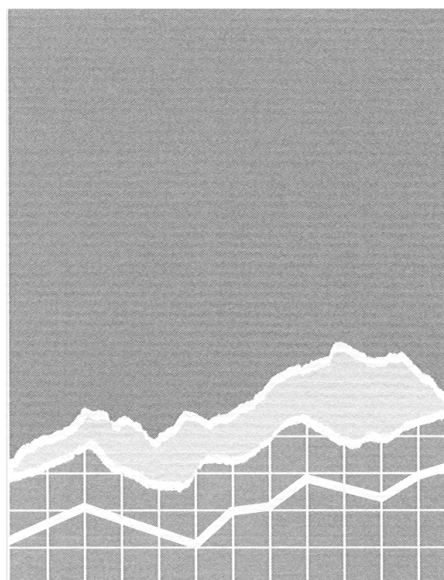


Incentives for Resource Conservation through the Capitalization of Environmental Value: An Evaluation of Open Space Mitigation Requirements

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The public regulation of private land use decisions has moved into the first tier of environmental issues in recent decades, particularly if political contentiousness forms the basis for this ranking. As air and water quality have measurably improved nationwide under a broad consensus that regulation is indeed necessary, efforts to preserve the public benefits of open space, particularly the ecological health of endangered species and their habitat, appear more prominently in contemporary environmental discourse. A coalition of environmental and “smart growth” advocates point to the heavy impact of continued expansion of the urban perimeter in many cities, not just the destruction and fragmentation of scarce biological habitat, but loss of erosion control and increased congestion. On the other side of this conflict are private property rights advocates, who argue that significant government restrictions on land use without compensation amount to “takings”, which are restricted by the Fifth Amendment to the US Constitution.ⁱⁱ The surrounding debate is especially interesting to observe here in the West, where landowners’ rights to independent control over their land have an historical legacy from the 19th century frontier.

A primary legal foundation for government intervention in private land use decisions has been the federal Endangered Species Act of 1973 (ESA). Along with a key 1982 amendment, the Act authorized the US Department of Interior’s Fish and Wildlife Service to prohibit or regulate land use found to impact species officially listed as endangered or threatened.ⁱⁱⁱ Implementation has evolved substantially over the past two decades to a stage where species and habitat conservation are an integrated effort (rather than a species-by-species search for violations), and more of the responsibility lies with local jurisdictions subject to state and federal oversight. In California, the Natural Community Conservation Planning (NCCP) Act of 1991 absorbed the goals of the federal and state Endangered Species Acts and granted oversight responsibility to the state Department of Fish and Game for the development of local habitat conservation plans (HCPs). With this the actual resource management planning filters to the local (and “ecosystem”) level as conservation plans are divided into regions, sub-regions, and finally sub-areas. The sub-regional conservation plan for southwestern San Diego County is considered a model by federal authorities.^{iv} Originally adopted in 1998, the Multiple Species Conservation Program (MSCP) covers 85 species of flora and fauna, and aims to preserve over 170,000 acres of open space within the planning area.^v Sub-areas plans are either completed or under review for all 12 local jurisdictions included in the plan.

The motivations for managing open space through such local habitat conservation plans are both biological and economic. Traditional enforcement of the Endangered Species Act placed substantial direct restrictions on landowners and potential developers, often in a manner not readily foreseen by these parties. Under such conditions the result is too frequently a perverse conservation incentive for landowners: to destroy sensitive habitat on one's land lest it be identified as supporting a federally protected species and saddled with a costly easement. Environmentalists and anti-growth advocates have rarely felt their interests were effectively served either. The *ad hoc* identification of violations led to fractured protection of habitat, while biologists emphasize that contiguous areas—and corridors connecting them where possible—are of vital importance for species and ecosystem health. The 1982 amendment to the ESA introduced the more flexible modern implementation by allowing for “incidental” impacts on protected species when part of a larger conservation program. The goal after all is the health of various species, their habitat, and the greater ecosystem. Since that can be accomplished best by committing the most ecologically valuable land to an open space preserve while allowing legally secure development on land better suited for that purpose (precisely the goal of San Diego's MSCP), biologists and economists agree this is an improvement.

In many ways local communities are ahead of state and federal authorities on land conservation. Sub-area plans for the MSCP refer to resource management plans in place that are fully consistent with the goals of the required habitat conservation plans.^{vi} Now handed the primary planning responsibility, communities are looking to more innovative and agreeable approaches to meeting the goals of the wildlife agencies and local demand for open space. As with other environmental policies where the compliance costs are essentially private and the benefits public, conflict cannot be avoided altogether. Experience shows however that policy designed to address the economic incentives facing landowners and residents can minimize conflict, accomplish environmental goals efficiently, cost effectively, and equitably, and will engage private parties productively rather than only punitively. To economists, a very direct approach is the purchase and commitment to open space of sensitive habitat using public funds. This has several appealing features, including a clear incentive for local landowners to conserve the natural resources on their land in anticipation of a possible sale to the public preserve. It requires the dedication of substantial local tax revenue, however, which presents real political and practical constraints.

An alternative tool for the allocation and financing of open space is the employment of mitigation requirements, which legally assign responsibility for providing or protecting open space as a condition for new development. Traditional, “on-site” mitigation requires the developer to restore (or under some conditions only to preserve) land within the development site in compensation for the environmental impacts of the project. The goal is, appropriately, *no net loss* of habitat rather than no impact at all. Yet this type of regulation is still subject to a similar critique as other traditional land use restrictions: there is

little concession to the fact that some land in a region is better suited (biologically and economically) for open space than other land. This logic leads to “off-site” mitigation, which allows for compliance to be met with preservation elsewhere in the planning area, where the biological value of open space is greater and/or the value of the alternative land use is smaller. A final step, one in which economists are keenly interested, involves the “banking” of mitigation credits in contiguous preserves and the marketing of credits to developers or others requiring them.

The purpose of this paper is to outline the economic principles behind open space mitigation requirements and mitigation banking, and to present some conclusions regarding the prospects for their effectiveness as environmental policy. First the economics of property rights, non-market value, and market failure are briefly reviewed. From this review we recognize that while the establishment and enforcement of property rights are indeed important, standard economics indicates that local land use controls or limits on new development are valid roles for government intervention. Next mitigation requirements are compared with incentive-based environmental policy in other areas in an effort to identify the key features of good programs that can guide the design of land use policy. Finally, the incentives produced by mitigation requirements are analyzed more closely, with special attention to the determinants of market value for mitigation land in idealized and more realistic settings.

The potential for sound resource management incentives resulting from mitigation requirements are excellent, but the measure of effective incentives is always in the prices. Mitigation land markets are only truly effective when the normally “non-market” environmental value of mitigation land is explicitly reflected to landowners in exchange prices with developers or mitigation “banks”. The ultimate evaluation of this and every approach to resource conservation therefore depends on the extent to which this “capitalization” of environmental value into prices occurs.

The simple economics of property rights...

The frontier spirit of the American West aside, there are excellent reasons to believe that the enforcement of private property rights is vital for sound management of land and other natural resources. Property rights advocates make the compelling point that a private owner has every incentive to protect her land from degradation and to make investments in conservation when doing so improves its current or future value. Even if only motivated by the selfish goals of asset ownership, the logic proceeds, a resource owner is unlikely to tolerate exploitation, mismanagement, or degradation of the quality (and value) of their property. Would a rancher allow cattle to devour all his grazing land at once? Would a farmer neglect soil conservation projects if they would improve the productivity of his field? Secure ownership leads to this generally reliable form of resource management through the alignment of private interest with resource quality and sustainability.

Indeed a closer look reveals that poor resource management is much more likely to arise in cases of common property, collective management, or other arrangements where ownership is incomplete or uncertain. Untitled or publicly owned forestland in “open access” is plundered for timber or conversion to agricultural uses, both historically in the US and currently in the world’s tropical areas. We say that resources under these circumstances suffer from the “tragedy of the commons”, an economic affliction that presents environmental degradation as a prominent symptom.^{vii} The “tragedy” is that with common property resources, an individual user neglects the benefits of conservation and the costs of degradation associated with their actions because other users absorb the greater share of the effects; an individual resource user among many cannot expect to appropriate the returns to their conservation effort. The lesson here is that resource degradation is not caused by the pursuit of profit itself, but by under-investment in conservation resulting from incomplete ownership.

...and non-market land value

Herein lies the source of the fundamental land management problem: some of the environmental effects of land use decisions are *external* to the owner, meaning a portion of the benefits and costs are borne by neighbors or the larger community. This is particularly true of rare habitat, the loss of which affects everyone who places value on the survival and health of locally threatened species. In the presence of such externalities, decisions based only on private costs and benefits may be quite different from those that would be made under consideration of the full social costs and benefits. When this is the case, our expectation that property rights will automatically align landowners’ interests with the efficient management of resources should be reconsidered. In fact, such externalities are kin to the tragedy of the commons in that landowners typically cannot privately appropriate the benefits of habitat conservation (or erosion control), so these investments languish.

A brief comparison with the externalities underlying another primary environmental concern is revealing. A power plant, a steel mill, and an automobile are all operated by private decision makers who weigh the private benefits and costs of additional production or miles traveled. Yet these activities also generate air pollution, which potentially affects the health of a large number of people. Should we expect that these external costs be included in the decision calculations of firms or drivers in the absence of any regulation? Without passing judgment, I think as a practical matter we had better not count on it. The health and other costs of pollution are very real, but in the absence of any regulation a polluter isn’t faced with paying them. Consequently, these circumstances provide a classic economic rationale for government involvement, and the need for air quality standards or other regulation is now nearly universally accepted.

Decisions regarding land use are of course a bit different from air pollution. With land it may be more natural to think about a menu of potential uses—perhaps a given acre can be farmed, developed for residential or commercial space, or left as open space—and the best use from society’s standpoint is simply the one that generates the greatest net benefits. If an owner were always in a position to recover the value associated with all possible uses, she is automatically guided by the desire to maximize the value of her asset to choose this socially preferred use. If on the other hand substantial value associated with the land is not reflected in any market—as with open space, where the benefits accrue largely to community residents other than the landowner—the use providing the highest value to the owner can easily deviate from that which would provide the greatest social net benefits. Under these circumstances we cannot expect private land use decisions to always line up with the best interests of the community as a whole.

And clearly for *some* land the greatest social value is generated by “non-market” uses: habitat preservation or open space. Suppose a landowner could collect fees from residents of the community (or beyond) who value the preservation of open space on her land, and that the obvious practical problems associated with collecting such fees didn’t exist. In other words, suppose a market existed for the owner to “sell” the environmental services her land provides to the community when it is dedicated to habitat preservation. Would collecting these environmental fees be a more profitable operation than some alternative development? If so, the community is better off with the land committed to open space, even if no such fee system could ever be established. The conclusion to this thought experiment rests on the idea that the sum of the fees people are *willing* to pay measures the non-market value of open space, just as profit from development measures the value of that land use.

Of course, development projects pay dividends in the world outside of hypothetical thought experiments in a manner that providing open space rarely does. Markets for environmental services simply don’t naturally exist for landowners to benefit directly from this aspect of what their land is capable of providing. When this kind of “market failure” is present, one is compelled to conclude that some kind of public action is indeed necessary to promote efficient resource management. We are left then with the problem facing local communities in the design of habitat conservation plans: what kind of public action will accomplish the goal of efficient management best?

Economic incentive-based environmentalism

The traditional first line of defense against externalities, at least from a legal perspective, is liability. If a landowner believes she is liable for damages resulting from groundwater contamination, for example, this should encourage proper caution in waste disposal on her property with some effectiveness. However for many of the environmental problems associated with land use, especially habitat loss,

liability regulation is bound to be ineffective or inappropriate. The number of affected parties is too large to allow for simple litigation, and as early enforcement of the endangered species act revealed, it is a bit absurd to characterize as culpable what is essentially normal economic activity. The types of environmental problems caused by everyday activity like electricity consumption, travel, or the construction of commercial and residential space require a different approach—one that focuses on incentives.

Lessons from four decades of environmental policy suggest the following: the best programs address problems at the source of the market failure, and engage private parties in conservation by giving them direct incentives to do so. If environmental problems boil down to a weak signal to decision makers regarding the true costs and benefits of their actions, as the previous section argued, the most direct solutions involve improving the reception of that signal. With respect to market failure associated with land use, this involves landowners confronting, in one way or another, the environmental value of their land. If individuals can appropriate sufficient benefits from conservation—or, put differently, are liable for the social costs associated with degradation—their land use decisions will to a greater degree reflect the community's best interests.

The logic of approaching policy at the level of incentives facing individuals and firms has been slow to take root in the environmental movement, but today enjoys greater acceptance than ever before. The US Environmental Protection Agency operates several incentive-based programs to address air pollution, the largest and farthest-reaching being the SO₂ program created Title IV of the Clean Air Act Amendments of 1990.^{viii} The program relies on a *constructed* market for sulfur emissions “allowances” in which firms emitting SO₂ (primarily electricity generating facilities) must acquire permits in proportion to how much they emit. EPA fixes the supply of permits—and therefore total emissions—at the outset, but firms are free to buy and sell permits among one another. The price of permits is established in a market where demand derives from the cost of controlling an additional ton of sulfur emissions, and becomes the incentive signal: firms confront the fact that emissions are costly because it requires purchase of another permit. By nearly all accounts this program is a brilliant success, reducing sulfur emissions in 2000 to 50% of the 1980 level with compliance costs significantly lower than anticipated. A program of a more limited geographic scope, but designed around similar logic is operated by the South Coast Air Quality Management District to control particulate air pollution in southern California. The next frontier for resource management based on market incentives is the allocation of surface water in the Southwest. Water prices have traditionally been set by authorities to reflect only the cost of transporting the resource to users, not its *scarcity*. Consequently some users, especially in agriculture, pay such low prices that direct incentives to conserve water are essentially non-existent. The establishment of markets where water

rights can be exchanged, and where scarcity is reflected to users in the market price, is an old idea slowly gaining recognition as the best approach to rationing this precious resource.^{ix}

These and other market-based programs present welcome alternatives to traditional “command-and-control” environmental regulation based on technology mandates and other direct government control over resource allocation. Because individuals and firms are engaged in little or no active effort to control their impact on the environment, command-and-control regulation presents limited incentives to find more effective or cheaper ways to do so. Perhaps equally damaging is the effect poorly designed policy has had on the *political* environment: when those subject to regulation feel as if they have no avenue to participate or react to minimize their fiscal impacts, every aspect of their relationship with the regulator is degraded. The conflict between landowners and conservationists surrounding the traditional design of ESA enforcement and urban planning is a classic example.

If environmental interest groups have been slow to warm up to incentive-based regulation, traditionally favoring more direct government control, this is at least partly due to a long-running miscommunication regarding the proposed role of markets in the regulatory process. Proponents of incentive-based environmental policy often favor using “constructed” markets to implement control in a flexible way. This is of course very different from relying on *deregulated* markets to do the job on their own, but I believe the “market-based” terminology has resulted in some confusion over this. As environmental groups have grown in funding and sophistication, this confusion has cleared substantially and opposition to market instruments is more likely based today on legitimate concerns regarding localized “hotspots” and other vulnerabilities. Several environmental interest groups have even become enthusiastic proponents of incentive-based regulation, including the influential Environmental Defense Fund (EDF), and World Resources Institute (WRI). A glance at selected titles from these organizations’ publication lists reveals the growing consensus among the parties interested in environmental protection: “A Home on the Range: How Economic Incentives Can Save the Threatened Utah Prairie Dog,” (Bonnie et al., 2001 *EDF*); “An Overview of Incentive Approaches to Ecosystem Protection,” (Parker et al, 2000, *WRI*).^x

For habitat protection and other land use control, paying close attention to incentives is perhaps even more important than with other environmental issues. Consider the incentives facing a landowner who knows her property includes rare, fragile habitat for an endangered species, but believes that discovery of this habitat could result in a taking without sufficient compensation. It is a horror story for everyone involved that she consider at all attractive the prospect of destroying that habitat before it can be discovered. Yet if the expected “fair market value” appraisal in an eminent domain case is less than what she would be willing to sell for, this is precisely the incentive presented. The value of that habitat is real—that is why as a community we seek to protect it. But if that value is not made explicit to the

landowner, how can we expect decisions regarding its protection to be made responsibly? With this considerable background information in place, it is time to evaluate whether a market-based approach is feasible and desirable for the protection of habitat and open space.

Can open space mitigation requirements create effective conservation incentives?

In light of the discussion thus far, this fundamental question must be the focus of any serious evaluation of the mitigation requirements approach undertaken by San Diego County and local municipalities. Effective protection of natural habitat in the region over the coming decades, almost certainly with continued population growth applying pressure for new development, will be a direct function of the incentives presented to developers and landowners. Will landowners be rewarded for conservation and foresight, or will they find the environmental value of their land a burden, with the tragic consequences suggested in the previous section? We will see that the answer depends not only on the design, implementation, and enforcement of habitat conservation plans, but also on other general conditions permitting a viable market in mitigation land to evolve. While mitigation requirements are an extremely promising approach, there are still substantial institutional and circumstantial hurdles to their effectiveness.

First I will sketch an idealized picture of mitigation requirements and the trading of mitigation credits, followed by some cautionary remarks about their implementation. The most successful, though certainly imperfect, existing market for mitigation credits is that for wetlands. The federal regulations pursuant to Section 404 of the Clean Water Act Amendments require mitigation of any impacts associated with filling in or discharging waste into wetland areas.^{xi} Development rights are granted on the condition that this mitigation takes place through the restoration of former or degraded wetlands, or even the engineering of new wetland areas. Wetlands mitigation traditionally took place on site; if a wetland area was compromised by the development on one side, it was to be expanded or improved on another. Over the past two decades this system has evolved into a vigorous trading system focused on offsite mitigation. If more ecologically valuable restoration projects are available away from the development, undertaking one of these will produce greater overall environmental benefits as well as reduce costs for the developer. Put another way, allowing developers to undertake lower cost-per-acre restoration projects offsite means more acreage can be preserved for the same total cost. The net benefits of the regulation are improved because the options, both environmental and economic, are expanded.

The evolution of wetlands “banks” is the most encouraging feature of this history. Firms and non-profit organizations acquire land and implement the restoration, then apply for credits granted by the Army Corps of Engineers and U.S. EPA (who jointly enforce the Clean Water Act). These credits can then be sold to developers, who can shop around for the suitable quantity and classification of wetland

acreage, to fulfill their mitigation requirements. The classification of wetland credits includes measures of habitat value, encouraging the dedication of ecologically valuable land all else equal. For most of the history of wetlands regulation, the EPA articulated a “no net loss” goal, implying a 1:1 mitigation ratio (an acre restored or created per acre developed or degraded). Encouraged by the efficiency and cost savings resulting from the markets in mitigation permits, in recent years this goal has been extended to achieve a 100,000 acre net increase in wetlands by 2005.^{xii} The adjustment in the stringency of the regulation needed to pursue this goal is simple: adjust the mitigation ratio.

Programs requiring the mitigation of impacts to other sensitive habitat are of course capable of functioning in much the same way. The San Diego County Department of Planning and Land Use currently recognizes 13 formal and 9 informal mitigation banks possessing nearly 13,000 acres of land,^{xiii} mitigation requirements have already become central to local planning, and are a central component of the MSCP sub-area plans. The required open space mitigation associated with the granting of local development rights appears to have the potential to generate significant positive incentives for conservation. In an ideally functioning market for mitigation land, one pictures a landowner in San Diego County evaluating his land use options and concluding that, in spite of some profitable alternatives, the best option is to preserve or restore the habitat in anticipation of the highest bid for the land coming from a developer requiring mitigation land. At the same time, developers are engaged to shop for high value environmental land at their lowest cost. This combination guides mitigation to the land best suited for that purpose. The key to this vision is the capitalization of ecological services into land prices in this policy-constructed market for mitigation credits.

It is worth examining this last statement more closely. How exactly does policy of this type create *market* value for ecological services? Recall that the problem was never that land in open space wasn't valuable. That value is the entire point of the public action: it is precisely what we are seeking to protect! The problem was that no market existed to reflect that value, and to allow landowners to benefit financially from it. The market that is established to exchange mitigation land, and the environmental services it provides, fills precisely this role. The all-important incentives generated by this policy are embodied in the land prices prevailing in these exchanges. Just as water prices reflecting scarcity were seen to promote conservation in an earlier comparison, land prices in this market are the reliable incentive mechanism that ensures potential mitigation land is likewise treated as a scarce resource. In any properly functioning market, prices are a function of supply and demand. It is important then to consider what is behind supply and demand in a market for mitigation land, and through this to gain a better understanding of what determines its market value.

The supply of suitable mitigation land is constrained not only by ecology, but also by the alternative economic uses of land available in the region. That is, some land is unsuitable for mitigation

because it provides the wrong type of habitat, and other land is unsuitable because it is simply more valuable in another use. Of course this second judgment depends critically on the prevailing price of mitigation land: as this price increases, competing land uses begin to look less attractive to landowners by comparison, and more land becomes available for mitigation. This basic relationship—that the quantity of a good supplied to a market increases as the price in that market increases—is characteristic of supply curves, as Economics 101 students recall. At a given price, mitigation land will still be in shorter supply when the ecosystem is physically scarcer, of course, but even this ecology may not be completely unresponsive to price signals. Remember from the description of wetlands permit markets that most of what is “banked” has been *restored*, not just protected. In a market where high quality coastal sage scrub fetches a good price, investments in ecosystem restoration are potentially worthwhile as well.

Demand for mitigation land of course derives from the requirement that developers acquire land as a condition for development. If they were not required to do so, there is no demand and consequently can be no market. With mitigation requirements, demand clearly will depend directly on the acreage of approved development and the amount of mitigation required per acre. We have seen that the latter is a ratio set by local government policy or, more accurately, negotiated between local government and developers. The other key variable, development undertaken, is certainly related to regional trends in population and economic growth. At the micro level however it is important to recognize that planned development is first a response to the housing market. When new home prices increase as they have in San Diego County in recent years, it is no mystery why we observe a concurrent building boom. Developers plan new projects because they expect them to be profitable. In this proximate sense, conditions in the regional real estate market are the engine of demand in the market for mitigation land. When home prices are increasing and residential development is lucrative, developers are willing to pay more for the mitigation land they must acquire before cashing in. Such an increase in willingness-to-pay is synonymous with an increase in demand in this market.

At this point it is tempting to regard demand as independent of the price of mitigation land itself—that developers will “pay whatever it takes” to acquire the mitigation land they need—but this would be misleading. The acquisition of mitigation land can represent a significant portion of development costs, and clearly more so if mitigation credits are expensive. When prices for mitigation land are low (or no mitigation is required at all), some development projects are bound to be economic that would not be under different market conditions. Make no mistake that part of the incentive structure of mitigation requirements is to limit marginal development by making projects more costly. Put another way, when developers are confronted with paying for the full environmental impact of their projects, they are more selective about when and where to build.

The simple analytics of supply and demand are extremely useful for understanding the determination of prices. All else equal, reductions in supply or increases demand result in higher market prices. In this way resource prices signal scarcity to market participants and allocate the resource to those who derive greatest economic benefit from it. From the determinants of supply and demand in this market described in the previous paragraphs, a combination of plentiful suitable habitat, limited alternative land uses, and a weak real estate market would result in low market prices for mitigation land. Under these conditions the supply of mitigation land is high and the demand low. A more accurate description of current conditions in San Diego County leads to a very different assessment. Given the rapid urbanization and resulting habitat disruption of recent decades, and the inflated land values associated with a fast-growing regional economy, supply of suitable mitigation land is limited. At the same time, a market for new homes positively bursting at the seams certainly assures strong demand. One can only conclude that if such a market existed today, it would reveal potential mitigation land to be a valuable commodity indeed.

Some realistic considerations

The preceding has been a rather rosy view of how the implementation of mitigation requirements could result in effective incentives for resource conservation. Reality presents a substantially cloudier view. First, for a market to function in the fluid manner described, with buyers and sellers responding only to market prices, there have to be a sufficient number of participants on both sides. One of the reasons wetlands mitigation banks have been effective is their wide geographic scope, allowing for developers to be matched with appropriate conservation projects outside of their immediate region. The more localized a market for open space mitigation, the more limited the opportunities for exchange. Simply put, for the incentives presented to landowners to be effective there must be a reasonable expectation of substantial demand in the future. Under the current circumstances buyers of mitigation land may possess significant market power, which puts downward pressure on exchange prices to just above the value of the next best alternative. This pressure of course also suppresses the accompanying incentives for conservation as well.

All this argues that more widespread application of mitigation requirements is necessary before a vigorous market to exchange open space can evolve. Until such a day when regularly observed exchanges establish the market value of suitable mitigation land, the commitment of open space is likely to continue to take place largely through eminent domain claims in which “fair market value” is decided by arbiter or jury. The need for such appraisals is the clearest indication that significant barriers to efficient market exchange remain: mutually voluntary exchange is “fair” by definition. The incentives for resource conservation created by these circumstances are much dodgier. There is still strong disagreement within

the appraisal community whether environmental land value should be considered in such cases.^{xiv} From the standpoint of efficient resource management, this debate is mysterious. The best appraisal of land being committed to open space, at least in terms of the price incentives, should involve an attempt to project what the market value for open space land would be if a well functioning market for the ecological services existed. In other words, the determinants of supply and demand analyzed in the previous section are precisely the factors that should be considered.

Finally, while we have established that the very existence of a market that will reflect the environmental value of land hinges on the public action of requiring open space mitigation, good land use governance by county and municipal authorities requires a bit more. Precisely because it is the public action that creates demand for mitigation land, landowner expectations regarding *future* policy and enforcement play a direct part in the determination of land prices. It is a common feature of all asset markets that prices depend not only on current conditions but expectations regarding future market conditions, and on the security of claims to the asset. If local governments demonstrate questionable commitment to enforcement, this will have a very real effect on prices and incentives for conservation *today*. This is not to say changes in policy by local governments are never warranted; good governance always requires the reassessment of the relevant benefits and costs. But the lost incentive effects of weakening mitigation requirements should be recognized as a genuine cost, and environmentalists would do well to consistently point this out.

Conclusions

This evaluation of mitigation requirements as effective habitat protection policy has purposely omitted a central normative question: just how much land should be set aside? What is the appropriate ratio of required development acreage to open space acreage? In establishing these levels the local community is making implicit tradeoffs between habitat protection, affordable housing, and local tax revenue used to finance a variety of worthwhile public projects. The stringency of the policy can be adjusted rather directly simply by changing the ratio. In other words, there remains a great deal to disagree over even if a consensus evolves that mitigation requirements are a good approach.

In this sense the stringency of the habitat protection policy, a matter of adjusting the mitigation ratios, can be separated from the overall design of the policy. The greater lessons at this point involve the potential for mitigation requirements to produce a market for open space land, and through this effective incentive for resource conservation. I will take this opportunity nonetheless to argue that the stringency debate can be advanced most productively through the use of careful benefit-cost analysis. The better our understanding of the benefits the local community enjoys from open space, the more informed local governments will be in their evaluation of the relevant tradeoffs. When the stringency is calibrated

correctly to maximize social benefits, the market value of mitigation land will accurately reflect the environmental benefits that land provides.

If benefit-cost analysis related to public policy were easy, we might demand such a calibration. A more modest, but realistic expectation of local government policy is that it reallocate resources for the better—that it moves us in the right direction. I think we have a right to expect this standard of performance. Open space mitigation requirements in their current form are policy of this second variety. More widespread implementation and enforcement, and some careful articulation of habitat classes and corresponding mitigation ratios, are necessary before a market for land that genuinely reflects environmental value will evolve. In the meantime, this discussion has hopefully revealed that “the right direction” for local land use regulation requires most critically this incorporation of environmental value in the prices to which landowners respond. Conversely, any set of circumstances that presents landowners with no return to investments in conservation is just the opposite.

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- ⁱⁱ See Miceli and Segerson (2000)
- ⁱⁱⁱ The National Marine Fisheries Service, part of NOAA, is the agency authorized to implement the ESA for aquatic species.
- ^{iv} See Nelson (1999).
- ^v See City of San Diego (1998).
- ^{vi} See City of Chula Vista review draft sub-area plan in the *Federal Register* October 10, 2002.
- ^{vii} A phrase coined by Hardin (1968).
- ^{viii} For a review of incentive-based regulation with special attention the SO₂ allowance program, see Stavins (1998).
- ^{ix} See Colby et al (1993). "Water Rights Transactions, Market Values and Price Dispersion." See also "Saving our streams through water markets: A Practical Guide." Landry, Clay. Political Economy Research Center.
- ^x To download these papers and for more information on these organizations visit www.edf.org and www.wri.org .
- ^{xi} Information on wetland mitigation banking is drawn in part from Johnson, LC. "Wetland mitigation banking: a market measure for land use control." Presented at the Clark University Multidisciplinary Conference, Worcester, MA, 2000.
- ^{xii} See EPA (1998).
- ^{xiii} See <http://www.co.san-diego.ca.us/cnty/cntydepts/landuse/>
- ^{xiv} See for example Lusvardi (1997) and Sanders (2000).