

Learning From Disasters: The Synergy of Law and Geography

by Rutherford H. Platt

Editors' Summary: Historically, regulatory approaches to natural disaster mitigation have been created in the aftermath of specific disasters. For instance, the world's first city building code was created in the wake of the Great Fire of London, and the U.S. Congress enacted flood control rules for the Lower Mississippi after the Great Mississippi River Flood of 1927. In this Article, Rutherford H. Platt discusses how natural disasters have informed society's understanding of natural resource management and land use planning over the last several centuries. He examines the evolution of single use policies into multiple use management, deconstructs federal disaster policies, and advocates for ecological cities. He concludes with a reminder to address natural disaster mitigation—indeed, all of modern urban planning—with comprehensive policies addressing the full range of urban needs.

I. Introduction: The Great Fire of London

In the year 1666, London, England—the primary city of the western world—was a medieval labyrinth of some 400,000 souls packed into wood structures overhanging twisting, narrow streets within and just beyond the city's ancient Roman walls. The previous year, 56,000 Londoners had succumbed to the plague, a testament to the overcrowded and unsanitary condition of the city. On the evening of September 1, after a long summer drought and fanned by high winds, the Great Fire of London began. Over the next five days, most of the old city within the walls was destroyed, including St. Paul's Cathedral, some 80 churches, many guildhalls and warehouses, and countless dwellings. London's population fled to open fields beyond the walls in unspeakable misery and fear.¹

The Great Fire of London was possibly the first modern disaster to be fully described by literate eyewitnesses. According to Samuel Pepys' *Diary*: "I saw a fire as one entire arch of fire above a mile long: it made me weep to see it. The churches, houses are all on fire and flaming at

once, and a horrid noise the flames made and the cracking of the houses."²

The fire epitomized Garrett Hardin's famous and gloomy adage: "Freedom in a commons brings ruin to all."³ The growth of London over the previous four centuries had flourished in a permissive legal environment where common-law property rights were increasingly recognized and protected, but the public had virtually no voice in how those property rights were exercised—a morality tale of *laissez-faire* run amok. Even as the fire raged, the usual last resort of pulling down houses in its path was delayed as King Charles II, the newly restored and nervous monarch (after all, his father had been beheaded), dithered about the costs of compensation to the owners.

London was a financial success but a geographic disaster waiting to happen: private structures clogged the narrow lanes and passageways, encroached on market spaces, and blocked access to the Thames River. With no regulation of building size, location, and construction materials, the fire was inevitable. And without access to water, it could not be halted.

But there is a happier aftermath to this dreary account. At the urging of the architect Christopher Wren and other leading citizens, King Charles II issued an astounding proclamation a week after the disaster calling for restraint and foresight in the rebuilding process, pending a full investigation of the causes of the disaster. The proclamation addressed five practical city planning aspects of the rebuilding process:

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1. WALTER G. BELL, *THE GREAT FIRE OF LONDON IN 1666* (Greenwood Press 1971).

2. SAMUEL PEPYS, *DIARY* 390 (George Bell & Sons 1893).

3. Garrett Hardin, *The Tragedy of the Commons*, 162 *SCIENCE* 1245 (1968).

1. Stone or brick was to be used for exterior façades in place of wood;
2. The width of streets was to be established in relation to their importance;
3. A broad quay or open area would be maintained along the Thames River for access to water for firefighting;
4. Public nuisance activities such as breweries or tanneries should be removed from central London to more suitable locations; and
5. Reasonable compensation should be determined and paid to property owners whose right to rebuild was curtailed by public restrictions.⁴

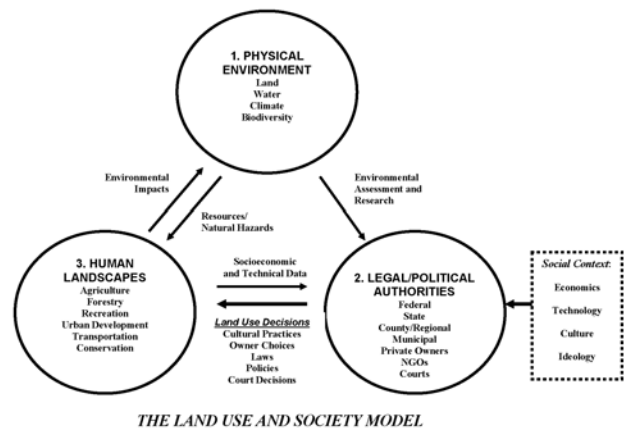
Like a modern chief executive, the king then appointed a Royal Commission, including Wren, to study the causes of the disaster and to draft a Parliamentary law to codify rules for rebuilding. The resulting Act for Rebuilding London, adopted on February 8, 1667, has been described as London's first "complete code of building regulations."⁵ The Act provided for permits and fines, a precedent for modern building codes. And its rules regarding the banishment of smoky or noxious activities to specified locations anticipated modern zoning laws. Its most indelible legacy was the mandating of stone or brick in place of wood for building façades, which probably helped London's West End avoid a firestorm in the Nazi Blitz, such as later occurred in Dresden and Tokyo.

II. A Model of Land Use and Society

While the 1667 Act for Rebuilding London was an important forerunner of modern building and land use laws, it was equally significant in a different sense. It was an exemplar of enlightened social response to limit private freedom to a degree necessary to prevent a reoccurrence of the disaster, or in other words to forestall repetitive "tragedies of the commons." It reflected the ability of the institutions of governance to learn from bitter experience, and to revise the balance of public and private rights, duties, and powers accordingly.

My book *Land Use and Society: Geography, Law, and Public Policy*⁶ uses a simple model to depict this social learning process as reprinted in Figure 1. The model depicts three sets of spatial or "geographic" data that interact over time to determine how humans manage or abuse land, water, and the rest of the biosphere. Circle 1 represents the "physical environment" including geology, soils, hydrology, ecology, and climate. Circle 2 represents the spatial distribution of political and legal authority, including private ownership, governance at various scales, and the judiciary system for resolving disputes. Circle 3 represents spatial patterns of land and water use such as agriculture, mining, forestry, recreation, conservation, and urbanization, which geographers collectively refer to as the "human landscape."

Figure 1: Land Use and Society Model



It should be obvious that Circle 3 landscapes result from exploitation and modification of Circle 1 physical environments by Circle 2 decisionmakers. However, this is not a static linear process—practices and patterns of land and water use once started are not immutable or we would all be nomadic hunters and gatherers. Over time, Circle 2 decisionmakers undergo a "learning process" based significantly on new information about Circles 1 and 3, along with changes in technology, the economy, culture, ideology, and other exogeneous variables. The learning process, which involves complex interaction among private, public, and often judicial decisionmakers, yields changing practices, policies, and rules—here represented by the "land use decisions" arrow—that collectively determine the way Circle 1 physical resources are organized in Circle 3 human land and water uses.

III. The Land Use and Society Model Applied to the American West

Historically, the process described by the model has not always yielded what we might consider "optimal" or "socially desirable" changes in land usage. In the 19th century, western settlement of the United States was stimulated by explorers' fragmentary reports on the physical resources of the West and the availability of new technologies such as the steam engine, steel plow, and barbed wire. It was further encouraged by governmental policies such as vast land grants to states, railroads, homesteaders, and other economic interests. In order to encourage settlement of their huge land grants in dry regions, New York-based railroad corporations spread the scientific fiction that "rainfall follows the plow."⁷ In the process, timber was cut, prairies plowed or grazed, Indian populations driven out, buffalo slaughtered, and homesteaders imperiled by drought and blizzards on the Great Plains. Elsewhere, forests were clearcut, and streams

4. STEEN E. RASMUSSEN, *LONDON: THE UNIQUE CITY* 116-17 (MIT Press 1967).

5. BELL, *supra* note 1, at 251.

6. RUTHERFORD H. PLATT, *LAND USE AND SOCIETY: GEOGRAPHY, LAW, AND PUBLIC POLICY* fig. 2-8 (Island Press 2004) [hereinafter PLATT, *LAND USE AND SOCIETY*].

7. JONATHAN RABIN, *BAD LAND: AN AMERICAN ROMANCE* 31 (Vintage Books 1996).

dammed and clogged by mining spoils, all based on erroneous understanding of the physical environments of the West.

But even as the “Big Raid” on the nation’s western resources, in Stewart Udall’s phrase,⁸ was in full swing, voices of caution reflecting new research and insights, began to be heard. George Perkins Marsh, the erudite Vermont lawyer and diplomat, published his landmark treatise, *Man and Nature or Physical Geography as Modified by Human Action*⁹ in 1864. Drawing on both New and Old World evidence, Marsh traced the impacts of human activities on the natural environment, usually to the detriment of both nature and human society. A century ahead of its time, it would eventually be hailed as the forerunner of “environmental impact analysis” (the arrow connecting Circle 1 to Circle 2 in the Land Use and Society Model).¹⁰ The George Perkins Marsh Institute at Clark University, established in the 1980s, attests to Marsh’s standing as a high priest of contemporary environmentalism.

Following Marsh came Major John Wesley Powell—the one-armed geologist, geographer, ethnologist, and exemplar of scientist in service to government. Powell became justly famous for his explorations of the Grand Canyon of the Colorado River in 1869 and 1871, followed by survey expeditions elsewhere in the arid West. His 1878 *Report on the Lands of the Arid Region of the United States*¹¹ challenged national policies that encouraged settlement in arid areas through small homestead grants.¹² Powell urged that settlement policies be based on geographic realities of the West, especially water scarcity, and not the preconceptions of the East Coast establishment. He urged that allocation of public land be based, not on political determinations in Washington, D.C., but rather on scientific appraisal of the physical resources of the area in question. As the second Di-

a certain extent, if regulation goes too far, it will be recognized as a taking.”¹⁶ From this phrase sprang the “takings” issue whereby certain regulations deemed by courts as going “too far” are held to be uncompensated takings in violation of the Fifth Amendment to the U.S. Constitution (“[n]or shall private property be taken for public use without just compensation”).¹⁷

Natural hazards, however, present a complex problem in terms of regulation and the takings issue. Hazards differ in terms of geographical incidence, speed of onset, and magnitude of impacts. Weather-related hazards like tornadoes, lightning, and winter storms tend to be capricious in impact. Other hazards are more geographically selective, e.g., landslides and debris flows (unstable steep slopes), wildfires (dry forests on mountainsides), and floods (primarily in coastal and riverine floodplains, except when they occur somewhere else like your basement). Earthquakes are most likely along faultlines between plates but their effects spread capriciously depending on many geophysical and cultural variables.

Public policies to mitigate risk from capricious hazards largely focus on limiting damage to structures and their occupants through state and industry building codes, and public education, e.g., take shelter from tornadoes or lightning; avoid driving in blizzards. Building codes may be tailored to the hazards relevant to the state or region in question, e.g., wind resistance standards in Florida, tornado refuge rooms in the Midwest, seismic stability on the West Coast, and wildfire precautions in the mountainous West. The adoption of such building code standards has been widely encouraged by the casualty insurance industry through its Institute for Business and Home Safety policy think tank. Although technical standards may be questioned on economic or scientific grounds by industry interests, property owners seldom litigate them. As land use lawyer Alexandra Dawson is fond of asking: “When has a building code requirement ever been challenged as a ‘taking’?”

Geographically specific hazards however are another story. And so is the issue of rebuilding a structure that is destroyed by a hurricane, northeaster, or fire in a location known to be chronically vulnerable to such threats. The obvious way to prevent repetitive losses on eroding shorelines, high risk floodplains, unstable slopes, or tinder-dry forests is to prohibit building or rebuilding in such locations. But land use regulations which thwart property owners from enjoying or cashing in on splendid views, beach access, or rustic isolation are likely to be challenged as takings of private property without compensation. The 1991 wildfires in the East Bay Hills of Oakland and Berkeley, which destroyed 3,600 homes in 24 hours, yielded several post-disaster assessments that led to the banning of wood shake roofs, improvements in water distribution systems, and the creation of a vegetation management district to curtail the buildup of fuel—but no significant limitation on rebuilding in the hills.¹⁸

Proposals to use land use planning and regulation to reduce vulnerability to floods are long-standing. As early as 1934, a New Deal panel of water experts called attention to the need for land use planning in flood hazard areas: “To minimize the menace of waters and to promote their greatest usefulness are objectives worthy of the application of the highest intelligence and other energies of the Nation. The problem is an engineering problem; not merely physical engineering but of cultural engineering—of planning a future civilization.”¹⁹

But “cultural engineering” (read “land use regulation”) would remain largely an academic notion for decades while the dominant response to floods until the 1960s remained “physical engineering”—dams, reservoirs, diversions, floodwalls, and coastal protection projects. Such projects were believed to be invincible, obviating the need to worry about limiting development behind them. Indeed, many such projects were justified by cost-benefit analysis in terms of their potential to protect future growth in floodplains not yet developed. As of 1956, two USGS hydrologists wrote that “[f]lood zoning, like almost all that is virtuous, has great verbal support, but almost nothing has been done about it.”²⁰

However, the Land Use and Society Model was beginning to churn. In the 1950s, geographer Gilbert F. White and his associates at the University of Chicago began to publish research findings that structural protection actually *increases* average annual flood losses nationally by creating a false sense of security. When a flood exceeds the design level of a flood control project, or exploits weaknesses in it (as with Hurricane Katrina at New Orleans in 2005), much greater damage results than if the floodplain had continued to be considered potentially floodprone.²¹ In 1959, law professor Allison Dunham, a colleague and neighbor of White’s, published a law review article, *Flood Control Via the Police Power*.²² Although the article could cite few case decisions on the topic, Dunham argued that floodplain regulation should be constitutional on the basis of: (1) protecting unwary investors; (2) protecting nearby property from increased flood levels (on smaller urban streams at least); and (3) protecting the public from the costs of emergency response and disaster relief.

In 1972, the Dunham rationale was cited by the Massachusetts Supreme Judicial Court in its landmark decision approving floodplain regulation: *Turnpike Realty Co. v. Town of Dedham*.²³ This case in turn influenced a series of state and lower federal court decisions supportive of floodplain (and wetland) regulation during the 1970s and 1980s.²⁴ In 1989, for example, the California Supreme Court firmly upheld a floodplain zoning ordinance on remand from a skeptical U.S. Supreme Court: “The zoning

states: “[N]or shall private property be taken for public use without just compensation.”

16. *Id.* at 415.

17. ROBERT MELTZ ET AL., *THE TAKINGS ISSUE: CONSTITUTIONAL LIMITS ON LAND USE CONTROL AND ENVIRONMENTAL REGULATION* (Island Press 1999).

18. RUTHERFORD H. PLATT, *DISASTERS AND DEMOCRACY: THE POLITICS OF EXTREME NATURAL EVENTS* ch. 8 (Island Press 1999) [hereinafter PLATT, *DISASTERS AND DEMOCRACY*]. The “taking” is derived from the Fifth Amendment to the U.S. Constitution which

19. National Resources Board, Final Report 260 (Washington, D.C.: Gov’t Printing Office, 1934). The statement has been attributed to University of Chicago geographer Harlan Barrows.

20. WILLIAM G. HOYT & WALTER B. LANGBEIN, *FLOODS* 95 (Princeton Univ. Press 1955).

21. Rutherford H. Platt, *Floods and Man*, in 2 *GEOGRAPHY, RESOURCES, AND ENVIRONMENT* 47-51 (University of Chicago Press 1986).

22. Allison Dunham, *Flood Control Via the Police Power*, 107 *UNIV. PA. L. REV.* 1098-1131 (1959).

23. 284 N.E.2d 891 (Mass. 1972).

24. PLATT, *DISASTERS AND DEMOCRACY*, *supra* note 18, at 136-41.

regulation . . . involves the highest of public interests—the prevention of death and injury. Its enactment was prompted by the loss of life in an earlier flood. And its avowed purpose is to prevent the loss of lives in future floods.”²⁵

Thus, as per the Land Use and Society Model, research results by White’s group, translated into legal terms by Dunham, inspired general judicial support for the constitutionality of floodplain zoning under the police power. Widespread adoption of floodplain zoning ensued, with the additional stimulus of the National Flood Insurance Program (NFIP) established in 1968 in response to growing flood losses during the 1960s.

But in 1992, the U.S. Supreme Court weighed in with its decision in *Lucas v. South Carolina Coastal Council*,²⁶ a triumph of ideology over geographic reality. The plaintiff landowner and developer was denied a state permit to build on two lots on the eroding Isle of Palms oceanfront. The defendant was guided by the 1988 South Carolina Beachfront Management Act that prohibited new building seaward of an erosion setback baseline. Due to recent fluctuations of the Isle of Palms shoreline, the baseline ran entirely behind Lucas’ lots. Several large homes built on adjoining lots before the law went into effect had already required state assistance to combat encroaching erosion. Lucas did not challenge the validity of the Beachfront Management Act per se, but claimed that its application to his lots destroyed all of their value and comprised a taking.²⁷ The trial court agreed and ordered the state to pay Lucas \$1.2 million. The South Carolina Supreme Court in a 3-2 vote reversed the trial court, holding the permit denial to be a valid application of the police power.²⁸ The High Court agreed to review the state decision and the case attracted numerous amicus briefs by interested parties on both sides of the issue. According to an editorial in the *Boston Globe*:

The case has far-reaching implications for the enforcement of regulations concerning everything from billboards to wetlands, as well as the coastline. Environmentalists fear that if the court decides in Lucas’s favor, virtually every environmental restriction placed on the use of property will be considered a taking, thus making environmental protection too expensive.²⁹

The Court reversed the state ruling in a 6-3 decision, holding that where a regulation “denies all economically beneficial or productive use of land,” it is a “categorical taking” equivalent to a physical invasion of the property by governmental action.³⁰ The majority opinion by Justice Antonin Scalia disregarded the erosion issue and viewed the law as merely promoting “ecological” goals (as though ecology is not worthy of judicial protection!).³¹ In passionate dissent, Justice Blackmun wrote:

Today the Court launches a missile to kill a mouse. . . . The State has full power to prohibit an owner’s use of property if it is harmful to the public. Since no individual has a right to use his property so as to create a nuisance or otherwise harm others, the State has not “taken” anything of value when it asserts its power to enjoin the nuisance-like activity. . . . It would make no sense under this theory to suggest that an owner has a constitutionally protected right to harm others, if only he makes the proper showing of economic loss.³²

The political impact of *Lucas* far outweighed its legal significance. Pro- and anti-regulation factions vied with each other to interpret the decision favorably to their positions. For example, one property rights advocate paraphrased the decision as follows: “[T]he U. S. Supreme Court said [in *Lucas*] that it will require close scrutiny of land use regulations that devalue private property.”³³ An environmental writer, on the other hand, viewed *Lucas* as “[a] decision full of sound and fury signifying nothing.”³⁴

As of September 2005, *Lucas* has not spawned a plethora of federal and states decisions overturning land use measures or narrowing further the scope of the public power to regulate land use. This of course does not mean that *Lucas* has been toothless. Much harder to document than reported decisions is the extent to which *Lucas* has influenced public authorities to “pull their punches” and back off from strict regulation in order to avoid the threat of being sued. Furthermore, the conventional wisdom has suggested that as long as property owners are left with some “reasonable use,” though not as intense or profitable as they may wish, the “total taking” prohibition of *Lucas* may be avoided. Potential ways to avoid this pitfall include transfer of development rights as employed to protect historical landmarks and agricultural land in some jurisdictions.

In terms of the Land Use and Society Model, *Lucas* demonstrated that Circle 2—the legal/political arena—is in constant ferment as courts and legislatures seek to adjust to conflicting inputs and cues. As with global warming and other environmental contexts in recent years, economic and political inputs may outweigh the influence of scientists, causing setbacks in the process of constructive revision of society’s laws and policies to cope with threats such as natural hazards.

V. Calibrating Federal Disaster Policies

Even as the United States has struggled to develop a judicially acceptable rationale for limiting private and public investment in hazardous locations, this objective has been undermined by well-intended but often counter-productive federal policies and programs to help victims of disasters. The principal forms of federal response to disasters have included:

25. *First English Evangelical Lutheran Church of Glendale v. County of Los Angeles*, 258 Cal. Rptr. 893, 930 (Cal. Ct. App. 1989).

26. 112 S. Ct. 2886, 22 ELR 21104 (1992).

27. PLATT, LAND USE AND SOCIETY, *supra* note 6, at 301.

28. *Lucas v. South Carolina Coastal Council*, 404 S.E.2d 895, 21 ELR 20837 (S.C. 1991).

29. Editorial, *Private Rights, Public Benefit*, BOSTON GLOBE, Mar. 5, 1992, at A16.

30. *Lucas*, 112 S. Ct. at 2893.

31. In an awkward distinction, Justice Scalia held that compensation would not be required for total takings where a regulation merely reflected a state’s “background principles of nuisance and property law” *id.* at 2901. The case was remanded for consideration of that

question, and the state court abandoned its earlier position and agreed that compensation was required for a “temporary taking” while the ban was in effect. *Lucas v. South Carolina Coastal Council*, 424 S.E.2d 484, 23 ELR 20297 (S.C. 1992).

32. *Lucas*, 112 S. Ct. at 2912.

33. Gerard Stoddard, *Coastal Policy Implications of Right to Rebuild Questions*, 63 SHORE & BEACH 30 (1995).

34. Glenn P. Sugameli, *Taking Issues in Light of Lucas v. South Carolina Coastal Council: A Decision Full of Sound and Fury Signifying Nothing*, 12 VA. ENVTL. L.J. 439-504 (1993).

1. Structural protection;
2. Warning and emergency response;
3. Mapping and technical assistance;
4. Financial disaster assistance (grants, loans, tax relief, other);
5. Government-backed insurance programs;
6. Public education and counseling; and
7. Hazard mitigation.

Among these, I will focus on the most pervasive and prone to mischief: disaster assistance and the NFIP.

The nation's first general disaster assistance law, the Disaster Relief Act of 1950 (Pub. L. No. 81-875), was adopted three months after the outbreak of the Korean War as the foul winds of McCarthyism were beginning to waft through the nation's capital. Its initial authorization was \$5 million—paltry even then. But despite the conservative climate of the time, it harked back to New Deal social legislation as a logical extension of social security, housing, education, war veterans' medical care, and other social benefit programs. Initially, its benefits were limited to local *public* costs; later this would be expanded to include *private* firms and individuals as well. It was the modest forerunner of a long series of acts that would cumulatively commit the United States to providing tens of billions of dollars in assistance to individuals and communities stricken by natural and other disasters.³⁵

For over two decades, the disaster assistance program was housed within a series of civil defense agencies where it languished in relative obscurity in the midst of preparations for nuclear war. In 1974, it was transferred to the newly created Federal Disaster Assistance Administration of the U.S. Department of Housing and Urban Development. From there, in 1979, it was transferred to the new Federal Emergency Management Agency (FEMA). Under President William J. Clinton and his Administration, FEMA shed its Cold War baggage and evolved into a genuinely domestic program with a strong emphasis on natural hazard mitigation. In 2002, FEMA itself was absorbed into the new Department of Homeland Security with so far uncertain implications for its natural disaster mission.

As originally established by the U.S. Congress, the federal disaster assistance program was to be: (1) limited as to the *scope of federal assistance* to be supplied; (2) limited as to *amounts of federal funding* to be allocated to disaster relief; and (3) contingent upon a presidential disaster declaration finding that federal assistance is required to *supplement state and local capabilities*. In my book *Disasters and Democracy*, all three of these qualifications are argued as having been largely disregarded for both practical and political reasons.³⁶

The issuance of presidential disaster declarations—the prerequisite to release of federal funds to stricken areas—has been interpreted loosely by both Republican and Democratic administrations.³⁷ Despite repeated calls for more precise cri-

teria for declarations, the process has remained ambiguous in terms of: (1) the definition of a “major disaster”; (2) the threshold level of damage to trigger a declaration; (3) the geographic scope of declaration in terms of states and counties eligible for federal assistance; (4) the kinds of costs eligible for federal assistance; (5) the level of federal cost-share; and (6) what *quid pro quo* is required of recipient units of government and individuals.

In particular, the principle that federal assistance should *supplement* state and local resources has been largely ignored. To the contrary, the expectation of generous federal assistance has tended to diminish state and local interest in preparing for or mitigating the effects of natural disasters. And in the absence of clear *quid pro quos* (strings attached), local communities and private investors have been *encouraged* rather than *discouraged* from building or rebuilding in unsafe locations. As reported by a U.S. House of Representatives' Bipartisan Natural Disasters Task Force in 1994: “Federal disaster assistance can discourage individuals, communities, and state governments from taking action to prepare for, respond to, and recover from disasters.”³⁸

And by its U.S. Senate counterpart in 1995:

The federal role has increased since the mid-20th Century to the point that the federal government stimulates and guides states' and localities' planning efforts, provides much if not most of the response and recovery funding, coordinates all response efforts . . . and funds mitigation efforts. . . . But the *federal government has little authority over* critical components of loss control and emergency management such as . . . *land-use decisions and building codes*.³⁹

FEMA established a Mitigation Directorate early in the Clinton Administration and launched Project Impact, a program of small mitigation grants and technical assistance to communities, businesses, and households. This effort was reinforced by the parallel Showcase Communities program of the Institute of Building and Home Safety, an insurance industry-funded research and education organization. The federal hazard mitigation strategy, however, generally avoided the “third rail” issue of land use regulation, and Project Impact itself vanished under President George W. Bush and his Administration.

The NFIP,⁴⁰ a response to geographical research cited earlier, sought to bundle the *carrot* of affordable flood insurance (not otherwise available from most private insurers) with the *stick* of floodplain management, including land use and building regulation. The NFIP operates as a partnership between the private insurance industry which markets and administers flood insurance policies and the federal government which maps flood-prone areas, sets criteria for local floodplain management within such areas, and provides reinsurance in the event of catastrophic floods.

Purchase of flood insurance is generally voluntary, but since 1973, persons borrowing money from federally related lenders to acquire or develop property in a mapped floodplain must purchase a flood insurance policy. And in

35. The current authority for federal disaster assistance is the Robert T. Stafford Disaster Relief and Emergency Assistance Act of 1998 (codified as amended at 42 U.S.C. §5121 et seq.).

36. PLATT, DISASTERS AND DEMOCRACY, *supra* note 18, at 15.

37. Research on presidential disaster declarations is reported in RICHARD T. SYLVES & WILLIAM L. WAUGH JR., DISASTER MANAGEMENT IN THE U.S. AND CANADA: THE POLITICS, POLICYMAKING, ADMINISTRATION, AND ANALYSIS OF EMERGENCY MANAGEMENT (Charles C. Thomas Publishers, Ltd. 1996).

38. HOUSE BIPARTISAN NATURAL DISASTERS TASK FORCE, REPORT 9 (1994).

39. U.S. SENATE BIPARTISAN TASK FORCE ON FUNDING DISASTER RELIEF, FEDERAL DISASTER ASSISTANCE DOC. NO. 104-4, at 15 (1995) (emphasis added).

40. National Flood Insurance Act, Pub. L. No. 90-448, tit. XIII (codified as amended at 42 U.S.C. §4001 et seq.).

order for such insurance to be available, the local community where the property is located must have satisfied the NFIP floodplain management requirements. The result has been a high level of nominal compliance: today some 20,000 communities participate in the program; some five million policies covering more than \$600 billion in flood-prone structures are in force.

But what has been the impact of the NFIP on flood losses? Geographer Gilbert F. White raised that question persistently after the program was established in 1968 until his death in 2006.⁴¹ Many journalist investigations have blamed the NFIP, along with the disaster assistance program, for exacerbating flood losses, particularly on coasts.⁴² I share that view, as documented in my research on recovery from disasters at Fire Island, New York⁴³; Folly Island, South Carolina⁴⁴; and the Outer Banks of North Carolina.⁴⁵ The NFIP requires elevation of structures above expected wave heights in a “100-year storm,” but in the absence of erosion setbacks (land use restrictions), such structures on eroding coasts are doomed. But the NFIP pays the insured owner nonetheless. So why not build and rebuild there if the government allows it and will cover your eventual losses? As of April, 2006, the explosive issue of mandatory elevation of structures damaged by Hurricanes Katrina and Rita in late 2005 looms over the recovery of New Orleans and Gulf of Mexico coastal communities.

VI. Ecological Cities—An Alternative Perspective

The social decisionmaking process described by the Land Use and Society Model may yield surprising new ways of responding to problems, i.e., “thinking outside the box.” Recent discourse amongst natural scientists, urban design practitioners, and policymakers is beginning to nurture perspectives on human communities as artifacts *within* the natural world, rather than divorced from it. Landscape architect Ian McHarg in his 1968 book urged developers to “design with nature.”⁴⁶ His colleague Ann Whiston Spirn in 1984 gave this principle an urban twist: “The city, suburbs, and the countryside must be viewed as a single, evolving system within nature, as must every individual park and building within that larger whole. . . . *Nature in the city must be cultivated, like a garden, rather than ignored or subdued.*”⁴⁷

41. Rutherford H. Platt, *Comments on the National Flood Insurance Program (NFIP) Evaluation Final Report*, NAT. HAZARDS OBSERVER, Nov. 2007, at 11, 11-12.

42. “Extending insurance in the face of irresponsible placement of property, building infrastructure that storms are bound to wash away, and encouraging any policy that continues a cycle of predictable damage and guaranteed repair—all that sounds like the recipe for chronic disaster.” Editorial, *Money Washed Away*, NEWS & OBSERVER (Raleigh), Sept. 3, 1998, at 14A (written after Hurricane Bonnie).

43. PLATT, DISASTERS AND DEMOCRACY, *supra* note 18, ch. 6.

44. Rutherford H. Platt et al., *The Folly at Folly Beach and Other Failings of U.S. Coastal Erosion Policy*, 33 ENVIRONMENT 6-9, 25-32 (1991).

45. Rutherford H. Platt, *Recovery of the North Carolina Coast After Hurricane Fran: Did Regulations Matter?*, 30 COASTAL MGMT. 249 (2002).

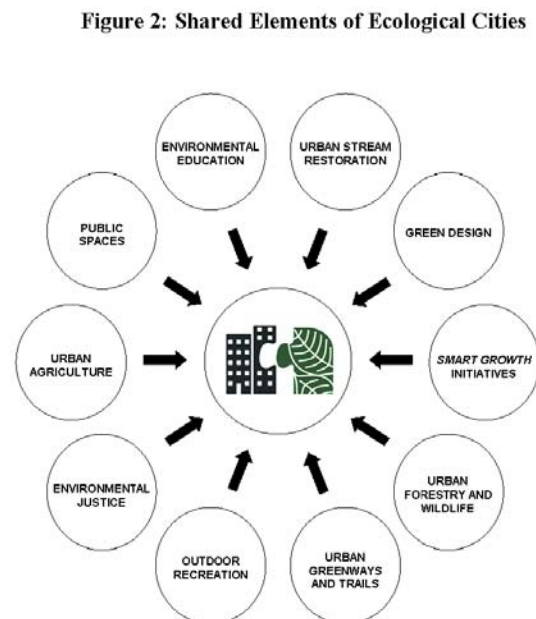
46. IAN L. MCHARG, DESIGN WITH NATURE (Natural History Press 1969).

47. ANNE W. SPIRN, THE GRANITE GARDEN: URBAN NATURE AND HUMAN DESIGN 10 (Basic Books 1985) (emphasis added).

While ecologists have long dismissed urban places as hopeless wastelands, a new interest in “urban ecology” is now beginning to emerge.⁴⁸ This perspective recognizes “ecological services” as the free bounty of natural systems and processes in such forms as air and water purification, decomposition of wastes, moderation of microclimate, and reduction of flood hazards.⁴⁹ Impairment or loss of such ecological services due to urban development often requires their replacement through costly technological substitutes, e.g., water treatment, air conditioning, and flood control.

In contrast to large-scale engineering fixes, “ecological adjustments” are often localized, inexpensive, and serve multiple objectives. According to planner Timothy Beatley, “green urbanism” in European cities includes such elements as green roofs, community gardens, car-free neighborhoods, pavement removal, passive solar heating, and co-housing.⁵⁰ Many of these are beginning to appear in American cities at various scales and involving a broad range of goals and means. These diverse initiatives all share an implicit common vision of a more sustainable, ecological city. Figure 2 below illustrates the concept of shared elements of ecological cities. The idea behind the diagram is the shared vision of the people and programs in each satellite circle.

Figure 2: Shared Elements of Ecological Cities



48. Charles P. Lord et al., *Natural Cities: Urban Ecology and the Restoration of Urban Ecosystems*, 21 VA. ENVTL. L.J. 317-50 (2003).

49. GRETCHEN C. DAILY, NATURE'S SERVICES: SOCIETAL DEPENDENCE ON NATURAL ECOSYSTEMS (Island Press 1997).

50. TIMOTHY BEATLEY, GREEN URBANISM: LEARNING FROM EUROPEAN CITIES (Island Press 2000).

Restoration of urban streams and watersheds—a prominent subset of these activities—was the subject of a three-year research project by The Ecological Cities Project under a grant from the National Science Foundation. This study documented and compared regional experience in pursuing environmental, social, and economic goals in local watersheds. Typically, metropolitan streams flow from their headwaters in rural areas or suburbs, through lower income urban districts, past (and sometimes under) central business districts, before discharging into tidewater, lakes, or larger streams. Along the way, they cross numerous political boundaries, posing formidable challenges for multi-jurisdictional cooperation.⁵¹

A watershed perspective may be easier to develop when one or more specific problems loom large to many of the stakeholders, e.g., flooding, poor water quality, fish kills, shortage of drinking water, or lack of public access. Once a watershed network is organized, it may begin to acquire funding, experience, and credibility. It then can serve as a steady “voice” for watershed issues not limited to the problem that initially brought it to life, and thus, it can play a key role in providing input to decisionmakers as per the Land Use and Society Model.⁵²

An ambitious program for the Buffalo Bayou in Houston evolved from a primary concern about flooding. Beginning in the 1980s, local activists successfully persuaded the Harris County Flood Control District to stop lining the natural streams with concrete channels, and instead use bioengineering to retain more natural stream and bank conditions. The Buffalo Bayou Partnership expanded on that success to undertake an ambitious 20-year master plan for the lower Buffalo Bayou including extensive greenway and downtown esplanade elements (available at www.buffalobayou.org). Much of those improvements are expected to be funded by the flood control district with money not spent on channelization.

Elsewhere, the Milwaukee Metropolitan Sanitary District is undertaking selective restoration of tributaries to the Milwaukee River to reduce flood hazards while gaining natural habitat and recreation opportunities. In Lincoln Creek, the district has actually removed concrete and restored natural stream flow and biotic conditions. It is also buying and removing chronically flood-prone structures from the floodplain.

Some watershed plans arise from concerns other than flooding. In Portland, Oregon, the Johnson Creek watershed program was initially driven by local interest in restoring the Pacific salmon fishery and generally cleaning up a long neglected local stream. The Johnson Creek Watershed Council is collaborating with the city, state, and university researchers in a comprehensive restoration program.

In Pittsburgh, poor water quality is the driving issue for many creeks and streams, resulting from old industrial brownfields, failing septic systems, storm sewer overflows, and acid mine drainage. Several stream improvement initiatives in the area have been envisioned by the 3 Rivers/2nd

Nature project at Carnegie Mellon University. One of these is a pilot project for the highly urbanized Nine Mile Run watershed involving brownfield redevelopment, stream daylighting of buried sections, and wetland restoration.

The Anacostia River watershed in suburban Maryland and the District of Columbia has been the focus of a series of planning initiatives dating back to a 1987 Anacostia Watershed Restoration Agreement between the District of Columbia, the state of Maryland, Montgomery County, and Prince George’s County. The National Park Service and the U.S. Army Corps of Engineers were added as parties and the overall planning process was assumed by the Washington Metropolitan Council of Governments. In 1991, six “restoration targets” were established: (1) reduce pollutant loads; (2) protect and restore ecological integrity in the watershed; (3) restore the natural range of resident and anadromous fish; (4) increase wetland acreage to promote natural filtering and habitat diversity; (5) protect and expand forest cover; and (6) increase public perception and involvement in watershed restoration activities. The watershed agreement was revised in 1999, calling for the development of specific restoration indicators. In 2004, the District of Columbia launched its own ambitious Anacostia Waterfront Initiative to reclaim and redevelop both sides of the river within the city.

VII. Conclusion

These examples of urban watershed restoration are but a few among hundreds of innovative activities and programs that collectively seek to make urban places greener, healthier, more equitable, less hazardous, and more humane.⁵³ In terms of the Land Use and Society Model, these are fruits of diverse new voices challenging limited objectives, conventional solutions, and defeatism in the management of the urban environment. These new voices include a new generation of urban design professionals trained to address a broad spectrum of interrelated problems, techniques, and opportunities.

In place of “stove pipe programs” seeking single objectives in isolation from each other, contemporary urban planning must address the full palette of urban needs including water supply, natural hazard mitigation, housing, jobs, and biodiversity. Similarly, a broad range of means must be applied selectively and skillfully. In the arena of natural hazard mitigation, the older approaches of engineering fixes and land use regulation must be blended with ecological restoration, water quality improvement, and sustainable waterfront redevelopment. With limited resources and broadening understanding of the interaction of the natural world and the human landscape, our programs must be multifaceted and interdisciplinary. Like Isaiah’s prophecy that the “wolf shall dwell with the lamb and the leopard shall lie down with the kid . . .,” we are seeing engineers, ecologists, lawyers, architects, and geographers all beginning to talk to each other about common goals. The familiar adage of ecology still applies: “Everything is connected to everything else.”

51. Rutherford H. Platt, *Toward Ecological Cities: Adapting to the 21st Century Metropolis*, ENVIRONMENT, June 2004, at 10-27.

52. Rutherford H. Platt, *Urban Watershed Management: Sustainability, One Stream at a Time*, ENVIRONMENT, May 2006, at 26.

53. RUTHERFORD H. PLATT, *THE HUMANE METROPOLIS: PEOPLE AND NATURE IN THE TWENTY-FIRST CENTURY CITY* (2006).