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**NON-REGULATORY APPROACHES
FOR BIODIVERSITY MANAGEMENT:
20TH CENTURY LESSONS FROM THE U.S.**

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Introduction (246)

Non regulatory approaches for biodiversity protection have emerged as a relatively new idea. However, the core concept of using non-regulatory approaches to facilitate sustainable resource behavior is actually long standing in the United States, and through the 20th century has been applied to many types of natural resource and ecological systems.

In the United States the rationale for the programs that have been developed has been to intervene in normal market processes. Landowners receive market signals, which, if responded to rationally, leads owners to engage in land use practices that are non-optimal from a social perspective, even though they appear optimal from an individual's perspective (Bator 1958, Harris 1980).

This mismatch between individual and social outcome is one version of Hardin's "Tragedy of the Commons" (1968). Normal market processes often result in situations where land prices escalate, sometimes sharply, encouraging landowners to allow land to move into alternative uses. The change in the land use can threaten ecological stability. Throughout the 20th century the focus of most non-regulatory programs is to seek to break, through policy intervention, this economic incentive for land use change.

(246) This paper draws heavily from an earlier and related exploration of these topics, see Jacobs (2008).

I. - Historical Context/Combating Ecological Disaster

During the urban economic boom of the 1920s, America's rural areas experienced a serious economic downturn. American agriculture still had its 19th century form of small holdings and small-scale producers, but mechanization and industrialization changed the economics of production. As farm prices dropped, owners and users worked as hard as they could to squeeze out as much profit as possible. One consequence of this was to stress the ecosystem, which became evident to all of America during the 1930s dust bowl (Worster 1979).

A national level response to this ecological disaster was the formation of the federal Soil Conservation Service (SCS). Natural resource and social scientists experimented with how to get farmers to more sustainably manage their land. The experiment became a national program in 1933 with the election of Franklin Delano Roosevelt.

The decline of the dust bowl as an ecological phenomenon, the advent of World War II, and the subsequent post-War economic boom turned America's attention away from resource management, though work with the establishment SCS districts and assistance to individual landowners continues to the present.

Beginning in the late 1950s, the focus shifted to the consequences of urban sprawl and specifically the protection of agricultural land. Beginning on the east and west coasts, land economists and agricultural scientists became concerned with the rapid transformation of productive agricultural land through peri-urban land subdivision. Often the precise characteristics that made land good for food production were also those that made it attractive for land subdivision - land that was relatively flat, well drained, with ready access to transportation corridors, etc. Scientists concerns were of two types - whether the conversion of agricultural land was in and of itself a wise thing relative to food production, and how much impact land conversion had on ecosystem factors such as ground water recharge, wildlife habitats, and air and water pollution.

The earlier SCS programs focused on a farm-by-farm approach to stemming soil erosion and promoting resource sustainability. The new approaches were based on broad changes to state law, which then enabled local, sub-state governments to offer individual landowners opportunities for more resource sustainable behavior.

Over the last 50 years, the approach pioneered in the area of agricultural land protection has been expanded to a wide range of natural

resources including for example wetlands, forest lands, riparian buffer strips, and wildlife habitat. In all of these situations the rationale is the same. The owner has land whose ecological characteristics yield broad social value. However, changing market conditions, often related to peri-urban or rural growth, create a situation where the owner's rational behavior is to sell the land for the highest price offered by the market. This price, though, is not for the land in its ecosystem state - as agricultural land, forest land or wetland. Instead it is for the transformation of the land use to a more intensive, urban style use. The net result of a set of owners acting rationally can be the destruction of the ecosystem.

Therefore the policy alternatives developed over the last 50 years have all striven to intervene in this process, by making the market price less attractive to the owner, or by providing compensation (payment) to the owner, so that the owner has no need to take the market's offer price.

II. - Policy Approaches

Attempts in the United States to facilitate sustainable resource management are shaped by several unique factors. Among these are: a strong cultural and historical tradition that promotes and respects private property, a relatively weak legacy of government intervention with private property rights, and a system of governmental planning and policy implementation oriented towards subsidiarity and action by local government (Jacobs 2010).

Within this context, non-regulatory resource management approaches are generally of two types: taxation programs and land rights compensation programs, and these two types of programs are generally carried out by either government itself or in collaboration with NGOs.

A. Taxation Programs.

Landowners in the United States are required to pay taxes on the land they own, and in most states the tax is required to reflect the land's full, real market value. This means that land used and valued for natural resource characteristics will have a relatively low tax. But as peri-urban and rural growth cause land value to escalate, the tax on the land also rises, reflective of the rising market value. Landowners are

presented with a quandary. Market signals, as translated into tax rates, tell them that their land is more valuable. In order to pay the increased taxes due on the land they either have to increase the land's productivity or find alternative means of paying the tax. These leads to a condition commonly known as "being taxed out of use," where the taxes owed on land exceed the land's ability to generate the tax revenue when the land is used for productive or ecosystem service purposes.

The design of taxation programs assumes that owners would prefer to pay fewer taxes and that if they could pay fewer taxes the signal they receive to encourage a change in land use would be lessened. These programs thus offer to reduce the normal amount of property taxation owed in exchange for preferred landowner behavior with regard to the resource. Generally these programs are implemented through individual contracts between government and a landowner (similar to the individual, farm based approaches of the SCS programs), though the terms of the contract (the amount of reduction, the period of reduction, etc.) are set by state law. The net result of most programs is to reduce the annual taxation burden on the landowner by 50-100%.

Landowners have been very receptive to these types of reward programs. As designed, they do provide relief from market pressure for land use change. In addition, they allow owners to continue in their current use of land. Importantly, these programs do not prevent future land use change in the period after the contract expires. Governments have also been receptive to this approach, though for different reasons. As designed and implemented these programs delay demand for infrastructure investment and expansion related to new urban-style growth.

These programs were first developed for agricultural land protection, and have now been expanded to cover a broad range of natural resources. They are now authorized by every state in the U.S. Do they work? Yes and no. Yes, owners participate in these programs, often in large numbers. Owners especially appreciate the individual nature of contract negotiations, which allow the generalities of the program to be shaped to their individual circumstances. And yes, these programs *delay* land fragmentation and conversion. Yet *these programs do not prevent land conversion*. What they do is postpone the timing of land conversion.

B. Land Rights Compensation Programs

Taxation approaches have come to be understood as providing temporary solutions... As concerns for sustainable resource management

grew in the latter part of the 20th century, attention focused on approaches that would provide more permanent solutions, whereby the landowners of targeted lands would not disrupt ecosystem service. These solutions often focus on providing compensation to landowners for a permanent change to their land use options and build on the core concept of land as a bundle of property rights (Kayden 1992).

In the United States landownership is operationalized as ownership of a bundle of rights. These rights refer to the physical character of the land – the air right, the soil right, the water right, the mineral right – and social relationships relative to the land – the right to use, the right to control access, the right to transfer (through sale, lease, or gift). Fee simple ownership of land is ownership of all of these rights. For the purposes of natural resources management some of the key rights in this bundle are the rights to change land use by the owner and the owner's right to transfer to another who can choose to change land use. A key element of this core concept is the ability to separate one or more rights (for example, the mineral right or the water right) from the other rights in the bundle (Demetz 1967). In the literature, the particular right(s) related to land use change are often referred to as "the development right." The two policy approaches that utilize this core concept and have been widely discussed are transfer of development rights and purchase of development rights.

C. Transfer of Development Rights (TDR)

TDRs were invented in the early 1970s, as an approach to protect historic buildings in dense urban areas (Costonis 1973). The problem that prompted their invention is analogous to that faced by ecosystem areas, which is why the approach quickly expanded to such areas. Historic buildings have broad social value. But to the owner, a rational response to the ownership of the building is to destroy it so as to be able to capture market values for the land in more intensive urban use. In the United States this market demand is often supported by public land regulation which, because of cultural values, does not allow the public to require the owner to keep the building in its relatively low density use. Thus the problem: a mismatch between individual and social logic over land use. The solution? To use the core concept of ownership as a bundle of rights where individual rights can be separated from the bundle to try and address both the owner's and societies needs.

Two land use districts are created, a sending district and a receiving district. In the sending district land use is strongly restricted, via public

regulation, to that use that serves public purposes – e.g. wetlands, wildlife habitat, old growth forest, unique ecological sites, etc. Owners of these lands are issued TDR credits that represent a difference between the land use they would be allowed to engage in prior to the TDR program and the land use they are allowed to engage in now.

In the receiving zone landowners are also subject to land regulation. The regulation provides these owners with the option to intensify land use with the acquisition of a TDR credit. The expectation is that if these are properly designed and properly responsive to market conditions, owners in the receiving district will want to acquire TDR credits, because it will allow them to engage in more intensive, and thus more profitable land use-development activity.

When a transfer occurs several things happen. The landowner in the sending district has received compensation for the value of the TDR credit. And once the transfer occurs, the sending district owner's bundle of rights has been permanently altered. The right to "development" is no longer within the bundle.

Thus, the logic goes, the ecosystem service provided by the land is now permanently available, because the right to change land use is no longer within the owner's bundle of rights, even if the owner transfers the property to another. Also, the compensation provided to the owner in the sending district has come from a private party, not from government. So government has achieved a broad public purpose without substantial governmental expenditure. And, government has achieved its purposes of efficient infrastructure and development through the design of the receiving district and the intensification of land use in that district.

Though owners may dislike the level of strong public regulation that is at the base of TDR programs, if owners in the sending district receive strong levels of compensation for their development right, and they get to continue owning and using their land, they tend to be satisfied. The funds they receive can be used to invest in the land itself, or for other personal purposes.

For TDR to work it requires a very specific relationship of supply and demand. Ideally, it requires a relatively small supply of TDR credits (a small sending area) and a relatively high demand for them (a large receiving area). This creates conditions where owners in sending districts are essentially guaranteed a purchaser and a strong purchase price. In practice, many TDR feasibility studies result in the opposite –

a large sending area (a large supply of TDR credits) and a small receiving area. Why? Because it is easy to identify the ecosystem that should be protected and managed, and to overdesignate it. Conversely, it is can be difficult to develop public consensus about the location and size of receiving areas.

D. Purchase of Development Rights (PDR).

In part because of the inability to more widely implement TDR in the 1980s the approach of PDR was introduced (Daniels 1991).

PDR is also based on the concept of land as a bundle of rights, where rights can be separated from the bundle. Its purpose is to provide the owner of critical ecosystem land with compensation for permanently altering the bundle of rights for the land, so the land will be permanently available for ecosystem services. PDR also identifies the land it is concerned with through designation of a sending district. Owners in this district are subject to strict public regulation over their land, regulation that is compatible with the goals of protecting and enhancing ecosystem services.

With PDR there is only one district, a sending district. There is no attempt to design supply and demand, and thus create a market for land rights. There is also no attempt to fund land protection through the private sector. Instead, with PDR the public itself provides compensation to owners in the sending district for the value of their publicly designated and created PDRs. Depending on market conditions, a publicly purchased PDR costs between 50-95% of the land's full market value.

Given this cost, what are the advantages of a PDR over a TDR? The program is easier to explain to policymakers and citizens than TDR, it is less complicated to operate, and it has more certainty for owners in the sending district. In general owners do not like the level of strong public regulation that is at the base of PDR, but they do like the strong levels of compensation for their development right, the fact that a buyer is assured, and the fact that they get to continue owning and using their land.

The key to the success of PDR is sufficient funding. In reality this restricts PDR to governments wealthy enough to generate the funds for the program. In part because of this limitation, NGOs in the United States have become very active in PDR programs. NGOs – private sector land trusts – raise the funds privately for the purchase of develop-

ment rights. Sometimes these funds are provided to government. More usually, though, the NGOs themselves engage in the negotiation and purchase of the development right, and then the ownership and management of it (Mason 2008).

III. - Lessons Learned/Will It Work Elsewhere?

The United States has experimented with its version of non-regulatory approaches for sustainable resource management for close to 80 years. Prompting these programs, in general, is the pull of market forces, which entices landowners to consider converting land from a state that favors ecosystem services to a state where the ecosystem will be disserved. Therefore, the U.S. experiments have been prompted by an interest in blunting natural market forces that cause a rise in land prices or a decision to engage in destructive land use behavior.

The programs most responsive in terms of drawing in participants have tended to be those that:

- are designed to allow for substantial individual interaction and negotiation with the landowner,
- provide short-term rewards to the landowner, without restricting long-term options,
- partner financial rewards with technical assistance in land management.

The programs most effective at actually protecting ecosystem services have tended to be those that:

- tend to have a basis in a strong system of public regulation,
- combine this regulation with a process that permanently alters the composition of the owners property rights bundle through removing their so-called development right, and providing the owner with compensation for this removal,
- provides a public enforcement mechanism for the regulation and the rights removal.

As other countries move forward with these programs there are elements of the U.S. experience worth noting (Jacobs 2008, 2009). First, the need for these types of programs emerge because of a disruption of prior land tenure relationships that sustained ecosystem services; often these are market conditions which send signals to owners encou-

raging land use change. Second, programs to which landowners are most receptive are those tailored to the individual's circumstances (land and life), and which include a combination of financial assistance and technical assistance, and do not require long-term (as opposed to contractual) commitments from the individual. Third, while the programs designed under the guidelines noted immediately prior have not secured ecosystem services for the long term, they are effective at postponing the timing of land use change. Finally, programs that do secure sustainability in the long-term are expensive, require the permanent acquisition of land rights, are set with a system of strong public regulation, and seem most feasible within a system of law and enforcement that recognizes and manages those rights.

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