Alberta Soil Health: Law and Policy

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Introduction

Alberta's resilience in the face of economic and climate-related threats is directly related to the quality of our soil. Ensuring the sustainable management of agricultural soil is imperative in the Alberta context. Not only is the agriculture sector vital for provincial economic well-being, accounting for 1.2% of Alberta's GDP, but it also serves as a source of identity for producers and communities.[1] As of 2020, the agricultural sector in Alberta employed 42,500 people in primary production and indirectly created another 27,300 jobs in food and beverage manufacturing.[2] The sector is also a "vibrant and significant contributor to Canadian agriculture," meeting the demands of consumers in both domestic and export markets.[3] As global demand for nutritious food increases, it is imperative that Alberta's agricultural lands can adapt to and recover from future environmental disturbances.[4] The Food and Agriculture Organization of the United Nations stresses the importance of soils, on which 95 per cent of the world's foods are directly or indirectly produced.[5]

The concept of soil health has emerged as a holistic framework to assess and manage not only the agronomic functions of soil but also its environmental functions.[6] Recognizing the fact that soil is a non-renewable resource, management for soil health takes a systems approach, focused on the capacity of soil to function as a living system, with the ecosystem and land use boundaries, to sustain plant and animal productivity, maintain or enhance water and air quality, and promote plant and animal health.[7]

The management of soil is complex, as it is often a private resource, but its degradation and loss are a cost to society as a whole. Agricultural lands not only provide food to communities, but also improve ecological balance and enable ecosystem services.[8] Healthy soils control floods, improve water quality, sequester carbon and nitrogen,

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[1] Alberta, "Agriculture: Industries in Alberta," online: Government of Alberta <https://alis.alberta.ca/occinfo/industry-profiles/agriculture/>.

[2] Alberta, Agriculture and Forestry, *Agriculture Statistics Yearbook 2020* (2021), online: *Government of Alberta* <https://open.alberta.ca/dataset/da3573a5-465c-4dc1-8793-36e9dc02b775/resource/68350a33-6224-4f1a-93f1-894cc10c2c75/download/afred-itrb-agriculture-statistics-yearbook-2020.pdf>.

[3] *Ibid*.

[4] *Supra* note 1.

[5] Food and Agriculture Organization of the United Nations, "Healthy soils are the basis for healthy food production" (2015) at 4, online (pdf): *Food and Agriculture Organizations of the United Nations* <http://www.fao.org/3/a-i4405e.pdf>.

[6] Rattan Lal, "Soil Health and Climate Change: An Overview" in Bhupinder Pal Singh, Annette L. Cowie & K. Yin Chan, eds, *Soil Health and Climate Change* (Berlin: Springer-Verlag Berlin Heidelberg, 2011) 3.

[7] *Supra* note 1.

[8] Eric C. Brevik et al, "Connecting the public with soil to improve human health: Connect public with soil to improve human health" (2019) 70:4 Eur J Soil Sci 898–910.

process waste, and promote biodiversity.[9] The agri-environmental policy should emphasize accordingly that healthy and resilient soils have the capacity to mitigate climate change in addition to promoting food security.[10]

Despite the pressing importance of healthy soils policy, little attention has been paid to the legal characterization of the soil itself and to the delineation of rights and responsibilities of owners and other actors in relation to soil. This report is intended to fill this gap and inform producers and policymakers. Part I of the report describes the status of soil as property in the common law system. The common law is the "system of jurisprudence, which originated in England and was later applied in Canada, that is based on judicial precedent rather than legislative enactments…. Common law depends for its authority upon the recognition given by the courts to principles, customs, and rules of conduct previously existing among the people. It is now recorded in the law reports that embody the decisions of the judges, together with the reasons they assigned for their decisions."[11] Among other things, the common law expresses the rules of ownership of land and other resources, the rules for resolving property disputes, and the rules for interpreting property legislation. The common law rules relating to ownership of soil are in tension with its social function.

Part II of the report focuses on statutory law, which includes primary legislation adopted by Parliament and the provincial legislatures, and regulations promulgated by bodies vested with delegated powers such as municipal councils and environmental regulators. Statutory legislation is regarded as "remedial", that is, intended to address some deficiency in the common law.[12] Part II provides an overview of the laws and regulations that govern soil in Alberta and that are designed to promote its proper management.

1. Soil: Property Rights and Stewardship

Inasmuch as soil is synonymous with land, property in one is virtually indistinguishable from property in the other. Where ownership of land is largely private, ownership of the soil is private too. In Canada, land ownership is based on English land law, which regards the Crown to be the "true" owner of all the lands over which it is sovereign.[13] What

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[9] Peter M. Lacy, "Our Sedimentation Boxes Runneth Over: Public Lands Soil Law as The Missing Link in Holistic Natural Resources Protection" (2001) 31 Environmental Law 433.
[10] *Supra* note 6.
[11] *Barron's Canadian Legal Dictionary.* See also *Black's Law Dictionary*, which defines the common law as "The body of law derived from judicial decisions, rather than from statutes or constitutions".
[12] *Heydon's Case* [1584] 76 ER 637.
[13] Kevin Gray & Susan F. Gray, *Elements of Land Law*, 5th ed (Oxford: Oxford University Press, 2009).

landowners in Canada typically "own" in the strict legal sense is the right to hold title (or "an estate") granted from the Crown. The radical title of the Crown finds expression, for example, in the power to reclaim title by means of expropriation.[14] But for most intents and purposes, land in Canada, and agricultural land in particular, is privately held.

Private property is often (but not always) held to promote better use and management of resources than public ownership or no ownership (open access).[15] In the perennial parable of the tragedy of the commons,[16] a common pasture is depleted due to overgrazing, because every owner, acting in their private interest, attempts to maximize the number of their own livestock without regard to the common good. One solution to the conundrum is to carve the common pasture into private allotments on which each rational owner can be expected to graze no more animals than is sustainable. By the same token, the owners of land are expected to manage their soils in their best interest: to nurture the soil, to take measures to avoid contamination and erosion, etc. Soil loss and degradation on the private lands in Canada was widespread until 1940s[17]; however, more recent studies suggest that soil health across most Canadian provinces has improved significantly in the last 30 years. For instance, Soil Quality Compound Index[18] has improved from 64 to 77 between 1981 and 2011. These improvements can be largely attributed to the adoption of best land management practices, such as increased adoption of reduced tillage and no-till practices, cover crops, and the reduction in area under summerfallow in the prairies. To note, cover crops improved soil organic matter while reduced tillage helped in lowering soil erosion risk. Limited summerfallow improved soil health, reduced soil erosion from wind and water and optimized salinization risk.[19]

What explains this private failure?

Private property can fail to align private costs and benefits with common welfare for different reasons. The most common reasons are as follows. First, where the resource in question or its physical or legal boundaries are not well-defined. Second, where the legal

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[14] See, e.g, Eran Kaplinsky & David Percy, *A Guide to Property Rights in Alberta* (Alberta Land Institute, 2013), online: < https://www.albertalandinstitute.ca/public/download/documents/10432>.

[15] Daniel H Cole & Elinor Ostrom, *Property in land and other resources. [electronic resource]* (Lincoln Institute of Land Policy, 2012).

[16] Garrett Hardin, "The Tragedy of the Commons" (1968) 162:3859 Science 1243–1248.

[17] K. W. Hill, *Soil Drifting: Its Causes and Control* (Dept. of Agriculture: Ottawa, 1953), online: https://publications.gc.ca/collections/collection_2015/aac-aafc/A53-896-1953-eng.pdf.

[18] This compound index is a weighted average of the performance indices reported for the Soil Erosion, Soil Organic Carbon, and Soil Salinization Indicators.

[19] Clearwater, R. L., T. Martin and T. Hoppe (eds.) 2016. Environmental sustainability of Canadian agriculture: Agri-environmental indicator report series – Report #4. Ottawa, ON: Agriculture and Agri-Food Canada, online: https://publications.gc.ca/collections/collection_2016/aac-aafc/A22-201-2016-eng.pdf

rights and responsibilities associated with ownership of the resource are not made clear in advance or are defined by reference to "muddy" standards (for example, some conduct being "reasonable").[20] Third, where the decisions of the resource owner result in a positive or negative externality (i.e., the decisions impact the welfare of others and that impact is not accounted for by the owner): for example, use of land that causes pollution or nuisances. Finally, where different owners opt for conflicting or interdependent uses or activities, and there are difficulties or "transaction costs" to successful negotiations between the owners.[21]

In our analysis, the development of a healthy soil policy in Alberta is hindered by all these challenges to varying degrees. "Soil" is not well-defined for legal purposes; rights and duties in relation to soil are poorly defined; decisions made by landowners can transcend property boundaries; and coordination of activities among owners and producers can be challenging.

There are other explanations for suboptimal soil health that are not rooted in private ownership. In our conversations with producers, they stressed the importance of extending soil education to the public and owners of agricultural land in particular. We have also observed from discussions with informants that economic and regulatory incentives can make it difficult for producers who adopt best practices for soil management to compete with other producers who do not adopt such measures.[22] Identifying and assessing these important incentives is outside the scope of this report.

Part I: Property in Soil

2. The Legal Definition and Classification of Soil

The soil is traditionally regarded as the fulcrum of property in land. According to a maxim of the common law, whoever "owns the soil", owns the land up to the sky and down to the depths of the earth.[23] Two concepts of property are entangled in this old maxim: the ownership of the soil, and the boundaries of ownership. As it is used in that classic Latin statement, the word "soil" does not literally mean physical dirt. Here "soil" is used to

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[20] Carol M. Rose, "Crystals and Mud in Property Law" (1988) 40:3 Stanford Law Review 577.

[21] See generally, Henry E. Smith, "Economics of Property Law" in Francesco Parisi, ed, *The Oxford Handbook of Law and Economics: Volume 2: Private and Commercial Law* (Oxford University Press, 2017) 148.

[22] Alberta Land Institute, Understanding and mitigating the gaps between the federal and provincial policies related to soil health and farm management practices in Alberta, Proceedings from Soil Health Workshop-2023 conducted on March 17, 2023, by Alberta Land Institute, Edmonton.

[23] The maxim is traditionally expressed in Latin: *cujus est solum ejus est usque ad coelum et ad inferos.* For the application of the maxim, see, e.g., *Didow v Alberta Power Limited*, 1988 ABCA 257 (CanLII).

denote a legal parcel of land defined by geometric boundaries that include various rights of use and enjoyment extending over, above, and below the surface of the land. Together, these land rights comprise a well-known concept in property law – the bundle of rights. Clearly, a distinction should be made between the soil as a parcel of land with three-dimensional boundaries and soil as the brown earth matter one can pick up with a shovel. For example, the *US Soil Survey* notes that the word "soil" is traditionally and commonly used, among its many meanings, to describe "the natural medium for the growth of land plants"; but for the purpose of scientific classification, the *Survey* defines soil as "a natural body comprised of solids (minerals and organic matter), liquid, and gases that occurs on the land surface, occupies space, and is characterized by one or both of the following: horizons[24], or layers, that are distinguishable from the initial material as a result of additions, losses, transfers, and transformations of energy and matter or the ability to support rooted plants in a natural environment".[25] The *Survey* proposes further to distinguish the non-soil beneath the soil as "virtually devoid of animals, roots, or other marks of biological activity" but acknowledges the difficulty of observing this lower vertical boundary.[26]

Importantly, there is no agreed-upon definition of soil in Alberta law, not in terms of soil's physical properties (i.e., what matter is legally considered soil), and not in terms of its spatial boundaries (e.g., the subsurface limits of soil). Certain legislation in some provinces gives the term "soil" a particular definition depending on the regulatory context: for example, municipal statutes in Ontario and BC define soil for the purpose of authorizing councils to regulate the removal or deposit of topsoil.[27] We did not find a definition of "soil" in any statute of Alberta.

The legal definition of soil can be further complicated by the bifurcation of property rights in land into two conceptually discrete interests: the "surface estate", which includes the rights to the airspace and subsurface; and the "mineral estate". Due to the history of settlement and land grants in western Canada beginning in the late 19th century, only about 10% of land titles issued in Alberta entitle the surface owners to any subsurface

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[24] Soil horizons are horizontal layers that parallel the land surface, which are associated with distinct sets of soil forming processes: see Amanda Diochon et al, *Digging into Canadian soils: an Introduction to Soil Science* (Canadian Society of Soil Science, 2021) at 27.

[25] Soil Survey Staff, "Keys to Soil Taxonomy", 13th ed. (USDA-Natural Resources Conservation Service, 2022).

[26] *Ibid*. For the technical purposes of the survey, the boundary was arbitrarily fixed at a depth of 2 metres below the surface.

[27] The British Columbia *Community Charter*, SBC 2003, c 26 defines "soil" to include "sand, gravel, rock and other substances of which land is composed". Similarly, the Ontario Municipal Act, SO 2001, c 25 s 142 defines "topsoil" as "those horizons in a soil profile, commonly known as the 'O' and the 'A' horizons, containing organic material and includes deposits of partially decomposed organic matter such as peat."

mines and minerals. The rights to most mines and minerals in Alberta are held by the Crown or energy companies.[28] While soil naturally consists of mineral substances, Canadian common law employs various rules to determine if ownership of any subsurface resource had been severed from the ownership of the surface by a grant. These tests include references to the vernacular or common understanding of landowners and miners and the intentions of the parties to the grant. Ordinarily the "agricultural surface of the ground" is excluded from the definition of minerals.[29] Alberta legislation defines minerals broadly to include "all naturally occurring minerals" and provides a list of such substances without derogating from the general definition; however, the legislation clarifies that clay, marl, sand, gravel, and peat, which are found on the surface, or are recoverable by surface operations, are property of the surface owner.[30]

Finally, rights and responsibilities in relation to soil may change depending on its legal classification as "real property" (rights relating to land) or "personal property" (rights in property which are not attached to land, also known as "chattels").[31] Soil is regarded as part of the land while *in situ*, but it can be excavated, removed, and transported, thereby transforming its legal status to that of personal property.[32] It is not unusual for topsoil to be sold by a landowner to a willing purchaser for value.[33] Furthermore, if soil is removed from one location and stored, dumped, or used as fill on some other land, it *may* be transformed again into real property and form part of the land in the new location. Generally speaking, whether personal property becomes a "fixture", i.e., part of land, is a matter of intention. According to the case law, things that are "not otherwise attached to the land than by their own weight are not to be considered as part of the land, unless the circumstances are such as [show] that they were intended to be part of the land.[34] If soil is deposited on land in circumstances that suggest it was intended to be part of that land, all pre-existing legal rights and duties in relation to that soil are subsumed in those of the landowner.[35]

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[28] Bruce Ziff, *Principles of Property Law*, 7th ed. (Thomson Reuters Canada, 2018) at 121, citing *Bearspaw Petroleum Ltd*., 2007 CarswellAlta 723 (E.U.B.) at para 5.
[29] *Nova Scotia Sand and Gravel Ltd v Canada*, [1978] FCJ No 122, [1978] ACF no 122.
[30] For the precise definitions and rules, see *Mines and Minerals Act*, s. 1(1); *Law of Property Act*, RSA 2000, c L-7, sections 57 and 58.
[31] See generally Bruce Ziff, *Principles of Property law*, 7th ed (Thomson Reuters Canada, 2018). at 87-90.
[32] This necessary conclusion is supported by the US caselaw: see 73 C.J.S. *Property* § 19 (2020) ("Conversion or change of form by attachment or severance"): "Anything detached from the realty becomes personalty as when any part of the freehold, such as coal, minerals, sand, *soil*, gravel, crops, or fixtures, is severed from the freehold".
[33] See, e.g., *Caburn Contracting Ltd v Creekside Estates (Camrose) Inc*, 2016 ABQB 29, *Caleron Properties Ltd. v ESA Holdings Ltd.*, 2003 ABQB 36.
[34] *Stack v. T. Eaton Co.* (1902), 1902 CarswellOnt 399, [1902] O.J. No. 155, 4 O.L.R. 335, 1 O.W.R. 511 (Ont. Div. Ct.).
[35] Bruce Ziff, *Principles of Property Law*, 7th ed. (Thomson Reuters Canada, 2018) at 136-143.

3. The Rights and Duties of the Soil Owner

What does ownership of soil mean? What rights and responsibilities does it entail? Property is nowadays typically described as a bundle or collection of rights that the owner can exercise over the subject of property, which in turn creates and governs the various relationships of the owner with others. These rights are not immutable, but vary depending on the resource and social context. Ownership typically consists of the right to possession, use, management of the resource; the right to derive material benefits from it; the right to transfer or alienate it; and to the protection of the law in respect of these rights.[36]

Ownership is also commonly associated with duties and liabilities, such as the duty to prevent harm to the public. There is no general duty to care for the subject of ownership, however.[37] On the contrary, the right to destroy is considered a fundamental aspect of ownership and an important component of the bundle of property rights.[38]

The preceding suggests that owners of soil have broad powers to use and manage the soil and may be as good or bad stewards of the soil as they wish. Yet common law rights of ownership are not absolute. An owner may not, for example, remove the soil in such a way that will deprive some other land of its natural support, causing subsidence or collapse.[39] For a more extreme example, an owner's instructions contained in a will that the soil be laid to waste may be arguably void as against public policy.[40]

3.1 Nuisance

One of the common law restrictions on the use of property is the tort of nuisance. Nuisance allows one property owner to seek a judicial remedy (in the form of damages or an injunction) against another landowner for substantial and unreasonable interference with the enjoyment of property caused by offensive odours, noise, or similar emanations

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[36] See Bruce Ziff, *Principles of Property Law*, 7th ed. (Thomson Reuters Canada, 2018) at 2-3.
[37] See further R.C. Ellickson, "The Affirmative Duties of Property Owners: An Essay for Tom Merrill" (2014) 3 Brigham-Kanner Prop. Rights Conf. J. 43
[38] See *Hayduk v. Pidoborozny*, 1971 ALTASCAD 12 (CanLII); See further Joseph L. Sax, *Playing Darts with a Rembrandt: Public and Private Rights in Cultural Treasures*, (Ann Arbor: University of Michigan Press, 1999); Lior Strahilevitz, "The Right to Destroy" (2005) 114 Yale Law Journal 781.
[39] *Bamlett v. Osterling* (1964), 47 D.L.R. (2d) 61 (Alta. S.C.).
[40] Compare *Wishart Estate, Re*, 1992 CanLII 2679 (NBKB), where a New Brunswick court spared the lives of four horses in spite of the testamentary intentions of their owner, who directed in his will that they be shot and buried after his death. Similarly, a Missouri court in one case prevented the executor of the deceased's estate from razing her home: *Eyerman v Mercantile Trust Co.*, 524 S.W.2d 210, 217 (Mo. Ct. App. 1975).

from neighbouring lands.[41] Nuisance claims can play a part in redressing environmental damage.[42] In one case, which involved discharge from the City of Edmonton's stormwater into a private stream, the Supreme Court held that "pollution is always unlawful and, in itself, constitutes a nuisance."[43] Land use conflicts and disputes among neighbours are now more often mediated by zoning and other regulations than by the tort of nuisance. For example, the *Agricultural Operation Practices Act*[44] immunizes "generally accepted agricultural practices" against nuisance claims even if the activity would amount to a nuisance at common law. [45]

Poor management or use of soil in itself is unlikely to result in a claim of nuisance. Conversely, activities on one property that cause chemical changes in the soil of some other land will be actionable in nuisance only if they result in physical harm or damage to the property or result in a detrimental effect on the use of the land.[46]

3.2 Covenants and Conservation Easements

Another legal device that can be used to protect soil health is covenants. A covenant is legally speaking a type of contract. The owner or tenant of agricultural land make may make a promise to some other person to use the soil or not to use the soil in a particular manner, and that promise may be enforceable as a matter of contract law. In specific circumstances, Canadian law will allow such promises to "run with the land", that is to be binding in property law on successors in title of the parties. For example, a covenant made in a lease agreement by the tenant to use or refrain from using specific agricultural techniques can be enforceable by someone who bought the land from the landlord against someone to whom the tenant assigned the lease.[47]

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[41] *Antrim Truck Centre Ltd. v Ontario (Transportation)*, 2013 SCC 13, [2013] 1 S.C.R. 594; *Appleby v Erie Tobacco Co.,* (1910), 22 OLR 533 (Div Ct).

[42] Arlene Kwasniak, "Alberta's Wetlands: A Law and Policy Guide" (2001), online (pdf): *Environmental Law Center and Ducks Unlimited Canada for the North American Waterfowl Management Plan* https://wetlandsalberta.ca/media/uploads/AlbertaWetlandsGuide.pdf; Lynda Collins, "Evergreen? The environmental law of torts" (2014) 22 Tort L Rev 107.

[43] *Groat v Edmonton (City)*, [1928] SCR 522.

[44] *Agricultural Operation Practices Act*, RSA 2000, c A-7.

[45] Jason Unger, "Environmental rights in Alberta: phase I: do we have the rights we need? Environmental Bill of Rights today and in the future" (2016), online (pdf): *Environmental Law Centre <https://elc.ab.ca/wp-content/uploads/2016/12/Environmental-Rights-PHASE-1-Do-We-Have-the-Right-We-Need-1.pdf>.*

[46] See *Smith v Inco Limited*, 2011 ONCA 628 (CanLII). In that case, contamination of the plaintiff's soil with nickel particles was not proven to produce such negative effects. Compare *Sorbam Investments Ltd. v. Litwack*, 2021 ONSC 5226 (CanLII) (affirmed 2022 ONCA 551 (CanLII)), where the court found that contamination by the migration of chemicals from a dry-cleaning business resulted in physical damage and reduction in market value amounting to a nuisance.

[47] See Bruce Ziff, *Principles of Property Law*, 7th ed. (Thomson Reuters Canada, 2018) at 331-334.

Covenants between neighbours ("freehold covenants") can also run with the land in Canada as long as certain technical requirements are met. In particular, the covenant must restrict the use of one parcel (the "servient land") and must be made for the benefit of, and be capable of benefitting, some other parcel (the "benefitting land"). Once the covenant is registered on the title of the servient land, it becomes binding against the person who undertook the restriction and against every transferee and every other person deriving title from the first owner.[48]

Covenants between landlords and tenants and covenants between neighbouring owners have limited practical value in protecting soil health,[49] because they are enforceable only by particular interest holders. Covenants between owners are limited also by the kind of obligations that may be enforced: Canadian law insists that the covenant be negative in substance, that is, be such that can be complied with by doing nothing at all.[50] A covenant not to till may be enforceable; a covenant to plant cover crop is not.

In Alberta, the use of covenants for conservation purposes is facilitated through legislation relaxing the traditional technical requirements for the running of the obligations. The *Environmental Protection and Enhancement Act*,[51] authorizes the Minister to enter into an agreement with a registered owner of land to restrict the purposes for which that land may be used. Such an agreement, once registered on title, runs with the land "whether it is positive or negative in nature and notwithstanding that the person wishing to enforce the agreement does not have an interest in any land that would be accommodated or benefitted by the agreement".[52] Such an agreement can impose binding, affirmative duties on an owner to manage the soil, for which the owner may be compensated.

Enduring conservation arrangements are further enabled by the *Alberta Land Stewardship Act.*[53] So-called "conservation easements" can be granted by a landowner to a qualifying organization (e.g., a government agency or a conservation association) for prescribed purposes, including the protection, conservation, or enhancement of the environment; natural or aesthetic values; or agricultural land purposes. Here, too, the owner makes assume negative or positive obligations – such as not removing the topsoil, adopting a grazing management plan, or to control for invasive species – which are not

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[48] *Land Titles Act*, RSA 2000, c L-4, s 48.
[49] See also Arlene J. Kwasniak, "Facilitating Conservation: Private Conservancy Law Reform" (1993) 31 Alberta Law Review at 607.
[50] Bruce Ziff, "Restrictive Covenants: The Basic Ingredients" in *Special Lectures of the Law Society of Upper Canada 2002, Real Property Law: Conquering the Complexities* (Toronto: Irwin Law, 2003).
[51] RSA 2000, c E-12.
[52] RSA 2000, c E-12, sections 21-24
[53] *Alberta Land Stewardship Act*, SA 2009, c A-26.8.

for the benefit of any dominant land, yet are enforceable by the receiving organization against the owner and their successors in title.[54]

Part II: The Regulation of Soil in Alberta

As can be seen, due to its limitations the common law is not sufficient to protect and promote soil health. Regulation to supplement the common law is necessary to clarify rights and responsibilities and to address private and public interests in soil. The purpose of this section is to provide an overview of existing regulations that impact or have the potential to impact soil health directly. This overview includes not only regulations relating to agricultural land, but also those that apply to industrial and other land. The list is not necessarily exhaustive. There may be other policies and regulations that may affect the practices and incentives of producers, other land users, and consumers in important ways.

4. Jurisdiction for Regulating Soil

It is important at the outset to recognize the levels of government that have the authority to regulate soil. In the Canadian federal system, legislative powers are divided in the *Constitution Act, 1867*[55] between Parliament and the provincial legislatures. Importantly, with limited exceptions (e.g., federal lands and reserves), the provinces have exclusive jurisdiction over property and civil rights. The regulation of soil and the use of land generally is in principle therefore reserved to the provinces. At the same time, the federal government and the provinces have concurrent jurisdiction over the environment and agriculture, whereas food and health are not explicitly mentioned in the Constitution. Parliament has furthermore exclusive jurisdiction over criminal law and matters of national concern, which can sometimes justify federal regulation relating to food and the environment.[56] Municipalities do not have a constitutional status other than as “creatures

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[54] See Guy Greenaway & Kim Good, “Conservation Easements in Alberta: Past, Present, and Future” in David W. Poulton & Eran S. Kaplinsky, eds*., The Implementation of Market-Based Conservation Tools Under the Alberta Land Stewardship Act: A Review* (Alberta Land Institute, 2022), online: <https://www.albertalandinstitute.ca/public/download/files/218649>.

[55] 30 & 31 Vict, c 3. Sections 91-92A specify the distribution of legislative powers.

[56] See generally Don Buckingham, “It's complicated: food and federalism in Canada” in McLeod-Kilmurray, Heather, Lee, Angela & Chalifour, Nathalie, eds, *Food Law and Policy in Canada* (Carswell, 2019) at 55. In *R v Hydro-Quebec*, the federal criminal law power was used to legislate on matters of environmental concern.

of the province". They may regulate in any area, including the environment, provided that the authority to do so was validly delegated to them by the province.[57]

5. Agricultural Regulations

5.1 The Soil Conservation Act

Soil conservation became a pressing concern in the 1930s and resulted in the *Control of Soil Drifting Act* (CSDA) in 1935.[58] Under this Act, restrictions on the landowner were limited to tilling fields in summer fallow in a manner that prevents soil drifting. This legislation was replaced in 1962 by Alberta's *Soil Conservation Act*[59] (SCA) to expand the scope of conservation efforts. Through the SCA, the provincial government enabled municipalities' authority over soil erosion issues. Compared to the CSDA, the SCA imposes a broader obligation on landowners to prevent any soil loss or deterioration.

The goals of the SCA include maintaining a strong agricultural land base for Alberta and promoting soil conservation practices[60] through the threat of legal sanctions. Different parties have different responsibilities imposed by the *Soil Conservation Act*.

The key provision guiding the responsibility of the landowner reads as follows:

> Every landholder shall, in respect of the landholder's land, take appropriate measures
>
> (a) to prevent soil loss or deterioration from taking place, or
> (b) if soil loss or deterioration is taking place, to stop the loss or deterioration from continuing.[61]

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[57] See, e.g., *114957 Canada Ltee (Spraytech, Societe d'arrosage) v Hudson (Town)*, 2001 SCC 40). See further Howard M. Esptein, "Subsidiarity at Work – the Legal Context for Sustainability Initiatives at the Local Government Level: How an environmental agenda could be advanced through Canadian Municipalities" (2009) 63 MPLR-ART 56 at 8 (WL); Cameron S. G. Jefferies and Erin Sawyer, "Subsidiarity in Action: Effective Biodiversity Conservation and Municipal Innovation" (Alberta Land Institute, 2019), online: <http://aref.ab.ca/wp-content/uploads/2019/12/2018-04-Subsidiarity-in-Action-Effective-Biodiversity-Conservation-and-Municipal-Innovation.pdf >.

[58] *An Act to Encourage Methods of Cultivation to Control Soil Drifting*, SA 1935, c 40.

[59] *Soil Conservation Act*, RSA 1980, c S-19, s 3.

[60] Alberta, *Soil health management resources*, online: <https://www.alberta.ca/soil-health-management-resources.aspx>.

[61] *Soil Conservation Act*, RSA 1980, c S-19, s 3.

The Act does not define “loss” or “deterioration” (or, “soil”, for that matter”), but its clear purpose is to impose a positive duty on the occupants of the land to take measures to prevent soil loss or deterioration, for example, by protecting the land from external forces such as wind or water that can cause erosion.

Should the landholder fail to take appropriate measures to protect the soil, the agricultural field officers or soil conservation officers can direct that remedial action be taken and impose a fine of up to $10,000 to ensure compliance. The SCA also lists the powers and duties of officers in the enforcement of this Act.
Preventing soil loss and deterioration is a broad and far-reaching obligation for the landowner. How strictly this positive obligation is enforced varies depending on the respective municipality’s bylaws.

5.2 The Role of Municipalities in Soil Conservation

Through the *Soil Conservation Act*, the province has expressly delegated powers to the municipalities to help implement this legislation. Municipalities have certain responsibilities through the *Soil Conservation Act*, such as the obligation to appoint officers, which will enforce the legislation. However, it is not obligatory for the municipality to promulgate bylaws for these purposes.

Currently, the municipalities that have implemented soil conservation bylaws include: Lamont County, Parkland County, County of Stettler, County of St. Paul, Municipal District of Taber, Thornchild County, Woodlands County, Municipality of Crowsnest Pass, Greenview, Leduc County, Lethbridge County, County of Minburn, Northern Sunrise County, County of Two Hills, Vulcan County, Westlock County, and Wheatland County. This list includes 17 of Alberta’s 64 municipal districts. The conservation policies/bylaws implemented by these districts range in content. As can be seen in Appendix A, some policies/bylaws simply provide a broad purpose statement, while others outline procedures to achieve these goals.

Municipal districts have also implemented legislation to regulate issues related to soil conservation. For example, legislation exists to control the burning of crop residue[62] and

[62] Flagstaff County, By-law 02-17, *To Control Burning of Crop Residue* (12, April 2017).

stubble,[63] the removal of topsoil,[64] charge back for blow dirt clean up,[65] and Agricultural Services Board equipment rental.[66] Furthermore, some municipalities have chosen to extend their obligations to mitigate soil erosion. For example, Strathcona County, in its Municipal Development Plan, has undertaken obligations to protect areas that are prone to erosion and soil instability.[67]

The Edmonton Metropolitan Region Board, which is a growth management board established by provincial regulation[68] adopted a Regional Agriculture Master Plan (RAMP)[69] in 2021, which is intended to preserve prime agricultural land in the region against development pressures. RAMP recognizes that some of Alberta's most productive soils are located in the Edmonton Region and prescribes policies designed to protect these prime soils, including restricting activities that may degrade soil quality, requiring reclamation, and minimizing land subdivision and conversion. With respect to the implementation of soil management policy specifically, RAMP provides as follows:

1. Soil should be recognized as a limited non-renewable resource and managed accordingly.
2. Soil management, including its reuse and recycling, should be considered as part of an area structure plan for greenfield areas.
3. Soils should be managed in the municipality in which they originate. Where soils are exported to another municipality, the municipality in which the soils originated is encouraged to engage with the municipality receiving the soil to ensure effective soil management.[70]

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[63] Kneehill County, Rocky View County, Strathcona County, Municipal District of Two Hills.

[64] Municipal District of Kneehill, Mountain View County, Sturgeon County, Parkland County, Sturgeon County, Municipal District of Willow Creek.

[65] Lethbridge County implemented in 1991 a policy to recovering the costs of clean up from owners who allowed eroded soil to be deposited on public roads and ditches. The policy was superseded in 2021 by Agricultural Service Board Policy #614 (on file) which allows the County to recover costs from landowners who do not comply with the provincial Soil Conservation Act and whose land requires cleanup and remediation due to soil erosion.

[66] Municipal District of Kneehill.

[67] Strathcona County, By-law 1-2007, Municipal Development Plan, s 8.2(c).

[68] *Edmonton Metropolitan Region Board Regulation*, Alta Reg 189/2017.

69 Edmonton Metropolitan Region Board, Regional Agriculture Master Plan (August 2021) [RAMP], online: <https://www.emrb.ca/s/pln-Regional-Agriculture-Master-Plan-Growth-Plan2Regional-Agriculture-Master-Plan-RAMP2Edmonton-ID-7-gwwt.pdf>.

[70] RAMP, s 5.1.

5.3 Alberta Land Stewardship Act

The Alberta Land-Use Framework (LUF) is a 2008 policy statement that outlines a broad and purposeful approach to land management. The *Alberta Land Stewardship Act*[71] (ALSA) was passed into law in 2009 to carry out the LUF objectives and strategies. Among other matters, LUF and ALSA impact the planning and conservation of agricultural lands.

ALSA and LUF divide the province into 7 planning regions. Currently, two regional plans have been approved – the Lower Athabasca Regional Plan, and the South Saskatchewan Regional Plan – while the remaining plans are in progress or to be developed in the future.[72] Within each of the seven regional plans for Alberta, different environmental management plans are to be developed.[73] A regional plan is generally binding on the Crown, local government bodies, decision-makers, and all other persons.[74]

A regional plan can set out binding policies relating to soil conservation. It can prescribe permitted uses, prohibit fragmentation and conversion of agricultural land, and set benchmarks for monitoring soil quality, for example. Of the two approved regional plans, the Lower Athabasca Regional Plan does not refer to soil conservation or health as an explicit objective, but it set out related policies, such as reclamation of disturbed lands, maintenance of biodiversity, and management of air and water.[75] The South Saskatchewan Regional Plan describes the agricultural industry as "the number one renewable and sustainable resource" in the region and makes explicit reference to its "fertile grassland soils".[76] The South Saskatchewan Regional Plan, too, does not specify soil conservation as an area of focus, but sets out related policies such as supporting the agricultural industry, maintaining air and water quality, conserving landscapes for biodiversity, ensuring efficient use of land, and managing land disturbance. Only two suggested measures directly refer to soil: obtaining enhanced soil data to support irrigation policy[77], and allowing winter-only access to conservation areas to minimize soil disturbance by the energy sector[78].

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[71] *Alberta Land Stewardship Act*, SA 2009, c A-26.8.
[72] See Alberta, *Planning Regions*, online: <https://landuse.alberta.ca/RegionalPlans/Pages/default.aspx>.
[73] ALSA, sections 3-9.
[74] ALSA, sections 13 and 15.
[75] Alberta, Lower Athabasca Regional Plan 2012-2022, *Report by the Land Use Secretariat* (2012) at 24, online: Government of Alberta <https://open.alberta.ca/dataset/37eab675-19fe-43fd-afff-001e2c0be67f/resource/a063e2df-f5a6-4bbd-978c-165cc25148a2/download/5866779-2012-08-lower-athabasca-regional-plan-2012-2022.pdf>.
[76] Alberta, South Saskatchewan Regional Plan 2014-2024 (amended May 2018) at 11.
[77] *Ibid.*, at 45.
[78] *Ibid.*, at 64.

As discussed above[79] and in other Alberta Land Institute reports[80], ALSA establishes a legislative framework for conservation easements and other market-based instruments, such as conservation offsets and tradable development credit schemes. Whereas conservation easements in Alberta have flourished, largely through the work of charitable conservation trusts and participating owners, the potential of other regulatory instruments under ALSA is yet to be unleashed.

5.4 Agricultural Operation Practices Act

The *Agricultural Operation Practices Act* is provincial legislation governing the operation of agricultural activity and is intended "to ensure that the province's livestock industry can grow to meet the opportunities presented by local and world markets in an environmentally sustainable manner".[81] The Act contains no direct guidelines or regulations in relation to soil management or health, but an applicant for a permit under the Act must provide as part of the application a "soil investigation as required by an approval officer".[82] The Act protects agricultural operations from nuisance claims, as long as the farmer does not contravene the applicable land use bylaw, any regulations or approvals, or deviates from "generally accepted agricultural practices".[83] This latter standard is undefined in the legislation and left to the courts' interpretation.[84]

5.5 Agricultural Service Board Act

The *Agricultural Service Board Act*[85] enables municipalities to establish agricultural service boards. Boards are responsible:

> (a) to act as an advisory body and to assist the council and the Minister, in matters of mutual concern,
>
> (b) to advise on and to help organize and direct weed and pest control and soil and water conservation programs,

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[79] Link to conservation easements earlier.

[80] David W. Poulton & Eran S. Kaplinsky, eds., *The Implementation of Market-Based Conservation Tools Under the Alberta Land Stewardship Act: A Review* (Alberta Land Institute, 2022), online: <https://www.albertalandinstitute.ca/public/download/files/218649>.

[81] Alberta, *Agricultural Operation Practices Act*, online: <https://open.alberta.ca/publications/a07>.

[82] *Agricultural Operation Practices Act Administrative Procedures Regulation*, Alta Reg 106/2017, s 2(3)(c).

[83] *Agricultural Operation Practices Act*, RSA 2000, c A-7, s 2(1).

[84] *McColl-Frontenac Inc. v Alberta (Minister of Environment)*, 2003 ABQB 303. This is the only case to our knowledge where s 2(1) is considered, and it does not develop the understanding of "generally accepted agricultural practice".

[85] *Agricultural Service Board Act*, RSA 2000, c A-10.

(c) to assist in the control of animal disease under the *Animal Health Act*,
(d) to promote, enhance and protect viable and sustainable agriculture with a view to improving the economic viability of the agricultural producer, and
(e) to promote and develop agricultural policies to meet the needs of the municipality.[86]

Agricultural service boards help enforce the *Weed Control Act*,[87] the *Agricultural Pests Act*,[88] and the *Soil Conservation Act*. The *Agricultural Service Board Act* is enabling and does not impose mandatory obligations on the municipalities. There are currently 69 service boards established throughout Alberta.[89]

5.6 Regulations and Agricultural Extension

An important question that arises from the previous section is whether or not the existing agricultural regulations have led to better agricultural practices for soil health. While it is unlikely that the *Soil Conservation Act* was solely responsible for the implementation of better soil management practices, it has likely been a significant contributing factor. There are soil conservation practices that can be implemented by producers to comply with their statutory obligations. Beneficial practices include extended crop rotations, residue management, conservative tillage, and winter cover crop growth.

In addition to wind and water erosion, there are other forms of degradation that are harmful to soil quality. These include depletion of soil organic matter content — which can occur through erosion, increase in soil salinity, soil compaction, and problematic soil pH levels. The detrimental consequences of this organic matter loss include "reduced fertility, poor water holding capacity, greater risk of erosion, and lower crop yields."[90] Conservative tillage practices can help maintain organic matter content. Soil salinity and pH issues hinder the plant's ability to absorb nutrients, resulting in reduced quantity and quality of

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[86] *Agricultural Service Board Act*, RSA 2000, c A-10, s 2.
[87] SA 2008, c W-5.1. This legislation and the *Agricultural Pests Act* immediately below do not deal with soil.
[88] RSA 2000, c A-8.
[89] See Alberta, *Agricultural Service Boards Program – Overview*, online: <https://www.alberta.ca/agricultural-service-boards-program-overview.aspx>.
[90] Alberta, Beneficial Management Practice: Environmental Manual for Crop Producers in Alberta, *Report by Alberta Agriculture*, Food and Rural Development (2004) at 7, online: Government of Alberta <https://open.alberta.ca/dataset/109a381d-f8f7-45f3-88ad-73ca78eb8746/resource/f85cf467-0adc-407b-97aa-23fd1cbe57fe/download/2004-100-25-1.pdf>.

crops. Soil salinity is linked to the redistribution of soluble salts through groundwater movement. The ideal soil pH balance can be worked towards by controlling which substances are added to soils, such as fertilizers and pesticides. Many of these issues could be mitigated through proper agricultural management. The Alberta government provides knowledge about these practices; however, they could further incentivize their integration into the industry.

The only positive obligations pertaining to soil conservation center around preventing erosion. In the Soil Conservation Act, there are no prescribed duties regarding the maintenance of a certain quality of soil, and there are no requirements to implement sustainable soil health practices.

6. Other Provincial Policies Affecting Soil Health

6.1 Environmental Regulations (Soil Remediation)

The Government of Alberta's *Soil and Groundwater Remediation Guidelines* provide a regulatory scheme pursuant to the *Water Act*[91] and the *Environmental Protection and Enhancement Act,*[92] specifically tailored to the management of contaminated sites. The guidelines do not prohibit any activities or prescribe prophylactic measures to protect the soil but come into effect after the soil has been contaminated. The applicable policies are grouped into 3 tiers (Tier 1, Tier 2, and Exposure Control)[93] and depend among other factors on the contaminants in the soil, including oil and gas and their by-products, but also pesticides.

The Tier 1 guidelines note that Alberta's approach to the management of wastes is based on the potential to improve soil quality. "Wastes that provide no benefits to soil quality must not be applied to land in a manner that causes soil contamination. Industrial byproducts, composts, and other materials that provide a potential benefit to soil quality may be applied to land according to good agronomic or forestry practices and in accordance with any other regulatory requirements" The guidelines also note that "soil is

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[91] RSA 2000, c W-3.
[92] RSA 2000, c E-12.
[93] *Alberta Tier 1 soil and groundwater remediation guidelines*, Alberta Environment and Parks Land Policy no. 4 (2022), online: <https://open.alberta.ca/publications/1926-6243>; *Alberta Tier 2 soil and groundwater remediation guidelines*, Alberta Environment and Parks Land Policy no. 5 (2022), online: <https://open.alberta.ca/publications/1926-6251>; *Alberta Exposure Control Guide*, Alberta Environment and Parks Land Policy no. 6 (2016), online: <https://open.alberta.ca/publications/9781460114902>.

a biologically active medium and is sometimes used as a treatment medium for soil contaminated by biodegradable substances." [94] The guidelines also apply to pesticide concentrations, but for remediation purposes and not for restricting pesticide use.[95]

Alberta's framework for the management of contaminated sites involves three main aspects: source control, contamination delineation, and contaminant management.[96] There is an emphasis on source control as pollution prevention, rather than relying on retroactive reclamation measures. Delineation programs help ensure that the contamination is under the Tier 1 and Tier 2 guidelines.[97] There are subsoil guidelines provided for managing the quantity of petroleum hydrocarbons and salinity.[98] The two pieces of legislation underlying this scheme are the EPEA and the *Water Act*.

These efforts to control the levels of toxins present in soils are largely retroactive measures used to control soil health — after there has been soil contamination. These guidelines work in conjunction with the EPEA. Through the approval process, the province can engage in proactive efforts to keep the soil clean, as this may be more effective than remediating contaminated land. The approvals process is designed to mitigate adverse environmental consequences. EPEA also contains regulatory provisions regarding substance release, remediation, and reclamation. These actions sanctioned by EPEA could be detrimental to the health and quality of the soil.

However, neither EPEA nor the Soil and Groundwater Remediation Guidelines prescribe certain agricultural practices to maintain soil health.

6.2 Soil Monitoring Directive

Alberta Environment and Parks has also implemented a Soil Monitoring Directive[99] in connection with projects requiring approval under the *Environmental Protection and Enhancement Act*.[100] The Directive is largely intended to deal with industrial contamination and is designed to work in tandem with the *Soil and Groundwater Remediation Guidelines*.

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[94] *Alberta Tier 1 soil and groundwater remediation guidelines* at 11.
[95] *Ibid*.
[96] *Ibid* at 53.
[97] *Ibid* at 54.
[98] *Ibid* at 54, Table 3, Table 4.
[99] Government of Alberta, *Soil Monitoring Directive* (2009), online: <https://open.alberta.ca/dataset/237d66fc-2347-41f4-820b-e950c7e75542/resource/df94722f-7333-429b-9344-0be8f5ebd063/download/2009-soilmonitoringdirective-may2009a.pdf>.
[100]

6.3 Land Use Planning and Soil Health

Other factors beyond agricultural practices have contributed to the loss of soil, especially prime agricultural land, including urbanization. Historically, cities were located next to prime agricultural land as a matter of convenience, but as urban populations began to expand, this led to the loss of prime farmland.[101] "As a result, the average soil quality of land used for agriculture has declined in the Calgary–Edmonton corridor, confirming other studies of the food security implications of urbanization."[102] Combatting this issue requires effective land use policies that ensure urban development does not result in the loss of high-quality agricultural land.

Some scholars suggest that to influence producer behaviour – on issues of soil erosion – there should be a combination of economic incentives, programs, legislation, and institutional arrangements.[103] Some jurisdictions outside Canada have introduced charges to encourage development to account for the social loss of farmland.[104] For these legislative goals to be successful, a more comprehensive effort from the government, including organized incentives and assistance to implement better practices, in addition to the existing legal sanctions imposed by the *Soil Conservation Act* and consequent bylaws, is required.

8.4 Beneficial Management Practices and Soil Health Resources

A Beneficial Management Practice (BMP) is defined as "any management practice that reduces or eliminates an environmental risk."[105] The provincial government has published a series of manuals to guide producers, including the *Environmental Manual for Alberta Farmsteads*; the *Environmental Manual for Alberta Cow/Calf Producers*; the *Environmental Manual for Crop Producers in Alberta;* and the *Environmental Manual for Livestock Producers in Alberta*.[106] Each manual contains specific information about BMPs

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[101] Federico Martellozzo et al, "Urbanization and the loss of prime farmland: a case study in the Calgary-Edmonton corridor of Alberta" (2014)15:5 Reg Environ Change 881–893, DOI: <doi:10.1007/s10113-014-0658-0>.

[102] *Ibid* at 881.

[103] W.E. Phillips & T.S. Veeman, "Alternative Incentives and Institutions for Water and Soil Conservation" (1987) 12:3 *Canadian Water Resources Journal* at 28, DOI: <https://www.tandfonline.com/doi/pdf/10.4296/cwrj1203027>; Philips and Veeman give the example of Ontario, which has provided technical and financial assistance to farmers to reduce erosion.

[104] See, e.g., Eliška Vejchodská & Martin Pelucha, "Environmental charges as drivers of soil sealing? The case of the Czech charge for agricultural land loss" (2019) 87 Land Use Policy 104071.

[105] Government of Alberta, "Beneficial Management Practices," online: *Government of Alberta* <https://www.alberta.ca/beneficial-management-practices.aspx>.

[106] *Ibid*.

for dealing with on-site environmental risks. BMPs are encouraged in order to maintain or improve water, air, wildlife habitat resources, and soil, in order to contribute to the operation's sustainability and the health and welfare of the landscape and the community. With respect to soil conservation and health, BMP publications focus on pesticide management, fertilizer management, and crop production practices and techniques.

A compendium of soil health management resources is maintained separately from BMPs.[107] It includes land and soil data, online tools for soil fertility, and soil health information (e.g., erosion, salinity, pH, monitoring, and benchmarking).

7. Analysis and Conclusions

Notwithstanding centuries of legal doctrine touching upon soil, our review highlights the absence of precise definitions of soil and the rights and responsibilities related to it resulting in ambiguity and uncertainty. This has significant consequences for the treatment and management of soil in practice and soil health generally.

The common law defines several aspects of land ownership and relationships between neighbouring landowners by reference to the soil, but overlooks the soil itself. Modern remedial regulations do not adequately fill these gaps. Specifically, there is no legal definition of "soil" in Alberta legislation. Unclear definitions of boundaries and legal rights and duties hinders efficient management of the resources.

Our survey catalogues discrete regulations governing soil and soil health in Alberta, which can be divided into two categories. First, land use regulations (such as regional and municipal planning and zoning policies), prescribe the uses of land and determine where soil is reserved for agricultural production and where it can be paved over. Second, regulations specifically focused on soil health, including the Soil Conservation Act and environmental laws intended to prevent or remedy soil contamination. These regulations have played a beneficial role, but fundamentally do not share or work toward a clear and cohesive concept of soil health. Indeed, there continues to be no clear policy direction in Alberta on soil health.[108]

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[107] Alberta, *Soil Health Management Resources*, online: <https://www.alberta.ca/soil-health-management-resources.aspx>.

[108] See further, Brenda Heelan Powell, "Agricultural Lands: Law and Policy in Alberta" (2019) at 110, online (pdf): *Environmental Law Centre <https://aref.ab.ca/wp-content/uploads/2020/01/Agricultural-Lands-Law-and-Policy-in-Alberta-November-2019.pdf>.*

Our workshop participants expressed concerns about discrepancies between production incentives and sustainability goals. Many producers are interested in improving soil health beyond its agricultural productivity, but good ethics and best management practices, can put produces at a competitive disadvantage. The suite of regulations that we have reviewed are in themselves inadequate to change the incentive structure. In such an environment short-term economic gain can continue to dominate private decision-making.

A final consideration is the availability of information and supporting resources for all who control the soil. For agricultural producers, this includes access to best management practices and soil testing data,[109] as well as continuing education about soil regulations and policies.[110] The need for similar resources is also important for homeowners, developers, and other decisionmakers in Alberta who increasingly express willingness to steward our soils.[111]

[109] See, e.g., Government of Alberta, "Alberta Soil Information Viewer," online: *Government of Alberta* <https://www.alberta.ca/alberta-soil-information-viewer.aspx>.
[110] In a 2018 survey, 38% of Alberta producers have not heard of standards and requirements in the Soil Conservation Act, and 62% have not heard of standards and requirements provided in the Agricultural Operation Practices Act: Alberta, 2018 Environmentally Sustainable Agriculture Tracking Survey, *Report by Kynetec Canada* (2018), online: Government of Alberta <https://open.alberta.ca/dataset/4eb85c95-c8de-40c3-ace5-7acc129ff663/resource/db7a2ef7-8ed8-4303-a1da-4717127ee0af/download/2018-environmentally-sustainable-agriculture-tracking-survey-052018.pdf.
[111] Cite the resource guide again here.

Appendix A

Table Summarizing Soil Conservation Bylaws & Policies (as of 2021)

MUNICIPALITY	BYLAW NAME	HIGHLIGHTS
CROWSNEST PASS	**Soil Conservation Policy**	• Agricultural Fieldmen will conduct inspections, enforcement initiatives, encourage voluntary compliance with the Act, and will provide information/education on conservation practices.
GREENVIEW	**Soil Conservation Policy**	• Agricultural Services personnel will provide information and serve as inspectors (who encourage voluntary compliance, and impose fines, as a last resort). • Agricultural Services personnel have a responsibility to seed exposed areas and seed areas that have been disturbed by municipal projects.
LAMONT COUNTY	**Soil Conservation Policy**	• Agricultural Fieldmen will conduct conservation activities and address all concerns regarding soil degradation • Enforcement under the *Soil Conservation Act* will be carried out by the Agricultural Service Board
PARKLAND COUNTY	**Soil Conservation Policy**	• Soil Conservation Officer will address concerns -- and take action — regarding soil erosion on farmland in accordance with the *Soil Conservation Act*
COUNTY OF STETTLER	**Soil Conservation Policy**	• Landowners are required to prevent soil degradation or loss of soil to the extent that policy • Soil Conservation Officer is empowered to issue warnings and/ or notices to prevent or remedy soil degradation or erosion • Sets out acceptable remedial measures for soil loss that can be enforced by Officer
COUNTY OF ST. PAUL	**Soil Conservation Policy**	• The objective of the policy is to promote and inform producers about environmentally sound agricultural practices.
	Direct Seeding Program	• The objective is to allow producers the opportunity to try a Direct Seed Drill, if funding is available
KNEEHILL COUNTY	**Soil Conservation -- Stubble Burning Policy**	• The purpose of this policy is to control the burning of large areas of stubble and to ensure the conservation and protection of Kneehill County soils
MUNICIPAL DISTRICT OF TABER	**Soil Conservation Policy**	• The purpose of this policy is to define how and when soil conservation notices will be issued.
	Blow Dirt Cleanup Charges Policy	• Sets out conditions and enforcement of the policy, whose objective is to ensure that when landowners allow their property to be subjected to soil erosion — to the degree that the eroded soil is deposited on public property — they will be responsible for costs incurred for clean-up
THORNCHILD COUNTY	**Soil Conservation Policy**	• The Agricultural Service Board will promote a program to demonstrate and promote good soil conservation practices • The Board will undertake public education and media marketing to promote soil conservation practices
WOODLANDS COUNTY	**Soil Conservation Policy**	• Policy created to support and promote soil conservation involving and affecting agriculture and the Municipality. • The Agriculture Services Board will be involved in education, awareness, encouragement, and enforcement of the use of good soil conservation practices within the County

LEDUC COUNTY	**Soil Conservation Enforcement Obligations**	• Sets out how soil conservation is enforced under the *Soil Conservation Act* • Soil Conservation Officer will conduct inspections, make recommendations, and, when necessary, issue notices as set out under the *Soil Conservation Act*
LETHBRIDGE COUNTY	**POLICY 614 - Soil Conservation**	• The purpose of this policy is to define how and when soil conservation notices will be issued.
	Policy 615 - Charge Back for Blow Dirt Clean-up	• The policy is intended to encourage landowners to combat soil erosion on their own property • Sets out conditions and enforcement of the policy, whose objective is to ensure that when landowners allow their property to be subjected to soil erosion — to the degree that the eroded soil is deposited on public property — they will be responsible for costs incurred for clean-up
COUNTY OF MINBURN	**Soil Conservation Policy**	• The purpose of this policy is to define how soil conservation notices will be issued and enforced by the County • Agricultural Fieldmen will conduct inspections and enforcement initiatives as set out under the Act
NORTHERN SUNRISE COUNTY	**Soil Management and Conservation Policy**	• Policy manages soil loss and degradation under the *Soil Conservation Act*
COUNTY OF TWO HILLS	**Stubble Burning Policy**	• Agricultural Fieldman will inspect requests for stubble burning to reduce soil organic matter loss at the property level
	Agricultural Service Board Policy	• The purpose of the Board is to advise on proper land utilization and engage in the creation of new policies that support both producers and communities. • Sets out the roles and responsibilities for the Agricultural Service Board
VULCAN COUNTY	**Soil Erosion Policy**	• The policy purpose is to set out how soil erosion should be controlled at the property level by property owners
WESTLOCK COUNTY	**Soil Conservation Policy**	• The policy purpose is to articulate Westlock County's role in soil conservation both as outlined in the *Soil Conservation Act* and beyond • Westlock County Agricultural Services will provide information on appropriate soil conservation practices and, if available, programs • Soil Conservation Officer will conduct inspections, promote best practices, and encourage voluntary compliance with the Act — unless enforcement is absolutely necessary
WHEATLAND COUNTY	**Agriculture & Environment Policy**	• The Agriculture and Environment department is responsible for all duties legislated under the *Soil Conservation Act* and will carry out inspection activities

Appendix B

Alberta Soil Health Resources	
Soil Management Practices	https://www.alberta.ca/soil.aspx
Agriculture tools and resources	https://www.alberta.ca/agriculture-tools-and-resources.aspx
Agricultural Land Resource Atlas of Alberta	https://www.alberta.ca/agricultural-land-resource-atlas-of-alberta.aspx
Land use decision support resources	https://www.alberta.ca/land-use-decision-support-resources.aspx
Alberta Soil Information Viewer	https://www.alberta.ca/alberta-soil-information-viewer.aspx
Wind erosion control	https://www.alberta.ca/wind-erosion-control.aspx
Water erosion control	https://www.alberta.ca/water-erosion-control.aspx
Beneficial management practices	https://www.alberta.ca/beneficial-management-practices.aspx
Manure and nutrient management tools and resources	https://www.alberta.ca/manure-and-nutrient-management-tools-and-resources.aspx