics of colonialism fuse with projective and accumulative operations of capital. While staking a claim refers to an event, maintaining this possessive relationship takes a great deal of work (Moreton-Robinson, 2016). Colonial governments have, for hundreds of years, gone to great lengths to encourage, manage, and scale these geo-social relations through the development of various settler infrastructures (LaDuke & Cowen, 2020; Simpson, 2014; Spice 2018; Yusoff, 2018).

This article examines how settler colonial logics of possession and extraction are being reconstructed through digital infrastructures by analyzing the history of territorial mediation through mineral staking and the implementation of the first online staking system in Canada: Mineral Titles Online. This application was introduced by the provincial government of British Columbia in 2005. As a web-based registry and staking interface, it remediates earlier prospecting practices of ground staking. Integrating geoinformatics and e-commerce, it enables users to stake a claim to subsurface mineral rights remotely and at a low cost, with the click of a button. In a land rush reminiscent of the gold rushes of the nineteenth century, Mineral Titles Online received 2.5 million hits in its first week of operation. It led to a fourfold increase in total land staked from the previous year—from 1.08 million hectares in 2004 to 4.87 million hectares in 2005 (Clogg, Richie, & Lehrer, 2013).

Territorial mediation has been taking place through mineral staking procedures for hundreds of years. Since the early 2000s, across Canada and around the world, various jurisdictions have digitized these processes through online mineral tenure systems. These interfaces are designed to create a seamless experience for acquiring mineral rights. Mineral Titles Online does this through attempting to reify settler colonial constructions of space and erase Indigenous jurisdiction and with it, the contested status of land title in British Columbia, where the vast majority of land is not covered by treaty. The transition to web-based systems has
made it easier and cheaper for exploration companies to stake subsurface rights to remote lands in a centralized manner. Relying on subtending legal, regulatory, and information architectures, these computerized systems change the terms of access to land for extraction.

This article draws on industry journals, legal cases, archival sources, and an analysis of the online staking interface itself to interrogate the logistical politics of settler colonial territoriality that are taking shape through these infrastructural arrangements. Staking practices and their online interfaces are key sites for analyzing the role of logistical media in extending and intensifying the frontiers of extractive capitalism, as well as the practices and strategies mobilized by communities seeking to contest them. By bringing work on mining, settler colonialism, and critical Indigenous studies into conversation with scholarship on media, infrastructure, and software studies, this research traces how extractive settler colonial regimes, largely configured at the provincial level while appealing to global markets, are being reconstructed and maintained through online platforms. While the rise of platform capitalism has seen the concept of extraction expanded to describe the mining of data as raw material, this article considers how the materiality of what has correspondingly been termed “literal extraction” (Mezzadra & Neilson, 2017, p. 4) is being mediated by infrastructures of software-enabled property registry.

Online staking interfaces in Canada are a result of long-standing settler colonial land politics and prospecting practices. Before analyzing Mineral Titles Online, this article outlines the role of prospecting within the imaginaries and infrastructures of both settler colonialism and the mining industry. It then turns to the history of the Fraser Gold Rush to illustrate the foundational and ongoing co-constitutive relationship between mining claims and colonial assertions of sovereignty. Geographer Dawn Hoogeveen (2016) has described mineral staking practices as “everyday enactments of British sovereignty steeped in settler colonial structures” (p. 103). This article attempts to extend this argument, illustrating how everyday enactments of colonial jurisdiction are reconstructed in the design and use of Mineral Titles Online, through which assertions of Crown sovereignty and the disregard of Indigenous jurisdiction are enacted with the ordinary act of clicking a button.

Settler colonial infrastructure
Patrick Wolfe (2006) has described settler colonialism as a structure rather than an event, comprised of various violent logics and strategies that persist and transform over time. Settler colonialism, with the logic of elimination as its organizing principle, “destroys to replace” (p. 388). As a structure, settler colonialism operates through various infrastructures. These infrastructures are the material base and form that carry out and subtend settler colonial strategies and attempt to uphold their continuity through time. They also make claims on territory and seek to undermine inherent Indigenous jurisdiction. While structure, in Wolfe’s (2006)
formulation, refers to complex social formations and logics, attending to settler infrastructure involves charting material arrangements. Settler colonial infrastructures are sites where the logic of elimination takes shape through diffuse networks of power and is maintained in embedded symbolic, affective, and material ways. They are also, however, sites of discontinuity, contingency, and sabotage: often falling short of their own intended functions as well as being vulnerable to various forms of undermining.

Studies of infrastructure find their most common referents in transportation, energy, water, waste, and communications. In much of this work, infrastructure operates not only as the object of analysis but often as an analytic or method. Lisa Parks and Nicole Starosielski (2015) suggest the adoption of an “infrastructural disposition” (p. 5) in media studies, characterized by an emphasis on materiality and the relations of distribution, that attends to enabling conditions and how social reality is built and organized. Their approach is key in considering how the digital infrastructures of online staking—as a system that logs, stores, and distributes mineral rights but also classifies and manages geological information—operates. Mineral Titles Online hosts systems of classification, management, and archiving that materialize jurisdiction through providing access and rights to land. To think infrastructurally is to see how sociotechnical formations and spaces have “emerged, changed, and been layered upon one another over time” (Parks, 2015, p. 357). In this way, infrastructural analyses of power relations diverge from idealist or liberal additive theories of power that see the extension of rights, recognition, and formal equality before the law as adequate measures to address histories of dispossession, racialized oppression, and other forms of subordination. Critical Indigenous studies scholars have long articulated critiques of liberal theories of power that resonate with those now often found in infrastructure studies. Liberal theories of power as manifested in the politics of recognition have been widely criticized by critical Indigenous scholars and activists (Coulthard, 2014; Hunt, 2014; A. Simpson, 2014; L.B. Simpson, 2017). Mushkegowuk (Swampy Cree – Constance Lake) scholar Michelle Daigle (2019) argues that the politics of recognition often manifest in performances of remorse that are “severed from a larger terrain of settler colonial violence” (p. 5) and dispossession in ways that depoliticize Indigenous-settler relations. The spectacle of rights and recognition obscures the ways that power is materially sedimented in relations mediated by infrastructure. While the state posits that reconciliation through recognition can lead to a “renewed relationship” with First Nations, attending to infrastructural conditions—whether a lack of infrastructural provisions, such as drinking water and telecommunications, or the imposition of extractive infrastructures, such as mines, powerplants, or refineries—lays bare how settler colonial power is established, sedimented, normalized, and maintained.

Struggles over extractive infrastructure have been central to political struggles across Canada in recent years: from Coastal GasLink’s incursion onto Wet’suwet’en
lands and the Trans Mountain bitumen pipeline and tanker project in the West to the Ring of Fire mining developments and Muskrat Falls hydroelectric megaproject in the East. For industry and government, these projects are cast as imperative to the health of the national economy. For those engaged in struggles for energy and climate justice, they are key sites where the future of national energy systems and climate commitments are unfolding. These discourses often overshadow, however, the underlying issue that the Canadian state assumes its unilateral jurisdiction over national infrastructure on unceded lands that are, in practice, governed by multiple Indigenous jurisdictions (Cowen, 2018). Both prior to and following confederation, physical and legal infrastructures have been entwined in a circular and reinforcing relationship at the “center of violent relations of rule, materializing settler colonial jurisdiction” (Cowen, 2018, p. 17). Legal infrastructures play a key role in this colonial field of power, not only in disproportionately criminalizing and targeting Indigenous and racialized people but also in the very claim to authority on which settler law rests and enacts. That is, its claim to jurisdiction. Cowen (2018) powerfully demonstrates the foundational link between jurisdiction, settler colonialism, and infrastructure in the Canadian constitution. The confederation relied on infrastructure—specifically the transcontinental railway—to be realized, and the document that wrote it into being, the Constitution, gave the federal government jurisdiction over national infrastructure (see LaDuke & Cowen, 2020).

In order to theorize the multiple and often competing sources of legal authority, scholars have turned to the concept of jurisdiction (Dorsett & McVeigh, 2007; Mawani, 2018; Pasternak, 2017). As opposed to sovereignty, which refers to the possession of ultimate or supreme legal authority within a defined territory, jurisdiction denotes the authority to exercise legal power. Where sovereignty reinforces notions of uniformity and coherence, analyzing colonial power through the lens of jurisdiction points to the limits of legal control and the existence of multiple competing foundations of law (Mawani, 2018, p. 24). A focus on jurisdiction reveals spaces of colonialism as patchy, made up of imperfect legal geographies where full territorial control is not realized in coherent or complete ways (Pasternak, 2017). Legal scholars Shaunnagh Dorsett and Shaun McVeigh (2007) explain that “an exercise of jurisdiction is always an exercise of a technology, or an assemblage of devices, that authorizes law in a general sense” (p. 12). Infrastructures often mediate and materialize these jurisdictional claims to authority in ways that are uneven across space and open to forms of contestation. Attending to the mechanics of mineral claim staking and the interface of Mineral Titles Online, this article argues that the architecture and use of claim staking platforms functions as part of the machinery of state jurisdiction that participates in a broader strategy of capitalist extraction and the colonial dispossession of Indigenous lands.

While the focus here is on the contested nature of mineral lands and the colonial forces that bolster mining economies, it is important to note that Indigenous
nations and peoples have varied relations to mineral development. Many communities collaborate actively with the mining sector, as mineral resource development can provide an opportunity to derive economic benefit to fund essential services and infrastructures (Cameron, 2015). At issue here are the mechanisms through which settler colonial infrastructures—specifically, online mineral claim staking applications—seek to undermine Indigenous jurisdiction and consent over where, when, and under what conditions such developments take place, as well as the kinds of unsustainable and unjust relations such arrangements build into the world.

**Frontier visions and prospecting practices**

Vast infrastructures support the mining industry within and beyond the borders of Canada. There are various stages of the mining cycle: mineral exploration, mine development, extraction and closure. Online staking applications intervene in exploration, the first stage. Given the non-renewable nature of mineral deposits, constant mineral exploration is key to reproducing the conditions for mine development and extraction. For this reason, it has been referred to by the industry as “the lifeblood of mining” (Hemmera Envirochem Inc., 2016, p. 3).

Mining is increasingly governed through supply chain management. Exploration is considered the first stage in the “mineral value chain” (Zuíga, Wuest, & Thoban, 2015). In this phase, prospectors and exploration companies seek to map the location and makeup of mineral deposits and acquire the required permitting and proprietary rights. Mineral Titles Online intervenes with respect to both steps; it mediates the licensing process and also offers users a range of geographic, mineralogical, political, and social information regarding the likelihood of developing a successful mine. Online staking applications make the exploration stage cheaper and easier for prospecting and exploration companies by consolidating communication across various governmental, corporate, and scientific bodies. Similar to online staking applications in other provinces and territories, Mineral Titles Online recodes flows of geological and political information and automates the distribution and record-keeping of mineral tenure rights.

Online staking applications perform the everyday operations of what Anna Tsing (2004) has described as the “magical vision” of frontier cultures. This speculative vision “asks participants to see a landscape that doesn’t exist, at least not yet” (p. 68) one that must be continually reproduced by erasing and dispossessing other residents’ rights, creating in their place “wild and empty spaces where discovering resources, in place of stealing them becomes possible” (p. 68). The magical vision of frontier rationality is a key operation of mineral exploration. The term prospect finds its meaning in both the notion of looking out in space and looking forward in time. Prospecting is always in part a speculative exercise. Mineral lands and underground mineral deposits do not simply exist awaiting discovery; they must be created, cleared, and rendered through techniques of rationalization and
visualization. While all natural resource economies rely on forms of mediation to gather and plot data pertaining to abundance, availability, and use, mining requires unique forms of mediation as mineral deposits are underground and entirely out of view. They require a host of technologies to render them knowable and finances to make them extractable. These technologies are not new, they are built upon longer histories of geo-social relations.

In the centuries following European arrival in the Americas, successive gold rushes swept northward, reaching what is now known as British Columbia in the 1850s (Hoogeveen, 2018). Often marked by violent clashes between incoming miners and local Indigenous communities, these events also occasioned the development and administration of colonial mining laws (Hoogeveen, 2018). During the Fraser Canyon Gold Rush of 1858, thousands of California miners flooded into the centre of Nlaka’pamux territory. Hungry for gold, the miners disregarded local laws, committed sexual violence against Nlaka’pamux women, and disrupted critical salmon fisheries by occupying shorelines and diverting rivers (Marshall, 2018, p. 150). These violent incursions were met with resistance by the Nlaka’pamux and their allies leading to what would come to be known as the Fraser Canyon War (Marshall, 2018). Concerned about the threat American miners posed to tenuous British interests in the territory, James Douglas proclaimed sovereignty for the British Crown over the region (Loo, 1994). The following year, the first formal mining legislation was enacted through the BC Gold Fields Act, 1859 (Hoogeveen, 2016). The Act took on its material and practical form in the establishment of the Office of the Gold Commissioner, a body that was given jurisdiction to carve up lands into mining districts; distribute mineral licenses to miners and prospectors; and record, store, and manage mineral claims and information pertaining to the geology of mineral lands.

Legal mechanisms were adopted during the gold rush period that are still enshrined in law today. The BC Gold Fields Act of 1859 established a free-entry mining regime, a system that continues to be the basis of most mining regimes in Canada and in many regions across the Americas. With it, colonial administrators granted miners the right to stake mineral claims through the distribution of mining licenses, a practice that continues today. The licenses distributed were called “free miner’s certificates” (Hoogeveen, 2016, p. 96) and were appointed in the name of the Queen of England. In this respect, when the holders of these licenses staked mineral lands, they asserted British sovereignty to the subsurface.

Free-entry mining regimes reflect an extractive ideology that privileges mining as the most valued land use. Free-entry regimes typically comprise three key elements: prospectors are given the right to freely access land in which the minerals are held in public ownership; prospectors can take possession of these minerals
through the act of staking a claim; and the right to stake and possess mineral claims often leads to the ability to develop and mine the minerals discovered (Thériault, 2019). These regimes became the customary laws of the mining camps in the California Gold Rush and tended to travel with the gold rushes across North American in the nineteenth century (Barton, 1993). In the mid-nineteenth century, British colonists in the West were far from colonial centres of power and control and without an extensive colonial apparatus or infrastructure (Loo, 1994). With this tenuous hold on authority, colonial administrators had to assert their jurisdiction carefully. In the gold fields, this led them to accommodate miners’ practices and develop regulations that reflected the free-mining tradition they had brought with them from camps in California (Mills, 2018).

Free entry is a key means through which settler colonial governments continue to support mineral extraction above all other land uses. Barry Barton (1993) explains why prospectors are given such expansive rights:

One can see the free entry system as a covenant between the mining community and the government or wider community. Historically, the covenant was that the miner would be the pioneer and would open up the wilds, the untamed and forbidding wilderness. The miner would be the first agent of settlement and would push back the frontier. ... The miner would seek out and develop the resources of the new lands and would create new wealth. (p. 167)

This notion reflects a particular colonial imaginary of developmental settlement: the prospector seeks valuable minerals, the miner extracts them from the land, and together they create wealth for the benefit of the “wider community.” In this imaginary, the prospector’s freedom to traverse the land is seen as imperative to their potential to develop new mines, which is understood as being in the public interest. Here, the logic of prospecting intersects with the horizons of settler invasion, belonging, and futurity. Prospecting as a means of creating wealth is tied directly to colonial expansionism, not only because the extraction of these resources requires control over the spaces where they are to be found but also because this wealth serves as the basis for new settlements. Prospectors’ freedom and their and fantasies of expanding horizons for settlement were nightmares of invasion and dispossession for others. “Geology is a mode of accumulation, on one hand, and of dispossession, on the other,” Kathryn Yusoff (2018) writes, “depending on which side of the geologic color line you end up on” (p. 3).

Another key legal mechanism through which free-entry mining is enabled is the division of surface property rights from subsurface mineral rights. This stratification was introduced in order to optimize the use and extraction of the Crown’s vertical territory (Coste, 1885). This “split-estate” principle renders the geological
stratification of land a legal matter of property by creating two distinct categories for property and its commodities: the land’s topology and the matter contained below its surface.

The development and popularization of geology dovetailed with the colonial development of what would become Canada: theories of the Earth’s stratigraphy and inner architecture naturalized notions of Western colonial extension, providing expansionists with sights on a future transcontinental nation a rationalist basis for their imperialist impulses (Zeller, 2009). The science turned rocks and mineral lands into forms of inscriptions that could be read to reveal information about subterranean geologies and their potential as sites for the extraction of mineral wealth (Braun, 2000). The circulation of geological media, in the form of specimens and maps, was essential for mobilizing capital for mining endeavours in the provinces; they allowed investors and colonial officials in metropolitan centres to reimagine and reconstruct localized sites according to their extractive potential (Braun, 2000). Bruce Braun (2000) describes this as an instance of the entanglement of financial and geological abstraction, where “the circulation of one inscription, the geological map, permitted the circulation of another, money” (p. 25).

Geology, as a method for generating knowledge about the physical world, has been deeply entangled with imperial history, capitalist accumulation, and colonial dispossession. Under the banner of the Geological Survey of Canada (GSC), which was established in 1841 and predated confederation by almost a quarter century, numerous expansive survey expeditions were undertaken. Geologists and naturalists collected specimens, drew maps and sketches, and took measurements. These practices were driven by the desire for valuable minerals and fuels that might fund and power the British North American colonies. These practices transformed landscapes into value-bearing media. At confederation, jurisdiction over land and resources was granted to the provinces. Lacking surveys of their own, provincial mining departments relied on the federal GSC’s maps, surveys, and reports. The GSC was a significant information infrastructure that brought Canadian territory and its various qualities into communication with other forms of knowledge, including births, death, population, and health, which together formed the political rationality of the time (Zeller, 2009). As one of these inventory sciences, geology was considered a necessary field for those who sought to put the nation’s resources to use in the most enterprising and efficient way possible.

Rendering this geological imaginary operational, however, relied not only on a vertical attention but also a topological one. That is, mineral lands can only function as sites of potential wealth, and the minerals contained with them as commodities, if transportation infrastructures such as roads, canals, and ports reach them and administrative procedures manage their flow. This gave rise to the space-binding infrastructural imaginary that has been central to the Canadian national project (Barney, 2017; Berland, 2009; Innis, 1999). While geology, among other Victorian-
era sciences, naturalized Canadian expansionism, the extraction of these minerals would require the transportation and communication infrastructures of rail, canal, port, and telegraph to bind spaces together and render such lands extractable.

Colonial administration and law have played a key role in the management of settler infrastructures designed to optimize conditions for extraction. A common thread that runs through colonial documents and rhetoric from the nineteenth century to the present is an insistence that the government ought to do whatever it can to promote the discovery and development of workable mineral deposits. The techniques and strategies through which colonial governments have sought to execute this imperative have changed over time. The analysis that follows seeks to draw out the role of administrative infrastructures in mediating this relationship between colonial dispossession, capitalist accumulation, and geological imaginaries and practices. A set of technical processes have reproduced, maintained, and in many ways intensified this relationship over time. These processes are the focus of the rest of this article.

Claim staking

Prior to the introduction of online staking in 2005, acquiring secure and valid mineral rights in British Columbia required prospectors to follow specific procedures for physically staking claims in the ground, among other bureaucratic measures, such as filling out paperwork and paying necessary fees. Before setting out in the field, prospectors were required to contact the gold commissioner to obtain current mineral title information for the areas they intended to explore. The gold commissioner was then required to provide maps displaying information on up-to-date mineral titles and staking regulations, forms, and tags for making the perimeter of the claim (Mineral Titles Branch, 1999). To stake their claims, prospectors inserted wooden stakes into the ground or fashioned posts using nearby rocks and trees (see Figure 1). In order to ensure a claim was valid, metal tags marked...
with identifying serial numbers would be fashioned to the posts or cairns. Prospectors recorded the area using a claim form and were required to complete a sketch of the claim on a map, submitting it to any government agencies by mail or in person (Mineral Titles Branch, 1999).

During the early 2000s, the provincial mining sector underwent deregulation, among other policy measures, as a means to bolster the mining industry. Significant interventions included the formation of Geoscience BC, a privately operated but largely publicly funded and public-facing geological science organization, and the introduction of online mineral staking (Özden-Schilling, 2014). In ground-staking procedures, modes of inscription include claim sketches and plotting maps. Online staking applications shift the site of inscription to digital cells, which demarcate the bounds of mineral tenure. Using Mineral Titles Online, those registered with the Mineral Tenure Branch as free-miners can log in, open the map viewer tool, demarcate boundaries around a claim using a shape-drawing tool, and proceed to purchase subsurface mineral rights with a debit or credit card. The system keeps an up-to-date and open ledger of current and historical mineral title information, instantaneously processing transactions and registering tenure purchases. The database and mapping tools automatically update, reflecting new acquisitions once payments are confirmed.

Mineral Titles Online not only acts as an online store for subsurface mineral claims but also as an information database, with up-to-date land titles, and cadas-
eral, mineralogical, political, jurisdictional, and ecological information. The site’s map viewer (see Figure 2) enables users to navigate the application, and a sidebar displays the options for selecting and overlaying various layers of spatial data, with a zoom function that allows for different scales to come into view. The first layer listed for selection is “mineral titles,” which indicates historical and current mineral, placer, and coal titles. The next selection, “other mining layers,” allows users to overlay spatially demarcated and colour-coded information indicating the likelihood of discovering new metallic or industrial mineral resources in a given area. “Crown land layers” includes data drawn from the Crown land registry database, which has been continually expanding since the Hudson’s Bay Company first began surveying in the region in the 1850s, that indicate surface ownership, subdivision, and the lease status of land parcels. The “administrative boundaries” layer offers information on boundaries that could affect the development of future mines, such as agricultural land reserves, parks, and conservancy areas. “Private land layers” indicate the location, shape, and size of land parcels and surface land classification. “Other resource layers” include wildlife management areas, ungulate winter ranges, and habitat areas for species at risk or otherwise regionally significant wildlife.

**Mineral titles online as settler colonial infrastructure**

One of the options that can be selected in Mineral Titles Online is “First Nations,” which includes the geographic boundaries of treaty and reserve lands. By only highlighting the regions that lie within a negotiated treaty or are federally carved out Indian reserves, this layer offers an exceptionally limited and colonial view of Indigenous territory on the map. The “First Nations layers” obscure the unsettled questions of sovereignty and jurisdiction across the vast majority of the map by excluding the numerous Indigenous territories that are sites of ongoing contestation and claims. Furthermore, the limited vision of Indigenous jurisdiction offered by the application can be easily ignored with the click of a button, as the interface affords users the ability to select or deselect the “First Nations layers” as one of multiple abstractable options.

Across almost all of the territory that would later become British Columbia, colonial administrators blatantly ignored the issue of Indigenous title to land (Harris, 2003). As Anishinaabe/Ojibway legal scholar John Borrows (2015) explains, this not only involved the province being “created without much regard for the land’s Indigenous inhabitants … it was created in the face of First Nations active resistance” (p. 705). This illegitimate assertion of Crown sovereignty rested on the principle of *terra nullius*: the legal the legal fiction, based on racist understandings of Indigenous land-use practices, that lands were not owned prior to European settlers’ arrival. The Supreme Court of Canada recently confirmed in *Tsilhqot’in Nation v British Columbia* (2014) that “the doctrine of *terra nullius* ...
never applied in Canada” (para. 69). Despite this, Borrows (2015) explains that “Canadian law still has *terra nullius* written all over it” (p. 702) because despite invalidating *terra nullius*, the decision maintains that the Crown holds radical or underlying title to the province. This, he argues, would not be possible without *terra nullius* or another similar legal principle.

Borrows (2015) refers to this contradiction as a kind of “emptiness at the heart of the Court’s decision,” where “some kind of legal vacuum must be imagined in order to create the Crown's radical title” (p. 703). For Pasternak (2017) there is a “gap” between the “state’s assertion of sovereignty over Indigenous peoples and its legal authority to exercise territorial jurisdiction over Indigenous peoples and their lands” (p. 3). In other words, there is no legal basis for assertions of Crown sovereignty (Borrows, 2015; Drake, 2015; Pasternak, 2017). Settler governments often seek to address this gap and gain certainty regarding their claims to sovereignty through various mechanisms including attempts to extinguish Indigenous title and replace their claim to authority (Pasternak, 2017, p. 5). Despite these schemes, Indigenous legal orders continue to persist and thrive (Yellowhead Institute, 2019a). This tension reflects what Pasternak (2017) describes as a “suspended space” (p. 4) between settler assertions of sovereignty and the force and vitality of Indigenous law and territorial jurisdiction. Even on its own terms, settler sovereignty does not rest on any substantive justification; it is simply assumed and asserted. This article suggests that this metaphysical lack makes the actual operation and mechanics of settler colonial jurisdiction, and in this case, how they are mediated through digital infrastructures, particularly important because these forms of mediation are indicative of the contingent nature of these claims to authority and of possible sites to undermine them.

Online staking infrastructures install an experience of seamlessness in acquiring mineral rights. In the case of Mineral Titles Online, this seamlessness relies on the aforementioned vacuum, reproducing it in the design of the interface in a way that folds Indigenous jurisdiction into the “First Nations layers.” This is not only colonial and ideological, but it also erases the legal uncertainties that exist in regard to title. As Métis scholar Karen Drake (2015) has argued, Canadian free-entry mining legislation is incompatible with Indigenous constitutional rights because it allows for mining claims to be recorded without prior consultation (p. 186). This incompatibility is encoded into online interfaces in the mechanics of staking itself, where tenure rights can be acquired unilaterally to lands subject to ongoing or potential Indigenous claims. Mineral Titles Online, similar to other online staking applications across the country, structures the claim process in such a way that creates a seamless experience for the mineral title claimant while evading the Crown’s constitutional duty to consult.

As Shiri Pasternak and Tia Dafnos (2018) describe, British Columbia is “ground zero” for “uncertainty” regarding Indigenous land interests in Canada”
due to the fact that almost all of the territory was never the subject of treaty. Online staking interfaces hide the constructed and contingent nature of colonial jurisdiction behind seemingly benign, tabularized, and precise data points. They project an image of Crown sovereignty that does not reflect its uncertain nature or the ongoing vitality of Indigenous law and jurisdiction.

One of the key concerns raised by mining and environmental justice advocates in relation to online staking is that it makes it more difficult for communities to monitor staking activity in their territories (Clogg et al., 2013). Geologists and prospectors were previously perceptible as they traversed lands or flew in helicopters. Staying abreast of ongoing staking activity now, however, requires communities to monitor activity in the online application. To view staked claims, users must zoom in on the map to bring relevant claim data into view. This requires bandwidth often unavailable in northern and remote communities, many of those most affected by mining and online staking (P. Siebenmorgen, personal communication, October 19, 2019). Mineral staking applications’ “environment of expected use” (Light, Burgees & Duguay, 2018) is reflected not in only in the design of the interface, but also in the presumption of access to high speed or affordable internet, despite the fact that such infrastructural conditions are often not extended to rural and remote communities (see Duarte, 2018; Ruiz, 2014).

By reflecting an aspirational yet non-existent colonial sovereignty where Indigenous jurisdiction is abstractable, Mineral Titles Online installs the economic image of the province it seeks to enact. The application reconstructs the land as available and open for business, performing precisely the kind of “magical vision” of frontier rationality described by Tsing (2004, p. 68) in software encoded form. Drawing out the application’s environment of expected use illustrates how it imagines its users and embeds specific interests within the coded space of its architecture. Wendy Hui Kyong Chun (2005) and Alexander Galloway’s (2012) work on software as ideology is also useful in this analysis. The link between software and ideology is suggestive not only of the notion that value systems are laden in socio-technical systems but points to the ways in which software installs the hierarchy of relations that it performs, interpellates users in its interface, and, in turn, compels users to perform those hierarchies by using them. What is at issue with users navigating the map viewer, abstracting layers of spatial data, and drawing forms around claims they intend to purchase is not that they believe that the land is alienable in this way but that they interact with the system as if it is. While modes of abstraction have shaped geological practices and economies for hundreds of years, the operation of the map viewer demonstrates how this dynamic operates in an intensified way with such software systems. Infrastructures, like frontiers, involve the mediation of an imagined future, with certain subjects and beneficiaries in mind. The standards, tools, formatting choices, and omissions leave an imprint on the political and economic vision of the future of the province.
Settler colonialism operates as a socio-spatial structure that many discursive regimes work to justify, sustain, and reproduce. Hegemonic discourses, such as this one, operate in ways that cloak their ideological force under infrastructures of common sense. Software is increasingly bound up with these social, spatial, scientific, and colonial practices. Mineral Titles Online performs a kind of technical transcoding in the way it presents the apparatuses of mineral staking; the histories and work of surveying land, gathering and recording mineralogical data, standardizing records, and assembling them into a database are resolved in the software interface itself. This installs a form of false objectivity, where relations between complex spatial and colonial relations become relations between icons and buttons.

Undermining online mineral staking
Investing in mining exploration and junior mining companies is thought of as high-risk. Mineral exploration is a speculative enterprise, and in such endeavours, profit must be imagined before it can be extracted (Tsing, 2004). The line between the kind of investment that the government seeks to attract and the kinds of speculation it considers unproductive can be a fine one. As mentioned, Mineral Titles Online saw a fourfold increase in total land staked within its first year of operation (Clogg et al., 2013). While this seems to be in keeping with the government’s intention of decreasing barriers to acquiring mineral rights, it led to an unexpected outcome in practice. In the government’s attempt to engender a more attractive investment environment, the application opened the licensing system to more speculative land acquisition practices, termed “dead-staking,” whereby speculators purchase tracts of land without any intention of developing actual mines. Instead, buyers hold the land until commodity prices make it attractive to sell the title at a profit. This speculative practice breaks the “covenant between the mining community and the government or wider community” (Barton, 1993, p. 167), as outlined earlier, whereby the miner would develop resources and “create new wealth” (Barton, 1993, p. 167). The provincial government of British Columbia, similar to others seeking to attract investment in natural resource extraction, relies on a certain level of speculation to drive investment in new mines. In this context, however, Mineral Titles Online, by acting as a medium for abstraction and financialization, created a speculative market for mineral title that undermined the application’s intended use. As explained by a representative from the BC Ministry of Energy, Mines, and Petroleum Resources, “Where the land is held by a mineral claim that is not adequately explored, the province loses the potential for finding a mine. The land is sterilized from legitimate exploration” (Pollon, 2010, para. 5).

Speculative land staking practices are not the only way that the intended use of the online staking system has been undermined. In January 2017, Bev Sellars, former chief and councillor of the Xat’šūll First Nation and author, filed an application with the province to obtain a free-miner’s certificate, logged into
Mineral Titles Online, and staked and purchased the mineral rights to the one-hectare residential property of then minister of energy and mines Bill Bennett, who was a vocal advocate of the online staking system. In a process that Sellars said took less than an hour, she purchased the rights to the subsurface minerals sitting below Bennett’s home in Cranbrook for $104.89 (Hunter, 2017). The claim gives Sellars the exclusive rights to explore the area for mineable metals, “The basic fact is, I now have a right on his property and will definitely consider all my options,” (Narine, 2017, para. 8) she explained. She stated that her claim was intended to bring attention to the ease of access that Mineral Titles Online brings to mineral staking, issuing the free miner a number of rights while circumventing Indigenous consent.

Sellars is former chair and current member of the advocacy group First Nations Women Advocating Responsible Mining (FNWARM, 2014). The group’s goal is to promote environmentally and socially responsible mineral exploration and mine development processes that respect First Nations rights and participation. As the name suggests, the group’s position is not simply anti-mining. Many of their members and members’ relatives have worked for mining companies and “have learned first-hand how the promise of riches can quickly turn into destroyed lands and limited low-paying jobs for those who have, for millennia, depended on those lands” (FNWARM, 2014, p. 5). In a 2018 interview, Secwepemc and Nuxalk activist, researcher, and FNWARM coordinator Nuxmata (Jacinda Mack) explained that members of the group bring an important perspective that informs their advocacy for responsible mining and stewardship on the basis of their relations “as women on councils or in chiefs’ positions, and as mothers, grandmothers, daughters, and sisters” (2018, p. 5). Such perspectives, she explains, enable them to recognize and seek repair for the damages brought by mining, which tends to put certain gendered bodies at risk from violence, negatively impacts non-human life, and pollutes the land and water communities depend on (Mack, 2018). Kim TallBear (2016), of the Sisseton-Wahpeton Oyate and Cheyenne and Arapaho Tribes of Oklahoma, has noted the “striking women-led condition” of many current social and environmental justice movements—from Idle No More to No DAPL to Black Lives Matter. Noting importantly that neither care nor womanhood are the domains of solely “cisgendered, biologically-reproductive women,” TallBear (2016) characterizes the role and work these leaders are doing as “caretaking their peoples and others” and ensuring the well-being of “other-than-human relatives” (para. 2). To care is to look after, often involving the provision of what is necessary for life. While feminist theorists have complicated the status of care, demonstrating its ontological and political ambivalence and the ways it can be complicit in the reproduction of oppressive conditions (Murphy, 2015; Puig de la Bellacasa, 2017), the kind of
caretaking referred to here is nonetheless vital to the constitution and maintenance of alternative worlds and the reparative infrastructures necessary to sustain them (Berlant, 2016; Cowen, 2017).

Alongside its immensely important Red Paper “Land Back,” the Yellowhead Institute (2019a) released a web-based application called the Mine Sweeper Map (Figure 3). Playfully named after the single-player puzzle computer game where players seek to clear the board without detonating any of the hidden “mines,” the Mine Sweeper Map is a GIS-enabled visualization tool, currently covering Québec and Ontario, that illustrates the location and scope of mining claims and links them to the location of First Nations’ reserve lands. The application automatically searches provincial datasets and correspondingly updates the map when new claims are registered, thereby keeping a publicly accessible log of up-to-date mineral title claims (S. Pasternak, personal communication, November 19, 2020). In this way, the Mine Sweeper Map undermines the intended use of the provincial online staking applications, algorithmically drawing their data to represent the scope and scale of mining claims. In doing so, this critical mapping project intervenes in the profound imbalance created by the alignment of state and extractive interests (see Wylie, 2018) in the ways that online mineral staking interfaces visualize territory and distribute critical access to knowledge regarding claims.

**Figure 3: Online mining claims**

Source: Yellowhead Institute (2019b), mine-sweeper map view showing mining claims and First Nations.
Under the mineral staking regimes in these provinces, mining claims and the consultations that result from them take place one by one. Extractive projects are approved on a “block-by-block” basis, yet communities and ecosystems do not operate in such fragmented ways. Land alienation, ecological fragmentation, and degradation from infrastructural projects and extractive economies are interconnected and compound over time while the aggregate of issued mining licenses to private companies alienates Indigenous land and title areas. The lack of transparency about the cumulative impacts of extractive industries is one of many mechanisms that undermine free, prior, and informed consent (Yellowhead Institute, 2019a). While multiple settler infrastructures work to leverage the scope and scale of extraction, the compounding character of ecological effects and colonial incursions are hidden from the view of affected communities, undermining their ability to make informed decisions about land use and extractive projects on their territories (Yellowhead Institute, 2019a). Thus, visualizing “the scope and scale of extraction,” as the Mine Sweeper Map does, politicizes the problem (Yellowhead Institute, 2019a, p. 30). Michi Saagig Nishnaabeg scholar, writer, and artist Leanne Betasamosake Simpson echoes this understanding in reflecting on her collaboration with Elders on a land-use mapping project for Long Lake #58 First Nation: “Laid out in a visual way, the magnitude of loss cannot be explained away, the strategic nature of colonialism cannot be ignored. The driving force of capitalism in our dispossession cannot be denied” (2017, p. 13).

Conclusion
Canada is the epicentre of the global mining industry. Not only are 75 percent of the world’s transnational mining corporations headquartered in Canada, the country is also at the centre of global mining finance (Deneault & Sacher, 2012). Canadian extractivism is by no means limited to its own territorial bounds. The extractive ideologies and practices that have taken shape throughout Canada’s settler colonial history—whether through geological and financial expertise, software design, or governance—have reach across the globe, bringing toxic environmental, cultural, and political legacies with them. Settler colonial extractivism and its infrastructures not only affect the politics of land and life in Canada but also around the world.

Settler colonial regimes are co-produced in relation to the global political economy of capitalism, and the policies and platforms that govern them are tied into international strategies of accumulation (Pasternak & Dafnos, 2018). While the discussion here is largely limited to how digital mineral staking carries forward and reconfigures settler colonial territoriality, it is important to note that this form of mineral tenure management is used across the world. The World Bank Group has actively supported the adoption of computerized cadastre systems in a number of so-called developing countries (Ortega Girones, Pugachevsky, & Walser, 2009).
many cases, private geoinformatics companies own and operate these platforms, posing troubling questions of ownership and control. These software systems—in a similar way to infrastructural conditions such as roads, power, and telecommunications provision—are promoted as necessary technologies for rendering lands attractive for capital investment in accordance with international standards and for making a country’s resource sector competitive in the global mining sector. In this way, they have a centralizing and standardizing effect on regulatory regimes, geoinformatic representational practices, and the terms of access to land for extraction. Online staking systems are a key piece of digital infrastructure for the global mining industry, which is increasingly investing in geospatial analytics, artificial intelligence, and forms of automated labour (see Arboleda, 2020).

The notion of staking a claim is definitive of not only settler colonial logics of (dis)possession but also extractive and unsustainable relationships with land and non-human beings. The stakes of rethinking extractive relations could not be higher. Charting historical and present entanglements of settler jurisdiction and its extractive infrastructures—roads, canals, and bridges and also bureaucratic procedures, regulatory regimes, and software—reveals both the violence and ordinary quality of these fields of power. Infrastructures assert a normalizing force, often inscribing hegemonic power into sociotechnical and spatially distributed systems, where it is reproduced in everyday acts, assumptions, and forms of forgetting. The embedded nature and scale of these unsustainable and unjust relations can make imagining a future without them a daunting task. In this context, infrastructures, as sites where futurity is materially and ideologically negotiated and struggled over, demand critical, creative, and persistent attention. That is, to undermine extractive settler futurity and its radically unsustainable relation to planetary life requires contesting its infrastructures.

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Notes
1. Newfoundland and Labrador, Nova Scotia, New Brunswick, Ontario, Québec, Manitoba, Saskatchewan, and Nunavut have also introduced online mineral staking.
2. This understanding of territory is informed by Stuart Elden’s (2010) account, which conceives of it as a political technology reliant on a range of logistical and cartographic techniques—such as land surveying, navigation, and visualization—that emerged alongside political-legal relationships...
of sovereignty, jurisdiction, and authority. This conception is insightful for its insistence on the
dependence of territory on various epistemological and juridical techniques.

3. Before the creation of Geoscience BC in 2005, few public databases of mineral information
existed. The organization aggregates historical and existing geological information and carries out
exploration-driven geological survey work. Geoscience BC has a mandate to act as the “avant-
garde of mineral development in the province” (Özden-Schilling, 2014, p. 67).

4. The term undermine, used here to describe the unintended uses of online staking systems, is
drawn from the work of art critic and curator Lucy Lippard (2014). She uses the term as the title
of her book on the changing relations of land, art, and aggregate mining in New Mexico, explaining
that it operates on many levels. She literally describes the pits and shafts that alter landscapes,
capturing “what we are doing” to land “when greed and inequality triumph,” as well as the possi-
bility of subversion, that is, “undermining as [a] political act” (Lippard, 2014, p. 2). Undermining
as a political act operates in a similar way to sabotage. In the case of undermining the intended
use of online the applications, the examples here demonstrate that subversion is open to both
capitalists seeking to leverage value as well as activists such as Sellars seeking to undermine and
redirect that value. The ambivalence latent in such technologies is what opens them to forms of
sabotage or undermining (Barney, 2019).

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