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Property's Edges

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PROPERTY’S EDGES

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Abstract: Property law thinking normally assumes that the protection afforded an owner does not vary in intensity across the owned asset. Property rights’ legal potency can differ between different assets, but not within a given asset. This Article argues that this assumption is wrong—and that when lawmakers pretend that it is not, detrimental results ensue. This Article demonstrates that, in fact, property law distinguishes the edges of an asset from its core. For good normative reasons, the law recognizes much weaker ownership rights in the edges of an asset—the areas lying close to the private property boundary line—than at its core. The law conceives the edges of any private property as a space where private and public interests inevitably interact and where both must somehow be accommodated. But, because this doctrinal and normative reality has heretofore gone largely unacknowledged, lawmakers are prone to ignore it, particularly when new technologies or geophysical phenomena introduce new activities into the edges of a property or when advances in science improve society’s grasp of the effects of existing activities there. As judges, legislators, and regulators instinctively resort to a misleading notion of unitary private property protections across the relevant asset, they hamper attempts at effectively accommodating new challenges materializing at the asset’s edges, such as those presented by lead water pipes, drones, rising sea levels, and the digital revolution. Moving past the unitary vision of property, and drawing instead on its novel theoretical analysis, this Article suggests specific edges solutions to such problems. The Article’s introduction of a new framework for understanding property law protections—the property edges theory—thus not only contributes to existing scholarly discourse, but also aids in tackling daunting real-world property law puzzles.

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In the opening lines of her book *Property and Persuasion*, Carol Rose invites the reader to “[p]icture property. Use your mind’s eye: what do you see?”¹ She suggests that in many minds the image materializing is that of a fence, dilapidated as the fence might be, just like the one pictured on the book’s cover. This is a very strong image, Rose explains, because it embodies something foundational about property. The fence conveys a property owner’s assertion: “[t]his is mine.”² On one side of the fence lies the owner’s private realm—her home—on the other, the realm of others—neighbors or the public. Property is all about the dividing line between those two realms.

What legal meaning does the line carry though? What transformation in rights and liabilities occurs as one crosses that line? Consider again the proverbial fence. Beyond that fence, on the owner’s side, lies their home—their “castle”—where they exercise many rights and where they owe little to the public.³ The home, however, is unlikely to be the only thing situated on the owner’s side of the fence. Between the fence and the home one might find trees facing the street, a mailbox, gas and electricity meters; above there is open air; below water- and sewage-lines, underground minerals, and soil. With respect to none of these places and things does the owner enjoy the same broad legal rights and freedoms, to the exclusion of public rights, that the owner enjoys inside their own home—even though, just like the home, these places are all on “the owner’s” side of the fence. For example, the owner must maintain the trees so as not to cause harm to the street;⁴ they must keep the mailbox and meters and allow others access to them;⁵

² Id.
³ See Edward Coke, *The Third Part of the Institutes of the Laws of England*, ch. 73, at 162 (1797) (“For a man’s house is his castle, et domus sua cuique est tutissimum refugium . . . [and each man’s home is his safest refuge.”).
⁴ See, e.g., Whitt v. Silverman, 788 So. 2d 210, 222 (Fla. 2001) (holding that landowners, who were owners of a commercial service station on the property, had a duty to properly maintain the foliage “consistent with the safe egress and ingress of vehicles attracted to the business and persons affected thereby”); Gibson v. Denton, 38 N.Y.S. 554, 556 (App. Div. 1896) (suggesting that a cause of injury exists where “an unsound tree, standing on premises of a party near the house of his neighbor, [that is] liable, in any wind, to fall down upon it, and which the owner of the tree, after notice of its condition, neglected to remove”); Rosengren v. City of Seattle, 205 P.3d 909, 914 (Wash. Ct. App. 2009) (holding that “trees planted by a landowner are an artificial condition on the land, and that an abutting land owner has a duty to exercise reasonable care that the trunks, branches, or roots of trees planted by them adjacent to a public sidewalk do not pose an unreasonable risk of harm to a pedestrian using the sidewalk”).
⁵ See U.S. Postal Serv. v. Council of Greenburgh Civic Ass’ns, 453 U.S. 114, 128–29 (1981) (noting that mailboxes are “an essential part of the [Postal Service’s] nationwide system for the de-
they cannot stop planes from flying in the air above;\(^6\) they cannot interfere with the water- and sewage-lines below or with the support their soil offers to neighboring properties,\(^7\) nor do they necessarily own the underground minerals.\(^8\) Much is located between the home and the fence, and not all of it enjoys quite the same legal status as the home. The same is true on the other—the public—side of the fence. Thus, for example, the owner may have no personal rights in the public roadway, but they have an individual duty to maintain the public sidewalk abutting their land and the water-line running underneath it;\(^9\) a discrete right to plant vegetation along that sidewalk (along the space between sidewalk and street that is sometimes known as a

\(^6\) See infra notes 103–114 and accompanying text (discussing aerial navigation).

\(^7\) See infra notes 199–253 and accompanying text (discussing water lines and lead poisoning); see also 8 THOMPSON ON REAL PROPERTY, THOMAS EDITIONS § 69.01 (2018) (explaining lateral and subjacent support rights and obligations).

\(^8\) See 8 THOMPSON ON REAL PROPERTY, supra note 7, § 50.11(i) (discussing administrative regulation of groundwater in the western United States); see also Nadav Shoked, Two Hundred Years of Spite, 110 NW. U. L. REV. 357, 374–83 (2016) (discussing the general common law regarding landowners’ rights to percolating waters).

“planting strip,” “tree lawn,” or “hellstrip”);\textsuperscript{10} perhaps even a special right to have obstacles removed from the adjacent public street.\textsuperscript{11}

There is thus a distinct physical and legal space between the fence and what is the quintessential private property on the one side, and between the fence and what is the quintessential public property on the other side. That space represents, this Article argues, property’s edges. In this Article, we explain why it is useful to think of property, not in the binary terms of private ownership and the boundary that separates private ownership from that which is publicly owned—the thinking embodied in the popular preoccupation with the fence—but instead in terms of a private core, boundary, and edges found on both sides of the boundary.

First and foremost, this framework provides a better description of actual legal reality. As the examples above illustrate, the law simply does not treat all spaces that fall on the same side of the private/public boundary in the same manner. An owner has a more robust right, for example, to exclude others from their home than from the air above it (where airplanes might traverse) or from the entrances to it (where the mailbox or meter might be located). The owner also has a stronger right to freely designate the use of their property in their home than in the soil below (where the water-line is located) or the yard adjacent to the street (where they must ensure that trees are not felled). Similarly, the owner’s rights to influence the use of land, and their obligations with respect to land, do not abruptly end at the spot where their private property ends, at the boundary line: those rights and obligations extend, to some degree, to the areas (such as the sidewalk) immediately beyond it.

A realistic property theory should acknowledge these facts. The law appears to conceive our ownership regime not as a stark choice between private and public—mine and not mine, separated by a boundary—but as a continuum. That continuum starts at a core of private ownership—where the owner’s rights are strongest (albeit never absolute)—and proceeds towards the opposite pole—where the owner’s rights are weakest (albeit never non-existent). The boundary is probably an important point along that continuum; it is, in a

\textsuperscript{10} See, \textit{e.g.}, \textsc{Seattle Dep’t of Trans., Gardening in Planting Strips, Client Assistance Memo 2305}, at 1, 3 (2017), http://www.seattle.gov/Documents/Departments/SDOT/PublicSpaceManagement/CAM2305.pdf [https://perma.cc/SYQ8-3PJ2] (“A permit is not required to install vegetation in a planting strip.”). \textit{But see id.} at 1 (“However, a free Street Use permit is required to install trees and raised beds.”).

\textsuperscript{11} Traditionally, public nuisance claims could only be brought by public officials or private owners whose property was \textit{specially} affected in a way not shared by the general public. \textsc{8 Thompson on Real Property, supra} note 7, § 67.02(a).
sense, an inflection point (where the formal categories of ownership switch). Still, however, it is just one point along a wider continuum.

Better appreciation of this positive fact about our property law should aid both lawmakers and scholars. Lawmakers’ occasional failure to note the complex nature of property leads to problematic decisions with respect to activities taking place on private properties’ edges. This periodic failure is most conspicuous and generates the most troubling outcomes at times when new services or technologies that must make use of a property’s edge are introduced.12

Consider the U.S. Supreme Court’s famous 1982 decision in Loretto v. Teleprompter Manhattan CATV Corp.13 There, the Court could not imagine a new technology situated on a property’s edge—in that case, cable television wires being placed onto a landlord’s roof and the air space above it—as anything but an intrusion into the owner’s core property. For Justice Marshall, the boundary between private and public property was decisive, and once the government-mandated wires were placed on the private side, a physical intrusion—and thus, a governmental taking of private property—had immediately occurred. The Court thus held that such an intrusion was actionable regardless of the intrusion’s miniscule scope (about one-eighth of a cubic foot) or lack of influence on the owner’s use of her property (the owner did not even note the intruding wires for five years after acquiring the property).14

Rejecting this highly formalistic focus on the boundary between private and public property, Justice Blackmun, in a dissenting opinion, correctly conceived the issue as, to employ the term this Article introduces, an edges problem. Justice Blackmun drew on the example of other, very similar, public regulations allowable in other edges lying outside the core of pri-

12 See infra notes 193–210 and accompanying text.
13 458 U.S. 419 (1982). The case involved a cable television company placing cable wires and boxes on a landlord’s roof, the side of her building, and the space above the roof. Under New York state law aimed at protecting the interests of tenants, a landlord was required to permit such installation of cable television wires. Although the landlord in Loretto did not initially notice the wires when she purchased the property, she later contested the wires’ continued placement as an unconstitutional taking. The Court agreed. Id. at 421–24, 441.
14 Id. at 421. As Justice Marshall noted:

The dissent asserts that a taking of about one-eighth of a cubic foot of space is not of constitutional significance. The assertion appears to be factually incorrect, since it ignores the two large silver boxes that appellant identified as part of the installation. . . . In any event, these facts are not critical: whether the installation is a taking does not depend on whether the volume of space it occupies is bigger than a bread-box.

Id. at 438 n.16 (citations omitted).
vate property—for example, laws requiring mailboxes’ placement. Like these, the intrusion considered in the case, could not, to Justice Blackmun’s mind, be legally treated as the equivalent of an intrusion into the home. The New York Court of Appeals, to which the case was remanded, also arguably diverged in its attitude from Justice Marshall’s boundary-focused approach. The Court of Appeals found that the one dollar paid to the owner was sufficient just compensation for the taking of her property, evidently not perceiving the intrusion into the roof and side of the owner’s building as the equivalent of an intrusion into the owner’s living room. Perhaps unsurprisingly, therefore, the U.S. Supreme Court’s *Loretto* majority decision has not fared well as precedent. It is generally critiqued as incoherent. The Court itself has been unable to abide by the “rule” it announced—whereby all physical invasions, irrespective of extent or effect, are takings—generating a seemingly endless stream of contradictory decisions.

The Supreme Court’s unworkable *Loretto* ruling, as well as judicial opinions and legislative regulations in other doctrinal disputes that this Article will discuss, exemplifies the perverse results that follow when courts insist on analyzing problems through the boundary prism. In one example that we elaborate upon below, mindless adherence to this unitary property approach has undermined attempts to effectively replace old lead waterlines, imperiling the health of millions of Americans. The simplistic focus on private versus public induces courts to content themselves with answering the question of who holds formal title to the land, without proceeding to

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15 *Id.* at 452–53 (citation omitted) (contending that “[s]tates traditionally—and constitutionally—have exercised their police power ‘to require landlords to . . . provide utility connections, mailboxes, smoke detectors, fire extinguishers, and the like in the common area of a building’”). *See generally DOMESTIC MAIL MANUAL, supra* note 5 (providing physical standards necessary for residential mailboxes and alternative requirements for receiving postal mail).


18 JOSEPH WILLIAM SINGER, *PROPERTY* 704–11 (5th ed. 2017); *see also, e.g.*, Yee *v.* City of Escondido, 503 U.S. 519, 522, 531 (1992) (upholding a rent control law that prohibited a landlord’s eviction of mobile home owners from rented spaces unless and only if the landlord demonstrated that they wished to convert the property to non-rental use, differentiating prior cases that “generally require[d] compensation” as only applying to government-forced occupation by strangers); FCC *v.* Fla. Power Corp., 480 U.S. 245, 251 (1987) (holding that Congress could regulate rents that utility companies charged cable television companies to use utility poles, noting that the rule announced in *Loretto* was “very narrow”).

19 *See infra* notes 199–253 and accompanying text.
the much more important follow-up questions: what values that title in the specific space is supposed to protect—and, in accordance, what legal powers should be available to the title holder?20

Shifting to an idea of property as a continuum of legal entitlements that unfolds over space can thus aid courts in dealing with new challenges; it can also contribute to property theory. The past few decades have witnessed an explosion of sophisticated work on property law theory.21 The edges framework can integrate key insights of many of the most influential contending theories developed in these important works. Specifically, the edges vision preserves a place for the “thing” (or space) in our understanding of property law—a key insight of one group of writers—while still giving primacy to the social nature of property—the key insight of the other group.22

Through this act of theoretical synthesis, this Article develops a better understanding of our notion of property. Such an understanding is especially urgent nowadays as diverse stakeholders make recourse to traditional proper-

20 See Joseph William Singer, No Right to Exclude: Public Accommodations and Private Property, 90 NW. U. L. REV. 1283, 1464–65 (1996) (suggesting that because property rights have always been “contextual, changing over time, and dependent on the effects their exercise has on others,” the title model whereby formal ownership allegedly determines results should be abandoned in favor of a nuisance model that “expressly qualifies property rights by reference to their effects on other property owners and on the public at large”).


22 See infra notes 33–67 and accompanying text (discussing current, unitary concepts of property).
ty conceptions in order to analyze challenges presented by new, non-land based assets. Debates over the scope of different intellectual property rights—such as copyright and trade secrets—have, for decades, been couched in terms of property boundary disputes; as scholars note, this analogy is often applied in a misleading fashion.\(^{23}\) Perhaps even more worrisome, over the past few months, popular and legislative disputes over privacy on the Internet and the allocation of rights to information between users, websites, and providers, have likewise extensively employed—somewhat thoughtlessly—the boundary-focused terms supposedly derived from traditional property law.\(^{24}\) By questioning long-established precepts and offering a more accurate image of the legal treatment of the most traditional of property rights, this Article seeks to facilitate a better informed conversation regarding the legal reaction to such novel non-traditional properties.\(^{25}\)

This Article proceeds as follows. Part I situates the suggested framework within existing property scholarship.\(^{26}\) It provides a brief overview of the theoretical debates over the nature of property, concentrating on the role that the “thing” and the boundary line between the private and the public play in the conception of property. Part I also highlights the tendency of


\(^{24}\) See Louis Menand, Why Do We Care So Much About Privacy? New Yorker (June 18, 2018), https://www.newyorker.com/magazine/2018/06/18/why-do-we-care-so-much-about-privacy [https://perma.cc/5H8R-C48J]. Despite the continuous debate between tech companies seeking individuals’ private information and government entities seeking to protect such individuals’ interests, privacy interests are not “what’s really at stake . . . .” Id. (“[P]rivacy is simply a weapon that comes to hand in social combat. People invoke their right to privacy when it serves their interests . . . .”); see also Jessica Litman, Information Privacy/Information Property, 52 Stan. L. Rev. 1283, 1289–92 (2000) (criticizing early attempts to protect data privacy through property concepts).

\(^{25}\) Another recent, technology-generated legal dispute for which the edges model, replacing the unitary one, could be useful involves the embedding of tweets containing copyrighted material into online news stories. Two federal courts have issued apparently contradicting rulings on this point. Compare Goldman v. Breitbart News Network, LLC, 302 F. Supp. 3d 585, 586 (S.D.N.Y. 2018) (holding that the defendants violated the plaintiff’s exclusive display right under copyright law when they embedded tweets on a website), with Perfect 10, Inc. v. Amazon.com, Inc., 508 F.3d 1146, 1176 (9th Cir. 2007) (holding that Google’s framing and hyperlinking aspects of its search engine tool constituted a fair use of an adult entertainment magazine’s online images because the use was highly transformative).

\(^{26}\) See infra notes 30–67 and accompanying text.
property theories of different stripes to offer a unitary notion of private property—one that assumes that property entitlements are consistent across the owned space. Part II argues that this unitary view is misleading, focusing on three key doctrinal issues—trespass, aerial navigation, and police searches—to illustrate that the law explicitly denies the unitary conception of property. It then explains why the law has made this choice, examining the benefits of the edges notion of property. Specifically, our analysis of the three doctrinal issues demonstrates how, in contrast with the unitary property view, the edges concept better promotes the normative values on behalf of which private property was instituted (efficient land use and privacy), better corresponds to individuals’ expectations respecting private entitlements, and better economizes on administrative costs.27 Next, Part III employs the edges theory developed in Part II to address several pressing property law challenges.28 It turns attention to instances where, faced with some new development affecting the edges of private property, lawmakers have insisted on relying upon the unitary, boundary-based approach to property. Part III shows how this attitude engenders extremely dangerous results in the specific context of the challenges presented by lead water-pipes, drones, and rising sea levels. Drawing on the suggested edges theory, Part III proposes more appropriate legal solutions to these challenges. Part IV concludes by offering a potential extension of the property edges theory beyond its focus on real property—to intellectual property.29

I. CURRENT THEORIES: A UNITARY CONCEPT OF PROPERTY

This Article suggests a new view of property—one imagining property as a continuum proceeding from a core of private entitlement, to private edges, to public edges, and then to a public core. This view inevitably relates, and reacts, to existing views prevalent in the theoretical literature. This Part reviews that rich literature and its concept of property. It exposes the literature’s sometimes explicit, sometimes implicit, adherence to a unitary vision of property, which the remainder of the Article will rebuke. Nevertheless, this Part also gleans from that literature potential building blocks that can later be used to address this shortcoming.30

27 See infra notes 68–188 and accompanying text.
28 See infra notes 189–310 and accompanying text.
29 See infra notes 311–353 and accompanying text.
30 See infra notes 31–67 and accompanying text.
The canonical starting point for the evolution of property theory and law’s idea of private property has always been William Blackstone.\textsuperscript{31} For Blackstone, property was “that sole and despotic dominion which one man claims and exercises over the external things in the world, in total exclusion of the right of any other individual in the universe.”\textsuperscript{32} For over a century now, however, property theory has tried to come to terms with the collapse of this physical, absolutist property conception. In the early-twentieth century, legal realists successfully assailed the conception.\textsuperscript{33} They argued that property is not about the physical thing; rather, it is about relationships between people.\textsuperscript{34} For example, applying an oft-invoked illustration, as an owner, Jane does not exercise a dominion over the external thing, the land of Blackacre. Instead, Jane exercises a dominion over other people whom she may be able to exclude from Blackacre.\textsuperscript{35} Relatedly, the realists believed that defining something as property does not proffer the owner absolute rights.\textsuperscript{36} Even as owner, Jane might not be free to exercise the right to exclude all others in all circumstances from Blackacre.\textsuperscript{37} Property, therefore, is a “bundle of rights” that are exercised over other individuals rather than things, a bundle that need not include all imaginable rights.

The precise origins of the “bundle of rights” metaphor are unclear,\textsuperscript{38} but it nicely conveys the core realist tenet: “property” is a hollow, formalis-
tic concept of no practical usefulness. The fixation on “things,” long associated with thinking about property, is particularly puerile to this more sophisticated realist view. The result has been, as famously announced by Thomas Gray, a disconnect between the common perception of property and the legal-scholarly idea:

Most people, including most specialists in their unprofessional moments, conceive of property as things that are owned by persons. To own property is to have exclusive control of something—to be able to use it as one wishes, to sell it, give it away, leave it idle, or destroy it. . . . By contrast, the theory of property rights held by the modern specialist tends both to dissolve the notion of ownership and to eliminate any necessary connection between property rights and things.

This contrast may render the bundle image somewhat unappealing, as Bruce Ackerman noted decades ago. Even if legally accurate, the image materializes as highly abstract and as misaligned with the actual lived experience of property—which, often enough, is all about the statement “that house is mine.” Accordingly, in a series of highly influential articles pub-

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39 See Edward L. Rubin, Due Process and the Administrative State, 72 CALIF. L. REV. 1044, 1086 (1984) (“[P]roperty is simply a label for whatever ‘bundle of sticks’ the individual has been granted.”); Williams, supra note 36, at 297 (“Labeling something as property does not predetermine what rights an owner does or does not have in it.”).

40 See THURMAN W. ARNOLD, THE FOLKLORE OF CAPITALISM 118–35 (1937) (insisting that traditional notions of private property, as expressed through the language of law and of economics, were too simple and formal to usefully understand the contemporary economy’s complexity); Felix S. Cohen, Transcendental Nonsense and the Functional Approach, 35 COLUM. L. REV. 809, 815 (1935) (“The circularity of legal reasoning in the whole field of unfair competition is veiled by the ‘thingification’ of property.”).


42 See BRUCE ACKERMAN, PRIVATE PROPERTY AND THE CONSTITUTION 26–27 (1977) (arguing that “it risks serious confusion to identify any single individual as the owner of any particular thing”; instead, Ackerman suggests, identifying someone as a property “owner” merely serves “as a shorthand for identifying the holder of that bundle of rights which contains a range of entitlements more numerous or more valuable than the bundle held by any other person with respect to the thing in question”).

43 Consider this realist era definition of property: “a euphonious collocation of letters which serves as a general term for the miscellany of equities that persons hold in the commonwealth.” Walton H. Hamilton & Irene Till, Property, in 11 ENCYCLOPAEDIA OF THE SOCIAL SCIENCES 528, 528 (Edwin R.A. Seligman & Alvin Johnson eds., 1937).

44 See J.E. PENNER, THE IDEA OF PROPERTY IN LAW 75–76 (1997) (“As I walk through a car park, my actual, practical duty is only capable of being understood as a duty which applies to the cars there, not to a series of owners. . . . The content of my duty not to interfere is not structured in any way by the actual ownership relation of the cars’ owners to their specific cars. . . . Thus trans-
lished over the past two decades, Thomas Merrill and Henry Smith instigated a revolt against the realist bundle of rights view.\(^{45}\) They have argued that property as a legal category must, and does, have a well-defined essence. To differing degrees, they and their followers—the “essentialist theorists”—contend that this essence is the right to exclude.\(^{46}\) Even more recently, Smith has taken the argument a few steps further still.\(^{47}\) Fully reversing course from legal realism, he argues that property’s essence is the thing, with respect to which the owner has certain rights—most prominently, the right to exclude—against the whole world.\(^{48}\) To Smith and others,\(^{49}\) the correct representation of property is not the bundle of sticks, or even the abstract legal right to exclude, but the physical piece of property—the house on a lot—which everyone in the world knows is off-limits.\(^{50}\)

This new/old representation of property is by no means universally embraced. Joseph Singer, for example, argues that property is not about protecting the owner’s right to a thing or to exclude, but about protecting individuals’ legitimate reliance on certain relationships organized around assets.\(^{51}\) Gregory Alexander insists further that property law actually includes a socio-obligation norm to employ resources in a manner furthering human

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\(^{45}\) See, e.g., Thomas W. Merrill & Henry E. Smith, *Optimal Standardization in the Law of Property: The Numerus Clausus Principle*, 110 YALE L.J. 1, 8 (2000) (arguing for a positive theory of the *numerus clausus*, and explaining how property rights are different from contract rights in that they are restricted to a limited number of standardized forms); Thomas W. Merrill & Henry E. Smith, *What Happened to Property in Law and Economics?*, 111 YALE L.J. 357, 359 (2001) (tracing the worrisome rise of the modern legal economists’ view of property as simply a list of rights, and advocating instead for a return to the conception of property as a distinctive in rem right).

\(^{46}\) See PENNER, supra note 44, at 71 (“[T]he right to property is a right to exclude others from things which is grounded by the interest we have in the use of things.”); Thomas W. Merrill, *Property and the Right to Exclude*, 77 NEB. L. REV. 730, 731 (1998) (“My claim is simply that in demarcating the line between ‘property’ and ‘nonproperty’ . . . [], the right to exclude others is a necessary and sufficient condition of identifying the existence of property.”); Adam Mossoff, *What Is Property? Putting the Pieces Back Together*, 45 ARIZ. L. REV. 371, 439 (2003) (identifying “the right to exclude as the essential hallmark of the concept of ‘property’”).


\(^{50}\) See Smith, *Law of Things*, supra note 21, at 1699 (“The right to exclude, the residual claim, and so on are not detachable sticks serving detachable purposes. They are integral—but not absolute—aspects of property that follow from its architecture.”).

\(^{51}\) Singer, supra note 37, at 663–64.
flourishing, not just for the individual owner, but for all. For these scholars and their followers, property is not about the thing or the individual’s rights; rather, it is about the social relationships—the overall structure of society—that property establishes. This thinking argues that, given its social role, property cannot revolve around an individual’s right to exclude others; indeed, it cannot revolve around any one single right or interest. Property is about obligations towards others. Those obligations can—and often do—limit the owner’s rights on her thing. These “pluralistic theories” of property thus highlight property law doctrines that deny the owner a right to exclude. Scholars adhering to these theories bring to the fore cases in which the owner is subject to duties to accommodate others by granting them entry or by complying with their dictates respecting the land’s uses.

For their part, the essentialist theories relegate the doctrines that pluralists emphasize to property law’s periphery. Essentialists acknowledge these doctrines’ and cases’ existence but insist that they are mere exceptions to the general rule of property law, which remains the owner’s right to exclude. The essentialist-pluralist debate thus revolves around the determin-

53 See Peter M. Gerhart, Property Law and Social Morality 3, 5 (2013) (arguing that property is about what “we owe each other”).
55 Alexander et al., supra note 54, at 743.
56 See Ezra Rosser, The Ambition and Transformative Potential of Progressive Property, 101 CAL. L. REV. 107, 111–12 (2013) (“Limiting the owner’s right to exclude in light of the public interests at stake in private property is a common theme of progressive property scholarship, and in certain circumstances such limits can come close to promoting land redistribution.”).
57 See Alexander, supra note 52, at 773–810 (providing examples of legal doctrines that demonstrate the role of a socio-obligation norm in property law’s limitations of owners’ right to exclude).
58 See Nadav Shoked, The Duty to Maintain, 64 DUKE L.J. 437, 463–91 (2014) (arguing that several doctrines demonstrate that current property law imposes on an owner a positive “duty to maintain” his or her property and thus compels an owner’s accommodation of the public through various types of sanctions).
59 See Henry E. Smith, Mind the Gap, 94 CORNELL L. REV. (SPECIAL ISSUE) 959, 980–81 (2009) (contending that the examples that Gregory Alexander “are better handled under a regime that gives presumptive weight to owners’ exclusion rights and to traditional legal categories than under his [pluralist] alternative”).
60 See id. at 988 (“The structure of property in terms of a core and periphery, or exclusion and governance, is no accident.”).
nation of which doctrines form the heart of property law. For essentialists, “property proper includes a basic exclusionary regime with refinements of the governance type” that might impose on the owner some rules limiting his or her land’s use.  

For pluralists, “[g]overnance property now dominates the landscape of property institutions. As a result[,] . . . the right to exclude can no longer be considered the single most important element of ownership.”

The two sides concur that there are properties and property rights of different potencies (in terms of degree of protection of the right to exclude); they dispute, though, which type of property is more prevalent. They agree that the boundary between private property and public space (or the property of others) matters; they dispute how much it matters. Neither view explicitly acknowledges, however, the possibility that the strength of the protection of the property right to exclude differs across the same property (as opposed to between properties). Additionally, neither view focuses on the impact, on the owner’s right to exclude, of a given spot’s distance from the property’s boundary (as opposed to the impact of the boundary itself).

In this sense, both schools assume a unitary vision of property. Under both schools’ approach, the owner’s entitlements in a given property—strong as they might be for the essentialists, weak as they might be for the pluralists—are the same throughout that property. Whether they emphasize the thing owned, the right to exclude, or relationships, theorists proceed with the often-undeclared presumption that once a right is recognized with respect to a thing, the scope of that right does not vary across the thing. They conceive the major, perhaps only, point where a property right’s import shifts (and the theories diverge in their diagnosis of that shift’s intensity) as the boundary-line between private property and public property.

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63 Compare id. (arguing that the conception of ownership depicted by the fence metaphor is misleading), with Smith, supra note 47, at 2057 (“Property divides the world of horizontal interactions into modules, . . . which allow intensive activity inside boundaries . . . ”).

64 Our usage of the term “unitary,” especially in its application to theories that we otherwise deem pluralistic, might require elucidation. The realists-progressives are pluralistic with respect to the values they seek to promote through property, the nature of the entitlements they deem as covered under the property rubric, and the number and identity of stakeholders who might enjoy rights in a given property. But they are, like the essentialist theorists, often unitary in one respect relevant here: they emphasize the fact that a property right embodies a plethora of diverse relationships that might differ across rights, but they do not always extend this insight to conclude that, within the same property right, such variation might exist.

65 See Laura S. Underkuffler, Property and Change, 91 TEX. L. REV. 2015, 2030 (2013) (explaining that, although property does not exist as a coherent idea and, hence, theoretical debates abound, its uncontested essence is the idea of legal protection of fixed entitlements).
The next Part of this Article will question the descriptive validity of this unitary vision that, despite their many other differences, the contending property theories share. The more nuanced edges vision that it advances in its stead will owe much, however, to other key insights of these theories—both essentialist and pluralist. The edges framework we develop to replace the unitary view of property highlights the importance of the actual thing to the legal idea of property, as stressed by essentialists like Henry Smith. The edges framework also assumes the contextual and shifting nature of property protections, which the pluralists teach. Our view that entitlements vary across the thing owned builds both on Smith’s idea that the physical thing matters and, concurrently, on the pluralist tenet that what matters in property is not formal ownership but rather the specific, and flexible, entitlements that owners hold towards others.

II. AN EDGES CONCEPT OF PROPERTY

Prevailing theories of property maintain a largely unitary vision of property. Although they may recognize the distinct nature of different rights that can apply to land—for example, “exclusion” versus “governance” regimes—they insist on the unchanging nature of the right across the specific piece of land. That position has much theoretical resonance and appeal. Still, as this Part explains, it stands in stark contrast to the way property is regulated by the law and experienced by owners and non-owners alike. Indeed, this unitary view cannot account for the manner in which the most basic components of property law operate. To address this deficiency, in this Part, we develop a concept of private ownership that can: the property edges concept.

Section A shows that the unitary vision fails to accurately describe property law doctrine—which in fact clearly sets a property’s edges apart from its core. Section B explains why a view of property protections as varying over space is also more appealing as a theoretical matter, establishing the normative grounding for the law’s choice to distinguish property’s edges from its core.

66 See infra notes 68–188 and accompanying text.
67 See supra notes 45–50 and accompanying text (discussing the views of essentialists). Some realists-progressives also agree with this essentialist approach. For example, Laura Underkuffler stresses that “space” is vital to the concept of property. Laura S. Underkuffler, Subversive Property, 50 NEW ENG. L. REV. 295, 301 (2016).
68 See infra notes 69–188 and accompanying text.
69 See infra notes 71–135 and accompanying text.
70 See infra notes 140–187 and accompanying text.
A. The Law Denying the Unitary Concept of Property

First and foremost, the unitary view of property that the preceding Part detected in existing theories is descriptive. Its assumption is that property protections, as they exist in current and traditional law, do not vary within a property. In actuality, however, they do. In this Section, we expound on three examples from existing legal practice highlighting that fact.\(^{71}\) These instances—trespass law, aerial navigation law, and police searches law—affect all property owners in America. They forcefully show that the law treats property not as a binary private/public choice, but as a spectrum proceeding from a core of intensely-protected private property into much less protected edges of private property that blend into the public space.

1. Trespass Law

Trespass is the most basic element of property law.\(^{72}\) Trespass laws are the legal tool that afford the owner control over her land; they allow the owner to decide who may and who may not enter, and they thus define property entitlements.\(^{73}\) Despite common assumptions, however, the property right that trespass laws thereby define is not unitary; rather, it consists of a core of the property where the protection from uninvited entrants is extremely robust, as well as edges of the property where protection is much weaker—eventually fading to a point of having little practical significance.

Trespass is both a crime and a tort. The most momentous power that the law grants an owner is the ability to draw on the state’s enforcement mechanism—the police—to remove and prosecute those who enter her land without permission.\(^{74}\) The legal system recognizes trespass—but not, say, breach of contract—as a crime.\(^{75}\) In this manner, commentators explain,

\(^{71}\) See infra notes 72–135 and accompanying text.

\(^{72}\) See Richard A. Epstein, How to Create—or Destroy—Wealth in Real Property, 58 ALA. L. REV. 741, 741, 743, 744 (2007) (explaining how a clear right to exclude is necessary for economic welfare); Daphna Lewinsohn-Zamir, Can’t Buy Me Love: Monetary Versus In-Kind Remedies, 2013 U. ILL. L. REV. 151, 185 (“The right of property owners to exclude others . . . is considered a vital component of ownership.”); Merrill, supra note 46, at 747–52 (arguing the right to exclude is the defining characteristic of property).

\(^{73}\) SINGER, supra note 18, at 27.

\(^{74}\) See Leo Katz, Choice, Consent and Cycling: The Hidden Limitations of Consent, 104 MICH. L. REV. 627, 667, 668 (2006) (suggesting that the ability to rely on the police is what makes property rights strong).

\(^{75}\) See Ernest J. Weinrib, Punishment and Disgorgement as Contract Remedies, 78 CHI.-KENT L. REV. 55, 89 (2003) (“[U]nlike intentional violations of physical integrity or appropriations of another’s property, breaches of contract are not treated as crimes in any sophisticated legal system.”).
society expresses its prioritization of private property. Yet, in practice, the law appears to prioritize certain parts of the property over others. For example, in Illinois, a person is automatically liable for the crime of trespass if he or she enters a residence—the dwelling part of a property—without authority. Entry to any other portion of a private property, however, will only count as a crime if the trespasser actually received, prior to the entry, warning from the owner that entry is forbidden. Even then, the crime qualifies as a lesser offense than entry into the dwelling portion. Other state criminal trespass statutes provide similar illustrations.

This non-unitary conception of property prevails not only in criminal law, but also in private law. The gradation system established by the trespass crime reveals itself—if less explicitly—in the trespass tort. That tort, often referred to as property’s “sine qua non,” is of an alleged absolute nature. It applies evenly to all properties, and thus recognizes no exception for de minimis entries. Theoretically, if your neighbor’s dog relieves itself across your fence and into your lawn, the neighbor’s tort liability is identical to her liability in the case wherein that same dog engages in the same uninvited activity across your front door.

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77 See 720 ILL. COMP. STAT. ANN. 5/19-4(a)(1) (West 2014) (“A person commits criminal trespass to a residence when, without authority, he or she knowingly enters or remains within any residence, including a house trailer that is the dwelling place of another.”).
78 See id. 5/21-3(a)(2).
79 Compare id. 5/19-4(b)(1) (Class A misdemeanor), with id. 5/21-3(h) (Class B misdemeanor).
80 See, e.g., ARIZ. REV. STAT. ANN. § 13-1503 (1981) (non-residential structure); id. § 13-1504(A)(1) (residential structure); id. § 13-1504(A)(2) (residential yard); KY. REV. STAT. ANN. § 511.060 (West 2018) (criminalizing trespass to dwelling); id. § 511.070 (to enclosed space); id. § 511.080 (to premises); MO. ANN. STAT. § 569.140 (West 2018) (trespass to building); id. § 569.150 (to any property).
81 See Merrill, supra note 46, at 730 (“[T]he right to exclude others is more than just ‘one of the most essential’ constituents of property—it is the sine qua non.”).
82 Giddings v. Rogalewski, 158 N.W. 951, 953 (Mich. 1916) (“Every unauthorized intrusion upon the private premises of another is a trespass, and to unlawfully invade lands in his possession is ‘to break and enter his close’ and destroy his private and exclusive possession.”). Even commentators disagreeing with this notion present their writing as mere suggestions. See, e.g., Larissa Katz, Exclusion and Exclusivity in Property Law, 58 U. TORONTO L.J. 275, 302–03 (2008) (arguing that trespass law should protect the owner’s agenda-setting authority, thus not extending to meritorious invasions).
84 See Hoery v. United States, 64 P.3d 214, 217 (Colo. 2003) (en banc) (defining trespass as simply “a physical intrusion upon the property of another without the proper permission from the person legally entitled to possession of that property”).
Although such liability might be the law in books, it is not the law in action. 85 Tort law ends up distinguishing trespasses based on the intrusion’s location by means of the law’s remedy regime. 86 As others have noted, the robust protection that the legal system provides to an owner through the minimal formal requirements needed to establish a trespass tort claim is undermined by the rather weak remedy that the tort provides. 87 Trespass is a particularly pro-plaintiff tort because, in contrast to the usual practice in tort law, its proof does not require that the plaintiff suffer harm. 88 Nevertheless, the remedy that courts award the successful trespass plaintiff depends on the presence of such harm. 89 The remedy for trespass often consists of damages (an injunction is irrelevant once the trespasser has left), and these are almost always calculated to correspond to the harm that the trespass inflicted on the owner. 90 In the absence of a harm, the owner is awarded nominal damages (usually, one dollar). 91

86 See Ben Depoorter, Fair Trespass, 111 COLUM. L. REV. 1090, 1099 (2011) (explaining that “courts sometimes implicitly pardon trespassing by limiting the award in a trespass action”). The edges approach is also apparent in the law in Scotland and Sweden, which allows public access on unimproved, private land for “roaming” while making actionable any intrusion into cultivated areas and the area around a home, which the Swedish label the “tomt.” See Heidi Gorovitz Robertson, Public Access to Private Land for Walking: Environmental and Individual Responsibility as Rationale for Limiting the Right to Exclude, 23 GEO. INT’L ENVTL. L. REV. 211, 215 (2011) (“[T]he public has a right of access to private land [in Sweden] that is not within the ‘tomt’—because it, and cultivated areas, are the only areas to which the right of public access does not apply. As a result, the landowner may not put up a fence to exclude people from an area larger than the ‘tomt.’”); Brian Sawers, The Right to Exclude from Unimproved Land, 83 TEMP. L. REV. 665, 684–88 (2011) (describing the right to roam in the British Isles, Scandinavia, and continental Europe).
87 See Gideon Parchomovsky & Alex Stein, Reconceptualizing Trespass, 103 NW. U. L. REV. 1823, 1825 (2009) (“[I]t is necessary to understand the impact of the weakened ex post protection on the ex ante protection of the owner against trespass. Setting compensation at market value effectively erases the power of the owner to determine the price for the use of her entitlement. Similarly, it annihilates the owner’s immunity against forced transactions. Worse yet, it undermines the incentive for third parties to initiate negotiations with property owners.”).
88 The historical reason for this is that trespass was considered an offense against the public peace, and therefore relief was always granted as means of discouraging disruptive community influences. See WINFIELD ON TORT 323–25 (Rogers, W.V.H. ed., 1967). For a critique of this prioritization of plaintiffs, see Avihay Dorfman & Assaf Jacob, The Fault of Trespass, 65 U. TORONTO L.J. 48, 97–98 (2015).
89 See Eric R. Claeys, The Right to Exclude in the Shadow of the Cathedral: A Response to Parchomovsky and Stein, 104 NW. U. L. REV. 391, 404, 408 (2010) (contending that “option scholarship does not explain why trespass law strongly prefers injunctions when they can be enforced and propertized-compensation damages or disgorgement when they cannot”).
90 See, e.g., Hammond v. County of Madera, 859 F.2d 797, 804 (9th Cir. 1988) (“Common law principles . . . indicate that reasonable赔偿的 value is the appropriate remedy for trespass. Damage remedies for trespass are essentially compensatory and not punitive.”); RESTATEMENT
Entrances to the property’s core—the residence, the place of business, the cultivated area—are much more likely to generate harm than entrances to the outskirts. Trespass to a property’s outskirts will normally give rise to no meaningful harm and thus no meaningful damages awards. Consider again the example of the dog relieving itself across the property line: a main reason for the dearth of lawsuits pursuing such offenders is that such intrusions (unlike identical intrusions committed into the home) generate little to no harm. Such suits would entitle the owner to miniscule tort damages, and, consequently, owners who experience such trespasses to their property lack a legal incentive to actually enforce their formal rights.

Trespass law’s denial of a unitary vision of property—one that would treat identically an entrance to any part of the owner’s land—extends still further to cases where the intruder or intrusion remain on the property. When the trespasser is still situated on the owner’s land, devising a remedy should be straightforward: the remedy should simply be the entrant’s removal via an injunction. An injunction is indeed the traditional remedy in trespass cases. Nevertheless, such an injunction is less likely when the entrant is located on the property’s outskirts, rather than in its core.

A permanent intrusion—for example, a structure or wall built on the land of another—should, under trespass law, always be removed. Yet courts have recognized the “improving trespasser” doctrine that renders this remedy discretionary—particularly when the intrusion occurs on the property’s edges. Under the doctrine, an injunction will not be awarded if the trespasser’s expenditure in erecting the intruding structure was substantial, the intrusion minimal, and the encroachment innocent. All three elements are much likelier to be present when the intrusion is to the property’s outskirts.

91 See, e.g., Stockman v. Duke, 578 So. 2d 831, 832–33 (Fla. Dist. Ct. App. 1991) (finding no difference in value of land before and after trespass and thus reducing damages awarded by trial court to one dollar); Brown v. Smith, 920 A.2d 18, 32 (Md. Ct. Spec. App. 2007) (finding “nominal” damage award of $8,350 to trespass victim excessive and remanding to trial court to determine appropriate compensatory damages, if any). Punitive damages are an option, but they “are few and far between and consequently do very little to undermine the generality of market-value compensation.” Parchomovsky & Stein, supra note 87, at 1836.

92 See, e.g., Martin v. Reynolds, 342 P.2d 790, 795 (Or. 1959) (en banc) (“Inasmuch as it is not necessary to prove actual damage in trespass the magnitude of the intrusion ordinarily would not be of any consequence. But there is a point where the entry is so lacking in substance that the law will refuse to recognize it . . . .”); Jacque v. Steenberg Homes, Inc., 563 N.W.2d 154, 161 (Wis. 1997) (describing the applicable thirty-dollar forfeiture as a “halfpenny”).


94 See Geragosian v. Union Realty, 193 N.E. 726, 728 (Mass. 1935) (“The general rule is that the owner of land is entitled to an injunction for the removal of trespassing structures”).

95 SINGER, supra note 18, at 43–44.
rather than within the property’s core. A permanent intrusion made to the core of the owner’s land is highly unlikely to meet the improving trespasser doctrine’s requirements: it is unlikely to be minimal or made in good faith.96 Conversely, a structure intruding on the land’s edges is normally a part of a larger structure built on the trespasser’s own land—for example, a slight intrusion by the wall of the neighbor’s house resulting from a surveying mistake.97 The intrusion is thus often expensive to remove, causes little harm to the invaded owner, and is the product of innocent miscalculation. In addition, the encroached owner is less likely to immediately note such border intrusions, and courts are hostile to removal claims that are not brought promptly.98 The upshot is that, in practice, almost all cases in which courts rely on the improving trespasser doctrine to refuse the award of an injunction against an intruding structure involve intrusions to the property’s edges.99

The doctrine of improving trespasser joins still other assorted doctrines that courts resort to when settling border disputes, doctrines that enable courts to avoid automatic orders of removal under trespass law. Acquiescence, estoppel, and dedication are all doctrines the operation of which leads to the owner losing the portion of his or her land located near the property’s border—on its edges.100

96 See Restatement (Third) of Restitution and Unjust Enrichment § 10 cmt. a (Am. Law Inst. 2011) (“Even where a remedy imposes a forced exchange on the property owner, the extent of the resulting hardship is largely a function of the owner's reasonable expectations regarding the property.”).

97 See, e.g., Arnold v. Melani, 449 P.2d 800, 801, 806 (Wash. 1968) (per curiam) (holding that mandatory injunction for removal of an encroaching building onto neighbors’ land could be withheld where the intruding owner did not act in bad faith, the damage to adjoining owner’s land was minimal, moving of the structure would be impractical, and disparity in resulting hardships was enormous). Even the rarer still cases where a neighbor builds, in good faith, her entire structure on the owner’s land, are much likelier to occur close to the property boundary, rather than near the core of the owner’s land. See, e.g., Proctor v. Huntington, 238 P.3d 1117, 1118, 1123 (Wash. 2010) (en banc) (holding that where neighbors unknowingly built garage entirely on portion of land owned by adjoining owner, fair and just remedy was for intruding neighbors to purchase land they encroached upon, rather than for the court to issue an injunction to require neighbors to remove their improvements from owner’s land).


99 Id. at 2143–45; see, e.g., Myers v. Yingling, 279 S.W.3d 83, 84, 90 (Ark. 2008) (involving a landowner blocking neighbors’ only means of egress onto their property by erecting a gate on a private roadway that ran through edge of owner’s land); Golden Press, Inc. v. Rylands, 235 P.2d 592, 593, 596 (Colo. 1951) (en banc) (holding that where neighboring company constructed its building’s foundation and footings, which were seven feet below surface of ground, to intrude two to four inches onto owners’ property, a mandatory injunction for removal was unconscionable and that owners must thus be relegated to compensation in damages). For more on the improving trespasser doctrine’s practical effects, see Shoked, supra note 58, at 483–85.

100 See Singer, supra note 18, at 170–72.
In both its criminal and tort law iterations, trespass thus flatly denies the unitary vision of property. The power of the protections from intrusion that it proffers the owner varies across the owner’s land. The neighbor’s dog relieving itself on the property line will not constitute a criminal act and is unlikely to generate civil liability; that dog doing the same in the residence will. A court will, in most cases, order removal of an intruder’s structure in the middle of the owner’s land;\(^{101}\) however, a neighbor’s structure intruding across the property line often will not result in such an order. The unitary view of property cannot account for this varied level of legal protection afforded to the right to exclude—under some theories, property’s “\textit{sine qua non}”\(^{102}\)—across different spaces within the owned property. In actuality, as opposed to theoretical commentary, trespass law distinguishes the property’s edges from its core.

2. Aerial Navigation

Trespass law illustrates how, though formally embracing a unitary vision of property, the law in fact enacts a core-edges vision of property. In one element of trespass law—aerial trespass—the law abandons even the formal trappings of a unitary vision. For over seventy years now, the American legal regime for managing the skies has explicitly been grounded in what this Article terms an edges approach.

As most law students learn early in a property course, the advent of aviation in the early twentieth-century posed a challenge to prevailing property concepts. Under the common law, a private land owner’s right extends not only to the surface, but rather also into the air above “all the way to Heaven.” The rule, known by its Latin phrasing as the “\textit{ad coelum} doctrine,” implies that a plane flying above a private owner’s land is entering that owner’s private property. The plane is thus committing a trespass—just as if it were a car driving through the owner’s house.\(^{103}\)

\(^{101}\) But see Sommerville v. Jacobs, 170 S.E.2d 805, 806, 815 (W.Va. 1969) (holding that where an intruding neighbor built a structure entirely on land owned by the plaintiff owner, the owner must either compensate the intruding neighbor for the increase in the fair market value of the property or the intruding neighbor must purchase the land under which the structure was built from the owner).

\(^{102}\) Merrill, supra note 46, at 730.

\(^{103}\) See 2 WILLIAM BLACKSTONE, COMMENTARIES *18. The complete formulation of the doctrine is as follows:

Land hath also, in its legal signification, an indefinite extent, upwards as well as downwards. \textit{Cujus est solum, ejus est usque ad coelum}, is the maxim of the law, upwards; therefore no man may erect any building, or the like, to overhang another's land: and, downwards, whatever is in a direct line between the surface of any land, and the center of the earth, belongs to the owner of the surface; as is every day’s ex-
This equivalence, mandated by the *ad coelum* doctrine, was nevertheless explicitly rejected in the seminal U.S Supreme Court case of *United States v. Causby* in 1946. Dismissing “that doctrine” as having “no place in the modern world,” Justice Douglas emphasized that legal treatment must vary in accordance with the specific spot within the private owner’s domain into which the airplane (or any other person or object) intrudes. The Court was considering Congress’s authorization of interstate flights within “navigable airspace” (space situated at or above minimum safe altitudes of flight), defined by regulators to include most airspace over five hundred feet above the ground. The federal government had thereby extracted a right of way—an easement—from private owners, allowing planes to pass through the owners’ properties above the five-hundred-feet line. Yet the Court ruled that this extraction did not amount to an intrusion requiring the payment of compensation. A plane’s entrance into the owner’s land is actionable only if it occurs elsewhere in the property—closer to the ground. Specifically, the Court held that the owner enjoyed protected rights solely in the “immediate reaches of the [land’s] enveloping atmosphere.” The Court focused on low flights that could, as in the case at hand, disturb the owner in the normal use of their home or farm:

[T]he airspace is a public highway. Yet . . . [t]he superadjacent airspace at this low altitude is so close to the land that continuous invasions of it affect the use of the surface of the land itself. We think that the landowner, as an incident to his ownership, has a

experience in the mining countries. So that the word ‘land’ includes not only the face of the earth, but every thing under it, or over it. And therefore if a man grants all his lands, he grants thereby all his mines of metal and other fossils, his woods, his waters, and his houses, as well as his fields and meadows.

*Id.*

104 United States v. Causby, 328 U.S. 256, 261 (1946). In *Causby*, the plaintiff-landowners owned a chicken farm that was located near an airport regularly used by the military during World War II. Due to the proximity of the airport and the setup of the farm’s structures, military planes often passed at only eighty-three feet above the surface of the owners’ property; the noise caused the death of over 150 of the owners’ chickens, eventually forcing the owners to give up their chicken business. The owners, therefore, claimed that the sustained and close overhead plane travel constituted an unconstitutional taking. *Id.* at 258–59.

105 *Id.* at 258, 263; see 49 U.S.C. § 40102(a)(32) (2018) (“‘Navigable air space’ means airspace above the minimum altitudes of flight prescribed by regulations under this subpart and subpart III of this part.”).

106 *See Causby*, 328 U.S. at 261–64, 267.

107 *Id.* at 264.
claim to it and that invasions of it are in the same category as invasions of the surface.\textsuperscript{108}

The \textit{Causby} decision created a key distinction between aerial invasions into the owner’s property occurring at a high altitude above the surface—which would not count as acts of trespass—and invasions occurring close to the surface—which could. The Court refrained from neatly drawing that line of demarcation defining the area in which the owner’s rights were more fully protected. The concept on which the Court relied to describe the area—the concept of the house’s “immediate reaches”—was left intentionally fuzzy.\textsuperscript{109} The line has been made hazier still in American law, as federal regulations now clarify that even the five-hundred-feet line is not fixed across different properties, and may move up or down in accordance with the use of the land below.\textsuperscript{110}

This legal regime announced in \textit{Causby} is an uncontested element of American property law.\textsuperscript{111} Yet it starkly contradicts the unitary notion of private property on which, as Part I shows, commentators still rely.\textsuperscript{112} That theoretical notion is perfectly embedded in the old \textit{ad coelum} doctrine. After all, that doctrine is premised on the idea that the owner’s rights are unitary and consistent across space from the hells below the surface to the heavens above.\textsuperscript{113} The doctrine as announced in \textit{Causby} is that notion’s complete negation.\textsuperscript{114} Justice Douglas’s opinion stated, in no uncertain terms, that the owner’s private property is protected from invasions to drastically varying degrees based on the closeness of the invaded private space

\begin{itemize}
\item \textsuperscript{108} \textit{Id.} at 264–65.
\item \textsuperscript{110} Over “congested areas,” the line is at “an altitude of 1,000 feet above the highest obstacle within a horizontal radius of 2,000 feet of the aircraft.” 14 C.F.R. § 91.119(b) (2010). Over water or in “sparsely populated areas,” aircraft can fly less than 500 feet above the ground so long as they are not “operated closer than 500 feet to any person, vessel, vehicle, or structure.” See id. § 91.119(c). Within six miles of some airports, the line may commence at less than 500 feet above ground to provide for takeoffs and landings. See id. § 77.17.
\item \textsuperscript{111} See STUART BANNER, WHO OWNS THE SKY? 259–60 (2008) (reporting that after \textit{Causby}, “reported cases raising the issue [of aerial trespass] became less common” and that “the aerial trespass debate largely fizzled out”).
\item \textsuperscript{112} Some of the unitary view’s strongest adherents thus deem the decision “rhetorical excess.” \textit{E.g.}, THOMAS W. MERRILL & HENRY E. SMITH, PROPERTY: PRINCIPLES AND POLICIES 296 (3rd ed. 2017).
\item \textsuperscript{113} See 2 WILLIAM BLACKSTONE, COMMENTARIES *18 (defining the \textit{ad coelum} doctrine).
\item \textsuperscript{114} See \textit{Causby}, 328 U.S. at 266; see also Hinman v. Pac. Air Transp., 84 F.2d 755, 757 (9th Cir. 1936) (“[W]e reject that doctrine [\textit{ad coelum}]. We think it is not the law, and that it never was the law.”).
\end{itemize}
to some (loosely defined) core place within the owner’s property. The farther an area is from that core, the stronger the public rights (here, the right for aerial navigation) in it.

3. Police Searches

The doctrine respecting private property’s protection from aerial navigation generates little controversy these days—outside the emerging context of drones, to which we will return later in this Article. The doctrine regarding private property’s protection from police searches, in contrast, generates abundant litigation. Still, all such litigation proceeds based on a baseline that—very much like the Causby rule for aerial navigation—wholeheartedly denies the unitary, boundary-focused, notion of private property.

The Constitution’s Fourth Amendment requires that the police obtain a warrant before conducting a search of private property. That constitutional decree generates a key question: what government intrusions into the private realm count as searches (and hence necessitate a warrant)? The history of the prohibition against government searches, and the supposed property law principles on which it relied, seemed to imply that any police intrusion onto an owner’s property requires a warrant. Hence, in one of the earliest cases where the Supreme Court expounded on the Fourth Amendment, Justice Bradley, reviewing the Amendment’s history, concluded:

The principles laid down in this opinion affect the very essence of constitutional liberty and security. They reach further than the concrete form of the case . . . [because] they apply to all invasions on the part of the government and its employes [sic] of the sanctity of a man’s home and the privacies of life. It is not the breaking of his doors, and the rummaging of his drawers, that constitutes the essence of the offence; but it is the invasion of his indefeasible right of personal security, personal liberty and private property,

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115 See infra notes 254–280 and accompanying text.
116 For example, a leading casebook dedicates close to eighty pages to the question of what counts as a search. JOSHUA DRESSLER & GEORGE C. THOMAS III, CRIMINAL PROCEDURE: PRINCIPLES, POLICIES, AND PERSPECTIVES 95–173 (6th ed. 2017).
117 U.S. CONST. amend. IV.
118 See, e.g., United States v. Rabinowitz, 339 U.S. 56, 70 (1950) (Frankfurter, J., dissenting) (arguing that any warrantless search incident to a lawful arrest is unreasonable and unconstitutional under the Fourth Amendment).
... it is the invasion of this sacred right which underlies and constitutes the essence of [the legal protection].  

This majestic proclamation, respecting property’s consistent and unconditional impenetrability, is often cited. But the Court has never blindly accepted claims that endeavor to rely on the unitary reading of property protection embodied in this famous statement. In 1924, in *Hester v. United States*, which presented the first instance in which an owner attempted to base a challenge to a police search on the proclamation’s literal meaning, the Court balked and hastened to clarify that not all intrusions required a warrant. In a terse opinion, Justice Holmes dismissed the claim that, in order to examine and obtain a jug containing moonshine whiskey located on private land but outside the house, the police required a warrant. Justice Holmes simply noted that “[t]he distinction between [open fields] and the house is as old as the common law.” Although an intrusion into the home required a warrant, an intrusion into “open fields”—where the jug was found—did not.

This open fields doctrine (covering spaces that need neither be “open” nor “fields”) has been repeatedly reaffirmed. To isolate the privately-owned spaces where, unlike in those open fields, police intrusions are regulated, the Court developed the concept of “curtilage.” The curtilage is “the land immediately surrounding and associated with the home.” The government’s entrance into that specific area within the owner’s land, unlike its entrance into the other area within the owner’s land—the open fields—amounts to an intrusion requiring a warrant. Although the distinction between curtilage and open fields might appear clear, the Court has refused to provide a definitive denotation of the dividing-line. Instead, it has urged reliance on a multi-factor test: the area’s proximity to the home, its

123 See id.
125 1 JOHN WESLEY HALL, *SEARCH & SEIZURE* § 2.4(a) (5th ed. 2013).
126 See *Olmstead v. United States*, 277 U.S. 438, 466 (1928) (“Neither the cases we have cited nor any of the many federal decisions brought to our attention hold the Fourth Amendment to have been violated . . . unless there has been . . . an actual physical invasion of [the defendant’s] house ‘or curtilage’. . . .”).
127 *Oliver*, 466 U.S. at 180.
inclusion within an enclosure, steps taken to protect the area from public view, and its use by residents.\textsuperscript{128}

This Fourth Amendment jurisprudence respecting searches explicitly relies, as Justice Scalia stressed, on a “traditional property-based understanding.”\textsuperscript{129} Yet it rebuts the traditional theories of property described in Part I. For those unitary theories, there can be no difference between the owner’s rights on one part of her land and her rights on another part of the land. They view property as a unitary spatial category. For American law, however, the difference between different portions of the land—open fields versus curtilage—is the key component of the doctrine regulating the government’s ability to enter an owner’s land. In the open fields portion of the private owner’s land, even when the owner places “No Trespassing” signs and installs a locked gate at the entrance, the government’s entry would not count as an intrusion.\textsuperscript{130} In the curtilage, on the other hand, even in the absence of any of these precautions, the police’s entrance will amount to an intrusion.\textsuperscript{131} The home forms the “core” of that latter, protected, area,\textsuperscript{132} and certain areas immediately adjacent to the home enjoy some, though perhaps not identical,\textsuperscript{133} protections. The definition of those areas—collectively forming the home’s curtilage—is fluid and dependent on the land’s location, conditions, and use. As commentators conclude, the end result is that, for purposes of protections from police searches, some trespasses count more

\textsuperscript{128} United States v. Dunn, 480 U.S. 294, 301 (1987).
\textsuperscript{129} Florida v. Jardines, 569 U.S. 1, 11 (2013).
\textsuperscript{130} See Oliver, 466 U.S. at 173, 180–81 (rejecting a case-by-case approach because, “[u]nder this approach, police officers would have to guess before every search whether landowners had erected fences sufficiently high, posted a sufficient number of warning signs, or located contraband in an area sufficiently secluded to establish a right of privacy”).
\textsuperscript{131} See Silverman v. United States, 365 U.S. 505, 511–12 (1961). The Court in Silverman stated:

\begin{quote}
Here, by contrast, the officers overheard the petitioners’ conversations only by usurping part of the petitioners’ house or office—a heating system which was an integral part of the premises occupied by the petitioners, a usurpation that was effected without their knowledge and without their consent. In these circumstances we need not pause to consider whether or not there was a technical trespass under the local property law relating to party walls. . . . This Court has never held that a federal officer may without warrant and without consent physically entrench into a man’s office or home, there secretly observe or listen, and relate at the man’s subsequent criminal trial what was seen or heard.
\end{quote}

\textit{Id.}

\textsuperscript{132} See id. at 511.
\textsuperscript{133} See, e.g., Florida v. Riley, 488 U.S. 445, 449 (1989) (holding that police officers need not avert their eyes, and therefore, observable elements of the curtilage may be less protected than the home).
than others. Trespasses to the home—the core—are not identical to trespasses to the property’s edges, which are not so “intimately linked to” the core, “both physically and psychologically.”

B. The Appeal of the Edges Concept of Property

Why does the law, through its trespass laws, protect some areas of privately-owned land more than others? Why is the government allowed to force an owner to permit airplanes on her property at certain altitudes as opposed to others? Why does the police need a warrant only when entering specific parts of the owner’s land? Why, in other words, despite the supposed unitary nature of property that the theories reviewed in Part I advance, does the law draw a distinction between different areas of the owned land—between a core, meriting stronger protections from outsiders, and edges in which those same outsiders enjoy some access rights?

In this Section, we review the reasons why the law denies the unitary property theory. We thereby present the rationale undergirding the law’s edges property theory. We identify three groups of such reasons: normative, empirical, and administrative. The normative reason relates to the values that the legal recognition of property seeks to promote. The empirical reason relates to individuals’ attitude towards, and reliance on, their property holdings. Finally, the administrative reason relates to the ease of property rights’ legal administration.

1. The Normative Basis for the Edges Concept

The law recognizes property rights in order to promote certain normative values. The two values normally associated with property and its concomitant right to exclude are efficient development of land and privacy. Without a private property right to land, permitting the owner to exclude all others, individuals will have little incentive to develop land because they

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134 Kugler & Rousse, supra note 121, at 54.
136 See infra notes 140–187 and accompanying text.
137 See infra notes 140–150 and accompanying text.
138 See infra notes 151–174 and accompanying text.
139 See infra notes 175–187 and accompanying text.
will fear that others will be able to reap the fruits of any development.\textsuperscript{141} Similarly, by establishing property rights from which others can be kept out, the law bestows on individuals a realm of autonomy where they can lead their lives as they see fit.\textsuperscript{142} The law defines and then protects property rights in accordance with their ability to serve these two values. As we will now demonstrate, protection of the property’s core is much more vital for the advancement of efficient development and privacy than the protection of its edges—as realized by the lawmakers designing the laws of trespass, aerial navigation, and police searches.

The need to distinguish core from edges when considering property’s function in facilitating efficient land development is the normative grounding of the aerial navigation doctrine. In \textit{Causby}, the Court insisted on the owner’s strong protection from public intrusions into her realm—but only as far as her structures and their immediate reaches were concerned. The reason, Justice Douglas explained, is that there, and only there, control is necessary for an owner to be able to develop her land—development that is socially beneficial.\textsuperscript{143} The farther the contested airspace is located from the property’s core, the private owner’s ability to develop it herself—and thus, to chart the best economic course for it—decreases. At some physical point, as the space draws closer to the public realm or to the property of others, the public becomes a better arbiter of the space’s best uses. Hence, high altitudes are designated a “public highway.”\textsuperscript{144} An edges solution accommodates a reality whereby a public use of the far aerial reaches of the owner’s property should be more efficient than any decision the owner herself makes respecting its use. Under that solution the owner remains the formal owner of that high-altitude space (and hence, the public may not erect floating structures there) but he or she is subject to a public easement (and hence cannot block travel there).

Promotion of the normative value of privacy explains the use of the concept of “curtilage” in the police search cases. The area within the own-

\textsuperscript{141} See Garrett Hardin, \textit{The Tragedy of the Commons}, 162 SCI. 1243, 1244 (1968), http://pages.mtu.edu/~asmayer/rural_sustain/governance/Hardin%201968.pdf [https://perma.cc/7TBP-CWWU].

\textsuperscript{142} See MARGARET JANE RADIN, \textit{REINTERPRETING PROPERTY} 57 (1993) (“The liberty rationale can be bent into a privacy rationale by considering the limitations on liberty set by the presence and activities of other people. The argument would be that people do not have sufficient liberty unless they have some realm shut off from the interference of others.”).

\textsuperscript{143} See \textit{Causby}, 328 U.S. at 264 (“[I]t is obvious that if the landowner is to have full enjoyment of the land, he must have exclusive control of the immediate reaches of the enveloping atmosphere. Otherwise buildings could not be erected, trees could not be planted, and even fences could not be run.”).

\textsuperscript{144} Id. at 261, 264.
er’s land that ought to be protected from warrantless police searches—the curtilage—was characterized by the Court as “the area to which extends the intimate activity associated with ‘the sanctity of a man’s home and the privacies of life.’”145 Other areas, those covered by the open fields doctrine, conversely, “do not provide the setting for those intimate activities that the [Fourth] Amendment is intended to shelter from government interference or surveillance.”146 That latter area lies in between the core of the owner’s private space and the public space (the street, for example). Due to this fact, the owner does not, and often simply cannot, engage there in intimate activities;147 the proximity to the public space effectively precludes that option.148 The public interest in promoting effective policing (necessary for public safety) hence trumps the private interest in privacy in those areas, an interest which could hardly be meaningfully served there to begin with. For privacy purposes, the area is, quite literally, an edges area, and the law creates an edges regime for it: the owner controls the land, but the police are legally allowed to enter—even without the owner’s permission or a warrant.

The aerial navigation doctrine and the police searches doctrine share a normative intuition. Property rights are set in order to promote certain social values: efficient land use and privacy. There is no reason to assume that a legal regime that empowers a private owner would serve these values in an identical fashion and to an equal extent throughout the land the owner holds.149 Quite the opposite, common sense dictates that, in most circumstances, as the relevant privately-owned space draws closer to the public area, the capacity of the owner’s control over it to promote efficient decision-making or that owner’s privacy proportionally decreases.150 The insights embodied in the aerial navigation and police search cases are thus not limited to those specific contexts; they provide the normative grounds for the law’s general rejection of the unitary property approach. They explain the law’s embrace of the edges approach—an approach that affords the owner decreased rights of control over her property’s edges.

145 Oliver, 466 U.S. at 180.
146 Id. at 179.
147 Id.; see RICHARD POSNER, THE ECONOMICS OF JUSTICE 314 n.8 (1981) (noting that “the invasion of a property interest is not a sufficient condition to find an invasion of privacy”).
148 See Orin S. Kerr, Four Models of Fourth Amendment Protection, 60 STAN. L. REV. 503, 508–09 (2007) (explaining that protection is only granted “when the odds are very high that others will not successfully pry into [the owner’s] affairs”).
149 Similarly, commentators note that some properties should enjoy more protection than others and that the determination should hinge on the properties’ respective natures—and perhaps even their owners’ identities. E.g., Underkuffer, supra note 76, at 375.
2. The Empirical Basis for the Edges Concept

The protection of property rights, perhaps more so than other elements of private law, draws not only on normative values, but also on social beliefs and expectations. From Blackstone’s oft-repeated catchphrase on the popular cachet of the right of property, to more recent scholarly explorations, commentators have long noted how deeply ingrained in laypeople’s minds the concept of private property is. The law often follows these expectations respecting property protections so as not to fall out of line with public perceptions—an eventuality undesirable for an array of reasons.

As we will explain now, these public expectations about property that inform the law do not align with a unitary property view. Although laypeople generally believe in the strength of their and their neighbors’ property rights, they do not necessarily believe that all privately-owned spaces enjoy the same strong protections.

The reason that the examples provided in this Article’s Introduction probably strike most readers as intuitive is that they are in line with the average person’s expectations. We all tend to assume that an owner has greater obligations to the public with respect to a tree on his or her property if that

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151 See Thomas W. Merrill & Henry E. Smith, The Morality of Property, 48 WM. & MARY L. REV. 1849, 1850–51 (2007) (“Rules making nearness and physical control the criteria for possession have a psychological basis, and the convention of respecting possession stems from people’s mutual expectations that they will respect the right to control these things.”).

152 See 2 WILLIAM BLACKSTONE, COMMENTARIES *2 (“[N]othing which so generally strikes the imagination, and engages the affections of mankind, as the right of property.”).


154 Many property law doctrines give voice to individuals’ varying expectations respecting owners’ powers. One example of such varying expectations is custom. See, e.g., Oregon ex rel. Thompson v. Hay, 462 P.2d 671, 673–75 (Or. 1969) (stating that long-standing public use of beaches established a custom that limited owners’ rights). Additionally, some states presume that use of land of another is permissive. See Jones v. Cullen, No. CX95601705, 1998 WL 811558, at *5 (Minn. Ct. App. Nov. 24, 1998) (explaining that owners often allow others to cross over as a “neighborly gesture” and thus, a use should be considered permitted and not giving rise to a prescriptive easement). Another expectations-grounded rule involves the acquisition of prescriptive rights by or from the public. See Elmer v. Rodgers, 214 A.2d 750, 752 (N.H. 1965) (explaining that “[t]he stabilization of long continued property uses” can serve as justification for a public prescriptive easement). Finally, a key element in the regulatory takings’ test further highlights social expectations molding of owners’ property rights. See, e.g., Penn Cent. Transp. Co. v. New York, 438 U.S. 104, 124 (1978) (setting “distinct investment-backed expectations” as one of the three factors determining whether an unconstitutional taking has occurred).

155 For a general survey of the psychological literature leading to the conclusion that there is no reason to assume that people’s feelings respecting property’s protection are automatically derived from the fact of ownership alone, across all circumstances, see Daphna Lewinsohn-Zamir, What Behavioral Studies Can Teach Jurists About Possession and Vice Versa, in LAW AND ECONOMICS OF POSSESSION 128, 129–31 (Yun-Chien Chang ed., 2015).
tree is close to the public sidewalk; similarly, we all are probably more outraged when the neighbor’s dog relieves itself on the house’s front-door than when it does so on the yard’s hedges.

The law in the three doctrinal fields discussed above is clearly attuned to these common human reactions. The definition that the law employs for the crime of trespass provides a stark illustration. The crime is recognized whenever the trespasser enters the property’s core—say, the residence—without permission. But if the entry is to the property’s outskirts, in some states liability arises only if the entrant was explicitly told to stay out. The law assumes that owners permit entry to their land’s outskirts—or that community members tend to believe that such permission is extended—while entry to the core is presumed to be, as a matter of common understandings, prohibited.

Similarly, in trespass tort claims, courts routinely refuse to order punitive damages for entrances to the property’s outskirts. They only award compensatory damages for actual harm caused by the trespass, which, as previously noted, normally amount in these instances to zero. Courts conceive such entrances as in line with common expectations respecting areas into which the public is invited and refuse to deem them worthy of harsh legal sanctions such as punitive damages. This attitude was perhaps particularly pronounced in the early aerial navigation cases. Even before the Supreme Court redefined the ad coelum doctrine in Causby, courts largely refused to abide by the doctrine, suspecting that claimants were exploiting the gap between black-letter law and common-sense expectations.

The police search cases are often explicitly couched in similar assertions about people’s expectations. As the U.S. Supreme Court explained, the extension of protection against warrantless searches to the house’s curtilage,

156 See supra note 72 and accompanying text.
157 See supra note 73 and accompanying text.
158 See Jon W. Bruce & James W. Ely, Jr., Law of Easements & Licenses § 5:3 (2016 Rev.) (“Th[e] presumption of adverse use does not apply, however, when an easement is claimed over vacant and unenclosed land.”).
159 See supra notes 89–91 and accompanying text.
160 See Thomas v. Harrah’s Vicksburg Corp., 734 So. 2d 312, 321 (Miss. Ct. App. 1999) (holding that plaintiff must prove defendant “acted with actual malice, gross negligence which evidences a willful, wanton or reckless disregard for the safety of others, or committed actual fraud” to receive punitive damages); Shiffman v. Empire Blue Cross & Blue Shield, 681 N.Y.S.2d 511, 512 (App. Div. 1998) (finding no punitive damages available when reporters gain entrance fraudulently because entry was not motivated by malice).
161 Banner, supra note 111, at 259–60.
but not to the open fields, was connected to owners’ expectations. Owners expect privacy in their homes and in those homes’ immediate surroundings, but generally not outside of those surroundings. The multi-factor test that the Court developed through its jurisprudence to assess whether an area is part of the protected curtilage was explicitly designed to determine how far the reasonable expectation of privacy extends outside the home. In all Fourth Amendment jurisprudence, reasonable expectations are the guiding-light. Thus, for example, in 1988, in *California v. Greenwood*, the Court held that the police were allowed to sift through trash bags left in front of the house because the owner could not expect privacy in items he discarded; even if the specific owner held a subjective expectation of such privacy, the Court found that society did not share such an expectation of privacy in one’s curbside trash.

In these and other cases, courts base their decisions on what they deem to be individuals’ expectations—holding that individuals do not expect full protection of private entitlements outside of the property’s spatial core. Of course, courts often resort to untested assumptions in such cases. Recently, however, scholars have begun to empirically appraise these assump-

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164 *See* Ciraolo, 476 U.S. at 213–14 (holding, where police officers flew in a private airplane over property owner’s land and observed marijuana plants growing in property owner’s backyard, that an “expectation that [the owner’s] garden was protected from such observation is unreasonable and is not an expectation that society is prepared to honor”).

165 Dunn, 480 U.S. at 301. The Court in Dunn stated:

> Drawing upon the Court’s own cases and the cumulative experience of the lower courts that have grappled with the task of defining the extent of a home's curtilage, we believe that curtilage questions should be resolved with particular reference to four factors: the proximity of the area claimed to be curtilage to the home, whether the area is included within an enclosure surrounding the home, the nature of the uses to which the area is put, and the steps taken by the resident to protect the area from observation by people passing by.

*Id.*

166 *See, e.g.*, *Katz*, 389 U.S. at 361 (Harlan, J., concurring) (stating that police conduct amounts to a search when “a person [exhibits] an actual (subjective) expectation of privacy and . . . [when] the expectation [is] one that society is prepared to recognize as ‘reasonable’”).

167 *See* California v. Greenwood, 486 U.S. 35, 39 (1988) (“The warrantless search and seizure of the garbage bags left at the curb outside the Greenwood house would violate the Fourth Amendment only if respondents manifested a subjective expectation of privacy in their garbage that society accepts as objectively reasonable.”).

168 *See, e.g.*, *Oliver*, 466 U.S. at 182 n.12 (surmising that the curtilage/fields distinction will be “easily understood from our daily experience”).
Psychological experiments and surveys have, by and large, corroborated the jurisprudence’s assumptions: individuals have varying privacy expectations across the different portions of their property. One recent study finds that individuals’ expectations respecting privacy—specifically, the protection from government and corporate surveillance—is not identical throughout their holdings.\textsuperscript{169} Another experiment found that the intensity of individuals’ objections to governmental taking of property similarly depends on the nature of the property taken and the use to which it is put.\textsuperscript{170} An additional example is a research of gardening practices in Vancouver finding that individuals’ perceptions of private property’s boundaries are complex, inter-subjective, and ambiguous.\textsuperscript{171}

Property rights are set to protect reasonable expectations.\textsuperscript{172} Those expectations do, inarguably, assign a role to the boundary between private and public property. Nonetheless, there is no reason to believe that those expectations—individuals’ expectations respecting the degree of protection afforded to their holdings—are fully binary. Individuals simply do not expect to enjoy full protections everywhere on the private side of a property boundary, and they do not expect to enjoy no protections whatsoever throughout the public side.\textsuperscript{173} Courts never assumed that individuals hold such extreme expectations—and hence, in different fields, courts refused to rely on the unitary

\textsuperscript{169} Examples for these new works on property and psychology include: Daphna Lewinsohn-Zamir, Behavioral Law and Economics of Property Law, in THE OXFORD HANDBOOK OF BEHAVIORAL ECONOMICS AND THE LAW 377, 377 (Eyal Zamir & Doron Teichman eds., 2014) (critically surveying the behavioral law and economics literature on property law, and discussing several areas in which behavioral analysis has made an impact on property law, such as in the characterization of property as either a thing or a bundle of sticks, and gaps in current literature that warrant further de-biasing and research); Paul Babie et al., The Idea of Property: An Introductory Empirical Assessment, 40 HOUSTON J. INT’L L. 797, 797 (2018) (exploring the development of property law and how it became an omnipresent force at controlling things and people); Janice Nadler, The Social Psychology of Property, 14 ANN. REV. L. & SOC. SCI. 367, 368 (2018) (examining “social and moral influences on beliefs about property and the consequences of these beliefs for the legal regulation of property”).

\textsuperscript{170} See Kugler & Rousse, supra note 121, at 8 (finding that the data suggests that people have a permitted “search hierarchy” in their private property and that “people want and expect the government to have more freedom to surveil than commercial parties”).


\textsuperscript{172} See generally Nicholas Blomley, Un-real Estate: Proprietary Space and Public Gardening, 36 ANTIPODE 614 (2004) (showing the complexity of the defensible notion of property in a neo-liberal world through the example of efforts to enlist public participation in a gardening project, or greenway).

\textsuperscript{173} SINGER, supra note 18, at 20.

\textsuperscript{174} The insight is not dissimilar to the hardly-contested moral assumption that a property owner carries duties in accordance with what he or she decides to do with that property. See Laura S. Underkuffler, A Moral Theory of Property, 2 TEX. A&M J. PROP. L. 301, 311 (2015).
property theory. The empirical backing for the law’s assumptions in this respect is mounting, further boosting the edges property theory.

3. The Administrative Basis for the Edges Concept

At the end of the day, property law rules, like all legal rules, are tools for settling social disputes. The disputes with which property law is concerned are particularly endemic because almost all social interactions occur against the background of some asset. Consequently, property law potentially opens the door for courts to actively regulate all individual and market activities. In designing property rules, therefore, normative values and social perceptions, like those reviewed in the two preceding sections, cannot be the only factors that lawmakers consider. The administrative costs that the rules generate and courts’ deftness at applying those rules are also determinative. Despite common wisdom, these too necessitate the application of the edges theory.

Courts and scholars often assume that clear-cut rules economize on administrative costs and, by bracketing the discretion of lay, capricious judges, enable market participants to negotiate welfare-enhancing bargains. This assumption advocates reliance on an unequivocal boundary between private and public, and on a legal regime instituting an uncomplicated and constant definition of property rights. Such an approach should serve the goals of administrative economy.

At least, that is the theory; the reality, however, is quite different. Both the aerial navigation and the police searches cases nicely illustrate the fact that, in actuality, the boundary-focused unitary property approach breeds impossible administrative challenges—and is therefore disfavored. A unitary boundary-focused property theory, because it insists on absolute protections for private ownership throughout land and space, thrusts almost all activities—both large and small—into court. Insouciantly dismissing the ad coelum doctrine in Causby, Justice Douglas explained that the unitary,
boundary-based rule it dictates “would subject the operator [of every trans-continental flight] to countless trespass suits. Common sense revolts at the idea.”

Acutely aware of these administrative risks, Justice Black, in his dissent, would have gone further to facilitate aviation, by denying landowners compensation even for low altitude flights. Any recourse to unitary, boundary-based concepts will, he reckoned, force courts—which do not possess the requisite “techniques or the personnel”—to intrude on Congress’s efforts to make legislative adjustments to accommodate a new technology’s growth.

A similar concern with the administrative costs of heightened judicial interference, as necessitated by the rigid unitary property conception, animates some of the police searches jurisprudence. The open fields doctrine is designed specifically to be easily administrable by law enforcement and to reduce the need for judicial involvement. It is premised on the notion that it is difficult to completely seal off open spaces from public view. Courts find it wasteful to insist on judicial regulation when the individual owner, by leaving a space open to external observers, herself has assumed the risk of surveillance.

The same idea forms the backbone of trespass jurisprudence—even if courts are often not as explicit in discussing it there as they are in the aerial navigation and police search cases. Trespass’s actual, as opposed to formal, legal doctrine concludes that the right to exclude is vital, but providing owners with an incentive to litigate every minimal intrusion into their land—say, the dog relieving itself—would be senseless.

The unitary property view, in its reliance on a clearly defined boundary and a binary distinction between the owner’s space and others’ space, is

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181 Causby, 328 U.S. at 261.
182 Id. at 274–75.
183 See Colb, supra note 163, at 124–25 (noting that because it “is normal for passersby, including police officers, to look at us momentarily[,] . . . . [r]equiring police to look away when everyone else may observe would accordingly add little to our privacy”; therefore, “the Court has defined a ‘reasonable expectation of privacy’ by reference to the privacy that one might legitimately expect to have from other private actors, independent of any state surveillance”).
184 See Oliver, 466 U.S. at 181 (“Nor would a case-by-case approach provide a workable accommodation . . . . Under this approach, police officers would have to guess before every search whether landowners had erected fences sufficiently high, posted a sufficient number of warning signs, or located contraband in an area sufficiently secluded to establish a right of privacy.”).
185 See United States v. Fields, 113 F.3d 313, 321 (2d Cir. 1997) (finding no expectation of privacy where “defendants conducted illegal activities in plain view of a bedroom window facing into the side yard, a common area accessible to the other tenants in the multi-family apartment building”); United States v. York, 895 F.2d 1026, 1029 (5th Cir. 1990) (noting that “occupants who leave window curtains or blinds open expose themselves to the public’s scrutiny” and that “police may look into that opening from any point in a public thoroughfare or sidewalk without engaging in a fourth amendment search”).
186 See MERRILL & SMITH, supra note 112, at 9.
trumpeted as administratively optimal. In practice, however, it often adds up to a form of boundary fetishism requiring endless and constant judicial policing.\footnote{See Sterk, \textit{supra} note 98, at 2133 (noting that when a potential user makes unsuccessful attempts to determine a property boundary, strict liability regimes require the user to compensate the owner even when the user did not actually derive any benefit from the use).} Therefore, in many contexts, courts refuse to abide by the unitary view. Instead, they opt for pragmatism: the edges theory of property, which does not require—or even permit—litigation over each and every intrusion into private space. The edges view embodies a practical approach distinguishing intrusions that merit heightened judicial attention—intrusions into private property’s core—from those that do not—intrusions into private property’s edges.

\section{C. Summary: The Law’s Edges Concept of Property}

As we established in Part I, the unitary vision of property appears to reign among scholars of different theoretical persuasions.\footnote{See supra notes 30–67 and accompanying text.} Nevertheless, the law seems—and has always seemed—to abhor this view. The doctrines that perform the most vital functions of property, enabling the owner to exclude others and protecting her from the government, clearly deny the unitary vision. They alter the level of protection bestowed on the owner’s interest in accordance with the spot on the land wherein protection is sought. The owner has a lessened power to exclude from the land and from the air above it, and weaker protection from the police, in areas lying at her property’s edges.

There are good reasons for the law’s choice to adopt this edges approach rather than a unitary property approach. Some areas of the owned asset serve the goals of efficient development and individual privacy better than others. Individuals’ expectations regarding their, and their fellow owners’, rights are not identical throughout the owned land. The administrative costs that the legal system must expend to regulate property relationships might grow unfathomable if disputes in the asset’s outskirts were regulated as forcibly as those occurring at its core. Courts and other lawmakers normally act on these insights. In doing so, they necessarily embrace an edges theory of property.

\section{III. Applications of the Edges Concept: Solutions for Unsettled Areas of Property Law}

Part II showed that, in general, the law does not follow a unitary property conception, but rather prefers—for principled reasons—an edges idea.
Still, the ubiquity of the unitary property concept of property rights—as seen in Part I—exhorts an influence on the law. There are exceptional cases in which courts resort to such simplistic, unitary ideas. Such rulings—where, for example, a court insists on issuing increased punitive damages for a trespass into the edges of a property—may get much traction among observers.\textsuperscript{189} Yet such cases are almost universally criticized, even by adherents of unitary, indeed essentialist, property theories,\textsuperscript{190} and are rarely followed by later courts.\textsuperscript{191} Because such rulings are unrepresentative outliers, their importance to actual law is rather limited.\textsuperscript{192}

Much more impactful—albeit in a harmful way—are lawmakers’ turns to the unitary theory, not in individual, exceptional cases, but when devising the general regime for addressing certain categories of problems in property law. Particularly as new phenomena or technologies appear on the edges of property, judges, legislators, and regulators are prone to fall back on the simplistic, boundary-based understanding of property rights.

Property law, more than other legal fields, struggles mightily to accommodate change.\textsuperscript{193} Because property law is defined as the protection of existing entitlements and is thus firmly attached to notions of stability, lawmakers often stumble when confronted with a real-world change that questions existing property practices.\textsuperscript{194} In attempting to address the legal challenges presented by such new occurrences, lawmakers sometimes heedlessly fall back on a unitary concept of private property. Often, this practice

\textsuperscript{189} See, e.g., Jacquie v. Steenberg Homes, Inc., 563 N.W.2d 154, 156 (Wis. 1997) (holding where, despite landowners’ refusal to grant permission, company plowed path through owners’ snow-covered field to deliver mobile home to third party via that path, that punitive damages may also be awarded by a jury when nominal damages are also awarded for intentional trespass to land). The Jacquie case is a casebook staple in a law school course on property. See, e.g., MERRILL & SMITH, supra note 112, at 1; SINGER ET AL., supra note 176, at 38.

\textsuperscript{190} See, e.g., Claeys, supra note 150, at 423 (“[T]he court’s justification for this holding was less than satisfying.”); Katz, supra note 82, at 303 (contending that “Jacquie was most likely wrongly decided”).

\textsuperscript{191} See RESTATEMENT (SECOND) OF TORTS § 195(1) (AM. LAW INST. 1965) (“A traveler on a public highway who reasonably believes that such highway is impassable, is privileged, when he reasonably believes it to be necessary in order to continue his journey, to enter, to a reasonable extent and in a reasonable manner, upon neighboring land in the possession of another . . . .”). The cases upon which the Restatement relies are “very much like the Jacquie case on their facts, even to the point of finding an obstruction in snowdrifts.” John Makdisi, Uncaring Justice: Why Jacquie v. Steenberg Homes Was Wrongly Decided, 51 J. CATH. LEGAL STUD. 111, 126 (2012).

\textsuperscript{192} Another example is the Loretto decision, discussed in the Introduction. See supra notes 13–18 and accompanying text (discussing Loretto v. Teleprompter Manhattan CATV Corp., 458 U.S. 419 (1982)).

\textsuperscript{193} Underkuffer, supra note 65, at 2035–37.

\textsuperscript{194} See id. at 2016 (“It is the inability of the Court to intellectually reconcile the incompatibility of the ideas of property and change—indeed, to acknowledge the problem of property and change—that lies at the core of its incoherent takings jurisprudence.”).
breeds detrimental results that could otherwise be avoided through the application of the more rational edges theory.

In order to illustrate the utility of the edges theory which this Article advocates, in this Part we review three contemporary instances where courts’ and legislatures’ responses to technological and geophysical change have been handicapped by an attachment to, and over-reliance on, the unitary property view. Specifically, Section A examines lead poisoning and ownership of water lines, Section B examines drones and rights in the low-airspace, and Section C examines climate change and rights in the shoreline. With respect to each, we first explain how the unitary approach enshrines a binary public-private boundary test that has complicated—indeed, at times, even actively sabotaged—efforts to tackle the relevant challenge. We then argue that this Article’s competing, more nuanced, edges approach can greatly aid in handling those daunting, novel real-world problems.

A. Water Lines and Lead Poisoning

Most Americans live in localities where drinking water is provided by a public water system (“PWS”). Indeed, most property owners have no realistic alternative to using a PWS for drinking water. The service lines that connect the PWS to the owner’s home are, we will argue, a quintessential private property edge. Before making this argument, however, we doc-

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195 See infra notes 199–310 and accompanying text.
196 See infra notes 199–253 and accompanying text.
197 See infra notes 254–280 and accompanying text.
198 See infra notes 281–310 and accompanying text.
200 Aside from cost considerations, zoning and other local regulatory restrictions make private drinking-wells infeasible outside rural areas. The FHA also mandates a connection public water system (“PWS”) where a connection is available. Joe Wallace, FHA Loan Minimum Property Requirements in HUD 4000.1: Water Supply, Wells, FHA NEWS & VIEWS (Nov. 23, 2015), https://www.fhanewsblog.com/2015/11/fha-loan-minimum-property-requirements-in-hud-4000-1-water-supply-wells/ [https://perma.cc/5MJ9-HXCA]. See generally U.S. DEP’T OF HOUSING & URBAN DEV., FHA SINGLE FAMILY HOUSING POLICY HANDBOOK, HUD 4000.1 (2016) (providing comprehensive information of FHA Single Family Housing policies). Courts have upheld local ordinances mandating connections to a PWS even when residents have wells and there is no evidence of water unsafety. See, e.g., District of Columbia v. Brooke, 214 U.S. 138, 148–51 (1909) (holding that D.C. could create a drainage system and that requiring residents, even those whose houses were unoccupied at the time, to be included in such did not constitute an unconstitutional taking); Stern v. Halligan, 158 F.3d 729, 730–31, 732 (3d Cir. 1998) (holding that township ordinance requiring residents to hook up to the public water supply and to discontinue use of well water in home was based on rational basis to protect public safety and that such a requirement was not a compensable taking).
ument the reigning approach to rights in the water lines—which defines those rights through recourse to the unitary property view and the private/public boundary—and the way in which this approach jeopardizes attempts to battle lead poisoning.

1. The Unitary Approach and Its Effects

As physical and stable things that cross the boundary of an owner’s private property at a defined point, water lines connecting individual properties to the PWS’s main line (which runs under the center of the street) appear particularly congenial for regulation under the formal private/public property boundary approach. Localities that own and operate PWSs have accordingly repeatedly announced their dedication to this framework.201 The water main line, they claim, is public property, owned by the government holding title to the surface street; the lateral service line attaching an individual building to the main line is, localities further claim, the private property of the owner of the individual building.202

This formal division of public and private ownership rights in water lines is intuitively appealing, and for more than a century, there was little reason to question its coherence. Modern scientific discoveries, however, have shown that certain water-related phenomena refuse to abide by this unitary ownership approach to the lines carrying water. Moreover, the legal attachment to that unitary approach undercuts the ability to confront the problem—namely, lead poisoning—that those phenomena generate.

Lead has been a building block of human civilization for millennia.203 Going back to Ancient Roman times, lead pipes were used to deliver spring water to homes,204 as well as to line channels of public aqueducts.205 The


material holds many advantages: it melts at a relatively low temperature and is extremely malleable, so it is easily cast, shaped and joined; it is abundantly available (lead can be extracted from ore); and its durability surpasses that of most other metals. At the same time, some always suspected that lead could be poisonous. Benjamin Franklin complained that the “mischievous Effect” of lead had been known for years yet ignored, demonstrating “how long a useful Truth maybe known . . . before it is generally receiv’d and practis’d on.”

The “useful Truth” about lead was largely ignored during the construction of water supply systems in the two centuries following Franklin’s death. The installation of lead pipes in the United States on a major scale began in the late 1800s. By the dawn of the twentieth century, over seventy percent of cities with populations greater than thirty thousand utilized water lines made of lead. The use probably peaked in the 1930s and gradually decreased thereafter. Still, professional standards continued to recognize lead as a suitable material for water pipes, and city ordinances in major cities—such as New York and Boston—persisted in approving or even encouraging its use. Until Congress banned lead pipes in 1986, a Chicago ordinance actually mandated lead piping. Consequently, today, as many as three hundred thousand households in Chicago receive drinking water through lead service lines. Across the country, there are over six

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207 *See Lead Poisoning and Rome*, supra note 205 (noting that Vitruvius wrote, during the time of Emperor Augustus, that “there can be no doubt that [lead] itself cannot be a wholesome body”).
208 Letter from Benjamin Franklin to Benjamin Vaughan (July 31, 1786), in 7 NEW SOLUTIONS 80 (1998).
210 Richard Rabin, The Lead Industry and Lead Water Pipes, 98 AM. J. PUB. HEALTH 1584, 1585 (2008); see TROESKEN, supra note 209, at 11 tbl.1.1 (providing data about major American cities with lead pipes in 1900).
211 Rabin, supra note 210, at 1589–90.
212 Id. at 1590.
million lead service lines, and eighteen million people still receive water from a water supplier known to be in violation of EPA lead standards. Unsurprisingly, many of these lead service lines are located in low-income neighborhoods. 

The large number of lead lines might not have been of great concern had Franklin’s “useful Truth” not been firmly established by scientific findings over the past four decades, to the degree that it is now unquestionably “generally receiv’d.” Since the 1970s, the Centers for Disease Control and Prevention (CDC) has repeatedly lowered its threshold for “safe” exposure to lead, and today public health experts and federal agencies agree that there is no such safe level. Even low levels of lead in drinking water pose an untenable risk to pregnant women, infants, and children. As long as pipes are made of lead, this risk is unavoidable because lead leaching from pipes is always possible. Accordingly, experts concur that the only way to eliminate lead poisoning risk is to replace all lead water lines.

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216 Id. at 5. Moreover, it is widely acknowledged that localities under-report violations, so the figure understates lead exposure’s extent. David A. Dana, Escaping the Abdication Trap When Cooperative Federalism Fails: Legal Reform After Flint, 44 FORDHAM URB. L.J. 1329, 1337 (2017).


220 Rabin, supra note 210, at 1586.

221 Infusing corrosion control chemicals into the water can lessen the risk of lead leaching, but it cannot eliminate that risk. Dana, supra note 216, at 1344. Furthermore, as recent events in Flint, Michigan, showed, control management is subject to human error. See id. at 1341–42 (discussing the detrimental effects of treating water quality as a solely local, rather than federal, concern in Flint, Michigan). Moreover, storm damage and road repair can result in lead discharges into water even when chemical treatment to inhibit corrosion is employed. See, e.g., Jennifer Larino, New Orleans Road Work Could Raise Lead Levels in Your Water, NEW ORLEANS TIMES-PICAYUNE (July 12, 2017), https://www.nola.com/environment/index.ssf/2017/07/lead_water_new_orleans_road_wo.html [https://perma.cc/7Q29-FJ7T].

222 NRDC REPORT, supra note 215, at 6; see 40 C.F.R. § 141.84(b)(1) (2007) (codifying the EPA’s Lead & Copper Rule (“LCR”)).
Unfortunately, water line replacement is expensive: nationally, estimates run into the hundreds of billions of dollars.223 Who should foot this bill? The formal, unitary ownership regime provides an easy answer: the water main line is owned by the local government, and thus is to be replaced by the public. Conversely, the lateral service line connecting the main line to the private owner’s home and running (in large part) beneath the owner’s land is owned by the homeowner and should thus be replaced by him or her.224 The EPA’s Lead and Copper Rule from 2000 reflects this approach, extending a PWS’s responsibility to replace lead pipes only to lines that the PWS owns.225 The financial responsibilities, according to the EPA’s rule, are thus neatly divided along the boundary between private and public property.226

For their part, localities often maintain that they are prohibited from replacing the lateral lines, which they deem private.227 They contend that

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225 The original version of EPA’s LCR, adopted in 1991, provided that a PWS was responsible for replacement of lead service lines that it “controls,” and stated that evidence of control included “authority to set standards for construction, repair, or maintenance of the line, authority to replace, repair, or maintain the service line, or ownership of the service line.” 40 C.F.R. § 141.84(d)-(e) (1991). “Control” was thus an amorphous concept. But, the rule set very lax standards for lead testing and sampling and, in practice, did not compel local authorities to replace even lead lines they indisputably controlled. When EPA revised the rule, strengthening its testing requirements, localities argued—and EPA agreed—that a “control”-based rule would foster disputes and delays. See EPA, LEAD AND COPPER RULE REVISIONS WHITE PAPER 9 (Oct. 2016), https://www.epa.gov/sites/production/files/2016-10/documents/508_lcr_revisions_white_paper_final.10.26.16.pdf [https://perma.cc/XTK3-GYZZ] [hereinafter LEAD RULE REVISIONS WHITE PAPER]. But see Jessica Pupovac, Where Lead Lurks and Why Even Small Amounts Matter, NPR (Aug. 12, 2016), https://www.npr.org/sections/health-shots/2016/08/12/483079525/where-lead-lurks-and-why-even-small-amounts-matter [https://perma.cc/645Z-XLF6] (discussing continuing criticisms of the EPA rule).


227 Localities base this position on two arguments. First, lines are appurtenant to private structures and thereby take on private status, like antennas or attached garages. Second, historically in many places, landowners were legally required to pay for extending a line from the water main to
state constitutional and statutory law provides that utilities may expend funds only for a public purpose. 228 It follows, in localities’ view, that they are thus barred from spending money to replace lines on the private side of the public/private ownership divide. 229

This reliance on a clear formal dividing line may appear rather rational as a matter of abstract law, but as a matter of actual policy, it ends up uncommonly irrational. Overwhelmingly, the invocation of a formal dividing line has had two results, both undesirable. First, many localities with lead main and lateral lines have avoided replacing any lines. 230 In these localities, the risk of lead exposure has not been abated. Second, in other localities, such as Chicago, 231 and Washington, D.C., 232 the locality has undertaken the replacement of main lines but has refused to replace lateral lines unless the private homeowner pays for such themselves.

Homeowners, unfortunately, have funded very few lateral line replacements under this approach. 233 This might be due to the fact that homeowners do not understand the threat lead pipes pose 234 or because they are unable to afford the thousands of dollars necessary for lateral line replace-

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228 See 71 AM. JUR. 2D STATE AND LOCAL TAXATION § 36 (2018) (“Constitutional basis of requirement of public purpose.”).  
229 See, e.g., Tiffany Stecker, Federal Law Makes Lead-Pipe Removal Anything but a Cinch, E&E NEWS (July 7, 2016), https://www.eenews.net/stories/1060039790 [https://perma.cc/8KCP-PATJ] (“There was a very clear legal assessment done in that DC Water could not use public funds to replace the service line on the private side,” quoting the then-director of the D.C. Department of the Environment at the time when the city experienced a lead water crisis).  
231 See Hawthorne & Matuszak, supra note 213 (noting that, although “Chicago has more lead service lines than any other city... administration officials say it is up to individual homeowners to decide whether it is worth replacing the[ir lateral] pipes at their own expense”).  
233 For example, despite a major, multi-year campaign by Washington, D.C., to convince owners to finance replacement of the service lines, only twenty-five percent agreed. Stecker, supra note 229.  
234 See LEAD RULE REVISIONS WHITE PAPER, supra note 225, at 9 (recommending “[t]argeted outreach to customers with lean service lines (“LSL”), with information about the risks of lead exposure”)
Regardless of the cause, the EPA was incorrect when it predicted that homeowners would readily fund private line replacements. The outcome in many places is, accordingly, partial replacement (in other words, replacement of the main but not of lateral lines)—an unpropitious strategy. No credible expert or professional association maintains that partial replacement of lead lines substantially reduces lead risks. Moreover, partial line replacement often discharges lead particles and, as a result, actually raises lead levels at the water tap at least temporarily. A group of homeowners in Chicago recently sued the city, plausibly alleging that Chicago’s partial replacement was exposing residents to more lead than ever before.

2. The Edges Approach

The legal attachment to a unitary worldview neatly dividing private from public ownership rights along the water line is thus inadequate for solving the problems that materialize along that line. An acknowledgment of the mingling of public and private interests on the lateral water line—precipitating an edges-style legal solution—is therefore necessary.

Such an edges-based approach to tackling the problem of lead would also be much more in line with the actual regime the law has applied to water lines ever since their introduction. Historically, when defining rights and duties in water lines, the law never truly focused on the private/public boundary that localities and regulators now sanctify. Rather, in practice as opposed to rhetoric, the law identified the water line as, to use this Article’s novel term, an edge, where public and private rights (and duties) co-exist.

First, the law has sometimes ignored formal property boundaries in its characterization scheme of the portion of the lateral line running between

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235 Id.
236 Stecker, supra note 229.
the boundary of the owner’s private land and the center of the street. As previously noted, local ordinances generally characterize the line situated below the owner’s land as private. Conversely, the main line situated below the center of the street is public. In between, however, the water line connecting the individual home to the main, generally runs underneath a public space: the sidewalk area. Based on the formal private/public boundary and a unitary approach, this portion of the line, like the main, must be labelled public. Yet the public does not benefit from this portion of the service line: unlike the main, its sole beneficiary is the private owner. Thus, some localities have always conceived it as private.

Second, and similarly, the lateral service line located underneath the private owner’s property, though formally privately-owned, was never treated by lawmakers as quite the equivalent of the owner’s private home. The private owner does not enjoy much freedom with respect to “her” service line. Laws do not allow her to interfere with it without public approval; all work must be conducted by the public utility company. Needless to say, the owner is not subject to such debilitating regulation elsewhere on her land, say in her home. Furthermore, the owner does not even enjoy the freedom to simply choose not to have the lateral line. Owners are required to

240 A few localities, however, do appear to mark the private/public divide at the actual surface property line. See LEAD RULE REVISIONS WHITE PAPER, supra note 225, at 3, 7, 9 (“LSLs are often partially or totally owned by private homeowners. Under the current LCR, public water systems are responsible for replacement of LSL or the portion of the LSL it owns. This is typically the portion of the line from the water main to the property line.”); see also, e.g., supra note 224 (discussing Lansing, Michigan, as an example of a city that owned the lateral water lines below the surface of homeowners’ property edges, which allowed the city to pay for the complete lead line replacement).


242 In Milwaukee, for example, the locality has “virtually all of the control over the service line[,] including “the use of certain materials and installation practices[,] . . . the manner in which the line must be maintained[,] . . . the quality of water delivered through the lines[, and ] . . . the ultimate power to shut off water service to the line.” Memorandum from Jennifer Chavez, supra note 227, at 9.
allow the locality to lay the lines, they are forced to pay for them, and, when connecting their homes to the lines, they must abide by the PWS’s construction criteria. Courts across the nation—and even the U.S. Supreme Court—have routinely upheld such requirements. These cases acknowledge the great power that the public exercises over the water delivery system to private homes, fully disregarding the unitary vision of property that would equate the private ownership status of the lateral line with that of the home itself.

Therefore, despite the formalistic claims discussed in the previous Subsection, the legal treatment of lateral water lines does not truly perceive the boundary between private and public property as determinative in setting rights and duties associated with such lines. The public side of the boundary is not totally public, and the private side is not totally private. Because the law treats the lateral service line as an edge of private property, with coexisting private and public elements, the popular solution that localities currently use to address the lead problem in such lines—designating replacement as a purely private obligation—is not only unsatisfactory, but also unwarranted given the logic of existing law. Because lateral water lines not only should be, but are, private property edges, local governments ought to recognize the replacement of such lines as a shared responsibility between the private owner and the public.

Models for this approach are found in Pittsburgh, Pennsylvania, as well as in Madison and Milwaukee, Wisconsin. Following the lead poisoning crisis in Flint, Michigan, the Pennsylvania Legislature endorsed a hybrid, public-private, edges approach, that empowers municipalities to raise water rates to cover lateral line replacement but specifies that the lines remain private. Following the statute’s enactment, Pittsburgh established a

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243 See, e.g., District of Columbia v. Brooke, 214 U.S. 138, 147, 150 (1909) (upholding requirement for residents to comply with a District of Columbia statute regulating connection of home to water main and public sewer).

244 See, e.g., Stern v. Halligan, 158 F.3d 729, 734 (3d Cir. 1998) (holding that township ordinance requiring residents to hook up to the public water supply and to discontinue use of well water in home was based on rational basis to protect public safety and that such a requirement was not a compensable taking); Citizens for Personal Water Rights v. Borough of Hughesville, 815 A.2d 15, 16, 22 (Pa. Commw. Ct. 2002) (upholding ordinance that required all owners of improved property to connect to the municipal water system).

program to replace all lead water lines at public expense, with a determination to act quickest in areas where lead risks were gravest.\footnote{Kristina Marusic & Stephen Caruso, \textit{Who Should Be Responsible for Replacing Pittsburgh’s Lead Water Pipes?}, PUB. SOURCE (Mar. 22, 2017), https://www.publicsource.org/who-should-be-responsible-for-replacing-pittsburghs-lead-water-pipes/ [https://perma.cc/5C4L-N6TS].}

Madison, Wisconsin offers an even more appealing model of a cost-sharing edges solution. A 2013 ordinance required the city to replace lateral lines if the homeowner consents to the payment of fifty percent of the cost (in most cases, one thousand to fifteen hundred dollars).\footnote{See MADISON, WIS., CODE § 13.18 (2013), https://www.cityofmadison.com/sites/default/files/city-of-madison/water/documents/MGO%202013%202018.pdf [https://perma.cc/HH6J-T5XD].} Low-income, low-asset, or otherwise distressed homeowners could apply for further reimbursement of any portion of the cost. Therefore, the private share of responsibility for this property edge was, in effect, flexible and needs-based. As a result, all lead lines in Madison were replaced with non-lead lines.\footnote{EPA Looks to Madison as Leader on Lead Pipe Issue, MADISON WATER UTIL. (Jan. 4, 2016), https://www.cityofmadison.com/water/insidemwu/epa-looks-to-madison-as-leader-on-lead-pipe-issue [https://perma.cc/FYM2-HV26].}

Milwaukee attempted to follow this model, but because its program is much less comprehensive in requiring and subsidizing replacement, the rate of lateral line replacement has been slow, generating frustration among activists.\footnote{Mark Johnson et al., \textit{Long Before Milwaukee Lead Poisoning Fallout, Mayor Tom Barrett’s Staff Was Given Warning}, J. SENTINEL (Jan. 19, 2018), https://www.jsonline.com/story/news/local/milwaukee/2018/01/19/long-before-milwaukee-lead-poisoning-fallout-top-mayor-tom-barrett-official-given-warning/1045389001/ [https://perma.cc/3MTL-RNF3].}

The success of these model solutions to the lead lines problem depended on local governments embracing and acting upon the edges view of water lines. Other legal actors could perhaps aid in promoting such solutions by similarly denying the unitary property view in this context. One such actor is the EPA, that can change its 2000 rule to require PWSs to replace lead lines they control in any way, rather than only ones they formally own. An advisory committee recently urged the EPA to act in this fashion.\footnote{ENVTL. PROT. AGENCY, FINAL REPORT OF THE LEAD AND COPPER RULE WORKING GROUP TO THE NATIONAL DRINKING WATER ADVISORY COUNCIL 18 (Aug. 24, 2015), https://www.epa.gov/sites/production/files/2016-01/documents/ndwaclcrwgfinalreportaug2015.pdf [https://perma.cc/WZ5K-4XVE].}

Although the EPA appears hesitant to do so,\footnote{See LEAD RULE REVISIONS WHITE PAPER, supra note 225, at 8 (“There are important legal questions about EPA’s authority to mandate replacement of privately-owned portions of lines and about water systems’ authority under state or local law to require and or pay for such replacement.”).} public interest groups have made similar recommendations.\footnote{See, e.g., Memorandum from Jennifer Chavez, supra note 227, at 1, 10–15 (providing Earthjustice’s recommendation for the City of Milwaukee to take ownership of lateral service
mote effective edges solutions is the judiciary. Courts could facilitate public replacement of lateral lines by declaring them public property for the specific purpose of allocating financial responsibility for their maintenance and treatment. That is, courts should explicitly endorse this Article’s approach by renouncing the unitary property view and instead characterizing lateral water lines as property edges.

This proposed move draws on the three general justifications—normative, empirical, and administrative—that we provided for the edges view in Part II. Given scientific findings with respect to water lines, the only efficient development policy—one of property law’s normative goals—is the expeditious replacement of all lead lines. This eventuality can only be assured through shared responsibility between the individual owner—who is the primary, and most direct, beneficiary of replacement—and the public—which must deal with lead poisoning’s public health hazards.

The edges view also comports with owners’ reasonable expectations. Water lines are not visible structures situated at a lot’s center. They are hidden structures, whose undisclosed presence is mandated by the locality. Most property owners never focus on water lines’ existence upon acquiring their land or thereafter. Even where owners do notice the lateral water lines crossing their property, they reasonably regard them as the equivalents of utility lines (electricity or phone). In American law, such utility lines are owned by the locality or utility company, not the private owner—regardless of where those lines happen to be located.253

Finally, as the unfortunate experiences of Chicago and Washington, D.C., illustrate, from an administrative perspective, acting on the unitary property vision invites contention, confusion, delay, and ultimately litigation over the question of who bears responsibility for lead-related harms. The water line example thus emphasizes the necessity of adopting the edges approach if the dire costs associated with the unitary vision’s boundary fetishism are to be avoided.

lines, a proposal contrary to the City’s ordinance mandating lead line replacement at the partial expense of the landowner).

253 See, e.g., Salvaty v. Falcon Cable Television, 212 Cal. Rptr. 31, 33, 36 (Ct. App. 1985) (holding that cable television company’s installation of wires to telephone pole on owners’ property was within scope of easement and that company did not need owners’ consent for such installation); Henley v. Cont’l Cablevision of St. Louis Cty., Inc., 692 S.W.2d 825, 827 (Mo. Ct. App. 1985) (holding that cable television company was permitted by 1922 easement to enter housing subdivision for installation and maintenance of coaxial cables).
B. Drones and Rights in the Low Airspace

The misleading nature of the unitary property vision as applied to water lines was ignored with little cost until the emergence of new scientific findings about lead poisoning. Similarly, the introduction of new aerial technology is rendering the unitary vision of property rights in the low airspace, heretofore commonplace among lawmakers and observers, increasingly unsustainable. Here too, accordingly, applying the edges view that this Article advocates can solve a seemingly intractable legal problem: the invention and then spread of flying objects—unmanned drones—that can fly very low above others’ private property.

1. The Unitary Approach and Its Effects

As discussed in Part I, in the 1946 Causby decision dealing with airplanes, the U.S. Supreme Court affirmed that owners enjoy protected property rights above the ground, but confined those rights to the surface property’s “immediate reaches.” Although the Court did not precisely define those “immediate reaches,” the Federal Aviation Administration (FAA) has designated the airspace above five hundred feet as navigable airspace subject to full federal control. That space is thus clearly beyond the “immediate reaches” of the ground and not subject to private control in American law. Aircrafts generally fly at five hundred feet or more above the Earth’s surface, except during takeoffs and landings—and public or private airports normally own land or navigation easements near their runways. For decades, therefore, there were no substantial conflicts over rights in the low airspace—and thus no need to explore the ramifications of the unitary property vision which supposedly applied to that specific space.

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254 See generally United States v. Causby, 328 U.S. 256 (1946); supra notes 104–109 and accompanying text (discussing Causby).
255 14 C.F.R. § 91.119(b) (2010).
257 See MERRILL & SMITH, supra note 112, at 89, 142 (arguing that the basic ad-coelum rule had no need to be made precise until airplanes’ invention).
ient circumstance was recently disturbed by the growing popularity of privately-owned drones.

Unmanned aircrafts—drones—have existed for decades, but only over the past ten years did they become objects of mass civilian production—and mass civilian use. They are now accessible and affordable for almost all industries and individual users. As the use of these low-flying vehicles proliferates, the need to assess public rights to enter the low airspace above private property intensifies. The unitary, boundary-focused, approach offers a readily available answer: some determined height should dictate the line between private and public. And although no court has yet addressed the issue, the solutions commentators and several state statutes offer have drawn on this approach.

Scholars have advocated the clear boundary approach whereby surface owners would have a full property right to exclude drones flying at an altitude lower than five hundred feet above their land. Two states have enacted drone-specific statutes reflecting this clear boundary approach. Oregon empowers owners to sue the operator of a drone flying at four hundred feet or less above their land if they had previously notified the operator of their objection to entry. Nevada authorizes a landowner to pursue the operator of a drone flown fewer than 250 feet over her property.

Irrespective of the specific boundary-line delineated, these unitary approaches to the problem are not without their appeal. Most significantly, they provide a neat solution that seemingly draws on established precedents respecting aerial navigation. Still, in the long-run they are unlikely to solve the drone problem; rather, they will exacerbate it—a potentiality which might explain the reluctance of most states and the FAA to endorse such solutions.

258 See Hillary B. Farber, Eyes in the Sky: Constitutional and Regulatory Approaches to Domestic Drone Deployment, 64 SYRACUSE L. REV. 1, 12–14 (2014) (explaining how the rapid growth of the drone industry has made unmanned aerial vehicles “smaller, more sophisticated, and cheaper” for all types of users).

259 In the only case to date directly addressing a private conflict over drones, Boggs v. Meredith, No. 3:16-CV-00006-TBR, 2017 WL 1088093 (E.D. Ky. 2017), a drone was shot down by an angry landowner. The court held that there was no federal jurisdiction, even though the issue of whether the drone was gravelling in federal airspace conceivably could be raised as a defense to a trespass to chattels claim.


261 OR. REV. STAT. ANN. § 837.380(4)–(6) (West 2016).

262 NEV. REV. STAT. ANN. § 493.103 (West 2015).

263 The FAA reads its regulatory jurisdiction as extending well below 500 feet, depending on circumstances. See Huerta v. Pirker, No. CP-217, 2014 WL 8095629, at *8 (N.T.S.B. Mar. 6, 2014)
The clear boundary approach is likely both excessively restrictive and excessively permissive. It would nip the technology in the bud by making drones’ widespread use dependent on obtaining surface owners’ permission. Determining who has surface rights at each and every spot above which a drone is flying, and then negotiating for permission with each holder of such rights, could entail very high transaction costs. Surface owners with no actual objection might nevertheless hold out in order to secure the highest possible payment. Moreover, to the extent the boundary approach would privilege owners to shoot down drones as self-help against trespass, drone operators may understandably find it prudent to refrain completely from flying through the low airspace. The abandonment of drone technology—which these outgrowths of the unitary approach should precipitate—would almost certainly be socially inefficient. Plausible claims abound that drones are to become a major contributor to the economy and public welfare. Drones could breed dramatic improvements in myriad vital fields: from the production of better maps for individual users, utility companies, and first responders, to the delivery of food and goods at greater

(especially order) (noting that, under the FAA’s interpretation, even “a flight in the air, e.g., a paper aircraft, or a toy balsa wood glider, could subject the ‘operator’ to” an FAA enforcement action). The FAA, however, appears less insistent than before that state regulation is flatly preempted even in the low airspace. Still, the question of the outer reach of the FAA’s authority remains unresolved. See Jason Snead, The FAA Is Empowering States to Regulate Drones. Why That’s a Win for Everyone, HERITAGE FOUND. (Dec. 6, 2017), https://www.heritage.org/government-regulation/commentary/the-faa-empowering-states-regulate-drones-why-thats-win-everyone [https://perma.cc/3HLA-R8DN] (discussing the dispute between the FAA and states over whether state regulation of drones is preempted by federal law). In 2015, the California legislature refused to pass a bill that would make any drone overflight that was below 350 feet a trespass. Gregory S. McNeal, California’s Drone Trespass Bill Goes Too Far, FORBES (Aug. 11, 2015), https://www.forbes.com/sites/gregorymcneal/2015/08/11/californias-drone-trespass-bill-goes-too-far/ [https://perma.cc/7UD2-3A48].

264 See Should You Be Allowed to Prevent Drones from Flying Over Your Property? Two Legal Experts Debate Who Has the Right to Decide When and Where Drones Will Fly, WALL ST. J. (May 22, 2016), https://www.wsj.com/articles/should-you-be-allowed-to-prevent-drones-from-flying-over-your-property-1463968981 [https://perma.cc/3L57-FCE7] (providing a debate between two legal schools of thought regarding who should be able to determine where drones can fly, as well as the associated costs and benefits of such determinations).

265 See id.

266 See Froomkin & Colangelo, supra note 260, at 30–35, 56 (suggesting that self-help against trespassing drones should be privileged).

speeds with a decreased environmental footprint,\textsuperscript{268} to the monitoring of crops and the combatting of pest infestations.\textsuperscript{269} Drones could thus revolutionize the economy as profoundly as trains, cars, trucks, and conventional airplanes previously did. Therefore, the unitary approach’s outright exclusion of drones from the low airspace would deprive society of some of the benefits drones otherwise could provide.

Concurrently, the approach’s clear boundary rule may fail to effectively protect surface owners. As commentators and statutes recognize, the main threat that drones pose to owners is the potential interference with privacy through the aerial recording of information found in, and activities taking place on, an owner’s land.\textsuperscript{270} But that threat is not presented by flights in the low airspace alone. Technological advancements have made it exceptionally easy for high-flying drones (as well as manned vehicles) to record detailed information regarding the surface far below.\textsuperscript{271} Under the unitary approach, however, drones are wholly free to employ these advanced—and intrusive—recording devices if they are flying in “public” airspace.

2. The Edges Approach

The boundary-focused unitary approach to property in the low airspace exemplifies the general normative drawback of the unitary property view as identified in Part II.B.: the approach clings to a formalistic property definition in complete defiance of property’s goals in promoting efficient land development and privacy. An alternative edges approach will offer a nuanced, flexible interpretation of both the owner’s and the public’s rights, serving the interests of efficient deployment of a new technology and safeguarding owners’ privacy interests.

An edges approach will also be much more faithful to the \textit{Causby} precedent, which has been setting owners’ expectations in the field for more than seventy years. As previously noted, in distinguishing the owner’s private sphere from the public’s, the Court in \textit{Causby} relied on an inherently fuzzy term: the surface’s “immediate reaches.” The Court further urged a nuisance-like, case-by-case test to determine whether the owner could de-

\begin{footnotesize}
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\item \textsuperscript{268} See, e.g., Jim Lyza, \textit{Could Drones Give Your Package a Sustainable Lift?}, \textsc{GreenBiz} (May 2, 2014), https://www.greenbiz.com/blog/2014/05/02/could-drones-give-your-package-sustainable-lift [https://perma.cc/5UC9-3EW3].
\item \textsuperscript{269} See Saurabh Anand, \textit{Hovering on the Horizon}, 26 \textsc{Air & Space L.} 9, 9–10 (2013).
\item \textsuperscript{270} See Froomkin & Colangelo, supra note 260, at 1, 4, 60 (“Is the fear that a drone may be operated by a paparazzo or a Peeping Tom sufficient grounds to disable or interfere with it?”).
\item \textsuperscript{271} See Farber, supra note 258, at 4, 11–15 (“[D]rones can spy on you from vantage points that homeowners have historically had no reason to fear. In addition, drones can spy without trespassing.”).
\end{itemize}
\end{footnotesize}
mand compensation for aerial uses of those immediate reaches. The Court thereby implicitly recognized the low airspace—and not merely airspace in general—as an edge: a place where private and public interests are both present and where the formal boundary is of limited consequence. What should matter in such an edge space, according to the Causby decision, are actual and substantive harms to the interests of either party.

In light of this edges approach to the low airspace, when dealing with the new challenge of drones, contemporary law should recognize that wherever the formal boundary of private ownership might be set, some drone flights within the “private” airspace may be wholly unproblematic whereas some flight in the “public” airspace may be highly problematic. Case-by-case tort litigation coupled with flexible state privacy statutes and rational local drone zoning, all focusing on the actual harm to the surface owner’s interests, is the best means of accommodating the competing public and private interests in the property edges of low airspace. This nuanced approach might, at least in the short term, increase litigation, but it will certainly refocus any such drone-related litigation on the issues that are actually relevant—concrete harms drones engender. Furthermore, over time, as precedents define the nature and extent of harms required for a successful tort claim, some claims against drones will not be brought and many others could be dealt with promptly.

Useful guidance for the desirable tort standards is offered by the Restatement’s test for trespass by an “aircraft” into private airspace—although adopted early-on and formally inapplicable to drones (it exempts “missiles[] and the like”). That test eschews boundary fetishism in affixing liability, allowing a lawsuit only when the aircraft entering the surface’s immediate reaches “interferes substantially with the [owner]’s use and enjoyment of his [or her] land.”272 This standard permits a balancing of interests. The more the surface activity calls for seclusion, the likelier an intrusion to be found. If the standard were applied to drones, the immediate reaches of a private home, for example, would be more protected than the immediate reaches of a commercial parking structure. Liability would similarly be likelier the more disruptive the drone. A noisy, lingering, or unsightly drone would be treated more harshly than a discreet, silent one quickly passing overhead.273

272 RESTATEMENT (SECOND) OF TORTS, § 159(2)(b) (AM. LAW INST. 1965).
273 State courts have generally focused on some combination of the aircraft’s altitude and the time it hovers in identifying a substantial interference. See, e.g., Bevers v. Gaylord Broad. Co., No. 05-01-00895-CV, 2002 WL 1582286, at *1, *6 (Tex. Ct. App. July 18, 2002) (holding that a helicopter that hovered for ten minutes at three hundred to four hundred feet over a home did not substantially interfere with the homeowner’s use and enjoyment).
Drones’ most substantial—and to lawmakers and commentators, most troubling—interference with owners’ use and enjoyment of land is the threat that they pose to privacy. The regulation of drone trespass into the relevant property edges must thus put special emphasis on privacy interests. Given this emphasis, the tort of invasion of privacy should be central. The Restatement’s “Intrusion Upon Seclusion” section provides that “one who intentionally intrudes, physically or otherwise, upon the solitude or seclusion of another . . . is subject to liability to the other for invasion of his privacy, if the intrusion would be highly offensive to a reasonable person.”

Significantly, the tort does not focus upon—or even recognize—property boundaries in settling liability. Rather, it introduces flexibility through the “highly offensive to a reasonable person” standard. Under this legal standard, it would arguably be permissive to operate a drone one hundred feet over corn fields as they are being plowed, even if the drone records the plowing. In contrast, it arguably would be actionable to operate a drone six hundred feet over a pool and record a sunbathing family.

These common law tort protections against invasion of privacy can be augmented if they are codified into state statutes. Statutes can increase consistency and even establish a system of fines and other public penalties. States have, in fact, already begun enacting a wide range of statutes at least implicitly addressing drones’ threat to privacy. These statutes mostly avoid—wisely—the unitary property view. The California statute, for example, though never explicitly mentioning drones, provides that

[a] person is liable for constructive invasion of privacy when the person attempts to capture, in a manner that is offensive to a reasonable person, any type of visual image, sound recording, or other physical impression of the plaintiff engaging in a private, personal, or familial activity, through the use of any device, regardless of whether there is a physical trespass, if this image, sound recording, or other physical impression could not have been achieved without a trespass unless the device was used.

Finally, in regulating drones’ presence in the low-airspace, the desirable edges solution may involve not only state level actors—courts and legislatures—but also local governments. Because it is area-specific and codified into state statutes.
fied, local zoning could define what counts as “the immediate reaches” in different areas, taking account of diverse property uses and population densities. Such an approach would be sensitive to different communities’ baselines of seclusion and varying reasonable expectations regarding its protection. As in other fields of local action, however, local authorities cannot be afforded a free-hand to zone drones: they may succumb to anti-drone “NIMBYism” or create an impossible patchwork of rules. State legislatures and (perhaps) the FAA would therefore need to be ready to preempt communities that overreach. Nevertheless, some room for local legislation should be preserved.

Overall, the low-airspace edge illustrates how multiple actors and institutions could productively play a mutually-supporting role in defining and redefining the private-public interface along a private property edge.

C. Climate Change and Rights in the Shoreline

Water-lines and the low airspace are property edges—that must be regulated accordingly. Perhaps the most literal property edge, however, is the beach—where the land meets water. Unsurprisingly, therefore, the divide between private property in the land and public property in the water, as the two interact at the seashore, is particularly unconducive to a unitary view of property, imagining it as consisting of clear boundary lines. Especially in our era of climate change, the current formal regime that the unitary vision has inspired is increasingly exposed as inadequate, as this Section will establish before explaining how the edges approach improves on that vision’s performance.

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278 See Rule, supra note 260, at 160–61 (presenting drone zoning’s advantages).
279 “NIMBYism” is an acronym for the phrase “Not In My Back Yard.” The term “nimby” is defined as “[a] person who objects to the siting of something perceived as unpleasant or hazardous in their own neighbourhood, especially while raising no such objections to similar developments elsewhere.” Nimby, OXFORD DICTIONARY (2018), https://en.oxforddictionaries.com/definition/Nimby [https://perma.cc/9A53-LYDE].
280 For further explanation of the legal limits typically placed on local action due to such risks, see generally Nadav Shoked, Cities Taxing New Sins: The Judicial Embrace of Local Excise Taxation, 79 OHIO ST. L.J. 801 (2018) (discussing the complex patchwork of local excise rules and varying judicial embrace of such).
281 See Katrina M. Wyman & Nicholas R. Williams, Migrating Boundaries, 65 FLA. L. REV. 1957, 1967, 1982–83 (2013) (“[T]he mean high water line is not a clear on/off signal. There are problems with policing trespassing by members of the public onto private property in beach areas due to the uncertainty of the boundary.”).
1. The Unitary Approach and Its Effects

The common law has long held that navigable waters and the land they submerge are held by the Crown—later, the government—as the public’s trustee. Consequently, a private owner may own the adjacent land, but she cannot own the land under the water. In light of this rule, the need to manage the interaction between the private and the public along the shoreline—where the land and the water meet—is inevitable. Yet the shoreline is inhospitable to regulation through the lens of a formal dividing line between public (water) and private (land). This is primarily because shorelines are not generally stable: their location changes over time.

The challenge is obvious: if water levels recede and once-submerged land is no longer under water, who is the owner of that “new” land? The shoreline—the line between water and land—has physically moved. Did the legal boundary between public and private move with it, and does the private owner now own more land as a result? And vice versa: what happens if water levels increase and previously dry land becomes submerged? Does the legal boundary move too, and does the owner therefore lose title to her old, now-submerged land?

The common law answers such complex questions by drawing a formal distinction between gradual and sudden changes. Gradual, imperceptible shifts in the physical boundary between water and land do not shift the legal boundary between private and public land; abrupt ones do. Thus, gradual additions of land on the beach (reliction or accretion) belong to the private landowner; sudden additions of land on the beach (avulsion) belong to the public. Similarly, gradual losses of land at the beach (erosion) decrease the private owner’s holdings; sudden losses of land at the beach (also avulsion) decrease the public’s holdings (in other words, the landowner could still claim their newly-submerged land).

282 See Josh Eagle, Taking the Oceanfront Lot, 91 IND. L.J. 851, 872 (2016) (“Under English common law, the public trust doctrine covered lands beneath waters subject to the ebb and flow of the tide; the catalog of protected public uses of trust areas included only navigation, commerce, and fishing.”).

283 See Colin H. Roberts, It’s All Mine, Stay Off, and Let Me Do What I Please: An Abyss Between the Rights and Desires of Coastal Property Owners and Public Privileges and Protections?, 18 OCEAN & COASTAL L.J. 255, 264 (2013) (“While land below the high-water line is held in public trust by the state, the dry-sand beach above it is not within the state’s purview under the traditional public trust doctrine.”).

284 Wyman & Williams, supra note 281, at 1957–58.
285 SINGER, supra note 18, at 172, 534.
This explanation of black-letter law suggests much more clarity than ever truly existed in American law. Unsurprisingly, in practice, the line between “gradual” and “sudden” change is often not easily drawn. Courts have largely dealt with the inevitable factual uncertainty by labelling practically all changes as gradual ones. This judicial bent was rather random. Nevertheless, any ensuing sense of irrationality or unfairness was negated by mutuality: such decisions’ inconsistencies would even up in the long-run. Owners always won the increases in landmass because additions to the shore were almost always deemed gradual, but owners also always lost decreases in the landmass because subtractions from the shore were also almost always deemed gradual.

But once this resultant fairness of the otherwise contrived approach was no longer attainable due to natural changes in the global environment, the underlying inconsistencies could no longer be ignored. Because of climate change, ocean water-levels hardly recede anymore—they only rise—with the consequence that almost any change to the shoreline takes the form of a decrease in the landmass. With gradual subtractions constantly present (erosion) but no gradual additions (accretion or reliction) to offset them, owners can understandably view the existing legal test, combined with courts’ tendency to characterize all changes as gradual, as stacked against them. Owners always, and only, lose land.

Further complicating this reality, to the extent that additions to land on the shoreline still occur, they are mostly the product of public infrastructure projects. To stem rising sea-levels and worsening storm conditions, beach

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287 See Alyson C. Flournoy, Beach Law Cleanup: How Sea-Level Rise Has Eroded the Ambulatory Boundaries Legal Framework, 42 VT. L. REV. 89, 91–92 (2017) (“[T]hese doctrines [are] vague, lack[ ] a coherent justification, [are] inefficient, and tend[] to create uncertainty. . . . [T]he primary distinction the doctrines draw—between changes that are slow and imperceptible and those that are rapid and observable—creates heavy evidentiary demands with little benefit, and is ill matched to a reality where many changes reflect a combination of rapid and slow processes.”).

288 See Sax, supra note 286, at 348 (noting that courts apply the accretion rule “very generously”).

289 See Flournoy, supra note 287, at 114–15 (discussing the false assumption by common law doctrines that “landowners may be winners or losers due to the vagaries of the tides on any given day” and explaining how the way in which “courts have invoked the fairness rationale distinguishes cases of rapid change from gradual change”; e.g., a determination by a court that an owner experienced avulsion of his or her land was generally based in the idea that “[a] sudden and unpredictable loss entails lack of warning and an inability to prepare for, mitigate, or avoid the loss,” warranting the court’s rare “sympathy”).

290 See id. at 115–16 (“Today, the dynamic along our coasts is (and will continue to be) predominantly erosion and inundation.”).

291 See Donna R. Christie, Of Beaches, Boundaries and Sobs, 25 J. LAND USE & ENVTL. L. 19, 25 (2009) (“This is because the rising water level will not simply inundate the shoreline, but will induce and accelerate further beach erosion.”).
replenishment has become a major focus of coastal communities’ policy.\textsuperscript{292} When such governmental projects are challenged for their effects on private ownership interests, courts attempt to characterize the projects as either accretions (gradual) or avulsions (sudden).\textsuperscript{293} That test, however, is wholly irrelevant to any policies involved because it artificially fits manmade phenomena into categories developed to account for natural occurrences.

The results of such strained judicial moves to accommodate new climate-related developments into old formal categories have been predictably unsatisfactory. Pertinent issues are repeatedly litigated in many states,\textsuperscript{294} generating contentious and heavily criticized decisions, including some of the U.S. Supreme Court’s most prominent constitutional takings cases.\textsuperscript{295}

\section*{2. The Edges Approach}

The formal boundary approach bred by the unitary property view frustrates legal actors as they confront the new challenges that climate change has wrought. What is needed is an approach that recognizes the shoreline’s nature as an edge with concomitant private and public elements. One such edges approach that can be employed to settle disputes over receding shorelines is, in fact, already a well-established component of the common law: the public trust doctrine.\textsuperscript{296} This doctrine’s openness to contextual, complex


\textsuperscript{293} See, e.g., City of Long Branch v. Liu, 4 A.3d 542, 560 (N.J. 2010) (holding that expanded dry beach, situated on beach previously covered during high tide, that was produced by government-funded beach replenishment program constituted an avulsion, and that the increase in beach fell within the public trust doctrine and therefore the beachfront property owners had no rights there).

\textsuperscript{294} See, e.g., Severance v. Patterson, 370 S.W.3d 705, 711–12, 732 (Tex. 2012) (applying “rolling easement” concept, holding that an avulsion that moves mean high tide line and vegetation line suddenly, causing former dry beach to become part of State-owned wet beach, did not automatically deprive private property owner of her right to exclude public from new dry beach); Marion Burke, Comment, Building a Wall to Keep Out the Sea, 18 U. Pa. J. Const. L. 1231, 1234–36 (2016) (describing ongoing litigation surrounding Superstorm Sandy).

\textsuperscript{295} See, e.g., Stop the Beach Renourishment, Inc. v. Fla. Dep’t of Envtl. Prot., 560 U.S. 702, 707, 732–33 (2010) (finding no unconstitutional taking of littoral property owners' rights to future accretions and to contact with the water where State restored eroded beach by filling in submerged land in front of owners’ beachfront property); Lucas v. S.C. Coastal Council, 505 U.S. 1003, 1031–32 (1992) (holding that a taking occurred where newly enacted state statute prevented beachfront landowner from erecting structures on property); Nollan v. Cal. Coastal Comm’n, 483 U.S. 825, 841 (1987) (holding that a state agency “could not, without paying compensation, condition grant of permission to rebuild house on property owners’ transfer to public of easement across beachfront property”).

solutions that accommodate public and private interests can further help
courts fashion workable solutions to the conflicts that beach replenishment
projects engender.

The public trust doctrine, precluding private ownership of the lands it
covers and bestowing ownership in the government as the public’s trustee,
originally applied to submerged lands. Its further application to the beach
was inevitable from the outset, however, given the nature of tidal water bod-
ies. Certain portions of the beach facing tidal water bodies are, by defi-
nition, submerged at times (high-tide time) but not at other times (low-tide
time). Consequently, through the public trust doctrine, courts have, in dif-
ferent ways, treated the beach more as an edge than as a core private space
bordering a public one. Some state courts hold that the tidal land simply
cannot be owned by the adjacent private owner based on the fact that such
land is often submerged. Other courts hold that although the owner’s in-
terest does extend to the tidal land because it is not always submerged, that
ownership interest is subject to a pre-existing public access right. Rea-
soning that the public’s expectation of beach access may extend beyond
these tidal lands or that public rights in tidal lands are meaningless if no
reasonable access to them is assured, one court has further expanded the
public’s access rights to privately-owned dry-sand areas (in other words, to
portions of the beach that are never submerged).

Regardless of the relative merits of these individual rulings, all inter-
pretations of the public trust doctrine’s inland reach attest to the judicial
realization that the task of drawing a clear boundary between private and
public along the shoreline is futile. Courts aim to establish a combination of
private and public entitlements to the beach. They thus prescribe that the
private owner’s rights are not identical in different portions of the beach
despite the fact that technically all those portions fall on the owner’s side of
the private/public boundary.

This edges approach, embodied in the public trust doctrine, can aid in
solving some of the contentious legal debates that climate change gener-
ates—debates that, as noted above, the formal boundary approach fails to

\[297\] See Ill. Cent. v. Illinois, 146 U.S. 387, 452 (1892) (applying the public trust doctrine to
submerged lands).

\[298\] See Neptune City v. Avon-by-the-Sea, 294 A.2d 47, 51 (N.J. 1972) (discussing the appli-
cation of the public trust doctrine to tidal waters).

\[299\] For an overview of states’ differing approaches, see Margaret E. Peloso & Margaret R.
Caldwell, Dynamic Property Rights: The Public Trust Doctrine and Takings in a Changing Clima-

\[300\] E.g., Minnesota v. Slotness, 185 N.W.2d 530, 531 (Minn. 1971).

\[301\] E.g., Glass v. Goeckel, 703 N.W.2d 58, 68–75 (Mich. 2005).

coherently settle. For example, in the Texas case of *Severance v. Patterson*, the shore moved inland, thereby leaving the owner’s home on what (according to the wet-sand-as-public-trust-asset principle under Texas law) then should have been considered public land. In one of the dissents, one justice suggested that, although the private house should be allowed to stand, the land bordering the water should be treated as a public trust area subject to public access rights.\(^{303}\) This proposed solution could have accommodated the competing—and legitimate—public and private interests coexisting on the property edge that is the beach. It would have done so much more effectively than the majority approach, which insisted instead that the land at issue must be fully characterized as either private or public.\(^{304}\)

The same sensitivity to the mix of private and public interests typified by the public trust doctrine may also help in developing a rational edges test for beach replenishment cases. Useful examples are found in recent New Jersey decisions handed down in the wake of Superstorm Sandy and its like. Following these devastating events, New Jersey began replenishing beaches and constructing dunes to—allegedly—protect beach land. These projects are generally disruptive to the private owners of adjoining beach land. The builders must traverse their lands to reach project sites. More importantly, at these projects’ completion, the beachfront owners would inevitably enjoy less direct visual and physical access to the water. Owners have hence sought compensation from the government for such projects.

In response, the New Jersey courts developed a nuanced test to deal with these challenges. Under this test, if private owners independently engage in anti-erosion measures that protect not only their own interests but those of the public as well, the government cannot demand access through their private land to initiate its own anti-erosion projects.\(^{305}\) If, on the other hand, the government can prove that the projects it initiates are necessary to combat threats that owners cannot reasonably address themselves, the pri-

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\(^{303}\) *Severance*, 370 S.W.3d at 748–49 (Guzman, J., dissenting). Another possible edges approach would have allowed the homeowner to remain and use the house but only for a reasonable amortization period and/or only on the condition that the house could not be rebuilt if further inundation made it uninhabitable. *See* Gwynne Hunter, *Severance v. Patterson: How Do Property Rights Move When the Dynamic Sea Meets the Static Shore?*, 40 ECOLOGY L.Q. 271, 290–95 (2013) (urging courts not to take the binary, either private-or-public approach of the *Severance* majority).

\(^{304}\) The court then proceeded to label it private, leaving it to the state to exercise its powers to claim any public easements therein. *Severance*, 370 S.W.3d at 732.

\(^{305}\) *See*, e.g., N.J. Dep’t of Envtl. Prot. v. Tavasco, No. OCN-L-3290-15 (N.J. Sup. Ct. Aug. 16, 2018) (holding that private beachfront owners that had invested in a flood control system were entitled to a hearing as to whether that investment rendered the government project and public easements unnecessary, but also holding that the evidence supported a finding that the government project was necessary).
vate beachfront owners are only entitled to very modest, essentially sym-
olic, compensation for their loss of water access. In Borough of Harvey
Cedars v. Karan in 2013, the New Jersey Supreme Court invoked this for-
mula, by which any loss borne by the private owners is offset by the benefit
they reap from the public investment in storm and flood protection, to va-
cate a $375,000 award to private owners for the loss of their water view as a
result of a dune construction project. The landowners ultimately settled
for a symbolic one dollar. In another dune construction case, application
of the test on remand resulted in the reduction of damages from $275,000 to
$300.

The logic of these rulings is straightforward once one acknowledges
the edges nature of the beach. Irrespective of any formal property bounda-
ries, the public and the private owners both hold interests in the beach. If
replenishment is necessary to prevent further beach erosion—for the benefit
of both the public and the adjacent private owners—the owners reap the
direct fruits of the government’s expense, so there should be no significant
compensation obligation. If, on the other hand, the public project is not tru-
ly necessary for such purposes, there is no reason to deprive private owners
of their rights of direct water access. This approach replaces the irrelevant
gradual/sudden question with a test that is sensitive to the mix of rights—
public and private—that constantly interact on the shore, a quintessential
property edge.

The edges approach can thus simplify the legal struggle to come to
terms with global warming’s increasing effects on beaches. Although that
approach is now urgently necessary, it was always much better suited, as

307 See id. For a similarly positive analysis of the case, see Joshua Ulan Galperin & Zaheer
Hadi Tajani, Resilience and Raisins, 46 ENVTL. L. REP. NEWS & ANALYSIS 10,123, 10,128–29
(2016).
308 Scott Salmon, Necessary Change: Re-calculting Just Compensation for Environmental
309 Donna Weaver, Jury Awards Harvey Cedars Couple $300 for Easement to Complete Dune
Wins Another Cheap Easement of Beach Dune Project, LAW360 (Sept. 22, 2015), http://law360.
com/articles/553508/nj-wins-another-cheap-easement-for-beachdune-project [https://perma.cc/
33KZ-HMLP] (discussing a 2014 decision in which a New Jersey Superior Court reduced the
award for homeowners because of the benefits homeowners received from a town-constructed
dune project).
310 Josh Eagle suggests a similar test under the label “waterfront takings test,” through which
public access and use of private shoreland that is truly necessary for legitimate public purposes
generally would be permissible without compensation. Eagle, supra note 282, at 903–04.
IV. EXTENSION OF THE EDGES CONCEPT: FROM REAL TO INTELLECTUAL PROPERTY

The edges concept provides an accurate and normatively appealing description of property. Accordingly, it helps in effectively tackling countless legal problems in property. This is true not only with respect to property interests in land—on which we have focused so far—but also as applied to intellectual property. True, the edges idea is probably more intuitive in the context of traditional property. Land has a physical edge at or near the boundary, where it is easy to visualize the confluence of private and public and thus appreciate how the allocation of public and private rights there differs from the allocation of such rights at the land’s core. Intellectual property, by contrast, is not tangible and thus cannot have a visible edge or core.

Nevertheless, intellectual property law is still, we argue, characterized by a property edges-styled logic analogous to that we uncovered in the context of real property law. This contention is not as surprising as it might seem at first blush. For property law, the “thing”—which, as noted, for some thinkers is property’s defining element—need not be an actual physical thing: property is about the legal thing, which may or may not be physical. Thus, there is no gulf between tangible and intangible property. Indeed, a long legal tradition exists of applying the metaphor of property in land to intellectual property. The equation of intellectual property infringement with trespass to land “remains pervasive,” with intellectual property law’s grant of exclusive rights paralleling “a landowner’s legal right to exclude others from his land.”

Accordingly, property edges thinking can be detected in all fields of intellectual property: patent, trademark, and, finally, copyright, on which

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311 See Smith, supra note 47, at 2065 (“In property law, things are the lynchpin of the architecture . . . . [A] method of making the problem [of horizontal interactions and their interpersonal nature] more manageable is to modularize the system, starting with the definition of legal things.”).

312 See generally Adam J. MacLeod, Patent Infringement as Trespass, 69 ALA. L. REV. 723 (2018) (arguing that patent infringement historically was understood as trespass); Mark Rose, Copyright and Its Metaphors, 50 UCLA L. REV. 1 (2002) (tracing the land metaphor’s application to literary works to Blackstone).

313 Rose, supra note 312, at 8.

314 The clearest “edge” doctrine in patent law is in the area of reverse equivalents, which provides that a new invention, even if seemingly infringing upon an existing one, does not actionably infringe if it employs a different principle than the patented invention and represents an inno-
our discussion here will be focused. Following the framework that we applied above to explore the edges idea in real property, we will first show, in Section A, that the edges concept provides a better description of the operation of copyright law than the traditional unitary property concept.\textsuperscript{316} Then, in Section B, we will illustrate how the acknowledgment of this legal reality aids in solving a novel problem afflicting copyright’s edges—here, music sampling—with which lawmakers still attached to the unitary theory continue to struggle.\textsuperscript{317} In this manner, this Part seeks to contribute to debates in copyright law and theory, while simultaneously highlighting once more the power of the edges concept of property that this Article advances.

\textbf{A. Copyright Law Denying the Unitary Concept of Private Property}

Copyright law protects an original work of authorship from use by those who do not own it.\textsuperscript{318} Consequently, many scholars view its function as similar to that of trespass protections in property law and as employing the same prevalent notion of unitary protection within a boundary.\textsuperscript{319} Just as trespass protects a landowner from outsiders’ invasions into her land, copyright’s prohibition on copying protects a work’s owner from outsiders’ invasions into her work.

Yet, in various ways, copyright law does not treat all that falls within a given copyright—every aspect of the original expression that makes up the copyrighted work—as warranting equal levels of legal protection from invasion through copying. Instead, copyright law generally treats some copying of a copyrighted work as too attenuated from the core of the work to

\textsuperscript{315} For example, trademark allows for de minimis copying, and provides a fair use defense to infringement where the use serves a legitimate social function (such as promoting product competition) and does not appropriate more of the trademark than is absolutely necessary. \textit{See, e.g.}, New Kids on the Block v. News of Am., 971 F.2d 302, 306 (9th Cir. 1992) (finding a fair use, in part, because the use did not reproduce the distinctive logo); Gottlieb Dev. v. Paramount Pictures Corp., 590 F. Supp. 2d 625, 634–36 (S.D.N.Y. 2008) (holding that a trademark’s depiction in the background of a movie scene is not actionable).

\textsuperscript{316} \textit{See infra} notes 318–333 and accompanying text.

\textsuperscript{317} \textit{See infra} notes 334–353 and accompanying text.

\textsuperscript{318} \textit{See U.S. CONST. art. I, § 8, cl. 8} (confering on Congress the power “[t]o promote the Progress of Science and useful Arts, by securing for limited Times to Authors and Inventors the exclusive Right to their respective Writings and Discoveries”); Copyright Act of 1976, 17 U.S.C. § 102 (2018) (specifying the subject matters of copyright).

\textsuperscript{319} \textit{See, e.g.}, Michael J. Madison, Rights of Access and the Shape of the Internet, 44 B.C. L. REV. 433, 472, 473 (2003) (applying copyright law and trespass to chattels doctrines to examine developments in using the internet for access to others’ information).
warrant legal protection. In other words, in practice if not in theory, copyright law adopts an edges—rather than a unitary—view of property.

That result is achieved through two key doctrinal tools: the definition of copyright infringement and the mechanisms of the fair use defense to copyright infringement. Copyright law protects works by conferring upon their owners the power to seek an injunction or damages against infringing (in other words, copying) uses. To garner a remedy, the copyright holder must establish that another work infringed upon her prior work. The test that courts employ to identify infringements explicitly employs the language of edges. A work is deemed infringing only if it is “substantially similar” to the copyrighted work, and “substantial similarity requires that the copying is quantitatively and qualitatively” meaningful. In other words, “a party may be held liable when he or she appropriates a large section or a qualitatively important section of plaintiff’s work.”

The “substantial similarity test” entails a qualitative, as well as quantitative, aspect and hence cannot be reduced to rote percentages. Courts must examine the copyrighted work and draw a qualitative distinction between its core—the lifting of such would qualify as substantial, rendering the lifting work infringing—and the work’s margins or edges—the lifting of such would not qualify as infringing. This assessment is, therefore, an inherently fact-intensive, contextual inquiry that explicitly and intentionally avoids the rhetoric of clear boundaries that dominates the unitary vision of property. Consequently, the edges vision is an innate element of the copyright infringement definition.

The edges vision is built into copyright protection in yet another way: through the functioning of the major exception to copyright infringement. Even where substantial copying occurs, an infringement might nevertheless be excused if it constitutes a “fair use” of the copyrighted work. Incorporating prior case law, the Copyright Act of 1926 identifies four factors that a court must consider in deciding whether the fair use defense applies: (i) the purpose and character of the infringing use, (ii) the nature of the copyrighted work, (iii) the amount and substantiality of the portion taken, and (iv) the effect of the use upon the potential market. While the fourth factor can, at

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323 Peter Letterese & Assocs. v. World Inst. of Scientology Enters., 533 F.3d 1287, 1306–07 (11th Cir. 2008) (explaining that summary judgment therefore is inappropriate on the substantial similarity question).
times, implicate an edges determination (to ascertain the original work’s relevant market), the third factor proactively requires such a determination. That factor entails judicial consideration of whether the core of the copyrighted work was copied. Indeed, an empirical study of published fair use opinions found that federal courts rejected fair use claims in thirty-five out of thirty-seven cases in which the court concluded that the defendant took “the heart” of the plaintiff’s work.\(^{325}\) By contrast, in the opinions in which courts concluded that the defendant did not take “the heart” of the plaintiff’s work, they recognized the fair use defense in all but two cases.\(^{326}\) A copying of a work’s edges, rather than core, thus appears much more likely to qualify for the fair use defense.\(^{327}\)

One of the most famous Supreme Court fair use cases illustrates this point. The 1985 case of *Harper & Row v. Nation Enterprises*, involved a challenge brought by the publisher of President Gerald Ford’s memoirs against a magazine that had published excerpts from the book without receiving permission from the publisher.\(^{328}\) The Court refused to recognize a fair use defense for the magazine because the infringing article copied language that the Court deemed to be at the core, rather than the edges, of the unpublished autobiography. “In absolute terms, the words actually quoted were an insubstantial portion” of the copyrighted memoir.\(^{329}\) Nevertheless, the Court held that those words were “what was essentially the heart of the book.”\(^{330}\) Specifically, the portions taken were those pertaining to Ford’s pardoning of his disgraced predecessor, President Richard Nixon—arguably the most momentous decision of Ford’s brief presidency which many believe later doomed his election prospects. An editor described those chapters as “the most interesting and moving parts of the entire manuscript.”\(^{331}\) The magazine “quoted these passages precisely because they qualitatively embodied Ford’s distinctive expression.”\(^{332}\) In view of the excerpts’ “key

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\(^{326}\) See id.

\(^{327}\) See William Paltry, *Paltry on Fair Use § 5.1* (2018) (explaining that “[n]umerous courts have rejected fair use claims when defendant copied a small but qualitatively important part, including the ‘heart of the work’”); Matthew Sag, *Predicting Fair Use*, 73 OHIO ST. L.J. 47, 77 (2012) (finding that the third factor of the four-factor fair use test has explanatory power in fair use decisions).


\(^{329}\) Id. at 564.

\(^{330}\) Id. at 565.

\(^{331}\) Id.

\(^{332}\) Id.
role in the infringed work,” the Court concluded that they could not be characterized as an “infinitesimal amount” despite their paltry length.333

Harper & Row identified the infringement to the copyrighted work as going to that work’s heart—and therefore as actionable. The mere fact that an infringement had occurred—that some portion of the work had been copied—did not suffice to warrant a remedy. What mattered was which specific portion that was copied. The analogy relevant to copyright law is thus not the unitary land boundary that can never be crossed. Rather, if one were to analogize a copyrighted work like a novel to real property like land, copyright law in effect dictates that only some trespasses into the novel’s land are actionable—only those that are substantial, by virtue of the specific location in the work into which they intrude.

B. An Edges Solution to a Current Copyright Problem: Music Sampling

Like real property law, copyright law employs an edges vision of property. Also as in real property law, however, courts at times stray and fall back on a unitary property vision—especially when a new technology enables a new type of intrusion into the property’s edges. Thus, in the context of copyright, to a similar extent as elsewhere, greater attention to the edges approach that this Article propagates can facilitate salutary legal reforms. To demonstrate, we detail the case of music sampling.

The practice and legal challenge of sampling arose following the proliferation, starting in the 1980s, of a new technology that allowed snippets of sound recordings to be copied, modified, and made part of a new recording.334 Hip hop artists employed this technology to create recordings consisting of dozens or even hundreds of samples.335 As such computer-generated music grew to occupy a prominent position in popular music, a legal challenge emerged. Sampled works are copyrighted, and thus any sampling generates a potential infringement claim—indeed, a myriad of such claims.336

In 2005, the United States Court of Appeals for the Sixth Circuit was the first to confront the problem in Bridgeport Music v. Dimension Films.337 At

333 Id. at 566.
336 Indeed, Professor Olufunmilayo Arewa suggests that hip hop and musical schools based on sampling challenge the fundamental conception of copyright, which is authorship by an autonomous, individual author. Olufunmilayo Arewa, From J.C. Bach to Hip Hop, 84 N.C. L. REV. 547, 551–52 (2006).
337 See Bridgeport Music, Inc. v. Dimension Films (Bridgeport II), 410 F.3d 792 (6th Cir. 2005).
issue was a recording, “Get Off,” which opened with a three-note combination solo guitar “riff” lasting four seconds. The riff contained a two-second sample that was copied from a protected work, albeit at a lower pitch and after being “looped” and extended to sixteen beats. The United States District Court for the Middle District of Tennessee found that those two-seconds did not “rise to the level of a legally cognizable appropriation.” On appeal, however, the Sixth Circuit disagreed. Holding that there was no de minimis exception to the prohibition against a sound recording’s copying, it concluded that even a one-second sample could be actionable. The court found grounding for this absolutist position in amendments to the Copyright Act enacted in 1971. The amendments predated the technology enabling music sampling, and therefore, do not explicitly state that an owner can enjoin the practice. Nevertheless, the court read the statute as intending to empower owners in this fashion. It partially based this peculiar reading of the statute on the notion that clear property rights lead to efficient transactions. It predicted that the realization among musicians that sampling would be actionable would remove uncertainty and incentivize samplers to pay copyright-holders, thereby facilitating creativity. Therefore, the court adopted a unitary, distinctly non-edges approach to copyright disputes involving sampling: all infringements of music recordings were to be treated alike.

The *Bridgeport Music* decision has been heavily criticized. Its logic appears lacking. The rationale that samplers can simply bargain with each rights-holder is untenable. It ignores the daunting transaction costs for such bargaining given the prevalence of musical creation via computer, in which any given recording might contain hundreds of samples and in which those sampled often had also engaged in sampling. Due to the potentially debilitating effects on the music industry—particularly on hip hop artists—commentators expressed “outrage that the Sixth Circuit had read a statute

338 *Id.* at 796.
339 *Bridgeport Music, Inc. v. Dimension Films (Bridgeport I),* 230 F. Supp. 2d 830, 841 (M.D. Tenn. 2002), rev’d, 383 F.3d 390 (6th Cir. 2004), republished as modified on reh’g, 401 F.3d 647 (6th Cir. 2004), amended on reh’g, 410 F.3d 792 (6th Cir. 2005), rev’d, 401 F.3d 647 (6th Cir. 2004), amended on reh’g, 410 F.3d 792 (6th Cir. 2005).
340 See 17 U.S.C § 114(b).
341 See VMG Salsoul v. Ciccone, 824 F.3d 871, 883 (9th Cir. 2016).
342 *Bridgeport II,* 410 F.3d at 802.
343 *Id.* at 801.
344 See MCLEOD & DICOLA, supra note 334, at 223 (describing the criticism that *Bridgeport II* will “stifle creativity”).
345 See *id.* at 224 (“[T]he evidence we have collected in this book significantly contradicts the *Bridgeport* court’s economic presumptions.”).
designed to protect creative enterprises in a manner that would instead stifle creativity.\textsuperscript{346}

A rational, edges approach to sampling would avoid such undesirable outcomes that are inevitable when drawing on the misleading unitary property vision. An edges template is offered by the more recent United States Court of Appeals for the Ninth Circuit decision in \textit{VMG Salsoul v. Ciccone} in 2016.\textsuperscript{347} The case involved the early 1990s Madonna hit “Vogue”; the plaintiff alleged that the “Vogue” producer had copied a “horn hit” from an earlier song, known as “Love Break,” and used a modified snippet in “Vogue.”\textsuperscript{348} Rejecting the lawsuit—and implicitly the Sixth Circuit’s unitary approach—the Ninth Circuit held that although a recording’s creator may have a right to exclude others from even small samples, that right only applies where the sample is used in a way removing something akin to the creation’s core.\textsuperscript{349} Investigating statutory history, the court reasoned that infringement occurs when a \textit{substantial portion} of the actual sounds that constitute a copyrighted recording is reproduced.\textsuperscript{350} This test is not quantitative. Thus here, although the Ninth Circuit noted that the sample was short (one quarter-note of a four-note chord, lasting 0.23 seconds), length itself was not the determining factor.\textsuperscript{351} Under the court’s reasoning, the shortest of samples could be actionable if it appropriated something at the core of the copyrighted property, rather than at its edges. The test, for the court, was whether the sampling takes the original recording’s distinctive, or signature, sound as conceived by the average listener. That was not the case here.\textsuperscript{352} As the court explained, “[e]ven if one grants the dubious proposition that a listener recognized some similarities between the horn hits in the two songs, it is hard to imagine that he or she would conclude that sampling had occurred.”\textsuperscript{353}

The Ninth Circuit thus reaffirmed copyright as protecting property right holders while accommodating the public interest in dynamism in the arts. More important for this Article’s purposes, however, the decision ratified copyright as a body of property law that meaningfully distinguishes the core from the edges of the asset owned. The court internalized property


\textsuperscript{347} \textit{VMG Salsoul}, 824 F.3d at 873.

\textsuperscript{348} \textit{Id.} at 875–78.

\textsuperscript{349} \textit{Id.} at 880.

\textsuperscript{350} \textit{Id.} at 883.

\textsuperscript{351} \textit{Id.} at 879–80, 883.

\textsuperscript{352} See \textit{id.} at 880.

\textsuperscript{353} \textit{Id.}
law’s message that not all property infringements are created equal. Just as an entry into the home is not, for legal purposes, identical to an entry into land’s outskirts or to the air above the land, so too is an excerpt that encapsulates the essence of a work-of-art not identical to a marginal, hardly identifiable, extract.

CONCLUSION

For too long, property law scholarship has been obsessed with boundaries, with hard lines that divide what is inside the private property from what is outside of it. This unitary conception of property ignores the fact that inevitably any property has outer reaches that are within the property boundary but not at the property’s core. These edges simply cannot be—and are not—treated by the law as if they were at the core. Espousing property edges as a discursive category—indeed, simply adding edges to the vocabulary of property—helps us understand a plethora of court decisions and legislative edicts that do not square with a unitary conception of property.

Equally important, the recognition of edges as a distinct property category with descriptive and normative heft can help legal institutions address the myriad controversies over the private-public divide that crop up in the aftermath of new developments as diverse as climate change, drones, the digital revolution, and improved research on lead’s poisonous effects. In approaching these controversies, lawmakers sometimes reach stilted, unsatisfactory results because they insist on fetishizing the property boundary line. Better solutions—ones that accommodate the interests of both the private owner and the public—are imaginable only if lawmakers steadfastly hold to the edges idea of property. The edges idea is perhaps intuitive, and existing property theories could have perhaps easily assimilated it in the past had they explicitly addressed it. Nevertheless, they have not done so, and as long as the edges idea remains unstated, it is too often forgotten—to our property system’s detriment.