

THE RIGHT TO INNOVATE

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ABSTRACT

Individual citizens have been found to be a major source of new product and service innovations of value both to themselves and to the economy at large. These citizen innovators operate in a little-understood legal environment that we call the innovation wetlands. We show via a review of fundamental rights guaranteed in the U.S. Constitution and elsewhere that individuals in the United States participating in the innovation wetlands possess strong legal protections with respect to both their freedom to innovate and their right to diffuse information about their innovations to others. However, we also show that legislation and regulation—often promulgated without awareness of consumer innovation as a valuable resource—can, in practice, significantly interfere with individuals’ exercise of their fundamental freedom to innovate. This interference can cost society dearly by discouraging and slowing innovation or even thwarting it entirely. Just as intellectual property may chill citizen user and open innovation by raising the costs of innovation, so may regulatory property rights agencies grant to incumbent market actors.

We offer three approaches to protecting the valuable resource of innovation by individuals from excessive negative impacts caused by legislation and regulation. First, we propose enhancing general awareness of the issue by framing the concept of individual innovation rights as an “innovation wetlands” that must be protected from encroachment and despoilment. Second, we describe the legislative and regulatory frameworks and practices that demark today’s innovation wetlands, as experienced by individual and collaborating innovators. Third, we suggest improvements that can strengthen protection of the innovation wetlands, including heightening awareness of the issue in existing, mandated cost–

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benefit analyses that are already applied, although imperfectly, to regulation in the United States.

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INTRODUCTION AND OVERVIEW

Many millions of individuals around the world spend many billions of dollars every year to create new products and services for

their own use. This innovation activity is of great benefit to the individuals involved, and to national economies as well. Individuals create products and services they personally need, and also learn from and enjoy engaging in the innovation process. Also known as user, consumer, or citizen innovation, this phenomenon involves individuals who, either alone or collaborating with others, engage in noncommercial innovation to satisfy their own needs. The practice of innovation by individuals prominently involves factors important to “human flourishing,” such as exercise of competence, meaningful engagement, and self-expression.¹ In addition, the innovations individuals create often diffuse to peers, who gain value from them, to firms that may adopt them as the basis for valuable commercial products offered on the market, or to both.²

Individuals innovate on their own and also collaboratively.³ To innovate on their own, individuals need the right both to develop and to use their innovations for themselves. To innovate collaboratively, individual developers also need the right to share their detailed designs with others, who then, in turn, must have the right to copy, test, and use these innovations, to add improvements, and to share with others what they have learned. Impediments to individual and collaborative innovation harm social welfare by reducing the amount, rate, and dissemination of innovation.

The law robustly protects the rights of citizens to engage in noncommercial innovation and the dissemination of information about their innovations, both individually and collaboratively. In the United States, fundamental constitutional, statutory, and common law rights, such as the right of privacy, protect individuals’ rights to develop innovations for their own use without undue government interference. Furthermore, fundamental legal rights to share and disseminate innovation-related information, such as freedom of speech, foster the spread of innovations. What, then, are the threats to this valuable personal and societal resource? Most individuals cannot afford to spend a great deal of money on their innovation projects. Anything that raises their innovation costs can therefore have a major deterrent effect. As we will show, legislation and regulation at multiple governmental levels—generally aimed at goals

1. William W. Fisher III, *The Implications for Law of User Innovation*, 94 MINN. L. REV. 1417, 1463-72 (2010).

2. *Id.* at 1432-33.

3. Carliss Baldwin & Eric von Hippel, *Modeling a Paradigm Shift: From Producer Innovation to User and Open Collaborative Innovation*, 22 ORG. SCI. 1399, 1399 (2011).

unrelated to individual innovation—can and do sometimes increase individual innovation costs to prohibitive levels. A particularly potent impediment to user, open, and collaborative innovation involves agency regulation. Regulation can directly harm individual innovators by raising their costs of innovating. Regulation can also act in a manner analogous to government grants of intellectual property. Just as the threat of infringing existing patent and copyright protections can chill subsequent innovation, especially where cost-sensitive individual innovators are targeted, agency regulation can chill innovation by effectively granting to market incumbents powerful “regulatory property” rights. Large commercial firms are more likely to be able to afford substantial regulatory compliance costs. In fact, these firms may even lobby governments to increase regulation to increase barriers to market entry to prospective new market entrants. Even if not primarily aimed at individual innovators, regulatory property, like intellectual property, can have very harmful effects on the innovation wetlands. In effect, heedless government actions currently have significant impacts upon the fragile innovation wetlands environment within which individual innovators operate.

In this Article, we will argue that it is important for society better to protect the innovation wetlands. We think this can be done with greater awareness of *existing* legal protections for innovation coupled with more careful and innovation-conscious regulatory design. At least in the United States, a mechanism is already in place at the federal level that can be used to insist on such awareness: cost-benefit analyses are required for all federal regulations, and the requirements specifically cite the impacts that regulation can have on innovation as an important motivation and caveat. Many U.S. states also have similar cost-benefit analysis requirements.

We begin Part I by briefly developing our innovation wetlands metaphor. We then summarize the evidence for the great extent and value of innovation by individual users of consumer products and services in Part II. Next, in Part III, we explain how a bulwark of existing legal principles, some longstanding and fundamental, are already available, in the United States, to protect individuals’ rights both to innovate and to freely diffuse their innovations noncommercially. In Part IV, we then explore how governmental actions can impact users’ rights to innovate and diffuse their innovations. Finally, in Part V, we offer some practical guidelines to individual innovators regarding their innovation wetlands rights. We also suggest approaches for improving protection of the innovation wetlands, a goal we consider very important to social welfare. The

right to innovate should be recognized, respected, and protected to ensure that individuals and society enjoy more fully the myriad benefits of innovation.

I. THE INNOVATION WETLANDS METAPHOR

Until recently, marshy ecosystems were generally regarded as, at best, resources ripe for conversion into more beneficial uses. At worst, they were considered noxious sources of pestilence and disease, as exemplified by the disparaging phrase “malarial swamp.”⁴ Accordingly, for many decades governments promoted the filling in or draining of wetlands “through a variety of legislative and policy instruments.”⁵ For instance, “the Watershed Protection and Flood Prevention Act (1954)⁶ directly and indirectly increased the drainage of wetlands near flood-control projects.”⁷ Perversely, “[t]ile and open-ditch drainage were considered conservation practices under the Agriculture Conservation Program”⁸ These and other misinformed “policies caused wetland losses averaging 550,000 acres each year from the mid-1950’s to the mid-1970’s.”⁹

Beginning in the 1950s, a paradigm shift in the biological understanding of wetland ecology drove the recognition that, far from being dangerous or waste areas, wetlands are actually among the most productive and diverse of ecosystems on earth, providing great benefits, such as vital habitat for biodiversity, flood control, and water purification. Diffusion of information on these benefits changed the perception of wetlands by citizens, and the posture of governments also gradually changed. “Noxious swamps” increasingly came to be viewed as “valuable wetlands.”¹⁰ Regulatory approaches underwent a remarkable *volte-face*, resulting in a new emphasis on protection, preservation, and even rehabilitation of

4. Mark Sagoff, *Muddle or Muddle Through? Takings Jurisprudence Meets the Endangered Species Act*, 38 WM. & MARY L. REV. 825, 886 (1997).

5. THOMAS E. DAHL & GREGORY J. ALLORD, U.S. GEOLOGICAL SURVEY, WATER SUPPLY PAPER NO. 2425, HISTORY OF WETLANDS IN THE CONTERMINOUS UNITED STATES 9 (1997), available at <http://water.usgs.gov/nwsum/WSP2425/history.html>.

6. Pub. L. No. 83-566, 68 Stat. 666 (1954).

7. DAHL & ALLORD, *supra* note 5, at 9.

8. *Id.* at 10.

9. *Id.*

10. See Harold Ornes & C. Michael Hogan, *Wetland*, ENCYCLOPEDIA EARTH (Sept. 30, 2014, 10:32 AM), available at <http://www.eoearth.org/view/article/157085/>.

degraded wetlands. This new legal approach was crystallized in the U.S. Clean Water Act of 1972, which provided a strong legal basis for discouraging further elimination or degradation of wetlands.¹¹ The Ramsar Convention on the Conservation of Wetlands of International Importance also elevated the value of wetlands at the international level when it came into force in 1975.¹² Whereas governments had once targeted wetlands for destruction, many now focus on preserving and fostering them.¹³

We define the innovation wetlands as the rights and conditions that enable innovation by individuals to flourish. Just as in the case of environmental wetlands, the nature and extent of the innovation wetlands must be understood, and the value of the considerable innovation activity that takes place therein must be better appreciated. Recall that innovation by individuals, although of proven economic and social value, is fragile in the sense that it is developed by individuals who generally have small resources, and who expect only small-scale personal rewards for their efforts.

Legislative bodies and governmental agencies whose legal actions raise consumer innovation costs can greatly damage this economically important and individually-valued activity. In fact, for many individuals, the mere worry that their innovative activities might trigger governmental (*e.g.*, agency) scrutiny or penalties is sufficient to chill, or even end, those activities. For citizen innovators, actually being subject to an enforcement action can be financially ruinous, whether such enforcement is justified or not, and even if the citizen innovator targeted by enforcement ultimately prevails. This stems from a fundamental imbalance: individuals' monetary, legal, and temporal resources are almost invariably insignificant compared to those effectively infinite resources available to governments and their regulatory agencies. By contrast, this imbalance is less pertinent to commercial firms, which often have access to the money, attorneys, and personnel sufficient to weather governmental action. It is important that present and potential negative impacts imposed by governmental legislative and regulatory actions be recognized and understood in the larger context

11. Clean Water Act of 1972, Pub. L. No. 92-500, 86 Stat. 816 (codified as amended at 33 U.S.C. § 1251 (2012)).

12. Convention on Wetlands of International Importance Especially as Waterfowl Habitat, Aug. 21, 1975, 996 U.N.T.S. 245.

13. ENVTL. PROT. AGENCY, AMERICA'S WETLANDS: OUR VITAL LINK BETWEEN LAND AND WATER 1-2 (2003), available at http://water.epa.gov/type/wetlands/upload/2003_07_01_wetlands_vital_wetlands.pdf.

of an innovation wetlands to ensure better stewardship of important sources of innovation.

II. INNOVATION DEVELOPMENT AND DIFFUSION BY INDIVIDUALS

In order to understand the value that protection of the innovation wetlands can potentially provide, we must understand the nature and value of innovations developed by individuals. Many consumers develop product and service innovations for their own use. Such innovations can range from new or modified vehicles they wish to use, to medical innovations intended to address their own health issues, to software code that improves data exchange, to sporting innovations developed to use in sporting activities in which they personally engage.

The large scale and scope of activities among individual users to create and improve products for their own use has been documented to date by three national surveys of representative samples of citizens over age eighteen. With respect to scale, as can be seen in Table 1, these surveys found that millions of individuals in the UK, the United States, and Japan individually spend between \$1,000 and \$2,000 per year in time and money developing new consumer products for their own use.¹⁴ Collectively, they spend billions of dollars annually on this type of innovation. In aggregate, the scale of this development activity by individuals rivals the scale of product development by all consumer product firms in those three countries.¹⁵

14. Unless otherwise specified, all monetary values referred to in this Article are expressed in U.S. dollars.

15. Eric von Hippel, Susumu Ogawa & Jeroen P.J. De Jong, *The Age of the Consumer-Innovator*, 53 MIT SLOAN MGMT. REV. 26, 28 (2011); Susumu Ogawa & Kritinee Pongtanalert, Visualizing Invisible Innovation Continent: Evidence from Global Consumer Innovation Surveys 3, 8-9 (June 30, 2011) (unpublished manuscript), available at <http://ssrn.com/abstract=1876186>; Eric von Hippel, Jeroen P.J. de Jong & Stephen Flowers, *Comparing Business and Household Sector Innovation in Consumer Products: Findings from a Representative Survey in the United Kingdom*, 58 Mgmt. Sci., Sept. 2012, at 1669, 1675. All figures have been converted into U.S. dollars for comparison.

Table 1: Extent of Innovation by Consumers in Three Countries

	UK	USA	Japan
Sample Size	1,173	1,992	2,000
Percentage of population aged eighteen and over that creates or modifies products for their own use	6.1%	5.2%	3.7%
Annual expenditures by average individual consumer innovator (time plus out-of-pocket money per year)	\$1,801	\$1,725	\$1,479
Estimated total expenditures by consumer innovators on consumer products per year	\$5.2 billion	\$20.2 billion	\$5.8 billion

As can be seen in Table 2, the subject matter of user innovations documented in these three surveys covers a very wide scope, mirroring the wide range of product types used by consumers.

Table 2: Types of Innovation Developed by Users

Categories	Japan	USA	UK
Craft and shop tools	8.4%	12.3%	23.0%
Sports and hobby	7.2%	14.9%	20.0%
Dwelling-related	45.8%	25.4%	16.0%
Gardening-related	6.0%	4.4%	11.0%
Child-related	6.0%	6.1%	10.0%
Vehicle-related	9.6%	7.0%	8.0%
Pet-related	2.4%	7.0%	3.0%
Medical	2.4%	7.9%	2.0%

Individuals will innovate if and as their expected benefits exceed their expected costs, up to the level of resources they have available. It is reasonable that the average innovating individual will expect benefits per project that are, although a matter of personal importance, of relatively small scale. One consequence is that regulatory costs and risks that are easily borne by commercial firms, for which innovation-related regulations are generally designed, can be prohibitively costly for individual users. For example, a

requirement to crash-test an automobile enhanced by a modification before receiving regulatory approval to use an auto having that modification on public roads would be an acceptable business expense for an automobile producing firm—but would be literally prohibitive for all but a tiny, wealthy minority of car modifiers. Or, putting it in terms of the metaphor used in this Article, the innovation wetlands can be expected to be quite fragile: legislative or regulatory actions that increase the costs of individual user innovators can be expected to have a significant negative impact on the amount of innovation activity taking place. Overregulation drains vitality from the innovation wetlands, depriving society of valuable benefits.

III. LEGAL RIGHTS TO INNOVATE AND DIFFUSE INFORMATION

Individual innovators in the United States have strong, and sometimes even fundamental, legal rights to innovate, to use what they create for themselves, and to diffuse information to others about what they have done. These rights are *de jure*, or formally derived from the law, and are distinct from *de facto* factors, such as the practical difficulty of regulating innovative activities by individuals that are likely to escape detection, or are so common or popular with the public as to render enforcement impractical or impolitic. Though underappreciated and often unrecognized, these “innovation rights” offer robust protection to the innovation wetlands. In this Part, we explore the sources of individuals’ broad rights to engage in innovation-related activities without unreasonable governmental interference. As we will see, these rights often have long been embedded in the common law, the U.S. Constitution, or both. We focus on common law and constitutional innovation rights because of the powerful and durable principles they represent. Although legislatures and agencies can also confer valuable innovation rights by statute and regulation, respectively, these rights tend to be less reflective of deeper and more permanent innovation rights.

A. Rights at Common Law

The common law is a body of legal principles that has continuously evolved from customary practices and the decisions of courts. Having originated largely within the British legal system, the common law subsequently spread throughout the British Empire to countries such as Canada, Australia, New Zealand, India, and what became the United States. An influential early legal theorist, Sir

Edward Coke, emphasized the importance of the common law as “the most generall and ancient law of the realme,” and described its basis as “nothing else but reason . . . gotten by long study, observation, and experience.”¹⁶ Many common law principles support innovation rights and afford robust protection to the innovation wetlands. We highlight several notable principles, though there are many others.

1. *Bounded Liberty*

It is a fundamental default principle of U.S. law that, absent specified and legitimate prohibitions, people are generally free to act however they choose. This venerable liberty protects individuals from unreasonable limitations imposed upon them either by other people or by governments, and has deep roots in Western philosophy. As John Locke suggested more than three centuries ago:

Freedom of people under government is to be under no restraint apart from standing rules to live by that are common to everyone in the society and made by the lawmaking power established in it. . . . Persons have a right or liberty to [(1)] follow their own will in all things that the law has not prohibited and [(2)] not be subject to the inconstant, uncertain, unknown, and arbitrary wills of others.¹⁷

In the context of the United States, President Thomas Jefferson asserted that “rightful liberty is unobstructed action according to our will, within the limits drawn around us by the equal rights of others.”¹⁸ More recently, philosopher Isaiah Berlin described “[p]olitical liberty [as] . . . simply the area within which a man can act unobstructed by others.”¹⁹ The law affords the innovation wetlands a generous zone of freedom within which individual innovation can both survive and thrive.

This liberty is, however, subject to some limits. In general, one is free to take actions that do not materially harm others. Zechariah

16. EDWARD COKE, *THE FIRST PART OF THE INSTITUTES OF THE LAWS OF ENGLAND* 139, 171 (1623).

17. JOHN LOCKE, *TWO TREATISES ON GOVERNMENT: A TRANSLATION INTO MODERN ENGLISH*, at viii (Indus. Sys. Research 2013) (1690) (internal quotation marks omitted).

18. Letter from Thomas Jefferson to Issac H. Tiffany (Apr. 4, 1819), *in* THOMAS JEFFERSON POLITICAL WRITINGS 224, 224 (Joyce Appleby & Terence Ball eds., 2004).

19. Isaiah Berlin, Professor, Univ. of Oxford, Inaugural Lecture at the University of Oxford: Two Concepts of Liberty (Oct. 31, 1958), *in* FOUR ESSAYS ON LIBERTY 118, 122 (1971).

Chafee offered a vivid and visceral metaphor to describe the limits of liberty to act, suggesting that “[the] right to swing your arms ends just where the other man’s nose begins.”²⁰ This “bounded” liberty confers upon individuals a right to engage in innovation without requiring permission from other people or governments, provided that the actions engaged in while innovating do not violate specific, legitimate, and preexisting legal prohibitions (*mala prohibita*) or are not inherently wrongful or unreasonably dangerous to other people (*mala in se*). Beyond these limitations, individuals tend to be free to engage in a wide range of innovative activities. Indeed, the burden of proving that innovative activities do violate specific, existing legal prohibitions, or unreasonably endanger or harm others, generally lies with those who oppose these innovative activities. Furthermore, in the spirit of the rule of lenity, ambiguity as to whether an innovative activity is or is not illegal will tend to benefit an innovator wishing to engage in that activity.²¹

2. Castle Doctrine

Domiciles are accorded special protections under the common law. Their owners possess robust rights to deny entry to others, even official agents of the government. This principle is commonly expressed in the maxim “a man’s house is his castle.” This maxim is likely derived from a quote by biblical commentator Matthew Henry, who wrote that “[a] man’s house is his castle, and God’s law as well as man’s, sets a guard upon it; he that assaults it, it is at his peril.”²² Later, in his influential treatise, *Commentaries on the Laws of England*, William Blackstone emphasized the strong justification that the law gives the owner of a domicile to keep others, including the government, from impinging upon that domicile:

And the law of England has so particular and tender a regard to the immunity of a man’s house, that it stiles it his castle, and will never suffer it to be violated with impunity: agreeing herein with the sentiments of ancient Rome, as expressed in the words of [Marcus Tullius Cicero]; “*quid enim sanctius, quid omni religione munitius, quam domus uniuscujusque civium?*” [what more sacred, what more strongly guarded by every holy

20. Zechariah Chafee, Jr., *Freedom of Speech in Wartime*, 32 HARV. L. REV. 932, 957 (1919).

21. *Rule of Lenity Definition*, USLEGAL, <http://definitions.uslegal.com/r/rule-of-lenity/> (last visited Apr. 12, 2015).

22. 1 MATTHEW HENRY, AN EXPOSITION ON THE OLD AND NEW TESTAMENT, ch. 22, ¶6 (5th ed. 1761).

feeling, than a man's own home?] For this reason no doors can in general be broken open to execute any civil process.²³

Exemplified by the iconic garage inventor, individuals quite often engage in innovation at home, where the law provides them with considerable protection from scrutiny, intrusion, and interference. Without well-founded grounds for invading this sanctum of the home, those lacking permission from an individual innovator can be legitimately excluded from invading the innovator's home and property. The legal repose this affords robustly fosters and protects innovation by individuals within the innovation wetlands.

3. *Bodily Autonomy*

A corollary of Zechariah Chafee's rule, that "[the] right to swing [my fist] ends just where the other man's nose begins,"²⁴ is that noses, and the rest of the bodies attached to them, possess legal protection from interference by others. This principle of bodily autonomy affords individual innovators considerable scope for innovation affecting only their own persons, most notably medical treatments involving medical procedures, drugs, or medical devices. Physical interference with the body of another person constitutes battery; even the mere threat of physical interference can constitute assault. Forcefully preventing an individual from engaging in an act of innovation generally constitutes an illegal invasion of bodily autonomy. However, unless the actions of an individual innovator unreasonably threaten or harm the safety of another person, that innovator may usually interfere with her own body, even if such interference is unwise or dangerous to that individual. Medical innovation involving one's own body, such as the off-label use of pharmaceutical drugs to treat disease or discomfort, is generally protected by the principle of bodily autonomy. For example, medical patient contributors to the website of the firm PatientsLikeMe routinely engage in experimental medical treatments of their own maladies and report their findings on the firm website: www.patientslikeme.com.²⁵ Not only do members of PatientsLikeMe innovate with respect to their own healthcare, they also often share their results on the organization's website, allowing visitors to the

23. 4 WILLIAM BLACKSTONE, COMMENTARIES *223.

24. Chafee, *supra* note 20, at 957.

25. PATIENTSLIKEME, <http://www.patientslikeme.com> (last visited Apr. 12, 2015).

website to learn from the successes and failures of myriad others.²⁶ Although not without limits, legal protection for bodily autonomy allows individual innovators considerable liberty to innovate on their own health and bodies.

B. Constitutional Rights

In addition to rights arising within the common law, constitutional rights offer substantial protections to the innovation wetlands. We focus primarily on the highest U.S. legal authority, the U.S. Constitution, because most of the relevant innovation rights derive from the Bill of Rights, and thus apply to all levels of government by incorporation through the Fourteenth Amendment.

The Constitution provides individual innovators with several powerful and formal legal rights, including strong protections for thoughts, beliefs, and speech,²⁷ and homes,²⁸ as well as protections against unreasonable searches and seizures of persons and their property,²⁹ and self-incrimination and compelled release of personal information.³⁰ Together, these protections afford individual innovators with broad rights to conceive innovations, to engage in innovative activities in the privacy of their own homes, to use their innovations on and for themselves, to collaborate with other innovators, and to disseminate to others information about their innovations, all without unreasonable interference from governments. However, the Constitution is a two-edged sword because the copyright and patent protection it offers to authors and inventors can also discourage subsequent individual creation, experimentation, and tinkering, consequently inflicting harm on the innovation wetlands.³¹

1. *Right to Liberty*

In oft-cited language, the second paragraph of the 1776 United States Declaration of Independence recognized that all people possess “unalienable Rights [that include] Life, Liberty and the

26. The First Amendment right to disseminate the results of one’s innovation is discussed further in Subsection II.B.3.

27. U.S. CONST. amend. I.

28. *Id.* amend. III.

29. *Id.* amend. IV.

30. *Id.* amend. V.

31. *Id.* art. I, § 8, cl. 8.

pursuit of Happiness.”³² Later, the Bill of Rights enshrined a number of fundamental liberties, including freedom of thought, association, and movement.³³ As the American Civil Liberties Union has suggested, the Bill of Rights “guarantees individuals the right to personal autonomy, which means that a person’s decisions regarding his or her personal life are none of the government’s business.”³⁴ Like the common law principles of bounded liberty, castle doctrine, and bodily autonomy, the constitutional right to liberty provides considerable legal protection to individual innovators by preventing governments, including their regulatory agencies, from arbitrarily interfering with, or prohibiting, the activities of individual innovators. In addition, individuals have strong rights to associate with other individuals with whom they may engage in collaborative innovation. In other words, the constitutional right to liberty provides individual innovators several robust default rights to innovate, both alone and collaboratively.

2. *Right to Privacy*

Consider that the right to be left alone is a fundamental precondition of liberty. Although this right is not absolute, and, indeed, is limited in myriad ways by both law and the necessities of social interaction, its inner core allows an intimate zone of privacy surrounding each individual that can only be legitimately invaded, either by other individuals or governments, in rare and well-justified circumstances. In his classic 1879 textbook on tort law, Judge Thomas Cooley provided an early description of a right of personal autonomy: “The right to one’s person may be said to be a right of complete immunity: to be let alone.”³⁵ However, it was Samuel Warren and Louis Brandeis who formally proposed the existence of a constitutional right to privacy in an influential article they published in the *Harvard Law Review*.³⁶ In its landmark decision *Roe v. Wade*, the U.S. Supreme Court itself noted that it “has recognized

32. THE DECLARATION OF INDEPENDENCE para. 1 (U.S. 1776).

33. U.S. CONST. amend. I.

34. *The Right to Choose: A Fundamental Liberty*, ACLU Briefing Paper Number 15, LECTRIC L. LIBR., <http://www.lectlaw.com/files/con17.htm> (last visited Apr. 12, 2015).

35. THOMAS M. COOLEY, A TREATISE ON THE LAW OF TORTS OR THE WRONGS WHICH ARISE INDEPENDENT OF CONTRACT 29 (2d ed. 1888).

36. Samuel D. Warren & Louis D. Brandeis, *The Right to Privacy*, 4 HARV. L. REV. 193, 197 (1890).

that a right of personal privacy, or a guarantee of certain areas or zones of privacy, does exist . . . in the concept of liberty guaranteed by the first section of the Fourteenth Amendment."³⁷ In addition, state courts have recognized privacy as a fundamental legal right.³⁸

The right to privacy is a highly valuable innovation right, providing formidable protection against government intrusion into even illegal innovative behavior. For example, in *Stanley v. Georgia*, the Supreme Court held that the right to privacy even shields an individual who possesses pornographic materials so obscene that they would be completely illegal for vendors to sell.³⁹ In *Ravin v. State*, the Alaska Supreme Court went even further, ruling that the Alaskan Constitution confers upon individuals a right to privacy so powerful that it allows the personal possession and use of small quantities of illegal marijuana.⁴⁰ More recently, after overturning a statute criminalizing same-sex sexual intercourse in *Lawrence v. Texas*, the U.S. Supreme Court emphasized that "[i]t is a promise of the Constitution that there is a realm of personal liberty which the government may not enter."⁴¹ The right to privacy provides individuals with substantial autonomy of choice, including the ability to decide whether or not to perform controversial acts or undergo novel experiences, as well as the ability to control access to information about their private lives. It encourages individual innovators to take chances, question assumptions, challenge prevailing *mores*, and push back intellectual frontiers.

This right to privacy is vital for fostering individual innovation. It affords individuals a zone of freedom inside which they may engage in activities largely beyond the scrutiny and interference of others—especially governments. This is important for at least two reasons. Individual innovators may experiment, tinker, and create without feeling constrained by worries that their activities or ideas might be considered by others to be unorthodox, foolish, unethical, or immoral. An innovator may also use her inventions to satisfy her own needs, especially if such use takes place in a location, such as a home, in which she has a reasonable expectation of privacy.

Decisions regarding one's body and health can illustrate how the right to privacy can foster individual innovation. This category of

37. 410 U.S. 113, 152 (1973).

38. *See, e.g.*, *Ravin v. State*, 537 P.2d 494, 504 (Alaska 1975).

39. 394 U.S. 557, 564, 566 (1969).

40. 537 P.2d at 504.

41. 539 U.S. 558, 578 (2003) (quoting *Planned Parenthood of Se. Pa. v. Casey*, 505 U.S. 833, 847 (1992)).

decisions occupies the core of the right to privacy.⁴² Individuals are generally permitted to accept or reject medical care from physicians.⁴³ Alternatively, they may choose to engage in medical treatment of themselves. In fact, they may decide to modify aspects of their own bodies, either benignly, in the case of tattoos or ear piercings, or negatively, as in the case of dangerously extreme dieting or bodybuilding.⁴⁴ User creation or modification of medical treatments may, in some cases, turn out to be dangerous, but such practices can also lead to new insights into human health or even successful new medical treatments.⁴⁵ As long as one avoids carrying out such practices on other people (which may, among other violations, violate state law prohibiting the unlicensed practice of medicine, or even constitute battery), this behavior is generally legally permissible, as long as it does not reach a level so extreme as to attract the scrutiny of mental health authorities. Even the most extreme act of personal autonomy—suicide—is illegal at neither the state nor the federal level.

Naturally, innovators must usually still obey specific, legitimate legal rules, such as criminal prohibitions against possession or production of controlled narcotic drugs or dangerously radioactive substances. However, they are otherwise free to act for themselves as they wish, providing they do not harm others. Even actions ancillary to innovation, such as purchasing required parts or equipment, are accorded considerable protection under the right to privacy (and liberty), though the level of protection for an activity does tend to decline the further that activity strays outside a location or context usually associated with privacy. For example, innovative activities conducted inside one's own home are more strongly protected by the right to privacy than are activities conducted in a public park.

Finally, the right to privacy may even shield individuals somewhat from liability for infringing the intellectual property rights of others to the extent there is significant governmental involvement. Like the protection it affords personal possession and use of an

42. *Cruzan v. Director, Mo. Dep't of Health*, 497 U.S. 261, 269-70 (1990).

43. *Id.* at 278.

44. *Id.* at 269-70.

45. Hagen Habicht, Pedro Oliveira & Viktoriia Shcherbatiuk, *User Innovators: When Patients Set Out to Help Themselves and End Up Helping Many*, 66 *DIE UNTERNEHMUNG SWISS J. BUS. RES. & PRAC.* 277, 278-80 (2012), available at http://www.unternehmung.nomos.de/fileadmin/unternehmung/doc/DU_12_03.pdf.

illegal drug in Alaska,⁴⁶ the right to privacy might be invoked to challenge allegations of infringement arising from the personal making or using of others' patented inventions in contexts redolent of privacy. Moreover, individual noncommercial use of patented inventions rarely results in litigation due to limited prospects for collecting damages.⁴⁷

3. *First Amendment Rights to Free Speech, Press, and Association*

Crucial to individuals' rights to diffuse information about an innovation through speech or publications, and to collaborate on innovation, are rights guaranteed by the First Amendment to the U.S. Constitution. This provision states, in relevant part, that "Congress shall make no law . . . abridging the freedom of speech, or of the press; or the right of the people peaceably to assemble,"⁴⁸ which, through incorporation by the Fourteenth Amendment, also prohibits State governments from creating similar laws.⁴⁹

First Amendment rights robustly limit the ability of governments to restrain speech, communication, and the sharing of thoughts, thus allowing innovators not only to conceive of new inventions, but also to broadcast or share information about their new inventions with others, either directly or through general publication. These rights also allow innovators to meet and collaborate with one another.

Individual rights to diffuse information tend to be robust even when they protect behavior with potentially harmful consequences. For example, in *Caronia v. United States*, a 2012 decision by the Second Circuit Court of Appeals, the court held that a salesperson who promoted unapproved off-label—yet scientifically justified—uses of a drug (in this case, the anti-narcolepsy drug Xyrem®) could not be held liable for violating the Food, Drug, and Cosmetics Act (FDCA) because the particular FDCA restrictions imposed on such speech—even commercial speech, which the Constitution tends to accord lesser protection⁵⁰—violated the First Amendment.⁵¹ If such

46. *Ravin*, 537 P.2d at 504.

47. Rebecca S. Eisenberg, *Noncompliance, Nonenforcement, Nonproblem? Rethinking the Anticommons in Biomedical Research*, 45 HOUS. L. REV. 1059, 1062 (2008).

48. U.S. CONST. amend. I.

49. *Gitlow v. New York*, 268 U.S. 652, 665-66 (1925).

50. 703 F.3d 149, 163 (2d Cir. 2012).

commercial speech is protected by the First Amendment, then *a fortiori* is similar noncommercial speech about the off-label or unapproved use of drugs and medical devices.

The rights conferred upon individual innovators by the First Amendment should act as powerful protections against government actions that attempt to abridge the innovation process, from conception to publication to collaboration.

4. *The Fourth Amendment*

The Fourth Amendment to the U.S. Constitution can also be a powerful counterweight against governmental interference with individual innovation. It states that

[t]he right of the people to be secure in their persons, houses, papers, and effects, against unreasonable searches and seizures, shall not be violated, and no Warrants shall issue, but upon probable cause, supported by Oath or affirmation, and particularly describing the place to be searched, and the persons or things to be seized.⁵²

Although usually associated with criminal prosecutions, the rights this constitutional provision protects complement both the common law castle doctrine and the right to privacy by acting as legal bulwarks protecting individual innovators from unreasonable governmental intrusion into their homes, writings, and personal property. The Supreme Court has interpreted the Fourth Amendment as granting considerable protection from governmental intrusion into individuals' homes, home lives, and possessions. For example, in *Kyllo v. United States*, the Supreme Court overturned a homeowner's criminal conviction for growing marijuana at home on the grounds that the Fourth Amendment protected the homeowner from the warrantless use by the government of a thermal imaging device to detect heat radiation emanating from the home grow-op.⁵³ Although most citizen innovation is benign and uncontroversial, the Fourth Amendment provides innovators, even when engaged in activities society considers unsavory or the law otherwise prohibits, with considerable protection at home even from government monitoring carried out at a distance. Along with castle doctrine and the right to privacy, this provides individual innovators with considerable repose

51. *Id.* at 168-69.

52. U.S. CONST. amend. IV.

53. 533 U.S. 27, 40-41 (2001).

when innovating at home. It also makes the home an ideal place to innovate undisturbed.

5. Rights Reserved to the People

Finally, we note that the Ninth and Tenth Amendments to the U.S. Constitution not only allocate governmental power between the federal and state governments, but also retain and reserve all powers not specifically granted to these two levels of government by and for “the people.”⁵⁴ The legal implications for the innovation wetlands are profound. No government can claim a right to legislate or regulate unless it can ground its power to do so in the law. In the absence of such a specific legal grant, the people are sovereign, and their liberty to act, and to innovate, is considerable.

What does this mean for the innovation wetlands? Governments can legitimately legislate and regulate in many fields of human endeavor. Notable among these fields at the federal level are commerce, national defense, foreign relations, patent and copyright, and general police powers to maintain public safety.⁵⁵ However, the activities of individuals, when they fail to implicate interests legitimately within governmental jurisdiction, are largely beyond the remit of government. This is especially true of innovation that is noncommercial in nature, carried out by individuals on themselves or for their own benefit, conducted on private property or in one’s home, of a nature that does not materially risk public safety, or whose details are shared with others either privately or publicly. Much of the innovation carried out by individual citizens, independently or collaboratively, within the innovation wetlands falls into this realm of powers reserved to the people.

IV. HOW GOVERNMENTS CAN IMPACT THE INNOVATION WETLANDS

Given the array of legal rights described in Part III, one might ask why individuals’ rights to innovate, to collaborate, and to diffuse information about what they have created are not secure. Again, recall Zechariah Chafee’s rule: “Your right to swing your arms ends just where the other man’s nose begins.”⁵⁶ As possible sources of harm to public or private interests may exist, related to the

54. U.S. CONST. amends. IX, X.

55. *Id.* art. I, § 8.

56. Chafee, *supra* note 20, at 957.

development and use of innovations by individuals, a reasonable basis in law and policy exists to correspondingly constrain users' liberty of action with respect to many potential innovations. In the United States, three major levels of government can play roles in protecting or damaging the innovation wetlands: federal, state, and local. Each can constrain consumer freedoms to innovate via statutes or regulations intended to promote or protect public safety, welfare, or property rights, among other motivations, to benefit the public interest. In addition, governments, or their agents, may sometimes act due to improper or harmful motivations, such as agency capture whereby corporate interests influence agencies to regulate on behalf of protecting those corporate interests over the interests of the public.⁵⁷ While the examples we use to illustrate the effects of legislation and regulation on the innovation wetlands predominantly involve the federal level of government, we use this focus for simplicity. Legislation and regulation by state and local governments (which may conceptually be subsumed within the state level because local governments tend to derive their legal authority from their states) can also have strong effects on the innovation wetlands, and we also provide some examples drawn from these levels.

A. Regulating Access to Public Resources

Consider that federal, state, and local governments regulate and control access to many *public* resources. This can importantly affect the innovation wetlands because, more often than one might suppose, development and practice of innovations requires use of public resources. Thus, one can build almost any type of car one likes, but to test or use it on a public road, one needs to meet detailed regulatory constraints intended to protect the safety of the driver and others. Similarly, one can build a radio-controlled unmanned aircraft, but to test or use it in the public airspace, one must adhere to detailed regulations promulgated and enforced by the Federal Aviation Administration (FAA). One can build a new wireless transmitter, but to test or use it in the public radio spectrum, one must adhere to regulations and constraints imposed by the Federal Communications Commission (FCC). And, one can also use and test one's innovations in public waters, but only in certain prescribed areas and under prescribed constraints, such as the avoidance of polluting effects.

57. George J. Stigler, *The Theory of Economic Regulation*, 2 BELL J. ECON. MGMT. 3, 3 (1971).

Where others may be affected by an innovation, the argument for government regulation is stronger, but where the innovation affects only the innovator, this potential justification for regulatory action would be much slimmer. For example, in the case of an automotive innovation that a user makes and practices away from others—driving the innovative auto only on his or her private land, and only at his or her own risk, for example—arguments favoring strong regulation to protect the public are much weaker.

As we will consider in our discussion section (Part V), there can be ways both to protect the public *and* to provide access to public resources for user innovators. However, if legislators and regulators are not aware of the prevalence and value of user innovation, they can grievously and unnecessarily damage the innovation wetlands while pursuing other objectives. As an example, consider a pending European Union (EU) directive that will, if passed, in effect prohibit users from modifying their personal vehicles in functional ways, in the name of increasing road safety.⁵⁸ This proposed EU regulation, if enacted, will have just that result by mandating that cars will only be allowed on public roads if periodic inspections by authorized inspectors reveal that they have only standard producer parts installed, even if a nonstandard user modification *enhances* safety.⁵⁹

Road safety is certainly a worthy social goal, and as we have seen, governments have the right to regulate access to public resources, like roads, in order to reduce actual or potential public harm. However, no serious comparison of costs and benefits has been done in the case of this pending EU regulation because, we presume, there is no awareness among EU regulators that there is in fact a cost to offset against the intended benefit upon which they are focused. In the written background justification of this regulation, there is only one empirical study of automotive accident rates in standard and modified cars, and that study finds that modified cars are *less* frequently involved in accidents than nonmodified cars.

The extent of economic disruption to individual user innovation caused by this single proposed EU regulation can be approximately measured by reference to the national surveys discussed earlier. Recall from Table 2 that 8% of all consumer innovations in the UK were related to vehicles. If we assume that each innovation in that sample had the same cost independent of subject matter, we see that

58. Council Directive 2009/40, 2009 O.J. (L 141/12) (EC).

59. *Id.* art. 13.

in the UK alone, consumer innovators spent \$416 million dollars in vehicle-related innovations annually. Effectively all of this innovation expenditure and related benefits are threatened by this single short-sighted regulation.

Regulations with damaging impacts on the innovation wetlands can be promulgated by all levels of government. For example, codes regarding acceptable homebuilding practices in the United States are generally left to state and local governments. Building codes that are drawn up without awareness of the potential of user innovation in this realm can prohibit novel—including safer or more efficient—building techniques.⁶⁰ Interestingly, unlike the auto-regulation case just described, where a new regulation threatens to close down a thriving and very visible ecosystem of vehicle-related innovations, opportunities for innovations that are deterred by regulations long in place can be effectively invisible because these innovations simply do not happen. This can make it difficult to document the benefits to be derived from the easing of those regulations. Phantom innovation prevented from ever occurring, due to misguided regulation, denies society considerable potential benefits.

B. Regulating Commerce

Federal regulatory agencies can generally regulate the *commercial* manufacture and practice of, and *commercial* advertising and distribution of, innovations via the Commerce Clause in Article 1, § 8 of the U.S. Constitution.⁶¹ This clause grants Congress power “[t]o regulate Commerce with foreign Nations, and among the several States, and with the Indian Tribes.”⁶² The Supreme Court has construed the Commerce Clause as permitting Congress to pass statutes regulating broad swathes of the economy, and reaching commercial activity that implicates interstate commerce both directly and indirectly.⁶³ However, Supreme Court decisions have consistently agreed that the Commerce Clause does not allow federal agencies to regulate truly noncommercial activities.⁶⁴ The Supreme Court reaffirmed this principle in 2012, when it decided *National*

60. Rob Harris, *A Building Code with Room for Innovation*, N.Y. TIMES GREEN BLOG (Oct. 5, 2012, 10:19 AM), <http://green.blogs.nytimes.com/2012/10/05/a-building-code-with-room-for-innovation/?hp>.

61. U.S. CONST. art. I, § 8, cl. 3.

62. *Id.*

63. *Wickard v. Filburn*, 317 U.S. 111, 123-24 (1942).

64. *United States v. Morrison*, 529 U.S. 598, 617 (2000).

Federation of Independent Business v. Sebelius, a case contesting the constitutionality of the federal Affordable Care Act of 2010.⁶⁵ There, the Court clarified that “[t]he power to *regulate* commerce presupposes the existence of commercial activity to be regulated.”⁶⁶

In other words, innovative activity by individuals that is commercial in nature can be within the legitimate reach of the federal government, whose authority to regulate is often derived from the Commerce Clause. In turn, federal regulatory agencies derive their legal authority to regulate commercial activity both from the Commerce Clause and, more particularly, from the “organic statutes” that govern their activities and specify the limits of their authority. Organic statutes typically limit agency authority to regulate more restrictively than the full scope of the Commerce Clause would allow. Thus, agency regulation tends to be best justified when it concerns clearly commercial activities. For example, individuals who develop and *sell* novel medical treatments are subject to Food and Drug Administration (FDA) regulatory oversight. More specifically, when innovators or others begin to advertise or sell drugs or devices, or services entailing their use, the Commerce Clause is triggered, and the FDA, Federal Trade Commission (FTC), and other relevant agencies are empowered to regulate such behavior.

However, as discussed above, when individuals develop their own medical drugs and treatments, they can personally make and use them as they see fit, provided that they do not use materials, such as opioids, specifically (and legitimately) proscribed by law, pose unreasonable harm to others, or infringe existing patent rights. These citizen innovators are also free to distribute information about their innovations, including design details and the effects of use they have experienced, to others without permission from, or constraint by, the FDA or the FTC, as long as they do not engage in commerce or incite others to break the law or infringe patents or copyrights belonging to others. In practice, innovative activity that avoids the indicia of commerciality (*e.g.*, advertising, offering or holding for sale, or actually selling) lies at the margins of what tends to attract regulatory agency attention, and beyond what regulatory actions courts will tend to uphold as justified by the Commerce Clause or the agency’s organic statute. Individual innovators who innovate to satisfy their own individual needs, and who do so noncommercially,

65. 132 S. Ct 2566, 2577 (2012).

66. *Id.* at 2586.

will tend to be beyond legitimate federal agency regulation. This is the heart of the innovation wetlands.

C. Defining and Regulating Intellectual Property Rights

Patent and copyright laws are based in the U.S. Constitution. Article I, § 8, Paragraph 8 (the “Intellectual Property Clause”) states that Congress shall have 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.”⁶⁷ Congress derives its authority to legislate patent and copyright policy directly from the Intellectual Property Clause, rather than via the Commerce Clause discussed in Section IV.B above. Consequently, with respect to patents and copyrights, Congress may regulate *noncommercial* behavior, such as that carried out by myriad individual user innovators.

For example, without permission of the patent owner, one may not make, use, sell, offer to sell, or import a claimed invention, either directly or indirectly.⁶⁸ This can pose dangers to the innovation wetlands, because even individual users who are *not* engaging in commerce are prohibited from making or using patented inventions, such as incorporating them into their designs. In fact, due to the unforgiving “strict liability” principles of patent law, even inadvertent or unknowing use of patented inventions may trigger infringement liability, monetary damages, and injunctive relief. This can create a forbidding cost and risk problem for individuals active in the innovation wetlands because it is often prohibitively expensive to identify all relevant patents and their true owners, to understand what activities all relevant patent claims prohibit, to calculate accurately the risks of infringement and litigation, and to predict the specific likely monetary and injunctive penalties.

Copyright law also poses hazards to the innovation wetlands, especially in the restrictions it places on software code and the making of digital copies. Consider the Digital Millennium Copyright Act of 1998 (DMCA).⁶⁹ This U.S. legislation was intended to prevent free digital copying—“piracy”—of commercially sold information products such as software and music. However, the DMCA has

67. U.S. CONST. art. I, § 8, cl. 8.

68. 35 U.S.C. § 271(a) (2012).

69. Digital Millennium Copyright Act of 1998, Pub. L. No. 105-304, 112 Stat. 2860.

created severe collateral damage to users' abilities to innovate with respect to products subject to DMCA restrictions, even where such products have been legally purchased. Specifically, the DMCA made it a crime to circumvent anti-piracy measures built into most commercial software. The intent of the law was to reduce "piracy" by using the threat of criminal sanctions to prevent copying of software or digital media.

However, access to software code in products is also needed by user innovators to understand, modify, and improve products they purchase, and innovators must circumvent anti-piracy measures to gain access to the software code. As a result, the DMCA legislation raises the costs of this type of user innovation significantly, thereby damaging this portion of the innovation wetlands. The damage done is invisible—no one has totaled up the value of phantom innovative projects not embarked upon—but it may be of significant scale. Recall that in the UK, 14% of consumer innovation involved the development and modification of software. If, in the United States, the same fraction of innovation is devoted to software (this fraction was not measured in the U.S. survey), a total of \$2.8 billion worth of annual of user innovation activity in the United States alone will have been put at some level of risk by the DMCA.

In the legislative history of the U.S. bill, there is little evidence that the drafters were even aware of the damage the legislation they were developing would inflict on the innovation wetlands.⁷⁰ And what evidence was presented failed to soften the draconian effect that the DMCA has had on curbing user innovation reliant on digital text, images, videos, recordings, and software code. Worst of all, uses of digital media by user innovators that were formerly sheltered under the venerable copyright fair use defense were walled off from user innovators by the anti-circumvention provisions of the DMCA. Like a stream providing water to an ecological wetland that is dammed or diverted, access to the flow of digital resources that provides a feedstock to creativity within the innovation wetlands has been damaged by the DMCA legislation. Although some countervailing legal rights (*e.g.*, castle doctrine, the right to privacy) may lessen the chilling impact that intellectual property rights may have on individual innovation, indiscriminate application of intellectual property rights to the activities of individual innovators risks doing substantial harm to the innovation wetlands.

70. *Digital Millennium Copyright Act*, OPENLAW (Feb. 15, 2000), <http://cyber.law.harvard.edu/openlaw/DVD/dmca/>.

V. DISCUSSION

We have proposed that a first and very important step in the preservation and strengthening of the innovation wetlands is to frame that integrating concept and explain its value. In a similar way, the unifying concept of wetlands was used by environmentalists to draw together diverse features ranging from inland bogs to seacoast marshes under a single heading, so that their collective properties and value could be better evaluated and protected. Here, with the same goal in mind, we seek to draw together diverse innovation contexts, rights, statutes, and regulations, ranging from those applicable to the reverse engineering of software, the hacking of continuous glucose monitors to extend their capabilities, and experimental airplane design and usage, under the encompassing heading of the innovation wetlands. The important features that we view as common among all these diverse settings is the innovation activity of, and value provided by, individuals participating in the innovation wetlands, and the net levels of freedom or restriction that they encounter with respect to their ability to innovate freely and freely diffuse their innovations as they choose. In short, we believe the law affords individuals a robust right to innovate.

Beyond this basic contribution, there are additional, more detailed considerations that we explore next. Analysis shows that economies that include open user innovation in addition to closed producer innovation improve social welfare.⁷¹ Therefore, if areas of governmental discrimination against the former type of innovation can be found, a “leveling of the playing field” or even positive support from government can be justifiable.

A. Include Innovation Wetlands in Cost–Benefit Analyses

The way to good practice with respect to innovation wetlands protections is, first, to measure the impacts of present or proposed governmental actions on the innovation wetlands. Such evidence-based policy making has become a hallmark of modern regulatory analysis, and is often formally referred to as “regulatory impact

71. Joachim Henkel & Eric von Hippel, *Welfare Implications of User Innovation*, 30 J. TECH. TRANSFER 73, 73 (2005); Eric von Hippel & Christina Raasch, *User-Contested and User-Complemented Markets for Innovations: Impacts on Market Outcomes and Social Welfare* 12 (Feb. 2012) (unpublished manuscript), available at <http://www.kites.unibocconi.it/wps/allegatiCTP/vonHippel.pdf>.

analysis.”⁷² This can be done by following the pattern pioneered by environmental protection acts around the world. “Environmental impact statements” are now required in the case of proposed changes that might inflict environmental damage.⁷³ Within such an impact statement, evidence is provided to enable officials and citizens to weigh the likely costs and benefits the proposed change would create so that a rational, evidence-based decision can be made.

Cost–benefit analysis has long played a role in regulation in the United States. It was first enshrined in statutory form in the Flood Control Act of 1939, which mandated a straightforward confirmation of net benefits: in any federal flood control project, the overall benefits were required to exceed the estimated costs of implementing the project.⁷⁴ On a wider scale, the National Environmental Policy Act of 1969 (NEPA) introduced a requirement that cost–benefit analysis be conducted for any proposed federal regulation that implicated environmental quality. Although NEPA did not mandate that the results of a cost–benefit analysis be determinative on governmental decisions, actions carried out in the face of net costs naturally invite scrutiny.

Perhaps the most far-reaching application of cost–benefit analysis has resulted from executive orders issued by presidents, beginning with Ronald Reagan. Over the past three decades, these executive orders, aimed at regulatory agencies, have markedly expanded the use of these analyses in evaluating the desirability of any new federal regulatory program. The Reagan administration was the first to make cost–benefit analysis a requirement for all federal regulatory agencies. On February 17, 1981, Reagan promulgated Executive Order 12,291,⁷⁵ which mandated cost–benefit analysis when triggered by a variety of factors, most of them economic in nature. Among these triggers was any rule “likely to result in . . . [s]ignificant adverse effects on . . . innovation.”⁷⁶ Succeeding presidents George H.W. Bush, Bill Clinton, and George W. Bush largely maintained this approach to detecting and minimizing adverse economic effects of federal regulation. Most recently, on January 18, 2011, President Barack Obama issued Executive Order

72. *Regulatory Impact Analysis*, OECD <http://www.oecd.org/gov/regulatory-policy/ria.htm> (last visited June 14, 2015).

73. National Environmental Policy Act of 1969, Pub. L. No. 91-190, § 102(C)(i), 83 Stat. 852.

74. Pub. L. No. 76-396, 53 Stat. 1414.

75. Exec. Order No. 12,291, 3 C.F.R. 127 (1982).

76. *Id.* at 127-28.

13,563, which reaffirmed Executive Order 12,866 (itself a reaffirmation of Executive Order 12,291), issued by President Bill Clinton, on September 30, 1993, and requires cost–benefit analysis of federal regulations.⁷⁷ Among the requirements of Executive Order 13,563, “[e]ach agency shall . . . seek to identify, as appropriate, means to achieve regulatory goals that are designed to promote innovation,”⁷⁸ “each agency shall ensure the objectivity of any scientific and technological information and processes used to support the agency’s regulatory actions,”⁷⁹ and the formerly prospective scope of cost–benefit analysis for regulations is to be made retrospective as well.⁸⁰ A related procedure, called “regulatory impact assessment” or “regulatory impact analysis,” is required in many jurisdictions before passage of new regulations. Given growing recognition of the importance of user, open, and collaborative innovation, the addition of these forms of innovation to the cost–benefit analysis calculus should help to shift the balance away from regulations harmful to the innovation wetlands.

To recognize more formally the role it should play in sound policy making, some have suggested that the cost–benefit analysis approach for evaluating regulations be elevated into the more durable form of a generally applicable federal statute.⁸¹ So influential has this form of analysis become in federal regulation that the United States is sometimes referred to as the “cost–benefit state.”⁸²

One of the primary benefits of using cost–benefit analysis to protect the innovation wetlands is that it is already a requirement of federal law with strong bipartisan support. Rigorous application of such analyses to the federal regulatory scheme could help free all sources of innovation from unwarranted restrictions imposed by agencies. However, innovation by individual and collaborating users would benefit disproportionately. Because of the small scale of individual innovators’ resources relative to those commanded by firms, it is reasonable that increases in regulatory costs would affect

77. Exec. Order No. 13,563, 76 Fed. Reg. 3,821, 3,821 (Jan. 21, 2011).

78. *Id.* at 3,822.

79. *Id.*

80. *Id.*

81. John D. Graham, *The Myths of Benefit Cost Analysis*, REGBLOG (June 6, 2011), <https://www.law.upenn.edu/blogs/regblog/2011/06/the-myths-of-benefit-cost-analysis.html>.

82. Cass R. Sunstein, *The Cost-Benefit State* 1 (Coase-Sandor Institute for Law & Economics, Working Paper No. 39, 1996), available at http://chicagounbound.uchicago.edu/cgi/viewcontent.cgi?article=1497&context=law_and_economics.

innovation and diffusion activities of citizen innovators more severely.

It is also the case that application of cost–benefit analysis to possible impacts on individual users is becoming more practical with measurements of the types and levels of user innovation activity that are now being carried out via representative national surveys such as those referred to earlier. These can, and should, be used as inputs to cost–benefit analyses. (Earlier, we illustrated this value in our Part IV case examples by roughly quantifying how much innovation wetlands activity was present in the two fields of motor vehicles and software.) Recognition of this new category of potential damage—contributing to the cost side of the ledger—should tend to result in the approval or survival of fewer regulations harmful to the innovation wetlands.

B. Design Regulations That Individuals Can Comply with at Very Low Costs

Governmental actions appropriate to repair or offset specific damage to the innovation wetlands will to some extent be project specific. However, some promising general pathways can also be identified.

One can add flexibility to currently rigid regulations to allow local adjustments that can open the door more widely to individual user innovation. For example, § 104.11 of the Utah building code provides county building inspectors with some flexibility in approving the use of unconventional, but innovative, building materials.⁸³ Instead of being restricted to specified materials, inspectors may approve any material as long as they are satisfied that it meets the functional requirements of safety and reliability. Such a regulation has notable advantages. It allows for innovation in building materials, which may lead to improved materials, but it also maintains sound public policy by ensuring that these materials work as intended.⁸⁴ Similar flexible treatment of individual innovators can be found in regulations applied to experimental airplanes and experimental vehicles.⁸⁵

83. UTAH ADMIN. CODE r. 156-56 (2008) (referencing INT’L BLDG. CODE § 104.11 (Int’l Code Council ed., 2006)).

84. Harris, *supra* note 60.

85. ME. REV. STAT. tit. 29-a, § 470 (2003).

As a second generic approach, agencies can elect to free segments of a public resource for unlicensed use and experimentation by innovation wetlanders. For example, the FCC reserves some segments of the radio spectrum as “white space[.]” where individuals or groups can explore and exploit novel uses without having to obtain a license.⁸⁶ At the same time, regulations reserve other parts of the spectrum for exclusive use by specific regulated entities with specified purposes, such as on-air TV station channels.⁸⁷ As a second example, the FAA allows the use of *some* airspace—for example, space far from airports and up to a height of 400 feet—for unlicensed use by hobbyist makers and users of small radio-controlled airplanes, including drones.⁸⁸ Other altitudes and areas are reserved for the use of pilots of licensed aircraft, or are completely off-limits to use by any aircraft.⁸⁹

Finally, Congress possesses the discretion not to use its constitutional powers to support patent or copyright laws to intrude upon the innovation wetlands. It could amend the patent and copyright statutes to end liability for experimental, research, or noncommercial uses. Congress, the courts, and the United States Patent and Trademark Office (USPTO) could even insist that no patent or copyright be granted or maintained unless it complied with the language of the Constitution that these rights be granted “[t]o promote the Progress of Science and useful Arts.”⁹⁰ Neither Congress, the courts, nor the USPTO have yet taken such steps. However, this would constitute good public policy for protecting the innovation wetlands and, if done judiciously, would have negligible effect on any current patent or copyright incentives to innovate.⁹¹

86. *White Space Database Administration*, FCC, <http://www.fcc.gov/topic/white-space> (last visited Apr. 12, 2015).

87. *FCC Frequency Bandplan*, COLUM. UNIV. AMATEUR RADIO CLUB (July 27, 1994), <http://www.w2aee.columbia.edu/fcc-bandplan.html>.

88. Unmanned Aircraft Operations in the National Airspace System, 72 Fed. Reg. 6689 (Feb. 6, 2007).

89. Commuter Operations and General Certification and Operations Requirements, 60 Fed. Reg. 65832, 65842, 65870 (Dec. 20, 1995).

90. U.S. CONST. art. I, § 8, cl. 8.

91. Other authors have also suggested ways in which intellectual property laws could be interpreted or amended to support, rather than harm, innovation. *See, e.g.,* Pamela Samuelson, *Freedom to Tinker*, THEORETICAL INQUIRIES L. (forthcoming 2015), available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2605195 (outlining the existence of, and support for, a freedom to tinker that supports legal innovation rights even in the face of others’ intellectual property, and additionally suggesting how intellectual property law could be reformed to widen this freedom to tinker); Ariel Katz, *The First Sale Doctrine and the*

C. Improved Wetlands Affordances Beyond Regulation

Beyond direct regulation, there are many business practices that are restrictive to citizen innovators because producers fear potential liability from serving these innovators. Innovation activities by individuals often build upon services, components, and equipment that are sold commercially. Costs for wetlanders are increased if businesses refuse to provide commercial materials or services to those they identify as wetlanders, due to fear of legal risks arising from their interaction with the innovation wetlands. For this reason, we suggest that laws should be changed to weaken users' rights to sue producers for damages incurred as a result of user modification of producer products, services, or use of them in ways not intended by producers.

It may also be valuable to consider the wisdom of freeing producers from legal liability if they support innovating users (which they may wish to do when users are working in areas of interest to the firm) without oversight or control of what users create. Ensuring a supply of products and services on or with which users may innovate also helps provide producers with user improvements that producers can then incorporate into better products or services they may then sell on the market. For example, boating firms interested in spurring innovation in boat hull design could then support individual or collaborating boating innovators with materials, tool kits, education, or even financial support without incurring legal risk. Such support for the innovation wetlands could result in a diversity of new and improved boat hull designs even if the supporting firm itself lacked its own internal research and design capability. Resulting innovations would benefit not only their creators, but would generally be disseminated freely to anyone, including the supporting firm, interested in using them. In many cases, supporting the innovation wetlands will tend to be a less expensive and more efficient strategy for finding useful innovations than the traditional routes of relying on internal efforts or hiring outside consultants. We consider it a fair tradeoff to lessen threats of liability to suppliers in return for improved access to tools, supplies, and services that spur activity in the innovation wetlands.

Economics of Post-Sale Restraints, 2014 BYU L. REV. 55, available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2434044 (explaining how proper interpretation of the first sale doctrine can support user and open innovation).

With respect to patents and copyrights, the fear of liability individuals currently feel should be eliminated by the pathway noted earlier.⁹² Congress should provide personal noncommercial use exemptions to make, use, and modify (and diffuse information regarding) innovation designs that are partially or fully covered by patents or copyrights. This could take the form of experimental, research, or fair use exemptions or defenses. This option exists in other countries, but not in the United States. The functional equivalent in the United States could perhaps be conveniently accomplished by incorporating a broad research exemption into existing U.S. patent law and by expanding the applicability of the fair use defense both for conventional copyright and for the anticircumvention provisions of the DMCA. Ideal for the innovation wetlands would be an exemption for personal noncommercial use, which would eliminate the high burden, and resulting chill, of detecting and avoiding potential patent and copyright infringements for innovating users.

Finally, governments offer extensive financial support to producers in the form of such things as research and development (R&D) grants and subsidies, and R&D tax credits. Neutrality with respect to provision of public resources to support valuable innovation would suggest the devising of supports of appropriate value to wetlands innovators that reflect the considerable level of their contributions, freely given, to social welfare. These might take the form of government investments to support research in methods of open innovation collaboration and diffusion. Neutrality can also include support for the development of an infrastructure appropriate to cheap distributed innovation development and diffusion. Government subsidies have already played an important role in Internet development, and policy has ensured that the Internet is open to those who seek to use it for innovation-related communications. This has greatly widened the range of online innovation opportunities for which innovation development and innovation diffusion in the innovation wetlands is viable.⁹³ Generalizing such support to include activities that occur within the innovation wetlands would help to even the playing field between firm and individual innovators. More, better, and more affordable innovation would be the socially beneficial result.

92. See *supra* Section IV.B.

93. See generally YOCHAI BENKLER, *THE WEALTH OF NETWORKS: HOW SOCIAL PRODUCTION TRANSFORMS MARKETS AND FREEDOM* (2006).

D. Practical Guidance for Individual Innovators

The essence of our message for individual innovators seeking guidance regarding their legal rights to innovate is that, as a general statement, individuals' rights to innovate are generous and already deeply enshrined in the law. In the United States, protected by both constitutional and common law rights, individuals are free to engage in a broad range of noncommercial innovative activities to satisfy their own curiosity and needs. They may also innovate collaboratively with others, and then disseminate information about their innovations to anyone and everyone. Moreover, they may engage in innovative activities, both wise and unwise, and risk life and limb doing so. Strong legal limits on such activities are triggered when they pose unreasonable risks to others, especially harm to third parties or their property. Thus, the core of the legal protections for the innovation wetlands allow individuals to innovate for their own noncommercial purposes without posing unreasonable risks to others. Both the theory and the empirical evidence we present above suggest that the lifeblood of the innovation wetlands is precisely this category of individual noncommercial innovation that does not unreasonably risk harm to others. As we have shown, misguided or misapplied statutes and regulations can impinge on the innovation wetlands, thereby impeding one of society's most important sources of new innovation, but the right to innovate provides legal protections against these threats. We next provide several illustrative examples of innovative activities that are likely well protected at law.

1. Individual Medical Experimentation

Like the admonition "Physician, heal thyself," almost everyone has, at some point in her life, engaged in innovative self-medication. Whether improvised bandages, splints, compresses, hangover concoctions, herbal remedies, folk cures for the common cold, or words of comfort with placebo effect spoken to a child who feels ill, people routinely engage in the practice of medicine on themselves. In most cases, the malady being treated is mild and temporary. However, many people also develop and implement novel treatments for more serious and chronic medical conditions when frustrated by the limitations, in effectiveness or access, of formal medical care. Many of these patient-developed innovations doubtless are of little value, or possibly even damaging. However, some are extremely valuable. Indeed, many medically important treatments, now adopted

widely as standard medical practice, have arisen from experimentation by patients themselves.⁹⁴ A powerful example involves NightScout, a community of collaborating individual innovators who successfully modified a commercially-available continuous glucose monitoring device—a device upon which many patients with type-1 diabetes rely to avoid such catastrophic outcomes as diabetic coma—to greatly improve the well-being of patients who require monitoring by extending the device’s capabilities to include remote monitoring of patients’ glucose by friends, family, or physicians.⁹⁵

As long as controlled substances or devices are not used, and others are not unreasonably endangered, the law provides strong protection to individual patient innovators to carry out medical treatments or experiments on themselves, to report the results to others, and to engage in collaborative innovation and experimentation. The FDA may chafe at such activities, and attempt to regulate them, but it is largely beyond the agency’s legal authority to prevent individual patients from engaging in such noncommercial medical treatment on themselves.

2. *Vehicle Customization*

Automobiles are legally regulated in many respects. These include minimum fuel efficiency standards, mandatory seatbelts, airbags, and other safety equipment, pollution emission standards, and wheelbase and width limits. Drivers must adhere to a plethora of operation regulations, such as not exceeding speed limits, obeying traffic lights and signs, and signaling turns and lane changes. Despite this maze of regulations, individuals retain tremendous scope for innovation, whether by modifying or constructing cars or by using them in unorthodox ways. High-fidelity stereos and video systems can be installed to transform automobiles into traveling entertainment centers, engines can be modified for high-performance or alternative fuels, shapes, colors, textures, and materials of various parts of a car may be customized, and many other creative alterations can be made.

94. Habicht, Oliveira & Shcherbatiuk, *supra* note 45, at 291.

95. Kate Linebaugh, *Citizen Hackers Tinker with Medical Devices; Diabetes Patients, Family Members Try to Make Glucose Monitors More Useful*, WALL STREET JOURNAL, Sept. 26, 2014, <http://www.wsj.com/articles/citizen-hackers-concoct-upgrades-for-medical-devices-1411762843>.

Individual innovators can make a nearly infinite number of modifications to their cars while retaining their right to use public roads. In part, this results from a regulatory emphasis by the National Transportation Safety Board (NTSB) and others on function rather than form. For example, as long as one's automobile emits measured pollutants at less than a legally specified level, regulators will tend to tolerate many different designs capable of achieving lower emissions.

On private land, customized automobiles are even freer. Private roads or race tracks can host even car designs that would violate statutes or regulations governing driving on public roads (*e.g.*, monster trucks, drag-racing cars, demolition derby cars), provided, of course, that they do not pose unreasonable risks (*e.g.*, extreme noise, noxious pollution) to third parties. Here, protections are afforded by such legal principles as the castle doctrine and the right to privacy.

In general, individuals are fairly free to innovate on their own vehicles in the United States as long as any resulting innovations comply with safety and pollution regulations and do not pose unreasonable risks or harms to others.

3. Intellectual Property Laws

Individuals' innovation wetland activities can be constrained by intellectual property rights owned by others. User innovators tend to be affected most by two kinds of intellectual property: patents and copyrights. Patents and copyrights pose a threat to the innovation wetlands that is different in kind from that posed by government legislation and agency regulation because ownership of these intellectual property rights tends to be diffusely spread among private owners. Rather than a small number of identifiable governmental threats, the threat of legal liability posed by tens of millions of patents and copyrights is decentralized among numerous private individual and corporate owners, making it difficult to determine whether or not one is infringing any of these owners' intellectual property rights.

One of the most worrisome aspects of patents and copyrights is the harsh legal standard of strict liability that can be applied to individuals who may, knowingly or unknowingly, violate owners' rights. Strict liability applies as long as a defendant is responsible for an act that causes damage. Liability tends to be triggered based on whether or not infringement occurred, not whether reasonable

precautions were taken to avoid infringement or the infringement occurred intentionally. In the case of patents, there are currently no significant fair use, personal use, or noncommercial use defenses available to infringers. In the case of copyright infringement, infringer may invoke the fair use defense to escape liability for a narrow set of unauthorized uses of copyrighted works. However, the DMCA, through its anticircumvention provisions, has severely curtailed the fair use defense in the case of digital works, to the strong detriment of citizen innovation.

Rather than the *de jure* protection afforded much activity within the innovation wetlands that may be threatened by government legislation and regulation, in the case of intellectual property law, wetlanders must generally satisfy themselves with the *de facto* protection that accompanies their *de minimus* and noncommercial activities. Especially in the case of patent-rights violations, patent holders whose rights individual innovators knowingly or unknowingly violate by making a copy of a patented invention for personal, noncommercial, or experimental use will tend to receive only damages reflecting economic losses resulting from infringement. Since this will likely be a very small amount, it will often be cost-ineffective for the patent-holder to sue individuals within the innovation wetland.

CONCLUSION

Despite the lack of awareness of, and attention to, the innovation wetlands that we have documented, evidence from surveys shows that innovation wetlanders are very active in many fields. In part, this is due to the reality that individual innovation tends to be small-scale and tends to avoid unwelcome attentions from firms and regulators who could have legal bases to take action against them if they so choose. This situation will become progressively less viable as the innovation wetlands continue to grow, and interactions with firms and governmental activities become progressively larger in scale and more visible. For these reasons, we must increase awareness of the innovation wetlands and their great value in order to ensure that statutes, regulations, and enforcement practices are better aligned to this increasingly important and beneficial phenomenon. Fortunately, the law already provides a robust right to innovate to individual or collaborating inventors, designers, creators, and tinkerers who inhabit the innovation wetlands. The core of this right protects noncommercial

innovation for personal use, collaboration with other similar innovators, and free dissemination to others of information about innovations that result from these activities.

In this Article, we have focused upon the legal context for the innovation wetlands in the United States only. National surveys cited in our Article, however, indicate that new product and service development by individuals is significant in many nations, and so, appropriate governance measures should be examined quite broadly. Just as actual wetlands were despised until their ecological importance was recognized, and only then subject to strong protections and public support, the importance of the innovation wetlands needs both recognition and robust protection. Individuals and nations will only enjoy the full benefits innovation wetlands can provide once society and its laws consciously and zealously protect this invaluable source of innovation.

