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Natural Transplants

Vanessa Casado Pérez
Yael R. Lifshitz

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NATURAL TRANSPLANTS

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*Yael R. Lifshitz*²

Policy-makers are constantly faced with the complex task of managing novel. At times, this results from new technologies: consider fights over allocating air rights for drones, or decisions about how to share scarce vaccines in a pandemic. Other times the resources are old, but the challenges are new: like how to fairly allocate water, in times of unprecedented drought, or previously undesirable rare earth minerals that have been in demand for modern manufacturing and energy production. Often, instead of carefully tailoring a regime to the new resource, decision-makers simply rely on mechanisms they are familiar with. When jurisdictions borrow from each other, scholars call this a “legal transplant”—as when one state copies another state’s innovations, or when the federal government learns from the “laboratory of states.” This article unveils a new legal transplant dimension: transplants across subject-areas. That is, when a jurisdiction looks within its own legal system, but for doctrines in other legal areas when regulating a new resource or a new challenge.

This Article makes three key contributions. First, it identifies a new type of transplant—between subject-matters within a jurisdiction. Second, it

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analyzes the reasons for internal, cross-subject legal transplants and the criteria for selecting which subject areas to copy from. Third, the Article brings the legal transplants literature to bear, specifically, on natural resource law. It explores two cases, groundwater and wind energy, where policymakers and courts have borrowed from other resource schemes, often ignoring the scientific and social differences between these natural resources. Other areas of law, such as, the incorporation of contract doctrines in landlord-tenant relations, are also described to show the explanatory power of the natural transplant framework. This conceptual framework is then applied to new mineral developments in space and the deep sea. Cross-subject transplants may be more prevalent than previously appreciated, and understanding them will pave the way to analyze the regulation of new developments in natural resources, infrastructure, and beyond.

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I. INTRODUCTION

Monumental infrastructure and energy shifts are currently underway. In March 2021, for instance, President Biden announced the start of a new era with regards to offshore wind energy,³ which is unprecedented in the US. As a result, decision-makers at the federal level will now need to decide how to divide and govern the winds blowing over US waters. Other large-scale plans include overhauling the electric grid, investing in electric vehicles, hydropower, and much more. All these grand new infrastructure and energy projects will require policy-makers to reassess the use of our resources in light of modern challenges.

How will decision-makers tackle the challenge of governing or reassessing the use of resources? To answer, we look at current and historical examples of resource-governance. We use two novel case-studies that offer in-depth analysis of two key resources: groundwater and wind energy. As we will see, an interesting pattern emerges: often, rather than carefully tailoring

³ The White House. *FACT SHEET: Biden Administration Jumpstarts Offshore Wind Energy Projects to Create Jobs*, March 29, 2021. <https://www.whitehouse.gov/briefing-room/statements-releases/2021/03/29/fact-sheet-biden-administration-jumpstarts-offshore-wind-energy-projects-to-create-jobs/> (last visited August 2, 2021)

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regimes to fit the resource at hand, or crafting rules from scratch, decision-makers simply copy an existing regime.

The key question then, is, why? Why is it that copying exists, and moreover persists, even when the imported regime is sometimes ill-suited for the task at hand? This Article offers a new conceptual framework for answering this question by bringing together currently separate strands of literature: the scholarship on resource economics, and the scholarship on “legal transplants”.

“Legal transplants,” in brief, are usually understood as a transfer of a legal regime or rule between one jurisdiction to another.⁴ The literature, generally, recognizes two types of transplants: the first, between similarly situated jurisdictions. This is known as “horizontal” transplanting.⁵ An illustrative example here is borrowing between states within the U.S. For instance, several states may copy California’s legislation on salaries for college athletes.⁶ The second dimension along which transplanting occurs, is between jurisdictions that are either “above” or “below” each other. This is sometimes known as a “vertical” transplant.⁷ For example, when States borrow from federal law or when international law transplants regimes from domestic law.⁸

This Article underscores another type of transplant, which has been largely overlooked by current scholarship: one that occurs within the same jurisdiction, but across subject matters. This third option has thus far been understudied, and is the primary focus of this Article. Cross-subject

⁴ Jonathan B. Wiener, *Something Borrowed for Something Blue: Legal Transplants and the Evolution of Global Environmental Law*, 27 *ECOLOGY L.Q.* 1295, 1296 (2001) (defining legal transplants).

⁵ *Id.* at 1303 (note the use of the term “horizontal” here is different to the way it is used in Yael R. Lifshitz, *The Geometry of Property*, U.T.L.J. (forthcoming 2021)).

⁶ Greta Anderson, *U.S. Congressman to Propose College Athlete Payment Bill*, *INSIDE HIGHER ED* (October 4, 2019), <https://www.insidehighered.com/news/2019/10/04/us-congressman-propose-college-athlete-payment-bill>.

⁷ Wiener, *supra* note 4, at 1303–04.

⁸ *Id.*; Toby S. Goldbach, “*Legal Norms’ Distinctiveness in Legal Transplants and Global Legal Pluralism*,” Allard Faculty Publications, 2013, at 32 <https://doi.org/10.2139/ssrn.2306782>.

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transplants may be both more prevalent—and more problematic— than the types of transplants scholars usually explore. Using examples from natural resource law, this Article thus highlights the transfers of legal rules and doctrines that occur within a jurisdiction, while also offering a conceptual framework to understand why these transfers occur, and why a particular subject matter is copied.

To illustrate how the three “transplant dimensions” might operate, consider the following example: Imagine a new resource is discovered, or becomes newly valuable in light of big infrastructure projects or shifts in energy policy. Decision-makers now need to determine how to manage the resource, whom to allocate it to, or how to solve a conflict related to its exploration. Think again of wind energy, which is currently a particular growth-area in the US. Winds, of course, are not new to the earth. But more recently, they have been deployed, at scale, to produce electricity.⁹ Faced with the growing use of wind power, policy-makers must now decide how they should manage the wind. Their first alternative, along the lines of a vertical transplant, would be to borrow from the regimes at the federal level, and apply a rule akin to the Clean Air Act. The second alternative, following a horizontal transplant, would be to copy a rule used by another U.S. state or a neighboring country. The third alternative, which is the focus of this Article, is to apply a rule from within the same jurisdiction, but which previously applied to a *different resource*. As the case study below shows, this third alternative best describes what courts and agencies did when faced with the challenge of conceptualizing wind rights.¹⁰ They copied the regimes applicable to water or to oil and gas.

The literature on legal transplants has largely ignored the third type

⁹ U.S. DEP'T OF ENERGY, WIND VISION: A NEW ERA FOR WIND POWER IN THE UNITED STATES, 1-3 (2015) (“from 2000 to 2013, installed capacity increased at a rate of nearly 30% per year”) [hereinafter DOE, *Wind Vision*]. The current total installed capacity in the U.S. (through the third quarter of 2017), is 84,944MW (Am. Wind Energy Ass’n, *Wind Energy Facts at a Glance*, <http://www.awea.org/Resources/Content.aspx?ItemNumber=5059> (last visited Jan. 10, 2018)).

¹⁰ See Part III.B *infra* (discussing the way courts dealt with the challenge of crafting wind energy).

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of borrowing, the cross-subject borrowing.¹¹ The analysis of vertical and horizontal transplants, on which the current literature focuses, helps us understand why jurisdictions prefer to borrow an already existing regime instead of coming up with new rules or doctrines. However, the reasons offered in the literature do not fully account for internal, cross-subject transplants where jurisdictions decide to transfer their own rules between different areas of law.

This Article, thus, aims to expand the legal transplant umbrella by laying out the conceptual framework for this third type route and illustrating its operation in the context of natural resources.

Importantly, cross-subject transplants occur within all policy-making institutions. Agencies that need to adopt a new set of rules, for example, could borrow existing rules from a different resource. That is precisely what the Bureau of Land Management did when it needed to put together rules for leasing offshore wind: it used the blueprint that existed in the context of offshore oil and gas.¹² Regulators have, similarly, used surface mining rules to regulate waste,¹³ and the Clean Air Act, which was originally intended for “conventional” pollutants, has been used to regulate greenhouse gases.¹⁴

Transplanting can occur in the practice of courts, as well. In another contemporary example, to decide whether dinosaur bones belonged to the surface owner, a recent case in Montana considered whether the bones can, and should, be treated like subsurface minerals, oil and gas, or rather like limestone.¹⁵ While oil and gas and dinosaur fossils are both derived from organic sources, preserved underground for millions of years, the court considered that fossils are not always valuable, while oil and gas is. Texas

¹¹ David Marcus, *Trans-Substantivity and the Processes of American Law*, 2013 BYU L. REV. 1191 (2014) (discussing the phenomenon this article labels natural legal transplants in civil procedure matters. His definition of cross-subject is “doctrine that, in form and manner of application, does not vary from one substantive context to the next”).

¹² See Part III.B *infra*, discussing the construction of wind law.

¹³ See Part IV.C *infra*, discussing waste management.

¹⁴ See Part IV.C *infra*, discussing the Clean Air Act.

¹⁵ *Murray v. BEJ Minerals, LLC*, 962 F.3d 485, 486 (9th Cir. 2020); Jeremy P. Jacobs, *Mineral Fight Goes Mesozoic: Who Owns Dinosaur Bones?*, E&E NEWS (July 8, 2019), <https://www.eenews.net/stories/1060685731>.

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follows oil and gas law whenever new questions arise,¹⁶ but Montana, producing about 1% of the oil Texas pumps produce, deviated from the oil model. The court considered fossils to be closer to limestone, instead. Limestone belongs to the surface owner because, according to the court, it is close to the surface and, like dinosaur fossils, can be found by scrapping the soil.¹⁷ Here, again, the courts' move can best be characterized as a cross-substantive transplant.

What motivates the adoption of natural transplants? Internal, cross-subject transplants are motivated by several, non-exclusive reasons. First, an existing regime may accurately reflect the preferences of a particular jurisdiction over the use and exploitation of natural resources and, thus, copying it would ensure those preferences are satisfied. For example, some jurisdictions may be wary of commodification of certain goods and be reluctant to accept regimes that rely on private property rights and market transactions. Second, the new regime might happen to be the most efficient for the new problem. In natural resources, two such resources may be scientifically similar and, as a result, applying the same rules to both can produce the desired results. Transplants can also be a positive source of innovation.¹⁸ Third, copying the rules from another resource may be cost-efficient because coming up with a new rule is expensive at the outset, and the transitional costs of adapting to a new rule are high. Relatedly, an internal transplant ensures that the legal community is already familiar with the rules and doctrines. The legal community will turn to a resource that is salient, likely one they are more familiar with, and which is *natural* to them. This is known as heuristic of availability.¹⁹ These operate as a sort of cognitive "short cut" to help decision-makers and legal actors. They also cement, over time, the use of particular transplants over others.

Yet, while there are generally many advantages to transplants, and

¹⁶ See Part III.A *infra*, discussing groundwater.

¹⁷ Brief for Appellees at 15, *Murray v. BEJ Minerals*, 908 F. 3d 437 (9th Cir. 2019) (No. 16-35506).

¹⁸ STEVEN JOHNSON, *WHERE GOOD IDEAS COME FROM: THE NATURAL HISTORY OF INNOVATION* (2010).

¹⁹ KAHNEMAN AND TVERSKY, *JUDGMENT UNDER UNCERTAINTY HEURISTICS AND BIASES* 14 (1982)

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particularly natural transplants, just like any other foundational tradeoffs in law—say, rules versus standards or boilerplate versus a non-standardized contract—transplants inevitably involve compromises. The primary risk is transplanting a regime that is inapt for the particular problem at hand. Even if the adoption-costs at the outset are lower, it could be the case that implementing the transplanted regime over time is sub-optimal. This could be because the transplanted regime is ill-fitted to the “new” setting or resource. As an example, courts in Texas ignored the scientific differences between oil and water and applied doctrines from oil and gas to groundwater.²⁰ The result of applying oil-law to groundwater was been well document and studied.²¹

The same tradeoffs that are embedded in the context of natural transplants, also extend beyond the use of resources. Additionally, they could very well apply to new regulatory challenges in family law, health law, labor law or regulation of constantly evolving new technologies, as they have done in the past. For instance, surrogacy, a controversial topic, needed to be regulated. Given that legislatures lagged behind, courts applied adoption regulations.²² In another example, part of the landlord-tenant revolution included treating leases more like contracts than conveyances, importing, thus, contract law doctrines.²³ Similarly, corporations' regulations were the base for the regulation of other forms of business associations.²⁴

This Article, thus, makes three key contributions. First, the Article expands the legal transplants literature by offering a conceptual framework for understanding borrowing across three dimensions. Second, it focuses, in particular, on the most understudied of these dimensions – the borrowing that occurs across resources or areas of law. In that sense, it also brings together two strands of literature: the literature on legal transplants and the literature on the mechanisms by which legal rules evolve or develop internally. The

²⁰ For a specific analysis of borrowing within property law, see Yael Lifshitz, *Property Beyond Land* (on file with authors) (discussing the borrowing between land law, a particular branch of property law, and other domains of property law).

²¹ Fambrough, Judon. “Mixing Oil and Water Law,” (September 21, 2016), <https://assets.recenter.tamu.edu/Documents/Articles/2141.pdf>.

²² See *infra* notes 173-176 and according text.

²³ See *infra* notes 177-178 and according text.

²⁴ See *infra* notes 179-183 and according text..

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framework for unpacking internal legal transplants explains why they are adopted, which institutions adopt them, and which subject areas are likely to be the exporting ones. Importantly, while the examples used in this Article focus on natural resource law, the internal, cross-subject transplants can be found in many other domains.²⁵ The conceptual framework will shed light on existing and future transplants, such as the regime for space minerals.²⁶ Third, this Article brings the legal transplants literature to bear, specifically, on natural resource law. While natural resource law has been studied in other contexts, the idea of legal transplants within natural resources has received little scholarly attention.

The Article proceeds as follows. Part II underscores current strands in the literature on natural transplants and the ways in which this Article broadens the scope of the transplant idea. Part III then illustrates how this third type of borrowing occurred. It does so by drawing on two historical case studies, focusing on two key resources: groundwater, which is crucial to our drinking water; and wind, which is key to our energy transition. Part IV, lays out the concept of a natural transplant, which focuses on cross-subject borrowing within a jurisdiction. It offers an analytical framework for understanding why transfers occur, what regimes are borrowed, and who are the legal actors involved in this internal, cross-subject transplants. Part V shows the explanatory and predictive power of the framework by applying it to past legal developments in other areas of the law, underscoring that natural transplants are pervasive, and to future regulations in cutting-edge natural resources areas, deep-sea and space minerals. Part VI offers concluding remarks.

II. BROADENING THE SCOPE: NATURAL LEGAL TRANSPLANTS

In order to understand *natural* legal transplants, it is necessary to first explore the general transplant framework. Natural legal transplants, which are the focus of this Article, are distinct from those analyzed by the transplant literature, because they are intra-jurisdictional and cross-subject.

²⁵ See Lifshitz, *supra* note 20.

²⁶ See Part V.B.1. *infra*, discussing space minerals.

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Nonetheless, there are commonalities with other theorized types of transplants that help frame natural legal transplants, explaining both why jurisdictions borrow a doctrine from an existing resource for a new resource and which doctrines they pick and analyze the case-studies. This framework is then illustrated by the case studies on Texas groundwater and wind rights in the next Section.

A. Understanding Legal Transplants

The concept of “legal transplants” has captured the imagination of scholars and policy-makers alike. The idea, put simply, is typically understood as the movement of a particular legal rule, or a system of laws, either from one country to another or from one people to another.²⁷ Much of the discourse regarding legal transplants has focused on the dynamics between developed and developing countries and the more or less voluntary legal borrowing that occurs in this regard.²⁸ But transplants also occur between neighboring jurisdictions with a similar level of development. This is the case, for example, with regards to the international spread of environmental impact assessments.²⁹ U.S. States, likewise, frequently copy each other.³⁰ Beyond the adoption of statutes sponsored by the Uniform Law Commission, some states are trendsetters such that other jurisdictions may copy their regulation on a particular area.

Copying between jurisdictions is often explained on utilitarian grounds. From the point of view of the “receiving” state, copying may be a way to increase efficiency.³¹ First, and probably most prominently, this could be a result of efficiency gains in the adoption process itself. The basic idea is that copying is essentially cheaper than crafting something anew. Although the adopting jurisdiction will still face some adaptation-costs, which could

²⁷ “[T]he moving of a rule or a system of law from one country to another, or from one people to another.” ALAN WATSON, *LEGAL TRANSPLANTS. AN APPROACH TO COMPARATIVE LAW* 21 (2ND ED. 1993).

²⁸ Glen Mola Pumuye, *Legal Transplants: A Conflict of Statutory Law and Customary Law in Papua New Guinea*, 4 *IALS STUDENT L. REV.* 31, 32–33 (2017).

²⁹ Natasha Affolder, *Contagious Environmentally Lawmaking*, 31 *J. ENV’T L.* 187, 190 (2019).

³⁰ Some scholars propose that state rules may also be followed at the federal level. See Alexandra B. Klass, *Eminent Domain Law as Climate Policy*, 49 *WIS. L. REV.* 82 (2020).

³¹ Wiener, *supra* note 4, at 1354.

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include the direct costs of acquiring the information about the rules and implementing them; the rent-seeking costs by those who resist change and those who do not; the indirect costs related to the new element imported not being coherent with the rest of the system; and the costs arising from lack of innovation since systems without local variations are less likely to innovate and adjust dynamically.³²

The copied rule might also happen to be beneficial in itself (regardless of the adoption process). Lastly, sometimes simply being in unison with neighboring states increases efficiency. This may be the case if having a coherent set of rules across jurisdictions will make it easier for various actors to navigate both jurisdictions' regulations and, for example, may enhance trade.

A transplant may also have functional advantages from the “originating” state’s point of view: for example, if a state sets a particularly demanding environmental regulation which is later copied by other states,³³ the originating state faces less risk of companies fleeing to other areas with less stringent regulations. Furthermore, states may want to have homogenous rules with their neighboring jurisdictions for other reasons. One is to avoid environmental externalities. If their neighbors adopt environmental regulations, cross-border externalities may be reduced, and having the same regime puts everyone on equal footing. Another reason may be that jurisdictions want to have rules aligned with the other jurisdictions that belong to their legal culture.

1. Which One? Transplant Types

The term “legal transplants” is in fact an umbrella concept that encompasses many different scenarios, including which regimes are copied, the reasons to

³² Nuno Garoupa & Anthony Ogus, *A Strategic Interpretation of Legal Transplants*, 35 J. LEGAL STUDS. 339, 345–46 (2006).

³³ This copying would not be as easy if laws and regulations were protected as Clowney suggests. Nonetheless, protection may help jurisdictions plan carefully for the adoption of the new regulation as they will have to face a price. S. Clowney, *Property in Law: Government Rights in Legal Innovations*, 72 OHIO ST. L.J. 1 (2011).

undertake, and the extent of the transplant.³⁴ Regarding the reasons why a particular jurisdiction would adopt a transplant, scholars have identified several types, which correspond with the motivations (or perceived motivations) to undertake a transplant. The leading typology in this regard was developed by Jonathan Miller, who categorized transplants by drawing on examples of transplants between developed to developing countries.³⁵ The first type is Cost-Saving transplants. This captures the idea of a jurisdiction wanting to save by not developing their own solution to a problem. Environmental law transplants, in particular, could respond to this model since some jurisdictions may not have the funds to invest in the research studies necessary to regulate certain pollutants. The second type is the Externally Dictated transplant, which implies that some external power has imposed a full new legal regime or some regulation. This category covers anything from a full overhaul of the legal system after a military conquest to the influence of the IMF or the World Bank. These transplants, in particular, have long been criticized, and the language of transfers and convergence of legal systems has been deemed to de-politicize the transplant masking the underlying issues that make Western regulatory examples the only ones valuable from the former-colonies' perspectives.³⁶ As for the efficacy of such transplants, scholars have claimed that imposed transplants are rarely successful.³⁷

The third type is the Entrepreneurial transplant, which focuses on the mechanism that prompted the transplant. In the Entrepreneurial transplant, the trigger is a group of people, often experts, pushing for the adoption. It can be NGOs working on a particular area, companies aiming at homogenizing the regulatory frameworks they operate under,³⁸ or locals educated in the

³⁴ Transplants are, broadly, aimed at improving the current legal system or converging with other legal systems. Jonathan M. Miller, *A Typology of Legal Transplants: Using Sociology, Legal History and Argentine Examples to Explain the Transplant Process*, 51 AM. J. COMPARATIVE L. 839, 839–886 (2003) (on the aims of transplants); Affolder, *supra* note 29 at 203. (on transplants as convergence). Although, of course, transplants are far from homogeneous, as the discussion here shows.

³⁵ Silvia Ferreri & Larry A. DiMatteo, *Terminology Matters: Dangers of Superficial Transplantation*, 37 B.U. INT'L L.J. 35, 54 (2019).

³⁶ Affolder, *supra* note 29 at 204.

³⁷ Matteo Solinas, *The Nature of Legal Transplants – Inspirations from Postcolonial Scholarship*, 22 NZACL YEARBOOK 179, 179–216 (2017).

³⁸ William Magnuson, *The Race to the Middle*, 95 NOTRE DAME L. REV. 1183 (2020).

country where the transplanted rule originated. Finally, the fourth type, is the Legitimacy-Generating transplant which focuses on the prestige of the originating legal system or rule.³⁹ Even without the colony-metropolis relationship, there is the possibility of certain countries being thought leaders because of their international power position.⁴⁰ For example, United States Environmental Protection Agency's asbestos regulations have been adopted in at least 25 more countries, even if their environmental protection regulations are less robust.⁴¹ There are also bottom up transplants where private actors abide by the rules of a certain jurisdiction everywhere they operate. The so called "Brussels effect" serves as an example: the European Union has unilaterally globalized certain regulations. International firms that operate in the European Union find it more efficient to produce all their products following the European standards, even if they are more stringent.⁴²

This typology mainly focuses on the reasons why a certain regime is picked. In reality, of course, the types can be "mixed and matched". Yet, the scholarship on transplants is not limited to studying the particular reasons for

³⁹ E. ROGERS, *DIFFUSION OF INNOVATIONS* 63 (5th ed., New York: Free Press 2003).

⁴⁰ Garoupa & Ogus, *supra* note 32, at 347. ("In summary, we consider that different legal regimes and practices may be more or less costly to adopt, depending on their influence. This is measured by higher switching costs for the more influential country and lower switching costs for the less influential country. Similarly, a regime that is well known and used may be cheaper to switch to than a brand-new regime (regardless of whether or not the countries are origins or transplants).")

⁴¹ Tseming Yang & Robert V. Percival, *The Emergence of Global Environmental Law*, 36 *ECOLOGY L.Q.* 615, 623 (2009).

⁴² For an account of the Brussels effect, see ANU BRADFORD, *THE BRUSSELS EFFECT: HOW THE EUROPEAN UNION RULES THE WORLD* (2019)

Among the scholars of legal transplants, prestige has been criticized. On the one hand, the prestige rationale could obscure the real reason for a transplant, efficiency. See Ugo Mattei, *Efficiency in Legal Transplants: An Essay in Comparative Law and Economics*, 14 *INT'L REV. L. & ECON.* 3, 8 (1994).

On the other, it has also been pointed out that prestige is not objective, but influenced by ideology and power relationships.

Ferreri and DiMatteo refine the taxonomy and suggest that there are 7 subtypes of transplants that can be classified in three larger groups (transplantation, borrowing, and influence): (i) transplantation of a legal tradition; (ii) Transplantation of a national law; (iii) transplantation of an area of law; (iv) double-transplantation when "a country transplants a specific area of law and then uses that transplantation in the making of a broader law"; v) borrowing of a particular rule or doctrine; (vi) influence from a country's law perceived as advanced; and (vii) superficial transplantation when only terminology is borrowed. Michele Graziadei, *Legal Transplants and the Frontiers of Legal Knowledge*, 10 *THEORETICAL INQUIRIES L.* 723, 739 (2009).

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adoption. It also extends to *where* the transplant is coming from.

As far as the origin of the transplant, the literature, generally, recognizes two types of transplants: the first, between similarly situated jurisdictions. This is known as a “horizontal” transplant.⁴³ An illustrative example here is borrowing between States within the U.S. For instance, in 2007, Maryland became the 12th state to implement Californian emissions standards.⁴⁴ The second dimension along which transplanting occurs, is between jurisdictions that are either “above” or “below” each other. This is sometimes known as a “vertical” transplant.⁴⁵ An illustrative example in this strand of scholarship is work by Jonathan Weiner, who traces how the Kyoto Protocol borrowed the emissions’ trading mechanism from national regulations.⁴⁶ Similarly, in a federal system, the federal-level of government may borrow from one of the sub-federal units. For example, provinces in Canada adopted carbon taxes well in advance of the Canadian Federal Government’s adoption.⁴⁷

Taken together, the categorization of transplants, in the literature, is largely based either on the reasons for adopting a transplant or on the origin-jurisdiction of the transplant. Yet none of these categories cover the cross-subject, natural, transplants which this Article underscores.

⁴³ Wiener, *supra* note 4, at 1303 (Note the use of the term “horizontal” here is different to the way it is used in Yael R. Lifshitz, *The Geometry of Property*, U.T.L.J. (forthcoming 2021)).

⁴⁴ Maryland Department of the Environment, *States Adopting California’s Clean Cars Standards*, <https://mde.maryland.gov/programs/air/mobilesources/pages/states.aspx>. (last visited Aug. 2, 2021).

⁴⁵ Wiener, *supra* note 4, at 1303–1304.

⁴⁶ *Id.*

⁴⁷ Maxine Joselow, *National Carbon Tax Upheld by Canada’s Supreme Court*, Scientific AMERICAN E&E NEWS (March 29, 2021), <https://www.scientificamerican.com/article/national-carbon-tax-upheld-by-canadas-supreme-court/> (last visited Aug. 2, 2021)

For information on U.S. carbon taxes, see generally *What Is A Carbon Tax?*, TAX.POL’Y CTR., <https://www.taxpolicycenter.org/briefing-book/what-carbon-tax> (last visited Jan. 29, 2021); *State Carbon Taxes: Overview*, CARBON TAX CTR., <https://www.carbontax.org/u-s-states/state-carbon-taxes-overview/> (last visited Aug. 2, 2021)

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2. Who and How? The Process and Conditions for Success

It is also important to understand what is the process by which a certain transplant is adopted. Scholars have also studied the conditions necessary for transplants to succeed, that is, to achieve the goals that prompted the selection of a particular regulation and be generally accepted by the community receiving it.⁴⁸ Although the success of a transplant will depend widely on the criteria chosen to evaluate such success, and the time frame as the more time passes the more likely it is that the transplant will fit the society where it is adopted because both the regulation may change and the context may adapt to the regulation.⁴⁹

Importantly, a key piece in the success of the transplant seems to be the people behind the transplant.⁵⁰ Those behind the transplant may be academics trained in a foreign country or public servants convinced of the good qualities of the foreign rule or special interests who may be favored by the rule. Those favoring the transplants and contributing to the harmonization of the new rule with the existing legal system have been called “transferists”.⁵¹ However, the risk with a transplant is that while it is championed by a particular group (often, an intellectual or economic elite), it may not filter through to the broader population.⁵² This focus on the human

⁴⁸ Rogers examines the five factors necessary for a legal innovation to succeed connected both with the socio-economic context but also the intrinsic technical characteristics of the regulation itself. The factors are: (i) relative advantage over other alternative regulations (including the status quo), (ii) compatible with the adopter’s preconditions, which relates to the institutions of the jurisdiction that adopts the rule, (iii) simplicity of the regulation, (iv) allows for evaluation and improvement, and (v) has observable benefits. (footnote the whole paragraph with E. Rogers, *Attributes of Innovation and Their Rate of Adoption*, in *DIFFUSION OF INNOVATIONS* 211 (1983).

⁴⁹ Bandeira Galindo understands transplants not only taking into account space, but time. According to him, a transplant implies that the country where the rule is transplanted to wants to achieve some result in the future. George Rodrigo Bandeira Galindo, *Legal Transplants between Time and Space*, in *ENTANGLEMENTS IN LEGAL HISTORY: CONCEPTUAL APPROACHES* 133 (2014).

⁵⁰ Affolder, *supra* note 29 at 208; Graziadei, *supra* note 42 (advocates for looking not only at the macro level of why transplants occur, but also at the micro).

⁵¹ María Paula Reyes Gaitán, *The Challenges of Legal Transplants in a Globalized Context: a Case Study On ‘Working’ Examples*, U. WARWICK (2014); Basil C. Bitas, *Comparative Theory, Judges, and Legal Transplants*, 26 *SINGAPORE ACADEMY L. J.* 50, 52–54 (2014).

⁵² Jan Torpman & Fredrik Jörgensen, *Legal Effectiveness: Theoretical Developments on Legal Transplants*, 91 *ARSP* 515, 515–534 (2005).

aspect, and the communities that lead the transplanting move, aligns nicely with our focus on the heuristics of availability within the legal community, as discussed below.

Finally, the literature on legal transplants has made clear that transplants are not just a “copy paste” technocratic mechanism. Interjurisdictional transplants have to rise above differences in culture,⁵³ religion, political and judicial system,⁵⁴ distribution of power,⁵⁵ geography, political economy, and norms⁵⁶ by adapting to them.⁵⁷ The complexity is even higher and the perils amplify when a developed-country regimes are applied to developing countries without tweaking it to suit the likely cultural and institutional differences. For a transplant to be successful, either it has to be applied to a jurisdiction with extremely similar characteristics to the jurisdiction of origin, or the transplant should be adapted to the particularities of a jurisdiction. In fact, no transplant can be a direct import. It may be expected that transplants will evolve in the same way as an organ transplant does in the human body.⁵⁸ However, it is important to note that in many cases, transplants are implemented to bring about changes, to jump start the wider process of social change.⁵⁹ Increasingly transplants happen between systems that already have a lot in common⁶⁰ and have become the rule rather than the exception.⁶¹

B. From Legal Transplants to Natural Transplants: Broadening the Scope

⁵³ Oscar S. Chase, *Legal Processes and National Culture*, 5 CARDOZO J. INT’L & COMP. L. 1 (1997).

⁵⁴ Mattei, *supra* note 42, at 17 (“a potentially efficient doctrine may be deprived of any impact if it is introduced in an incompatible machinery of justice”).

⁵⁵ Otto Kahn-Freud, *On Uses and Misuses of Comparative Law*, 37 MOD. L. REV. 1 (1974).

⁵⁶ Wiener, *supra* note 4, at 1357.

⁵⁷ Randall Peerenboom, *Toward a Methodology for Successful Legal Transplants*, 1 CHINESE J. COMPARATIVE L. 1, 1–3 (2013).

⁵⁸ WATSON, *supra* note 27, at 27. For a comment on Watson’s rejection of mirror theories of law (i.e. the theories that law is the mirror of the context external to the law), see William Ewald, *Jurisprudence (II): The Logic of Legal Transplants*, 43 AM. J. COMPARATIVE L. 489, 489–510 (1995).

⁵⁹ David Nelken, *Comparatists and Transferability*, in COMPARATIVE LEGAL STUDIES: TRADITIONS AND TRANSITIONS 455 (Pierre Legrand & Roderick Munday eds., 2003).

⁶⁰ Graziadei, *supra* note 42, at 727.

⁶¹ *Id.* at 733.

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This Article seeks to broaden the framework of horizontal legal transplants in two directions. First, it shows that legal borrowing may happen *within* a jurisdiction (not just between jurisdictions). Second, it shows that legal transplants do not need to happen within a single substantive area. While many transplants could be transferring a rule or doctrine within the same substantive issue, there are also cases where a legal doctrine, is transferred to another area of law.

This Article uses examples from natural resources to elucidate the cross-subject transplants. But these kinds of transplants are not limited to natural resources. In particular, we are looking at issues of first impression—be they either newly discovered, newly relevant natural resources in need of regulation, or new questions about existing resources that became contentious at one point—where doctrines from another resource have been applied.

Scholarship on natural resources, in the last few decades, has dealt with issues of first impression, largely, under the Demsetzian framework. In his seminal work, Harold Demsetz used an example of North American evolving rights in fur to argue that property rights will emerge in a particular resource when the benefits from creating and enforcing rights begin to outweigh the costs associated with such regimes.⁶² A Demsetzian analysis is thus concerned, particularly, with the question *when* will a (property) regime in a particular resource develop (and when not).

A rich body of scholarship has sprung up in the wake of Demsetz' analysis.⁶³ Some scholars relate Demsetz's theory to the more general notion

⁶² Harold Demsetz, *Toward a Theory of Property Rights*, 57 AM. ECON. REV. PAPERS & PROC. 347(1967) (broadly maintaining that property rights evolve when the benefits of establishing such rights exceed the costs associated with the property regime).

⁶³ See e.g. Terry L. Anderson & Peter J. Hill, *Cowboys and Contracts*, 31 J. LEGAL STUD. 489(2002); Stuart Banner, *Transitions Between Property Regimes*, 31 J. LEGAL. STUD. 359(2002) (applying the Demsetzian theory to land); Gary D. Libecap & James L. Smith, *The Economic Evolution of Petroleum Property Regimes in the United States*, 31 J. LEGAL STUD. 589, 590 (2002). (with regards to oil); David B. Schorr, *Appropriation as Agrarianism: Distributive Justice in the Creation of Property Rights*, 32 ECOLOGY. L.Q. 3(2005). (discussing the Demsetzian analysis with regards to water); Katrina M. Wyman, *From Fur to Fish: Reconsidering the Evolution of Private Property*, 80 N.Y.U. L. REV. 117, 135 (2005) (with regards to fisheries).

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of efficiency, claiming that “the Demsetz thesis can be seen as an anticipation of the idea that the common law evolves toward efficient rules”.⁶⁴ Other scholars maintain that Demsetz’s account can be linked to earlier views of scholars such as Thomas Hobbes and John Locke.⁶⁵

Much of the scholarship following in Demsetz’s footsteps can be seen through the lens of transaction costs:⁶⁶ the literature often focuses on different types of transaction costs, and highlights the significance of these costs in encouraging or impeding the creation of property (and by extension, other types of regimes as well). One particularly prominent cost that has been repeatedly emphasized in the literature relates to the price of defining and enforcing particular regimes.⁶⁷

Circling back to the choices in resource governance (and particularly when a new resource comes about or new uses require re-assessing): a Demsetzian framework, as mentioned, focuses primarily on the question of when a regime in a resource will emerge (answer: when the benefits of doing so outweigh the costs). But, importantly for our purposes, it does not speak directly to the question of *whether* a regime would be “copied” from one context to another, nor *which* regime would be chosen for copying. These questions remain open. We aim to begin filling this gap by weaving together the natural resource literature and the legal transplants literature.

⁶⁴ Thomas W. Merrill, *Introduction The Demsetz Thesis and the Evolution of Property Rights*, 31 J. LEGAL STUD. S331 S331 (2002); see similarly Thomas W. Merrill & Henry E. Smith, *Making Coasean Property More Coasean*, 54 J.L. & ECON S77, S79 (2011)).

⁶⁵ James E. Krier, *Evolutionary Theory and the Origin of Property Rights*, 95 CORNELL L. REV. 139, 149 (2009). For another analysis of the gaps on Demsetz evolutionary theory, see Carol M. Rose, *Property as Storytelling: Perspectives from Game Theory, Narrative Theory, Feminist Theory*, 2 YALE J.L. & HUMAN. (1990).

⁶⁶ But see Katrina M. Wyman, *From Fur to Fish: Reconsidering the Evolution of Private Property*, 80 N.Y.U. L. REV. 117, 135 (2005) (arguing that Demsetzian theory and transaction costs can’t fully explain the development of property rights, for example in fisheries, and that political choices often better explain the evolution of property).

⁶⁷ See e.g. Henry E. Smith, *Exclusion Versus Governance: Two Strategies for Delineating Property Rights*, 31 J. LEGAL. STUD. S453, S463 (2002); Terry L. Anderson & P. J. Hill, *The Evolution of Property Rights: A Study of the American West*, 18 J.L. & ECON. 163, 167 (1975). Also see generally Thomas W. Merrill & Henry E. Smith, *Optimal Standardization in the Law of Property: The Numerus Clausus Principle*, 110 YALE L.J. 1(2000); Henry E. Smith, *The Language of Property: Form, Context, and Audience*, 55 STAN. L. REV. 1105(2003).

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One could argue, on a high level of generality, that a Demsetzian framework would predict a regime would be “copied” when the benefits of doing so outweigh the costs. This assumption is largely shared by the legal transplants literature as well. So at a high-level of generality, the Demsetzian framework is in line with the legal transplants literature. But again, this high-level of generality doesn’t give us much by way of predicting *which* regime will be selected, and how.

III. HISTORICAL EXAMPLES OF NATURAL TRANSPLANTS

The application of oil and gas law doctrines to groundwater in Texas, and the regulation of rights in wind energy, illustrate the nature of internal, cross-subject legal transplants and the saliency hypothesis.

Cross-subject borrowing can occur between jurisdictions, although the case studies will focus on intra-jurisdictional transplants: water law borrowing from oil and gas, and water law or mineral law influencing regulation of “new” problems in wind and solar energy. Taken together, these illustrate how a jurisdiction could, in a sense, copy itself. It is copying a regime from a resource different from the one being newly regulated. The examples below illustrate the transplants that have operated in groundwater and wind.

A. *Water and Oil Do Mix in Texas*

(Ground)water and oil do not mix, except in Texas where the doctrines and rules governing one of these resources are often transplanted to govern the other. Water and oil do not mix because water is held together by hydrogen bonds that oil cannot break. But the scientific differences between groundwater and oil do not end there. There are also few commonalities. First, water and oil may be found underground. Second, both are fugitive resources because there is some movement of them underground.⁶⁸ Third,

⁶⁸ *Westmoreland v. Dewitt*, 130 Pa. 235, 249 (1889). (“Water also is a mineral; but the decisions in ordinary cases of mining rights, etc., have never been held as unqualified

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while for a long time oil was perceived as the most important resource for economic prosperity, climate change has changed the outlook. Now, the consensus is to move away from oil. At the same time, water scarcity is acuter than ever, and water has become the new oil attracting deep-pocket companies. However, the differences are important too, and they suggest that groundwater and oil allocation should perhaps follow different rules. First, oil reservoirs are non-renewable and groundwater can be renewable. But recharge can be affected by overpumping. Overdraft occurs when recharge of groundwater from precipitation is smaller than groundwater withdrawals.⁶⁹ Overdraft has numerous negative consequences. Overdraft directly causes a depletion of the aquifer, contributing to groundwater contamination, requiring larger groundwater pumping costs and/or drilling of new or deeper wells.⁷⁰ There are also indirect negative effects of groundwater overexploitation.⁷¹ Among those, there are: land subsidence, infrastructure damage, harm to groundwater-dependent ecosystems, and the economic losses from a more unreliable water supply.⁷² Second, and relatedly, groundwater systems have to be analyzed both dynamically, and over time, because there are lagged effects and across a vast territory since the aquifers are connected to other resources.

Courts in Texas have considered that the similarities are more important than the differences and have used doctrines from oil and gas to regulate issues related to groundwater, even if science suggest that these two resources are different. But not only courts, the legislature has shied away from correcting these missteps. Early on, the Texas Supreme Court in *Houston & T.C. Ry. Co. v. East* applied the English rule of capture to

precedents in regard to flowing, or even to percolating, waters. Water and oil, and still more strongly gas, may be classed by themselves, if the analogy be not too fanciful, as minerals *ferae naturae*. In common with animals, and unlike other minerals, they have the power and the tendency to escape without the volition of the owner. Their ‘fugitive and wandering existence within the limits of a particular tract was uncertain.’”).

⁶⁹ William M. Alley et al., *Sustainability of Ground-Water Resources*, USGS, <https://pubs.usgs.gov/circ/circ1186/html/intro.html> (last visited Jan. 29, 2021).

⁷⁰ Tara Moran et al., *The Hidden Costs of Groundwater Overdraft*, WATER IN THE W., <https://waterinthewest.stanford.edu/groundwater/overdraft/> (last updated Sept. 9, 2014).

⁷¹ *Id.*

⁷² *Id.*

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groundwater.⁷³ From there, when an oil case arose, the rule of capture was applied with references to the similarities with water.⁷⁴ The potential for tragedy that the rule of capture brings for the exploitation of natural resources has been well documented.⁷⁵ More interesting, for the purposes of this Article's analysis, is the relatively recent transfers from oil and gas law to groundwater law regarding ownership in place of the resource and the accommodation doctrine.

In *Edwards Aquifer Auth. v. Day*⁷⁶, The Texas Supreme Court adopted the rule of ownership in place for groundwater, following the oil and gas model in Texas.⁷⁷ In the *Day* case, the court made a comparison between groundwater and oil because both are fugacious resources. According to the court, the differences between the two are the product of regulation, and even that seemed to be converging. While the Edwards Aquifer Authority argues that the lack of correlative rights in groundwater implies that it cannot be subject to ownership in place, the court considers that the authority granted to the Edwards Aquifer Authority by the legislature is precisely establishing the equivalent of correlative rights in groundwater because the agency aims at ensuring that each landowner gets the fair share of groundwater. The Texas Supreme Court recognizes the differences between the two resources and the ultimate goals of their regulation.

⁷³ *Houston & T.C. Ry. Co. v. East*, 98 Tex. 146, 149 (1904); Charles R. Porter, *The History of W.A. East v. Houston and Texas Central Railway Company, 1904: Establishment of the Rule of Capture in Texas Water Law or "He Who has the Biggest Pump gets the Water"*, 50 E. TEX. HIST. J. 107, 112–15.

⁷⁴ *Stephens Cty. v. Mid-Kansas Oil & Gas Co.*, 113 Tex. 160, 167, 254 S.W. 290, 292 (1923) ("If the owners of adjacent lands have the right to appropriate, without liability, the gas and oil underlying their neighbor's land, then their neighbor has the correlative right to appropriate, through like methods of drainage, the gas and oil underlying the tracts adjacent to his own." citing *Houston & T.C. Ry. Co. v. East*, 98 Tex. 146 (1904)).

⁷⁵ Gary D. Libecap & Steven Wiggins, *Contractual Responses to the Common Pool: Prorationing of Crude Oil Production*, 74 AM. ECON. REV. 87 (1984); Anderson & Hill, *supra* note 63.

⁷⁶ *Edwards Aquifer Auth. v. Day*, 369 S.W.3d 814, 831–32 (Tex. 2012).

⁷⁷ Texas, New Mexico, Colorado, and Kansas apply this approach closer to the *coelum* principle. Other oil producing states, like California, Oklahoma, Louisiana, and Wyoming follow the non-ownership theory where the owner of the land has a "profit a prendre" right for the oil and gas beneath his surface estate and owns it only when and if he pumps it. The owner of the land has a right to explore and develop the oil. JOHN S. LOWE, *OIL AND GAS IN A NUTSHELL* 33–34 (6th ed. 2014).

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Oil is a non-renewable commodity used primarily for energy production. In contrast, groundwater is renewable, and while it may be sold as a commodity, it has multiple uses from irrigation to recreation. Accordingly, “Groundwater regulation must take into account not only historical usage but future needs, including the relative importance of various uses, as well as concerns unrelated to use, such as environmental impacts and subsidence.” However, the differences between water and oil are not relevant according to the court, instead it declared that “are governed by the same fundamental principle: each represents a shared resource that *must* be conserved under the Constitution.”

The court goes further and declares both groundwater and oil to be essential, water for life and oil for modern production. While it does not acknowledge the effects of climate change in water and the effects of climate change mitigation in oil, the court suggests that while oil is still sold at a higher price, the situation is changing. It goes on to conclude that groundwater, like oil and gas, is owned by the landowner in place and subject to the rule of capture following the oil case *Texas Co. V. Daugherty*.⁷⁸

Four years later,⁷⁹ the Texas Supreme Court continued its comparison between water and oil and gas by extending the accommodation doctrine from oil and gas⁸⁰ to groundwater.

In *Coyote Ranch*, the groundwater state and the surface state were separated, very much like in groundwater ranching.⁸¹ The City of Lubbock had bought the groundwater rights from the owners of Coyote Ranch in the midst of a drought in 1953. The issue at stake was the use of the surface area by the City. The deed provided that the City has “the rights to use all that part of [the Ranch] necessary or incidental to the taking[,] production, treating[,] transmission[,] and delivery of ... water.” But the Texas Supreme Court

⁷⁸ *Edwards Aquifer Auth. v. Day*, 369 S.W.3d 814, 829 (Tex. 2012) (*Stephens Cty. v. Mid-Kansas Oil & Gas Co* established that ownership in place of oil and gas was not incompatible with the rule of capture, *see id.* at 828).

⁷⁹ *Coyote Lake Ranch, LLC v. City of Lubbock*, 498 S.W.3d 53 (Tex. 2016).

⁸⁰ The accommodation doctrine of oil and gas was established in *Getty Oil Company v. Jones*, 470 S.W. 2d 618 (Tex. 1971).

⁸¹ Vanessa Casado Perez, *Liquid Business*, 47 FLA. ST. U. L. REV. 201, 226, 237-239 (2020).

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considered that the accommodation doctrine should be applied to groundwater. The accommodation doctrine was established for oil and gas in 1971 to regulate the conflicts between the surface estate and the severed groundwater estate. The Texas Supreme Court quotes oil and gas decision to state the tenets of the accommodation doctrine:

[T]he surface owner must prove that (1) the groundwater owner's use of the surface completely precludes or impairs the existing use, (2) the surface owner has no available, reasonable alternative to continue the existing use, and (3) given the particular circumstances, the groundwater owner has available reasonable, customary, and industry-accepted methods to access and produce the water and allow continuation of the surface owner's existing use.⁸²

The court analysed the similarities and differences between groundwater and oil and gas. They both “exist in subterranean reservoirs in which they are fugacious” and are subject to the rule of capture. Furthermore, both severed estates, groundwater and mineral, have the right to use the surface. These similarities prompted the Texas Supreme Court to transfer the oil and gas doctrine of ownership in place to water. The court considered that there is no reason not to do the same here, suggesting a certain path dependency.⁸³ The court goes on to say that, “common law rules governing mineral and groundwater estates are not merely similar; they are drawn from each other or from the same source.”⁸⁴ Even though the court recognizes some differences, mainly that water is a renewable and life-sustaining resource and oil is non-renewable and used for energy and manufacturing, it declares that “we are reluctant to search for a new approach to resolving disputes over a severed estate's implied right to reasonable use of the surface when a proven rule is at hand.” Commentators disagree with the Court’s view and consider that the natural and legal differences between groundwater and

⁸² *Coyote Lake Ranch* 498 S.W.3d 53 at 64–65. See *Merriman v. XTO Energy, Inc.*, 407 S.W.3d 244, 249 (Tex. 2013).

⁸³ *Cfr.* The city of Lubbock considered the application of the accommodation doctrine “momentous”. *Coyote Lake Ranch* 498 S.W.3d 53 at 64.

⁸⁴ *Id.*

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oil are dispositive⁸⁵ and that common law should give way to newer groundwater management rules today given the better scientific understanding of groundwater.⁸⁶

The City wanted the Court to apply a reasonable standard but, according to the Court, the municipality did not explain how it will differ from the accommodation doctrine. The City in this case centered its arguments on the interpretation of the deed. However, given that the Court believed the deed did not cover the conflict between surface and groundwater estate uses, competing ways to resolve the dispute could have been put forward. In particular, it could have been argued that while the mineral state and the surface estate are dominant and subservient, the groundwater and surface estate are equal as it is the case in Federal lands, where unnecessary and undue degradation⁸⁷ of the surface is not allowed.⁸⁸ While other states may not have specifically addressed the conflict between a surface owner and a groundwater owner, they do have a different approach to deal with the relationship between the surface and the mineral estates. In contrast to Texas' accommodation doctrine, these states follow a multidimensional approach or a correlative approach, which instead of focusing on the rights of the mineral

⁸⁵ Elizabeth A. Reichenberger, *Another Attempt to Mix Oil, Gas, and Water: An Analysis of the Texas Supreme Court's Decision to Apply the Accommodation Doctrine to Groundwater* (Coyote Lake Ranch, LLC v. City of Lubbock, 498 S.W.3d 53 (Tex. 2016)), 57 WASHBURN L.J. 367, 387 (2018). This author comments on the fact that property rules for oil and water are different because oil is subject to a single regime during its cycle while water has separate regimes for surface and groundwater even though these two are connected.

⁸⁶ *Id.*

For groundwater exceptionalism and the disconnect between science and law, see Christine A Klein, *Groundwater Exceptionalism: The Disconnect Between Law and Science* 71 EMORY L. J. (2021).

⁸⁷ 43 C.F.R. § 1732(b).

⁸⁸ Marla E. Mansfield, *On the Cusp of Property Rights: Lessons from Public Land Law*, 18 ECOLOGY L.Q. 43, 61 (1991) (“‘Unnecessary or undue degradation’ means surface disturbance greater than what would normally result when an activity is being accomplished by a prudent operator in usual, customary, and proficient operations of similar character and taking into consideration the effects of operation on other resources and land uses, including those resources and land uses outside the area of operations. Failure to initiate and complete reasonable mitigation measures, including reclamation of disturbed areas, or creation of a nuisance may constitute unnecessary or undue degradation.”).

Currently the Bureau of Land Management interprets unnecessary and undue degradation in a manner similar to the accommodation doctrine as it imposes conditions on the mineral development insofar it does not make the development impractical. *Id.* at 79–80.

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estate, focuses on the balance between the uses of the surface and the development of the mineral estate.⁸⁹

Day and Coyote ensure that the development of groundwater will piggyback from a well-developed oil and gas law in the state with a larger oil and gas production.⁹⁰

B. Constructing Wind Law

Wind has been harnessed for centuries by sea-faring sailors and mill-grinding farmers.⁹¹ But it is only more recently, in the past three decades or so, that wind has been used more readily in the production of electricity. Wind energy is now the largest form of renewable energy in the U.S., producing 105 GW of electricity, which is enough to supply about 32 million homes in America.⁹² Globally, according to the International Renewable Energy Agency, “Production of wind electricity doubled between 2009 and 2013, and in 2016 wind energy accounted for 16% of the electricity generated by renewables.”⁹³ Given the favorable economics of wind energy,⁹⁴ and the

⁸⁹ G. Alan Perkins, *Rights and Conflicts Among Surface Owners, Mineral Owners, and Lessees in Arkansas: Comparing Sticks in the Bundle*, 68 ARK. L. REV. 381, 390–391 (2006); Bruce M. Kramer, *The Legal Framework for Analyzing Multiple Surface Use Issues*, 44 ROCKY MTN. MIN. L. FOUND. J. 273, 273–275 (2007)

⁹⁰ Marvin W. Jones & C. Brantley Jones, *The Evolving Legacy of EEA v. Day: Toward an Effective State Water Plan*, 68 BAYLOR L. REV. 765, 783 (2016)

⁹¹ STEVEN A. WALTON, *WIND & WATER IN THE MIDDLE AGES: FLUID TECHNOLOGIES FROM ANTIQUITY TO THE RENAISSANCE* (2006).

⁹² *Wind Powers America Annual Report*, AM. WIND ENERGY ASS’N (Apr. 16, 2020), <https://www.awea.org/resources/news/2020/wind-is-now-america%E2%80%99s-largest-renewable-energy-prof#:~:text=Washington%2C%20D.C.%20%E2%80%93%20Wind%20power%20emerged%20power%2032%20million%20American%20homes> (“With these additions, operating wind power capacity in the U.S. now stands at over 105 GW, enough to power 32 million American homes”) (last visited Aug. 2, 2021)

⁹³ *Wind Energy*, INT’L RENEWABLE ENERGY AGENCY, <https://www.irena.org/wind> (last visited Jan. 10, 2021).

⁹⁴ See The European Wind Energy Ass’n, *The Economics of Wind Energy* (2009), https://www.ewea.org/faileadmin/files/library/publications/reports/Economics_of_Wind_Energy.pdf (last visited Aug. 2, 2021); Carbon Brief, *Analysis: Record-low Price for UK Offshore Wind Cheaper than Existing Gas Plants by 2023* (Sept. 20, 2019), <https://www.carbonbrief.org/analysis-record-low-uk-offshore-wind-cheaper-than-existing-gas-plants-by-2023>) (last visited Aug. 2, 2021).

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potential for wind energy both offshore and onshore,⁹⁵ further growth can likely be expected.

Why does it matter how we govern the wind? After all, goes the argument, it is a renewable resource. But in fact, the use of one does diminish or change the uses available to others. Wind is the movement of air upon the surface of the earth. Wind turbines produce electricity by converting that movement – known as kinetic energy – to electric energy. When kinetic energy is pulled out of the airstream (after it “hits” a turbine), there is less kinetic energy left for others downstream.⁹⁶ More broadly, harvesting the wind significantly affects the broader area in which it takes place. Importantly, the introduction of wind energy to an area has been shown to cause changes in temperatures⁹⁷ as well as levels of precipitation;⁹⁸ and even changes in climate.⁹⁹ Altering the wind can also affect local ambient pollution

⁹⁵ See U.S. DEP’T OF ENERGY, OFFICE OF ENERGY EFFICIENCY & RENEWABLE ENERGY, WIND VISION: A NEW ERA FOR WIND POWER IN THE UNITED STATES 21 (2015) (discussing the wind energy potential in the United States and noting that there are over “15,000 GW of technical wind resource potential, both land-based and offshore, that can be harnessed and delivered reliably”).

⁹⁶ For but a few examples of studies analysing wakes, see, e.g., Rebecca J. Barthelmie & L. E. Jensen, *Evaluation of Wind Farm Efficiency and Wind Turbine Wakes at the Nysted Offshore Wind Farm*, 13 WIND ENERGY 573, 573 (2010); THOMAS E. KISSELL, INTRODUCTION TO WIND PRINCIPLES 31 (2010); Rebecca J. Barthelmie & et al., *Modelling and Measuring Flow and Wind Turbine Wakes in Large Wind Farms Offshore*, 12 WIND ENERGY 431, 431 (2009).

⁹⁷ See Liming Zhou et al., *Impacts of Wind Farms on Land Surface Temperature*, 2 NATURE CLIMATE CHANGE 539, 539 (2012) (finding a warming trend near wind farms); R. S. Baidya & J. J. Traiteur, *Impacts of Wind Farms on Surface Air Temperatures*, 107 PROC. NAT’L ACAD. SCI. U.S. Am. 17899, 17903 (2010) (showing a warming effect at night and a cooling effect during the day near wind farms); David Biello, *How Wind Turbines Affect Your (Very) Local Weather*, SCI. AM. (October 4, 2010), www.scientificamerican.com/article.cfm?id=how-wind-turbines-affect-temperature.

⁹⁸ See B. H. Fiedler & M. S. Bukovsky, *The Effect of a Giant Wind Farm on Precipitation in a Regional Climate Model*, 6 ENVIRON. RSCH. LETTERS 1, 3 (2011) (finding a “statistically significant 1.0% enhancement of precipitation in a multi-state area surrounding ... the wind farm”).

⁹⁹ See D.B. Kirk-Davidoff & D.W. Keith, *On the Climate Impact of Surface Roughness Anomalies*, 65 J. ATMOS. SCI 2215, 2225 (2008) (claiming that very large wind farms could change air patterns enough that it would also affect worldwide climate); D. Barrie & D.B. Kirk-Davidof, *Weather Response to a Large Wind Turbine Array*, 10 ATMOSPHERIC CHEMISTRY & PHYSICS 769, 769 (2010); L. M. Miller, F. Gans & A. Kleidon, *Estimating Maximum Global Land Surface Wind Power Extractability and Associated Climatic Consequences*, 2 EARTH SYS. DYNAMICS 1, 2 (2011) (“Inevitably, this [huge scale] removal

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levels,¹⁰⁰ seed pollination,¹⁰¹ and has been suggested to influence radar systems.¹⁰² Given all these impacts, extracting wind requires our attention in determining who can use it and to what extent.

What is the legal rule that governs the use of wind? This question was largely not addressed until about two decades ago. The first modern case to address the issue was *Contra Costa Water Dist. v. Vaquero Farms, Inc*¹⁰³ in California. The case involved a taking of land on which wind power facilities were installed. The water district, the condemning authority in this case, severed the wind rights from the land and awarded compensation only for the land itself (excluding the value of the wind). The landowner argued against the severance, claiming that the water district needed to pay compensation for the entire value of the property including the wind rights.¹⁰⁴ The court was thus called upon to consider “[w]hen a public entity acquires property through eminent domain, are the windpower rights capable of segregation or are they so affixed to the underlying land that they must be acquired by the condemning authority?”¹⁰⁵ The court found that “windpower rights are ‘substantial rights’ capable of being bought and sold in the marketplace,”¹⁰⁶ and therefore could be severed from the land.

Importantly for our purposes, in doing so, the court held that wind rights were much like rights in other energy-producing minerals, such as oil and gas.¹⁰⁷ Agreeing with the Water District, the court specifically noted that

of wind power from the Earth system must result in climatic impacts”); Mark Z. Jacobson, Cristina L. Archer & Willett Kempton, *Taming Hurricanes with Arrays Offshore Wind Turbines*, 4 NATURE CLIMATE CHANGE 195, 199 (2014) (finding that offshore wind turbines can mitigate hurricane damage to coastal cities and states).

¹⁰⁰ See, e.g., Jonathan Remy Nash & Richard L. Revesz, *Markets and Geography: Designing Marketable Permit Schemes to Control Local and Regional Pollutants*, 28 ECOLOGY L.Q. 569, 601 (2001) [hereinafter Nash & Revesz, *Markets and Geography*] (“winds that carry chemicals great distances and mix atmospheric components can significantly augment the rate of ozone production”).

¹⁰¹ See JAMES D. MAUSETH, *BOTANY: AN INTRODUCTION TO PLANT BIOLOGY*, 208–11 (2008) (wind aids plants in dispersal and reproduction).

¹⁰² See Felix A. Losco & Thomas F. Collick, *When Wind, Wind Turbines, and Radar Mix – A Case Study*, 68 A.F. L. REV. 235, 239 (2012).

¹⁰³ *Dist. v. Vaquero Farms*, 58 Cal. App. 4th 883, 868 Cal. Rptr. 2d 272 (1997).

¹⁰⁴ *Id.* at 273.

¹⁰⁵ *Id.* at 276.

¹⁰⁶ *Id.* at 277.

¹⁰⁷ *Id.* at 278.

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"[t]he right to generate electricity from windmills harnessing the wind, and the right to sell the power so generated, is no different, either in law or common sense, from the right to pump and sell subsurface oil, or subsurface natural gas by means of wells and pumps."¹⁰⁸ Thus, it was based on the similarity to oil and gas, that the court recognized a right to the flow of wind, separate from the right to the land itself.¹⁰⁹

The question of wind rights, and specifically when and how they materialize, was also addressed by the U.S. District Court for the District of New Mexico in *Romero v. Bernell*.¹¹⁰ The respondent, opposing the partitioning of a parcel of land owned by tenants in common, "argued that the land could not be partitioned" because the main "value of the land was in wind farm development." Partitioning the land, the respondent argued, would diminish the land's main value.¹¹¹ Instead of drawing on minerals law (as the *Contra Costa* court did), the *Romero* court compared wind to wildlife or water as a severable property interest.¹¹²

The *Romero* court thus recognized property in wind. Although, it held that such rights only materialize when the resource (wind) is captured. The court found that "[t]he right to 'harvest' wind energy is... an inchoate interest in the land which does not become 'vested' until reduced to 'possession' by employing it for a useful purpose."¹¹³ In this case, since at the time there were no wind turbines on the land, the court found that the wind interest had not yet materialized, and had thus, ordered the division of the property.¹¹⁴

Importantly for our purposes, the court was drawing explicitly on Prior Appropriation water law mechanisms, which are dominant in New Mexico. "This analysis," finds the court, "is consistent not only with logic but with New Mexico's legal treatment of the most analogous natural

¹⁰⁸ *Id.* at 278.

¹⁰⁹ In this case, the result of recognizing wind rights (and their existence separately from the land) was that the landowner was not awarded additional compensation in addition that which was received for the value of the land itself. *Id.* at 278.

¹¹⁰ *Romero v. Bernell*, 603 F. Supp. 2d 1333, 1334–36 (D.N.M. 2009).

¹¹¹ *Id.* at 1334.

¹¹² *Id.* at 1334–35.

¹¹³ *Id.* at 1335.

¹¹⁴ *Id.* at 1335–36.

resource, water.”¹¹⁵ Specifically, “[i]t is long established in New Mexico that individual rights to water can be acquired only by appropriation and application of the water to beneficial use.”¹¹⁶

Aside from these two leading cases, there is otherwise very little jurisprudence on wind governance. The few adjudicated cases that pertain to wind energy installations are typically concerned with the noise or aesthetics of the turbines, or the wellbeing of the wildlife in the region, but are mostly not concerned with the extraction of the wind itself (the kinetic energy within it) as a separate protectable interest.¹¹⁷

The practice of transplanting regimes from one resource to another is not reserved for the courts. On federal lands, the Bureau of Land Management (BLM), which is the largest manager of federal lands,¹¹⁸ has initiated a process for awarding lease grants for wind energy production.¹¹⁹ Through this

¹¹⁵ *Id.* at 1335.

¹¹⁶ *Id.* at 1335.

¹¹⁷ The question of compensability of wind rights in takings was also addressed by the Supreme Court of Kansas in *Zimmerman v. Hudson* (264 P.3d 989 (Kan. 2011)), although the court rejected the claims (or zoning-related grounds), finding there was no “property for the purpose of a takings claim” (*Id.*, at 1005).

Residents of areas in proximity to turbine installations have voiced opposition to the projects focusing mainly on the noise, flickers and aesthetic impacts of turbines. These claims seem to be NIMBY-like in nature, and have mostly been brought under the nuisance doctrine claiming that the presence of the turbines interferes with the enjoyment of the land. Some courts have found that turbine operations indeed constitute an enjoined nuisance (*see, e.g., Rose v. Chaikin*, 187 N.J. Super. 210, 216, (Ch. Div. 1982); *Burch v. NedPower Mount Storm, LLC*, 647 S.E.2d 879, 885 (W. Va. 2007)), while other courts have found in favor of the turbine facilities (*see, e.g., Rankin v. FPL Energy, LLC*, 266 S.W.3d 506, 513 (Tex. App. 2008); *Rassier v. Houim*, 488 N.W.2d 635, 639 (N.D. 1992)). Suits have also been filed raising concerns over the potential environmental impacts turbines, focusing mainly on the wellbeing of birds in the region (*see e.g. Flint Hills Tallgrass Prairie Heritage Found. v. Scottish Power, PLC*, No. 05-1025-JTM, 2005 WL 427503 (D. Kan. Feb. 22, 2005), *aff’d* 147 Fed. App’x. 785 (10th Cir. 2005) (holding that Plaintiffs failed to state a cause of action under federal law because they could not establish that the Migratory Birds Treaty Act established a private right of action); *Ctr. for Biological Diversity, Inc. v. FPL Group, Inc.*, 83 Cal. Rptr. 3d 588 (Cal. Ct. App. 2008) (rejecting environmental group complaints regarding impacts on birds)).

¹¹⁸ BUREAU HIGHLIGHTS BH-7, BUREAU OF LAND MGMT. 2 (2020), <https://www.doi.gov/sites/doi.gov/files/uploads/fy2021-bib-bh007.pdf>.

¹¹⁹ The Energy Policy Act (EPAAct), passed in 2005, encouraged the Secretary of Interior, who oversees both the BLM and BOEM, to approve a minimum of 10,000 MW of renewable (but non-hydro) energy projects by 2015 (42 U.S.C. ch. 149 § 15801 et seq).

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process, the BLM administers “rights-of-way” for wind energy production under the authority given to it by Title V of the Federal Land Policy and Management Act (FLPMA).¹²⁰ These rights-of-way allow developers who seek to produce energy from the wind blowing over a specific piece of public land to do so, and to access the underlying land necessary for mounting turbines, transmission lines and other service areas.¹²¹ As of 2018, the BLM has approved 35 wind projects on public lands, with a cumulative capacity of 3,284 MW, which is enough to power a million American homes.¹²²

For our purposes, it is important to note that several of the key features of the BLM wind framework echo the frameworks adopted for leasing oil and gas on public lands. For example, the BLM uses a “multi-component” fee which is made up of and “acreage rent” (which correlates to the land area used by the wind project) and a “MW capacity fee” (which relates to the amount of electricity generated by the wind project).¹²³ While the similarity to oil and gas developments are not cited as the sole reason for adopting the fee structure, the similarity is specifically mentioned and explained. The structure of a multi-component fee, notes the BLM, is “mirroring the multi-component payments received from activities like oil and gas development where both rent and royalties are charged.”¹²⁴ This mirroring, emphasizes the BLM, ensures “consistency across users.”¹²⁵

¹²⁰ 43 U.S.C. § 1761-1771; *see also* Competitive Processes, Terms, and Conditions for Leasing Public Lands for Solar and Wind Energy Development and Technical Changes and Corrections, 81 Fed. Reg. 92,122, 92,124 (Dec. 19, 2016) (to be codified at 43 C.F.R. pt. 2800, 2880) [hereinafter BLM, *Final Wind Rule*] (discussing BLM’s authority to regulate; explaining that “Title V of FLPMA ... authorizes the BLM to issue rights-of-way for electric generation systems on the public lands and this authority includes solar and wind energy generation systems”).

¹²¹ BLM, *Final Wind Rule*, *supra* note 120, at 92,122.

¹²² *BLM Fact Sheet: Renewable Energy: Wind*, BUREAU OF LAND MGMT., <https://www.blm.gov/sites/blm.gov/files/Wind%20Fact%20Sheet.pdf> (last updated Mar. 2018).

The approved BLM projects are in Arizona, California, Idaho, Nevada, Oregon, Utah, and Wyoming. *Id.* There are also 23 pending applications. *BLM Fact Sheet: Renewable Energy: Wind*, BUREAU OF LAND MGMT., https://www.blm.gov/sites/blm.gov/files/documents/files/fact_Wind.pdf (last updated May 2015).

¹²³ BLM, *Final Wind Rule*, at 92,134.

¹²⁴ *Id.*

¹²⁵ *Id.*

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More broadly, beyond the explicit references to borrowing by the courts and agencies, spontaneous borrowing also occurs in the practices of individual developers and landowners. Where the law is silent on the governance of wind, the underlying assumption on which the market operates is that wind belongs to the landowners. The majority of wind energy development in the U.S. takes place on private lands.¹²⁶ The practice of wind energy is such that when a developer is looking to set up a wind farm, they will need to contract with the landowners in order to obtain access to the winds blowing over the lands. The agreements under which these access permissions occur are known as “wind leases.”¹²⁷ These wind leases are basically agreements under which the landowners agree to lease out “their” winds, much like the agreements the oil and gas leases which facilitate access to oil and gas on their lands. A few States explicitly embrace the practice of wind leasing.¹²⁸ Others, however, are silent on the matter. Nonetheless, the practice of wind leasing persists, and continues to underly both new and existing wind energy development.¹²⁹

The practice of wind leasing is rooted in the pre-existing tradition of oil and gas leasing, where the resource – whether it be below or above the ground – is initially allocated to the landowner, who can then agree to lease it out (or refrain from doing so). The reliance on oil and gas leasing in the context of wind has been mentioned specifically by practitioners in the field.¹³⁰ The same practice also echoes the centuries-old property-based concept of *ad coelum*, which views all resources (below and above the land)

¹²⁶ Yael R. Lifshitz, *Rethinking Original Ownership*, 66 U.T.L.J. 513 (2016); Yael R. Lifshitz, *The Geometry of Property*, U.T.L.J. (forthcoming 2021).

¹²⁷ Yael R. Lifshitz, *Rethinking Original Ownership*, 66 U.T.L.J. 513 (2016); Yael R. Lifshitz, *The Geometry of Property*, U.T.L.J. (forthcoming 2021).

¹²⁸ See Yael R. Lifshitz, *Rethinking Original Ownership*, 66 U.T.L.J. 513, 543–44 (2016).

¹²⁹ See Yael R. Lifshitz, *Rethinking Original Ownership*, 66 U.T.L.J. 513, 543–44 (2016).

¹³⁰ See e.g. Runnels, David G, and Bonnie Rubey McMurtry. “How Wind, Oil and Gas Leases Differ,” (March 18, 2013), https://www.kslaw.com/attachments/000/004/750/original/3-18-13_Runnels.pdf?1499791866 (“Due to the well-developed state of oil and gas leasing in Texas, landowners and their counsel often look to familiar oil and gas leasing concepts when negotiating wind leases”; further noting that “While mineral and wind leases have some similarities, efforts by landowners and their counsel to apply mineral-leasing concepts to the wind lease are creating challenges”).

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as attached to it.¹³¹ The key point here, is that using the property rules applicable to land as a fallback, or a blueprint, is a type of transplant in itself.¹³² It illustrates the same notion of using a familiar and salient blueprint.

IV. NATURAL TRANSPLANTS

The case studies underscore a third, as of yet understudied, type of transplant – one that occurs within the same jurisdiction, between types of resources or subject-matters. Beyond its descriptive capacity, the transplant framework is helpful in its explanatory power. It highlights *why* this kind of borrowing occurs, *what* is borrowed, and *who* is primarily engaged in borrowing.

A. *Why Do We Borrow?*

Why do we borrow? Policy-makers have more than one option regarding how to govern a particular resource. In that sense, regimes can be seen as “competing” with each other. So why choose an internal, cross-substance, transplant (as opposed to other alternatives)? A first explanation relates to particular preferences pertaining to natural resources. Natural resources is an area where sovereignty concerns are high,¹³³ and jurisdictions may aim at discouraging foreign investment by making the entry into a new legal system costly. Regulating a resource differently than their neighbors do may discourage foreign investors because it is more costly to invest if they need to adapt to a new regime. This policy encapsulates a form of natural resources parochialism, often also referred to as natural resources protectionism.¹³⁴

¹³¹ Yael R. Lifshitz, *The Geometry of Property*, U.T.L.J. (forthcoming 2021).

¹³² See similarly, Property Beyond Land (unpublished manuscript, on file with author).

¹³³ For example, foreign investors are not allowed to invest in minerals in federal lands. The Mineral Leasing Act only allows foreign investors to do so by owning stock on a U.S. corporation. Mineral-Leasing Act of 1920, Pub. L. No. 146, ch. 85, 41 Stat. 437 (1920), codified at 30 U.S.C. § 181 et seq.; U.S. GOV'T ACCOUNTABILITY OFFICE, GAO-08-320, FOREIGN INVESTMENT: LAWS AND POLICIES REGULATING FOREIGN INVESTMENT IN 10 COUNTRIES (2008), <https://www.gao.gov/new.items/d08320.pdf>.

¹³⁴ On protectionism, see Christine A. Klein, *Law of the Lakes: From Protectionism to Sustainability*, 2006 MICH. ST. L. REV. 1259, 1278 (2006). See also Vanessa Casado Perez, *Whose Water? Corporatization of a Common Good*, in ENVIRONMENTAL LAW DISRUPTED (ENVIRONMENTAL LAW INSTITUTE, 2021 HIROKAWA & OWLEY, eds.- forthcoming).

Another example of protectionism is Canadian GRAND canal. J. Owen Saunders, *Trade Agreements and Environmental Sovereignty: Case Studies from Canada*, 35 SANTA CLARA

Jurisdictions may also want a regime that reflects its preferences for natural resources' development, which may be different than their neighbors' ones.¹³⁵ For example, a jurisdiction may prefer market mechanisms to allocate natural resources, and copying a private property rights trading scheme used for one resource and applying it to another may be a good solution. Or, instead, the if jurisdictions prefer to channel exploration and development of resources via governmental licenses, and not property rights, they could already have licensing systems in place.

The second possible explanation focuses on efficiency gains. A regime borrowed from a different resource may be best suited for the new natural resource question. The reason why an existing regime for a different resource may be the most efficient could be related to the similarities between resources. For example, minerals in space could be deemed similar to any other mineral on Earth and, accordingly, we could apply similar rules. To be sure, there are no two resources that are the same, and whatever characteristic is deemed salient is subject to a certain degree of subjectivity. Whether or not these efficiency gains materialize is, of course, an empirical, and highly case-specific matter.

Finally, the third explanation concerns the transition costs involved in adopting a new regime. Copying a regime, instead of designing a new one, saves costs because, for example, there is less need for preliminary studies. Borrowing may also save time when a new regime needs to be in place quickly, either because the judiciary needs to decide on a case before it or an

L. REV. 1171, 1182 (1995) The Great Recycling and Northern Development (“GRAND”) Canal of North America was a project proposed to dam James Bay to collect water “wasted” in the Quebec River and pump it south to the Great Lakes and Mississippi River. This project prompted the parties to the free trade agreement to make clear that the North American Free Trade Agreement did not generate any right to the water resources of the parties. The North American Water and Power Alliance (NAWPA or NAWAPA) is another project that implied taking Canadian water into the U.S. The Army Corps of Engineers envisioned taking water from Alaska and the Canadian Northwest through the Rocky Mountain trench and replenish the Colorado and the Mississippi systems. This behaviour also exists at a smaller scale. *Id.* at 1181–84.

¹³⁵ U.S. GOV'T ACCOUNTABILITY OFFICE, GAO-08-320, FOREIGN INVESTMENT: LAWS AND POLICIES REGULATING FOREIGN INVESTMENT IN 10 COUNTRIES (2008), <https://www.gao.gov/new.items/d08320.pdf>.

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executive branch agency is constrained by current legislation and needs to resort to the toolkit available.

When the borrowing is internal, albeit cross-subject, there are further savings. The legal community of that jurisdiction is already familiar with the existing regime, and therefore, they face fewer upfront costs of learning the operation of the new rules or doctrines.¹³⁶ This is particularly true when the transplant occurs between two natural resources, as it is often the case that lawyers practicing in the area of natural resources work with several resources, so using doctrines from one resource for the other saves these lawyers costs.¹³⁷

Natural transplants also have potential to “succeed.” A legal transplant succeeds when it is not rejected and accomplishes the goals it was set up for. Transplants of natural resources doctrines are likely to succeed both because of the intra-jurisdictional nature and the area of natural resources. First, intra-jurisdictional transplants avoid many of the pitfalls of inter-jurisdictional transplants. As stated, the main challenges for transfers of legal doctrines between jurisdictions are the political, economic, and social differences. Inter-jurisdictional legal transplants need to both adapt to the context in the new jurisdiction and, often, be a motor of change. Intra-jurisdictional transplants should not need to adapt to different circumstances, although there is the possibility that the communities exploiting and affected by a particular natural resource may be different. Furthermore, as explained above, there is a community who will likely be constant across resources: the legal community specialized in natural resources. Second, regarding the natural resources law area, it is an area where transplants could succeed given the tight control that governmental agencies have over most natural resources and that the level of private intermediation is relatively low.¹³⁸ Success is difficult to measure though. Every rule evolves once introduced into a system. Even an ill-fitted one may remain in a system and both the rule, and the responses to it may adapt.

¹³⁶ Garoupa & Ogus, *supra* note 32, at 347.

¹³⁷ This is a difference between vertical and horizontal transplants. In vertical transplants between national and international law, international lawyers are borrowing from what they are not familiar with. Wiener, *supra* note 4, at 1349.

¹³⁸ Garoupa & Ogus, *supra* note 32, at 355–57.

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B. Heuristic of Availability

1. What do we borrow

We identify two factors that contribute to the determination which resource the jurisdiction is going to turn to for its borrowing, that is which analogy will win at court or will be picked up by regulators: either similarities between the resources or saliency, or a combination of both. A salient resource, in this context, is likely to be one that is most common in a particular jurisdiction, or one which is economically prominent in the jurisdiction. In Texas, for example, oil is probably the most – intuitively – salient resource. Thus, if there was a new resource to be allocated in the state of Texas (especially if that new resource happened to share a few characteristics with oil), rules regarding oil are the ones likely to be transferred. The idea is that when a new resource or a new legal challenge emerges, lawyers, courts and policy-makers, almost intuitively rely on what they know best and apply it to the new problem. This could also be seen as kind of heuristic of availability¹³⁹ or as a form of path dependence.¹⁴⁰ Literature on path dependence shows how areas of the law evolve constrained by existing regulations and institutions, making it difficult to start with a clean slate.¹⁴¹ In the case of natural legal

¹³⁹ Here we are using the term liberally to refer to legal professionals' inclination to resort to the rules of salient jurisdictions. The availability heuristic refers to risk perception. "If a particular incident is cognitively "available" -- both vivid and salient -- then people will have a heightened fear of the risk in question." Cass R. Sunstein, *Precautions Against What? The Availability Heuristic and Cross-Cultural Risk Perception, Meador Lecture Series 2004-2005: Risk and the Law*, 57 ALA. L. REV. 75, 77 (2005).

¹⁴⁰ Richard R. Nelson, *Recent Evolutionary Theorizing About Economic Change*, 33 J. ECON. LITERATURE 48, 50–51 (1995) ("[T]he process of evolution is strongly path dependent and there is no unique selection equilibrium. Any 'optimizing' characteristics of what exists therefore must be understood as local and myopic"); J.B. Ruhl, *The Fitness of Law: Using Complexity Theory to Describe the Evolution of Law and Society and Its Practical Meaning for Democracy*, 49 VAND. L. REV. 1407, 1442 (1996); Donald T. Hornstein, *Complexity Theory, Adaptation, and Administrative Law*, 54 DUKE L.J. 913, 921 (2005); Karrigan S. Bork, *An Evolutionary Theory of Administrative Law*, 72 SMU L. REV. 81 (2019).

¹⁴¹ Some times, though, institutions may be constrained in their choices as the Environmental Protection Agency was when mandated to regulate greenhouse gases without any legislative change. See Mark J. Roe, *Chaos and Evolution in Law and Economics*, 109

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transplants, it is often the case that those who practice, adjudicate, or regulate in one of the resources may also work on the new resource requiring a new solution and, as such, they may turn to what is familiar to them, illustrating the heuristic of availability.¹⁴² This also ties in closely with the community of “borrowers” – the legal community.

2. Who borrows?

One factor that legal-transplant scholarship focuses on is group of people with particular influence on the extent to which a legal rule flourishes in a new jurisdiction: the legal community.¹⁴³ Given its significance, the legal community, and its heuristics of availability, influence the choice of transplant.¹⁴⁴ Consider again the example of Texas: as mentioned, in Texas, the dominant industry is oil and gas and accordingly, oil and gas law is a particularly prevalent transplant.¹⁴⁵

Seliency in this context is also a result of the training and experience of the legal community, as lawyers often work across areas.¹⁴⁶ Natural resources lawyers work across areas and are likely to have more experience in the most common or most valuable resource in the community.

HARV. L. REV. 641, 642–643 (analyzing path dependence and how it overlaps with other paradigms of evolutionary theory of law). Roe also questions the law and economics claim that the regulations that survive are efficient. He claims that the regulations that we see can be related to path dependence or may have been efficient for the conditions at time of enactment but not at present time. *Id.* at 642–643; Donald T. Hornstein, *Complexity Theory, Adaptation, and Administrative Law*, 54 DUKE L.J. 913, 921 (2005); J.B. Ruhl & James Salzman, *Mozart and the Red Queen: The Problem of Regulatory Accretion in the Administrative State*, 91 GEO. L.J. 757, 806–09 (2003); Gail Charnley & E. Donald Elliott, *Risk Versus Precaution: Environmental Law and Public Health Protection*, 32 ENV'T L. REP. 10,363, 10,365 (2002).

¹⁴² Sunstein, *supra* note 139.

¹⁴³ George Mosourakis, ‘*Legal Transplants and Legal Development: A Jurisprudential and Comparative Law Approach*’, 54 ACTA JURIDICA HUNGARIA, 219, 223 (2013).

¹⁴⁴ Here we are using the term liberally to refer to legal professionals’ inclination to resort to the rules of salient jurisdictions. The availability heuristic refers to risk perception. “If a particular incident is cognitively ‘available’ -- both vivid and salient -- then people will have a heightened fear of the risk in question.” Sunstein, *supra* note 139 at 77.

¹⁴⁵ See *infra* section III.A.

¹⁴⁶ This is a difference between vertical and horizontal transplants. In vertical transplants between national and international law, international lawyers are borrowing from what they are not familiar with. Wiener, *supra* note 4, at 1349.

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The behavior of the legal community in this context, however, is not limited to the experience of private attorneys. The same behavior can happen in government. If one lawyer was working in coal mining in a state's environmental agency and is transferred to the waste program, this lawyer may well import regulatory frameworks from surface mining into waste when asked to prepare a new regulation.¹⁴⁷

Another important factor in the choice of transplant is the forum in which it occurs. On one account, transplanting within the legislature or an agency, may be even more prominent than if it happens in the courthouse where the procedure would be adversarial. Before a court, when facing a case where a problem with a new resource is litigated, both parties may argue that the resource is more like one other resource governed by a doctrine favoring the interests of the said party, while the other side will argue similarly in favor of the doctrine which governs a different resource. In the legislature or executive branches, we expect the deliberation procedure to engage with a broader set of stakeholders and draw from a larger pool of regulatory ideas.¹⁴⁸ In the absence of regulatory capture,¹⁴⁹ a legislature or the executive branch are expected to produce regulations applicable across all cases, with a long-term view. In contrast, judges and attorneys are more constrained by the facts of the case before them and may lack the capacity to systematically study a subject area. For example, if a new doctrine over a recently discovered natural resource is decided by a court, the information costs¹⁵⁰ judges face may prevent them from considering all the long-term effects and the application of the rule to situations that differ from the case at hand. This section will start by looking at analogy in judicial proceedings to highlight the similarities and differences between the natural transplants framework and legal analogy. It will then review examples of transplants in the other branches.

¹⁴⁷ See Part IV.C.3 *infra*, discussing waste management.

¹⁴⁸ Jody Freeman & David B. Spence. *Old Statutes, New Problems* 163 U. PA. L. REV.19 (2014) (Freeman and Spence argue that agencies, when dealing with obsolete statutes to regulate new problems, are strategic, methodical, and anything but out-of-control).

¹⁴⁹ Wiener, *supra* note 4, at 1359 (arguing that capture may be the cause of inefficient when legislatures adopt legal rules from other jurisdictions).

¹⁵⁰ *Id.* at 1359.

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C. *Institutional Analysis: going beyond reasoning by analogy*

1. The Judicial Branch: Analogy and Transplants

One may wonder, whether the borrowing highlighted by the case studies (groundwater and wind) isn't really just a manifestation of the common law practice of reasoning by analogy.¹⁵¹ We'd like to resist this simplification, for three main reasons.

First, the term "analogy" means, roughly, that an idea from one context is used in another. But that in itself has very limited explanatory power. It does not tell us, for example, which regime will be chosen, by whom, nor why. The transplant framework offered here, in contrast, offers a much richer conceptual analysis of these factors. We aim to begin filling the explanatory-gap (albeit, for now, only in the specific context of natural resources) by referring to the idea of saliency and the heuristic of availability.

Second, and relatedly, the idea of "analogy" also misses some of the important messages of the transplants literature: sometimes "borrowing" works well and sometimes it doesn't. The idea of "analogy," in itself, does not determine or indicate whether the borrowing is justified, successful or useful. The concept of "transplanting" is also much broader than an "analogy". The former indicates a broader adoption of systems and rules, whereas the latter is more limited to similarities between particular cases.¹⁵²

¹⁵¹ Brian N. Larson, *Law's Enterprise: Argumentation Schemes & Legal Analogy*, 87 U. CINCINNATI L. REV. 663, 679–80 (2019).

¹⁵² When reasoning by analogy we pull upon similarities of existing case law or statutory interpretations and apply them to a specific fact pattern (EDWARD H. LEVI, AN INTRODUCTION TO LEGAL REASONING, 34 (1949)). When it comes to case law, we typically see a particular phrase generalized through reasoning by analogy (*Id.* at 34). Legal concepts end up applying to a wide range of cases because a multitude of similarities have been identified. Thus, this constant analogizing and expansion can result in the breakdown of rules (*Id.*) This is where the application of the rule has become so broad through the use of analogy that the original, specific doctrine no longer exists (*Id.* at 51). Levi here seems to suggest that the rule is no longer the same across subject matters even if they nominally use the same concept. The application of the rule of capture to water (Texas), foxes (Pierson v. Post, 3 Cai. R. 175 (N.&. Sup. Ct. 1805)), whales (ROBERT C. ELLICKSON, ORDER WITHOUT LAW: HOW NEIGHBORS SETTLE DISPUTES 191-206 (1991)), or baseball balls (Popov v. Hayashi, No. 400545, 2002 WL 31833731 (Cal. Super. Ct. Dec. 18, 2002)) may well illustrate this point. However, the cases reviewed on this paper have not broken down the rules, such as,

Analogy could possibly be one mechanism by which transplanting happens. But it doesn't capture the full breadth and depth of the broader phenomenon of transplanting.

Third, and no less importantly, the term "analogy" is primarily court-focused. Whereas the practice of natural transplanting is not limited to courts; it occurs across institutions, and includes also legislators and agencies, as well as private individuals, as the next sections will show.

2. Natural Transplanting in the Legislature

Prior Appropriation is the regime that governs the allocation of rights to use water in the West of the United States. It is a doctrine born in the customs of mining camps.¹⁵³ The East allocated water based on the English doctrine of Riparianism,¹⁵⁴ well-suited for the humid areas of the first colonies, but much less so for the West where average rainfall was much lower¹⁵⁵ and use of

the ownership in place. Analogy is, thus, a mechanism through which natural transplants happen.

¹⁵³ The system of prior appropriation was first articulated in *Irwin v. Phillips*, when the court acknowledged "[t]he miner who selects a piece of ground to work, must take it as he finds it, subject to prior rights. ..." Accordingly, miners who selected riparian land previously subjected to water diversion could not prevent others from diverting the water in the future. To the contrary, miners who selected riparian land where water had never been diverted could prevent others from diverting the water in the future. *Irwin v. Phillips*, 5 Cal. 140, 147 (Sup. Ct. 1855)

¹⁵⁴ BARTON H. THOMPSON, JR., ET AL., *LEGAL CONTROL OF WATER RESOURCES: CASES AND MATERIALS* 194-95 (6TH ED., 2018).

¹⁵⁵ To illustrate the difference in rainfall from riparian states to prior appropriation states, Oklahoma provides a good example because it is a transition zone: eastern Oklahoma receives 54 inches annually, whereas western Oklahoma only receives around 15 inches annually. M. D. Smolen et al., *Whose Water Is It Anyway? Comparing the Water Rights Frameworks of Arkansas, Oklahoma, Texas, New Mexico, Georgia, Alabama, and Florida*, Oklahoma State University Ferguson College of Agriculture (2017), <https://extension.okstate.edu/fact-sheets/whose-water-is-it-anyway.html>.

The average annual rainfall for prior appropriation states, in descending order, is as follows: Colorado (16.98 inches), Idaho (16.91 inches), Utah (15.79 inches), Montana (14.92 inches), New Mexico (14.24 inches), Wyoming (13.23 inches), Arizona (11.80 inches), and Nevada (9.46 inches). These eight states are indeed the states with the least rainfall. The average annual rainfall as a total for prior appropriation states is roughly 14.17 inches. *U.S. Average Precipitation State Rank*, USA.com (Jul. 9, 2021, at 8:30 P.M. CST), <http://www.usa.com/rank/us--average-precipitation--state-rank.htm>.

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water beyond riparian lands was a necessity. “First in time, first in right” was the doctrine applied to minerals, so when mining camps had to decide how to allocate water the same principle applied. Courts acknowledged and accepted this doctrine for the first time in *Irwin v. Phillips*.¹⁵⁶ However, prior appropriation had to cohabit with riparianism as state legislatures were joining the union and adopted all of England laws. Later, most state legislatures moved to adopt prior appropriation, a doctrine based on mining principles, and, in most cases, repeal riparianism.¹⁵⁷

3. Transplanting Within the Executive Branch

Agencies usually work across different areas and administrators may not hold the same position. As such, they may be biased towards the resource they have more experience with. For example, an administrator worked in the Pennsylvania Department of Environmental Resources for more than a decade. First in the Bureau of Regulatory Council and after in the Bureau of Waste Management. In the first position, he worked on surface mining; second, in waste management. When tasked to deal with municipal and industrial non-hazardous waste, he borrowed ideas from surface mining and introduced them in the waste regulations. For example, the notice and participation requirements or the separation between permit and operating requirements were borrowed. Surface mining and waste have issues in common; for example, both required moving soil.¹⁵⁸ However, his knowledge of surface mining regulations clearly played a role. Nonetheless, this was not

¹⁵⁶ Denise D. Fort, *Prior Appropriation*, Water Encyclopedia (Jul. 9, 2021, at 8:43 P.M. CST), <http://www.waterencyclopedia.com/Po-Re/Prior-Appropriation.html>; BARTON H. THOMPSON, JR., ET AL., *LEGAL CONTROL OF WATER RESOURCES: CASES AND MATERIALS*, 194-95 (2018).

¹⁵⁷ “Most early western legislatures also saw no need to provide for appropriative rights outside the mining context. At a more general level, California and virtually every other western state and territory adopted statutes providing that courts should use the “common law” (sometimes the “common law of England”) to resolve disputes, except where the common law was inconsistent with federal or local laws. Where early legislatures were more specific, they typically adopted either variants of the riparian doctrine or more general equitable allocation schemes. In 1866, for example, the Dakota Territory adopted verbatim the New York riparian code provisions. “Starting in the 1860s, and especially by the 1870s, courts and legislatures increasingly saw the attractions of the appropriation system.” Barton H. Thompson, Jr., et al., *Legal Control of Water Resources: Cases and Materials* 196 (West Publ’g Co. ed., 6th ed., 2018). *See id.* 215.

¹⁵⁸ 25 Pa. Code §§ 86-90 (2021); 25 Pa. Code §§ 271-285 (2021); 25 Pa. Code §§ 287-299 (2021).

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a copy-and-paste type situation, content specific subject matter was introduced.¹⁵⁹

Sometimes administrators do not have such a blank slate or so many possibilities to choose from. Sometimes a natural transplant is the only possibility. This is one way to describe what happened when the Environmental Protection Agency had to regulate greenhouse gas emissions and the only toolkit available was the one offered by the Clean Air Act.¹⁶⁰ This statute did not originally envision the regulation of carbon dioxide or methane, instead, it was passed to regulate conventional pollutants even if the words were ambiguous.¹⁶¹ This is case of new wine in old bottles, where the Environmental Protection Agency could not use tools such as a carbon tax or cap-and-trade,¹⁶² the gold standard for greenhouse gases, due to congressional inaction, and, instead, had to make do with the Clean Air Act,¹⁶³ originally conceived for conventional pollutants. Conventional pollutants, for one, are local, while carbon dioxide is global. Another difference is the amount of emissions that the sources emit of each conventional pollutants and greenhouse gases. The EPA started the “tailpipe” rule, regulating fuel efficiency and GHG standards for mobile sources. By regulating greenhouse gases as pollutants, the regulation of stationary sources was triggered. Only “major” stationary sources had to be regulated. However the calibre of “major” was measured based on conventional pollutants, and they were 100 or 250 tons per year, much lower than the amount of greenhouse gases normally emitted. The EPA had to adapt and tailor the

¹⁵⁹ Conversation with John Dernbach, professor at Widener University Commonwealth Law School (May 2021).

¹⁶⁰ *Massachusetts v. E.P.A.*, 549 U.S. 497, 532 (2007) (The Supreme Court’s held that GHGs are “pollutants” subject to the CAA).

¹⁶¹ The words in a statute are given by the legislature and they carry a heavy weight. LEVI, *supra* note 152, at 54. However, there are many reasons why a legislature might purposefully leave a statute ambiguous, such as the legislature is receiving high pressure to pass the bill, or they cannot foresee every case which the statute will need to be applied.¹⁶¹ This intentional ambiguity is why the intent behind the statute is of equal importance as the words. Reasoning by analogy can expand the legislature’s intent and apply a statute to a specific fact pattern.

¹⁶¹ 42 U.S.C.A. § 7401 (Current through PL 117-30).

¹⁶² Congress approved American Clean Energy and Security Act of 2009, but the Senate did not. H.R. 2454, 111th Cong. (2009).

¹⁶³ Freeman & Spence. *supra* note 148, at 20.

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requirements for stationary sources to greenhouse gases to 100,000 tons per year.¹⁶⁴

A similar phenomenon of federal agencies coping with new regulatory challenges and encountering problems of “fit” with older statutes, happened with the Federal Power Act, energy markets,¹⁶⁵ and in several other statutes,¹⁶⁶ including many not related to environment and energy.¹⁶⁷ Misfits mushroom as Congress is unable to amend obsolete statutes,¹⁶⁸ and the need to respond to new areas in need of regulation is satisfied thanks to transplants.

1. Private Parties’ Transplants

Oil and gas leasing brokered by landmen has a long history in the United States. Wind leasing is a more recent development, a development necessary to exploit wind energy in private lands. Both underground oil and above the ground wind belong by default to the landowner. Both resources need to be pooled so private parties need to agree to contracts with developers. Hence, it is natural that oil and gas leases have served as a model.¹⁶⁹

D. The Risks of Natural Transplants

Legal transplants are not always successful. Two jurisdictions are never identical. The economic, political, and social characteristics of a jurisdiction can influence the operation of the regulation. Accordingly, a successful law in country A may fail in country B. In that sense, legal transplants are not so different from organ transplants, where the organ can be rejected in the short or in the long term.¹⁷⁰ Many critiques of legal transplant stem precisely from

¹⁶⁴ Tailoring Rule, 75 Fed. Reg. at 31,550.

¹⁶⁵Freeman & Spence. *supra* note 148, at 43.

¹⁶⁶ *Id.* at 18

¹⁶⁷ *Id.* at 5-6

¹⁶⁸ *Id.* at 18

¹⁶⁹ See Runnels, *supra* note 130.

¹⁷⁰ *Transplant Rejection: MedlinePlus Medical Encyclopedia*, MEDLINEPLUS, <https://medlineplus.gov/ency/article/000815.htm>, (last visited July 31, 2021).

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the transplant of legal institutions from developed to underdeveloped countries, imposed or not, because the receiving country does not have the same characteristics as the country where the legal institution originated, and the effects may be detrimental for the importer. Natural transplants do not face the same challenges because they are internal to a jurisdiction, so the socio-economic and political contexts are constant; at most, there may be differences in the industry players and stakeholders. We can imagine one resource being controlled by a few big international firms, while another being allocated to small businesses in a state.

The material differences in the context of natural transplants that may actually affect the transplant success are the natural characteristics of the resource. A scientist would frown if someone assumed that water and oil, or water and wind, are similar. Yet courts or regulators have stated as much.¹⁷¹

If our transplant decisions ignore the scientific differences between resources, the consequences of importing a legal institution can be negative. As stated in the previous section, the exploitation of wind rights followed the oil and gas model on private lands: wind leases were modeled after oil and gas lease. This transplant may have impaired the development of wind rights. Oil is part of the mineral estate and is severable from the surface estate because the mineral estate is dominant. However, wind rights are not underground and require a different relationship with the surface owner. As a result, trying to apply the same severance strategy for wind rights is unsuccessful outright.¹⁷² However, as time went by, wind energy companies and their lawyers modified the original models to suit the characteristics of wind and the different regulatory frameworks. For example, wind rights developer now enter into contractual accommodation agreements with the mineral rights owners. This phenomenon is not exclusive to private parties. It can occur whenever a court, a legislature, or an agency import a regulation from a different resource if those institutions ignore the differences. But there is also cause for optimism. Sometimes regulators are able to incorporate from another resource a regulatory framework but infuse it with the particularities of the resource it is being applied to. This is what happened in Pennsylvania

¹⁷¹ See Part III.A *infra*, discussing the Texas groundwater case study.

¹⁷² Runnels, *supra* note 130.

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when municipal waste regulations imported the framework from surface mining but adapted it.

In fact, copying is often the source of innovation. Guttenberg introduced moveable type printing building on, copying if you wish, woodblock printing. Similarly, adopting regulations from other resources can save upfront costs while still allowing for adaptation.¹⁷³

V. BEYOND WATER AND WIND

A. *Other Areas*

While the focus of this paper has been on natural resources and transplants across resources, natural transplants apply to many other areas too. The description below of this phenomenon in landlord-tenant, family, or corporate law shows the explanatory power of the framework.

In the 1960s-1970s the revolution on landlord-tenant law occurred.¹⁷⁴ Rights of tenants were substantially strengthened. While leases always have had a dual nature as both conveyances of property and contracts between the landlord and the tenant, the import of contract law principles was the main departure from the status quo during the revolution.¹⁷⁵ Before, a tenant's covenant to pay rent was independent from any other covenant in the lease. But in *Javins*,¹⁷⁶ the court decided that in the modern residential lease context, the contract law principle of dependent covenants should apply. As a result, a breach by the landlord of a statutory or contractual duty allowed the tenant to stop paying rent.¹⁷⁷

Surrogacy in the US has been controversial. Courts often faced cases while the legislatures remained silent. Faced with the need to decide cases in

¹⁷³ STEVEN JOHNSON, *WHERE GOOD IDEAS COME FROM: THE NATURAL HISTORY OF INNOVATION* (2010).

¹⁷⁴ Rabin, Edward H. *Revolution in Residential Landlord-Tenant Law: Causes and Consequences*, 69, CORNELL L. REV., 517, 540, (1984).

¹⁷⁵ *Javins v. First Nat. Realty Coup.*, 428 F.2d 1072,1074-80 (D.C. Cir. 1970).

¹⁷⁶ *Javins*, 428 F.2d at 1083.

¹⁷⁷ Rabin, *supra* note 174 at 523

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front of them, different state courts applied adoption rules to cases of partial or complete surrogacy.¹⁷⁸ Even legislators have followed the same path naturally transplanting adoption regulation to surrogacy situations.¹⁷⁹

Another example comes from the realm of business associations. States have repurposed concepts from corporate law to other types of business entities. The most prominent example in recent years has been the adoption of LLC statutes.¹⁸⁰ These statutes often include ideas of fiduciary duties, management rules, and veil-piercing¹⁸¹ that were originally developed in corporate law. In some cases, they make sense, in others, less so. According to some scholars, veil-piercing was arbitrarily applied simply because it was available to judges when LLC cases arose, and not because it was intended to apply to LLCs. Not all veil-piercing factors applicable to corporations fit the nature of LLCs. The factors included are fraud, inadequate capitalization, failure to observe corporate formalities, and operation of the corporation as an alter ego for the shareholders. For example, state legislatures have been explicit in not wanting to subject LLCs to excessive formalisms, so relying on that to pierce the veil would be improper.¹⁸² Its application discourages capital formation in small businesses.¹⁸³ For example, the veil doctrine “encourage[es] ... [small businesses] to spend time and effort on organizational formalities that simply do not address the real problem of negative externalities.”¹⁸⁴

¹⁷⁸ *Ulliton v. Beth Isr. Deaconess Med. Ctr.*, 435 Mass. 285 (2001); *R.R. v. M.H.*, 426 Mass. 501 (1998).

For a general account on surrogacy across the globe and how researchers, legislators, and judges have applied adoption regulations to the surrogacy phenomenon, see Alex Finkelstein and Angela Kintominas, *A National Conversation Informed by Global Lawmaking*, REPORT OF THE COLUMBIA LAW SCHOOL, 90, (May 2016) <https://web.law.columbia.edu/sites/default/files/microsites/gender>

¹⁷⁹ Iowa Admin Code § 641-99.15 (144) (2013).

¹⁸⁰ Douglas K. Moll, *Minority Oppression & the Limited Liability Company: Learning (or Not) from Close Corporation History*, 40 WAKE FOREST L. REV. 883, 926–27 (2005).

¹⁸¹ See generally J. WILLIAM CALLISON & MAUREEN A. SULLICAN, LIMITED LIABILITY COMPANIES: A STATE-BY-STATE GUIDE TO LAW AND PRACTICE § 5:3 (2015); Eric Fox, *Piercing the Veil of Limited Liability Companies*, 62 GEO. WASH. L. REV. 1143, 1169 (1994).

¹⁸² Stephen M. Bainbridge, *Abolishing LLC Veil Piercing*, 2005 U. ILL. L. REV. 77, 105 (2005), *Cfr.* Geoffrey C. Rapp, *Preserving LLC Veil Piercing: A Response to Bainbridge*, 31 J. CORP. L. 1063 (2006).

¹⁸³ Bainbridge, *supra* note 182 at 102.

¹⁸⁴ *Id.* at 84.

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B. Implications for Current Debates: The Next Frontier In Natural Resources

Armed with a richer understanding of the operation of natural legal transplants—that is, cross-subject, intra-jurisdictional transplants—this section aims to analyze current developments in the regulation of new resources and their potential future evolution to show how natural transplants may operate in these new regimes.

1. Outer Space Minerals

Minerals in outer space are said to be the new Gold Rush. In many ways, the regime that now governs the extraction of resources from outer space has transplanted our familiar property law systems from planet earth, into a new atmosphere. As one scholar recently noted, “we copy-pasted our property law system.”¹⁸⁵

The Spurring Private Aerospace Competitiveness and Entrepreneurship (SPACE) Act was enacted in 2015. The SPACE Act allows U.S. citizens to “engage in the commercial exploration and exploitation of ‘space resources.’”¹⁸⁶ The Act expressly mentions water as one of the resources covered by it.¹⁸⁷ As Rhett Larson has recently pointed out, the regime governing the extraction and use of extra-terrestrial water, under the SPACE Act, is akin to Prior Appropriation, as it adopts a “first-in-time, first-in-right” approach.¹⁸⁸ The U.S. is not the only country to apply the familiar “first-in-time, first-in-right” rule to space exploration. Similar legislative provisions were passed in Japan and Luxembourg.¹⁸⁹

¹⁸⁵ Eva Vermeulen, *Transformative Property Law*, TRANSFORMATIVE PRIV. L. BLOG (Nov. 2, 2020), <https://transformativeprivatelaw.com/transformative-property-law/>.

¹⁸⁶ U.S. Commercial Space Launch Competitiveness Act, Pub. L. No. 114-90, H.R. 2262, 114th Cong. (2015).

¹⁸⁷ *Id.*

¹⁸⁸ Rhett Larson, *Nexus Private Sector Space* (2020) (unpublished) (on file with authors).

¹⁸⁹ Larson, *supra* note 188 citing: Mark J. Sundahl & Jeffrey A. Murphy, *Set the Controls for the Heart of the Moon: Is Existing Law Sufficient to Enable Resource Extraction on the Moon?*, 48 GA. J. INT’L & COMP. L. 683, 684 (2020).

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In 2020, President Donald Trump issued an executive order which eventually led to the creation of the Artemis Accords.¹⁹⁰ The accords were eventually signed by the United States and seven other countries (Australia, Canada, Italy, Japan, Luxembourg, United Arab Emirates, and the United Kingdom).¹⁹¹ The Artemis Accords took on a similar approach to appropriating resources in space (and according to some scholars, even went further in its rejection of outer-space as “global commons”).¹⁹²

Prior to the current wave of space-related regulation, the international convention that governed space exploration was the Outer Space Treaty. Rhett Larson argues that the two regimes – the SPACE Act along with the Artemis Accords; and the Outer Space Treaty – represent the two main regimes governing the use of surface water law in the United States. Whereas the SPACE Act roughly correlates with Prior Appropriation; the Outer Space Treaty is roughly akin to Riparianism.¹⁹³

2. Deep Seabed Minerals on the New Frontier

While the characters in *Twenty Thousand Leagues Under the Sea* do not find minerals in their underwater adventures, the prospect of deep-sea mining has attracted interest since the 1960s. Deep sea mining refers to the exploration and development of polymetallic nodules on the ocean floor and active or extinct hydrothermal vents containing minerals. Deep sea mineral

¹⁹⁰ *The Artemis Accords: Principles for a Safe, Peaceful, and Prosperous Future*, NASA.GOV, <https://www.nasa.gov/specials/artemis-accords/index.html> (last visited Jan. 29, 2020); Larson, *supra* note 188; Aaron Boley & Michael Byers, *U.S. policy Puts the Safe Development of Space at Risk*, 370 SCI. 174, 174 (2020).

¹⁹¹ Larson, *supra* note 188; NASA, *International Partners Advance Cooperation with First Signings of Artemis Accords*, NASA.GOV (Oct. 13, 2020), <https://www.nasa.gov/press-release/nasa-international-partners-advance-cooperation-with-first-signings-of-artemis-accords>.

¹⁹² Larson, *supra* note 188; Aaron Boley & Michael Byers, *U.S. Policy Puts the Safe Development of Space at Risk*, 370 SCI. 174, 174 (2020).

¹⁹³ Larson, *supra* note 188 at Part II.

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quantities surpass those of the earth surface, and they are important for renewable energy technologies needed to fight climate change.¹⁹⁴

These minerals are in the high seas and, thus, beyond the territorial jurisdiction of states. The 1982 United Nations Convention on the Law of the Sea (UNCLOS) established the International Seabed Authority, with base in Kingston (Jamaica) to manage those resources in the benefit of mankind. The International Seabed Authority was operative in 1996 after the 1994 Agreement relating to the Implementation of Part XI of the United Nations Convention on the Law of the Sea.

The regulation of these bountiful resources has always been controversial. There were discussions even before UNCLOS was signed.¹⁹⁵ The authority of the International Seabed Authority and the principles regulating the exploration and exploitation of the seabed minerals is one of the reasons why the United States has not ratified UNCLOS, albeit it recognizes parts of it as customary international law. The 1994 agreement addressed some of the United States concerns over the Authority and the wealth redistribution scheme. Yet, the United States remains an observant country in the International Seabed Authority.

While the interest on deep sea minerals has not waned, the technology for its exploration has been too expensive, the regulation too uncertain, and the finances up in the air¹⁹⁶ for their exploitation to take off. Only recently, exploration has peaked up,¹⁹⁷ both because satisfying renewable energy demand requires copper, nickel and other seabed minerals and because the promised Mining Code by the International Seabed Authority was said to be finalized in 2020,¹⁹⁸ guaranteeing some regulatory certainty. The Mining Code has been in the works for almost a decade. Stakeholders have had the opportunity to comment on several iterations. Their comments have often

¹⁹⁴ Daniel Ackerman, *Deep-Sea Mining: How to Balance Need for Metals with Ecological Impacts*, SCI. AM., August 31, 2020.

¹⁹⁵ N. Ely, *Potential regimes for deep seabed mining*, OCEANS'77 CONFERENCE RECORDS (1977).

¹⁹⁶ Ackerman, *supra* note 194.

¹⁹⁷ *Id.*

¹⁹⁸ *Id.*

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referred to other regimes.¹⁹⁹ For example, regarding the Environmental Management Plan, the model of the OSPAR Guidelines for Monitoring the Environmental Impact of Offshore Oil and Gas Activities (2004) is put forward. For regulation of emergencies, the stakeholders suggested looking at, among others, the International Convention on oil pollution preparedness, response, and cooperation (1990), and the EU Directive 2012/18/EU on control of major-accident hazards involving dangerous substances.²⁰⁰ For risk assessment, oil and gas is also the model. The transfer of different aspects of oil and gas law, albeit sometimes with adaptation,²⁰¹ continues. The notes from the Secretariat of the International Seabed Association in February 2020 refer oil and gas regulations regarding inspection matters.²⁰²

Oil and gas regulations are a salient example because of their economic relevance and the common development of deep-sea reserves. Land mining, by contrast, is not acknowledged as a source of regulatory models. The borrowing in this case is both horizontal and vertical. An international institution is incorporating regulations from other international regimes and from national ones. But in both cases, the borrowing is cross-subject, that is, the borrowing happens across resources.

VI. CONCLUSIONS

Understanding the mechanisms by which legal regimes develop is particularly important in our times, with innovative technologies, new resources, and new health-related and economic challenges constantly coming to the fore. From drones, novel vaccines, to hydrofracking, aquaculture, or deep-sea mining, legislative, executive, and judicial branches constantly encounter new issues in need of regulation.

¹⁹⁹ INTERNATIONAL SEABED AUTHORITY, DRAFT FRAMEWORK, HIGH LEVEL ISSUES AND ACTION PLAN, VERSION II 15 July 2015 (Reviewed and revised for Stakeholder responses to the Report to Members of the Authority and all stakeholders issued 23 March 2015), https://www.isa.org.jm/files/documents/EN/OffDocs/Rev_RegFramework_ActionPlan_14072015.pdf

²⁰⁰ *Id.* at 33.

²⁰¹ *Id.* at 31

²⁰² Note by the Secretariat, *Comments on the draft regulations on the exploitation of mineral resources in the Area* (2020).

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This Article has shown that when facing new questions, jurisdictions often copy their own doctrines and regulations for a different subject matter. To explain this phenomenon, the Article builds on and expands the literature of legal transplants with two additional dimensions: internal transplants and cross-subject transplants. When these two dimensions combine, natural legal transplants take place. Jurisdictions copy their own doctrines across subject areas for a myriad of reasons, chief among them is the cost savings arising from the application of a doctrine which the legal community is already familiar with. In natural resources, the most salient resource in a jurisdiction turns out to be the source of doctrines for other areas, as the case studies on Texas groundwater and wind regulation illustrate. Saliency is often correlated with economic relevance of that particular resource. Regulatory innovations following the regulations and doctrines of the most salient resource can result in regulations poorly fitting the new resource in question, which may not share relevant characteristics with the salient resource. As the Texas groundwater case study has shown, a doctrine from a different area -oil and gas in that case- may not respond to the particularities of the new challenge presented.

While the focus here is on natural resources, natural legal transplants – internal, cross-subject transplants – occur well beyond this legal area. In fact, “natural” in natural legal transplants refers not to the area of the law, but the fact that it seems intuitive or instinctual for judges, regulators, or other legal actors to turn to what is familiar, using a sort of heuristic of availability or path dependency, in order to respond to new challenges. Landlord tenant law, surrogacy regulation or the veil-piercing doctrine in corporate law illustrate examples in other areas of the law. Examples abound and will keep appearing as sea bed and space minerals show. This paper shows that legal actors will turn to what is familiar and copy rules and doctrines from other legal areas. In doing so, these legal actors should account for the differences between areas and the potential for misfit.

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