

Ecological Policies for an Age of Political and Social Fragmentation

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Suppose that society might need proactive policies to avert unacceptable ecological outcomes, that effective policies will require sustained collective action, and that many of the traditional institutions of community are under stress. This situation would demand new solutions and, in fact, new policy directions are being offered in bewildering array, from rebuilding the national community, to extending vastly the traditional reliance on private property and deregulated markets.

In what follows, I will first establish the premises: the potential need for policy, the requirement for sustained collective action, and the increasing fragmentation of politics and society. Effective solutions call for new policies and new policy processes. So, I will conclude with some suggestions concerning processes compatible with emerging social patterns, and policies compatible with these processes.

Premises

The Need for Ecological Policies

Rather than make a comprehensive case that ecological policies may well be needed, let us begin with a simple and abstract model which, it turns out, illustrates several significant cases and identifies important characteristics of the potential policy problems. After all, it takes just one convincing example to establish the potential need for policy.

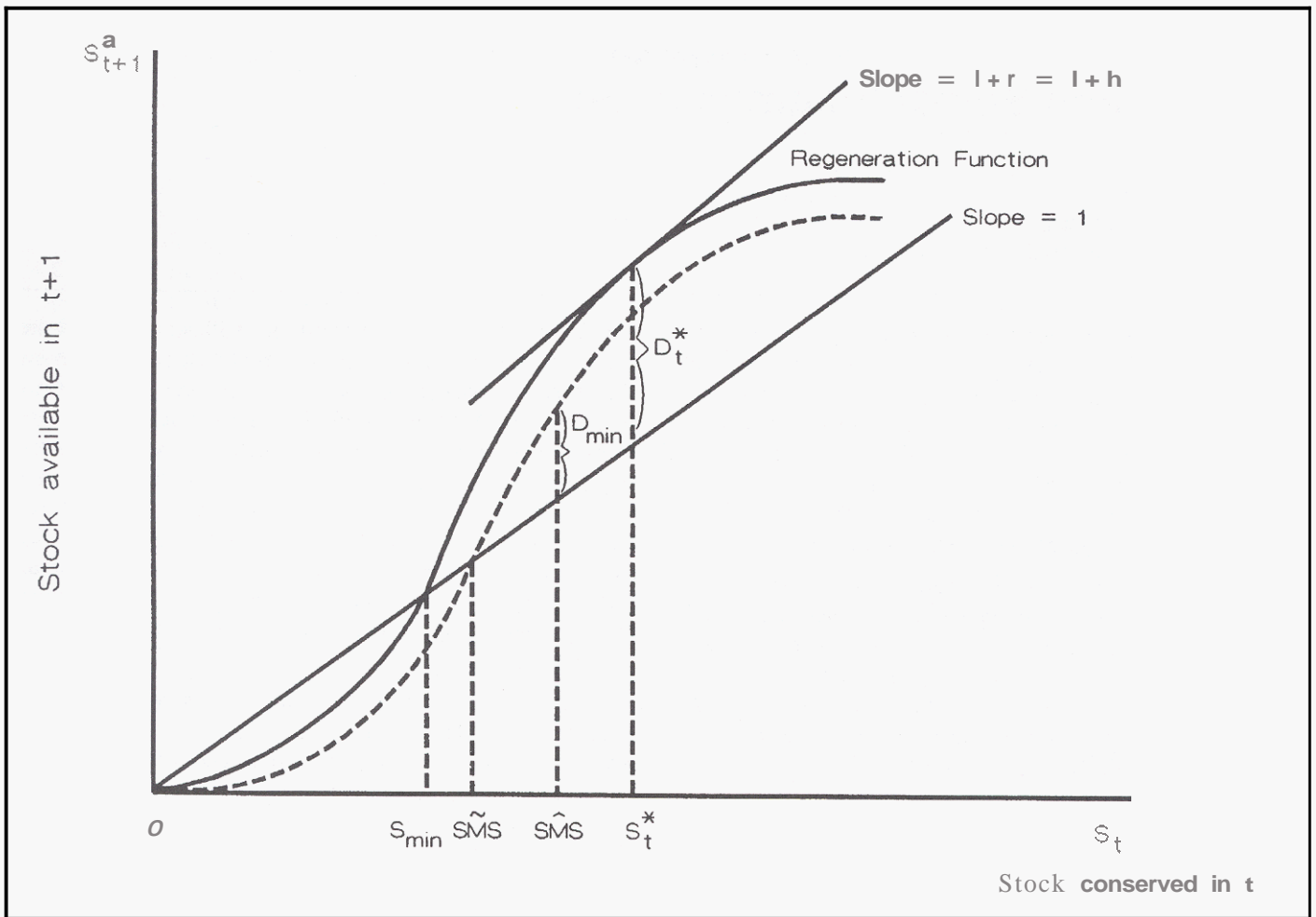
The example offered below is, however, more than just illustrative of the potential need for ecological policies and the need for sustained collective action to implement such policies. It also is of interest, in and of itself, in that it introduces some current thinking (Farmer and Randall 1997) concerning the safe minimum standard of conservation (SMS).

Ciriacy-Wantrup (1968; 1st ed. 1952) introduced the concept of SMS-based policy: a constraint should be placed on business-as-usual, requiring that renewable natural resources (one might think, here, of a species or an ecosystem) should be conserved in sufficient amount to assure their regeneration, unless the costs of so doing are in some sense "too great." This idea has been enacted quite literally in American endangered species legislation. Endangered and threatened species are identified and special efforts are directed to preserving their critical habitats, unless a high-level interagency committee determines that such action would require disproportionate economic sacrifice.

The basic principles involved can be illustrated with a simple two-period diagram (see the Figure). Assume D is a renewable natural resource; that is, D carried-over in one period regenerates by the next period. If S_t is the stock of D carried-over in period t , the regeneration function traces the relationship between S_t and S_{t+1} , the amount of D available in the next period. In a two-period diagram, the line of slope = 1 starting from the origin is diagnostic: at points above the line, S_{t+1} exceeds S_t so that the natural resource is at least potentially sustainable; but at points below the line, the natural resource will eventually be exhausted even if none of it is harvested for human use.

Notice that the regeneration function is shown as sigmoid as such, it provides both a stylized representation of a fairly typical biological regeneration process, and a case in which a real threat of resource exhaustion is present. If less than S_{min} is carried-over in each period, exhaustion of D is inevitable. The optimal stock to carry forward is S , at which point the steady-state efficiency condition? $l + r = l + h$, holds (where, with constant unit-values, r is the marginal efficiency of capital, and h is the marginal regeneration rate of the natural resource).³ This steady-state optimum would permit a sustainable harvest of D in each period, for human use. With sigmoid regeneration, however, sustainability is not assured. First, if initial resource stocks are less than S_{min} there is no hope: resource exhaustion is unavoidable. S_{min} is therefore the minimum standard (i.e., the minimum stock to carry forward to assure regeneration) assuming deterministic regeneration. Second, Ciriacy-Wantrup's safe minimum standard proposal invokes uncertainty. Assume that the regeneration function is stochastic and that its lower bound is traced by the dashed curve. Then, if SS is carried-over in each period, resource exhaustion will be avoided, even in the worst case with respect to resource regeneration. SS is the safe minimum standard defined by Ciriacy-Wantrup; it makes sense, in our context, to call it the safe minimum standard of preservation.

SS sustains the resource (and that may satisfy some preservationists). Suppose, however, that D is a particular natural resource (or natural resources in aggregate) essential to the human population for production and/or consumption, and that D_{min} must be harvested in each period; otherwise, people in aggregate would suffer extreme deprivation. At this point, it helps to cast the issue in generational terms. Let each time period, t , represent a generation of people. Then, any generation that uses less than D_{min} suffers extreme deprivation. We identify SS as the minimum stock carried-forward that will pro-



Setting the SMS.

vide D_{min} for each succeeding generation. Harvests of D_{min} and regeneration of the stock can be guaranteed. SS is the safe minimum standard of conservation.

Standard accounts of the SMS approach suggest that the SMS should be maintained unless the costs of so doing are “immoderate” (Ciriacy-Wantrup, 1968) or “intolerably high” (Bishop, 1978). This escape clause has generated much discussion, and several rationales have been offered. I would argue that the escape clause is essential because one cannot imagine a contract, freely entered and enforceable, between the present and the future that binds the present to observe the SMS; rather, the SMS is a commitment that the present might undertake for ethical reasons. With only conscience to prevent the present from unilaterally voiding an SMS commitment, it is prudent to design an SMS policy that avoids requiring more sacrifice on the part of any particular generation than that generation is willing and able to bear.

If D is essential to the human population for production and/or consumption, it would be intolerable—in both practical and ethical terms—to demand that the present generation restrict resource use below D_{min} to assure the prospects of future generations. An implementable safe minimum standard policy must seek to avoid placing any present or future society

in a position where it must choose between sacrificing itself and dooming subsequent societies.

One could also apply the model to particular natural resources—say, species or habitats—that, so far as we know, are not essential to human welfare. In this case, D_{min} could not refer logically to harvest essential for human welfare; however, it could refer to competing human demands for some resource (e.g., land or water) upon which the species or habitat depends. There may be a considerable variety of good reasons why society would or should want to protect this piece of nature, and an SMS policy may be adopted. Nevertheless, people arguing from different ethical foundations are likely to reach different conclusions as to the level of cost that would be intolerable (Randall and Farmer 1995); frankly, a consensus concerning the level of the intolerable cost is easier to imagine when the resource is essential to humans than when it is not.

To this point, the discussion has treated the level of SS and the magnitude of D_{min} as quantities to be determined independently. Yet, a little reflection suggests otherwise. Imagine a society with relatively little tolerance for sacrifice to benefit future generations. That society would set D_{min} at a relatively high level. It follows that, with D_{min} larger, SS would need also to be larger: sustainability can be assured only by invoking

ing the SS policy at a stock level large enough to assure the larger D_{min} harvest.

Rather than a Ciriacy-Wantrup SMS policy that emphasizes intervention to prevent imminent and clearly visible crises—as, for example, underlies present endangered species policy—this discussion leads toward a SS policy emphasizing early warning, and early implementation of conservation policies that require only modest sacrifice on the part of each generation. From one perspective, the prospects for actually implementing effective ecological policy in such circumstances are good the cost will be quite affordable. To gain this advantage, however, it will be necessary to take effective policy action long before a crisis is imminent; and that will sorely tax our policy processes, which have become accustomed more to crisis response than to far-sighted pre-emptive action. Furthermore, as the discussion of D_{min} has emphasized, effective policy action depends crucially on social commitment sustained within and across the generations.

The Isolation Paradox

Even where the necessary social commitment exists, the issue remains of effective implementation in a society founded on individualistic precepts. Effective ecological policies typically cannot be implemented by a single individual acting alone. Species and habitat protection typically require coordinated strategies on areas of land larger than single private holdings. For the gray wolf, Yellowstone National Park is too small, and an effective reintroduction policy requires coordination with neighboring public and private landowners.

These kinds of problems can be analyzed as isolation paradoxes: Adam Smith discussed the case of one hundred farmers in the upper end of a valley, beyond the reach of the existing large canal. While all would benefit from extending the canal, none could bear the cost alone. Yet every single one of them would enjoy benefits larger than one one-hundredth of the cost. Acting alone, each can do nothing, but everyone could enjoy a net benefit from coordinated action. The isolation paradox is the general name given to problems of this kind. An isolation paradox is present whenever individual action fails but there exists a cost allocation (not necessarily an equal sharing of costs, as in Smith's example) such that all parties would be better-off with coordinated action than with no action at all.

To this point, we have ignored coordination costs, which depend on technology and institutions. High coordination costs have often provided a motivation for government action to break the isolation paradox. Governments have often justified such action on the ground that aggregate benefits exceed the costs, without requiring that costs actually be allocated so that all individuals enjoy benefits; in technical terms, action is justified by potential Pareto-improvements.

Solutions that break the isolation paradox do not have to involve government or (even worse, in today's political environment) big government. Individuals may act together to form and maintain clubs in order to get the job done. Many

entities that call themselves clubs, for example, the local health and fitness club, are actually private for-profit enterprises. One can readily imagine a private entity resolving the canal extension problem profitably, just as "city water" is in fact delivered to my home by an investor-owned corporation.

The isolation paradox concept, then, suggests an openness to solutions that invoke a variety of institutional forms: private enterprises, voluntary associations, and government form the most local level to the national scale and beyond. For particular problems, the appropriate institutions will be consistent with the dimensions and scale of the problem itself, and with the prevailing political realities. For ecological issues such as biodiversity, one can conceive of private for-profit genetic reserves; nature reserves operated by corporations, voluntary associations, or governments; clubs supported by members and donors operating in markets to enhance both private and government conservation efforts; and government operating as facilitator of consensual agreements among stakeholders, as well as legislators, regulators, and resource managers.

While those in policy circles are retreating from paternal government and expressing a refreshing openness to institutional innovation, an increasingly vocal "property rights movement" is promoting skepticism about public institutions of all kinds. An insistence on libertarian principles and (a particular construction of) private property rights may impede solutions to the isolation paradox, just as society may need sometimes to impose uncompensated costs on some of us in order to secure the general good.

It is telling that, out of ten invited representatives of private interests at a recent workshop on ecological policy, nine wanted only to tell horror stories about private property owners terrorized by the eco-police, while just one discussed processes by which property owners, environmentalists, and other interested parties might work out mutually acceptable solutions. The property-rights lobby needs to get serious about innovative solutions to the isolation paradox if it intends to play a constructive role in environmental policy. Support for environmental objectives remains strong among the general public, and the isolation paradox stands in the way of satisfying many of these objectives.

Social and Political Fragmentation

One could establish the premise of increasing social and political fragmentation with reference to the disintegration of Yugoslavia and parts of the former Soviet Union and, in the United States, the emergence of organized militias and domestic terrorism. But the phenomenon is more general than that, albeit in forms not so immediately threatening. We see frustration not only with national institutions; the proliferation of gated communities and private schools suggests that many households no longer trust even the most local of public institutions to provide basic services like security and education.

In his acceptance speech, one of the major party nominees for president in 1996 earned applause with the statement: "It doesn't take a village to raise a child, it takes a family." This

generates a rather stark mental image. Imagine the nuclear family literally going it alone, providing for itself all of its needs, private and public: food and shelter, of course, but also security, education, and spiritual fulfillment. Perhaps that is not what the candidate had in mind. Perhaps the nuclear family could go shopping: shopping for neighborhoods, for community, for schools, and for a church. If dissatisfied with its purchases, the family could cash them out, and go shopping again. But this, too, is not a pretty picture. First, the motivations are often less than generous: let's take care of ourselves, rather than joining with others to take care of everyone. Second, this shopping-around for services results in a series of one-shot transactions, without any commitment to stay and help work out the problems that cannot be resolved easily. It is an inferior substitute for the repeated-game structure that develops in a true community.

At this point, it is appropriate to pause and define some terms. First, "community," as used here, has a rather special meaning: the key element is that members of a community are committed to its continuity, and hence to resolving a wide variety of problems and providing a wide variety of services within the community structure. "Fragmentation" is, then, a phenomenon that includes diminished commitment to community in this sense, and increased willingness to withdraw from the community when disappointed by decisions concerning perhaps just a few issues. When fragmentation is understood in this way, the recent prominence of nationally organized single-issue lobbying, for example serves as evidence for, not against, increasing fragmentation.⁵

Fragmentation is exacerbated by certain social and demographic phenomena that are themselves based in advancing technology: increased geographic and occupational mobility, and the increasing participation of women in work away from the home. But, that is not the whole story. Beginning in mid-century, a series of influential academic contributions—Arrow's (1951) and Coase's (1960) arguments that shook the foundations of the idea that there exists a public or general interest and an activist government is needed to promote it, and Tiebout's (1956) "voting with the feet" hypothesis that elevated shopping for neighborhoods above staying around to resolve existing problems — and Ayn Rand's popular writings led to a resurgence of philosophical individualism and an increasing cynicism about public institutions which, in turn, have encouraged the fragmentation we now observe.

Presently, we observe a variety of efforts to revive the notion of community. However, I believe community cannot be simply revived; it will need to be reinvented. Any viable new notion of community will need to come to terms with underlying irreversible social and demographic phenomena: weakening of the ties that bind individuals to places and employers, and increasing scarcity of the unpaid female labor that (we now recognize in retrospect) bore a disproportionate share of the costs of maintaining community in previous generations.

My claim that a reinvented concept of community must coexist with increasing occupational and locational mobility suggests that the term "community" is being used here in a sense quite different to its use, for example, in the phrase "community stability." Throughout history, extractive industries have in fact extracted and moved on. Boom towns and ghost towns, both, have a strong association with extractive industries. But, in the kinder, gentler twentieth century, government tends to subsidize declining industries (often extractive), usually on the rationale of promoting community stability. The subsidies may be financial or environmental, and in practice both kinds of subsidies are often provided. At best, these subsidies tend to prolong the inevitable decline, and their very existence promotes the assembly of rent-seekers loudly demanding their continuation. Holding jobs in place despite changing patterns of need and scarcity must not be what we mean by promoting community.

Policy Processes to Break the Isolation Paradox

Building on a combination of abstract theory (from game theory, political science, and economics, perhaps among still other disciplines) and emerging experience, it is possible to identify some of the characteristics of policies and policy processes that are effective in breaking the isolation paradox.

1. Seek problem-scale solutions. National, one size fits all, solutions to local and regional problems are currently out of fashion, and for some good reasons. Sometimes the solutions themselves do not make sense in the local context and, regardless of that, solutions imposed from distant capitals seldom enjoy the local commitment necessary for their success. Instead, it makes sense to seek solutions scaled to the problem at hand and, to a considerable degree, fashioned by those involved most directly.

Nevertheless, a framework of national laws and policies remains necessary, to provide parameters within which local solutions can be negotiated. A major element of this framework is property rights. In light of the current property rights movement, it is well to remember that property rights are the creation of the government which defines and secures them, and they evolve over time in response to changing circumstances. The current property rights movement is not really about protecting existing property rights, but about extending them in ways quite inconsistent with recent political history: broadening the conditions under which property owners may demand compensation for private losses due to regulation in the public interest, and reversing the quarter-century-old principle of "polluter pays."

More generally, there is an inherent tension between the advantages of problem-scale solutions and the need for national policy. Nationally and internationally mobile industries, for example, have proven more than willing to use the current enthusiasm for state and local institutions to create prisoners' dilemmas for their own benefit. We observe this when states and localities find themselves in destructive competition to attract firms with tax abatements and/or relaxed enforcement

of environmental controls. **An** effective policy process encourages problem-scale solutions within a framework of national policy; it does not simply set states and localities adrift and wish them well.

2. Establish a long-term process involving all of the legitimate interests. Since the 1970s, public participation has been an important part of the process for resolving resource management issues. Since the 1980s, involvement of all significant stakeholders has been considered essential. What is relatively new is the notion, supported by the theory of repeated games and by practical experience, of committing the participants to a long-term, continuing process. Rather than merely commenting on a solution proposed by professional managers (a typical way of implementing public participation), participants actually work out, over time, solutions to the problems at issue. A long-term continuing process has obvious advantages—it allows time for participants to develop an understanding of each others' interests and objectives, gather and interpret essential information, and develop solutions that will be broadly acceptable—but also an advantage which might not be quite obvious: after a few rounds, individuals tend to become committed to bringing the process to itself to a successful conclusion. If the default outcome is recognized broadly as unsatisfactory, and participants come to see the failure of the process as bad in and of itself, conditions are favorable for a successful process.

3. Establish a shared vision. The process starts by defining goals at the community level and the values that underlie those goals. The objective is to develop and articulate a shared vision: a statement of what it is that the community values and seeks to become. During this process, stakeholders whose most immediate interests would seem to be in conflict frequently discover that their basic values and vision of the future are in fact quite compatible. At this stage, it helps to define the problem set broadly: what does this community seek to become, and how can it get there?

4. Use all of the tools for achieving consensus: deliberation, persuasion, and negotiation. Structured discourse and deliberation can often undermine conflict, and careful consideration of information can erode firmly held priors and open up new possibilities. It would be a mistake—one that an economist might easily make, but nevertheless a mistake—to underestimate the value of deliberative processes. Nevertheless, negotiations, real trades, and win-win solutions are often essential to break impasses. Depending on particular circumstances, purchases of land or easements, land swaps, mitigation banking, and resources-for-resources compensation can be both efficacious and fair: they help move things toward real solutions that benefit all parties directly concerned. A broad definition of the problem set is helpful at this stage, too, because it increases the scope of potential trades and win-win solutions. As with all negotiations, however, it pays to proceed cautiously. It is not uncommon for parties to proclaim a secure *status quo* or default position that may in fact be quite shaky,

or to exaggerate the costs and adverse employment impacts of proposed environmental policies.

Conclusion

The policy process outlined above is still in its infancy. Most of the work is yet to be done, in developing both the conceptual framework and a substantial body of operating experience. Yet, many of the elements have been tried, sometimes with considerable success (Interagency Task Force 1995; Lincoln Institute 1995). Wetlands mitigation banking is working in Ohio; in several western districts, grazing and environmental interests have worked out mutually acceptable accommodations; “no surprises” policies have helped resolve impasses between development and endangered species protection in the southern California coastal sage; and land swaps have played critical roles in protecting the northern spotted owl. In each case, the credit must go not just to the policy tool used, but also to the policy process that identified promising approaches and, often slowly and painstakingly, made them work.

Endnotes

1. Alan Randall is a professor in the Department of Agricultural Economics at The Ohio State University, Columbus, OH, 43210-1067. He is grateful for the opportunity to participate in the Colloquium, guidance from the organizers, and suggestions from the anonymous reviewers.
2. The existence of an efficient steady-state is itself problematic, and assumes among other things that technology and human preferences remain constant. Nevertheless, these challenges to the empirical realism of the model need not concern us here. The general principles I seek to illustrate can be adapted to more a realistic model, with some loss of simplicity.
3. The intuition for this efficiency condition is that the natural resource and other forms of capital will be to some degree substitutes in satisfying human needs. At the margin, then, the value-productivity of natural resources and capital must be equated.
4. Technically, two kinds of issues are involved issues of spatial scale and of coordination. Economists often have discussed the coordination issues under the rubric of “market failure.” Under ideal conditions, they claim, the invisible hand of the market provides perfect coordination. Breakdowns in coordination are therefore attributed to market failure. This line of reasoning has produced ponderous taxonomies of market failure (e.g., common property resources, public goods, externalities, and natural monopolies.) It has also stimulated a skeptical reaction from some scholars of more individualistic bent: what can market failure possibly imply for policy, when government fails more pervasively than does the market? Given the baggage that “market failure” has accumulated, it

makes sense to revert to the simple and general concept of the isolation paradox. For one thing, intellectually honest individualists nevertheless agree that isolation paradoxes exist in practice, and effective coordination has at least the potential to resolve them to the benefit of all concerned.

5. At the Colloquium, I offered an example from my immediate residential neighborhood. It seems that we are, together, able to generate a large turn-out for hearings on proposed zoning changes, but we cannot resolve the problem of straying dogs in our very own block, without appeal to authorities in the distant county seat. This, too, evidences increasing fragmentation in the sense the term is used here.

References

- Arrow, K.J. 1951. *Social Choice and Individual Values*. New York: Wiley.
- Bishop, R.C. 1978. Economics of endangered species. *American Journal of Agricultural Economics* 60:10-18.
- Ciriacy-Wantrup, S. von. 1968. *Resource Conservation: Economics and Policies*. (3rd ed.) Berkeley, CA: University of California Division of Agricultural Sciences.
- Coase, R. 1960. The problem of social cost. *Journal of Law and Economics* 3:1-44.
- Farmer, M.C. and A. Randall. 1997. Sustainability and the safe minimum standard of conservation. *Land Economics* (in press).
- Interagency Ecosystem Management Task Force. 1995. *The Ecosystem Approach: Healthy Ecosystems and Sustainable Communities. Vol. 1 - Overview* Springfield, VA: NTIS # PB95-265609.
- Lincoln Institute of Land Policy. 1995. *Managing Land as Ecosystem and Economy*. Cambridge, MA.
- Randall, A., and M.C. Farmer. 1995. Benefits, Costs, and a Safe Minimum Standard of Conservation. In *Handbook of Environmental Economics*, ed. D. W. Bromley. Cambridge, MA: Blackwell.
- Tiebout, C. M. 1956. A pure theory of local expenditures. *Journal of Political Economy* 64:416-424.