Natural resources law performs three basic functions: it specifies the parts of nature that can be owned and the basic terms of use rights, it facilitates resource-related transactions, and it provides mechanisms to coordinate uses and resolve inevitable disputes. Within these functions, a key question for lawmakers is whether a part of nature is identified as a discrete resource or an attribute of land ownership.

Natural resources law is the body of legal rules that encourages and controls uses of nature, particularly the parts of nature that people find valuable. Most societies have rules prescribing who can use nature, where, and in what ways. When markets play a dominant role, a society's legal system tends to include more complex laws that go beyond defining use rights in nature to regulating commercial transactions. Similarly, a society concerned about environmental degradation will have rules limiting resource-related activities to reduce environmental harms. In such societies, natural resources law may have multiple aims: to encourage and facilitate uses of nature, to promote fairness among citizens, and to ensure that human activities do not unduly pollute or degrade the natural environment.

In order to understand natural resources law, it is important to identify its main elements and basic functions. As lawmakers craft laws, they have certain options to meet their particular circumstances and needs. The United States has detailed, varied bodies of natural resources law among its fifty individual states. Although the laws of other nations can vary considerably from U.S. laws, the underlying functions of natural resources law are basically the same everywhere. In some manner, lawmakers in all nations must devise rules that perform these basic functions. As such, one can identify similarities among legal systems and among the laws governing specific natural resources.

**Basic Functions**

Broadly speaking, natural resources law performs three basic tasks. First, it specifies the parts of nature that can be owned and defines or prescribes the terms of the legal rights (use rights) that users acquire. Many uses of nature involve the extraction and consumption of parts of nature. Other uses—recreational activities and nondamaging uses of a land surface such as hiking and recreational boating—are mostly nonconsumptive. Valuable parts of nature can lie beneath, on, or above the surface. Resources that people consume can be either naturally renewable (plants, animals, some energy sources) or nonrenewable (most minerals and fossil fuels). Laws setting the terms of resource-use rights typically prescribe what can be used and in what ways, specify the duration of use rights and their transferability, address the inevitable conflicts among resource users, and impose cleanup or restoration obligations once a resource-use activity ends. Natural resources law also includes rules that allocate use rights—that is, rules specifying how governments make ownership rights in nature initially available to first users.

The second basic task of natural resources law is to facilitate resource-related transactions. Resource-use rights often arise in private transactions—licenses, leases, sales, conveyances, and the like. Typically, private parties enjoy considerable freedom in how they structure such transactions (as do governments when they are engaged in similar commercial transactions). Natural resources law can assist such transactions, thereby making markets more regular and efficient. One way it does so is by prescribing rules of contract or deed interpretation that govern a transaction unless the parties choose otherwise. The law, for instance, may provide definitions for commonly used terms (for example, mineral rights, mining claims, water...
rights, and hunting easements). It may prescribe widely accepted royalty arrangements and presumptions governing the duration of use rights (for example, the rule that a particular use right lasts only so long as its owner makes continued use of it). In such instances, the law fills in the gaps in incomplete contracts and incorporates customary understandings into private transactions. If private parties desire, they can usually reject these legal conventions and deviate from customary practices to define terms as they see fit. In some instances, lawmakers insist that contracts or deeds include specific terms designed to foster some public policy, without regard for the wishes of the parties. For example, laws governing oil and gas leases may insist that all leases require lessees to clean up well sites when pumping ends.

The third major task for natural resources law—one that is gaining in importance—is to facilitate the emergence of governance regimes by which resource users (and perhaps other people) coordinate resource uses and resolve disputes. For instance, irrigators in many jurisdictions are empowered to form irrigation or water-conservancy entities, which can orchestrate water uses over large areas. Similarly, owners of land parcels above a particular oil and gas field might be empowered to form joint-management entities to facilitate drilling and recovery methods (termed pooling and unitization arrangements in the United States). Looking ahead, natural resources law might well include more provisions that are aimed at encouraging resource users to work in concert for joint benefit.

What Comes with Land?

A key task for lawmakers is to describe which parts of nature can be owned and to set the basic terms of use rights. A particular part of nature could be viewed as a discrete resource such as a right to divert and use water, a right to cut trees, a right to hunt, or a right to graze livestock in an area. Alternatively, a right to use part of nature could be viewed as an attribute of land ownership, meaning that the legal right to use the resource is one of the entitlements held by the owner of the land that includes the resource. Lawmakers regularly employ both of these alternatives—treating a resource as part of the land and treating it as a discrete resource that one acquires separately. Thus, in surveying the law of a jurisdiction, it is useful to learn which parts of nature belong to the landowner and which parts are discrete assets.

Landownership almost always includes rights to use the soil, to harvest most or all plants, to grow crops, and to engage in some range of surface-use activities. Even on these basic points, however, legal systems vary. In colonial America for instance, English law withheld certain tall trees from private owners, reserving the trees for use by the Crown as ship masts. Nature protection laws in many countries today (e.g., Great Britain) similarly protect particular forests and even specific trees.

Beyond such uses of soil and vegetation, there is less agreement among legal systems on the parts of nature that attach to land. Landownership, for instance, may or may not include rights to extract minerals on or beneath the surface—that is, rights to remove coal, metals, oil and gas, and building stone. When minerals are excluded from landownership, then either the government retains the minerals for state exploitation or they are separately allocated as discrete resources. Jurisdictions take a variety of approaches on this critical issue of mineral ownership. A landowner, for instance, may have rights to engage in “hard rock” mining (removing coal, stone, and metals) but have no right to remove oil and gas. Laws can draw even finer distinctions. British law, for instance, long provided that gold and silver remained the property of the Crown, no matter where it was located. Landowners had the right to obtain all other minerals. Similar variations arise with respect to water, a critical resource in much of the world. Landowners may or may not have rights to use water that flows over, adjacent to, or beneath their lands. In the United States, this issue is largely governed by the laws of the individual states. Laws in the eastern part of the country tend to empower landowners to use both surface and groundwater, with rights shared among landowners. Laws in the western part of the country more often treat water as a discrete resource and include separate rules governing who can gain water rights and how these rights can be obtained.

Similar legal variations exist with wildlife. Lawmakers must consider the following questions: Does an owner of land own the wildlife located on it? (In the United States, the answer to this question is no, but in Great Britain, for
example, the answer if yes.) Typically, if a landowner owns the wildlife located on the land, the rights end when a wild animal migrates. Alternatively, does the legal system view rights to use wildlife, which are often tightly controlled by species, season, and location, as separate resources allocated apart from land? Similar issues arise over uses of airspace, access to light and wind, and uses of caves. All such rights may or may not be included in the bundle of rights held by landowners.

On several of these issues, lawmakers sometimes distinguish between the ownership of a physical resource in place and a legal right to use or capture the resource. For instance, American states provide that water in lakes and rivers remains public property; landowners only acquire rights to use it. In American law governing oil and gas, some states assert that landowners own underlying oil and gas in place. Other states assert that oil and gas are not owned until these resources are physically captured; what a landowner acquires, when gaining land, is simply the right to use the land surface to drill and extract. At first glance, these two approaches appear quite different: either landowners own the oil and gas or they do not. In practice, the two approaches produce similar results. All landowners own the oil and gas they pump from wells on their land. Accordingly, a landowner who owns oil and gas in place may lose their rights to a neighbor’s well. On the other hand, a landowner who possesses only a right to drill is not disadvantaged. The landowner still has the right to capture and retain as much oil and gas as possible. Thus, the distinction has only minor significance.

Natural resource regimes also vary in terms of a landowner’s ability to exclude people from land. Landowners typically can halt interferences with their own activities, or at least significant interferences; this is perhaps the key component of owning nature. On the other hand, landowners may or may not have power to exclude outsiders from crossing or otherwise using their lands in ways that cause no interference. Thus, private land may remain open to public hikers without the landowner’s consent. In many societies, the public holds expansive rights to use unenclosed private lands for hunting, foraging, travel, and livestock grazing. In these societies, resource-related activities are sometimes viewed as use rights available for either all members of the public or residents of a local village.

As lawmakers prescribe the rights that attach to landownership, they typically must deal with spillover effects or externalities. They must consider the ways actions by one landowner can harm other resource users. For instance, natural resources law typically prescribes whether a landowner can excavate in ways that physically threaten neighboring lands. Similarly, it prescribes the freedom a landowner has to divert surface waters and otherwise alter natural drainage. It may also prescribe rules on vegetative cover by banning certain unwanted species, requiring mowing or other weed control, or regulating forest or pasture management.

Whenever lawmakers treat a part of nature as a discrete resource, they confront a practical challenge. Nature’s parts are ecologically intermingled; they do not exist as neatly shaped packages. It is up to lawmakers to define the physical boundaries of the discrete resource, a task that necessarily requires line-drawing. For instance, a jurisdiction that views water as a discrete resource must somehow fragment the continuous hydrologic cycle. Rainfall absorbed by plants presumably belongs to the landowner. But can a landowner capture water on a rooftop cistern system; does that water belong to the landowner, or must the landowner acquire a separate resource right to collect it? Similarly, can a landowner capture and retain diffuse surface waters before they reach a stream? What about water from naturally recurring
springs or water that is hydrologically disconnected from any stream that would otherwise go unused? When water is scarce, lawmakers are obligated to supply answers. Similar questions arise when the law views subsurface minerals as discrete assets. Which minerals are included with land, and which are not? Is peat a mineral or part of the soil? What about minerals that protrude from the land surface? What about minerals embedded in low-grade ore formations?

Such issues inevitably arise whenever lawmakers decide to define a part of nature as a discrete resource. (They also arise when a landowner voluntarily severs a resource and conveys it separately.) The challenge that lawmakers face is easily stated: the more embedded a resource is in ecological processes, the harder it is to draw lines between the land and the discrete resource. Line-drawing is regularly required when a legal system allows a person to acquire a resource by becoming the first to seize it. For instance, mineral rights might go to the first person to discover a mineral deposit, but what are the legal boundaries of the mineral deposit? Where does the mineral deposit end, and where do the rights of the landowner begin? Does the new mineral owner gain ancillary rights to use the land surface (for example, cutting timber needed to support mining shafts)?

**Using Land**

Once the law has defined the physical elements that are considered part of land, it must then explain how the owner can use the land. This subject is an aspect of property or land-use law; yet it is also a component of natural resources law, given that so many resources are included in the landowner’s bundle of rights.

A few specific issues on this topic were identified in the previous section. Can a landowner alter natural drainage or remove vegetation? Can an owner harm in ways that erode soil or harm rare wildlife species? Adding complexity is the physical reality that actions by one landowner can readily disrupt other lands and land uses. Disputes among neighboring landowners are common and often involve variations on a basic fact pattern: one landowner favors an intensive land use (perhaps generating noise, vibrations, odors, or traffic) while another landowner plans a more sensitive one. Such disputes today sometimes involve renewable energy sources, as landowners regularly tap solar and wind energy sources, and their efforts are harmed when neighbors interfere with the light or wind. Another common fact pattern in disputes arises when actions of a landowner clash with uses of a discrete, separately owned resource or when owners of two discrete-use rights disrupt one another.

In some way, the law must resolve such disputes. Legal rules can be clear and precise, granting one party superior rights. They can also feature vague principles or values that courts must apply to resolve the conflicts. Generally speaking, lawmakers tend to use one or more of a relatively small number of approaches to resolve disputes among neighboring users. One common legal approach is simply to favor the land or resource user who came first in time. A second approach is to evaluate competing activities and to give preference to the one that is, in some sense, more reasonable or socially beneficial. A third approach, which is not always possible, is to divide the resource in question into fair shares—for instance, allowing owners of land above an aquifer to share the underground water in proportion to the sizes of their landholdings. A fourth approach considers whether one or the other party to a dispute might mitigate or end the conflict by making reasonable adjustments or accommodations in its activities. For instance, a court may consider whether one party can reduce its resource use through conservation measures. If a party can mitigate the conflict or accommodate the needs of the other side, then the law may insist that it do so.

A fifth, older approach for resolving disputes among users—a once-popular approach that was typically pushed aside with the coming of industrialization—is to resolve disputes by using nature as the baseline of legitimate resource use. That is, lawmakers might prescribe rights in land and discrete resources so that owners must use what they own without materially altering the natural incidents of lands owned by others. In the United States two centuries ago, courts typically ruled that landowners were entitled to enjoy the “natural incidents” of their lands, including wind, water, and light. A neighbor who materially disrupted these natural incidents acted wrongly. Thus, water law allowed landowners to use river water so long as they did not diminish the natural quantity or quality of the water flow. This legal approach favored sensitive, agrarian land uses over the newer, polluting industrial uses. Not surprisingly, the nature-as-abaseline approach was often pushed aside so that polluting factories and railroads could arise and so that urban landowners could block air and light with their tall buildings.

A sixth, final approach that is often used to resolve disputes differs from the others. Instead of crafting laws that directly resolve disputes, lawmakers can create mechanisms or processes by which the competing users resolve disputes on their own through a type of governance mechanism. As noted above in “Basic Functions,” natural resources law might authorize resource owners to form private or quasi-public entities with powers to adjudicate disputes, perhaps even averting the disputes in advance by limiting who can do what. Such arrangements can encourage resource users to work in concert, recognizing and resolving competing needs without resort to courts. Another aim could be to facilitate shared-management arrangements that are more
Allocating Discrete Resources

Once a part of nature is defined as a discrete resource, not part of the land, a legal system must make the resource available to potential users in some manner. This is the allocation function of natural resources law. A resource could be retained for use by the public (for instance, rights to use a river for travel or fishing). The rights could be allocated to some subset of the public (for example, to inhabitants of a particular village). Alternatively, the resource could be offered to individuals or businesses through one of many possible allocation methods.

One longstanding allocation method is to make a resource available to whomever is first to occupy or start using the resource. This first-in-time method has a long history. It is an easy allocation method in that no elaborate government structure is required to implement it. It is also typically favored by the first people to arrive in a geographic region since it favors them over later arrivals.

As a method of allocation, first-in-time raises predictable issues whenever it is employed. What action must a person take to qualify as first? A well-known American court ruling raised this issue in a dispute over a dead fox. Was a hunter considered first in time when he spotted the fox and pursued it closely, or was a person first only when he actually physically seized the fox? (The court decided it was the latter.) In western U.S. water law, the rule gradually developed that a person was first to capture a water flow only if the person physically diverted the water from the stream and applied it to a beneficial use; mere diversion was not enough, nor did a water right evolve if the use was not beneficial. In mining law, a person was first to find a valuable mineral deposit only if the person properly staked out the claim, filed papers on it, and could show that the deposit was valuable.

A second issue that arises under first-in-time schemes has to do with the timing of the capture when the action required to complete the work of capture takes time, as is often the case. How is timing determined when the work of capture takes months or years, as it might when diverting water for miles and applying it to an irrigation or mining effort? Does the timing of the capture date back to the first step in the process, or is the timing of capture dated only when all work is complete? In western U.S. water law, the rule soon emerged that a diversion of water related back in time to the first step in the diversion process, at least so long as the capturer used reasonable diligence to complete the needed work.

A third, related issue under first-in-time schemes has to do with the legal protections a capturer enjoys against interference by others. Mining codes in the American West typically gave prospectors protection against interference on all lands they physically occupied. More generally, lawmakers banned what they deemed unfair competition. As a policy matter, lawmakers who are trying to encourage resource discovery and exploitation typically must offer prospectors and other potential resource owners some degree of protection against interference. If they do not, the danger of disruption can discourage people from undertaking the search process.

Allocation of a resource based on first-in-time, or what might be termed historic use, is by no means free of moral or social objection. One complaint is that government essentially gives the resource away for free with no income for taxpayers. A second complaint is that resource users who are first on the scene are not, for that reason alone, particularly deserving or morally superior. A first-in-time rule can reward industry and initiative, but the reward can easily be excessive, particularly when the first occupiers can hoard a resource. Later generations can be particularly disadvantaged. At the global level, in terms of planetary resources, the disadvantage can fall on countries that are later to develop.

This moral complaint has arisen in disputes over ocean resources and, more recently, in clashes over rights to pollute the planet’s atmosphere. Developed countries typically claim that reductions in emissions, required to mitigate climate change, should begin from historic patterns of use. This policy position implicitly accepts the existing allocation scheme under which countries first to develop captured disproportionate shares of the planet’s absorption capacity. An alternative approach is to allocate Earth’s capacity on a per capita basis—an equal share for each person on the planet—without regard for prior patterns of pollution. Such an approach would require that reductions be made disproportionately by countries with above-average pollution levels per person. A per-capita allocation scheme would withdraw the advantage gained by countries that were first in time to industrialize.

Lawmakers devising natural resource regimes have a wide variety of other methods to use when allocating resources to initial users. An obvious method is either by sale at the highest prices the market will bear or by auction. Another approach is to allocate a resource based on
how the resource will be used or on characteristics of the prospective user. Thus a resource could be made available by permit only to people who will use it in the public interest, however it is defined. Alternatively, a resource could be offered based on the personal abilities or characteristics of users. Thus, marine resources are sometimes allocated to subsistence fishers, particularly communities that retain traditional patterns of harvesting. Rights to plant gardens could be allocated to low-income applicants. Rights to engage in demanding recreational activities (for example, river rafting and mountain climbing) could be allocated based on demonstrated individual skill.

Many resource-allocation schemes favor local users in an effort to stabilize and protect local economies. In some jurisdictions, lawmakers bundle discrete resources and allocate them as a package when the resources are best used together. For instance, a right to graze cattle in a semiarid area may be bundled with a right to use water for that purpose.

Rights to Use Discrete Resources

As lawmakers prescribe rules governing discrete natural resources, the main challenge they face is to prescribe the contours of each use right—what it covers, how the resource can be used, and how the terms of one resource right fit together with other resource and landowner entitlements. The numerous issues that fall into this category are often related to the physical features or attributes of particular resources. Sometimes lawmakers favor strict rules of priority as a means of clarifying rights and avoiding disputes. Thus, mineral law in the United States has typically provided that owners of subsurface minerals have priority when their excavation methods disrupt uses of the land surface; such owners can use the land surface, even destroy it, when such use is reasonably necessary to excavate and remove minerals. Oil and gas lessees similarly can make reasonable use of the land surface unless limited by the terms of a lease. Holders of mineral rights do face limits on their actions, limits that have slowly grown in recent decades. For instance, they typically can use the land surface only to exploit minerals on that land, not to aid in the exploitation of minerals on other lands. Also, they may be required to compensate surface owners for the damage they cause.

The many conflicts among resource users have given rise to rich, complex bodies of law, commonly tailored to the specific needs and consequences of using particular resources. Thus, irrigators in arid lands may have rights to cross adjacent lands to convey water to the places where they will use the water. Public users of waterways may possess rights to enter private lands along a river to avoid waterway obstructions. American Indian tribes with reserved rights to fish at traditional fishing sites may have, as ancillary entitlements, rights to dry the fish before transporting them. Holders of specific grazing rights may have the legal ability to construct fences and watering facilities. Further, the definition of a resource-use right in many resource settings somehow must prescribe the extent or intensity of the permissible use. For instance, a right to harvest trees in a region would need to specify what trees can be removed, where they can be removed, in what ways they can be removed, and with what damage to soils, water, and other trees. A right to graze livestock would specify the numbers and types of animals that can be grazed, where the grazing can occur, and whether the landowner (which could be a government agency) can order changes in grazing levels due to drought.

Duration and Transfer of Rights

Two key issues when defining resource-use rights have to do with their duration—how long they last—and whether the owner of a use right can sell or otherwise transfer it. Land ownership is typically (although not always) understood as perpetual, and landowners can transfer land at will. In the case of discrete natural resources, the law is more varied. Discrete-use rights in nature are rarely perpetual in duration. Often a use right includes a built-in term limit (for instance, a set number of years). Alternatively, the use right may last until the resource is fully exploited or so long as the use right remains valuable to the owner. In many instances, a resource-use right ends when its owner abandons it (it is typically not possible to abandon land). A use right can also be forfeited for simple nonuse or lost by failure to comply with an express duty...
to exploit the resource. For instance, oil and gas leases in the United States typically extend indefinitely beyond an original term of years “so long as” the lessee continues to extract petroleum in paying quantities. Once production ends—and unless the parties agree otherwise—the lease right terminates. As these examples illustrate, the duration of a use right is often linked to another major definitional element of the right: a use-it-or-lose-it obligation that compels the holder to exploit the resource. (Landowners sometimes face similar duties—they too can lose their rights if they leave land unused—though such duties of continuous use are far less common with land than with discrete natural resources.)

As for the ability of resource owners to transfer what they own, laws sometimes distinguish between resource-use rights of a commercial nature, which are transferable, and those of a more personal or familial nature, which may not be transferable. Thus, a right to log a forest commercially may be transferable whereas a right given to a neighbor to enter land and collect firewood might not be. Some resource-use rights become attached by law to a parcel of land when the resource-use right is intended to benefit uses of that specific land. In a simple case, a right-of-way to cross land may benefit adjacent land that is otherwise landlocked. In such an instance, the discrete-use right (in this illustration, the right-of-way) most likely cannot be transferred except when the benefitted land itself is being transferred.

Markets in resources flourish when resources are freely transferable. Free transfer, however, can easily clash with the desires of lawmakers to insist that resources be used in ways that achieve public-policy goals. Governments may decide to allocate resources based on a calculation of public interest or based on the identities of the recipients. They may allocate water to support a local farming community; they may allocate fishing rights to subsistence fishers; or they may decide that only working farmers can own farmland. These policy preferences can be frustrated if recipients of the use rights can promptly transfer their rights to other users or other uses. To avoid that danger, thereby protecting the policy goals underlying the allocation scheme, lawmakers often impose limits on subsequent transfer of the use right. They may allow transfer only to a person or to a type of use that is consistent with the original allocation mechanism. In the American West, transfers of water rights are often subject to governmental approval to ensure that new uses are socially beneficial. Lawmakers may further limit transfers so as to protect local farming communities. The problem with such restrictions on transfer is that they interfere with the market’s ability to reallocate resources. When the market cannot reallocate, then a state must develop some other reallocation method (for instance, using eminent domain to condemn existing uses, thus freeing the resource for reallocation by government, or, if the problem is understood in advance, only allocating use rights that are limited in duration or subject to termination under specific circumstances). The power of a resource owner to transfer the resource is thus intertwined with other defining elements of the use right.

Government Regulation

The power of government to regulate resource uses is intertwined with constitutional limits on the powers of various governments, federalism issues that coordinate governance activities by multiple levels of government, and limits on regulatory action designed to protect private property. Private property is a valuable institution that is capable of fostering economic enterprise and growth and adding stability to social, economic, and political orders. At the same time, private property derives from the exercise of governmental powers (that is, private property is inherently a creation of law). And private property is easily used by owners to oppress or subjugate other people and to degrade the lands and waters upon which these people depend. Particularly in the United States, these conflicting realities have been difficult to comprehend because of widespread assumptions that private property somehow arises outside of law or existed before the emergence of governance systems. Adding to the intellectual and ideological clashes are the economic realities that holders of valuable land and resource rights tend to defend their current rights tenaciously when lawmakers, out to promote the public good, propose changes in the laws that define their rights. Similarly, established resource users (for example, irrigators) can tenaciously defend their activities even when they cause ecological harm, which is viewed by the public as unacceptable. Whether lawmakers can promote the public interest by legally refining private rights depends upon governance structures and, importantly, on the strength and vigor of a jurisdiction’s democracy.

Many legal regimes have routinely allowed resource users to walk away from their operations, leaving nature to remedy scars and to absorb pollution. Increasingly, lawmakers have begun to insist that resource users clean up the worst contamination and restore lands to ecological conditions resembling their pre-extraction conditions. Oil and gas producers typically must fill in wells so as to diminish the dangers of groundwater contamination. Restoration duties are also being imposed in private transactions. Private leases and contracts governing resource activities now often require not just removal of equipment but affirmative measures to return land to specified conditions.

Natural resources law significantly affects how people use nature, particularly resource activities driven by market forces. Lawmakers can aid the quest for sustainability by

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reconsidering and revising the elements of natural resources law in ways that stimulate or insist upon resource uses that are consistent with the elements of sustainability. They can usefully refine the elements of resource use rights so as to prohibit ecologically degrading actions and require that resource users restore natural areas when resource extraction ends. They can improve resource allocation and reallocation methods so that patterns of resource use promote the common good. And they can better embed resources into landscape governance regimes, which, in effect, integrate multiple resource uses so as to reduce conflicts and accommodate shifting natural conditions and public values. Well-designed laws would provide frames in which market forces can operate, leading to patterns of resource use more consistent both with development aims and with the healthy functioning of landscapes.

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See also Environmental Dispute Resolution; Environmental Law—Europe; Environmental Law—United States and Canada; Land Use—Regulation and Zoning; Nuisance Law; Ocean Zoning; Real Property Law; Soil Conservation Legislation; Transboundary Water Law

FURTHER READINGS