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TOWARD A COMMON LAW OF ECOSYSTEM SERVICES

J.B. RUHL*

This speech was presented on October 6, 2005, at St. Thomas University School of Law, as part of the Distinguished Speaker Series program. Professor Alfred Light made introductory remarks.

I have known Professor Light for many years, probably longer than either of us would like to disclose, and have a great admiration for his work. Thus it is my honor and privilege for his faculty and law school to have invited me to share my work with you today.

I might add that since moving to Florida seven years ago, this is only my second trip to the Miami area. Of course, if it had been up to my out-of-state friends and relatives, I'd have been here many times for lunch. Not understanding where Tallahassee is located in our state, one or another has called to let me know they'd *be in Miami later that week* and *maybe we could have lunch or catch a movie*. My standard response is that I'd be happy to if they pick up the air fare.

It is fitting though, that I deliver this talk here, close to the hurricane zone. For what I hope to do is make the case for an evolutionary move in the common law that reflects what we are learning about ecosystems and the economic value they provide to humans, value that has been all too clearly illustrated in recent events by the Florida hurricanes and, of course, Hurricane Katrina.

I will argue that the common law is poised to recognize that a person's destruction of ecosystem structure, and thus of ecosystem functions, can be an appropriate basis for liability in tort where the result is to cause significant economic damage to others. This proposition runs counter to the historical role of the common law in the context of ecosystem conservation, which has been almost no role at all, but let me undertake to convince you nonetheless of the important role the common law can, and I believe will, play.

* Mathews & Hawkins Professor of Property, Florida State University College of Law, Tallahassee, Florida. I am thankful to the St. Thomas University School of Law for hosting me as a Distinguished Lecturer and providing the opportunity to deliver this presentation, and to the FSU College of Law for continued support of my research. These presentation notes are based on an earlier version of this topic I published as J.B. Ruhl, *Ecosystem Services and the Common Law of "The Fragile Land System,"* NAT. RESOURCES & ENV'T, Fall 2005, at 3, to which I have made some additional annotated comments and references. Please direct any questions or comments to jruhl@law.fsu.edu.

Indeed, the standard history of environmental law goes something like this: First, there was the common law of nuisance. It worked all right for a while at curtailing noxious uses of land, but over time things got pretty complicated with the rise of cities, industries, and all that. Earth Day and Rachel Carson awakened us to the ravages of pollution in an industrialized society, but by then the courts had thrown up their hands, claiming it was all too much for the common law to handle. State and local governments were busy racing to somewhere called “the bottom” and did not have time for legislative fixes, so the wise and mighty federal government took command by enacting a horde of laws designed to stop pollution and clean up the mistakes of the past. These laws worked like a charm for a good while, until things got even more complicated. We began to understand the breadth and depth of our impact on ecosystems and the landscape, and to appreciate how puny the federal laws seemed in comparison to the magnitude of large-scale ecological degradation. At the same time, landowners had gotten awfully riled up over all the rules and regulations, and said they could not stand any more of it. Thankfully, along came the second generation of environmental laws, with smart new ideas like pollutant trading, negotiated permits, and environmental management systems. And we all lived happily ever after.

Now, you could find plenty of support in law books and journal articles for this account, and just as high a stack of literature calling it into question. But one entry finds almost universal support—that the source, the very backbone of the wave of federal pollution control laws the federal government enacted in the 1970s, was the common law of nuisance. And many observers also agree that there has been a profound shift of emphasis in environmental policy from controlling smokestacks and discharge pipes to managing ecosystemwide phenomena such as habitat loss, invasive species, and nutrient-laden runoff—what today goes under the umbrella term of ecosystem management.

What is missing from this more recent focus on ecosystems and their sensitivity to human insult, however, is any notion that legislative initiatives might find some guidance in the framework of the common law. How is it that the common law of nuisance is regarded as the genesis of pollution control law, but for the law of ecosystem management it is as if the common law never happened? In fact, the more frequent prognosis is worse than that—it suggests that the common law simply *cannot* be a factor in shaping the law of ecosystem management.

For example, in *Lucas v. South Carolina Coastal Commission*,¹ Justice Scalia announced the majority's ruling that where a new regulation denies all economically beneficial or productive use of land—in that case a blanket prohibition of development in coastal dune areas—it must be treated as a *per se* taking of property for which just compensation is due under the Fifth Amendment. Justice Scalia's caveat was that just compensation would not be due if the regulation does “no more than [simply] duplicate the result that could have been achieved in the courts—by adjacent landowners (or other uniquely affected persons) under the State's law of private nuisance, or by the State under its complementary power to abate nuisances that affect the public generally. . . .”²

In his concurring opinion, Justice Kennedy expressed concern with the idea that state regulation could go no further than duplicating the common law of nuisance without exposing itself to the now infamous “categorical taking” problem, for as he put it, “[c]oastal property may present such unique concerns for a fragile land system that the State can go further in regulating its development and use than the common law of nuisance *might otherwise permit*.”³ In other words, Justice Kennedy took it as a given, as Justice Scalia and the majority also clearly did, that the common law could not reach the “fragile land system.” Indeed, although leaving the final say to state courts, Justice Scalia surmised that “it seems unlikely that common-law principles would have prevented erection of any habitable or productive improvements on petitioner's land. . . .”⁴ But why not? Why not?

I will explore that question today through a proposed evolution of the common law that is both radical and mundane. It is radical in the sense that it challenges the deeply rooted idea that the common law has no place in the law and policy of ecosystem management. It is mundane in the sense that the common law doctrine proposed to start filling the gap is quite ordinary—the law of nuisance. At bottom, therefore, it is about economic injury, not the environment at large. It is not a charter for courts to police the nation's biodiversity, or to restore what we believe to be some past state of nature, or to devise and enforce broad personal rights in environmental quality. Indeed, being based on the law of nuisance, it is grounded in terms and concepts so familiar in the common law as to appear quite plain vanilla.

1. 505 U.S. 1003 (1992).

2. *Id.* at 1029.

3. *Id.* at 1035 (emphasis added).

4. *Id.* at 1031 (citing *Curtin v. Benson*, 222 U.S. 78, 86 (1911)).

My thesis is in three parts. The first describes the arguments usually advanced for why the common law has not or cannot extend its reach to include the domain of the fragile land system. I will then explore the advances in knowledge about the management of ecosystem dynamics that point to a severe policy failure on the horizon, and discuss reasons why legislation has not effectively filled the void. I will close by outlining an evolution in nuisance law based on emerging knowledge about the economic value *humans* derive from healthily functioning ecosystems—what ecologists call “ecosystem services.” Though based on a straightforward application of nuisance law, the incremental development I am proposing for the law could jumpstart another evolution of environmental law, this time based in the common law and devoted to rectifying ecosystem-level harms.

THE COMMON LAW AND ECOSYSTEM MANAGEMENT

Several explanations have been advanced for why the common law seems virtually irrelevant, if not impotent, in the developing policy dialogue of ecosystem management. The first, what I call the “lack of capacity” argument, posits that the common law is inherently inept at addressing questions of ecosystem management. Nuisance law may have worked well enough for controlling pollution for a while, but there is just something about protecting ecosystems, goes the argument, that puts it outside the domain of the common law. Under this view, it is a waste of time to even think about how the common law can contribute to ecosystem management.

Evidence for this view is found in none other than the history of nuisance law in the pollution control context. Almost a century ago, the U.S. Supreme Court decision in *Georgia v. Tennessee Copper Co.*⁵ suggested that the common law could play an important and innovative role in pollution control. After agricultural landowners in Tennessee were unsuccessful in state court in stopping harmful air emissions from copper smelting plants in the eastern reaches of the state, Georgia sued the companies. Georgia’s public nuisance claim against the Tennessee companies fell on sympathetic ears in the Supreme Court. The Court was “satisfied by a preponderance of the evidence that the sulphurous fumes cause and threaten damage on so considerable a scale to the forests and vegetable life, if not to health, within the plaintiff State” as to justify an

5. 206 U.S. 230 (1907) (awarding injunctive relief in accordance with the State’s right to prevent pollution).

injunction.⁶ Indeed, in a later remedial decree, the Court, much like a modern administrative agency, required the company to keep daily records of its operations, to submit to court-appointed inspectors, to meet performance standards for emission rates, and to comply with maximum total daily emission loads.⁷ Although the Court later relaxed some of the limits during wartime, ultimately the case had a technology-forcing effect as the fear of liability led the industry to develop a new smelting process that allowed reclamation of the sulfur.⁸ Now if the common law can produce this kind of result, who needs legislation?

Alas, confidence in the common law eventually waned.

The death knell to any hopeful thinking came in 1970 in the famous New York case of *Boomer v. Atlantic Cement Co.*, in which New York's highest court declined to enjoin a cement plant's air emissions, ruling instead that a damages remedy, previously not available under New York law, was the more efficient approach.⁹ While known mostly for that shift in remedial doctrine, the court's rationale for backing off injunctive relief sent a loud message to legislatures that their help was needed. As the court warned:

It seems apparent that the amelioration of air pollution will depend on technical research in great depth; on a carefully balanced consideration of the economic impact of close regulation; and of the actual effect on public health. It is likely to require massive public expenditure and to demand more than any local community can accomplish and to depend on regional and interstate controls.

A court should not try to do this on its own as a by-product of private litigation. . . . This is an area beyond the circumference of one private lawsuit. It is a direct responsibility for government and should not thus be undertaken as an incident to solving a dispute between property owners. . . .¹⁰

The date of the opinion, not coincidentally, marks the advent of the wave of federal legislation regulating air, water, and land pollution. And the thesis of *Boomer* has stuck, with courts remaining reluctant to enter into the kind of remedial monitoring the Supreme Court evidently found appropriate in the pollution context a century ago.¹¹ So it is no surprise that

6. *Id.* at 238-39.

7. *Georgia v. Tennessee Copper Co.*, 237 U.S. 474, 478 (1915).

8. See ROBERT PERCIVAL ET AL., ENVIRONMENTAL REGULATION 82-84 (4th ed. 2003).

9. 26 N.Y.2d 219, 223, 228 (1970).

10. *Id.* at 223.

11. See, e.g., *Connecticut v. Am. Elec. Power Co.*, No. 04 Civ. 5669, 2005 U.S. Dist. LEXIS 19964, at *21, 27 (S.D.N.Y. Sept 15, 2005) (dismissing common law public nuisance claim against power companies for allegedly having contributed to global warming, on the ground that,

law students are taught today, and I am quoting from the leading environmental law casebook, that “there is wide agreement that private nuisance actions alone are grossly inadequate for resolving the more typical pollution problems faced by modern industrialized societies.”¹² Replace “pollution” in that sentence with “ecosystem management” and one has the lack of capacity argument in a nutshell.

The second explanation, the “lack of opportunity” argument, posits that the common law certainly could have developed principles governing the use and abuse of sensitive resources, but for some reason the stars did not align in such a way as to present the opportunity. Under this view, when the shift from pollution control to ecosystem management occurred as a matter of policy focus, there simply was no common law tradition on which to draw, and any legislative impetus thus must forge ahead without using common law principles as its backbone. It is too late, in other words, for the common law of ecosystem management to emerge.

This is the explanation often given for the underachievement of the common law’s Public Trust Doctrine. The name is impressive, suggesting great possibilities. But the lodestar case of the Public Trust Doctrine in the United States, at least for purposes of thinking about it as a tool of resource conservation, was no harbinger of ecosystem management. In the U.S. Supreme Court’s 1892 *Illinois Central Railroad Co. v. Illinois*¹³ opinion, the Court held merely that Illinois could not sell fee interests in the land under Chicago Harbor to private developers because:

[T]he state holds the title to the lands under the navigable waters. . . . It is a title held in trust for the people of the state that they may enjoy the navigation of the waters, carry on commerce over them, and have liberty of fishing therein, freed from the obstruction or interference of private parties.¹⁴

Nevertheless, in his landmark 1970 Michigan Law Review article, Professor Joseph Sax outlined an ambitious agenda for evolving the doctrine into the nation’s bedrock source of ecosystem management law.¹⁵ Sax argued that “[o]f all the concepts known to American law, only the [P]ublic [T]rust [D]octrine seems to have the breadth and substantive

among other things, the relief sought would require the court to determine appropriate levels of emissions, determine and apply emission reductions to the defendants, and develop a remedial schedule).

12. PERCIVAL, *supra* note 8, at 72.

13. 146 U.S. 387 (1892).

14. *Id.* at 452.

15. See Joseph L. Sax, *The Public Trust Doctrine in Natural Resource Law: Effective Judicial Intervention*, 68 MICH. L. REV. 471 (1970).

content which might make it useful as a tool of general application for citizens seeking to develop a comprehensive legal approach to resource management problems.”¹⁶ But this never came to be.

One reason why is that the U.S. Supreme Court declined the invitation to take the doctrine there. As far as the Supreme Court is concerned, the states may not alienate fee title in tidelands, shores, and other public trust lands in violation of the Public Trust Doctrine, and that is it. To be sure, many state courts have opined more broadly on the scope of the Public Trust Doctrine. In one famous case from California, regarding the diversion of water from Mono Lake, the court ruled that “[t]he state has an affirmative duty to take the public trust into account in the planning and allocation of water resources, and to protect public trust uses whenever feasible.”¹⁷ This and other state cases like it, however, are mindful of the “publicness” of public trust resources, emphasizing uses such as navigation, fishing, and recreation, and not necessarily preservation or even active conservation of ecosystems.

It is true that an occasional state case suggests an ecologically oriented purpose to the doctrine. Perhaps the most noted case in this regard is the Wisconsin Supreme Court’s 1972 decision in *Just v. Marinette County*, in which the court found that the doctrine required that wetland areas be limited to uses consistent with “natural conditions.”¹⁸ Several more recent cases are variations on that theme using the public trust doctrine to protect public parks, groundwater, lakes, fish, and other water based resources.¹⁹

Some commentators thus assert that the Public Trust Doctrine therefore is “definitely growing” as an ecosystem management tool, to use Arnold Lum’s words.²⁰ By and large, however, the state courts have

16. *Id.* at 474.

17. *Nat’l Audubon Soc’y v. Super. Ct. of Alpine County*, 658 P.2d 709, 728 (Cal. 1983).

18. *Just v. Marinette County*, 201 N.W.2d 761, 771 (Wis. 1972) (quoting *Turnpike Realty Co. v. Dedham*, 284 N.E.2d 891, 894 (Mass. 1972)).

19. *See, e.g.*, *Friends of Van Cortland Park v. City of New York*, 750 N.Y.2d 1050 (N.Y. 2001) (doctrine covers public parks); *In re Water Use Permit Applications*, 9 P.3d 409 (Haw. 2000) (doctrine covers groundwater); *Weden v. San Juan County*, 958 P.2d 273, 284 (Wash. 1998) (doctrine regulates personal watercraft on state waters); *Pullen v. Ulmer*, 923 P.2d 54 (Alaska 1996) (doctrine covers fish in their natural state); *Vander Bloemen v. Wisc. Dep’t of Nat. Res.*, No. 95-1761, 1996 WL 346266 (Wis. Ct. App. 1996) (doctrine protects lakeside ecology); *Selkirk-Priest Basin Ass’n, Inc. v. Idaho ex rel. Andrus*, 899 P.2d 949 (Idaho 1995) (doctrine allows challenge to timber sales on ground that sedimentation could injure fish spawning grounds).

20. *See* Arnold L. Lum, *How Goes the Public Trust Doctrine: Is the Common Law Shaping Environmental Policy?*, NAT. RESOURCES & ENV’T, Fall 2003, at 73 (quoting Pat Parenteau).

declined to mobilize Professor Sax's vision of the Public Trust Doctrine as a means of effective and broad judicial intervention in resource management policy. There is, simply put, no broad-based ecosystem management duty to be found in the judiciary's version of the Public Trust Doctrine, certainly not one that could reach private lands on which ecologically important resources are found.

In short, while it may be hard to detect any aversion in the case law to expanding the Public Trust Doctrine into the domain of ecosystem management, it is even harder to detect any sense of urgency or enthusiasm. One rather obvious explanation for this lethargic approach is that not long after Professor Sax suggested how the doctrine's latent power could be tapped, the legislative revolution of the 1970s unfolded to bring one after the other of comprehensive resource management laws into being. New federal legislation protecting wetlands, the coastal zone, and endangered species, as well as managing federal public lands, obviated the need for the Supreme Court to revisit the Public Trust Doctrine, and the eventual blossoming of similar state legislation did the same at the state level. Maybe the Public Trust Doctrine could have become what Professor Sax envisioned in 1970 and what many commentators still hold out hope for, but with the surge of federal and state environmental legislation that transpired, who needed it?

The fact that the common law can fashion innovative remedies, as the history of *Tennessee Copper* suggests, and is still "growing," as the slow evolution of the Public Trust Doctrine evidences, may support the position that the common law actually does have the capacity and the opportunity to move into the ecosystem management realm. But the final explanation for why it heretofore has not moved on that front—what I call the "lack of will" argument—is more cynical than the other two. It suggests that the common law has the capacity to develop a set of ecologically oriented doctrines and has had many opportunities to do so, but simply has no advocates who wish it moves in that direction. Rather, this position contends common law institutions have deliberately pursued anti-environmental policies to facilitate other interests such as the protection of property rights and promoting economic uses of land.

Evidence for this view was comprehensively assembled by law professor John Sprankling in his 1996 Chicago Law Review Article, *The Anti-Wilderness Bias in American Property Law*,²¹ in which he

21. John Sprankling, *The Anti-Wilderness Bias in American Property Law*, 63 U. CHI. L. REV. 519 (1996).

systematically surveyed property law doctrines such as waste, adverse possession, trespass, and nuisance, and argued that they were and remain “tilted toward wilderness destruction” in order “to encourage the agrarian development” of the nation.²² He pointed out, for example, that American law abandoned the British version of the waste doctrine, which banned forest clearing for cultivation, and replaced it with the view that clearing for cultivation was “good husbandry.”²³ American trespass law developed in many states so as to tolerate, if not to endorse, open grazing of livestock on the unenclosed lands of another landowner.²⁴ These and other examples of his thesis, Sprankling argued, flowed from the abundance of wilderness America enjoyed relative to England, the need to build an economy, and the exalted position in which Americans generally place private property rights. He concluded that “all other things being equal, the property law system tends to resolve disputes by preferring wilderness destruction to wilderness preservation.”²⁵

THE PUBLIC LAW OF ECOSYSTEM MANAGEMENT

Even if one subscribes to the view that the common law, for one reason or another, ran out of gas by the time the proliferation of federal environmental legislation began in the 1970s, it is difficult to deny the important role the common law had in shaping the contours of the pollution control laws. Most comprehensive treatments of the evolution of environmental law begin with the common law as the first meaningful stage of development.²⁶ Over time the nuisance doctrine developed into a powerful means of regulating the environment, so much that Professor Bill Rodgers observes in his environmental law treatise that:

There is no common law doctrine that approaches nuisance in comprehensiveness or detail as a regulator of land use and technological abuse. Nuisance actions reach pollution of all physical media—air, water, land, groundwater—by a wide variety of means. Nuisance actions have challenged virtually every major industrial and municipal activity that today is the subject of comprehensive environmental regulation²⁷

22. *Id.* at 521.

23. *Id.* at 534-35.

24. *Id.* at 548-49.

25. *Id.* at 520.

26. See, e.g., E. Donald Elliott et al., *Toward a Theory of Statutory Evolution: The Federalization of Environmental Law*, 1 J. L. ECON. & ORG. 313, 315 (1985).

27. WILLIAM H. RODGERS, ENVIRONMENTAL LAW § 2.1 at 112-13 (2d ed. 1994).

Indeed, from the beginning of the twentieth century courts had enjoined the operation of industries found to cause pollution of agricultural land, enjoined facilities emitting noxious odors, and awarded damages against manufacturing plants found to have polluted waters.²⁸ Clearly, therefore, by the time Congress turned its attention to air, water, and land pollution in the early 1970s, the common law had established the causal connections between pollution and environmental harm; between environmental harm and economic injury, and endorsed the need for and practical availability of remedies. The common law thus provided much-needed legitimacy to the public law agenda for pollution control.

By contrast, the public law agenda for ecosystem management has no common law roots. In 1993, when Vice President Al Gore's National Performance Review called for federal agencies to support a "proactive approach to ensuring a sustainable economy and a sustainable environment through ecosystem management,"²⁹ there was absolutely no foundation from which to begin, common law or otherwise. The case could have been made that the initiative would be an extension of the Endangered Species Act (ESA), which, after all, proclaims to be intended to "provide a means whereby the ecosystems upon which endangered species and threatened species depend may be conserved."³⁰ However, the ESA hardly enjoys broad-based legitimacy, as it remains one of the most controversial of environmental laws, and, in fact, its species-specific focus makes for a rather clumsy ecosystem management framework.³¹

In other words, the ecosystem management was left to building itself from the ground up. At about the same time, though, our knowledge of ecosystem dynamics and the fragility of some natural resource systems began growing by leaps and bounds, making the case for an ecosystem management initiative quite compelling. The landmark contributions in the

28. See, e.g., *Costas v. City of Fond Du Lac*, 129 N.W.2d 217 (1964) (holding that the injunction for the strong and obnoxious odors from the sewage disposal plant was a nuisance); *Steifer v. Kansas City*, 267 P.2d 474 (1954) (holding that the noxious and offensive odors from a public dump was a nuisance); *Harrisonville v. W.S. Dickey Clay Mfg. Co.*, 289 U.S. 334 (1933) (holding that the sewage disposal plant was a nuisance to a stock farm laying nearby); *Whalen v. Union Bag & Paper Co.*, 208 N.Y. 1, 101 N.E. 805 (1913) (holding that the pollution into the stream created a nuisance).

29. *Vice President Albert Gore's National Performance Review*, <http://govinfo.library.unt.edu>.

30. 16 U.S.C. § 1531(b) (2004).

31. See J.B. Ruhl, *Ecosystem Management, the Endangered Species Act, and the Seven Degrees of Relevance*, 14 NAT. RESOURCES & ENV'T 156 (2000).

field appeared in the mid-1990s, defining the basis and framework for ecosystem-scale management of natural resources.³²

For my purposes, however, the most important development was the emergence of a branch of ecosystem management focused on the economic value humans derive not from natural resource commodities such as timber, or from recreational uses, but from ecosystem functions such as flood control, pollination, thermal regulation, and storm surge mitigation—what ecologists today call ecosystem services.³³ Through enhanced understanding of ecosystem service values associated with natural resources, the case for ecosystem management took on a previously unnoticed *economic* dimension. Given the relation between intact ecosystems and the delivery of these economically important services, it seemed to me and a few other lawyers at the time that the law ought to pay attention to whether ecosystems are being properly managed to enhance overall social wealth.³⁴

Yet public legislation, so effective at combating air, water, and land pollution, is faltering at the prospect of forming a coherent ecosystem management regime, much less one with any focus on ecosystem service values. In the ten plus years since Vice President Gore began the ecosystem management initiative, not much concrete has happened. Federal agencies, particularly the public land management agencies, scrambled around for several years pronouncing their commitment to the cause, thereby striking fear into the hearts of western land interests.³⁵

But Congress has managed no more than to introduce a bill, the Ecosystem Management Act of 1995, *which did not even define ecosystem management!*³⁶ Indeed, in a Law School casebook I co-author on the law of ecosystem management, I had to conclude that, at best, “the ESA and a

32. See Norman L. Christensen et al., *The Report for the Ecological Society of America Committee on the Scientific Basis for Ecosystem Management*, 6 *ECOLOGICAL APPLICATIONS* 665 (1996); R. Edward Grumbine, *What Is Ecosystem Management?*, 8 *CONSERVATION BIOLOGY* 27 (1994).

33. See *NATURE'S SERVICES: SOCIETAL DEPENDENCE ON NATURAL ECOSYSTEMS* (Gretchen Daily ed., 1997).

34. See James Salzman, *Valuing Ecosystem Services*, 24 *ECOLOGY L. Q.* 887 (1997); J.B. Ruhl, *Valuing Nature's Services: The Future of Environmental Law?*, 13 *NAT. RESOURCES & ENV'T* 359 (Summer 1998). Since then, the most complete collection of legal work on ecosystem services appears in Symposium. See James Salzman, *Protecting Ecosystem Services: Science, Economics, and Law*, 20 *STAN. ENVTL. L.J.* 309 (2001). A similar collection of law symposium papers on the topic is expected to be published from a symposium planned for spring 2006 at Florida State University entitled *The Law and Policy of Ecosystem Services*.

35. See Rebecca W. Thompson, “Ecosystem Management”—*Great Idea, but What Is It, Will It Work, and Who Will Pay?*, 9 *NAT. RESOURCES & ENV'T* 42 (Winter 1995).

36. See Ecosystem Management Act of 1995, S. 93, 104th Cong. § 2 (1995).

collection of other laws contain elements and programs that can explicitly or implicitly be advanced toward developing ecosystem-level policies designed to conserve biodiversity.³⁷ In short, ecosystem management law is a cobbled-together body of law, if it can even be called that much.

My take is that ecosystem management finds itself in this fragmented and stalled condition because, unlike the antipollution legislation, it had no common law foundation on which to build its structure and legitimacy. Perhaps out of arrogance, or ignorance, or the failure fully to appreciate the importance of the common law to antipollution legislation, ecosystem management legislation tried to leapfrog its common law formative stage, and it has gained little traction as a result. The question is whether the common law can overcome its reputation as having little meaningful to add to the field and backfill a foundation for the public law of ecosystem management.

FORGING A COMMON LAW OF ECOSYSTEM SERVICES

There is a basis for hope in this regard; there is hope for a common law of ecosystem management to develop. For if any of the “lack of” arguments about the common law ever did provide explanatory power for understanding the state of the common law of ecosystem management in the past, it retains none today. Rather, the common law has the capacity, opportunity, and, I daresay, the present-day will to become an engine of ecological intelligence within our legal system.

Each of the three arguments for explaining the absence of a common law of ecosystem management, supported as they are by solid evidence in the case law, nonetheless suffers from the same problem—each depends on conditions exogenous to the common law, conditions that themselves evolve and thus may over time alter whatever constraint they imposed on the development of the common law in the past. In particular, each argument ignores society’s increasing base of knowledge about ecosystem dynamics and the immense economic value of the ecosystem services they provide, knowledge which, through its continuing development, could substantially alter the calculus of the common law.

Many commentators before me have advanced the case that the common law is profoundly adaptive.³⁸ It may very well be that nuisance

37. JOHN NAGLE & J.B. RUHL, *THE LAW OF BIODIVERSITY AND ECOSYSTEM MANAGEMENT* 297–98 (2002).

38. See J.B. Ruhl, *Complexity Theory as a Paradigm for the Dynamical Law-and-Society System: A Wake-up Call for Legal Reductionism and the Modern Administrative State*, 45 *DUKE*

law was overwhelmed by industrial society, that the Public Trust Doctrine was eclipsed by federal legislation, and that property law was heavily influenced by our nation's boundless frontier mentality; but all those conditions have changed. We know industrialization has harmed our ecosystems, that federal legislation does not hold all the answers, and that the ecological frontier, if anything, is vanishing. And we know much more today than we did thirty years ago about ecosystem services. As Justice Scalia acknowledged in *Lucas*, "changed circumstances or new knowledge may make what was previously permissible [under common law] no longer so."³⁹ Hence, there is no reason why the common law cannot make an adaptive move to fill some of the gap in ecosystem management law.

So, what would be the organizing principles for the evolution of a common law doctrine of ecosystem management? It is too easy to propose that the common law simply reverse direction and place a "green thumb on the scales of justice" in favor of protecting ecosystems in general, as Professor Sprankling has suggested.⁴⁰ Nor will it get far if we simply point out the objectives of ecosystem management and invite the common law to have at it. There must be a concrete theme to motivate the interest and action of private litigants and the courts, and that theme must have dimensions fitting within the basic contours of common law doctrine and institutions. This includes articulating a coherent statement of rights and liabilities that are susceptible to analysis through commonly understood and applied principles of proof of breach, injury, and causation, as well as a remedial system that provides efficient and equitable outcomes. In other words, the approach needs to be legally practical.

Unfortunately, the discipline of ecosystem management is for the most part brimming with themes that are decidedly impractical for these purposes. Its organizing principles include conserving biodiversity, restoring naturalness, providing safe harbor for native species, and the implementation technique of adaptive management. Impressive sounding as these terms may be, they are square pegs to the common law's round holes.

But against that grain, the ecosystem services branch of ecology holds great promise for the common law. Most of ecosystem management is devoted to keeping ecosystem functions healthy for the sake of ecosystems; on the other hand, the study of ecosystem services is devoted to articulating which ecosystem functions provide service values to humans that would be

L.J. 849, 916–20 (1996).

39. *Lucas*, 505 U.S. at 1031 (emphasis added).

40. See Sprankling, *supra* note 21, at 587–89.

costly, but clearly necessary or desirable, to replace were they to degrade in quantity or quality. Moreover, because ecosystem services are the product of ecosystem functions, and ecosystem functions are the product of ecosystem structure, it follows as a matter of economic theory that the relevant ecosystem structure is no less than the “natural capital” necessary for providing economically valuable services to humans. And this new focus in ecology is producing a rapidly mounting body of research attaching real numbers to ecosystem service values at local and regional scales.

Recently, for example, researchers studying pollination services in Costa Rica demonstrated that the conversion of land from forest to grazing uses reduces the local populations of wild pollinator species enough to diminish productivity of nearby coffee plantations by more than fifteen percent, resulting in significant annual losses for a typical plantation.⁴¹ On a larger scale, more than twenty years ago law professor Oliver Houck demonstrated that the loss of coastal wetlands in Louisiana was costing the state billions of dollars in lost ecosystem service values.⁴² The idea caught on too late, as we now well know, but Louisiana several years ago embarked on an “Americas Wetland” campaign to call attention to its vanishing coastal wetlands, including a major push to gain federal assistance by noting the economic consequences of having its “working coastline” of oil rigs, ports, fishing villages, and New Orleans casinos flooded by the combination of rising sea levels and falling coastline levels.⁴³ The bottom line: Ecosystem services are not about just birds and bees—they are about *money*, and lots of it.

Armed with that core set of principles, it is remarkable how straightforward an exercise it is to outline a set of common law rights and liabilities that put ecosystem services into play as the essential fabric of a new stage in the development of environmental common law. Every law student learns the black letter doctrine of nuisance: one commits a nuisance when his or her use of land unreasonably interferes with another person’s reasonable use and enjoyment of his or her interest in land.⁴⁴ Lawyers

41. See T.H. Ricketts, *Tropical Forest Fragments Enhance Pollinator Activity in Nearby Coffee Crops*, 18 CONSERVATION BIOLOGY 1262 (2003).

42. See Oliver Houck, *Land Loss in Coastal Louisiana: Causes, Consequences, and Remedies*, 58 TUL. L. REV. 3 (1983).

43. See *Hurricane Katrina Targets Louisiana-Nation’s Oils Supply, Economy Endangered*, <http://www.americaswetland.com/article.cfm?id=286&cateid=2&pageid=3&cid=16> (last visited Nov. 15, 2005). See also *Nature Destroys, But It Also Can Protect*, THE ENVTL. F. 18 (2005) (discussing the plans in a post-Katrina context).

44. See BLACK’S LAW DICTIONARY 1093 (7th ed. 1999).

through the ages have had no problem agreeing that odors from a pigsty, or fumes from a copper smelting plant, or chemical pollution of a lake or stream are within the ballpark of nuisance so defined. Why should matters be any different when one person's use of land severs the flow of economically valuable ecosystem services to another person's use of land?

A thought exercise drawing from the pollination example can help illustrate the spectrum of possibilities suggested:

A commercial apple orchard is situated between an industrial facility on one side and a forested tract on the other. The owner of the apple orchard has suffered a substantial decline in commercially marketable apple production and can prove both the cause and the economic damage. The alternative causes to consider are:

- Emissions from the industrial facility drifting into the orchard are *damaging the bark of the trees*, causing them to decline in productivity.

- Emissions from the industrial facility drifting into the orchard are blemishing the skin of a substantial percentage of the unripe apples, causing them to be unmarketable.

- Emissions from the industrial facility drifting into the orchard leave a residue on the apple tree leaves and interferes with photosynthesis, causing the trees to decline in productivity.

- Emissions from the industrial facility drifting into the orchard are deterring visits from wild pollinators residing in the forest tract habitat, thus causing a reduction in successful fruit production.

- The owner of the forest tract cuts down all the trees to build a shopping mall, eliminating that source of wild pollinator visits and thus causing a reduction in successful fruit production.

The first two of these scenarios are classic fodder for nuisance claims. To be sure, there may be much to resolve about questions of liability and remedy, but these cases are squarely within the tradition of nuisance law. The next two scenarios involve land uses that sever the flow of ecosystem services to the orchard by interrupting the delivery of the service, photosynthesis in one case and pollination in the other. If these causal connections are proven, it is not clear why the common law would fail to recognize them as cognizable causes of action in nuisance if it does recognize the first two scenarios as such. Indeed, while the causes in the first two scenarios are described in familiar terms—damage to tree bark and blemishes on apple skins—in fact, the causal chain in those cases results in the interruption of ecosystem functions that support the trees and their production of unblemished fruit. Why should it matter that the cause

of the reduced fruit production was the chemical reaction of the pollutant on tree bark or apple skin in the first two cases versus its effect on sunlight or bees in the next two? Why treat any of the first four scenarios differently?

The more difficult case is the fifth scenario, because the flow of ecosystem services is severed at the source property through destruction of the natural capital—the forest supporting the pollinators—rather than at the benefited property through interruption of the service at the point of delivery. But the end result is the same—the orchard produces less fruit. If the orchard owner can prove that the reduced fruit production is due to the loss of pollinators that once resided on the shopping mall tract, why would that not be cognizable in nuisance?

The quick response might be that the conversion of the source property from forest to shopping mall is not unreasonable, whereas pollution drifting in from the industrial facility is. But that does not answer the question, which was whether the orchard owner's case is *actionable* in nuisance, not whether it would prevail. The termination of pollination is, after all, interfering with the orchard owner's use and enjoyment of the property. That opens the door to a nuisance claim, with the central question being, as it is in most nuisance cases, whether the allegedly wrongful behavior was unreasonable. Nuisance law is quite a thicket on the question of what is unreasonable, but that is both the beauty and the frustration of the common law. It is made for this kind of balancing inquiry, which Justice Scalia described in *Lucas* as an

[A]nalysis of, among other things, the degree of harm to public lands and resources, or adjacent private property, posed by the [landowner's] proposed activities, the social value of the [landowner's] activities and their suitability to the locality in question, and the relative ease with which the alleged harm can be avoided through measures taken by the [landowner] and the government (or adjacent landowners) alike.⁴⁵

To be sure, it is not expected that every loss of natural capital should be or would be branded unreasonable under this test. Some natural capital is more critical than other natural capital, in that its degradation or destruction leads to significant economic injury on other lands. But given that we increasingly know where natural capital is located, where the ecosystem services it produces flow, and the value of those services at benefited properties, there is no reason why nuisance law in both its public and private stripes could not sort through questions about whether the destruction of natural capital, in discrete cases, is reasonable or not.

45. *Lucas*, 505 U.S. at 1030-01 (1992) (citations omitted).

Not far from where I live and teach in Florida, for example, one can see quite palpable evidence of the importance of coastal dunes to the mitigation of hurricane storm surge damage at inland locations. There is a staggering difference in outcome between inland areas shielded by intact dunes and those inland of coastal development that did not retain dunes. On a far more devastating scale, surely the media coverage of Hurricane Katrina, which repeatedly made the point that damage in New Orleans would have been mitigated had the coastal wetlands not been so severely degraded, has focused the nation's mind on the economic importance of ecosystem services. Under Justice Scalia's nuisance balancing test, the harm to the public resources and private property resulting from the impaired dune and wetland systems unquestionably was severe, likely far outweighing the social utility of development that destroyed the resources, and the owners of prior intact dune and wetland areas were in the best position to avoid the harm. Were those resources thus critical natural capital, the destruction of which was unreasonable in relation to the expectations of inland property owners whose homes and businesses are now in splinters?

It is my belief that the common law is equipped to answer that question and others like it. The fact that it has not, until now, attempted to do so does not mean that it cannot, or will not have the opportunity, or simply is against all notion of it. The only missing ingredient, until now, has been the storehouse of knowledge ecologists and economists are building about the value of ecosystem services. This is precisely the kind of new knowledge, as Justice Scalia confirmed in *Lucas*, that can transform the common law and "make what was previously permissible no longer so."⁴⁶ As sovereigns and landowners become aware of this new knowledge and begin to appreciate the cost imposed upon them when others sever the flow of ecosystem services to their lands, they *will* sue in public and private nuisance actions. Indeed, such a claim was initiated recently in federal court with respect to the losses suffered in Katrina, alleging that those responsible for the disruption of wetland processes are also responsible in tort for the economic losses that followed.⁴⁷ And when lawyers and experts use this new knowledge to demonstrate to courts the cause of the injury and the value of the services lost, the courts *will* award damages, injunctions,

46. *Id.* at 1031.

47. See *Barasich v. Columbia Gulf Transmission Co.*, Civ. A. No. 05-4161 (E.D. La) (complaint filed Sept. 13, 2005) (alleging that oil companies' dredging of pipeline channels in coastal wetlands tortiously degraded storm surge mitigation capacity).

and other relief.⁴⁸ And it will all seem quite mundane, because there will be nothing about it that is out of the ordinary for the common law.

CONCLUSION

The evolution of environmental common law I have outlined is radical in the sense that it rebuts long-held assumptions about the limits of the common law in the ecological realm, but it is not as radical as many advocates of a strong ecosystem management regime will desire. As unwise as it has been to forget to consult the common law about ecosystem management, it would be more unwise to expect or demand too much from it. This is why I avoided amorphous models for developing common law principles of ecosystem management, such as preserving “wildness,” or conserving “biodiversity,” or even protecting “the fragile land system” as such. Rather, my proposal comes at those goals from the other end—the practical, economic end—by being grounded in the demonstrable economic harms that flow from the degradation of natural capital and the ecosystem services it produces.

Admittedly, any approach based on proof of economic harm will not address all the instances in which sound ecosystem management principles might point in the direction of resource protection. The degradation of natural capital often is caused by the cumulative effects of dispersed and diverse actions, and the resulting depletion of ecosystem services may be distant in time or location. Causation will be difficult to prove in those cases. And even when causation can be reliably demonstrated, damages may be so diffusely distributed that significant transactions costs pose serious obstacles to successful prosecution of a nuisance claim. More broadly, it will not always be the case that a local or regional “fragile land system” produces ecosystem services of any substantial economic value, in which case the availability of a nuisance claim is a moot point. By no means, therefore, am I suggesting that nuisance law, even were courts and litigants enthusiastically to embrace my proposal, will fill all the gaps in ecosystem management law.

48. For example, a Rhode Island court recently found that proposed filling of wetlands for a residential subdivision would constitute a public nuisance based on evidence “as to various effects that the development will have including increasing nitrogen levels in the pond, both by reason of nitrogen produced by the attendant residential septic systems, and the reduced marsh area which actually filters and cleans runoff.” *Palazzolo v. Rhode Island, C.A.*, No. WM 88-0297, 2005 WL 1645974, at 5 (R.I. Super. Ct. July 5, 2005). This finding had the effect of precluding a claim that regulation preventing the filling took the property without just compensation. *Id.* at 5, 15.

On the other hand, nuisance law also did not provide a complete response to pollution, but nobody has suggested that nuisance law should not have been pursued in pollution cases, or that it was unimportant to the formulation of pollution legislation. Like pollution law, ecosystem management law will employ a wide variety of legal instruments and institutions. The point is that nuisance law can play an indispensable role in the evolution of that larger body of law, and that it has been overlooked at the expense of the ecological values we hope the law of ecosystem management will help us sustain. Indeed, there is no reason to stop at nuisance law in this regard, as a variety of common law tort and property doctrines are aptly suited for evolution toward the new understanding of the value of natural capital and the ecosystem services it produces.⁴⁹ And someday, perhaps, the developing body of law may coalesce into a common law of ecosystem services, complete with its own specialized cause of action.

Even so, it is best to take this renaissance one step at a time. At most, therefore, I hope to have described a way for the common law of nuisance to operate at the interface of ecology and economics, to provide a foundation for public legislation and a forum for resolving private civil disputes over the reasonableness of behavior. If this evolutionary step accomplishes that much, it will have proven yet again how flexible and powerful the common law still can be.

49. See, e.g., Michael C. Blumm & Lucas Ritchie, *Lucas's Unlikely Legacy: The Rise of Background Principles as Categorical Takings Defenses*, 29 HARV. ENVTL. L. REV. 321 (2005) (describing how common law doctrines such as water rights, navigation servitudes, and customary rights could form background principles within the meaning of *Lucas*).

