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DAVID D. HADDOCK\*

## When Are Environmental Amenities Policy-Relevant?

### ABSTRACT

*Due to the high transaction cost that would be necessary for large numbers of people to negotiate with each other, even those who are usually sanguine about private markets become reserved when externalities affect large populations. Among economists, at least, the distinction between private and societal interest is well understood for pecuniary externalities. But neglect of Buchanan and Stubblebine's article "Externality" is as widespread among economists as among legal scholars, biologists, environmental scientists, or politicians and has left the same distinction widely unrecognized for non-pecuniary externalities. If only a few parties on either side of an interaction experience a relevant externality—given Buchanan and Stubblebine's careful distinction between relevant and irrelevant externalities—private interactions can appropriately internalize costs and benefits across the entire population. Regardless of the perceptiveness of legal and cultural institutions in placing entitlements, and regardless of the level of transaction cost across the entire universe of the affected, a surprising number of externalities will readily fix themselves. The desirability of corrective intervention is much too easily conceded, at great cost to society.*

Suppose that goods could be categorized into two mutually exclusive cells: *market goods* such as shoes or movies that afford minimal value beyond the direct consumers and *environmental goods* such as forests and meadows that in addition to marketed outputs provide

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substantial spillover amenities to other members of the community. In the real world there is a continuous gradation, of course, but, as will be discussed below,<sup>1</sup> coherent analysis nearly always assumes away most real world complications in order to deal clearly with a subset, then gradually introduces additional complications one or a few at a time. Indeed, that is the "scientific method."<sup>2</sup>

There is a tradeoff between goods of one sort and goods of another. Manufactured goods compete for resources with alternative manufactured goods—machines useful for making movies cannot contribute much to the manufacture of shoes. Manufactured goods compete for resources with environmental goods—people who are making shoes do not have time to tend a forest. But environmental goods also compete with alternative environmental goods—an acre of forest cannot simultaneously be an acre of meadow. There are many facets to that competition, among them the extent to which free riding—the ability of some people to enjoy environmental attributes for which they do not pay—frustrates achievement of sufficient amenities.

One feature that seems to set many environmental amenities apart from most manufactured goods is an apparent difficulty of excluding those non-payers. If an individual perceives no change in environmental amenities whether that individual contributes to the provision or not, many people will choose to contribute nothing. Thus, some argue there is a threat that environmental amenities will be poorly funded unless there is government intervention.

That such free riding might lead to excessive tradeoffs of environmental amenities for manufactured goods is easily recognized by nearly anyone who carefully ponders the environment. But recognizing the easy problem leaves a lot of hard ones unresolved and leaves one far short of appropriate public policy. Two of the many difficult problems will be examined here. First, when does the expression "*might* lead to excessive tradeoffs of environmental amenities for manufactured goods" properly translate into "*will* lead to excessive tradeoffs of environmental amenities for manufactured goods?" Second, assuming *might* properly translates into *will*, under what circumstances can even a presumptively well intentioned government be expected to resolve the situation properly?

It is helpful to introduce the *might-versus-will* issue through a concrete example, a classic hypothetical from economics concerning the

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1. See *infra* Part III.

2. JAMES TREFFL, *READING THE MIND OF GOD: IN SEARCH OF THE PRINCIPLE OF UNIVERSALITY* §§ 3, 11 (1989).

external benefit that clover provides bees.<sup>3</sup> Land that is growing clover could instead be growing wheat. Simply avoid needless arithmetic that would leave the result unaltered and assume that the out-of-pocket cost to a farmer for cultivating clover is the same as the out-of-pocket cost for cultivating wheat. Though neighboring beekeepers' bees collect nectar from the blossoms, the more obvious reason for a farmer to cultivate clover is to produce hay for animals. The wind cross-pollinates wheat and other grasses, which produce no nectar useful to honeybees. The Nobel Prize winning economist James Meade concluded that, if there were no external encouragement to the farmer, the amount of clover planted would be deficient.<sup>4</sup> Meade argued that left to his own devices a farmer would expand his clover field only until the value of the additional hay that could be produced from still another acre was less than the cost of producing it, including the opportunity cost of the foregone wheat. Suppose that a farmer has 49 acres in clover and is considering whether to add a fiftieth, and at that margin the hay would be worth \$99. Suppose that \$100 worth of wheat could be produced on that acre. The acre would then be planted in wheat.

But a neighboring beekeeper also makes decisions at the margin. Suppose that adding another hive would cost her \$50. The value of the resulting honey depends on how much clover is nearby from which the bees can easily collect nectar. With 49 acres of clover in the farmer's field, the extra hive would increase the beekeeper's honey production by \$49, so the hive will not be added. If, however, the fiftieth acre were planted in clover, honey production would increase by \$60, ten dollars more than the hive's cost to the beekeeper. Add to the \$99 value of the hay from the marginal acre the \$10 of net increased honey value and it becomes apparent that, overall, clover is the better use of the acre at \$109 versus the \$100 value of the acre in wheat. From this example, Meade concluded that there would be too little clover planted unless the government acted to enhance its acreage. Stated differently, there would be insufficient clover due to an uncompensated positive externality provided by the farmer to the beekeeper – the "amenity" nectar would be underproduced due to the beekeeper's free riding.

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3. There is a converse positive externality that bees provide clover by cross-pollinating the plant. But as there is no reason, in general, to expect a constant ratio of magnitudes of the two externalities, that detail is inessential for present purposes and will be ignored. If and when the bees provide the more important externality, the parties in the hypothetical merely reverse roles.

4. James E. Meade, *External Economies and Diseconomies in a Competitive Situation*, 62 ECON. J. 54, 56 (1952).

Though it is not of central concern here, nearly a decade after Meade wrote, Coase noted that the marginal acre would indeed be converted to clover if it were easy for the beekeeper to identify and negotiate with the farmer.<sup>5</sup> Because a bee colony produces more honey if more clover is growing near its hive, the beekeeper would be willing to pay for that advantage if necessary. Suppose the beekeeper offers \$5 conditional on the farmer planting an additional acre in clover. The farmer now discerns revenues of \$104 if the marginal acre is planted in clover (\$99 worth of hay plus a fee of \$5 from the beekeeper) versus \$100 from planting the acre in wheat. The beekeeper gains \$10 from the extra honey from which she pays the farmer \$5, leaving her a profit of \$5. Meade's problem disappears. In the language of economics, the external benefit to the beekeeper that the farmer had been ignoring has been internalized into his decision-making process. As seen by the farmer, the opportunity cost of the acre in wheat would now be the foregone \$99 value of the hay plus the foregone \$5 fee from the beekeeper, which exceeds the \$100 value of the acre in wheat.

Meade-like problems are widely understood among environmentalists, while the more sophisticated of them also understand Coase's point that government solutions are unneeded if transaction cost is low so that an internalization is workable. This article focuses instead on a different, common, but poorly recognized situation, one in which the magnitude of transaction cost is completely irrelevant. Even if transaction cost is prohibitive, the externality, though real enough in aggregate, may dissolve before decisions regarding the margin—that fiftieth acre—are reached. Suppose that in the example above the value of an additional hive of bees fell below its cost as soon as the farmer had planted ten acres of clover. The farmer, however, would keep expanding the clover field to 49 acres solely for the value of the hay. The farmer may not even notice that the beekeeper is producing honey nearby; the beekeeper may have no idea where the bees are gathering nectar, merely that they are collecting it as fast as their little wings will carry them. Despite the externality, and despite the paucity of information and the prohibitive transaction cost thereby implied, there is nothing objectionable about the acreage planted in clover though the farmer

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5. Ronald H. Coase, *The Problem of Social Cost*, 3 J.L. & ECON. 1 (1960). Cheung subsequently discovered that, long before Meade wrote, many clover farmers and beekeepers had been contractually internalizing that very externality. See Steven N.S. Cheung, *The Fable of the Bees: An Economic Investigation*, 16 J. LAW & ECON. 11, 12 (1973). Other useful commentaries on Meade's argument appear in J.R. Gould, *Meade on External Economies: Should the Beneficiaries Be Taxed?*, 16 J.L. & ECON. 53 (1973), and David B. Johnson, *Meade, Bees, and Externalities*, 16 J.L. & ECON. 35 (1973).

ignores the beekeeper's interests altogether. In aggregate there is definitely a positive externality since the beekeeper is benefiting from the nectar produced by the clover field, but at the margin the externality is irrelevant. The beekeeper would not pay the farmer to expand the clover field since the marginal acre is worthless to her, though clearly the average acre is not. Nor would the farmer likely threaten a gross contraction of acreage (from 49 acres to something less than the bee-satiating 10 acres) merely to coerce a small fee from the beekeeper. Whether or not transaction cost is prohibitive, there would be no useful role for a policy urging any alteration of the clover field. Here, then, transaction cost is totally irrelevant.

The focus of this article—the distinction between relevant and irrelevant externalities—originated in James Buchanan and William Craig Stubblebine's "Externality."<sup>6</sup> Though "Externality" has attracted a small cult following among economists, it is virtually unknown among legal scholars, to whom it seems intuitive that chronic externalities beg for public policy initiatives. The nearly lost point of "Externality" is that more often even chronic externalities are irrelevant. If the farmer would use his field in some different way if, counterfactually, he took full account of the beekeeper's inconsistent preferences, the externality is indeed a phenomenon worth considering. But, if the farmer's use pattern would remain unchanged even if he took the beekeeper's preferences into account, the externality is real but simply does not matter. Externalities, positive and negative, are everywhere but are usually economically meaningless. Though chronic, such externalities, like others used in the discussion below, need no regulation.

## I. WHY MIGHT THE ENVIRONMENT MERIT NATIONAL GOVERNMENT SUPPORT?

A major problem addressed in the environmental literature is that the existence of the very large population enjoying many amenities is patently obvious, but there is a reasonable way neither to take a plausible census nor to gauge the strength of individual demands for the amenities.<sup>7</sup> Negotiating with such vast numbers would impose overwhelming transaction cost, and even then individuals, being trapped in a prisoners' dilemma, would have every incentive to understate or even deny their interest. If everyone else accurately

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6. James M. Buchanan & William Craig Stubblebine, *Externality*, 29 *ECONOMICA* 371 (1962).

7. Donald J. Boudreaux et al., *Talk Is Cheap: The Existence Value Fallacy*, 29 *ENVTL. L.* 765, 777 (1999).

reported and paid for the environmental amenity that they want, the trivial contribution that an individual could afford to add to that heap would cause barely a ripple. But if the others, thinking along a similar line, conceal personal demands, a forlorn exception would finance pathetically little. So everyone's best strategy seems to be concealing individual interest and in that way saving money. Consequently, it might appear that very little private funding for the amenity will materialize.

From that platform the usual argument proceeds to what this article will call *The Two Claims*. First Claim: Due to a high-transaction-cost/free-rider market failure, private investments in environmental amenities will certainly be deficient. Second Claim: It is thus necessary that government proxy for the governed. While government cannot know the unknowable, it can tax to fund some amenity investment and in that way extract us from our imprisoning dilemma. With care being taken that estimated amenity values are reasonable, that would be an improvement over total reliance on voluntary finance.

The Two Claims may hold in special cases, but they fall far short of a general rule. The problem becomes clearer when couched concretely: Many people in Dakota value the forests of Oregon (and many Oregonians value the badlands of Dakota) just as Dakotans value shoes to wear (especially in winter). If necessary, nearly every Dakotan would willingly pay to foster forests in Oregon, although most Dakotans would pay substantially less for that than they are willing to pay for a pair of shoes. But due to high transaction cost and their doomed hope of free riding—doomed because it seems there surely will be little enough to free ride on—the Dakotan interest in Oregon's forests registers in no market. Their interest in shoes, in contrast, comes readily to shoemakers' attention because that market has low transaction cost as well as presenting little opportunity to free ride on other people's expenditures on shoes.

So it seems that there will be enough shoes in Dakota but (since Dakotan interests are being ignored) too few trees in Oregon—unless a government intervenes. It seems that the intervention must be national because there are interested parties in every state (indeed vastly more outside than inside Oregon and Dakota) and many of them value Oregon's forests—this article's author for instance (true fact), probably its reader, but wait, even people in Quebec and Paraguay, the Finns, the Maltese and the Kenyans, some Punjabi—you get the idea. Even our national government cannot encompass enough taxpayers.

Naysayers may scoff that Oregon has incentive enough to maintain forestland for the tourist spending of nonresidents, but that argument offers scant solace to those who never visit Oregon but value

knowing that great evergreen forests survive there. Whether or not tourist demand registers fully, The Claims hold that there will be too little forest in Oregon because that existence value never weighs in. The Claims are interchangeable via easy word substitution, indeed are mass-produced for assembly line application to every manifestly valuable environmental feature, as well as seemingly endless more contentious candidates that apparently matter to some people—Dakota's badlands of course, the Everglades, the oil-befouled Spanish coast, penguins in Antarctica, and humongous turtles in the Galapagos, Andean darkness so coveted by astronomers, the chambered nautilus, Easter Island's stone heads, trails to the very peaks of Everest and Fujiyama, Bengal tigers menacing the honey hunters of the Sundarbans, or great white sharks and salt-water crocodiles and funnel web spiders busying themselves with Australians. Appealing amenities all (or nearly so), but how best to arrange for them?

## II. OR WHY NOT LOCAL ENVIRONMENTAL REGULATION—OR NONE AT ALL?

People are not identical, and they are not immobile like plants or sponges that live or die wherever their embryos chance to lodge. Different people have different interests, and they move around a fair bit in response to their personal interests. It is certainly not true that everyone living in Oregon is there because that state has evergreens. But it is certainly true that someone who deeply loves evergreen forest will more likely live in Oregon than will someone who does not care for such trees. Being around an evergreen forest provides non-pecuniary income to anyone who enjoys it, but not to someone who barely notices. The evergreens even reduce non-pecuniary income for anyone who finds dark forests spooky. Thus, holding a job's pecuniary returns constant, a forest lover will do better in Oregon than will others. More subtly, one who desperately loves evergreen forest will do better in Oregon than someone who only likes such forest quite a lot—it is not merely the existence of a preference but its strength that counts. Similarly, a person who deeply loves the Badlands is more likely to end up a Dakotan than someone who finds them only quite appealing, much less someone who abhors broken terrain.

Thus, one who loves Oregon's forests will be more likely to accept a job there when and if it is offered. But someone who desperately, passionately loves Oregon's forests will be quite likely to accept that job or to become self-employed to relocate to the state if no



offer is forthcoming.<sup>8</sup> Anyone helping college graduates find employment knows full well that there is no perfect correlation between their eventual haunts and the environmental entities that they especially value, but there is definitely a positive correlation, a stronger one for those with more intense preferences.

Therefore, those few who most intensely enjoy Oregon's forests should live predominantly (not exclusively) in Oregon. Those who most intensely love the badlands should be concentrated in Dakota. So some (not all) Oregonians want more forest in their state than most Dakotans want forest in Oregon. Some (not all) Dakotans more resolutely defend the badlands than nearly anyone from Oregon.

With isolated and unimportant exceptions, evergreens are not Christmas trees. Each household must have its own Christmas tree if its children are to enjoy placing baubles all over it (then later enjoy watching a grumbling parent tediously remove and store those decorations). In contrast—and here is the beauty of it—tree-loving Oregonians enjoy the amenity that their forests exude as a view, a sense of solitude, the smell, the sights and sounds of the forest flora and fauna, just knowing it is there, or all those at once. Those joys in no way interfere with similar and simultaneous enjoyment by anyone and everyone from Dakota, most of whom are not even in Oregon at the moment and some of whom never will be. We can all enjoy the exact same trees at the exact same moment, but nearly every Dakotan is satiated before the *most intense* of the Oregonian demands are met.

Of course, several million people live in Oregon, so perhaps the problem has merely been localized rather than eradicated. Even so, that fact implies that much of the environmental regulation is misguided—Salem rather than the District of Columbia could better govern the high-transaction-cost/free-rider problem.<sup>9</sup> Though many Dakotans definitely

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8. The contention does not fail if a great many people who love evergreen forests have inappropriate skills for Oregon jobs, but only if forest love and Oregon-appropriate skills are strongly but negatively correlated. The converse is more likely—to facilitate recruitment any employer exploiting a skill that is especially prevalent among forest lovers (or haters) will, where feasible, locate the work site inside (or outside) some place like Oregon. Like people, jobs also move around a fair bit.

9. Or the problem might best be delegated to specialized agencies with borders not coincident with any other political unit's, being either larger than a state—perhaps in addition to Oregon include Washington and Northern California (and why not British Columbia?)—or smaller—Oregon's Willamette Valley might encompass a complete unit. More external effects would no doubt spill across the borders as the unit's area was reduced, but its compactness would simultaneously provide information and agency cost offsets while mitigating the monopoly distortion of geographically large unitary governments. So the proper conception is cost versus benefit rather than costless benefit.

enjoy Oregon forests, the demands of most, if not all of them, are irrelevant in the Buchanan & Stubblebine sense. Legislators in Salem represent most of the relatively few relevant demands; the U.S. Congress represents predominately the many irrelevant ones.

Point taken, but the argument has been halted in midstream. Though the localized-not-eradicated viewpoint may sometimes be sound, in other instances even it fails. Far out in one tail of the bell-shaped Gaussian statistical distribution (a distribution often called "normal" for good reason),<sup>10</sup> a few Oregonians will have atypically intense demands for evergreen forests even when compared with the vast majority of their fellows, who located in Oregon more for the skiing, the sailing, the fishing, the microbreweries, and coffee, or even by random chance. Perhaps most of the others also really enjoy Oregon's forests, just not as much as those who are way out in the tail. If after taking into account both benefit *and cost* those in the tail achieve forests that are appropriately extensive for their purposes, other Oregonians — and everyone else — will be satiated.

Indeed, though Oregonians' demonstrable love of evergreen forest offered good expositional footing, a few individuals far out in the tail might even live in Dakota, or Korea for that matter. If a non-political solution is workable, the more important consideration will not be where people with marginally relevant demands for the amenity live but how many of them there are. When they are few, there is no obvious high-transaction-cost/free-rider problem, thus no relevant externality even though millions of people enjoy the amenity, and consequently no inexorable requirement to override privately determined allocations.

The article now lays out those ideas more methodically, beginning with a brief discussion of the scientific method to account for the argument's initial unrealistic though simple form in which (not incidentally) there are no environmental amenities at all. Additional complications are gradually introduced to make the points outlined above. It is argued that private parties will often (not necessary always) better optimize environmental amenities than a diligent, honest bureaucrat could be imagined doing. The bureaucrat's crippling disadvantage is that most amenity values are not merely subjective and thus knowable only to the demander, but the link between production and consumption skirts formal markets where objective proxies might

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See David D. Haddock, *Must Hydrological Regulation Be Centralized?*, in *WATER MARKETING—THE NEXT GENERATION* 43, 44 (Terry L. Anderson & Peter J. Hills eds., 1997).

10. The argument would apply equally well with almost any standard statistical distribution, though some variant of the Gaussian seems appropriate in this instance.

possibly be observed.<sup>11</sup> And though the argument would be strengthened, the article only occasionally brushes the voluminous public choice literature questioning the extent to which a bureaucrat would endeavor optimally to execute what appears to the public to be the bureaucracy's charge. The article concludes by pondering reforms that would transfer bureaucratic decision making into private hands by using tax allowances or other subsidies. Care should be taken to ascertain that it would not be better to eliminate the bureaucracy but eschew the subsidy. The scientific method enables one to annoy nearly every special interest.

### III. KEEP IT SIMPLE STUPID

#### **An Inquiry into the Nature and Causes of Scientific Progress**

Earth is hardly Sesame Street but instead a planet chock full of complex hazards, a disagreeable feature that successful organisms survive in various ways. Many insects, fish, rodents, and plants produce swarms of offspring so that a lucky few can reproduce the entire next generation. Human families of even 15 or 18 are minuscule in comparison—we humans survive more on logical ability than profligate reproduction. Even so, we are not nearly as smart as we pretend to be, and urgent problems sometimes overtax an unsystematic mind. In the mists of prehistory, our ancestors began to trace out a way to mitigate the impact. Gradual elaboration led to a marked increase in life expectancy—in today's First World by an order of magnitude or more. Only during recent millennia, however, has that tool been consciously recognized and systematized as the scientific method.<sup>12</sup>

Science relies on simplifying assumptions, beginning an attack on some potentially overwhelming problem by imagining a setting in which most of its complications are nonexistent. The scientist then tries to create a logical, internally consistent story regarding an imaginary world that may only vaguely resemble the real one, though one hopes with a few important similarities. To a scientist that story is called a theory, a very different meaning than mere speculation or assertion, for which the word is substituted all too often in non-scientific writing. A scientific theory is potentially useful if it foresees events that people had been unable to predict without it. Indeed, a theory may suddenly

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11. On the economic implications of subjective value, see Friedrich A. Hayek, *The Use of Knowledge in Society*, 35 AM. ECON. REV. 519 (1945).

12. This section leans heavily on TREFIL, *supra* note 2.

become almost alive and begin attacking problems that its originator had not even anticipated addressing.<sup>13</sup>

Even non-scientists repeatedly, if unconsciously, employ the scientific method when planning a trip to work, contemplating but the tiniest fraction of what might plausibly be encountered en route, the rest being implicitly assumed too improbable or unimportant to merit more than passing attention, if that. Scientific theories are to the world as a model plane is to an airliner—several parts may behave analogously, but the model omits a great many features, which defeats an exact (perhaps even a close) correspondence with the real thing.

Thus, scientific counterfactuals predict impending events imprecisely. But if the model is not too difficult (costly) to employ, even rough predictions can be quite useful. Today's assumption (albeit implicit) that no fire engines block any road of interest suggests a route to the office that at best approximates the ideal and occasionally misfires badly. But even when misfiring, past experience may have shown the model useful often enough to justify employing it again tomorrow.

If a model proves efficient in that way, more detailed versions might be built that gradually relax simplifying assumptions (address more real world complexity)—even model planes can become more like airliners. Because the researcher better understands interactions among features modeled earlier, the more elaborate model is more tractable than had the initial version included all those complications at once. With luck, the gradually refined predictions converge on subsequent experience. If not, the new variant will be discarded.

To illustrate, consider how that primitive excuse for a vehicle, a tricycle, enables children to learn to peddle and steer along sidewalks while deferring mastery of a great many more difficult skills. After those simple techniques become second nature, the child advances to a more complex model called a bicycle with nearly single-minded focus on the intricacies of balance. But one should thoroughly master the bicycle before challenging formidable highway hazards on a motorcycle. Injury and mortality statistics indicate that a perfect model is never actually attained, but the systematic progression greatly improves a rider's odds. Without the scientific method, we could all be mired in a crippling, nihilistic attention deficit disorder, our overmatched minds flitting fecklessly among complications, with no convergence emerging.

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13. That can be annoying if the theory, anxious to reveal some additional insight, persistently awakens its originator during the night. Artistic works also occasionally master their originators. See LUIGI PIRANDELLO, *SIX CHARACTERS IN SEARCH OF AN AUTHOR* (Stephen Mulrine trans., 2003) (1921).

Weather forecasting offers a familiar instance of evolving understanding of vastly complex systems through iterative model complication. Extreme stakes (life or death on occasion) repay rapt attention to predictions that remain observably deficient in an absolute sense. Though tornadoes rarely strike any given spot in a warning zone, alerts incite anxious preparations to seek shelter if that should prove advisable. Still, the weather model relied upon last year regularly is discarded as too imprecise in comparison with this year's new and improved (though still pitiful) version, just as the new one will be discarded in its turn for an even better, though possibly more complex variant. In more technical nomenclature, the new model has refuted the old one though it is not "the truth" but a still flawed tool that merely makes predictions that are closer to subsequent observations.<sup>14</sup> Scientific counterfactuals resemble hailstones—layer built upon layer; insignificant contrivances to a skeptic that occasionally attain a heft that, though only an approximation rather than reality, simply can no longer be ignored.

Even critical legal theorists select a route to work by building models.

#### IV. A DISCOURSE ON ENVIRONMENTAL AMENITIES

Taking land and sea together, human action can hardly alter our planet's area. Many different activities occupy that surface, some quite compatible—passersby enjoy the mountain vista across a bucolic pasture while oil is pumped from beneath—but others less so—the pasture's livestock preclude a shopping center on that site. While compatible uses may overlap, increased area in one use often imposes a corresponding decrease on some incompatible ones. Evaluating such displacement compels at least an implicit cost-benefit analysis. This article consciously begins with a very simple though unrealistic counterfactual, then in

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14. Model evolution need not converge on an epistemologically flawless worldview to yield predictions a lot better than guesswork. Ptolemy's crystal spheres provide an excellent example, though that astronomical theory was ultimately laughed to scorn. Those same spheres also illustrate that models can be forced into extreme contortions during efforts to preserve the received understanding while nonetheless accounting for perplexing new observations. Growing complexity may herald a paradigm shift—a totally new model that makes predictions as good or better than the old one while being simpler and easier to understand. Thus, Copernican astronomy supplanted its Ptolemaic predecessor (to be compromised in turn by the Theory of Relativity). THOMAS S. KUHN, *THE STRUCTURE OF SCIENTIFIC REVOLUTIONS* (1962). But thank goodness we had Ptolemy and then Copernicus while awaiting Einstein, who of course stood on Copernican and thus Ptolemaic shoulders. That the Theory of Relativity ultimately is sure to be fundamentally modified or even discarded does not and ought not dissuade us from using it until a better model appears (the present challengers include string theory and the theory of dark energy).

subsequent sections converges on more realistic analyses of those environmental amenities that are compatible with some commercial land uses though incompatible with others.

### **A. A Drab If Lucrative Island Life**

#### *An Amenity-Free Baseline*

As odd as it may seem, meaningful comparisons become more obvious if one begins with a hypothetical that has no environmental amenities at all and then observes if and how adding them to the model affects the results. So imagine that a rancher single-handedly owns and operates an entire island, a family legacy for generations that she would never consider selling. No one else ever visits or cares about her island, which is uniformly fertile, the whole of it attractive for commercial exploitation. Market prices and transport fees are unchanging and leave but two plausible outputs, timber or beef, either to be sold offshore, and in that market the island is producing too little to affect either price. In this section, the rancher regards the island's pasture and forest as mere tools for maximizing pecuniary return. Government policy is neutral—no tax or subsidy affects the island's use pattern. For now it will be assumed that the rancher costlessly acquires information, including foresight.

Under those simplifying assumptions, the entire island might plausibly be used for either timber or cattle, whichever yielded the greatest revenue per unit area after transport costs are deducted. But it is net rather than gross revenue that determines land use, and factor requirements for the alternatives have very different time profiles. To concentrate entirely on cattle, the rancher and her capital would be working long hours during the late winter calving season, then again during the summer's haying, and finally when surplus animals were shipped in early fall. Given the island's climate, cattle require little attention during the rest of the year, the rancher wallowing in idleness. But saplings of the appropriate sort can only be planted during spring, while mature trees are cut while the sap is down during late fall and winter. Cattle are at their most demanding when the forest needs little attention and vice versa, which counters whatever economies of specialization may exist, so mixed agriculture is a possibility, and henceforth will be assumed.

Little cost is imposed if only a few days are devoted to one or the other of the outputs, because the requisite labor and capital will be withdrawn when they are of relatively little value to the other process. But increasing the days devoted to the former requires diverting time of increasing urgency for the latter, implying for each output an increasing

opportunity cost. Due to the increasing opportunity cost of concentrating the rancher's labor and capital, the net value of marginal land units will be a decreasing function of the area devoted to either product, even though market prices are invariant to island output.<sup>15</sup> The marginal net value of timber would initially be high because the marginal opportunity costs of the other inputs are low for the first land devoted to forest—most of the work required to maintain the forest occurs when cattle barely compete for attention. But as tree planting operations keep expanding, time and then more time is diverted from increasingly weighty cattle-tending duties so the marginal net value of timber would fall due to the increased opportunity costs that must be netted against timber receipts. Similarly, the marginal net value of cattle would be high if virtually the entire island were devoted to forest because the opportunity cost of the inputs required to exploit the first pastureland would be low—cattle draw most inputs during the late winter, summer, and early fall when forest requirements are few. But if the pasture kept expanding, the marginal net value of cattle would fall as the requisite work began to intrude on prime timber-producing months.

Thus, maximizing the island's value might easily prevent the ranch from specializing in either timber or cattle, but instead require production of a mix of the two outputs. Assume that the island long ago settled into a stable, comprehensively renewable, value-maximizing division between forest and pasture. One percent of the timber is harvested and replanted each year. Hence, the age distribution of the woodland is unchanging, but mature trees are found in various locations around the island through a century-long cycle.

## **B. Even Cowgirls Get the Blues**

### *A Private Environmental Amenity*

As detailed in section III above, the scientific method begins with a rudimentary model that is relatively easy to understand, then iteratively relaxes one or a few of its simplifying assumptions to observe what difference (if any) that concession to realism makes.<sup>16</sup> In that spirit,

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15. Given the rancher's present exclusive focus on pecuniary magnitudes, the marginal value of a land unit used to produce timber (or cattle) would be the increase in total timber (cattle) output as a result of a marginal increase in land used to produce it, multiplied by the market price of timber (cattle) net of the per unit transport charge necessary to ship it to market, a product from which the marginal opportunity cost of the other inputs necessary to exploit that marginal land unit has been subtracted.

16. Were this an empirical paper incorporating an appropriate data set, successive versions of the model could be pitted against each other via "critical tests." If within

imagine that our lonely rancher feels consoled when sitting under her forest's trees. Apart from an enjoyable anticipation of receipts from cattle sales, she experiences neither pleasure nor pain when contemplating pasture. Thus, the forest now provides an additional though ephemeral benefit to the rancher—an environmental amenity—that is distinct from the timber revenues she receives.

Monies from timber sales are objectively measurable and directly comparable to income from selling cattle. Maximizing the aggregated income maximizes the value of what the rancher can purchase while ashore. Neither timber nor cattle nor the income earned when they are sold provides the rancher with satisfaction, but enjoying goods that can then be purchased does. Trees, animals, and money are mere accounting units encountered along the passage to the rancher's utility, the magnitude of ultimate interest to economics.

In contrast, the amenity is not marketed but consumed directly by the rancher, valuable to her because it makes her happy, providing utility directly. There is no market measure by which the reader could contrast the rancher's benefit from a marginally increased amenity with any resulting decrease in pecuniary income. Discovering all the relevant objective information in a market would be an insuperable task; discovering all relevant subjective information would be impossible. With no reliable measure of the subjective amenity value to the rancher, an observer could never ascertain the island's optimal division between pasture and forest, a matter that weighs more heavily as the article proceeds.

The rancher suffers no similar uncertainty. She is both the producer of timber and cattle and the producer (and consumer) of the forest amenity, so she simply compares her utility from increasing the amenity with utility that might be lost by foregoing market consumption since any decrease in pasture will reduce pecuniary income.

Woodland provides the rancher two distinct benefits, a flow of income from timber sales and a forest amenity that she finds in a copse of mature trees. The amenity may or may not alter the pasture-forest division. If additional forest continues to create additional amenity value

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statistical standards of confidence one model yielded predictions that accorded better with factual observation, the evidence would be said to have refuted its competitor(s). Careless commentators sometimes characterize such an outcome as having "verified" or "proven" the non-refuted model. But each counterfactual contains numerous simplifying assumptions—a few usually explicit, but a vast number implicit, many unrecognized even by the model-builder—and any of those could be relaxed at some point. So there is prospect of an even better fit with reality. It is less misleading to say simply that the evidence has failed to refute whichever model still stands, while recognizing that alternatives with different simplifying assumptions might yet do so.



for the rancher as the forest gets larger than that which maximizes her pecuniary income, the respective areas will change.<sup>17</sup> The forest will be expanded, and what heretofore would have been a pointless sacrifice of pecuniary income will have become an implicit price the rancher willingly pays to expand the amenity she so enjoys. To borrow from "Externality," the amenity is relevant to the rancher's boundary placement between forest and pasture.<sup>18</sup> For brevity, call such an amenity boundary-relevant.

But suppose the rancher cannot see the entire island at once and can relax in any forest glade. Then the amenity, though valuable in total, may have no value at the margin and as a result might be irrelevant for deciding the island's forest-pasture division. Paradoxically then, an amenity can simultaneously be as important but as marginally irrelevant as oxygen is. Without oxygen we die; what could be more important? Yet, there is so much oxygen floating freely in the atmosphere that almost all of it is still there after the earth's  $n$  billion people have been sated.<sup>19</sup> And so it will sometimes be for an amenity. Perhaps the rancher cherishes few things more than her beautiful woodland, but she is satiated before its marginal amenity value has the least impact on her division of the island between the two outputs. What a wonderful situation! The rancher enjoys as much amenity as she wants (thus, until its marginal value has fallen to zero) without sacrificing even a cent of market income and the goods that buys. Where irrelevant externalities are present, there really can be a free lunch. Those best things in life that

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17. See Antony W. Dnes & Dean Lueck, Common Law, Statute Law and the Birth of the Conservation Easement 20 (Oct. 2002) (unpublished manuscript on file with the offices of the *Natural Resources Journal*).

18. Buchanan & Stubblebine, *supra* note 6. As their title suggests, Buchanan and Stubblebine discuss "relevant" versus "irrelevant" solely in the context of externalities. Obviously the concept is more broadly useful; as yet there are no externalities in this article.

19. Consider the following:

What greater stupidity can be imagined than that of calling jewels, silver and gold "precious," and earth and soil "base"? People who do this ought to remember that if there were as great a scarcity of soil as jewels or precious metals, there would not be a prince who would not spend a bushel of diamonds and rubies and a cartload of gold just to have enough earth to plant a jasmine in a little pot, or to sow an orange seed and watch it sprout, grow, and produce its handsome leaves, its fragrant flowers and fine fruit. It is scarcity and plenty that make the vulgar take things to be precious or worthless; they call a diamond very beautiful because it is like pure water, and then would not exchange one for ten barrels of water.

DAVID SOBEL, GALILEO'S DAUGHTER: A HISTORICAL MEMOIR OF SCIENCE, FAITH, AND LOVE 148 (1999) (excerpt from the character Sagredo in *Galileo Galilei, Il Dialogo* (1632)).

actually are free (impose no opportunity cost) pose no economic problem and beg for no solution.

Perhaps the reader will object that the marginal value of an amenity never falls to zero, that more is inevitably better than less. In a world without constraints and the tradeoffs constraints impose, that notion would be correct, because then there would be no distinction between preferences and value. But in a constrained world, rational decisions cannot flow from pondering our unconstrained preferences but rather from considering how much of one valuable thing you would be willing to give up for an additional unit of another valuable thing. To put the matter concretely, consider that while forest yields amenity value so does seashore. If neither marginal value ever falls to zero, one receives positive amenity value from each added bit of forest regardless of how much forest there already is, so one's unconstrained preference would always be for more forest. But since one also receives positive marginal value from each added bit of seashore regardless of how much there is already, one's preference would always be for more seashore. That combination is internally inconsistent—eventually forest occupies so much land that further expansion would require cutting into the seashore and vice-versa. One is left wringing one's hands rather than deciding how much forest there should be at the expense of seashore. And of course there are not two but thousands of distinct sorts of land use that yield amenity value (wetlands, desert, granite mountain faces, and so on), so the problem is vastly more protracted.

Ah, the reader replies, one makes the decision between forest and seashore by comparing the strength of the preferences. Exactly! The reader has begun to practice economics. One decides whether to expand the forest by comparing the value that one places on having more forest with the opportunity cost of expanding it, which includes the value lost from contracting the seashore or some other valuable land use. Possibly without even realizing it, the rancher indirectly decides whether to expand the forest by comparing that value with the cost (among other things) of the added hunger that would result from reduced beef output.

Thus, the marginal amenity value of forest is measured not by wishing for the impossible, but by gauging the amount of some other valuable thing that one would be willing to give up to have a bit more forest. One cannot place any substantial value on an unlimited amount of forest because there is not an unlimited amount of other valuable things (including of course seashore, wetlands, freedom from hunger, and so on) that one can give up to obtain it.

### C. Second Party Environmental Amenities

Only those policy proposals that (given adequate data) might plausibly lead to Kaldor-Hicks improvements are examined here.<sup>20</sup> But in defining a clear starting point, the simplifying assumptions have deleted so many of the complications that bedevil environmental amenity provision that no such policy issues have arisen. This section begins correcting that omission by relaxing the assumption that only the rancher enjoys the amenity, with subsequent sections relaxing still other assumptions.

#### 1. *Public Goods with and without a Public*

Vessels begin passing, and the sailors admire the forested island view. Hence, more people now enjoy an amenity once produced and enjoyed solely by the rancher. In the argot of economics, the amenity is a "public good" rather than a private one. Even with sailors involved, the model rarely supports amenity-targeted policy initiatives.

When one asks randomly selected non-economists what they take "private good" to mean, nearly everyone replies that a private good is something that is owned by a human or a non-governmental organization, as in "the blue car is my private property, but the red one is not a private good; it belongs to the city government." If one asks the same people what a "public good" might be, a common answer is that it is something provided by the government to members of the public. Some take it to be something available to every member of the public, for example the public highways, but many also apply the term to things such as public housing that are made available by the government only to members of the public who meet particular criterion. A few people will say simply that a public good is something owned by government—the red car in the illustration above—while ignoring the issue of who is permitted to use it.

Those intuitions undoubtedly predate the formal distinction between "private good" and "public good" in technical economics. Unfortunately, the economic definitions imply something quite different though they are now perhaps too ingrained to alter. To an economist, a private good (which might better have been termed a rivalrous good) is

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20. A Kaldor-Hicks improvement requires that a policy's beneficiaries would retain some benefit even if required to compensate those who had been disadvantaged, though the definition does not require that compensation actually be paid. See RICHARD A. POSNER, *ECONOMIC ANALYSIS OF LAW* 13 (6th ed. 2003). Pure transfers would be of no interest here. Redistribution—even costly redistribution—is a legitimate topic of public debate but goes well beyond environmental amenities and would pose a distraction.

something such as an apple whose consumption by one person forecloses consumption by anyone else—the eaten apple inevitably was for someone's private consumption, even an apple that was provided to that person by the government. The economic value of such a good is measured by the most that any one person would exchange to obtain it if giving up so much were unavoidable. For instance, if the rancher would give up as much as \$10 to be able to eat the island's only apple while each passing sailor would give up as much as \$5 to do so, the economic value of the apple would be \$10, the highest valuation of the lot. Private goods pose a rationing problem solved in a market economy through the price mechanism—if the rancher offers \$6 for the apple, no sailor will top the bid and the rancher will be said to have realized a consumer surplus of \$10 minus \$6, or \$4, while the seller will have realized a producer surplus of \$6 minus the apple's \$5 opportunity cost (its value to a sailor), or \$1.

In contrast, in economic vocabulary, a public good is non-rivalrous in consumption, such as a television program that can be enjoyed by many viewers—the entire public even—without depreciating anyone's enjoyment of it. Using "public" as the modifier is perverse—a view of the island forest was in fact a "public good" by that definition even when the "public" consisted solely of the rancher. Her act of viewing the forest left the view unaltered had there been anyone else wanting to take a look (which there was not until the boats came along—details, details). As with a private good, the common economic definition of public good makes its provider or owner irrelevant; it is what happens when someone partakes that matters.<sup>21</sup> By eating it, a person removes an apple from everyone else's opportunity set. But when that person enjoys a television broadcast, any other interested viewer (if they exist) can readily do likewise; no one should be troubled by the behavior of others, nor even recognize that they exist. Indeed, since discovering others who may be enjoying a public good imposes information costs but typically no benefits, one's fellow consumers of a public good will usually remain unidentified.

Since each person must have his own units in order to consume private goods, the observer aggregates the interest of the entire market by adding everyone's quantity demanded at a given monetary price. But since many people can enjoy it simultaneously, the economic value of a public good is measured not by any individual's valuation but rather by

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21. "Many public goods are provided by private entities (most radio programs in the United States for example) while governments often provide private goods (such as seats in sports stadiums)." David D. Haddock & Lynne Kiesling, *The Black Death and Property Rights*, 31 J. LEGAL STUD. S545, S558 n.33 (2002).

adding each different person's valuation at a given quantity. That is to say, by summing the various maximum amounts that (if necessary) all the different individuals would give up to obtain the (shared) amount.<sup>22</sup>

Solely for pecuniary reasons, the rancher would divide her island at one boundary but would increase the amount of forest at the expense of pasture for the sake of the amenity value that she personally received from the added woods providing the forest was boundary-relevant. For concrete illustration, suppose that 15 land units had been placed in the forest. If the rancher would sacrifice as much as \$10 of pecuniary income per year while each of ten passing sailors would give as much as \$5 apiece to enjoy the extra amenity from increasing the wooded area from 15 to 16 units, the amenity value of that land would be the sum of the individual values, or \$60, since all eleven people could view the same additional trees without troubling the others.<sup>23</sup> If the rancher would sacrifice as much as \$7 while each of the ten sailors would give as much as \$2 apiece for the amenity value of still another unit of forest, the amenity value of the seventeenth timbered unit would be \$27.

But the sailors would see the island less often than the rancher and, being some distance offshore, they would be less likely to notice small-scale "imperfections" where, for instance, a narrow tongue of pasture intruded into the woods. Consequently, as the hypothetical's numbers imply, the rancher might value the amenity more highly than would any sailor, perhaps more highly even than all the sailors combined. Similarly, she might value having beauty in places where sailors would rarely glimpse it. In that event, the rancher might also value a more extensive amenity than do the sailors. Thus, the rancher might sacrifice as much as \$4, but none of the sailors would be willing to pay anything to expand the forest from 17 to 18 units, so the amenity value of that unit of public good would simply be the rancher's private valuation of \$4. Similarly, the rancher might value even a fourth additional unit by \$1 though all sailors were satiated after two had been added to the initial 15.

The nature of a public good permits everyone to consume it simultaneously so it need pose no rationing problem. But the good must nonetheless be paid for, so a free-rider problem can replace the rationing

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22. Harold Demsetz, *The Private Production of Public Goods*, 13 J.L. & ECON. 293, 296 (1970).

23. Though jointly produced with the public good (the environmental forest amenity), the rancher's timber that is growing there is a private good—when the rancher cuts and sells it, everyone else is precluded from doing the same. The discounted value that the rancher attaches to future timber sales from a given plot is apart from and additional to the subjective amenity value of the plot's forest that she experiences in the meantime.

problem if non-paying users cannot be excluded.<sup>24</sup> In the model here, the sailors are offshore and it will be assumed that the rancher's property right permits no unilateral imposition of a fee though the sailors relish the superb forested island view. If exclusion is impractical, as it has just been assumed to be, a public good is called a collective good.<sup>25</sup>

To illustrate the free-rider problem posed by collective goods, suppose that converting one unit of pasture into a sixteenth unit of forest would reduce annual cattle revenue by \$250 while increasing annual timber revenue by only \$238. As contrasted with her private benefit from the marginal amenity of \$10 per year, that would imply that the additional forest would cost the rancher \$12 annually, the \$250 of cattle revenue foregone minus the \$238 of additional timber revenue that could be realized on the converted land. Calculated in an analogous way, suppose that the second additional unit of forest would cost the rancher \$13, the third \$14, and the fourth \$15. Since the first two additional forest units would provide amenity value of \$60 and \$27 respectively while costing only \$12 and \$13, those two would become wooded in an ideal world and there would be 17 units of forest rather than 15. The forest amenity being worth only \$4 but costing \$14, the third unit would remain pasture.

But since no individual realizes sufficient benefit from an expanded forest, neither the rancher nor any individual sailor would willingly pay for either of the first two units of forest expansion. A few of them might join together to finance the expansions if they were convinced that their contributions were essential to the project, but each would prefer to have the other ten people contribute the entire amount. If they all free ride, however, a potential Kaldor-Hicks improvement will be frustrated.<sup>26</sup> An appropriate tax-expenditure scheme to pay for those two forest units consequently offers a plausible prospect of a Kaldor-Hicks improvement, though some commentators offer just as plausible a

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24. ARMEN A. ALCHIAN & WILLIAM R. ALLEN, *UNIVERSITY ECONOMICS* 475-77 (2d ed. 1969).

25. Demsetz, *supra* note 22, at 295.

26. Interestingly, if nine of the ten sailors discovered a more attractive place to sail, the amenity value of the island's first additional forest unit would fall to \$15 but free riding would pose no barrier to obtaining it — both rancher and sailor would have to contribute or too little financing would be available. There would remain a transaction cost as each maneuvered to nudge the other's contribution up so their own could be moderated to that extent, but even that cost is expected to decrease as the parties to negotiation fall. Paradoxically, the minor Kaldor-Hicks improvement would seem easier to achieve than the major one.

prospect that the free riding could be overcome without sovereign coercion.<sup>27</sup>

But suppose that the rancher discovers a typographical error in the published cattle price data and consequently has to reduce from \$250 to \$239 the estimated annual cattle revenue lost due to a first unit of pasture-to-forest conversion, the increased annual timber revenue remaining at \$238. The cost of that first additional unit of forest will have dropped from \$12 to \$1.<sup>28</sup> Suppose that, as a result of correcting the same error, the estimated cost of converting the second unit drops from \$13 to \$2, the third from \$14 to \$3, and the fourth from \$15 to \$4. The third unit of new forest, increasing amenity value by \$4 while costing only \$3, is now worth adding. That unit may comprise a public good in the economist's sense since consumption is non-rivalrous, but the public interest can hardly be implicated—only the rancher is willing to make any sacrifice to obtain that third unit. No opportunity to free ride on that unit presents itself, nor does transaction cost create any market failure since the rancher could find nobody to transact with.

A remarkable finding has emerged: if the tax-expenditure scheme envisioned above provides the two extra units that are valued by a multi-person public, the rancher will add the third unit of her own volition. But if there is no public provision of the first two extra units, the rancher will add all three of her own volition since their worth to her alone is \$10, \$7, and \$4 respectively, while their cost to her is \$1, \$2, and \$3. A positive externality exists since the sailors can readily view the island forest while bearing none of the cost, but the externality is irrelevant. The public's valuation of the amenity is thus boundary-irrelevant, "public" being used in the ordinary rather than technical economic sense. There will be the same amount of forest—18 units—either way, the first 15 plus the eighteenth provided at the rancher's expense if the government taxes to subsidize the sixteenth and seventeenth, all 18 provided by the rancher otherwise! Thus, even Demsetz, who is quite sanguine regarding the private provision of excludable public goods, overstates the problem with respect to collective goods, "the private production of collective goods, for which

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27. See generally TERRY L. ANDERSON & DONALD R. LEAL, *FREE MARKET ENVIRONMENTALISM* (rev. ed. 2001); TERRY L. ANDERSON & DONALD R. LEAL, *ENVIRO-CAPITALISTS: DOING GOOD WHILE DOING WELL* (1997); Terry Anderson, *Viewing Land Conservation Through Coarse-Colored Glasses*, 44 NAT. RESOURCES J. (2004). This article skirts that empirical debate.

28. The \$1 conversion cost is the difference between the alternatives of \$239 cattle revenue or \$238 timber revenue. A modest correction of hay, timber, or transport prices could have an analogous impact on the estimated conversion cost.

the cost of excluding nonpurchasers is great, does not seem to be practical."<sup>29</sup>

No doubt the rancher would prefer to be paid for planting those two units (but why stop there, the rancher would prefer to be paid for planting all 18!), while taxpayers would prefer not to be coerced into making those payments. Apart from that wealth effect, are the alternative routes for obtaining the forest expansion equivalent? For now the answer seems to be yes. The answer becomes clouded when the simplifying assumption that information is costless is relaxed, a task delayed a moment yet. With costly information one will find that the tax-expenditure route will more often miss the ideal and will likely miss it by greater magnitudes due to miscalculation of the true costs and benefits of marginal amenity enhancements.

The discussion also illustrates a more subtle point—the cost of increasing the forested area depended (among many other things) on the prices of cattle and hay and transport in addition to the price of timber. Imagine that there were some other island nearby where expanding the forest would curtail the area planted in asparagus. Then, the cost of the forest amenity would depend also on asparagus prices and the wages paid to those harvesting it. With other diverse islands in the chain, each a plausible locale for forest and for pleasurable sailing, the number of margins along which the forest amenity abuts incompatible uses could defy any manageable accounting. Economic costs are not dollars (mere proxies to facilitate recording and comparing dissimilar things) but the value of the multifarious opportunities foregone, and those costs are difficult to gauge by anyone not closely involved in the activities.

## 2. *Could a Million Sailors Be Wrong?*

One would naturally have thought that more users would require more of an amenity and that adding ten forest-loving sailors to a world that previously had only one forest-loving rancher would increase the ideal amount of forest. That intuition reflects the familiarity most of us have with private goods coupled with substantial ignorance regarding public goods. Providing they are willing to pay at least the marginal cost of production of a private good, it is efficient that even those with relatively weak demands have an impact on its output, as they do in a competitive market.<sup>30</sup> If the ten sailors begin to use the

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29. Demsetz, *supra* note 22, at 306.

30. Even where markets exhibit monopoly influence, relatively weak demands for private goods commonly induce some output response—though very weak demands may well be ignored.



mainland grocery where the rancher customarily buys her grub, the shop owner will definitely find it advisable to add inventory.

Those with weak demands for a public good often have no impact on its ideal amount even if they would be willing to pay marginal production cost for a unit. That is not because they are excluded but because they can be satiated without any expansion—they piggyback on stronger demands. Those with the strongest demands will, if necessary, be willing to pay for, and may indeed pay for, so much of the public good that those with weaker demands are unwilling to pay to have one unit *more*.<sup>31</sup> With sailors now in the model, the text from above can aptly be paraphrased: Those with weak demands value the amenity—perhaps they enjoy few things more keenly—but they are satiated before their preferences have the least impact on an ideal amenity provision. They enjoy as much amenity as they want (thus, until its marginal value *to them* has fallen to zero) without requiring the expenditure of a cent more than is required to satisfy stronger demands. A few strong demands, perhaps just a single one, may completely determine the optimal amount of a public good.

The arrival of boats carrying forest-loving sailors may or may not alter the optimal allocation between pasture and forest. If it does not, the amenity remains esthetically important to the sailors but their demand for it is boundary-irrelevant and thus raises no policy issue. But suppose the sailors' presence means that the ideal woodland would be larger (their arrival creates or strengthens the boundary-relevance of the amenity). Still, no policy issue arises if that ideal is reflected in the rancher's voluntary decisions. Consider those points in turn.

Boundary Relevance: In order for the boats to alter the optimal amount of the amenity it is necessary and sufficient that the most extensive sailor demand for the amenity exceeds the rancher's demand to be boundary relevant if the rancher's demand is not. That is plausible even though the rancher sees more of the forest and sees it more often providing she has a weak taste for looking at forest compared to at least one sailor's liking for such views. But if the rancher's amenity demand is boundary relevant, a sailor may have an impact on the optimal amount

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31. Menahem Spiegel, *Charity Without Altruism*, 33 ECON. INQUIRY 625, 627 (1995). Common law courts have perhaps been more successful than economists in distinguishing irrelevant from relevant externalities. Courts in all states except Louisiana, for example, have implicitly decided that the externality in alienation of affection case is irrelevant—the new pairing would be consummated even if the couple took full account of the interests of the disappointed spouse. *N.Y. Times, Co. v. Sullivan*, 376 U.S. 254 (1964) reaches a similar result with respect to inadvertent libel.

of the amenity even if his demand is less extensive than the rancher's.<sup>32</sup> Amenity value will be lost if the rancher does not make that adjustment of her own volition, though the loss will be overstated if one focuses strictly on the marginal amenity that is missed by a failure to expand the wooded area while ignoring its opportunity cost, the value of producing beef on that same land. A tax-expenditure inducement to the rancher to expand the forest offers a plausible prospect of avoiding that Kaldor-Hicks loss, though the requisite governmental process will impose costs of its own, and they might plausibly swamp any gain from correcting the shortfall.

**The Rancher's Reaction:** If transaction cost were modest, the rancher would move the boundary without governmental inducement because she would be paid to do so by those enjoying the enhanced amenity. But with ten sailors offshore enjoying the amenity, how likely is it that the transaction cost would be low?

With the amenity being a public good, low transaction cost is substantially more likely than one might have expected. If, counterfactually, the amenity were a private good, the number of necessary interactions would depend on the number of sailors. Although there are ten sailors offshore enjoying the forested view, some sailors will have more extensive demands for the public good than others, so it requires no stretch to imagine that on some (perhaps many) occasions the second most extensive sailor's demand will be boundary irrelevant given the first sailor's presence.

Then, it hardly matters how many sailors are offshore, ten or a million; only the most extensive sailor's demand is boundary relevant, and one rancher negotiating with that lone especially interested sailor hardly compels a conclusion that the negotiation will be overwhelmed by transaction cost. Most people bear that level of transaction cost, and more, virtually nonstop—buying a house, buying a car, negotiating for a job, planning fence replacement with a neighbor, attracting a spouse, and so on. Even if several sailors have boundary-relevant demands, the cost of using the government to seek an optimal forest amenity could dwarf the cost of a private multiparty negotiation. Indeed, as one suspects, negotiating for a collective good with a million sailors would almost certainly be prohibitively costly. But such diverse involvement would hardly ever be needed—worse than pointless actually—though all million fully enjoy the amenity. If a hundred sailors from the million had

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32. The point is difficult to prove discursively but can easily be shown with more rigorous tools. See David D. Haddock, *Irrelevant Externality Angst*, 31 ICER WORKING PAPER SERIES 13 (2003), available at <http://ideas.repec.org/s/icr/wpicer.html> (last visited Apr. 12, 2004).

boundary-relevant demands, a public action problem would exist, though one much less extensive than would have been imagined. If only a few of the million have boundary-relevant demands, the matter might best be left to private negotiation.

In brief, a boundary-relevant public amenity does not necessarily create a useful policy issue. Having a million sailors nearby may indeed mean that more of the island's territory ideally would be wooded. But if transaction cost is modest between the rancher and one or a few of the million who have an especially extensive demand for the amenity, the rancher will collect a side payment and make the adjustment. It will become the rancher's interest to expand the forest without any government's intrusion. Going beyond economic terminology to rephrase the point, one sailor or a few of them who are strongly interested can purchase an environmental easement from the rancher, compensating her for the reduction in pecuniary income that she experiences when expanding her forest to what, without the sailors' amenity demands, would have been an excessive size. Given the information and transaction cost of identifying consumers of the amenity coupled with the paucity of most of the valuations at the margin, it seems unlikely that the rancher would have adequate incentive to coax contributions from the other beneficiaries.

An advantage of private negotiation is that the rancher already is attuned to the local cattle and timber markets, to local transport, to the prices of hay and all the other inputs she uses on her island. Consequently, she can cheaply judge the opportunity cost of expanding the island forest. Bureaucrats can find objective market measures for some of those variables, but they would have to collect, at some cost, information the rancher acquires in the course of business. Moreover the few sailors with whom the rancher would negotiate are the only reliable judges of the subjective value to them of the expanded amenity, just as she is the only reliable judge of the additional amenity value to her. There are at best only extremely poor market proxies for those subjective values.

Clearly the model does not preclude transaction cost so high as to frustrate optimal amenity provision. But such a prospect is too readily conceded in policy discussions, with minds attuned to private goods, where more demanders nearly always imply more individuals with a marginally relevant interest. One or a few strong demands for a public good often determine not merely the actual but also the ideal quantity. In consequence, transaction cost for environmental amenities—even those enjoyed by a million sailors—are chronically overestimated. Not everyone who may enjoy the amenity is relevant to policy discussions,

only the smaller number who would enjoy boundary-relevant marginal increases.

One's intuition rebels against such a conclusion. There must be too many boundary-relevant demands for, say, Yellowstone National Park for reasonable people to expect private negotiations to suffice. A park that seemed huge a century ago when few people could afford the time and expense to get there seems deficient now that it has become crowded.

Perhaps Yellowstone represents an instance where high transaction cost might frustrate optimal expansion; without data the article can make no claim regarding that empirical issue.<sup>33</sup> The words "might" and "did," of course, are different—speaking counterfactually, the present congestion of Yellowstone *might* have arisen from a high transaction cost frustrating optimal private amenity provision; but speaking factually, it *did* arise despite more than a century of control by the national government. We have no recent evidence regarding private provision of capacity in Yellowstone, though in the 1800s people were able to enjoy its amenities solely as a result of private efforts by railroad companies. Motivated by company rather than public benefit, the railroads then lobbied influentially for national government (and national treasury) involvement.<sup>34</sup>

All of that, however, is largely beside the point. Even during low season when the Yellowstone amenities are a public good, they are not a collective good since it is easy to exclude non-payers at the gate. But park congestion during recent decades implies that during high season the amenity has become a private good. It is impossible for one to visit the park during the summer without diminishing others' enjoyment. One's very presence contributes to crowded campgrounds, congested roads, and delayed meal service. Then, there are the sightlines impeded by all those annoying vehicles. In a market economy private goods are rationed by prices, but the National Park Service holds the price too low to clear the market during Yellowstone's high season. So, like an experiment in elementary microeconomics, there is a shortage of elbowroom. Transaction cost is not the problem; the problem is the price being charged. The transaction cost for providing park admittance as a private

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33. Even if Yellowstone requires public control, whether it would be better exercised by the United States, by Wyoming, or by a specialized unit encompassing northwestern Wyoming, southwestern Montana, and eastern Idaho is unclear as a matter of theory. See *supra* note 9.

34. Terry L. Anderson & Peter J. Hill, *Appropriable Rents from Yellowstone Park: A Case of Incomplete Contracting*, 34 *ECON. INQUIRY* 506, 510 (1996); Terry L. Anderson & Peter J. Hill, *Rents from Amenity Resources: A Case Study of Yellowstone National Park*, in *THE POLITICAL ECONOMY OF THE AMERICAN WEST* 113, 118 (Terry L. Anderson & Peter J. Hill eds., 1994).

good is the cost of rangers at the various entrances collecting a fee from one automobile at a time. That cost is being borne already and is substantially lower than the transaction cost a Dakotan bears to purchase a new pair of shoes.

Proposals to control park congestion by increasing entry fees invariably spark indignant complaints that the poor would then be excluded while the rich would continue to be admitted. But the vastly greater expenses of travel and lodging exclude most of the poor already. After struggling to overcome that burden, the rare poor person lucky enough to reach a national park would barely notice an increase in the comparatively modest entry fee.

Assuming that park visits were the most urgent of the many things poor people do without, a more efficacious program might subsidize bus travel from poor neighborhoods, even financing it from the increased entry fees that would in turn limit the aggregate number of vehicles in the park.<sup>35</sup> Many rich people would no doubt pay the increased tolls and continue to drive their vehicles into the park, but that would mean they, rather than the general taxpayers, were subsidizing visits by the poor—and the rich would be doing it voluntarily by purchasing, at a fair market price, something they want. The poor (and everyone else) could better enjoy the amenity after arriving.<sup>36</sup>

Existence of an environmental amenity does not create a policy issue by itself. Even an amenity enjoyed by a large public leads to no policy issue if its marginal (not total) value is driven to zero by landowners' own utility maximizing decisions. Even if the amenity's marginal value remains positive after the landowner has completed her autonomous decisions, no policy issue arises unless transaction cost is daunting enough to seriously hamper negotiations for an easement that would induce the landowner to take other marginally relevant interests into account. With reasonable interpersonal variance in amenity demands, only a minority of the public will be boundary relevant, so exorbitant transaction cost is hardly inevitable. For a public issue to exist,

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35. Milton Friedman would likely remark, "The poor are not poor because they can't visit Yellowstone; they are poor because they don't have more money. If they had more money perhaps they would choose to visit national parks, but why should the public use government to dictate that outcome?" Thus, even one wishing to enhance park fees specifically to finance increased aid for the poor could easily find more efficacious uses for such funds than subsidized park visits.

36. Many who will drive their jumbo-sized recreational vehicles into the national parks in any event readily play the "poor card" merely to conceal their efforts to limit their own entry fees but would be outraged by any potentially effective plan that threatened to deliver actual poor people there. Such treasury-subsidized limits are regressive in that the actual poor so rarely benefit while more comfortable citizens do.

it is necessary that the amenity be public in both the common and the economist's senses, that exclusion be impractical, that the amenity be marginally relevant, and that negotiating easements be seriously burdened by transaction cost. But that is not enough—for a number of reasons that will be investigated below, even those are necessary conditions, not sufficient ones. But first the article detours briefly through a real world application.

### 3. *Two Meanings of Free Range Bison*

A small public road traverses the Flying D Ranch in southwestern Montana, wending its way between a highway in the Gallatin Valley and a Spanish Peaks campsite. Ranch owner and media mogul Ted Turner is wealthy and loves wildlife. Due in part to his willingness to invest, the ranch puts some national parkland to shame. Turner, a Georgian, visits Montana infrequently enough to require a full-time overseer to operate the ranch. A bison herd was established on the Flying D as a commercial operation—for meat, not tourist fees. But until they are shipped the bison are there to be seen by motorists passing along the road, along with raptors, coyotes, grizzly bears, and other wildlife that find a living at the herd's margin. Turner charges nothing for the excellent views of his ranch that are easily seen from the state road; indeed, he can legally charge nothing. So what?

Many drivers passing along the road place a high absolute value on viewing Turner's ranch but would pay nothing for further improvement in it. Given his wealth and his taste for a particular sort of landscape with its flora and fauna, Turner paid for all improvements to the Flying D that were worth more to him personally than they cost him, and in the process the marginal value of improvements to the rest of us has been driven to zero. We free ride on Turner's efforts, but it hardly matters. The ranch will be the same whether we pass through or not, and whether we pay Turner or not. If Turner altered the ranch further, passersby would rarely notice the improvements. Of course, Turner would notice or he would not finance it, but that is a private rather than public amenity according to the common meanings of those terms. Our free riding *per se* does not justify non-market additions to the valley's environmental amenities.

Turner's ranch provides a dramatic illustration of the point, but there are many others both grand and modest. Only miles south of Turner's ranch, for instance, lies Moonlight Basin athwart a pass that links the Gallatin River Valley at Big Sky, Montana, with the Madison River Valley at Ennis. The area might have become the site of literally thousands of vacation cottages. Instead, a developer voluntarily committed most of the territory to permanent wilderness, financing it

through a resulting multiplication of value for the few home sites that remained. Those few dwellings are difficult for passersby to notice, and it is only because they are surrounded by wilderness that they are so valuable. But the wilderness atmosphere is palpable whether or not one paid for a home site. On a smaller scale, a few neighbors often amalgamate modest individual contributions to realize an unusually intense localized benefit, yet simultaneously provide irrelevant external benefits to passersby. Need gardens be subsidized if pedestrians enjoy seeing and smelling the flowers?

#### **D. Bilateral Environmental Amenities**

The rancher and the sailors like to look at forest, but it seems unlikely that anyone would much care to look at pasture—until one remembers that a well-tended pasture is in fact a meadow. People demonstrably like to nestle among the trees, but people (perhaps the same people, perhaps different ones) also like to look at wildlife. Holding the population of animals constant, adding trees makes viewing most sorts more difficult. Since mature trees capture a great deal of sunlight high above the ground and thus reduce understory vegetation, forests also reduce the population of particular sorts of animals such as ungulates and ground dwelling birds, elephants and some types of primates in Africa, kangaroos in Australia, and so on. With fewer ground dwelling prey animals, the population of their predators is reduced. On the other hand, some people prefer to see forest dwelling animals and the cats and raptors that prey on them. Evidently, there could be too much meadow crowding out forest or too much forest crowding out meadow. Similarly, depending on one's taste, too much or too little of the meadow can be of a short-grass variety just as too much or too little of the forest can be deciduous.

##### *1. Sleeping Beauty in a Pasture*

Forests and meadows are incompatible uses of land, but each can provide environmental amenities. That means that what might have struck one initially as a boundary-relevant amenity urging intervention of one sort may actually imply an entirely contrary conclusion. Because there is competition not just between environmental and market goods but among environmental goods of alternative sorts, erroneous policies are the likely result if the focus is solely on one or the other amenity. Thus, quite apart from the difficulties a bureaucracy experiences if it attempts accurately to gauge costs and benefits of a given amenity, especially the subjective costs and benefits, the bureaucracy could

plausibly intensify rather than alleviate a deficiency by improperly weighing the amenities.

Suppose that those who appreciate the forest amenity are politically influential while meadow-lovers have difficulty organizing and communicating their preferences. Suppose that as a result the bureaucracy compels or persuades the rancher to increase the island forest at the expense of meadow. That policy could well move the boundary away from rather than toward the ideal island division and represent a Kaldor-Hicks deterioration rather than an improvement—even in principle those who lose could not possibly be fully compensated from the beneficiaries' gains. Indeed, it can be shown that the loss expands geometrically as one moves away from the ideal.<sup>37</sup> A bureaucratic error that is equal to the original deviation from the ideal but in the wrong direction will, roughly speaking, quadruple the amenity loss. Even though our confidence may be high that laissez-faire leads to some welfare loss vis-à-vis the ideal, it does not follow that the loss is economically significant.<sup>38</sup> Instead, the relevant question is whether that laissez-faire loss is greater than those of plausible alternative policies that also, we may be confident, lead to some degree of welfare losses vis-à-vis the ideal.<sup>39</sup>

Alternatively, suppose that the deviation from the ideal is small and that the bureaucracy accurately perceives its direction and acts to correct it. Even that may decrease environmental values if bureaucratic inability to correctly estimate the relative costs and benefits causes it to overshoot the ideal by even a small amount. Gross deviations from the ideal are likely to be easier to discern than are smaller ones, and the direction if not the magnitude of correction is similarly more likely to be apparent. But as has been argued over the last few paragraphs and demonstrated elsewhere,<sup>40</sup> small deviations from the ideal are likely to impose relatively little cost on society when gauged against the cost of even minor misjudgments regarding their correction. For a society as well as an individual, it is important to recognize the distinction between a problem and an inconvenience.<sup>41</sup>

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37. See Haddock, *supra* note 32, at Part II.

38. See generally D.N. McCloskey, *The Loss Function Has Been Mislead: The Rhetoric of Significance Tests*, 75 AM. ECON. REV. 201 (1985).

39. Harold Demsetz, *Information and Efficiency: Another Viewpoint*, 12 J.L. & ECON. 1 (1969).

40. Haddock, *supra* note 32.

41. According to Robert Fulghum,

"Life is inconvenient. Life is lumpy. You learn to know the difference between an inconvenience and a problem. You'll live longer."...Problem or inconvenience? I call this the [Auschwitz survivor Sigmund] Wollman



The discussion may actually have understated the difficulty of bureaucratically fine-tuning the amenity. Suppose that, contrary to all expectation, the bureaucracy actually manages to identify the ideal division between forest and meadow. Unfortunately, the values that led them there are likely to shift constantly as market prices of cattle, timber, hay, transport, and the like and the value of boundary-relevant amenity demands fluctuate. That means that, while the selected area may have been ideal yesterday, it is unlikely to be nearly as good an approximation tomorrow. Of course, if the bureaucrats could obtain a tolerable estimate of yesterday's ideal it is as likely that they can obtain a tolerable estimate of tomorrow's as well. But how will that be done? It can be done only by canvassing those affected in one way or another by the island's production and its amenity, hence by obtaining, at some cost, information that private participants already possess. Due at least in part to that greater cost of information, bureaucratic decision making tends toward inflexibility and sudden, large, episodic change, more akin to flash floods than smoothly flowing streams.

Laissez-faire losses are not ideal, but they may be optimal given the bureaucracy's innate disability in acquiring essential information, especially subjective costs and benefits, coupled with a danger that the bureaucracy will bias its process to favor the politically powerful. In contrast, if there are only a few boundary-relevant demanders for forest and meadow amenities, there are only a handful of private parties required for negotiation. In that instance, prohibitive transaction cost is hardly inevitable. And reliance on private negotiation rather than government regulation would avoid the danger of exacerbating an amenity shortfall.

For instance, the rancher might put environmental easements over successive units of her ranch up for bid, and the successful bidder is then permitted to limit the uses to which the plot could be put with the rancher retaining a residual right to capture the commercial output. In that way, the parties themselves, being knowledgeable about both the objective and subjective costs and benefits of adjustments on the island, might well achieve the ideal division of the island between forest and meadow.

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Test of Reality. Life is lumpy. But a lump in the oatmeal—a lump in the throat—and a lump in the breast—are not the same lump. We should learn to know the difference.

ROBERT FULGHUM, *Problems and Inconveniences*, in *ALL I REALLY NEED TO KNOW I LEARNED IN KINDERGARTEN* 43–46, 46 (dramatic adaptation by Ernest Zulia; music & lyrics by David Caldwell, Dramatic Publ. Co. 1998).

Failure to leave a demonstrably faulty environment alone occasionally leads to dire consequences, as the following brief application illustrates.

## *2. Would That We Had Suffered Only Neglect*

An extended, widespread drought afflicted much of the United States during the 1930s. Parched farms were denuded as rains failed for several years running. Then, gales began stripping topsoil, depositing it where more fertile soil's vegetation broke the wind. The former plots were receding toward subsoil; the latter were being buried under an inferior overlay. Natural processes take years to repair such damage. Since wind can blow from any direction and wind-borne dust easily travels for tens, hundreds, or even thousands of miles, prohibitive transaction cost made it impractical for the many owners of superior land to persuade the many owners of devegetated land to undertake costly erosion control.

The federal government intervened on a number of fronts, some effective but others not. One of the latter offered a bounty to southern farmers who planted a hardy, drought-resistant Asian groundcover that almost completely eliminated wind erosion. After a few years the drought ended, but the plant—kudzu—had become entrenched across the region.<sup>42</sup> Kudzu has never contributed to a commercial product more substantial than hand crafted baskets and goat's milk cheese, but it was certainly able to defeat desiccation and wind—and every competing form of vegetation, including trees of virtually any height. Kudzu can even engulf, invade, and destroy buildings if energetic defenses are not mounted. The vines grow 60 feet per year, send regenerative roots at least ten feet deep, and have laid waste to vast swaths of southeastern farms, forest, parkland, and even military bases. Kudzu has now reached New York State, and recently a nascent patch was discovered within five miles of my Evanston, Illinois, home. Cold winters seem barely to retard kudzu's northward progress. Kudzu can be managed in a low labor cost (hence low opportunity cost of labor, hence impoverished) nation like China, but it poses a very serious problem in a wealthy, high labor cost region such as the United States. Harsh chemicals take ten years or more to eradicate the plant and pose an environmental concern of their own.

The soil erosion problems of the 1930s posed a prohibitive transaction cost. The political initiative that encouraged kudzu's spread successfully responded to several years of drought but has now resulted

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42. Dahleen Glanton, *South Struggles in the Clutches of Kudzu*, CHI. TRIB., Nov. 10, 2002, at A1.

in two-thirds of a century of growing cost and environmental damage with no end in sight. A better reaction would surely have been neglect—leave resources as they lie. High transaction cost suggests a possibility that political action is desirable but does not compel any such result. It should merely advance analysis to the next phase.

### E. Government Policy Regarding Environmental Easements

It is time to relax one of the article's least convincing simplifying assumptions, that government policies are neutral. For better or worse, supplanting market divisions between incompatible land uses has been a political mainstay in North America since colonial times.<sup>43</sup> Some government policies have collaterally diminished environmental amenities that might better have been retained. Other policies have intentionally augmented amenities well beyond the level at which marginal cost has matched any plausible marginal benefit. The U.S. Forest Service (USFS) obliges with numerous examples of each sort.

As one example of an amenity-diminishing USFS policy, consider that much national forest logging is anticipated from the planning stage to cost substantially more than the projected output value. Private companies harvest timber on those sites only because taxpayers rather than logging companies bear a substantial burden for logging roads, surveys, fire suppression, pest control and the like, while the royalty per tree is set at ridiculously low levels.<sup>44</sup> Often those logging

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43. See King George III, Royal Proclamation of 1763, available at <http://www.bloorstreet.com/200block/rp1763.htm> (last visited Apr. 13, 2004) (a significant contributor to the outbreak of the Revolutionary War, which attempted to monopolize in the King's hands all negotiations for the purchase of tribal lands and to determine by royal decree which parts could then be settled by immigrants; through the Constitution, the government of the United States retained the restrictions and the collateral hostility of those most eager to settle the new nation's western reaches).

44. States and counties cannot rely on the national treasury to subsidize their forest operations and predictably report much better cost-benefit ratios. In Montana, "state forests averaged \$2.16 in...revenues for every dollar in expenditures, while nine of ten national forests averaged between \$.09 and \$.73." Donald R. Leal, *Turning a Profit on Public Forests*, PERC POLICY SERIES PS-4 (Jane S. Shaw ed., 1995), available at [http://www.perc.org/publications/policyseries/turning\\_full.php?s=2](http://www.perc.org/publications/policyseries/turning_full.php?s=2) (last visited Apr. 13, 2004).

[Leal's] results are no fluke. Combined results from Montana, Washington, Idaho, and Oregon show the...national forest average yield in 1996 was \$.93 in timber revenues for each dollar spent on the timber sales program. State-managed forests yielded \$7.42 in revenue for each dollar in costs—an eightfold performance margin for the state-managed lands.

It might be thought that the states' lower costs are the result of skimping on environmental protection, but in fact, just the opposite appears to be true. Evaluations carried out by independent audit teams

roads are permanent and of a much higher caliber than is required for logging, while fire suppression has been overenthusiastic, resulting in a bank of unburned deadfall on the forest floor that itself has become a major threat to forest health.<sup>45</sup> Such policies generate logging industry votes for senators and representatives from the states involved, as well as support from locals who use the roads provided by taxpayers everywhere but at the expense of excessive depletion of environmental amenities. Similarly, politically popular Bureau of Land Management and Bureau of Indian Affairs policies induce serious over-grazing and erosion across large areas of both government and tribal lands.

Other national forest locales provide examples of excessive rather than deficient bureaucratic provision of environmental amenities of particular sorts. Though so unattractive a proposition for timber production that even USFS subsidies leave logging privately unviable, remote and rarely visited places would sometimes be attractive locations for low-density vacation cottages, dispersed ski or hunting lodges, campgrounds, and the like. But those uses often are forbidden by edict, and merely obtaining lawful permission for low-impact transit can be difficult.

A common argument against permitting cottages, lodges, and campsites in such locales is that if permits were given out only the rich would be able to afford the substantial expense of building on or even visiting such out-of-the-way places. In some instances that would probably be true. But why give such permits away? If an only-the-rich argument is to be credited, it follows that the rich would be willing and able to pay fees, and once in the public treasury dollars look the same wherever they originated, whether fees collected voluntarily from the rich or tax dollars collected compulsorily from the poor. So, as with the earlier discussion of increased national park fees, the rich could be induced to make an enlarged contribution to other government services. Rich or poor, people do not so much oppose paying the government as they oppose paying any entity that provides an inadequate offsetting benefit. Having an option to pay to use a beautiful and remote vacation, ski, hunting, or camping site would seem to offer such an offset.

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(which include state, federal, and industry experts and representatives from environmental groups) show that environmental protection and economic performance go hand in hand. State forests rated higher than the national forests in mitigating the impacts from logging and protecting watersheds.

Holly Lippke Fretwell, *The Untouchables: America's National Forests*, in GOVERNMENT VS. ENVIRONMENT 123, 126–27 (Donald R. Leal & Roger E. Meiners eds., 2002).

45. Fretwell, *supra* note 44, at 130–34.

So, some government policies lead to deficient environmental amenities while other policies lead to excessive areas elsewhere being reserved for them. As a substitute, public subsidies for environmental easements (commonly via a tax allowance) are increasingly being used to counter total reliance on bureaucratic decision making. Easements retain some commercial use that jointly affords environmental amenities, such as forest that periodically is cropped for timber or meadows where deer and beaver mingle with cattle. The easements simultaneously forbid other commercial uses that would severely attenuate the environmental amenities, such as shopping centers or dense housing developments.

The motivation for substituting subsidized private initiative for bureaucratic discretion is both straightforward and intuitively appealing: While a USFS decision might alter, say, a forest in Idaho despite the decision maker never having even been in the state, a private party would devote personal resources to Idaho's environmental concerns only when that alteration is understood and valued. But, so the argument continues, non-investing citizens also benefit, so unsubsidized private efforts would be deficient.

Substituting private for bureaucratic initiative has a great deal to recommend it, but proposals to subsidize the change require at least three caveats:

- First, as discussed above, unsubsidized financing by one or a few citizens sometimes leads to appropriate amenity provision. Even if there are many people who enjoy it, the amenity is a public good, and only one or a few such individuals may have boundary-relevant demands, plausibly only the owner. Then there will be no free-rider problem to be overridden. Indeed, any subsidy in such instances will induce excessively costly amenity provisions.

- Second, even when there are many boundary-relevant demands for a particular amenity, using tax incentives to mitigate a potential free-rider problem distorts decisions. Since they stand to receive the largest tax breaks, the particular amenity demands of those with higher wealth will become increasingly influential in determining which amenities are expanded. In contrast, those with lower wealth stand to receive little if any tax benefit from personally making investments in amenities. Unless amenity demands are highly correlated across wealth, low-wealth individuals will remain as vulnerable as ever to free riding and amenity under-provision. Worse still, the sorts of amenities that the poor especially value may actually be driven out where alternative sorts of amenities are incompatible, as they were in the forest-meadow discussion above.

- Third, tax allowances routinely facilitate a multi-stage expansion of bureaucratic purview without requiring any congressional

vote. Rather than providing a way for citizens to overcome bureaucratic hubris, tax offsets for amenity provision can become a way for bureaucrats to evade what little citizen scrutiny they receive through the political system. Consider those three caveats in turn.

### 1. *Subsidizing Provision of Environmental Amenities*

This section considers subsidized environmental amenities while abstracting from the nature of the subsidy, whether tax allowance, in-kind transfer or direct payment.<sup>46</sup> As was true earlier in the article, it will initially be assumed that only forest provides amenity value. The rancher would provide the ideal amount of forest voluntarily if transaction cost were low, as if one or a few sailors have boundary-relevant demands. But in that instance any subsidy obviously threatens excessively costly amenity provision.

Hence, it is necessary for transaction cost to be high enough to prevent bargaining for subsidies to make sense. The division of the island then would have taken full account of the rancher's utility from the amenity, though the sailors' demands would be *underserved*, as opposed to *unserved*—they are advantaged by the rancher's chosen border, though there remains a shortfall from the ideal.

A subsidy for forest increases the net pecuniary returns to the rancher from devoting land to that purpose without affecting the pecuniary returns from pasture. Assuming that the subsidy is directly related to the amount of land in forest, it increases the marginal private value to the rancher of each acre of forestland. Hence, the subsidy increases the amount of amenity-providing forest, as it should.

But if the subsidy is too generous it will overshoot the mark, and there is good reason to expect that it will indeed be too generous.

First, the sailors receive amenity value from forest expansion but barely have to pay anything for it since only a minuscule part of the subsidy collected by the rancher would have to be paid by the minority of the public enjoying the amenity. Hence, the sailors' criterion for lending political support will not be the appropriate one—whether the added benefit exceeds the added cost—but only whether the added benefit is positive.

Second, as the rancher is being subsidized rather than compelled to provide forest, each additional unit will increase her income. So, she too will support the subsidy. Indeed, she would lend political support to

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46. The next section extends the analysis of mutually incompatible environmental amenities, with a focus specifically on tax allowances as opposed to other sorts of subsidy.

subsidies large enough to induce voluntary conversion of the entire island to forest.

Third, otherwise uninvolved taxpayers will bear the brunt of subsidy financing without receiving any benefit from it. But individually they bear a modest cost as it is divided across the entire population rather than across a few sailors and a rancher. Hence, uninvolved taxpayers are likely to be rationally ignorant, rationally apathetic, and, thus, politically silent regarding this particular subsidy, though the cost aggregated over all taxpayers must equal the subsidy the rancher receives plus the tax authority's cost of administering the program, which takes no account of the opportunity cost of lost beef.

In summary, those who receive the benefits of the subsidy are apt to be politically vocal, while those who bear the costs are likely to be ignorant of it and hence silent.<sup>47</sup> The bureaucracy will hear nothing but support for its subsidy so amenity provision will be excessive. As a first approximation, excessive land in forest is as costly per unit area as is deficient land in forest. To revive the numerical examples employed above, the private outcome with prohibitive transaction cost would be 15 land units in forest whereas the ideal would be 17 units. A subsidy that is so generous that it induces a forest expansion to 20 units would likely more than double the net loss from inappropriate amenity provision (now excessive rather than deficient).<sup>48</sup>

## 2. Regressive Tax Effects

Viewed narrowly, financing environmental amenities through tax allowances is regressive given the present tax structure. Or, viewed more broadly, financing environmental amenities through tax allowances undoes some of the present structure's progressivity. Certainly some people favor a less progressive tax structure, but employing tax allowances to induce environmental investments is a backhanded way to make marginal tax rates less progressive. And it introduces additional distortions, as will now be discussed.

Wealthy people make greater direct tax payments than poor people. Wealthy people are more likely to be in a position to claim a property tax write-off. They pay higher marginal income tax rates. Suppose that wealthy people value one particular sort of environmental amenity, such as remote wilderness areas that can be enjoyed only after substantial expenditure for travel and lodging. Suppose that people of

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47. See generally Mancur Olson, *THE LOGIC OF COLLECTIVE ACTION: PUBLIC GOODS AND THE THEORY OF GROUPS* (2d ed. 1971).

48. See Haddock, *supra* note 32.

modest means value a different sort of amenity, perhaps parkland in or near urban areas accessible by public transportation. A tax allowance for an environmental easement would increase the amount of land devoted to the former while seeming to have little impact on the latter.

Where the alternatives are mutually inconsistent, however, that result becomes clouded. For example, a wooded area along a city's edge could be a quiet wildlife refuge funded by a generous donor living nearby so that deer, owls, and the occasional fox can be glimpsed from a few well-groomed horse trails, a setting that functionally excludes the poor. Neighboring back yards bordering the refuge would be more attractive as a result. The compensating increase in real estate prices would mean that nearby homebuyers would tend to become even wealthier.

Alternatively, a much denser network of trails, some paved for bicycles, could interconnect a number of multi-unit picnic areas with ball fields nearby. Those in neighboring backyards would hear more noise and see less wildlife. The denser network would sacrifice nearby residents' external benefits for those of a more distant and perhaps less affluent population. The second plan would therefore be less likely to attract the donor's investment. Both amenities convey benefits, but both also impose costs, one of them arising from the contraction of one amenity necessary to expand the other.

The question to be considered, therefore, is not merely whether environmental amenities are to be supported by government policy, but which environmental entities are to be supported, since in this instance the community cannot have both. If initially wildlife refuges and picnic zones were properly divided according to some standard, the tax benefit would unbalance the system toward wildlife refuges. That is not to argue that a proper division had been achieved before the tax benefit was instituted, but the prospect that a bluntly applied tax allowance will redress an imbalance seems about as likely as the prospect that the imbalance will be exacerbated. And the error-induced losses increase geometrically with the magnitude of the error.

One question, then, concerns whether the aggregate increase in amenities arising from tax allowances is worth the resulting impact on the progressivity of the tax structure plus the cost of distorting the environmental investments made by the wealthy. The other question concerns whether less distortionary subsidies can be utilized instead.

### *3. Oversight-Free Bureaucracy*

Providing tax write-offs in exchange for environmental easements does not necessarily effectively substitute private for bureaucratic decision making. Suppose Alice owns a plot next to



Wonderland National Park. A bureaucrat in the National Park Service (NPS) would like to add her plot to Wonderland and inserts a line item in the NPS budget proposal submitted to Congress. Congress determines that the addition would be worth \$60,000 and budgets that amount for acquisition. Alice values the plot by \$70,000 and refuses to sell. Comparison with other takings in the vicinity makes it seem likely that a common law court will award Alice compensation of \$100,000 if eminent domain is used by the NPS to take the plot. Assuming a correct congressional evaluation of the plot's value as a park addition, the plot seems destined to remain in its higher valued non-park use despite being coveted by the NPS bureaucracy.

Suppose, however, that if Alice sells the plot to a non-profit environmental organization for less than full market value she will be able to claim a tax write-off for the difference. She sells for \$55,000 and claims a write-off for \$45,000. If Alice's marginal tax rate is one-third, the write-off enables Alice to realize a \$55,000 sales price plus a tax reduction of \$15,000, or \$70,000.<sup>49</sup> The environmental organization then sells the plot to the NPS for the budgeted \$60,000, takes the funds (including the organization's \$5,000 profit) and repeats the process elsewhere. In essence, taxpayers have paid for the property in two installments, once as a \$15,000 reduction in the treasury's tax receipts from Alice, then again as a \$60,000 payment from the treasury to the environmental organization. That neither of those payments individually matches the value of the plot as parkland hardly implies that the sum of the two must be less than that value.

Though this hypothetical may seem farfetched, a few ostensibly independent environmental organizations, arguing that they are more skilled at acquiring than managing the land, seem indeed to function as stalking horses for government bureaucracies in much this fashion. The NPS augments its territory despite an implicit congressional determination that the acquisition was inadvisable. So a program trumpeted as a means to substitute private for bureaucrat decision making can be corrupted, and in some instances apparently is being corrupted, to shield bureaucracies from close congressional oversight. Unfortunately, as one conference attendee piquantly put it, for a number of decades the land management units of government have resembled roach motels—land checks in, but it never checks out.<sup>50</sup>

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49. The specific dollar figures used to make the example work would have to be adjusted for whatever tax rate applies to Alice, but the point remains that realistic figures can be found to establish the hypothetical.

50. Julia D. Mahoney, Address at PERC's annual political economy forum, Private Land Conservation: Institutions and Instruments, Big Sky, Mont., Dec. 5-8, 2002.

## V. CONCLUSION

Environmentalists often point to the planet's limited resource base and urge that resources must be conserved, and with good reason. But we often do a rather poor job of thinking completely through the implications of that postulate. At some point it becomes necessary to stop scolding and actually come to grips with the planet's budget constraints—it is impossible to conserve everything to the utmost, and it would be undesirable even to try. Saving more of one good thing means giving up some of another. Obsessively relishing what is to be saved while ignoring or dismissing evidence of what will consequently be lost is bound to leave everyone in a right pickle. Before affairs are rearranged, wise people will ponder both sides of that inequality.

Certainly an appropriately motivated analysis would endeavor to find and correct externalities—but only relevant ones. High transaction cost and uncontrollable free riding do not lead inexorably to resource misallocation, but ill-considered efforts to deal with them will. When transaction cost is low, no free riding occurs, and voluntary agreements appropriately arrange for environmental amenities. But the converse does not follow. In any particular instance high transaction cost and private inability to eliminate free riding may justify political intrusion, but in each instance that determination will require substantial further investigation.

If Jane purchases a book for 30 dollars when she would have paid up to 40, economists say she has received a ten-dollar consumer surplus—but we never characterize it as free riding on the publisher. If Jane receives that book gratis because the publisher is freeing inventory space, her surplus is 40 dollars. But if Dick receives for free or for only ten dollars an environmental amenity when he would have paid as much as 40 if pushed to the wall, many people want to claim that he is free riding and call it market failure. That leap is too facile. Each market embeds a public good. Some books are never published because too small a portion of a substantial surplus can be captured to cover overhead, but most manuscripts that languish would be unable to cover overhead cost even if all surplus could be captured. Distinguishing the two is very easy in an equation or diagram where no numbers need be attached to the variables, but the same project becomes very difficult in practice where the numbers are essential. Estimating those values would become especially difficult if the treasury paid all publication costs so there was no market to generate data. Happily, with both literature and environmental amenities, overhead cost can often be covered privately while consumers share a surplus. Without surplus it would hardly

matter whether or not something could be produced, and why argue that producers should have it all?

Still, the concern with free riders is overstated rather than vacuous. Sometimes less of an amenity exists because the free riders are numerous. But even then that cost must be contrasted with the cost of employing non-market means to extract support. Governmental resolutions gut the process of its information collecting ability, its ability to control agency cost, its ability to mitigate the monopolistic aspects of unitary government, its ability to avoid political favoritism, and its ability to identify those who might have volunteered a contribution without coercion. Geographically smaller regulatory units will often have a comparative advantage in that regard over larger units. But even then regulatory cost will sometimes exceed its benefit. The unattainable ideal might be perfection, but the optimum may lie with a free-rider induced amenity shortfall.

The problem with environmental amenities, then, is not always that government policy is too lax. Sometimes government policy is quite active but works against rather than for optimal amenity provision. Recognizing that, many observers focus on reforming those government policies, and it is hard to wish them ill. A better-informed and better-motivated government could no doubt improve things right across the board, not merely with regard to environmental amenities. Our focus should be wide enough to recognize that government policy will never be perfectly informed nor perfectly motivated, so imposing appropriate constraints on government is sometimes more promising than trying to redirect and reenergize (or de-energize) its policies.

At the end of the day, sufficient conditions are different from necessary conditions. Low transaction cost is sufficient to justify leaving decision making in private hands, but it is not necessary. As Terry Anderson suggests, much mischief arises from a misperception that transaction cost is high where it is not or that some enjoy a free ride though they cannot.<sup>51</sup> But surely a great deal of mischief also arises from a misperception that high transaction cost and widespread, even rampant, free riding justify a headlong charge up the Capitol steps. They do not.

Quick and easy answers usually betray careless logic, enabling embedded though hidden beneficiaries to confound the careless and impatient, though the gains are less than the more poorly discerned losses.<sup>52</sup> Easy environmental answers cloak a Trojan amenity.

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51. Anderson, *supra* note 27, at 377.

52. David D. Haddock & Jonathan R. Macey, *Regulation on Demand*, 30 J.L. & ECON. 311 (1987).