# The Fate of Wetlands in the Face of Rising Sea Levels: A Strategic Proposal

*by Joseph L. Sax**

## I.
## INTRODUCTION

If dire predictions come to pass, global warming will produce rising sea levels which in turn will inundate coastal wetlands.[1] In the absence of human intervention, the rising sea would submerge formerly dry upland.[2] The landward sea movement would create substitute wetlands at the new water's edge. As the prospect of inundation becomes palpable, the owners of those lands can be expected to protect the value of their lands by building—or pressing the government to build—seawalls[3] in order to keep the water from moving upland. In such a case, the seawalls would block the rising water from seeking a new water's edge. Existing wetlands would be destroyed and no new wetlands created. Unless steps were taken to let some flooding occur so as to create substitute wetlands, the existing stock of wetlands would diminish.

Land near the shore frequently is very valuable and available for development. A good deal of now-vacant upland abutting existing wetlands will doubtless be developed in the coming decades. Such development will increase the economic incentive of upland owners to build protective seawalls and will increase the cost of public ac-

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1. There is already a good deal of writing on this issue. There is no need to recount it in detail here. For reference, see IMPACT OF SEA LEVEL RISE ON SOCIETY (H. Wind ed. 1977); GREENHOUSE EFFECT AND SEA LEVEL RISE: A CHALLENGE FOR THIS GENERATION (M. Barth & J. Titus eds. 1984); THE CHALLENGE OF GLOBAL WARMING (D. Abrahamson ed. 1989).

2. Upland is a term that refers to land above the line of ordinary high tide of tidal waters, and above the ordinary high water mark of non-tidal waters. It is ordinarily privately owned, not regularly wet, and amenable to economic use and development.

3. For simplicity's sake, I use the term seawall to describe all the structures that might be used to hold back the rising sea and prevent the inland migration of wetlands.

quisition, the purpose of which would be to permit inundation to occur and thereby to establish substitute wetlands.

The comments that follow assume a public goal of reserving some areas where, if sea levels rise significantly, the seashore would be allowed to migrate inland in order to maintain a desired quantity of wetlands. Putting aside the questions of identifying and quantifying appropriate lands for such a purpose, this article addresses solely the practical question of implementation: how can such a commitment be made acceptable to land owners at a tolerable cost to the public?

The problem is not an immediate one. Indeed, one of its primary characteristics is that its major effects lie in the rather distant future. What will be said here applies only to areas where the threat of flooding is at least several decades away. Current threats from erosion and storm damage present a separate problem that is not treated here.[4]

Some estimates project a sea level rise of about six inches by 2025 and somewhere between four and twelve feet by the year 2100.[5] It is not necessary here to rehearse the particular effects of such changes in various places. It suffices to note that, according to expert estimates, over the next century—even with a worldwide ban on the burning of coal—the potential loss of existing wetlands could be enormous.[6] Effects will not be uniform. In low-lying places inland migration would submerge far more land than in other places, and the benefits of preserving wetlands will vary considerably from place to place. This article addresses the following question: Assuming it is determined that there is enough risk of rising sea levels to justify a public policy designed to protect some wetlands if the

4. We face an immediate and serious problem of shorelands and barrier islands threatened by erosion. *See, e.g.*, Dean, *As Beach Erosion Accelerates, Remedies Are Costly and Few*, New York Times, Aug. 1, 1989, at B5, col. 5 (western ed.).

There are some differences. The global warming problem is one where the government has a positive goal of its own. It wants wetlands to migrate inland, and wants private lands to be subordinated to that goal. Insofar as the government in effect wants the land as a nature area, a serious "taking" problem is presented. *See infra* text accompanying note 26. As to erosion damage, government has a more conventional regulatory goal. It is primarily protecting itself from claims against it as the provider of disaster relief. In addition, because the threat of erosion is more immediate, there is less economic benefit foregone from legislation that sharply restricts development.

For these reasons, an uncompensated regulatory scheme is more appropriate for the typical erosion case than it is for the long-term global warming case where wetland preservation is the goal.

5. Titus, *Greenhouse Effect, Sea Level Rise, and Coastal Zone Management*, 14 COASTAL ZONE MGMT. J. 147, 153-54 (1986).

6. *Id.* at 154.

harm occurs,[7] what steps might now be taken? These steps should be legally sound, economically rational, and practical to ensure the likelihood of their success.

## II.
## IDEAS THAT HAVE PREVIOUSLY BEEN ADVANCED

Excellent work has been done in identifying the basic legal techniques available to deal with the problem just described.[8] The following presents a simplified version of the possibilities:

### A. *Prohibit the Building of Walls that Would Prevent the Rising Sea from Moving Landward*

Under this idea the government would not dictate uses, but would allow landowners to adapt to the prospect of flooding. This approach provides the benefit of permitting interim use during the potentially long period before inundation, and relies upon private initiatives to accommodate to the future (by installing moveable structures or facilities that would be fully amortized when inundation occurred, for example).

### B. *Prohibit or Limit Development in Potentially Submerged Uplands*

Limitation on development is theoretically unnecessary if there is a prohibition on seawalling. Presumably an owner, barred from seawalling, would know her own best interest and be able to minimize her own losses. Other than that, the public has no particular interest in how the land is used prior to submergence.[9] The argu-

7. No judgment is made here as to whether the risks are being overstated. The question for government is the same one that any individual asks about buying insurance: is the likelihood of harm great enough—though uncertain—to justify a specified cost to protect against the damage if it occurs.

8. I rely here on several thoughtful articles by J. Titus, primarily: Options for Enabling Coastal Wetlands to Migrate Inland as Sea Level Rises (July 10, 1989) (unpublished manuscript) (on file in the office of the UCLA Journal of Environmental Law and Policy) [hereinafter Options]. *See also* J. Titus, Preparing for Global Warming ch. 19 (unpublished manuscript) (on file in the office of the UCLA Journal of Environmental Law and Policy) OFFICE OF POLICY, PLANNING, AND EVALUATION, ENVIRONMENTAL PROTECTION AGENCY, GREENHOUSE EFFECT, SEA LEVEL RISE AND COASTAL WETLANDS (J. Titus ed. 1988).

9. That is, the public has no interest from the perspective of global warming policy; obviously it may have an interest from the perspective of ordinary zoning or coastal zone management policies. These latter perspectives are not considered here.

It is important that the goal of regulation not be to minimize the economic stake of owners in potentially submerged lands so as to permit subsequent public acquisition at

ment in favor of such prohibitions comes from the prospect that owners would overbuild and then be reluctant to de-develop[10] at the appropriate time. These owners would then pressure the government to permit seawalling to protect valuable investments.

### C. *Purchase a Sufficient Interest in the Uplands to Prevent Unwanted Development or Diking*

Acquisition gives government the surest control over the land in question and removes private economic incentives either to overdevelop or to press for non-enforcement of restrictive laws. Acquisition can take a variety of forms. For example, the public might purchase an interest that becomes operative only at the time of anticipated flooding, leaving all uses prior to that time in the hands of owners. Condemnation and leaseback for a term provides one possible approach to minimize underutilization in the interim before sea levels rise.

Each of the techniques just mentioned has merit, but practical considerations, to be considered next, raise questions about their likely efficacy.

## III.
## HOW TO THINK ABOUT THE PROBLEM

### A. *Restrictions on Development*

Regulations to prevent development seem unlikely to supply a successful technique. Even if enacted in the near future, such regulations would be subject to great pressures for repeal or for creation of exceptions as market demand developed. A variety of factors militate against the prospect of land valuable for development remaining undeveloped for decades while awaiting rising sea levels: the experience of flood plains and of earthquake-prone areas like San Francisco; the perceived unfairness and possible unconstitutionality of keeping landowners from using their property; and the large benefits foregone by keeping land out of production for a very long time. Furthermore, the high cost of acquiring land ripe for development makes public acquisition of development rights unlikely. Development rights are often nearly as expensive as the full

low prices. Such strategies constitute unconstitutional pre-condemnation down-zoning. *See* D. MANDELKER, LAND USE LAW § 2.29 at 36 (2d ed. 1982).

10. The term "de-develop" as used throughout this article refers to a process of razing structures or allowing them to decay through natural processes.

fee simple.[11] Even if such acquisitions were made, society would suffer the same loss in foregoing the benefits of development for many years whether the land was privately or publicly owned.

An alternative approach is regulation limiting construction to development that is compatible with the anticipated flooding, such as movable structures and self-amortizing uses. The success of such regulation would depend upon the extent to which compatible uses are just as profitable as incompatible ones. Large differences in profitability between compatible and incompatible uses (high rise vs. mobile home parks) would create strong lobbies for the most profitable uses.

Experience reveals the paradox that land controls work best where needed least.[12] Regulation may work only in the areas where development is already unlikely for economic reasons. The classic example is the favorable taxation of agricultural land to discourage development that destroys prime farm land and open space.

> [Such laws have] been criticized because of the large percentage of enrolled land that is distant from areas that are ripe for development. . . . [In California] only 6.4 percent of the land in the program was within three miles of a city and less than 2 percent was within one mile of a city. . . . [T]he program has failed to enroll land on the fringe of development. . . . [T]he results of studies in Virginia, Washington and New Jersey, indicate that California's experience is not unique.[13]

## B. *Prohibition on Seawalling and Public Purchase of a Future Right*

The prohibition of seawalling and the public purchase of a future right present the same concern. They rely on landowners behaving as if the existing rules will be enforced when the time comes. No such assumption should be casually made. Both of these techniques presume that owners will self-amortize because at a future time they

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11. The policy of waiting until there is an imminent threat was illustrated by the recent controversy over Manassas battlefield. The legislative taking statute for Manassas is Technical and Miscellaneous Revenue Act of 1988, Pub. L. No. 100-647, 102 Stat. 3342, 3810 (1988) (codified at 16 U.S.C. § 429b (1988)). The issue is discussed in Powell, *Battling Over Manassas*, NAT'L PARKS MAG. 12, 13 (July/Aug. 1988); *see also* Webb, *Manassas Tragedy: Paving Over the Past*, Wash. Post, Mar. 13, 1988, at C1, col. 1. For a study of this policy as applied to the national parks, see Sax, *Buying Scenery: Land Acquisitions for the National Park Service*, 1980 DUKE L.J. 709.

12. Alternatively, land controls work when they are supported by a strong constituency, such as neighbors or environmental groups opposed to growth and who perceive the adverse impacts as being immediate. The difficulty in the case in question here is that the harm of development is, by definition, quite remote.

13. R. ELLICKSON & A. TARLOCK, LAND USE CONTROLS, 686 (1981).

will be unable to protect their investment; either seawalling will be prohibited, or government will takeover ownership. There is, however, another possibility: owners will develop the land in the most profitable way, will have large and valuable investments in place when sea levels begin to rise, and will gamble that the rules will be changed when the time comes. That is the prospect (not a certainty, but a real possibility) that I consider here.

If one could be confident that the rules would not change under pressure, current public purchase of the right to the land's use as of the projected date of flooding offers the preferred strategy. The public purchase option avoids the problems with regulation mentioned above, and also avoids the resistance to regulatory enactment or enforcement generated by a law barring seawalling. The purchase of future development rights also mutes the usual concern about acquisition—high cost. Because the government would acquire an interest quite far in the future, ordinary discounting principles would make the present cost very small.[14]

I shall use the future-acquisition technique to illustrate my concern, though a prohibition on future seawalling presents the same problem. What is wrong with the plan by which government currently buys developmental rights that become effective in the future, leaving the owner to use the property in the interim, legally ousting him when the sea rises so as to permit the wetlands to recede landward? The practical likelihood of success of any such plan turns on the assumption that people will play by the rules of the game. It is this assumption I wish to question. I suggest two alternate hypotheses: (1) it is perfectly plausible that owners will gamble on the rules of the game changing; and (2) the tactics owners will follow will most likely be dictated by their circumstances at the moment they are faced with restrictive rules.

In pursuing these propositions, I draw on a fine study done by Helen Ingram that was directed to quite a different issue. She was studying the behavior of farmer-irrigators in Arizona to determine why they gave political support to a water supply project that would have to charge more than they could afford to pay for the water. The subject of her study was "Willingness to Pay, and Will-

14. *See* Titus, Options, *supra* note 8, at 8.

[B]y 'discounting' the current value over a period of 100 years; assuming the private-sector discount rate to be 5-10 percent implies that the costs would be 0.007 to 0.7 percent of the cost of buying the property. Moreover, the price might also be further discounted according to the probability that the sea will rise enough to inundate the property.

ingness to Play."[15] She observed that the usual way of looking at such a situation involves examining the willingness to pay. Rational economic behavior dictates that farmers will support a water project if their costs and potential profits enable them to afford the price the project will charge for the service. The project Ingram studied, however, did not develop this way. Despite increasing evidence that water charges would exceed the farmers' ability to pay, farm support for the project did not decline. Indeed, she found that many farmers did not even know what they could afford to pay, nor were they informed about what the project would charge.

This latter data led her to the surprising conclusion that the presence or absence of support for the project was *not* based on the economically rational issue of "willingness to pay." Instead, farmer support depended on a political judgment that she called "willingness to play." Farmers believed that if they succeeded in getting the water project built, and thus created a situation of need, the government would come to their rescue. If that meant reducing the price of water, the government would reduce water prices to a level farmers could afford. In short, the farmers were willing to "play" the game of politics, and to bet that the rules of the game would change. In fact, a long history of western water projects gave credence to the farmers' tactic: in decade after decade, the government had effectively forgiven agricultural debts on projects that legally required repayment.[16]

To appreciate fully the force of the Ingram study, it is essential to understand the distinctive position in which the government stands as a creditor or an owner vis-a-vis its citizens, and the real incentives and disincentives that its special position creates. In an ordinary business situation, when a lease expires, the landlord evicts the tenant. The tenant's plight does not concern the landlord. Whether the tenant becomes homeless or goes on welfare is someone else's problem. Similarly, if the water supply were privately controlled, the inability of buyers to pay the contracted-for price would simply result in the supplier shutting off their access. Only an imprudent farmer would "play" on the assumption that a private supplier would renegotiate the contract merely because it turned out to be

15. Ingram, Martin & Laney, *A Willingness to Play: Analysis of Water Resources Development in Arizona*, WATER AND AGRICULTURE IN THE WESTERN U.S., No. 2, Pt. V (G. Weatherford ed. 1982).

16. For a history of reclamation law detailing the forgiveness of repayment obligations, see Sax, *Federal Reclamation Law*, in 2 WATERS AND WATER RIGHTS 122, 129-130, 265 (R. Clark ed. 1967).

unaffordable.[17]

Government, however, operates quite differently. Achieving the economic benefits of business relations almost never serves as the government's primary goal. Keeping its constituents from going under economically, conversely, quite often *is* its primary goal. Consequently, it is not surprising that, in the water situation, the government has routinely been willing to subordinate its position as creditor to its position as sustainer of the local economy. As a practical matter government serves as both the employer and welfare provider of last resort. The government is unlikely to foreclose on debtors and drive them into bankruptcy because such action would merely transform the government's debtors into its wards. From the perspective of a politically influential community dealing with the government, contracts, debts, or promises are not as important as the desperation of the situation. The more people who are in trouble the better the chance of obtaining forgiveness of obligations. This special relationship with government is precisely what Helen Ingram's farmers intuitively understood. Owners of coastal lands will probably behave no differently than the farmers. Furthermore, coastal landowners threatened by flooding will likely be perceived as other victims of natural disasters are perceived.

Let us return to the seemingly most promising plans for dealing with upland owners in the event of rising sea levels: the prohibition on seawalling and the public acquisition of a conditional future interest in coastal property. What might we expect if a law were proposed to prevent seawalling under circumstances that did not presently exist, but were many years in the future? Or what would result if a condemnation and leaseback type plan were put into effect, where land owners were compensated now for the public's right to take possession of the land and substitute wetlands if and when the sea levels rise some decades hence?

The "willingness to play" strategy suggests that owners might well accept an anti-seawalling law that left them free to use their land to maximum benefit for the present and for the considerable future. The landowner might be even more amenable to an acquisition that offered immediate cash in exchange for a distant and contingent obligation to evacuate.[18] Under the acquisition approach,

17. Obviously a different situation exists where the debtor's obligation threatens the viability of the creditor (as with so-called third-world bank loans), and where—for a different reason—the debtor's well-being *is* a concern of the creditor.

18. If the landowners resist even these plans, then the prospects for protecting wetlands are dimmer still.

what would happen as sea levels rose to submerging levels? Under a model of rational behavior landowners should begin to modify their uses in the direction of de-development; and no doubt they would do so *if* they were confident that the rules of the game would not change. If, however, they decided to gamble that the rules would change, the upland owners would respond differently. Of course there is no infallible way to predict future conduct in such a situation, but a review of all the considerations in favor of the "willingness to play" proves disquieting.

Presumably, continuing to use the property in a highly developed form would yield more profits than de-development. In addition, the costs of seawalling would be less than the losses from any substantial levels of de-development. So, at the moment of decision economic forces would probably favor seawalling. To be sure, the benefits previously gained from decades of use may be fully amortized as a bookkeeping matter. In that sense, there may be economic justification for ceasing or revising those uses. However, all the benefits would have been realized in the past; they will not be lost to the owner no matter what happens in the future. From the owner's perspective, the present and future are at issue. From that perspective, seawalling provides the favored alternative, regardless of how fully the property has paid its way through past benefits.

The fact that the owner will have already been paid to abandon the land under a condemnation and leaseback scheme will not necessarily change the perceptions and strategy of owners at the critical time when the rising seas become a reality. The earlier condemnation, which fully compensated the landowners for their present losses from abandonment of the land, will have receded far into the past. In theory, perhaps, that money should have been invested and saved to provide funds to compensate the losses from abandonment, but it would hardly be prudent to rely on such rational behavior by landowners. To the extent that owners take the short view (maximizing their most immediate benefits) and insofar as they intuit the value of becoming victims and then attempting to change the rules, they will not engage in gradual de-development. As a practical matter, the demand to evacuate the land will appear as an immediate, painful, and uncompensated loss. Surely this perception of loss will generate resistance (even more so, paradoxically, to the extent that there has not been preparatory de-development).

With the lease period at an end, there will be no legal right to remain on the land. Plainly the lack of a legal right strengthens the government's hand. Public ownership would present a more diffi-

cult barrier to overcome than a mere regulatory law against seawalling that could always be weakened or left unenforced, even if it were not openly repealed. The rules do not always prevail; even property claims by the government are often subverted. The cases of debt forgiveness to farmers offer an instructive example. There is actually quite a long history of sympathetic actors in illegal positions obtaining changes in the rules to legitimize their status, beginning with squatters on the public lands who eventually got the legal right to stay on the sites they had preempted.[19]

There are other reasons to anticipate that eviction and abandonment may prove difficult. If the land is developed, some sort of community will exist, whether residential or commercial. If the community is not in a state of decline, its members will resist efforts to force it into decline, even gradually. The fact is that communities do not self-amortize; they tend to continue according to their own rhythm and function. Nor are buildings normally wasting assets; they are maintained, remodelled and replaced over time on the assumption that the neighborhood will go on indefinitely. The only familiar example of owner-generated, conscious decline is the slum landlord who is awaiting condemnation in urban renewal; and that is not a very attractive model. Otherwise, efforts to raze functioning communities generate great resistance which require very powerful forces to overcome.[20] This suggests that the actual users of the land as well as the owners may serve as a constituency against purposeful de-development.

The paradox here is that, from the point of view of the landowners and users, the worse things get the better they are. The more evidence of a crisis, the more the likely government is to yield and change the rules of the game. As a consequence, the landowners and the actual users of the land have a greater incentive to foment a crisis than to avert one. This situation arises, as mentioned before, because government stands in a special role as protector of citizens and their well-being, and not simply (or primarily) as a landlord or creditor.

To be sure, for landowners the game is a risky one,[21] for if gov-

19. P. GATES, HISTORY OF PUBLIC LAND LAW DEVELOPMENT 219 (1968).

20. A prominent modern case is Poletown Neighborhood Council v. City of Detroit, 410 Mich. 616, 304 N.W.2d 455 (1981), where General Motors got the City of Detroit to raze a residential area so that it could enlarge its factory. The City, desperate for jobs and fearful of flight, agreed. The Court sustained the eminent domain action against profound objection, both legal and political.

21. A revealing contemporary example of a situation where debtors played, and significantly lost, is the students who decided not to repay their guaranteed student loans.

ernment holds fast their losses could be very great. This prediction of landowner behavior is not meant to suggest that landowners will make a conscious and deliberate decision to foment an emergency. The unfortunate consequences result from the failure to overcome inertia and take affirmative steps to prepare for eventual evacuation. Preserving the *status quo* probably offers the path of least resistance, and that is the path most likely to lead to a crisis that would provoke a change in the rules. Since intuitively people sense that the government will bail them out if all else fails, the prospect of a "play" for a change in the rules should be viewed as an entirely plausible possibility.

## IV.
## IS THERE A MORE PROMISING ALTERNATIVE?

I think there is, though I do not believe any proposal is foolproof.[22] The preceding comments urged examining the perspective of landowners and their real incentives for insight into the likely dynamics of the case of rising sea levels. The conclusion drawn above was that the combination of permitted development in the earlier years and a requirement of uncompensated abandonment when sea levels later rise, no matter what the formal rules, would likely generate powerful pressures to change the rules and to maintain the *status quo ante*.

### A. *The Insurance-Natural Disaster Model*

The following proposal suggests a variant of the condemnation

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Perhaps to their surprise, the government decided not to forgive the debts, but rather held them to their obligations.

22. In recommending an unconventional approach, the insurance model, I omit the more modest flood control model. One might, either by easement, by purchase, or by regulation, describe permissible sorts of development that would be compatible with flooding. Examples of such uses would be golf courses, mobile home parks, parks, and other uses involving structures that are moveable or of low value. For the reasons stated above, I think such a strategy would have to be employed from the beginning: it is unlikely that owners would voluntarily shift from more developed uses to such uses as time went on, and there are undesirable losses associated with the conscious destruction of a successful community. With this qualification, would such an approach work? I think not. Because of the remoteness in time of the anticipated loss, restriction from an early date, extending over many decades, would entail huge losses in foregone benefits. Conventional flood plain zoning is attractive precisely because there is a risk of frequent floods, and development is actually a poor investment unless it is effectively subsidized by disaster relief. If one were confident that an area would be flooded only once a century on average, it would probably be unwise to restrict development there. It would doubtless be a better investment to permit the development and insure against the infrequent loss.

and leaseback scheme. This alternative differs in only one detail from that scheme, but the difference could be determinative of success or failure. Like the leaseback scheme, this model also proposes acquiring an interest which would become possessory at the time of rising sea levels, obtained at today's discounted value. But it would *not* turn the purchase price over to the landowner today. Instead that money would be retained, invested and compounded over the years so that when the moment for evacuation of the property arrives, the total proceeds would then, and only then, be paid to the owner.

In effect, this idea serves as an effort to construct a plan that responds to the problem as the typical landowner will perceive it: as a natural disaster (the rising sea level) that destroys her property (evacuation required). The plan treats the owner as she would ordinarily be treated in the case of such a destructive natural disaster: payment will be made for the loss sustained, as if there were an insurance policy or a full form of disaster relief.

The notion is a simple one. It assumes the owner will experience rising sea levels just as she would experience a fire or a hurricane that destroyed her house. The owner will see herself as an innocent victim, and because—voluntary amortization being unlikely—she will effectively be wiped out, she will feel the need for compensation. If she gets compensation at that point, she is likely to feel that justice has been done, just as she would if an insurance policy paid for the damage she had sustained. Such compensation will deflate the pressures described earlier. The insurance model also incorporates another practical point about compensation: to be effective, it should be given at the moment that loss is sustained. Giving compensation at the time of loss provides the only way to avoid or greatly diminish the sense of loss.

This alternative avoids the disadvantages of the standard condemnation and leaseback model. Let us assume a property interest that is condemned in 1995 with an assumed leaseback of fifty years in which the owner receives discounted compensation upon condemnation. It is a fair assumption that by the year 2045 the compensation will effectively have disappeared. The likelihood that it will have been held and invested, for use when needed a half-century hence, seems small. The money will most likely have been spent long ago. For that practical reason, the coming of the flooding will create the impression of a disaster.

To be sure, perfectly rational economic behavior should produce a different scenario. The market value of the property over the pe-

riod 1995-2045 should decline as the moment marking the termination of the leaseback draws closer. In that respect, even a brand new owner who bought the land near the time of evacuation should, in theory, enjoy the benefit of the compensation paid earlier in the form of a reduced purchase price. Owners should behave in response to that prospect, and change their uses of the property over time in the direction of de-development.

The forces both of human weakness and human cunning will likely work together to derail the rational agenda. The human tendency to over-discount relatively remote and less-than-certain undesired events demonstrates these elements (the extreme case being the behavior of cigarette smokers). In addition, landowners may exhibit a "willingness to play" for a change in the rules so as to stop the decline in the value of the property as flood-time draws near. Both these factors will create pressure on government to construct, or permit, seawalls to protect existing uses. No one can say that landowners will definitely respond this way, but it is important to note that such a response is a real possibility. Strong incentives favor such behavior, and government is especially vulnerable to those who find themselves in a helpless situation, even where the victims have created the situation themselves. The existence of this possible outcome encourages us to choose strategy that is less vulnerable to such tactics.

### B. *Some Specifics on a Proposal for the Insurance Model*

What would be the elements of a program devised to implement the approach suggested here? The following is a sketch of some possibilities rather than a fully developed plan.

The government would identify the lands targeted as desired substitute wetlands and declare them eligible for the program. No doubt these lands would consist almost exclusively of presently undeveloped uplands. For example, this program would not suit the shoreline of New York City.

The public would acquire an interest in these lands sufficient to assure their availability for flooding as sea levels rise.[23] What is the nature of that interest? I would suggest—as the simplest and most familiar legal category—a form of flooding or flowage easement.

23. The same program could be implemented with compulsory self-insurance imposed on landowners. But, as the cost is small and compulsion might be challenged as an interference with property rights, I would strongly urge public financing of the program, or at least a high degree of public subsidy of a compulsory insurance program. *See infra* text accompanying notes 26-28.

Just as the right artificially to flood land behind a proposed dam is routinely acquired,[24] a right to the natural flooding from rising sea levels, if and when it occurs, could be acquired. In this way, the government would neither have to explicitly impose a prohibition against seawalling nor significantly regulate development. Some constraints—such as assuring that the lands were not contaminated in the interim, through use as a toxic waste site, for example—would no doubt be necessary.[25] Beyond these constraints, the easement would merely have to make clear that (1) no steps could be taken to interfere with natural flooding from rising sea levels, and (2) that the easement authorizes the removal of any structure on the land that interferes with the purpose for which the easement has been acquired.[26]

A flood easement offers one attraction, as contrasted with a residual interest following a leaseback, by eliminating the need to make a decision about the length of the lease. Nor would government have to take affirmative steps to regain possession and possibly evict the lessee. The easement would not require an affirmative invocation; when and if there is flooding, the landowner is obliged not to interfere with it.

How is the easement interest to be acquired? Since voluntary purchase provides the simplest and politically easiest means, it should constitute the primary tool. The government generally uses condemnation only in those cases where the owner refuses to negotiate a sale. Condemnation should be avoided where possible because it is a complex and expensive process that requires government to take the initiative. Instead, where voluntary sales cannot be negotiated, the government should initiate action through a permit process when and if owners decide to develop their land.[27]

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24. *See e.g.*, Wilbour v. Gallagher, 77 Wash. 2d 306, 462 P.2d 232, *cert. denied*, 400 U.S. 878 (1969).

25. This article makes no judgment about what use limitations would be necessary in order to keep the land suitable for future conversion to a productive wetland. It should be noted, however, that if most economically productive uses were found to be inappropriate, then the cost of acquisition at the outset would become much greater than assumed in this article. The acquisition would impose a serious short-term use servitude as well as the long-term servitude for flooding. On the other hand, if the use constraints were imposed as non-compensable regulation, there would doubtless be very great resistance from landowners.

26. The cost of removing incompatible structures should be a prior lien on the insurance proceeds. For a fuller discussion of the insurance plan, *see infra* text accompanying notes 25-31.

27. Where there is no development, government might wait and acquire the land later when flooding is imminent. If the land has very little developmental potential, as may be the case with much wetland in Alaska, purchase at the time seems unlikely to be

This method involves enacting a law requiring owners to deed over to the public a flood easement as a condition precedent to development. In exchange for the compelled grant of the easement, the owner will receive an insurance policy with a present value equal to the present value of the easement.

The grant of the insurance policy should take most of the force out of any claim that the exaction represents an uncompensated taking. If, however, the further claim is made—as no doubt it will be—that a taking requires payment in cash,[28] the following addition to the plan should solve that problem. The law would require every owner of targeted property to have insurance sufficient to cover his losses in the case of flooding from rising sea levels. The State would then pay for the insurance. In this way, the State would avoid condemning without paying cash. This approach raises the question of whether the compulsory insurance law would be unconstitutional. I think not. Such a paternalistic law is rather like the compelled social security program; it protects the state against destitute individuals becoming wards of the state.

If opponents of the laws assert the claim that the state itself caused the problem by preventing seawalling, the government may answer that the real problem results from global warming. The state would only require owners not to interfere with the natural processes set in motion by global warming. Perhaps the landowners would claim that the state cannot prevent an owner from protecting her property. Ordinarily the state does not impose such restrictions (one is allowed to fight threatening fires to save one's house). Though the outcome remains uncertain, such a law should pass constitutional muster. The closest analogy might be a law prohibiting landowners from interfering with a natural process of erosion at the seashore which gradually reduces the size of coastal tracts. In that case, the state may justify the act as necessary to maintain a natural sea-land interface by not having the entire coast walled

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too burdensome. Where the land has high value for potential development and the owner does not agree to an easement, the government has no choice but to initiate condemnation proceedings. Condemnation is not objectionable in principle. My only suggestion is that it be used as little as necessary, since it is not only complex and expensive, but also unpopular.

28. This would be rather like granting transferable development rights equal in value to "just compensation" given to the owner of a building designated as an historic monument. For a discussion of the constitutional issues raised by such transfers, see Note, *The Unconstitutionality of Transferable Development Rights*, 84 YALE L.J. 1101 (1975). The leading proponent of this technique is Costonis, *The Chicago Plan: Incentive Zoning and the Preservation of Urban Landmarks*, 85 HARV. L. REV. 574 (1972).

off.[29]

In any event, it should be emphasized that the owner does not suffer any conventional economic loss under the insurance scheme proposed here. The plan provides full compensation but requires the landowner to invest the compensation in a compulsory savings program similar to the social security system.

What is the nature of the insurance policy that would be provided? Perhaps an annuity provides the best description of the policy rather than ordinary casualty insurance, though it will have elements of each type. At the time the above-described flood easement is granted, the government will pay an amount equal to the easement's present value.[30] That amount is treated as an annuity, and invested so that it will pay a fixed sum at various future dates. That sum would be paid on the date when—by some measure to be determined—the sea level rises to a designated point on the target land.[31]

The proposal serves the central purpose of softening the blow for the landowner, if and when flooding occurs, by deterring the owner's incentive to wall out the flooding. Because the amount to be paid depends on annuity principles, the sum will bear no necessary relationship to the actual damage the owner sustains. The in-

29. I know of only one sort of case that deals with a similar situation. Different individuals owned land on either side of a river. One owner dredged to make the river shift over her way, thus depriving her neighbor of access to the water. The court held that such interference was impermissible. Strom v. Sheldon, 12 Wash. App. 66, 527 P.2d 1382 (1974). The law makes some general distinctions between artificial and natural accretions. *See* California *ex rel.* State Lands Commission v. United States, 457 U.S. 273 (1982). It might be argued from this precedent that shoreland owners must sit back and accept changes in the shoreline brought about by natural causes. One might imagine a riparian owner adjacent to a river which is widening to her disadvantage (it is moving her way and submerging her former upland.) I doubt that a court would say she had a property right to change the natural deposition of sediment upstream in order to prevent accretive loss.

30. Obviously the calculation of that value is a complex matter, turning on the state of scientific understanding of the prospects of global warming. But any effort to deal currently with the issue of rising sea levels necessitates a judgment about the likely course of future events. At some point, exceedingly difficult scientific estimates would have to be converted into an administratively manageable table of discounted values. The exact accuracy of such estimates is not essential. All that the proposal requires is the source of a fund that, some decades hence, will significantly compensate for the costs of then-required evacuation of the flooded land.

31. What if a given tract of target land never is flooded? The point is a minor one, no doubt, but I would suggest the following plan: since the policy is in effect an annuity, and has been given to the landowner as compensation for an easement she has yielded, the appropriate outcome would be to pay the proceeds to the owner after some designated number of years (rather like the situation when one "outlives" her life insurance policy).

surance proceeds could be more, less, or the same as the actual damages depending on the amount and nature of the development at that time. Obviously, if the amount is much less than the actual damage, the goal of the plan will be frustrated, for the owner will still have an incentive to "play" to change her obligations and be allowed to wall out the rising sea. If the amount of the insurance proceeds exceeds the damage, the owner should welcome the inundation, as she will profit from it. This last scenario would also be highly desirable from the perspective of the wetlands protection policy that underlies the scheme.

Though the relation between insurance money available and actual damage sustained remains unpredictable, the landowner has the power to keep them in phase by controlling the level of her development so that it will not exceed the amount of the insurance available. If this appears to the landowner as the path of greatest prudence, the plan achieves a very desirable outcome. Any hope that the landowner will follow this path rather than "playing" to have the rules changed rests on the decreased public sympathy for an owner who is significantly insured, and who had the ability to assure that her insurance would be sufficient to cover her losses.

Certainly a more desirable alternative would assure that the insurance would fully compensate all the owner's losses. However, without regulating development, or enabling the insurer to charge premiums based on actual risk (the casualty insurance model), there is no way to achieve that result. The inability to achieve this outcome results from the very nature of the plan in which the premiums depend on the fixed amount of the present value of the future easement. If the government were to compensate the actual risks, based on development, it would remain at the mercy of the landowner, who would have no incentive whatever to limit development. Alternatively, to limit development by regulation involves the most difficult and problematic sort of government activity, which is undesirable for reasons stated at the beginning of this article.

Another possibility exists which may help and which certainly ought to be included in the program: In addition to the annuity-type insurance the government provides, the landowner should be able to buy actual casualty insurance of her own to cover any additional risk of loss she wishes to take. From a public perspective such additional insurance seems desirable since it would reduce the incentive of landowners to try to avoid the flooding as the time approached. Indeed, the government might have an interest in en-

couraging such insurance by co-paying some percentage of it; one might imagine the government paying 10% or 20% of such additional insurance. The fact that the landowner would pay the lion's share of premiums would insulate the government from very heavy costs. Actuarial principles should constrain overbuilding in light of the risks. In this way, the insurer could effectively be drawn in as a self-interested enforcer of the public policy against overdevelopment.[32]

As the time of flooding approached with some certainty, any such insurance would become prohibitively expensive. This would create an incentive for de-development, which is desirable from a public policy perspective. Though, as noted earlier, de-development is inevitably attended with difficulties, and should not be heavily relied on, it offers one possible response in the package of responses that an insurance program along the above lines permits. The overall expectation is that the various elements of the program, taken together, would limit public sympathy for owners and would subvert their incentive to "play" to undermine the policy of wetland reproduction.

## V.
## CONCLUSION

The preceding observations sketch out the essential form that an insurance scheme might take. One can imagine many variants, and no particular detail in the program imagined here should be viewed as other than suggestive. The central purpose of this article has been to urge that attention be focused on the way people are likely to behave when we ask them to stand by and let their land be flooded. If we think behaviorally as we formulate legal schemes, we may find the schemes more effective. The insurance model is put forward as a potentially promising way to deal with our imperfect fellow creatures.

32. For this reason, as well as to add a constituent who has an economic interest in a program of the sort described here, I would recommend using private insurance companies, backed by government guarantees, to administer the program.

If government administered the program itself, it would be greatly tempted to invade any such long-term trust fund to meet other budgetary needs. Using a private insurer would remove that temptation, while government guarantees would create an incentive to provide oversight of the insurer's behavior (more effective than oversight of federally insured savings and loans, it may be hoped).