

1-1-2000

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### Recommended Citation

Dan Tarlock, *Putting Rivers Back in the Landscape: The Revival of Watershed Management in the United States*, 6 *Hastings West Northwest J. of Env'tl. L. & Pol'y* 167 (2000)

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## Putting Rivers Back in the Landscape:

The Revival of Watershed  
Management in the  
United States

By A. Dan Tarlock<sup>♣</sup>

### I. Introduction: Rivers and Watersheds as Commodities

At the dawn of the progressive conservation era, river basin planning and watershed management were to be the centerpieces of water resources planning.<sup>1</sup> For most of this century, however, natural resources policies and laws have promoted watershed degradation. Today, the resource values<sup>2</sup> of watershed ecosystems are being rediscovered. The current revival of interest in watershed management in the United States is driven by a variety of not entirely consistent factors. Watershed management is seen as an alternative to costly command and control water pollution regulation or, more broadly, as the logical progression from the early focus on individual discharges to a more “ecorealistic context”<sup>3</sup> which seeks to prevent pollution rather than to treat waste discharges and drinking water. The watershed is the preferred problem-solving method of the federal Environmental Protection Agency (“EPA”) as it tries to stop nonpoint sources of pollution from canceling out the gains from point controls.<sup>4</sup> More generally, watershed management reflects the recognition that we can only sustain biodiversity by managing entire ecosystems. For example, the preservation of the Florida Everglades requires that the

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1. See generally SAMUEL P. HAYS, *CONSERVATION AND THE GOSPEL OF EFFICIENCY: THE PROGRESSIVE CONSERVATION MOVEMENT, 1890-1920* (1959). This book is the standard in the United States history of river basin development ideology.

2. Economists now value natural resources by their total economic value, which includes traditional use, as well as passive non-use values such as ecological services. See NATIONAL RESEARCH COUNCIL, *VALUING GROUNDWATER: ECONOMIC CONCEPTS AND APPROACHES* 48-55 (1997).

3. See Samuel P. Hays, *The Future of Environmental Regulation*, 15 J.L. & COM. 549, 553 (1996).

4. See *Advanced Notice of Proposed Rulemaking on Water Quality Standards*, INSIDE EPA'S WATER POLICY REPORT, June 29, 1998.

entire watershed be managed to prevent their continuing degradation.<sup>5</sup>

The rediscovery of watershed values is nationwide, but it has special relevance in the Western United States. Many Western river basins are stressed from a variety of land and water use practices, especially nonpoint sources of pollution. Salmon are on the brink of extinction in the rivers along the Pacific coast. Their perilous condition has been brought about by a combination of damming, timber harvesting practices, agricultural run-off and diversions, as well as non-anthropocentric climate cycles. The Sacramento-San Joaquin Delta is stressed from upstream diversions that increase the risk of saltwater intrusion in dry years. Many smaller watersheds face a variety of stresses. For example, Salt Lake City is concerned that the 2002 Winter Olympics will put new stresses on its watershed which has provided high quality water since Brigham Young declared City Creek a protected drinking water source in 1851. A major winter storm could shut down the city's Mountain Dell reservoir due to salt run-off from I-80, and an increase in backcountry camping could increase the risk of contamination to the drinking water supply.<sup>6</sup>

Watershed management is politically attractive because it has the potential to promote consensus rather than conflict.<sup>7</sup> Many watersheds have experienced bitter and prolonged conflicts over the application of national standards to longstanding land and water use practices. The watershed can be a focus for local interests to resolve conflicts, consistent with federal standards, because diverse stakeholders possess a common interest in a specific resource that will allow them to transcend their differences. Many permanent and special river

basin management agencies and ad hoc watershed coalitions have sprung up in recent years and are potential partners for EPA and other federal agencies to craft specific solutions to "place-based" controversies. However, the institutions that have supported watershed degradation are difficult to reform, as well as slow to adapt to the effort to use the watershed as a "problem-shed" because they presume that nature must be improved for human benefit.

#### A. We Love Nature But We Love to Improve Her More

The basic cause of watershed degradation is human manipulation of river systems and the conversion of adjacent watershed land to urban, industrial and agricultural use. Degradation is a global environmental problem, and throughout the world, countries are trying to integrate land and water use planning and regulation in watersheds or catchment basins. This integration is extremely difficult because it cuts against the grain of history and the legal expectations that developed from this history. The story of modern civilization is largely one of accelerating watershed development. Until the last one hundred years, river behavior was a constraint on river and corridor development; thus, land and water management were integrated by inherent physical limitations.<sup>8</sup> Technology enabled us to remove the previous limitations on river and watershed development and produced the current nonintegrated watershed management characterized by: (1) the transformation of rivers from natural to artificial systems, and (2) unsustainable watershed development and land use practices.

5. See generally Thomas H. Ankersen & Richard Hamann, *Ecosystem Management and the Everglades: A Legal and Institutional Analysis*, 11 J. LAND USE & ENVTL. L. 473 (1996). For a further discussion of the Everglades protection efforts, see discussion *infra* Section V.B.

6. See *Watersheds/Utah—2002 Winter Olympics*, WESTERN STATES WATER (Weekly Newsletter of the W. States Water Council, Midvale, Utah), Dec. 31, 1998, at 1-2.

7. This assertion is more a hope than a reflection of experience. For a penetrating theoretical but skeptical review of consensus processes, see DOUGLAS S. KENNEY, ARGUING ABOUT CONSENSUS: EXAMINING THE CASE AGAINST WESTERN WATERSHED

INITIATIVES AND OTHER COLLABORATIVE GROUPS IN NATURAL RESOURCES MANAGEMENT (University of Colorado Natural Resources Law Center 2000).

8. For a good application of this thesis to the ancient Mediterranean world, see J. DONALD HUGHES, PAN'S TRAVAIL: ENVIRONMENTAL PROBLEMS OF THE ANCIENT GREEKS AND ROMANS 35-40 (1994). Hughes argues that religious beliefs combined with the limits of available science and technology were used to promote sustainable resource patterns. However, neither the Egyptians nor the Greeks and Romans were good watershed managers. Deforestation, overgrazing and erosion permanently changed the Mediterranean landscape to the bleak, if romantic, one that we know today. See *id.* at 73-90.

Scientists in the United States have long been aware of the costs of unplanned and unregulated watershed development, and they have advocated integrated watershed planning and management as the cornerstone of river basin development. However, for most of the twentieth century the ideal of integrated watershed management was subordinated to intensive, structural multiple-purpose river basin water project development in the name of scientific conservation.<sup>9</sup> We have conserved water, but not the landscapes and ecosystems that produced it. The result was massive watershed degradation because the land uses that result from the conversion of riparian land, especially flood plains, to more intensive uses were largely unregulated and unplanned. The consequences of this neglect of watersheds include difficult to control sources of water pollution, productive land inundated by large impoundments,<sup>10</sup> and destroyed or changed forest ecosystems.<sup>11</sup> For example, flood control dams and levees opened up flood plains to development, although, paradoxically, structural flood control measures increase the cost of floods when they occur by inducing extensive development in the flood plain.<sup>12</sup> Large-scale arid region irrigation schemes produce salty soils

and downstream saline and toxic pollution, as well as waterlogged land.<sup>13</sup> Intensive timber harvesting practices pollute rivers and contribute to the decline of historic fish runs.<sup>14</sup> These adverse impacts have been well documented by geographers<sup>15</sup> and others. Most societies, however, have been unable to prevent and mitigate these impacts and, in fact, often make them worse by continuing to subsidize inappropriate watershed activities.<sup>16</sup>

### **B. The Watershed Restoration Agenda: Difficulties in Moving From Theory to Practice**

Ambitious experiments are underway to restore many degraded river systems and to protect healthy watersheds from future degradation. This effort requires myriad site-specific and regulatory efforts ranging from education and the voluntary adoption of new land management practices to the reduction of withdrawals and the construction of new water conservation facilities. These varied efforts have three common themes. First, many traditional land and water management practices must be modified to restore the region's ecological health and protect the region from future degradation.<sup>17</sup> Second, these efforts require

9. See generally HAYS, *supra* note 1.

10. One of the most extensive and sad examples of impoundment occurred in the Upper Missouri river basin. Five main stem flood control reservoirs built in the 1940-50s took 550 square miles of the Native American tribal lands with "nominal" tribal benefits. See JOHN E. THORSON, *RIVER OF PROMISE, RIVER OF PERIL: THE POLITICS OF MANAGING THE MISSOURI RIVER* 80-83 (1994).

11. For example, dams and diversions on the Columbia River and timber harvesting practices on the tributaries have virtually destroyed valuable salmon runs. See, e.g., WILLIAM DETRICH, *NORTHWEST PASSAGE: THE GREAT COLUMBIA RIVER* (1995). Additionally, fish-timber harvesting conflicts are now pervasive on many watersheds. See, e.g., Swanson v. United States Forest Service, 87 F.3d 339 (9th Cir. 1996) (providing review of forest management plan's effect on listed salmon species).

12. See DANIEL B. BOTKIN, *OUR NATURAL HISTORY: THE LESSONS OF LEWIS AND CLARK* 21-38 (1995). There is vast technical literature on the irrationality of the use of dams as the primary flood reduction strategy. See, e.g., ELMER THEODORE, *BIG DAM FOOLISHNESS: THE PROBLEM OF MODERN FLOOD CONTROL AND WATER STORAGE* (1954); LUNA B. LEOPOLD, *THE FLOOD CONTROL CONTROVERSY: BIG DAMS, LITTLE DAMS, AND LAND MANAGEMENT* (1954); GILBERT WHITE, *FLOOD HAZARD IN THE UNITED STATES: A RESEARCH ASSESSMENT* (1975); HENRY BERESFORD-PEIRSE, *FORESTS, FOOD, AND PEOPLE* (1968); PETER BLACK, *CONSERVATION OF WATER AND RELATED LAND SOURCES* (1982); RAYMOND J. BURBY, *FLOOD PLAIN LAND USE MANAGEMENT: A NATIONAL ASSESSMENT* (1985); ROBERT N. STAVINS, *FORESTED WETLAND DEPLETION*

IN THE U.S.: AN ANALYSIS OF UNINTENDED CONSEQUENCES OF FEDERAL POLICY AND PROGRAMS (1988).

13. See, e.g., PHILIP L. FRADKIN, *A RIVER NO MORE: THE COLORADO RIVER AND THE WEST* (1981); PETER BEAUMONT, *ENVIRONMENTAL MANAGEMENT AND DEVELOPMENT IN DRYLANDS* (1989).

14. For example, the National Marine Fisheries Service listed the northern California coast Coho salmon as a threatened species under the Endangered Species Act, and identified the adverse impacts of timber harvesting practices on coastal stream systems as one of the factors contributing to the decline of the species. See *Endangered and Threatened Species*, 61 Fed. Reg. 56,138 (1996) (to be codified at 50 C.F.R. pt. 227).

15. See ANDREW GOUDIE, *THE HUMAN IMPACT ON THE NATURAL ENVIRONMENT* 177-234 (4th ed. 1993).

16. Since 1968, the federal government has provided subsidized flood insurance conditioned on the adoption of local flood plain land use regulations. See 42 U.S.C. §§ 4001-4028 (1994). A recent assessment notes that "[p]articipation in NFP river floodplains and flood-prone areas is high, . . . yet many experts believe that the results have been minimal." Robert W. Adler, *Addressing Barriers to Watershed Protection*, 25 ENVTL. L. 973, 1034-35 (1995).

17. See generally RECLAIMING THE NATIVE HOME OF HOPE: COMMUNITY, ECOLOGY AND THE AMERICAN WEST (Robert B. Keiter ed., 1998) (providing a collection of essays which redefine the western landscape to balance human use and ecosystem functions).

both new management practices and the application of technology. Third, although these efforts must be tailored to specific watersheds, they often must be integrated into emerging large river basin restoration and management regimes. In short, effective prevention, mitigation and remediation of negative environmental impacts requires no less than a reversal of our country's deeply entrenched urbanization, agricultural and silviculture production patterns. It also requires awareness that technological manipulation of natural systems, especially rivers and forests, is always beneficial.<sup>18</sup>

The idea that the benefits of improving nature always exceed the costs is difficult to reverse because it is so deeply embedded in the law and philosophy of watershed use. We have been conditioned to appreciate the value of altered and managed riverine landscapes.<sup>19</sup> Historically, the flow of large river systems and their adjacent corridors have been perceived as under-used natural resources that should be extensively developed or used for waste disposal. Thus, rivers have often been conceptually and functionally "detached" from their surrounding landscape. River corridors ceased to be considered resources that should be subject to special protection regimes.<sup>20</sup> In the United States, large river systems have been viewed as commodities<sup>21</sup> and this has contributed to the "detachment" of rivers from their surrounding ecosystems. Both science

and law have contributed to the "detachment" of rivers from their watersheds. Hydrology is the science of river manipulation<sup>22</sup> and geographers concerned with possible adverse effects of the relationship between river unmodified and river behavior were relegated to a marginal status. Law turned both land and water into commodities to facilitate intensive development.

This article examines the new focus on the resource values of "ecologically healthy" watersheds from two perspectives. First, it takes a historical perspective to demonstrate why it is difficult to achieve effective integrated land and water management. The "negative" thesis of this article is that the major obstacle to integrated watershed management is the persistence of entitlements to use land and water without regard to the adverse environmental watershed impacts. This article explains the theoretical underpinning of the laws that govern the use of river systems and their watersheds in the United States. Doing so provides the context to understand the problems that ongoing efforts to implement an ecosystem approach to river management face.

The second perspective examines the efforts to promote ecologically healthy watersheds. Watershed governance is a paradox because the idea is being promoted by those who want to substitute top-down command

18. Criticism of this assumption has been a persistent theme in environmental thinking. See generally THEODORE STERNBERG, *SLIDE MOUNTAIN OR THE FOLLY OF OWNING NATURE* (1995).

19. See I.G. SIMMONS, *ENVIRONMENTAL HISTORY: NEW PERSPECTIVES ON THE PAST* 29-41 (1993) (providing a brief survey of the principal forces behind the counter-environmental transformation).

20. The reintegration of water and land is supported by the current recharacterization of biodiversity conservation as the primary purpose of environmental regulation. This is a helpful paradigm shift, but biodiversity preservation remains primarily a land rather than water-based science. Biodiversity protection has centered almost exclusively on the creation of large, terrestrial biodiversity reserves rather than on the protection and restoration of river corridors, and thus ironically has reinforced the detachment of rivers from their surrounding landscapes. Biodiversity strategies must be rethought to focus on watersheds with rivers in the center (rather than as an edge) to enhance the protection of whole systems. Unlike the usual two-dimensional biodiversity protection strategy, this reconfigured watershed geometry is three-dimensional. Watersheds are not only long and narrow, but deep, and are measured from ridge top to river bot-

tom. A watershed biodiversity strategy would ensure protection of more species than would a land-based strategy. As John Haubert, a river specialist in the Department of Interior, observed, "one well-placed river with 50,000 acres might be more important than 500,000 acres of wilderness or national park on a glacier." TIM PALMER, *THE WILD AND SCENIC RIVERS OF AMERICA* 34 (1993) (quoting John Haubert).

21. The influence of western European law and economic theory on the perception of land and related resources as commodities, from the time of settlement, has been explored brilliantly by the environmental historian William Cronon. See, e.g., WILLIAM CRONON, *CHANGES IN THE LAND: INDIANS, COLONISTS, AND THE ECOLOGY OF NEW ENGLAND* (1983); WILLIAM CRONON, *NATURE'S METROPOLIS* (1991). The adverse consequences of the "commodification" of nature is, of course, the central theme of modern environmentalism. See Lester W. Milbrath, *The World is Relearning Its Story About How It Works*, in *ENVIRONMENTAL POLITICS IN THE INTERNATIONAL ARENA: MOVEMENTS, PARTIES, ORGANIZATIONS AND POLICY* 21, 41 (Sheldon Kamieniecki ed., 1993).

22. See COMMITTEE ON OPPORTUNITIES IN THE HYDROLOGIC SCIENCES, NATIONAL RESEARCH COUNCIL, *OPPORTUNITIES IN THE HYDROLOGIC SCIENCES* 38-43 (1991).

and control regulations for voluntary and collaborative problem solving to achieve national environmental objectives. However, neither the federal environmental programs nor the Constitution are well adapted to support these efforts, and substantial legal questions exist about the use of local programs either to define or to implement a federal standard. On a more positive note, the article concludes that a new vision of urban and rural landscapes and the relationship between human settlement and natural systems is required to address the adverse impacts of river and watershed development. At the present time, the future of the West's unique landscape is uncertain, however there are signs that a new balance between respect for the natural values and functions of land and water and human use is emerging.

## II. The Role of Water Law In Detaching Rivers From Their Corridors

### A. Competing River Visions

Water law has contributed to watershed degradation by making it easy to disrupt hydrologic and ecosystem functions by dewatering watersheds. We are now beginning to calculate the high social and environmental costs of maximum development, and this calculation is creating a counter-ethic to the historic one of maximum commodity development. In the United States, the costs are primarily environmental and, to a much lesser extent, social.<sup>23</sup> However, in the developing world the costs are equally environmental and social—foreign dam projects often have devastating impacts on local subsistence economies.<sup>24</sup> As a result of domestic and international environmental and human rights movements, supported by fifty years of economic criticism of the efficiency of public investment in water resources projects, the idea that regional multiple-purpose river projects will provide both fair and efficient eco-

nomc development has been challenged. Dam projects in developing countries have been opposed because they displace minority populations, inequitably distribute water, and often fail to deliver the promised economic benefits.<sup>25</sup>

Two river function visions, maximum development of the water resource and maintenance of the ecological integrity of large river systems, now compete for policy dominance.<sup>26</sup> Ecological integrity still remains subordinate to the older vision of maximum exploitation, however there have been a number of recent national and grassroots efforts to implement ecological sustainable watershed management practices. United States and international water allocation rules support maximum development that reinforces the detachment of land and water. Water law reflects the assumption that the manipulation of nature should be encouraged and thus does not incorporate the full social costs of altered flow patterns and watershed functions. Water law treats rivers as commodities separate and apart from land, which is itself a commodity. Water law has effectively created "quasi-exclusive" property rights to put the right to exploit and consume water on the same footing as the right to develop land. Water law directly supported the destruction of the ecological integrity of rivers and their flood plains by allowing unlimited human alteration of watersheds. This same story for land is told in the next section.

Throughout the world, the theory that water and river basins are simply under-developed commodities is being replaced with a focus on the maintenance of the ecological integrity of the watershed as the major planning and management objective. The goal of maximum physical development through multiple-use projects, which dominated water and land use thinking until the late 1960s, has been challenged and supplemented by the sustainable

23. One example of social disruption occurred in Hawaii. Native Hawaiians now criticize the commodification of watersheds during the period that the islands were a United States territory and the consequent destruction of the indigenous communal taro culture. See Elizabeth Ann Ho'oipo et al., *Cultures in Conflict in Hawai'i: The Law and Politics of Native Hawaiian Water Rights*, 18 U. HAW. L. REV. 71, 83-97 (1996).

24. See generally W.M. ADAMS, *WASTING THE RAIN: RIVERS, PEOPLE AND PLANNING IN AFRICA* (1992).

25. See generally BRUCE RICH, *MORTGAGING THE EARTH* (1994); E. GOLDSMITH & N. HILDYARD, *THE ENVIRONMENTAL AND SOCIAL EFFECTS OF LARGE DAMS* (1984).

26. See A. Dan Tarlock, *River Management in the Twenty-First Century: The Vision Thing*, 6 RIVERS: STUDIES IN THE SCIENCE, ENVIRONMENTAL POLICY, AND LAW OF INSTREAM FLOW 43 (1997).

ecosystem paradigm. This paradigm posits that river systems are dynamic, ever-changing ecosystems which serve a variety of purposes from the maintenance of consumptive uses to the maintenance of the river's historic natural functions for both anthropocentric and non-anthropocentric reasons.<sup>27</sup> The newer ecological integrity vision is less clearly articulated than the older vision because it rests on a complex and dynamic view of nature and humankind's role in the functioning of natural systems.<sup>28</sup> It is not a simple river preservation concept, but rather one that advocates integrating human use of a river system with the maintenance of its natural environmental sustainability.<sup>29</sup> Integrated watershed planning and management will not be effective unless we find ways to incorporate the costs of watershed degradation into private entitlements. This newer river basin vision seeks to provide a framework for integration of watershed planning and management by identifying a river's hydrograph and the natural functions sustained by the flow over time and by recognizing that property rights must be defined in relation to the watershed community as well as to the individual right holder. These functions include the maintenance both of natural systems, such as wetlands, and human economies. The flow cycle of the pre-Aswan Dam Nile is the classic example of the ecological-social vision,<sup>30</sup> as the

post-dam river is a prime example of the commodity vision. This new river basin vision has its roots in bioregionalism,<sup>31</sup> the long and ineffective history of watershed planning in the United States, and an interest in the implementation of environmental policy on both large and small scales.<sup>32</sup>

The emerging sustainable ecosystem paradigm is still too crude and imprecise to provide concrete guidance about the precise balance between development and environmental protection in a specific watershed. For example, the paradigm can support a range of approaches. These vary from the creation of narrow river corridor vegetation preservation bands to buffer the river from permitted development, to a more radical ecological ideal that the maintenance or restoration of the "natural" functions of river systems and their flood plains should control development patterns.<sup>33</sup> However, the sustainable ecosystem paradigm is a radical break with the past view that rivers and watersheds should be developed intensely. This paradigm also provides the basis for using rational hydrologic and land use background levels as the foundation for watershed management.<sup>34</sup>

27. See generally Anthony Scott & Georgia Coustalin, *The Evolution of Water Rights*, 35 NAT. RESOURCES J. 821 (1995). This article surveys the growing tension between the commodity and community-conservation visions and suggests that new trusts will emerge to hold water rights for instream as well as out of stream uses and that river corporations will be created to manage water for the full range of uses.

28. The leading exposition in the United States of this thesis is DANIEL BOTKIN, *DISCORDANT HARMONIES* (1991). For an exploration of the potential influence of the non-equilibrium paradigm on environmental law, see A. Dan Tarlock, *The Non-Equilibrium Paradigm in Ecology and the Partial Unraveling of Environmental Law*, 27 LOY. L.A. L. REV. 1121 (1994), and Fred P. Bosselman & A. Dan Tarlock, *The Influence of Ecological Science on American Law: An Introduction*, 69 CHI.-KENT L. REV. 847 (1994). For lawyers looking for a good introduction to modern ecology and its influence on environmental management, see Judy L. Meyer, *Changing Concepts of System Management*, in *SUSTAINING OUR WATER RESOURCES* 78 (Water Science and Technology Board ed. 1993), and Judy L. Meyer, *The Dance of Nature: New Concepts in Ecology*, 69 CHI.-KENT L. REV. 875 (1994).

29. See REPORT OF THE WESTERN WATER POLICY REVIEW ADVISORY COMMISSION, *WATER IN THE WEST: CHALLENGE FOR THE NEXT CENTURY* 3-

1 to 3-3 (1998).

30. Nile irrigation began to be modified in the nineteenth century and barrages and dams were constructed to regulate the River's flow, but historic patterns were relatively maintained until the construction of the High Aswan Dam. See generally H.E. HURST, *THE NILE* (1952).

31. Australia is a leader in this movement. See, e.g., J.M. POWELL, *THE EMERGENCE OF BIOREGIONALISM IN THE MURRAY-DARLING BASIN* (1993).

32. For a comprehensive survey of the factors that contribute to the current interest in watershed-based protection strategies, see Adler, *supra* note 16, at 1057-79.

33. Professor Ludwik A. Teclaff has been one leading advocates of the need to recognize the benefits of historic flood cycles as well as the benefits of flood control. See generally Ludwik A. Teclaff, *Treaty Practice Related to Transboundary Flooding*, 31 NAT. RESOURCES J. 109 (1991); LUDWIK A. TECLAFF, *THE RIVER BASIN IN HISTORY AND LAW* (1967).

34. See The Independent Scientific Group, *Return to the River: An Ecological Vision for the Recovery of Columbia River Salmon*, 28 ENVTL. L. 503 (1998) (explaining the sustainable ecosystem paradigm as applied to the Columbia River).

## B. Water Rights, Multiple Use and Integrated Watershed Management

Water law has historically contributed to nonintegrated watershed management by removing natural river behavior as a constraint on watershed development. The law has facilitated the regulation of rivers and transwatershed diversions. There are, however, some hopeful counter-trends. In recent years, the law has contributed to the maintenance of instream flows. Instream flow protection is an important component of integrated watershed management. A few American states are beginning to integrate water and land use to try to ensure that development does not outstrip available water supplies,<sup>35</sup> but the legacy of water management as physical conservation remains strong.

The movement to conserve water resources originated in scientific surveys of the American West<sup>36</sup> and the need to find a formula to sustain the settlement of the nation's arid and semi-arid areas.<sup>37</sup> Scientific conservation theory was driven by theories of production efficiency and assumed that the entire river system should be intensively developed and managed to maximize its economic potential through large-scale, multiple-use projects. Multiple-use became the organizing principle of both public and private water development and management. The major uses were irrigation, municipal and industrial, hydroelectric power generation and flood control.<sup>38</sup> Environmental values were largely absent from this calculation or, when present, were secondary. "Conservation" provided the scientific and political bases for the principle of maximum water development that flowed between the turn of the century and the mid-1960s.

Scientific conservation did not separate land from water; in fact, early proponents of conservation recognized the close relationship between land and water management and the importance of regulating land use in the watershed. The conservation movement, however, set in motion the process of separation by making water development paramount to watershed management. The United States has a long history of failed attempts to integrate water and land use because it has always opted for structural river development rather than integrated resource management.<sup>39</sup> The debate regarding water resources in the United States has, in fact, been dominated by the idea of comprehensive and coordinated federal river basin development to promote efficiency and social equity. At the height of the Conservation Era, President Theodore Roosevelt appointed the Inland Waterways Commission, which recommended a federal waterways commission to coordinate all river basin development. A fight between the older Corps of Engineers and new Bureau of Reclamation, however, led to the rejection of coordinated river management. Thus, after a ten-year fight, any hope of federal integrated watershed planning died in Congress.

Congress did create a regional development authority to promote social equity in the Tennessee Valley region. The Tennessee Valley Authority has become a global model of river basin development, but it has never been repeated on any other United States river. River basins are not natural political boundaries and the states and powerful constituencies refuse to cede political power to the federal government or an independent political body. Intensive federal water resources planning programs were put in place between the 1930 and 1970s, however their objective was

35. See A. Dan Tarlock & Sarah B. Van de Wetering, *Growth Management and Western Water Law: From Urban Oases to Archipelagos*, 5 HASTINGS WEST-NORTHWEST J. OF ENVTL. L. & POL'Y 182 (1998/1999).

36. See generally WILLIAM H. GOETZMANN, *EXPLORATION AND EMPIRE: THE EXPLORER AND THE SCIENTISTS IN THE WINNING OF THE AMERICAN WEST* (1966).

37. See, e.g., DONALD WORSTER, *RIVERS OF EMPIRE* (1985); MARC REISNER, *CADILLAC DESERT: THE AMERICAN WEST AND ITS DISAPPEARING WATER* (1986).

38. See Stephen McCaffrey, *The Evolution of the Law of International Watercourses*, 45 AUST L.J. PUB. INT'L L. 87 (1993).

39. The basic reason for structural development has been the ease with which the central government—either state or federal—could construct water resources projects combined with the impossibility of controlling the development of the basin because the river basin is not a political unit. See Norman Wengert, *The River Basin Concept as Seen From a Management Perspective*, in STRATEGIES FOR RIVER BASIN MANAGEMENT 287, 299 (Lunquist, et al., 1985).



primarily to facilitate the construction of large, multi-purpose reservoirs to subsidize regional development.<sup>40</sup> Non-consumptive uses and non-structural flood control measures remained secondary to engineering solutions that encouraged maximum use and development.<sup>41</sup>

During the New Deal, there were efforts to focus on the land use impacts of federal development,<sup>42</sup> however these efforts were unsuccessful, as was another effort in the 1960s. Between 1965 and 1980, seven river basin commissions with broad planning powers to coordinate federal and state water and related land use development were formed, but their promise was never realized. As the influential National Water Commission noted in 1973, “[w]ater planning sometimes appears to be an end in itself.”<sup>43</sup> Ultimately Congress ignored the experience by defunding the program. River planning in general has fallen into disrepute in part because the environmental movement took full advantage of the economic criticisms of subsidized regional water development virtually to shut down large-scale federal dam construction. Thus, the driving force behind national river basin planning had exhausted itself by the mid-1970s.

## C. Water Law: The Creation of the Right to Consume

### 1. *The Common Law of Riparian Rights*

The common law of water rights is a land-

based water allocation system that could serve as a watershed-based conservation regime,<sup>44</sup> but it has generally performed this function only by default. A riparian right is a usufructory right to use a portion of the flow of a watercourse that arises by virtue of ownership of land bordering a stream or lakes.<sup>45</sup> The common law of riparian rights limited use to riparians within a watershed and prohibited each riparian from diminishing the natural flow of the stream.<sup>46</sup> Under the pressure of industrialization and urbanization, the common law has been modified to allow water to be used consumptively and in some cases away from the river corridor and watershed when there is no substantial injury to other users.<sup>47</sup> For example, the merits of riparian rights were extensively debated in California in the late nineteenth and early twentieth century. Upstream users, especially electric utilities, were afraid that the doctrine would block access to water and contribute to the monopolization of the resource by downstream users.

Today, California and most other states have solved the problem by permitting the reasonable use of water.<sup>48</sup> The reasonable use doctrine replaced the natural flow doctrine and allows the appropriation of surplus water (water beyond that used by riparians) for storage and use outside the watershed.<sup>49</sup> All in all, the doctrine has not blocked access to consumptive uses by major users. Municipalities have exercised the power of eminent domain to condemn water rights outside of their territorial limits

40. See BEATRICE HORT HOLMES, U.S. DEP'T OF AGRIC., MISC. PUB. NO. 1233, A HISTORY OF FEDERAL WATER RESOURCES PROGRAMS, 1800-1960 (1972); BEATRICE HORT HOLMES, U.S. DEP'T OF AGRIC., MISC. PUB. NO. 1379, A HISTORY OF FEDERAL WATER RESOURCES PROGRAMS 1960-1970 (1979).

41. See INTERAGENCY FLOODPLAIN MANAGEMENT REVIEW COMMITTEE, SHARING THE CHALLENGE: FLOODPLAIN MANAGEMENT INTO THE 21ST CENTURY 142-143 (1994).

42. See generally NATIONAL RESOURCES COMMITTEE, REGIONAL FACTORS IN NATIONAL PLANNING (1935).

43. NATIONAL WATER COMMISSION, WATER POLICIES FOR THE FUTURE 366 (1973).

44. See Lynda Butler, *Allocating Consumptive Water Rights in a Riparian Jurisdiction: Defining the Relationship Between Public and Private Interests*, 47 U. PITT. L. REV. 95, 111-115 (1987).

45. See NATIONAL WATER COMMISSION, A SUMMARY-DIGEST OF STATE WATER LAWS 32 (Richard Dewsnap & Dallin Jensen eds., 1973).

46. See Butler, *supra* note 44, at 111.

47. See, e.g., Pyle v. Gilbert, 265 S.E.2d 584 (1980). However, the watershed rule continues to surface in new contexts. In 1994, Florida created a commission to review its water management law, which has liberal transbasin transfer rules. Water-rich counties convinced the commission to recommend to the legislature that local sources be favored. Before a trans-basin diversion could be authorized, a water management district would have to consider the proximity of the source to the proposed destination and the availability of alternative sources of water. Two commentators have characterized the recommendation as “a partial revival of the common law rule that prohibited the diversion of water to use on nonriparian lands.” Marcia Penman Parker & Sally Bond Man, *Water Management: Mission Impossible?*, 70 FLA. BAR J. 20, 28 (1996).

48. See CAL. CONST. art. X, § 2.

49. See Clifford Schultz & Gregory Weber, *Changing Judicial Attitudes Toward California Water Resources: From Vested Rights to Utilitarian Reallocations*, 19 PAC. L.J. 1031, 1041 (1988).

and to transfer water to areas of demand. In many states it is becoming easier to sever water rights from riparian land.<sup>50</sup> The common law had a per se rule against transwatershed diversions. At both the federal level and in most states, however, an environmental impact assessment process has been substituted for per se prohibitions against movement across watershed boundaries.

Groundwater allocation is another example of the use of water law to divorce land from water. In arid areas, groundwater law helps to deplete streams and the dependent riparian vegetation because the common law neither constrains use on overlying land nor prohibits transfers to centers of demand.<sup>51</sup> In addition, the common law treats groundwater as a separate source of water from streams, and thus pumpers may exercise their rights to dewater streams and their vegetation corridors without regard to the impact on riparian surface rights.<sup>52</sup> Groundwater was initially allocated by the ownership of overlying surface land, however this has created greater conservation and environmental problems because no comparable riparian sharing limitations were imposed upon use.<sup>53</sup> In some states, this rule has been modified to impose minimal sharing obligations.<sup>54</sup>

50. See Richard Harnsberger, *Eminent Domain and Water Law*, 48 NEB. L. REV. 325, 366-69 (1969). See generally Thomas Ziegler, *Acquisition and Protection of Water Supplies by Municipalities*, 57 MICH. L. REV. 349 (1959).

51. See COMMITTEE ON CHARACTERIZATION OF WETLANDS, NATIONAL RESEARCH COUNCIL, *WETLANDS: CHARACTERISTICS AND BOUNDARIES* 153-155 (1995).

52. There have been some efforts at integration. See A. DAN TARLOCK, *LAW OF WATER RIGHTS AND RESOURCES* § 4.11 (The Clark Broadman Environmental Law Series Vol. 1, 1988). However, in the majority of states, the two legal regimes often operate independently of each other.

53. See *id.*

54. Two rules developed to allocate the resource. Under the absolute ownership rule, an overlying landowner can use as much water as he can pump unless the purpose is malicious. Many courts modified the absolute ownership rule by adopting the reasonable use rule, but this is not an effective limitation on most uses. A pumper may still use as much as can be pumped, without regard to surface stream impacts, so long as the use is for a productive purpose and is confined to the overlying land. Neither of these rules prevents rapid exploitation or prior use. Modern law only provides small pumpers who have been dewatered a right of compensation. The Restatement of Torts provides large-scale pumpers may be liable for if "the withdrawal of groundwater unreasonably causes harm to a proprietor of neighboring land." RESTATEMENT (SECOND) OF TORTS § 858 (1979). See also

Public utility law has also promoted urban growth in watersheds. Water suppliers have assumed that they have a duty to meet any demand, although public utility law in fact gives suppliers more discretion to match service with supply.<sup>55</sup> Modern statutes are rapidly eroding the assumption that there is an absolute duty to serve. States are beginning to follow Arizona's lead in linking water supply planning and urban growth.<sup>56</sup> For example, a 1995 California law requires that environmental impact statements ("EIS") for large projects assess the capacity of the public water provider to meet the existing and future demands of the project.<sup>57</sup> This imposes important new planning responsibilities on local governments. A California case holds that an EIS for a large real estate development is deficient if it defers consideration of the adequacy of water supplies for the entire project.<sup>58</sup> In *Stanislaus*, a county authorized a resort in the foothills of the Sierra Nevada mountains that would be followed by residential units.<sup>59</sup> No long-term water supply was available for the residential component of the project, and the court held that the water supply issue could not be deferred until a subsequent EIS which assessed the residential phase of the project could be completed.<sup>60</sup>

*Cline v. American Aggregates Corp.*, 474 N.E.2d 324 (Ohio 1984). Prior appropriation often produces the same result because it is difficult to apply priority principles to groundwater, and thus priorities are seldom enforced. For example, most states have rejected a senior "right to lift" because it would freeze pressure levels and discourage subsequent use. See *Wayman v. Murray City Corp.* 458 P.2d 861 (1969). Juniors have a right to lower pressure to a "reasonable" level. States have taken some steps to correct the anti-conservation incentives of these rules. In some states, ground and surface rights are integrated, but the purpose of the law is mainly to protect senior surface users and not the ecological integrity of the watershed. Many arid states have conservation regimes which could be used to promoted integrated management, but historically they have not been so used.

55. See A. DAN TARLOCK, *LAW OF WATER RIGHTS AND RESOURCES* § 5.13[b] (1988).

56. See, e.g., IDAHO CODE § 42-211(1) (1996) (stating that the Department of Water Resources must determine planning horizon for municipal retention of water rights).

57. See CAL. WATER CODE § 10911(a).

58. See *Stanislaus Natural Heritage Project v. County of Stanislaus*, 48 Cal. App. 4th 182 (5th Dist. 1996).

59. See *id.*

60. See *id.* at 185. I have addressed these issues in more detail in, A. Dan Tarlock & Sarah Bates Van de Wetering, *Growth Management and Western Water Law: From Urban Oases to Archipelagos*, 5 HASTINGS WEST-NORTHWEST J. ENVTL. L. & POL'Y 182 (1999).

## 2. *The Law of Prior Appropriation*

Prior appropriation is the ultimate river and watershed engine of destruction because it allows the last possible amount of a stream to be diverted and depleted to satisfy prior rights. For example, in the last major Western drought, small trout streams in Montana were dewatered to satisfy prior rights.<sup>61</sup> Appropriative water rights are theoretically the opposite of riparian rights: there need be no relationship between the source of water and the locus of use.<sup>62</sup> Los Angeles, for example, enjoys water appropriated from the Colorado and Owens Rivers hundreds of miles from the city. Los Angeles effectively foreclosed growth in the Owens Valley watershed because of its diversions and has done substantial environmental damage that is now being redressed.<sup>63</sup> Prior appropriation is therefore a use-based rather than land-based system of property rights. The system was developed in the mining camps of California to allocate water for placer mining.<sup>64</sup> It spread throughout the West because it was thought to promote irrigation economies.

Appropriate rights are not tied to the locus of the use of the water. They apply to direct flow diversions and to the storage of water for subsequent release. Water can be used any place to which it can be transported within a state.<sup>65</sup> A water right is perfected by diverting water and applying it to a beneficial use. Rights are allocated by priority. In times of shortage, there is no pro rata curtailment. Junior rights must cut back so that senior right holders will obtain the full amount of their

rights. Holders of senior rights are entitled to take the full amount of their rights regardless of the comparative efficiencies of junior and senior uses. These rules were generously applied to cities. The growing communities doctrine, for example, allowed cities to appropriate water to meet the anticipated future capacity of its system.<sup>66</sup> In addition, most western states have also applied the doctrine of prior appropriation to groundwater, but the large pumping states of California, Nebraska and Texas have not.

Prior appropriation does have some riparian elements that support watershed protection.<sup>67</sup> For example, junior appropriators have vested rights to return flows,<sup>68</sup> and therefore stream systems enjoy de facto, but unsecure, minimum flow levels. A senior right holder may generally only transfer the amount of water actually consumed in order to protect downstream users. Some states have enacted area of origin protection statutes.<sup>69</sup> However, as the West turns to "water marketing," large scale permanent or temporary transfers, to reallocate water from agricultural to urban and environmental uses,<sup>70</sup> return flows are diminishing. Recent droughts in the western United States have exposed substantial fish population and riparian vegetation to extreme stresses from the prior appropriation doctrine. A number of states have tried to address this problem by recognizing various forms of instream flow rights to sustain fish populations in designated rivers. Initially, the law of prior appropriation did not recognize rights unless there was a diversion, but most western states now have

61. See Brian Morris, *When Rivers Run Dry Under a Big Sky: Balancing Agricultural and Recreational Claims to Scarce Water Resources in Montana and the American West*, 11 STAN. ENVTL. L.J. 259, 276 (1992).

62. See *California-Oregon Power Co. v. Beaver Portland Cement Co.*, 295 U.S. 142 (1935).

63. See generally Tarlock & Bates, *supra* note 60.

64. See *People v. Shirokow*, 26 Cal. 3d 301, 307-08 (1980).

65. Ironically, many states have imposed statutes that prohibit or restrict the export of water across state lines. Export prohibitions are unconstitutional discrimination against interstate commerce, but statutes that prefer in to out-of-state users may be constitutional. See *Sporhase v. Nebraska*, 458 U.S. 941 (1982).

66. However, the Washington Supreme Court has limited the reach of this doctrine. The Court held that the measure of the

water right is the actual application to beneficial use rather than the capacity of a private municipal water system. See *State Dep't of Ecology v. Theodoratus*, 957 P.2d 1241 (1998). The Court left open the issue of whether the holding applies to municipal water suppliers. See *id.* The growing communities doctrine was strongly endorsed in the dissenting opinion. See *id.* at 1257-58 (Sanders, J., dissenting).

67. See A. Dan Tarlock, *The West Returns to Riparianism*, 27 WATER RESOURCES RESEARCH 987 (1991).

68. See *McDonald v. Bear River and Auburn Water & Mining Co.*, 13 Cal. 220 (1859).

69. See generally Lawrence J. MacDonnell & Charles W. Howe, *Area-of-Origin Protection in Transbasin Water Diversions: An Evaluation of Alternative Approaches*, 57 U. COLO. L. REV. 527 (1986).

70. See NATIONAL RESOURCE COUNCIL, *WATER TRANSFERS IN THE WEST: EFFICIENCY, EQUITY AND THE ENVIRONMENT* (1992).

instream flow protection programs that permit states to reserve or appropriate water for this use.<sup>71</sup> The public trust doctrine can also promote integrated watershed management by requiring the preservation of minimum flows necessary to sustain local fish populations. In brief, the doctrine posits that states hold navigable waters in trust for an expanding compass of public uses that include watershed and environmental protection.<sup>72</sup> A landmark California decision held that vested appropriative rights are subject to the public trust.<sup>73</sup> As a result, the right holder, the City of Los Angeles, had to cutback on diversions from the tributaries to a lake on the eastern slope of the Sierra Nevada because lower lake levels threatened the stability of Mono Lake's fragile ecosystem.<sup>74</sup>

### 3. Native American and Federal Public Land Rights

Native American tribes have a special class of water rights that adhere to treaty and executive order reservations and these rights may be used to promote watershed conservation.<sup>75</sup> The distinguishing feature of all aboriginal peoples is that their identity is tied to a specific geographic location. Thus, these group rights are more strongly tied to the watershed of origin and could be the basis for the integration of water and land use on Indian reservations. Indian reservations are the remnants of the pre-European society that existed in North America before its discovery and conquest. These reservations sometimes are the true aboriginal homelands and, in other cases, they represent wastelands on which tribes were resettled in the nineteenth century. All reservations may claim implied federal reserved Indian water rights to support reservation uses because they are pre-existing or aboriginal

rights reserved by the treaty creating the reservation or they were granted by the federal government, as owner of all public lands including Indian reservations.<sup>76</sup>

The Supreme Court first recognized tribal water rights in the case of *Winters v. United States*.<sup>77</sup> The Supreme Court held that the tribe had superior rights to state appropriators because tribal rights date from the creation of the reservation. The Court reasoned that reservations were set aside to transform Indians into settled irrigators and that the rights were necessary to fulfill Congress' "civilizing" mission.<sup>78</sup> Tribal water rights have characteristics of both appropriative and riparian rights and are superior to most state created-rights. *Winters* rights are "quasi-riparian" because the right is based on land ownership, not, as in the case with appropriate rights, on the application of water to beneficial use. But, they are also appropriative because the right has a priority date; the usual priority date is the date of the creation of the reservation.<sup>79</sup> Since most reservations were created to clear the way for non-Indian settlement, this date is sufficient to give the tribe a right superior to most state-created rights. True aboriginal rights based on immemorial practices would, of course, be superior to any state-created right.

Until the 1960s, tribal rights were asserted by the federal government under its trust responsibility. As a result, *Winters* rights were generally only claimed to support existing or planned tribal irrigation needs, and were thus minimal since federal irrigation funding lagged far behind non-Indian subsidies. *Winters* rights are now asserted directly by the tribes and tribal-state tensions have risen. Tribes assert rights to large amounts of water long allocated by state law, to the use of water for irrigation

71. See generally NATURAL RESOURCES LAW CENTER, *INSTREAM FLOW PROTECTION IN THE WEST* (Lawrence J. MacDonnell & Terese A. Rice eds., 1993).

72. See *Marks v. Whitney*, 6 Cal. 3d 251, 259-60 (1971).

73. See *National Audubon Soc'y v. Superior Court of Alpine County*, 658 P.2d 709 (Cal. 1983), cert. denied, 464 U.S. 977 (1983). See also Gregory S. Weber, *Articulating the Public Trust: Text, Near-Text and Context*, 27 ARIZ. ST. L.J. 1155 (1995).

74. See *National Audubon Soc'y*, 658 P.2d at 712 (Cal. 1983).

75. See generally *Winters v. United States*, 207 U.S. 564 (1908).

76. The proposition, much despised among Native Americans today, that Indian tribes have no title against the federal government because the Indians only occupied, rather than possessed, the land was established in *Johnson v. M'Intosh*, 21 U.S. 543 (1823).

77. 207 U.S. 564 (1908).

78. See *id.* at 576.

79. See Judith V. Royster, *A Primer on Indian Water Rights: More Questions Than Answers*, 30 TULSA L.J. 61 (1994).

and non-irrigation purposes, and to the right to lease the water for non-reservation uses. In 1963, the Supreme Court held that the right entitled the tribes to all the water necessary to irrigate the "practicable irrigable acreage" on the reservation.<sup>80</sup> This standard requires that the land be (1) capable of irrigation, and (2) at a reasonable cost.<sup>81</sup> Practicable irrigable acreage gives many tribes large blocks of paper water rights.

Many tribes want to use water for non-consumptive, non-irrigation uses and these uses can be the foundation for reservation watershed protection and restoration strategies. Courts have also recognized *Winters* rights for instream flows and fisheries,<sup>82</sup> but the idea has not been universally accepted. The Wyoming Supreme Court held that *Winters* does not apply to either groundwater or to the use of water for fisheries maintenance.<sup>83</sup> *Winters* rights are also a source of off-reservation transfers and thus could frustrate watershed restoration or protection efforts. However, the legal power of tribes to transfer water remains disputed.<sup>84</sup> The power to lease to non-Indians is often asserted but has never been directly judicially sanctioned. The transfer to tribal land and probably water requires congressional consent under the Nonintercourse Act of 1790 and this may apply to leases as well as permanent title transfers.<sup>85</sup>

80. *Arizona v. California*, 373 U.S. 546 (1963).

81. See *In re General Adjudication of All Rights to Use Water in the Big Horn River System*, 753 P.2d 165 (Wyo. 1988), *aff'd sub. nom.* *Wyoming v. United States*, 492 U.S. 496 (1989). *Arizona* has rejected this narrow reading of *Winters*. See *In re General Adjudication of All Rights to the Use of Water in the Gila River System and Source*, 989 P.2d 739 (Ariz. 1999) (holding that federal reserved rights apply to groundwater beneath Indian reservations and other federal lands such as national parks, monuments, wildlife preserves and military bases). Indian tribes and federal land managers may claim reserved rights in unappropriated waters beneath the land. The non-subflow pumpers are subject only to the limitations of the reasonable use rule because the Court had previously held that the law of prior appropriation applies only to the waters of surface streams and their subflow. See *In re General Adjudication of All Rights to the Use of Water in the Gila River System and Source*, 857 P.2d 1236 (Ariz. 1993). However, the Court rejected the distinction as artificial and held that under federal law surface and groundwater are integral parts of the hydrologic cycle. See 989 P.2d at 748.

82. See, e.g., *United States v. Adair*, 723 F.2d 1394 (9th Cir. 1984), *cert. denied*, 467 U.S. 1252 (1983).

83. See *In re General Adjudication of All Rights to Use Water in the Big Horn River System*, 753 P.2d at 174.

Indian tribes may also protect their reservations against upstream pollution in the watershed. Section 505 of the Clean Water Act ("CWA") allows tribes to adopt more stringent water quality standards than those required by the federal EPA or the state in which the reservation is located.<sup>86</sup> Rio Grande River Pueblo, located below the city of Albuquerque, adopted a more stringent sewage discharge standard for arsenic than required by the state of New Mexico by classifying its portion of the river for ceremonial use.<sup>87</sup> Federal courts have held that tribes have the same power as states to adopt more stringent water quality standards and thus EPA has the authority under section 510 of the CWA to approve these standards.<sup>88</sup>

The federal government may also assert reserved rights to carry out the water-related purposes of public land withdrawn for a water-related use, but the Supreme Court has effectively refused to allow the doctrine to be used for watershed protection.<sup>89</sup> Federal land management agencies have tried to use these rights to protect riverine stream corridors in national forests and grazing lands, but the Supreme Court has basically rejected the use of federal rights for this purpose except for national parks and monuments;<sup>90</sup> thus, the doctrine plays a minimal role in watershed conservation. Most non-Indian reserved rights claims are based on

84. Western states have long argued that tribal reserved rights were recognized solely for the purpose of transforming nomadic into pastoral people and thus they cannot only be used for on-reservation irrigation. As Australia, Canada, New Zealand and the United States confront the special problems of defining rights to protect unassimilated aboriginal groups and give them a fighting chance of survival, the nature of aboriginal rights must be clearly confronted. Canada, for example, limits aboriginal rights to pre-European practices. See A. Dan Tarlock, *Can Cowboys Become Indians: Protecting Western Communities as Endangered Cultural Remnants*, 31 ARIZ. ST. L.J. 539, 578 (1999).

85. See Royster, *supra* note 79, at 82-83.

86. 33 U.S.C. § 1365.

87. See *City of Albuquerque v. Browner*, 865 F. Supp. 733 (D.N.M. 1993), *aff'd*, 97 F.3d 415 (10th Cir. 1996).

88. See *id.*; see also *Montana v. EPA*, 137 F.3d 1135 (9th Cir. 1998), *cert. denied*, 119 S. Ct. 275 (1998).

89. See *United States v. New Mexico*, 438 U.S. 696 (1978). The Idaho Supreme Court has held that the Wilderness Act is an implied reservation of all unappropriated waters in the wilderness watershed, but it is not certain the opinion will stand in the face of intense water user opposition. *In re SRBA*, No. 39576, slip op. (Idaho, Oct. 1, 1999), *reh'g granted*.

90. See *id.* at 707.

the implied rather than the express intent of Congress in withdrawing public land from entry. In a case denying reserved rights for national forests, the Court developed a high threshold test: (1) there must be strong evidence of implied intent, (2) the water must be for the primary not secondary purpose of the reservation, and (3) the right is limited to the minimum amount of water necessary to carry out the purpose of the withdrawal.<sup>91</sup>

#### 4. Regulatory Water Rights

Federal environmental mandates are a potential, but inconsistent, source of watershed protection because they allow the federal government to protect both the quantity and quality of the stream flows. The protection of biodiversity in river corridors requires the recognition of rights to some level of minimum flow. In addition to state laws that create instream flow rights, the federal government has the power to mandate conservation flows through the assertion of federal regulatory water rights. Regulatory water rights are de facto rather than de jure proprietary rights which arise because of federal and state regulatory programs. Regulatory property rights refer to federal programs which require flow releases to fulfill the regulatory mandate but which may be inconsistent with state water law. The three most important federal programs that can supersede state water law are sections 401 and 404 of the CWA<sup>92</sup> and the Endangered Species Act of 1973 ("ESA").<sup>93</sup> Prior to the 1970s, the federal government generally asserted only proprietary water rights.

Programs such as the Federal Power Act of 1920,<sup>94</sup> CWA and ESA, have the potential to require that large quantities of water be released from federal reservoirs or left in

streams to fulfill the federal program objectives. These decisions may preempt state water allocation law and thus often drive current watershed protection efforts. For example, ESA applies to both new and existing federal water projects and to federally licensed projects.<sup>95</sup> Section 401 of the CWA<sup>96</sup> is another source of new regulatory rights that gives the states increased power to protect their watersheds from the adverse water-quality related effects of federally licensed projects. The section requires state certification that a federal facility or licensed facility complies with state water quality standards.<sup>97</sup> A 1994 United States Supreme Court decision holds that a state may refuse to certify a hydroelectric facility because the proposed minimum flow schedules were inadequate to meet the state's anti-degradation standard.<sup>98</sup> The Court refused to confine state certification to chemical pollution, calling the distinction between water quantity and quality "artificial."<sup>99</sup>

The effect on vested state water rights remains unclear but sufficient uncertainty exists for states and private parties to seek alternatives, such as voluntary watershed restoration, to the regulatory programs. In 1982, ESA was reauthorized without carving out a special exception for western water rights,<sup>100</sup> and it has been interpreted to allow the federal government to deny the necessary federal permits to enjoy state water rights,<sup>101</sup> to require that the federal government dedicate previously dedicated reservoir blocks to the protection of endangered species,<sup>102</sup> and to enjoin state water rights holders from continuing diversions that harmed endangered species.<sup>103</sup> State regulatory water rights may exist as well as similar statutes or under assertions of the "public trust."<sup>104</sup>

91. See *id.* at 702.

92. 33 U.S.C. §§ 1341, 1344.

93. 16 U.S.C. § 1531.

94. 16 U.S.C. § 729.

95. 16 U.S.C. § 1535.

96. 33 U.S.C. § 1341.

97. 16 U.S.C. § 1344.

98. See PUD No. 1 of Jefferson County v. Washington Dep't of Ecology, 511 U.S. 700 (1994).

99. See *id.* at 706.

100. See Pub. L. 97-304 (1982).

101. See *Riverside Irrigation District v. Andrews*, 758 F.2d 508 (10th Cir. 1985).

102. See *Truckee Water Conservancy District v. Clark*, 741 F.2d 257 (9th Cir. 1984).

103. See *United States v. Glenn-Colusa Irrigation District*, 788 F. Supp. 1126 (E.D. Cal. 1992).

104. See *Weber*, *supra* note 73, at 1168.

Watershed protection has also been enhanced by the impact of pollution abatement programs. Most point source discharges have been substantially reduced, and we are now just beginning to see the secondary impacts on land use that cleaner water is producing. For example, the application of the CWA to New York's Hudson River has revived fisheries in it through the elimination of conventional and toxic pollution. PCB problems remain, although the risks that this level of PCB exposure presents are highly uncertain.<sup>105</sup> Communities along the river are reorienting themselves to the river, which had been dedicated to industrial use and transportation, and are now treating the river as an ecological system and valuable amenity.<sup>106</sup> The revival of the Hudson has also stimulated a greater sense of river-centered regionalism among the riparian communities.<sup>107</sup>

### 5. International Law

International law might serve as a model to integrate land and water use, but the concept has been strongly resisted by the international community. First, the law's historic function has been to set the ground rules for comprehensive river basin development and to promote treaties among riparian states for the allocation of large rivers.<sup>108</sup> In recent years, draft water law rules have added important environmental protection mandates, but it is very difficult to promote the protection of the ecological integrity of river systems because protection is not a conventional water use. Flood plain and wetland protection are largely excluded from these new rules which are focused on pollution prevention.

International water law is a channel-based, not watershed- or ecosystem-based, legal regime, and this focus is inherently biased toward development and against ecosystem protection. The United Nations Convention on the Law of Non-Navigational Uses of International Waters,<sup>109</sup> prepared by the International Law Commission of the United Nations and opened for signature in 1997, applies to international watercourses and not river systems. The term "watercourse" is narrowly defined in the Convention as "a system of surface and underground waters constituting by virtue of their physical relationship a unitary whole and flowing into a common terminus."<sup>110</sup> The definition is progressive because it includes connected groundwater. However, excluded from the rules are land in the watershed and probably confined aquifers, so the law does not promote environmental management. Ultimately, this is a step backward from previous definitions of international river systems. Land use practices, such as clear cutting timber, effectively remain outside of any international restraints. The exploiting nation's legal regime remains the controlling regulatory authority.<sup>111</sup> Domestic and international legal regimes maintain a persistent but artificial separation of rivers from the flood plains<sup>112</sup> and wetlands which influence them (and which they influence) to prevent water use rules—premised on the need to share a common resource—from becoming a basis for land use regulation.<sup>113</sup> Further, under some interpretations of equitable apportionment, traditional practices such as the use of flood waters may

105. See John H. Cushman, Jr., *Study Finds Little Risks From PCBs*, N.Y. TIMES, Mar. 10, 1999, at A12 (reporting that workers exposed to PCBs did not have significantly higher incidence of cancer compared to non-exposed groups).

106. See *id.*

107. See *id.*

108. See A. Dan Tarlock, *International Water Law and the Protection of River System Ecosystem Integrity*, 10 BYU J. PUB. L. 181 (1996).

109. See 36 I.L.M. 700 (1997).

110. *Id.* at 704.

111. This statement could be contested in light of the nascent international legal regime to conserve biological diversity. See PHILIPPE SANDS, *PRINCIPLES OF INTERNATIONAL ENVIRONMENTAL LAW*, Ch. 10 (1995).

112. Human actions that dampen or eliminate natural disturbances are likely to be a threat to biodiversity in many kinds of environments. For example, many riparian plant species such as cottonwoods become established after floods, which create new deposits of bare silt and gravel where seedlings can establish. Eliminating periodic flooding by building dams may prevent regeneration of many species and drastically alter riparian plant communities. See REED E. NOSS & ALLEN Y. COOPERIDER, *SAVING NATURES LEGACY: PROTECTING AND RESTORING BIODIVERSITY* 95 (1994). See generally Thayer Schudder, *The Need and Justification for Maintaining Transboundary Flood Regimes: The Africa Case*, 31 NAT. RESOURCES J. 75 (1991).

113. See Ludwick A. Teclaff, *Treaty Practices Relating to Transboundary Flooding*, 31 NAT. RESOURCES J. 109 (1991) (surveying the extremely limited international legal recognition of the values of flood cycles).

be inefficient and impose a duty on a riparian state to conserve water for the benefit of downstream states. Waste counts against a state in the balancing test because conservation has traditionally meant that water should be efficiently consumed.<sup>114</sup>

Environmental factors play a secondary role, although the Convention has made commendable efforts to incorporate them into international water law. The Convention contains several innovative environmental protection rules. For example, Article 20 requires that states protect the ecosystems of international watercourses,<sup>115</sup> and Article 22 requires a state to take all measures necessary to prevent the introduction of alien species into a river system if the species "may have effects detrimental to the ecosystem of the watercourse."<sup>116</sup> This standard comes from the objections that Canada lodged to the United States Garrison diversion in North Dakota.<sup>117</sup> However, the fact remains that the protection of a river system's ecological integrity remains secondary to the promotion of development.

### III. The Wild and Scenic Rivers Act: A Case Study in Non-Integration

The difficulty of integrating river corridor or watershed protection with water use and management is illustrated by the history of the implementation of the United States Wild and Scenic Rivers Act ("WSRA").<sup>118</sup> The WSRA could be, but is not, a model watershed protection act.<sup>119</sup> In 1968, Congress passed the WSRA to recognize and preserve free-flowing rivers with "outstandingly remarkable scenic, recreational, geologic, fish and wildlife, historic, cultural or other similar values."<sup>120</sup> The WSRA has effec-

tively stopped many water projects on large rivers,<sup>121</sup> but it has been less effective at controlling incompatible corridor land uses and upstream watershed degradation. The primary problem with the WSRA is the lack of integration of corridor and watershed management with the protection of rivers. From 1965 to 1968, the focus on river protection broadened from prohibiting dam building to the inclusion of river management.<sup>122</sup> However, the WSRA did not create a strong corridor management program.

There is some statutory basis for managing publicly-owned land to promote biodiversity.<sup>123</sup> However, few rivers have a single landowner along the entire river, much less within the whole watershed, and most rivers have a patchwork of public and private owners. In the absence of land use regulation, privately-owned land along WSRA-designated rivers is at risk for activities which increase erosion and pollution, harming the values for which the river was preserved. Land development along rivers ranks as the greatest concern to public interest groups interested in designating a river under the WSRA or managing already-designated rivers.

The subordination of flow protection to corridor management is an important element missing from current biodiversity and watershed protection programs. Riparian or stream-side systems are exceptionally rich, "contributing disproportionately to biological diversity."<sup>124</sup> Not surprisingly, the WSRA works best when the rivers are located on public lands. The designation to protect watersheds of rivers flowing through private lands has been controversial because land owners fear condemnation. This fear successfully blocked inclusion of

114. Article 5(e) includes "conservation, protection, development and economy of use of the water resource and the cost measures taken to that effect" and Article 5 mandates that international water courses be "used and developed . . . with a view toward obtaining optimal utilization therefrom consistent with adequate protection of the watercourse." 36 I.L.M. 710.

115. See 36 I.L.M. 710.

116. *Id.*

117. See Charles M. Carvell, *The North Dakota Garrison Diversion Project and International Environmental Law*, 60 N.D. L. REV. 603 (1984).

118. 16 U.S.C. § 1271.

119. This section is drawn from Carolyn Raffensperger & A. Dan Tarlock, *The Wild and Scenic Rivers Act at 25: The Need for a New Focus*, 4 RIVERS 81, 83 (1993).

120. 16 U.S.C. § 1271.

121. See 16 U.S.C. § 1278(a).

122. Congress established the WSRA in order to complement "the national policy of dam and other construction." *Id.*

123. See Robert B. Keiter, *Beyond the Boundary Line: Constructing a Law of Ecosystem Management*, 65 U. COLO. L. REV. 293, 297 (1994).

124. Reed Noss, *What Can Wilderness Do for Biodiversity?*, 1 WILD EARTH 51, 66 (1991).



the Cacapon and Shenandoah rivers in West Virginia. In response to vociferous opposition to the use of the power of eminent domain, the WSRA encourages easements on privately owned land rather than outright acquisition.<sup>125</sup> Condemnation is prohibited if more than half of the river corridor is already in public ownership, or where a local zoning ordinance conforms to the purposes of the Act.<sup>126</sup> These provisions limit the ability of managing agencies to procure entire watersheds for protection. Rivers brought into the system through state action have a further limitation: management (except for federally-owned lands) cannot be at the expense of the federal government.<sup>127</sup> However, land can be acquired through the Land and Water Conservation Act of 1965, which is exempt from the ban on federal dollars.<sup>128</sup>

Public land management creates problems even when agencies have the power to integrate land and water management. Public land management has never been unified. Agencies generally have pursued separate missions with little inter-agency coordination. Federal agency cooperation is gradually taking shape under pressure from environmental protection mandates and citizen watershed groups. Fragmented public land management can frustrate river corridor and watershed protection on wild and scenic rivers. The system is an orphan within the federal government with no strong advocates among the federal land management agencies. The result is a disjointed program with little money and little vision. The agencies that are to work together managing designated rivers, the Departments of Interior and Agriculture, have long had a fractious relationship. These inter-agency tensions have resulted in rivers qualified for inclusion but dedicated as recreation and not wild rivers, such as the Little Miami in Ohio.

125. See 16 U.S.C. § 1285.

126. See *id.*

127. See 16 U.S.C. § 1273.

128. 16 U.S.C. § 4601-4.

129. See, e.g., Deschutes River Landowners Committee, 136 INTERIOR BOARD LAND APPEALS 105 (1996) (stating that the Bureau

An additional problem in assigning the management of WSRA-designated rivers to these agencies is that they traditionally have multiple-use mandates, whereas the WSRA is a single-purpose mandate designed to protect rivers with remarkable characteristics. Having the Department of Agriculture manage a wild river flowing through a national forest where there is extensive logging can result in conflict between the agency's mandate to promote multi-uses in the forest and the protection of the river from erosion associated with logging. To the extent that a river could be protected for outstanding fish or wildlife, riverine biodiversity may be compromised by an agency sacrificing the river to its multi-use land management mandate.<sup>129</sup>

Fragmentation among the federal land management agencies is a major impediment to the integration of land use controls and water values. No single federal agency has jurisdiction over the system, and either states or the federal government can manage component rivers. A single river can be managed segment by segment by different federal, state or tribal agencies depending on the management or ownership of the land through which it flows. This makes consistent management of an entire watershed difficult at best. The WSRA itself provides for different managers depending on which agency had prior jurisdiction over the river.<sup>130</sup> Thus, state agencies or the federal Departments of Interior or Agriculture can all have jurisdiction over wild and scenic rivers depending upon the prior classification of the corridor. State agencies administer river segments that came into the system through state action, the Department of Agriculture administers rivers that are contained in National Forests, and the Department of Interior manages the remaining rivers.

The rejection of the Smith River in Northern California illustrates this problem.<sup>131</sup>

of Land Management has discretion to increase public access to a wild and scenic river).

130. See 16 U.S.C. § 1273(a).

131. See Sally K. Fairfax et al., *Federalism and the Wild and Scenic Rivers Act: Now You See It, Now You Don't*, 59 WASH. L. REV. 417, 424 (1984).

The Secretary of the Interior rejected designation of 2760 miles of the Smith River as a wild and scenic river because it would conflict with logging in the Six Rivers National Forest.<sup>132</sup> Under United States public land laws, the Forest Service, housed in the Department of Agriculture, not Interior, has a strong timber production mandate,<sup>133</sup> although the Service is a recent convert to watershed protection. Moreover, the seventy-six miles that were included were designated as recreational, rather than wild, so that logging and mining could continue.<sup>134</sup> The irony is that of all California rivers proposed for inclusion, only the Smith was undammed its entire length. The Smith was later protected as a National Recreation Area, a Congressional designation outside of the WSRA emphasizing recreation and restricting logging.<sup>135</sup> The WSRA recognizes that such conflicts may occur and specifies that for rivers running through wilderness areas, national parks or national wildlife refuges, the more restrictive law governs management of the rivers.<sup>136</sup> It may be presumed that the more environmental or preservationist law is the more restrictive. In the face of conflicting laws or management practices this clause can be used to enhance biodiversity.

Timber harvesting, mining, logging, grazing and recreation create acute problems for river quality and watershed integrity. These activities are permitted along designated rivers, but they can be managed under a provision of the WSRA which specifies that "[e]ach component of the national wild and scenic rivers system shall be administered in such a manner as to protect and enhance the values which caused it to be included in said system."<sup>137</sup> Management plans may specify varying degrees of protection and development based on the special

attributes of the area and on what designation a river receives. However, the directive to enhance the values which caused it to be included in the system offers a unique opportunity to restore biodiversity in a protected river. Enhancing and restoring river quality stands in marked contrast to activities such as mining and logging which degrade river quality. The WSRA recognizes the special harm that mining can do to a river by prohibiting the activity within one-quarter mile of the banks of a wild river.<sup>138</sup> Mining activity can continue on recreational rivers and is supposedly regulated by the managing agency.<sup>139</sup> While mining is not the major threat that dams were to the entire system, it has caused confrontations and environmental problems across the country. Gold and gravel mining, in particular, have posed particular harm to rivers due to the instream processes required for the mining operation.

Timber harvesting and grazing are two of the most environmentally damaging activities that take place along river corridors. Clear-cutting on erodible lands can lead to massive siltation and turbidity of the water with a consequent loss of biodiversity. Grazing causes erosion and siltation. Congress directed managing agencies that "[p]articular attention shall be given to scheduled timber harvests . . . and similar activities that might be contrary to the purposes of [the WSRA]."<sup>140</sup> This limit is particularly important in Oregon, a prime logging state that also has over 1600 miles of rivers in the wild and scenic river system.<sup>141</sup> It is projected that river designation will reduce the annual allowable timber sale on public land by seven million board feet.<sup>142</sup> Additionally, the National Environmental Policy Act ("NEPA")<sup>143</sup> is a potential tool for integration because it can be used as the basis to invalidate management

132. See *id.* at 444.

133. Environmentalists have mounted powerful arguments that in the nineteenth century, the protection of watersheds was one of the primary purposes for which national forests were established. See George C. Coggins, *Watershed as a Public Natural Resource on Federal Lands*, 11 VA. ENVTL. L.J. 1 (1991); Charles F. Wilkinson & H. Michael Anderson, *Land and Resource Planning in the National Forests*, 64 OR. L. REV. 1, 202-204 (1985).

134. See Fairfax et al., *supra* note 131, at 444.

135. See PALMER, *supra* note 20, at 44.

136. See 16 U.S.C. § 1281.

137. *Id.*

138. See 16 U.S.C. § 1280(a).

139. See *id.*

140. 16 U.S.C. § 1283(a).

141. See PALMER, *supra* note 20, at 252.

142. See *id.*

143. 42 U.S.C. § 4321.

plans that are internally inconsistent with the protection of a wild and scenic river.<sup>144</sup>

#### IV. Land Use Controls and the Constitutional Protection of Property

Many of the major causes of watershed degradation stem from unsustainable land uses within the watershed. With minor exceptions, United States land law has always promoted the settlement and intensive development of land.<sup>145</sup> In addition, the law frustrates integration by allocating land and water by two different property rights regimes. One, water, is premised on shared, semi-exclusive property rights, while the other, land, is premised on exclusive property rights. Both these regimes were regulated to minimize some of the obvious social costs of the exercise of private rights. However, this dual regulation frustrates integrated watershed management because the United States, like most countries, has created a fragmented maze of regulatory and planning authorities to deal with land and water separately. Thus, the fundamental but artificial dichotomy between land and water makes it difficult to integrate land and water management through existing land use and environmental regulatory regimes.<sup>146</sup> Formal integrated

planning, where it is practiced, cannot compensate for fragmented and incomplete regulatory authority. Land use planning and regulatory regimes often exclude the watershed and riparian impacts of the use of rivers. Until very recently, water users had no duty to consider the land use implications of the exercise of their rights.<sup>147</sup>

The single largest legal barrier to the protection of river corridors is the possibility that the necessary intensive regulation will be found to be an unconstitutional taking of private property without due process of law, as prohibited by the Fifth Amendment of the United States Constitution. River corridor protection is both an example of sensitive lands protection and an important component of biodiversity protection; however, this protection is difficult to accomplish because it requires intrusive land use controls.<sup>148</sup> All land use regulation, especially the protection of sensitive lands, disturbs political and legal expectations of easy and rapid land conversion. Rapid development is the cardinal value throughout the world, regardless of the system of government. Conversion is inherent in market systems because all resources, including land, are commodities to be exploited by development or transfer. In the United States,

144. See *Oregon Natural Desert Ass'n v. Green*, 953 F. Supp. 1133 (D. Or. 1997) (holding NEPA may apply to on going management activities when the agency's duties change as the result of the designation of a wild and scenic river). In 1988, Congress designated the Donner and Blitzen (Thunder and Lightning) River in Oregon as a wild river under the WSRA. See 16 U.S.C. § 1274(a)(74). Most of the river flows through public lands administered by the Bureau of Land Management ("BLM"). BLM prepared the required management plan with the help of the Nature Conservancy. See *Oregon Natural Desert Ass'n*, 953 F. Supp. at 1137. The Nature Conservancy report recommended that grazing be stopped along the entire river because parts of the ecosystem had been degraded by it. See *id.* However, BLM relied on a subsequent statement of the biologist who authored the report that livestock grazing should be banned in the canyon areas of the river, where topography and fences largely exclude it, but that a "well-crafted" allotment management plan be implemented in flatter areas. See *id.* at 1138. BLM adopted a river management plan after it issued an environmental assessment, which did not require the exclusion of cattle from any new part of the river. See *id.* The plaintiff disagreed with the plan because it failed to protect and restore "a very threatened ecosystem type." *Id.* at 1139. ONDA argued that the plan required the preparation of a full EIS. See *id.* at 1146. BLM countered with the argument that an EIS is not required for the continuation of the status quo. See *id.* at 1147. The court held that an EIS was required because the BLM was not simply continuing a prior management activity. See *id.* "Once the

Donner und Blitzen became a component of the WSRA system, intervening duties were imposed on the agency's decision-making process with respect to management activities." *Id.* See also GEORGE C. COGGINS & ROBERT L. GLICKSMAN, PUBLIC NATURAL RESOURCES LAW § 10G.04[1]-[2] (1993).

145. See Fred Bosselman, *Four Land Ethics: Order, Reform, Responsibility, Opportunity*, 24 ENVTL. L. 1139, 1467-72 (1994). Land development generally has not respected hydrologic limitations. For a summary of the environmental consequences of the development of urban oases in the western United States, see BEAUMONT, *supra* note 13, at 116-125, 402-448.

146. See generally Adler, *supra* note 16. For an excellent case study of these problems in New South Wales, Australia, see ENVIRONMENTAL DEFENDER'S OFFICE, INLAND RIVERS: STRATEGIES FOR ECOLOGICALLY SUSTAINABLE MANAGEMENT (1994).

147. See *infra* notes 181-89 and accompanying text.

148. Reviewing a moratorium on land development in a municipal watershed, a court noted that "[t]he Legislature is still wrestling with the problem of watershed protection. The issue is politically sensitive because it pits a matter of general concern (protection of watershed land and water sources) against both the property rights of watershed owners and the taxing interests of municipal entities . . . . Thus, the fact that no easy resolution has occurred is neither a surprise nor a signal that the moratorium was meant to expire." *City of Newark v. Township of Hardyston*, 667 A.2d 193, 198 (N.J. Super. Ct. App. Div. 1995).

the expectation of the "right to convert" is protected by the constitutional guarantee that property will not be "taken" without just compensation.<sup>149</sup> Land is a form of exclusive private property, and the United States Supreme Court has recently pronounced that land is the highest form of private property<sup>150</sup> and has displayed increasing hostility to the idea that the state can regulate the use of land to protect biodiversity.

This hostility to biodiversity protection is captured in the Supreme Court's 1992 decision, *Lucas v. South Carolina Coastal Council*.<sup>151</sup> *Lucas* held that a state beachfront setback line imposed to protect property from erosion was an unconstitutional taking of the owner's property because it virtually destroyed the development value of the lot. The most far-reaching aspect of the opinion is the suggestion that a regulation that has a substantial economic impact may only be justified if the limitation inheres "in the title itself, in the restrictions that background principles of the State's law of property and nuisance already place on land ownership."<sup>152</sup> *Lucas* did, however, recognize that a property owner cannot claim that a government regulation constitutes a taking if the regulation codifies "background principles of nuisance and property law," although it is clear that Justice Scalia did not intend it as a widely available justification for severe land use regulations.<sup>153</sup>

Common law-based background limita-

tions reflect the idea that property is a legal construct, which has historically reflected both public and private interests.<sup>154</sup> These background limitations can support more intensive regulation of resources such as wetlands that have long been subject to judicial and administrative control.<sup>155</sup> Furthermore, a federalism reading of the *Lucas* qualification would afford substantial deference to state law to define the background conditions<sup>156</sup> and would support a less uni-dimensional conception of property than is currently reflected in Supreme Court jurisprudence.<sup>157</sup> A federalism approach to the definition of property rights would not compel the adoption of an ecological concept of property, or the incorporation of an ecosystem support limitation into the right,<sup>158</sup> but it would permit states to integrate this approach into takings law.<sup>159</sup>

Despite the *Lucas* opinion, two contradictory trends are taking place in United States takings law. The first seeks to codify the restrictive tests of *Lucas* and impose extra-constitutional compensation burdens on states. In effect, states would have to pay to protect the environment. To that end, several states have passed property rights legislation.<sup>160</sup> Such legislation either requires some form of property rights impact assessment, modeled on environmental impact assessment, or contains a substantive standard—beyond that required by federal and state constitutions—to determine

149. U.S. CONST. amend. V.

150. See *Lucas v. South Carolina Coastal Council*, 505 U.S. 1003, 1027 (1992).

151. 505 U.S. 1003 (1992).

152. *Id.* at 1029.

153. *Id.* at 1029-30. See generally Louise Halper, *Untangling the Nuisance Knot*, 26 B.C. ENVTL. AFF. L. REV. 89 (1998).

154. See John F. Hart, *Colonial Land Use Law and Its Significance for Modern Takings Doctrine*, 109 HARV. L. REV. 1252, 1281 (1996).

155. Professor Fred Bosselman has recently traced the common law roots of wetlands regulation. See Fred Bosselman, *Limitations Inherent in the Title to Wetlands of Common Law*, 15 STAN. ENVTL. L.J. 247 (1996).

156. Professor Frank I. Michelman has lucidly pointed out the tension in *Lucas* between the desire to expand the scope of regulatory takings and the Court's respect for "our federalism." See Frank I. Michelman, *Property, Federalism and Jurisprudence: A Comment on Lucas and Judicial Conservatism*, 35 WM. & MARY L. REV. 301 (1993). See also Robert M. Washburn, *Land Use Control, The Individual and Society: Lucas v. South Carolina Coastal Council*, 53 MD. L. REV. 162 (1993).

157. The argument that no single "land ethic" is adequate to define property for Fifth Amendment purposes is brilliantly developed in Fred Bosselman, *Four Land Ethics: Order, Reform, Responsibility, Opportunity*, 24 ENVTL. L. 1439 (1994). Also see the exchange between Professors Richard Epstein and Frank Michelman. See Richard A. Epstein, *Takings, Exclusivity and Speech: The Legacy of Pruneyard v. Robins*, 64 U. CHI. L. REV. 21 (1997); Frank Michelman, *The Common Law Baseline and Restitution for Lost Commons: A Reply to Professor Epstein*, 64 U. CHI. L. REV. 57 (1997).

158. See Joseph L. Sax, *Property Rights and the Economy of Nature: Understanding Lucas v. South Carolina Coastal Council*, 45 STAN. L. REV. 1433 (1993) (sketching a concept of property as a usufruct rather than an exclusive right to maximization exploitation). See also Eric T. Freyfogle, *Ownership and Ecology*, 43 CASE W. RES. L. REV. 1269 (1993); Eric T. Freyfogle, *The Owning and Taking of Sensitive Lands*, 43 UCLA L. REV. 77 (1995).

159. See generally Michelman, *supra* note 156.

160. See, e.g., KAN. STAT. ANN. § 77-704 (1999); MONT. CODE ANN. §§ 75-1-102, 75-1-103, 75-1-201 (1999); TENN. CODE ANN. § 12-1-201 (1999).

when a landowner is entitled to compensation. The Florida Property Rights Act entitles an owner to compensation if a regulation inordinately burdens his land or he "bears permanently a disproportionate share of a burden imposed for the good of the public, which in fairness should be borne by the public at large."<sup>161</sup>

The counter-trend seeks to protect biologically sensitive lands such as wetlands and endangered species habitats either by preventing development, by allowing development in return for the dedication of land or the payment of fees to mitigate the adverse effects of the project, or by providing substitute forms of compensation.<sup>162</sup> State courts have shown considerable support for these efforts either by holding that the right to create an environmental hazard is not constitutionally protected or by supporting mitigation schemes. For example, Colorado has held that the enforcement of state radiation control regulations against a mill site with uranium tailings was not a taking because no investment-backed expectations were frustrated.<sup>163</sup> "The Mill was 'on notice' that the radioactive materials present on the property were dangerous and highly regulated at both the state and federal level as was the use of the property itself."<sup>164</sup> The Massachusetts Supreme Judicial Court has remanded a takings claim to determine if a city

can prevent the development of littoral land flooded by a public waterbody, under the *Lucas* pre-existing title limitation doctrine.<sup>165</sup> Iowa used a similar analysis to hold that state legislation protecting Indian mounds on private property precluded a takings claim.<sup>166</sup> Nevada has held that regulatory delays in development approvals in the Lake Tahoe Basin are not a taking because the developer had notice of a complex regulatory process and the protection of the Tahoe Basin would benefit the developer when his property was granted development approval.<sup>167</sup>

Many jurisdictions are experimenting with substitute forms of compensation for land owners whose property is subject to regulation. Transferable development rights ("TDRs"), originally developed to preserve urban landmarks, but more recently extended to the preservation of environmentally sensitive land, are the most common form of substitute. A land owner is assigned rights to develop which *cannot* be used on sensitive land but can be transferred to other land or sold to other developers. The basic idea is to set the level of development entitlements for an area, such as a watershed, and then allow an owner to detach a number of units from the land, usually in return for leaving it undeveloped, and to relocate or anchor those units on another tract.<sup>168</sup> A recent extension of the idea

161. FLA. STAT. ANN. § 70.001(3)(e) (West 1995). See also TEX. GOV. CODE ANN. § 2007 (West 1999).

162. State wetland regulation is analyzed in WILLIAM WANT, *THE LAW OF WETLAND REGULATION* ch. 13 (1989). *K&K Construction Co. v. Department of Natural Resources* is an important illustration of state laws which limit the development of water-related property. 575 N.W. 2d 531 (Mich. 1998). A developer applied for permission to develop an 89-acre tract which was divided into four parcels. Parcel 1 contained 51 acres, 27 of which were wetlands. Parcel 2 contained 16 acres and a small amount of wetlands. Parcel 3 contained 9.34 acres and Parcel 4 contained 3.4 acres; no wetlands existed on these two parcels. After a permit denial, the developer filed a taking action and the lower court held that the denominator was Parcel 1. The Michigan Supreme Court reversed, and held that "it is neither realistic nor fair to consider only Parcel 1 for purposes of the taking analysis" because the parcels were contiguous, although the court remanded for a factual finding on one parcel. *Id.* at 536 (citing *Keystone Bituminous Coal Association v. DeBenedictis*, 480 U.S. 470 (1987)). The court found that there was no categorical *Lucas v. South Carolina Coastal Council* taking because the developer could develop the upland portion of Parcel 1 and all of parcels 2 and 4. Thus, the plaintiffs must prove that a taking occurred under the *Penn Central Transportation Co. v.*

*City of New York* balancing formula. 438 U.S. 104 (1978). *Good v. United States*, 189 F.3d 1355 (Fed. Cir. 1999), *cert. denied*, 68 U.S.L.W. 3367 (U.S. April 3, 2000), holds that wetland investors who purchase with knowledge of the federal regulatory structure have no investment-backed expectations when a permit is denied to protect an endangered species.

163. See *Colorado Dep't of Health v. The Mill*, 887 P.2d 993, 1002 (Colo. 1994).

164. *Id.* at 1000.

165. See *Lopes v. City of Peabody*, 629 N.E.2d 1312, 1315-16 (Mass. 1994).

166. See *Hunziker v. State*, 519 N.W.2d 367, 371 (1994), *cert. denied*, 514 U.S. 1003 (1995).

167. See *Kelley v. Tahoe Reg'l Planning Authority*, 855 P.2d 1027, 1034-35 (Nev. 1993), *cert. denied* 510 U.S. 1041 (1994).

168. See DANIEL R. MANDELKER, *LAND USE* § 12.13 (2d ed. 1988). An early TDR scheme was invalidated because it vested too much discretion in the local government to designate receiving parcels. See *Montgomery County Citizens' Ass'n v. Maryland Nat'l Capital Park & Planning Comm'n*, 522 A.2d 1328, 1336-37 (Md. Ct. App. 1987).

contemplates the creation of wetland mitigation banks, which will hold entitlements until they are needed by developers.<sup>169</sup> However, the most important environmental protection experiment is the one currently in place in the Pinelands of New Jersey.<sup>170</sup> Pineland Development Credits are created based on the development expectations of severely restricted lands.<sup>171</sup> The scheme has been upheld by the New Jersey Supreme Court.<sup>172</sup> Furthermore, in a recent taking challenge to the Tahoe Regional Planning Agency's denial of a permit to build a house on a one-half acre lot because it was located in a Stream Environment Zone, the Ninth Circuit held that the claim was unripe, in part, because the lot owner was given TDRs.<sup>173</sup> The United States Supreme Court reversed the Ninth Circuit's lack of ripeness holding, but expressly refused to decide whether "TDRs may be considered in deciding the issue of whether there has been a taking . . . as opposed to the issue of whether just compensation has been afforded for such a taking."<sup>174</sup> Three concurring justices argued that TDRs were not relevant to the first issue because it would lead to under-compensation.<sup>175</sup>

## V. The Reemergence of the Watershed as a Land Management Unit

### A. The Rediscovery of River Basin and Watershed Planning and Management as an Environmental Protection Strategy

The long history of integrated land and water planning along hydrologic units seemed to die in the United States in the 1980s. The Reagan administration failed to fund the existing river basin commissions and the federal government continued its withdrawal from subsidized water development. However, in the

1990s, watersheds have reemerged as an ideal land use control unit and there are a variety of federal, state and local watershed protection initiatives underway. Unlike countries such as Australia, which have a rigorous catchment planning process,<sup>176</sup> there are no uniform, formal watershed planning processes to provide a framework for integration. No consensus exists in the United States about the scale or boundaries of such units and the proper allocation of control authority.<sup>177</sup> For example, the terms "watershed" and "river basin" continue to be used interchangeably, although "watershed" now usually refers to the catchment area of an individual stream or river, and "river basin" to the drainage area of a large river and its tributaries. Most integrated management is occurring in small watersheds and river basin planning remains focused on the water resource alone. However, in contrast to the past, the increasing emphasis in river basin management is on the use of existing supplies to satisfy both traditional right holders and environmental and Native American interests.

Integrated watershed and river basin planning in the United States is currently a series of ad hoc experiments often driven by citizen and stakeholder-initiated efforts to protect specific watersheds rather than by a desire to achieve a rational, ecologically-based planning objective. The experiments often represent efforts to overcome the obstacles placed by the current maze of planning and regulatory programs which influence watershed management and use rather than the creation of new planning and regulatory programs. Three related factors seem to drive the reemergence of the watershed as planning unit. The first is a search for alternatives to top-down federal water quality standards, which have generally been set on a

169. See generally Royal Gardner, *Banking on Entrepreneurs: Wetlands, Mitigation Banking and Takings*, 81 IOWA L. REV. 527 (1996).

170. See N.J. STAT. ANN. §§ 13:18A-31 to -54 (West 1999) ("Pinelands Development Credit Bank Act").

171. See *Gardner v. New Jersey Pinelands Comm'n*, 593 A.2d 251, 256 (N.J. 1991).

172. See *id.* at 260-61 (citing *Penn Cent. Transp. Co. v. New York*, 438 U.S. 104 (1978)).

173. See *Suitum v. Tahoe Reg'l Planning Agency*, 80 F.3d 359, 362-63 (9th Cir. 1996), *rev'd on other grounds*, 520 U.S. 725 (1997).

174. *Id.* at 728.

175. See *id.* at 745-750 (Justices Scalia, O'Connor & Thomas concurring).

176. The New South Wales Catchment Management Act of 1989 promotes the sustainable management of soil, water quality and vegetation, and the restoration of degraded areas in the state's catchment areas. See DAVID FARRIER, *THE ENVIRONMENTAL LAW HANDBOOK* 89-91 (2d ed. 1993); GERRY BATES, *ENVIRONMENTAL LAW IN AUSTRALIA* 206 (4th ed. 1995).

177. See Adler, *supra* note 16, at 1088-94.

state-wide basis, and which do not take into account the special features of individual watersheds. Federal standards, for example, have not effectively limited nonpoint sources of pollution because the implementation rests with local officials with the power to control land use. Also, technologically-based standards do not reward those who find cheaper mixed technology and management strategies to achieve a quality objective. In addition, federal water policy initiatives have reached a dead end. Congress is no longer interested in regional water development (except for a few specific "pork barrel" dams) and the water agencies have been severely limited by budget cuts. Executive leadership ended in the Carter Administration. Thus, effective watershed development is often only possible when a coalition of federal, state and private stakeholders agree on a plan that is built around the allowance of some development consistent with ecological sustainability.<sup>178</sup>

The current "driver" behind the federal EPA's interest in watershed planning is section 1313(d) of the CWA<sup>179</sup> which requires the agency to set total maximum daily loads ("TMDLs") for streams that do not meet existing water quality standards. TMDLs are, in effect, a total watershed waste load allocation among both point and nonpoint sources of pollution.<sup>180</sup> The allocations require additional land use controls for nonpoint sources of pollution, such as improved forest practices, beyond those required by the technology-forcing provisions of the CWA. States must make the initial identification of watersheds and "water-quality limited" stream segments that require TMDL allocations. States and the EPA were initially reluctant to set TMDLs for most watersheds and to identify the sources of pollution reduction, especially for watersheds where agricultural and timber harvesting practices were degrading streams. The identifica-

tion of water-quality limited stream segments is a long, costly, and uncertain process, and TMDL allocations pose complex equity and efficiency issues. States and the federal government must allocate responsibility among all sources of pollution, point and nonpoint, as well as among future polluters in a manner that is fair and efficient. To further complicate matters, neither the federal government nor the states have the authority to order the entire range of land use practices necessary to reduce nonpoint sources of pollution. Nevertheless, courts have begun to force the EPA to set stringent TMDL allocations if the state plan is inadequate,<sup>181</sup> and so watershed waste load trading schemes are being considered. The basic idea is to meet TMDL requirements by encouraging nonpoint sources to withdraw land from production to reduce sediment loads, rather than spend greater amounts to upgrade a facility. However, the feasibility of such trading schemes has yet to be established.

The second related factor is the emergence of grassroots organizations interested in conserving and restoring specific places. Again, integrated watershed management is often a conceptual focus of local initiatives. Local efforts at watershed management integration are usually small-scale and motivated by more than creating a sustainable watershed. While small watersheds are often the target of these efforts, local concern can produce state and national watershed protection initiatives. Some of the local watershed integration efforts are driven by the need to find alternative means of achieving federal objectives, but local plans are often joined with efforts to develop place-based sustainability strategies.<sup>182</sup>

The third factor is the recognition that there is an expanded range of stakeholders who must be accommodated in any legitimate decision. These three trends are synthesized in

178. See U.S. ENVIRONMENTAL PROTECTION AGENCY, WATERSHED APPROACH FRAMEWORK 5 (1996).

179. See 33 U.S.C. § 1313(d).

180. See generally U.S. ENVIRONMENTAL PROTECTION AGENCY, GUIDANCE FOR WATER QUALITY BASED DECISIONS: THE TMDL PROCESS (1991).

181. See, e.g., *Sierra Club v. Hankinson*, 939 F. Supp. 865 (N.D. Ga. 1996); *Alaska Center for the Env't v. Browner*, 20 F.3d 981 (9th Cir. 1994). See generally OLIVER HOUCK, THE CLEAN WATER ACT'S TMDL PROGRAM: LAW, POLICY AND IMPLEMENTATION (1999).

182. See SARAH F. BATES ET AL., SEARCHING OUT THE HEADWATERS: CHANGE AND REDISCOVERY IN WESTERN WATER POLICY 186 (1993).

a recent federal EPA publication for the allocation of nonpoint source control program grants.<sup>183</sup> "The watershed approach is commonly characterized by (a) well-integrated partnerships, (b) a specific geographic focus, (c) action driven by environmental objectives and by strong evidence and data, and (d) coordinated priority setting and integrated solutions."<sup>184</sup>

### **B. The Conceptual Shift: Bioregionalism, Adaptive Management and Neo Pre-Human Background Standards**

The most important conceptual development for modern watershed protection is the shift in focus from rivers divorced from their terrestrial ecosystem to aquatic ecosystems. The over-arching concept is bioregionalism, which seeks to identify "whole systems comprised of sets of diverse, integrated, natural subsystems and run by ecological laws and principles."<sup>185</sup> Policy planners advocate moving from a single media or species approach to an ecosystem approach to biodiversity management. Ecosystem management is a substantial conceptual advance over prior natural resources management principles because it collapses all conventional conceptual and jurisdictional boundaries and potentially integrates public and private lands and water in a single functional management unit. Bioregionalism both complements and contradicts watershed management because it can support the watershed as the organizing unit or it can suggest a larger management unit that subsumes and subordinates watershed protection to other objectives.

The goal of ecosystem management is to

establish background standards against which present and future human use can be measured. It asks a radical question: What was the region like before intensive human development?<sup>186</sup> The pre-human (or pre-European settlement) landscape approach sets new standards to guide modern management decisions to accomplish pre-human conditions.<sup>187</sup>

Bioregionalism is supported by the substitution of the non-equilibrium for the equilibrium paradigm in ecology and by the growing science of conservation biology. Bioregionalism seeks to develop areas based on protection and rehabilitation of all types of landscapes. This is forward rather than backward looking development because it recognizes that humans will continue to alter the landscape. Instead of a return to pre-human conditions, it seeks management strategies incorporating human use. The influence of non-equilibrium ecology can be seen in current restoration efforts that seek to protect remnants of degraded ecosystems.

The ongoing efforts to restore the Florida Everglades is an example of the implications of non-equilibrium ecology. The Florida Everglades is a large freshwater marshland that sits on a shallow bedrock trough in south Florida. The Everglades formed during the Pliocene and Pleistocene eras and constitutes one of the world's largest wetland systems. During the past five thousand years a rich peat, marl and muck base has formed which supports a biologically diverse and water-dependent Caribbean and temperate ecosystem.<sup>188</sup> The southern part of the ecosystem was designated as a national park in 1947,<sup>189</sup>

183. See OFFICE OF WATER, U.S. ENVIRONMENTAL PROTECTION AGENCY, NONPOINT SOURCE PROGRAM AND GRANTS GUIDANCE FOR FISCAL YEAR 1997 AND FUTURE YEARS (1996).

184. *Id.* at 2.

185. David Haenke, *Bioregionalism: A Territorial Approach to Governance and Development of Northwest British Columbia* (unpublished M.A. thesis) (on file with author), quoted in Keane Callahan, *Bioregionalism: Wiser Planning for the Environment*, 45 LAND USE LAW AND ZONING DIGEST 3 (Aug. 1993).

186. Environmentalists often make the mistake of assuming that all areas were Edenic prior to European discovery and occupation, but this overlooks the land use practices of indigenous peoples who often modified the land in substantial ways. For example, an assessment of aboriginal farming practices in

Australia concludes that "[i]n short, the Aboriginal farming system did not conserve the landscape of Australia. It created a new landscape, which was more productive than the landscape they found." NEIL BARR & JOHN CARY, *GREENING A BROWN LAND: THE AUSTRALIAN SEARCH FOR SUSTAINABLE LAND USE* 9 (1992).

187. The Murray Darling Basin Commission has constructed a profile of the river before and after human settlement. See generally MURRAY DARLING BASIN COMMISSION, *THE MURRAY* (Norman Mackay & David Eastburn eds., 1990).

188. See Patrick J. Gleason & Peter Stone, *Age, Origin, and Landscape Evolution of the Everglades Peatland*, in *EVERGLADES: THE ECOSYSTEM AND ITS RESTORATION* 149 (Steven M. Davis & John C. Ogden eds., 1994).

189. See 16 U.S.C. § 401.



while the northern part has been developed extensively for agricultural and urban use. Today, the entire system is under stress. In brief, the natural system depended on seasonal waterflows, but these flows have undergone a century of human alteration in the name of flood control, land reclamation (drainage), and conservation (urban growth). For example, a levee was constructed parallel to the coastal ridge to stop sheet flows toward Palm Beach and Miami. Also, basins and canals have been constructed to drain water from the Lake Okeechobee agricultural area to the Atlantic and into the national park at times different from the natural drainage cycles. The canals, culverts and levees have changed the drainage cycle from attenuated to pulsating flows, and the sustainability of the ecosystem has been subordinated to the minimization of flood risks during the hurricane season (June-October) and the storage of water during the dry season (November-May).<sup>190</sup>

The adverse impacts of the altered water flows on the Everglades National Park became apparent in the late 1960s. Congress initially tried to solve the problems by quantifying the park's reserved water right. Legislation enacted in 1970 guaranteed the park a 315,000-acre minimum flow.<sup>191</sup> However, increased water diversion to Miami reduced flows, and the park became a dumping ground for off-season regulatory releases during periods of abnormal winter rain. The net result remains a radically altered flow regime that interrupts the life cycles of many plant and animal species in the system. Seasonal drying and flooding cycles have been disrupted, and some areas have

been deprived of a permanent surface water cover. In addition, when the water arrives it is loaded with phosphorus from agricultural runoff.<sup>192</sup> Hardwood forests suffer from prolonged flooding and Florida Bay experiences hypersalinity from reduced freshwater flows. Altered flow patterns, along with other human encroachments, is blamed for the large decline in wading bird populations.<sup>193</sup>

To "save" the Everglades, the current thinking is that the system must be restored. This is not a simple return to the status quo. Rather, it involves the artificial reconstruction of pre-human intervention conditions by sophisticated techniques, such as computer hydrographs and the design of experimental management strategies that mimic the natural system to maintain a viable smaller ecosystem.<sup>194</sup> There is widespread agreement that more low-phosphorus water must be put back in the system and that the sheet flows must be more continual for longer periods of time during the wet season to sustain the system during dry periods.<sup>195</sup> Experimental flows have been released but the results are still uncertain. Existing agricultural uses must be reduced to decrease the nutrients entering the system and this will require a large amount of public money. All of this must be done under substantial scientific uncertainty about species and system responses to restoration efforts and management strategies must be constantly evaluated and often revised. In February 1999, a group of biodiversity experts complained to the Secretary of the Interior that the federal government's actions had a high risk of failure because of insufficient releases into the park.<sup>196</sup> Secretary

190. See generally Stephen S. Light & J. Walter Dineen, *Water Control in the Everglades: A Historical Perspective*, in EVERGLADES: THE ECOSYSTEM AND ITS RESTORATION, *supra* note 188, at 47.

191. See Pub. L. No. 91-282.

192. See Donald L. DeAngelis, *Synthesis: Spatial and Temporal Characteristics of the Environment*, in EVERGLADES: THE ECOSYSTEM AND ITS RESTORATION, *supra* note 188, at 307.

193. See G. Thomas Bancroft et al., *Relationships Among Wading Birds Foraging Patterns, Colony Locations, and Hydrology in the Everglades*, in EVERGLADES: THE ECOSYSTEM AND ITS RESTORATION, *supra* note 188, at 615.

194. For a brief discussion of the re-creation of simulated naturalness as a new management baseline, see NATIONAL RESEARCH COUNCIL, RIVER RESOURCE MANAGEMENT IN THE GRAND CANYON 38-49 (1995).

195. See Carl J. Walters & Lance H. Gunderson, *A Screening of Water Policy Alternatives for Ecological Restoration in the Everglades*, in EVERGLADES: THE ECOSYSTEM AND ITS RESTORATION, *supra* note 188, at 757. The restoration of prior water levels will raise takings issues. On the other hand, if the state restores riverine and wetland ecosystems by flooding land reclaimed from the beds of navigable waters, "[t]he property owner may not be entitled to compensation to the extent that value has been created by government public works specifically enhancing their property." Sharon Tisher, *Everglades Restoration: A Constitutional Takings Analysis*, 10 J. LAND USE & ENVTL. L. 1, 34 (1994).

196. See William K. Stevens, *Restoration Plan Does Too Little*, *Experts Say*, N.Y. TIMES, Feb. 22, 1999, at A1.

Babbitt immediately agreed to the creation of a new scientific panel to monitor the experiment.<sup>197</sup> The nub of the problem is the need to reduce the nutrient loads from upstream sugar production. A lawsuit brought by the federal government against Florida led to a settlement<sup>198</sup> and a joint federal-state set of principles that were incorporated into a state statute.<sup>199</sup> The settlement contemplated the construction of a phosphorus reduction facility, including the construction of new marshlands south of Lake Okeechobee, that would be jointly funded by the federal government, the state government and the agriculture industry through various taxes and fees. In November 1996, however, the Florida voters rejected a state constitutional amendment that would have financed restoration programs by levying a one-cent per pound tax on raw sugar harvested in Florida.

Another river restoration experiment is underway on the Colorado River in Arizona. In 1963, the federal government began construction of a large storage and hydropower dam, Glen Canyon Dam, above Grand Canyon National Park.<sup>200</sup> The dam has changed the ecology of the river and the riparian corridor. For example, temperatures are colder, which is threatening endangered fish, and beach building sediment flows have been reduced. Since the 1980s, the federal government has been studying the dam-induced changes, and in 1989 the government agreed to prepare an EIS for the increase in hydroelectric generating capacity at the dam. The EIS has focused attention on the possibility of operating the dam in a different way to mitigate its adverse impacts.

The dam managers have focused on minor flow alteration patterns, but in 1996 they agreed to a large experimental "flood flow" to

release tributary sediment to build beaches in the Grand Canyon.<sup>201</sup> This innovative action moves in the direction of a baseline of simulated naturalness for the river below Glen Canyon Dam. There is no simple or accepted definition of this concept. This management standard can best be understood as a progressive standard which recognizes that ecosystems are constantly changing and thus static preservation is impossible. The objective is to use natural processes, such as erosion, flow cycles and other ecological processes as standards against which man-made changes can be measured and, if appropriate, mitigated. This baseline approximates our understanding of pre-intervention or background conditions, within the limitations imposed by science and law due to the allocation of the river. With respect to the Grand Canyon, this would include the following: (1) flows that approximate pre-dam seasonable flows, (2) pre-dam water temperatures, and (3) pre-dam turbidity levels, which are both biologically and geologically significant.

As the Everglades and Glen Canyon Dam experiments illustrate, the restoration and continuous management of degraded ecosystems will be a major environmental management task in the future. Experiments are now underway on many river systems, wetlands and some degraded landscapes to restore the system to a baseline that reverses the most harmful effects of altering the natural system functions.<sup>202</sup> If we move toward ecosystem management, with its larger geographic scales, parts of the system will inevitably be degraded or stressed. Nonetheless, restoration is a controversial strategy with many environmentalists because of the argument that there is a clear distinction between the "natural" and "artificial" and that "value increases as

197. See William K. Stevens, *Panel Will Monitor Plan for Everglades*, N.Y. TIMES, Feb. 23, 1999, at A18.

198. See *United States v. South Fla. Water Mgmt. Dist.*, 28 F.3d 1563, 1572 (11th Cir. 1994), cert. denied 514 U.S. 1107 (1995).

199. See 1994 Fla. Laws ch. 94-115. The principles are reprinted in AMERICAN BAR ASSOCIATION, *ECOSYSTEM MANAGEMENT: A TEMPLATE FOR DECISION-MAKING IN THE 1990S AND BEYOND* (Aug. 5, 1996).

200. See NATIONAL RESEARCH COUNCIL, *RIVER RESOURCE*

MANAGEMENT IN THE GRAND CANYON (1996) (introducing the history of the efforts to decide how to mitigate the downstream corridor impacts of the operation of the dam).

201. For a more extensive discussion of the history of the 1996 flood release, see A. Dan Tarlock, *The Missouri River: The Paradox of Conflict Without Scarcity*, 2 GREAT PLAINS NAT. RESOURCES J. 1, 9-11 (1997); see also NATIONAL RESEARCH COUNCIL, *RIVER RESOURCE MANAGEMENT IN THE GRAND CANYON* (1996).

202. See generally NATIONAL ACADEMY OF SCIENCES, *THE RESTORATION OF AQUATIC ECOSYSTEMS* (1992).

naturalness increases."<sup>203</sup> In his important exploration of the consequences of the non-equilibrium paradigm, Professor Jonathan B. Wiener observes that the non-equilibrium paradigm leads to resource protection strategies based on stasis and separatism.<sup>204</sup> The view "that human action is separate from nature and that the balance of nature is disturbed by human intrusion" either leads to the view that humans undesirably interfere with nature or that "human action represents desirable dominion over nature."<sup>205</sup>

Ecosystem management magnifies the importance of conservation biology because this is the source of substantive management principles such as the dedication of viable patches of habitat linked by biological corridors.<sup>206</sup> It also increases the importance of adaptive management as the major resource management strategy<sup>207</sup> because it supports the idea that experimental "place-driven" strategies replace national standards.<sup>208</sup> For example, the 1996 Safe Drinking Water Amendment permits public water systems to substitute source-water or watershed management

for filtration in consolidated ownership, and having control over access to, and activities in, those watersheds, if the State determines (and the Administrator concurs) that the quality of the source water and the alternative treatment requirements established by the State ensure greater

removal or inactivation efficiencies of pathogenic organisms for which national primary drinking water regulations have been promulgated or that are of public health concern than would be achieved by the combination of filtration and chlorine disinfection.<sup>209</sup>

### C. The Roots Problem of Implementing Bio-regionalism: Vires and the Delegation of Power to Private Parties

The major legal problem with bio-regionalism or ecosystem management is that it often has no statutory basis. Ecosystem or watershed management is a scientific rather than legal concept, and at present it must be super-imposed over existing statutes that recognize political jurisdictions justified more by history than reason and the specific federal and state agency missions that history has produced. As a result, watershed protection efforts must overcome fragmented, incomplete and shared regulatory schemes, existing both among the three levels of government and within these levels, as well as the existing allocation of water and land entitlements. Thus, the geographic focus of legal regulation is inevitably narrow.<sup>210</sup> It is both difficult for mission agencies to cross political and cultural boundaries and for units of government to cooperate and share power among themselves, as well as the regulated community, now characterized as "stakeholders."

203. Robert Elliot, *Extinction, Restoration, Naturalness*, 16 ENVTL. ETHICS 135, 143 (1994). Compare Alastair S. Gunn, *The Restoration of Species and Natural Environments*, 13 ENVIRONMENTAL ETHICS 291 (1991), with C. Mark Cowell, *Ecological Restoration and Environmental Ethics*, 15 ENVTL. ETHICS 19 (1993).

204. See Jonathan Wiener, *Law and the New Ecology: Evolution, Categories, and Consequences*, 22 ECOLOGY L.Q. 325, 338-345 (1995) (reviewing JONATHAN B. WIENER, *BEAK OF THE FINCH: A STORY OF EVOLUTION IN OUR TIME* (1994)).

205. *Id.* at 340.

206. See generally Rebecca W. Thomson, *Ecosystem Management: Great Idea, But What Is It, Will It Work, and Who Will Pay?*, 9 NAT. RESOURCES & ENV'T 42 (1995); Rebecca W. Thomson, Note, *Saving an Endangered Act: The Case for a Biodiversity Approach to ESA Conservation Efforts*, 45 CASE W. RES. L. REV. 553 (1995).

207. A recent study conducted by the National Research Council and the National Academy of Sciences captures the essence of adaptive management:

Adaptive planning and management involve a decision making process based on trial, monitoring, and feedback. Rather than developing a fixed goal and an inflexible plan to achieve the goal, adaptive management recognizes the imperfect knowledge of interdependencies existing within and among natural and social systems, which requires plans to be modified as technical knowledge improves.

COMMITTEE ON RESTORATION OF AQUATIC ECOSYSTEMS, NATIONAL RESEARCH COUNCIL, *RESTORATION OF AQUATIC ECOSYSTEMS: SCIENCE, TECHNOLOGY, AND PUBLIC POLICY* 357 (1992).

208. See generally Thomas W. Jackson & Joshua S. Wyner, *The New Hot Doctrine: Ecosystem Management*, NAT'L L.J., Nov. 28, 1994, at 15.

209. 42 U.S.C. § 300-9-1(b)(7)(c).

210. I have explored these problems in A. Dan Tarlock, *Biodiversity Federalism*, 54 MD. L. REV. 1315 (1995).

Existing watershed experiments concentrate on small geographic areas such as a creek watershed or a small river. There are numerous such watershed initiatives underway in the United States. Some are simply for information sharing; others seek to solve specific physical and regulatory problems by using a consensus of stakeholders to secure government and private approval of specific programs that meet federal and state regulatory objectives.<sup>211</sup> These efforts are an example of a number of experiments to supplement rigid command and control regulation with more flexible collaborative governance processes.<sup>212</sup> Collaborative governance generally seeks to craft a consensus among a limited group of stakeholders.<sup>213</sup>

The ultimate watershed protection "deal" would be that local collaborative processes would set watershed and basin environmental standards. For this deal to work, private parties must forego the enjoyment of their full development entitlements in return for public approval of watershed management plans as consistent with environmental protection and related mandates. The Western Water Policy Review Advisory Commission recently endorsed a version of this collaborative governance "deal." In *Water Policies for the Future*, the Commission proposed "nest" watershed governance which would involve: (1) the revival of river basin commissions as river basin forums representing federal, state, tribal, local governments and stakeholder groups, (2) the horizontal coordination of federal spending and regulation within river basins, (3) the vertical integration of federal programs from the basin level to watershed groups, and (4) greater reliance on adaptive management.<sup>214</sup> The basin forum would engage in a planning process to

establish "measurable objectives for the basin which would comply with federal, tribal,<sup>215</sup> state, and local substantive law."<sup>216</sup> To implement the plans and standards, a basin trust fund would be established and fed by public and private monies. The nub of the proposal would be the enactment of congressionally authorized watershed governance pilot programs. Watershed councils would identify specific plans and projects to meet local needs in a manner consistent with the objectives established in the basin plan and "[a]ny project which is submitted by watershed councils to comply with the objective set at the basin level shall be presumed consistent with prevailing laws unless in sixty days it is found inconsistent with relevant authorities."<sup>217</sup>

This deal raises both vices and constitutional issues. State and federal agencies generally lack the formal authority to adopt local or place-based solutions as national ones. However, federal agencies are cobbling together conservation and restoration plans that rely on government-private cooperation. These efforts are vulnerable to legal challenges as *ultra vires*. Natural resources management is not, in fact, place-driven; it is centralized. The great conservation battles of this century have been fought to eliminate or minimize place-based, that is, local and low, standards by subjecting them to the discipline of scientific national standards, and this lesson was carried forward into environmental protection legislation. Congress could, of course, authorize agencies to adopt place-based solutions as the national standard, but environmentalists remain profoundly skeptical of doing so. The most notable effort to base a resource conservation program on place-based standards, the

211. For a comprehensive summary of western watershed groups and their activities, see UNIVERSITY OF COLORADO NATURAL RESOURCES LAW CENTER, *THE WATERSHED SOURCE BOOK: WATERSHED-BASED SOLUTIONS TO NATURAL RESOURCE PROBLEMS* (undated).

212. See generally Jody Freeman, *Collaborative Governance in the Administrative State*, 45 UCLA L. REV. 1 (1997).

213. Professor James Rossi is a leading critic of the fruits of open-ended public participation in environmental decision-making triggered by the access revolution of the now-mythic late 1960s and early 1970s. See James Rossi, *Participation Run Amok: The Costs of Mass Participation in Deliberative Agency Decision-Making*, 92 NW. U. L. REV. 173 (1997).

214. WESTERN WATER POLICY REVIEW ADVISORY COMMISSION, *WATER POLICIES FOR THE FUTURE* xv-xvix [hereinafter *WATER POLICIES*]. I wish to disclose that I was the principal report writer for the final report. However, the concept of a new template for river basin and watershed governance was developed by the commission itself.

215. Indian tribes now have considerable power under the Clean Water Act to adopt high water quality standards and to impose these on non-Indian water users. See, e.g., *Flathead Reservation in Montana v. EPA*, 137 F.3d 1135 (9th Cir. 1998).

216. *WATER POLICIES*, *supra* note 214, at xviii.

217. *Id.* at xix.

Taylor Grazing Act,<sup>218</sup> has been a disaster for watersheds. The more likely scenario, as illustrated by the Bay-Delta “process,” is to experiment with the use-based stakeholder groups, prodded by substantial federal and state involvement,<sup>219</sup> to develop acceptable solutions that achieve the objectives of federal environmental programs.

The substitution of voluntary watershed protection efforts for the administration of existing laws is also vulnerable to legal challenges, and several recent cases have held that voluntary protection does not comply with the ESA’s mandates. *Oregon Natural Resources Council v. Daley* illustrates a successful legal challenge.<sup>220</sup> In brief, the populations of evolutionarily significant units of coastal Coho salmon have been declining for a variety of anthropocentric and natural reasons. The decision whether to list the Coho as a threatened species under the ESA has been a political football throughout the 1990s because protection and restoration require intensive public and private land use and water management. The anthropocentric reasons include timber harvest practices, livestock grazing and water diversions. In 1997, the National Marine Fisheries Service (“NMFS”) withdrew an earlier proposal to list the Coho as a threatened species because the Oregon Coastal Salmon Restoration Initiative<sup>221</sup> would reverse the population decline.<sup>222</sup> California units were listed because the state dragged its feet in formulating a similar initiative.<sup>223</sup> The rejection of the state-federal “deal” has not, however, deterred

Oregon from moving ahead with its watershed protection strategy.<sup>224</sup> Scientific opinion within NMFS was divided on the effectiveness of the initiative and on the need to list the species.

A magistrate judge invalidated the decision not to list because NMFS applied the wrong ESA standard in its decision not to list.<sup>225</sup> A species must be listed if it is likely to become extinct in the foreseeable future, but the NMFS only evaluated the effect of the Initiative on population declines over a two year period.<sup>226</sup> The primary flaw in NMFS’s approach was to base its decision not on science but in faith in future actions taken by the legislative and executive branches of Oregon.<sup>227</sup> “NMFS . . . was unwilling to make the hard choice required by the ESA.”<sup>228</sup> This led to the conclusion that reliance on the state’s initiative was arbitrary and capricious because it relied on unimplemented, largely voluntary future actions.<sup>229</sup> Oregon’s initiative relied in part on voluntary watershed councils where landowner participation was “largely voluntary.”<sup>230</sup> NMFS had rejected California’s action plan, in part, because the state had not funded a paper watershed initiative and landowner participation was voluntary. The court found the agency’s failure to explain why Oregon’s initiative did not pose the same risks as California’s “telling.”<sup>231</sup> “However laudable Oregon’s efforts to employ new management techniques to try to restore the Oregon Coast [evolutionary significant unit], such future voluntary conservation effort cannot be a substitute for listing.”<sup>232</sup>

218. 43 U.S.C. § 35.

219. See generally Jody Freeman, *Collaborative Governance in the Administrative State*, 45 UCLA L. REV. 1 (1997).

220. 6 F. Supp. 2d 1139 (D. Or. 1998).

221. The Oregon Coastal Salmon Restoration Initiative also supplemented the Northwest Forest Management Plan adopted in 1994 to save the spotted owl.

222. See Threatened Status for Southern Oregon/Northern California Coast Evolutionarily Significant Unit of Coho Salmon, 62 Fed. Reg. 24,588 (May 6, 1997).

223. See *id.*

224. See THE OREGON PLAN FOR SALMON AND WATERSHED 1990 (on file with author).

225. See *Oregon Natural Resources Council*, 6 F. Supp. 2d at 1150.

226. See *id.*

227. See *id.*

228. *Id.* at 1152.

229. A series of previous district court opinions held that the United States Fish & Wildlife Service (“FWS”) could not rely on possible future management actions by other agencies. See *Biodiversity Legal Found. v. Babbitt*, 943 F. Supp. 23 (D.D.C. 1996); *Friends of the Wild Swan, Inc. v. United States Fish & Wildlife Service*, 945 F. Supp. 1388 (D. Or. 1996). The Ninth Circuit held that the FWS could not excuse its duty to designate critical habitat for the California gnatcatcher on an elaborate reserve system created under a voluntary state program. See *Natural Resources Defense Council v. United States, Dep’t of Interior*, 113 F.3d 1121 (9th Cir. 1997).

230. See *Oregon Natural Resources Council*, 6 F. Supp. 2d at 1159.

231. See *id.*

232. *Id.*

Under existing programs, federal agencies retain the discretion to decide if a stakeholder initiative complies with federal standards. This does not raise constitutional issues because there has been no delegation of legislative authority to private parties. If local groups had the authority to bind federal and state governments to place-based solutions to specific implementation plans, it would raise serious separation of power and due process issues.<sup>233</sup> Courts by and large have decided that the prohibition against the delegation of legislative authority to administrative agencies, and to mixed private public bodies, is best enforced by protecting the procedural rights of the regulated community. Moreover, *Chevron, USA, Inc. v. Natural Resources Defense Council*<sup>234</sup> signals an unwillingness to use the delegation doctrine to police administrative agencies. In place of the delegation doctrine, *Chevron* suggests finding a regulation *ultra vires* when an agency strays too far from congressional purpose.<sup>235</sup> The considerations that support nonenforcement of the delegation doctrine to administrative agencies do not support its abandonment when power is delegated to private parties. Private decision making, without some form of effective public checks, reinforces unequal distributions of political power. This creates a high risk that decisions will be made from a narrow perspective to the exclusion of other relevant considerations and without control by either the Executive or Congress.<sup>236</sup>

## VI. Conclusion

The reemergence of the watershed as a planning and regulatory unit in the United States represents an ambitious and promising attempt to adapt the rigidity of unnatural political boundaries to ecological reality. At the current time, the efforts are ad hoc and experimental, and the jury is still out on their success. Sometimes, they are limited to a local jurisdiction, but often, out of necessity, they involve federal, state and local governments. If watershed protection is to become the principal vehicle for the practice of environmentally sustainable land and water management, it must overcome two barriers. First, inter-governmental cooperation must become the norm rather than the exception as it is now. Public agencies must adapt their missions to this new and incompletely defined idea. Second, historic water and land use entitlements must be modified to make them consistent with the sustainability of watersheds as ecologically functioning units.<sup>237</sup> The incorporation of a public dimension into private entitlements must be the ultimate objective of the many ambitious cooperation and consensus efforts currently underway across the United States. This should be done in a manner consistent with stakeholder public participation that does not paralyze the process.

233. See generally *Carter v. Carter Coal Co.*, 298 U.S. 213 (1936).

234. 467 U.S. 837 (1984).

235. *Id.*

236. See generally Harold J. Krent, *Fragmenting the Unitary Executive: Congressional Delegations of Administrative Authority Outside the Federal Government*, 85 NW. U. L. REV. 62 (1990).

237. See Eric T. Freyfogle, *Ethics, Community, and Private Land*, 23 *ECOLOGY L.Q.* 631 (1996).