

# WATERSHED MANAGEMENT: SLOGAN OR SOLUTION?†

*William Goldfarb\**

## I. INTRODUCTION

The natural resources management field is replete with terms that carry powerful prescriptive and hortatory meanings but lack descriptive specificity. The currently popular terms “sustainability” and “biological diversity” are examples of this genre. Terms such as these are valuable tools for articulating goals, stating general objectives, and mobilizing public support; but they also tend to be employed as manipulative and confusing slogans. This paper attempts to analyze another such fashionable term, “watershed management,” in order to determine the extent to which it is a meaningful component of the water resources management lexicon. Section II identifies the water resources management problems that the proponents of watershed management seek to address. Section III focusses on the historical development of watershed management and its analogues, and how this evolution has influenced the current meaning of watershed management. In Section IV, current applications of the watershed management concept are explored. Section V examines some of the theoretical underpinnings of watershed management. Finally, Section VI outlines and evaluates recent proposals for achieving watershed management.

## II. WATERSHED MANAGEMENT AS A RESPONSE TO INSTITUTIONAL PROBLEMS

The trend toward watershed management is a response to the following fundamental legal-institutional problems of water resources management: A) Transboundary water management problems; B) Implications of federalism and separation of powers; and C) Variability of water law among political units.

### A. *Transboundary Water Management Problems*

American political boundaries do not, for the most part, correspond to water resources problem-sheds.<sup>1</sup> Most water resources problems are transboundary in nature, i.e., intermunicipal, interstate, or international.<sup>2</sup> In the American political system, regional political institutions are difficult to create and, when established, tend to lack political viability.<sup>3</sup> Thus, there is rarely a single competent institution with legal jurisdiction over a water resources problem of regional dimension. In addition, water resources problems such as interbasin transfers of water transcend even recognized regional boundaries.<sup>4</sup> This institutional situation creates the traditional incentive for one jurisdiction to solve its own development problems without regard to spillover water resources effects on neighboring jurisdictions, frequently downstream or downgradient jurisdictions.<sup>5</sup> In this process of cost externalization, tragedies of the commons are often overlooked.

Regional solutions to water resources management problems are also frustrated by the difficulty of defining a water resources problem-shed in a way that will both promote holistic problem-solving and elicit political support. For example, the term "watershed" is ordinarily understood to apply to surface waters. The United States Environmental Protection Agency (EPA), however, defines a "watershed" as a geographic area in which water, sediments, and dissolved materials drain to a common outlet—a point on a larger stream, a lake, an underlying aquifer, an estuary, or an ocean. This area is also called the *drainage basin* of the receiving water body.<sup>6</sup>

EPA's definition views groundwater as a receiving waterbody but not as a source of water for a surface waterway. Perhaps aware of the inadequacy of this definition for comprehensive management purposes, EPA goes on to widen the scope of "watershed" even further:

The Watershed Protection Approach described in this booklet does not require a particular definition of watershed. Local decisions on the scale of geographic unit consider many factors, including the ecological structure of the basin, the hydrologic factors of underlying ground waters, the economic uses, the type and scope of pollution problems, and the level of resources available for protection and restoration projects.<sup>7</sup>

Here, the watershed concept includes socioeconomic factors as well as physical ones. This definitional extension achieves comprehensiveness at the risk of contravening the public's understanding of what a watershed entails. The arduous political task of regional institution-

building is further exacerbated by EPA's strategy of adopting an ad hoc, esoteric definition of "watershed."

### *B. Implications of Federalism and Separation of Powers*

Myriad governmental institutions at the international, federal, interstate, state, substate regional, and local levels of government play significant roles in managing water resources. Institutional rivalries, conflicting or overlapping jurisdictions, diverse constituencies, and other factors cause frequent disagreements among these institutions with regard to water resources issues. On the federal level, thirteen congressional committees and subcommittees, eight cabinet agencies, six independent regulatory agencies, and two White House offices are involved in establishing water policy. "An estimated 100,000 water-related entities exist locally; states have over 300 departments having water and water-related resource functions."<sup>8</sup> Mann has pointed out that states have adopted water resources management policies "that reflect an incongruous mix of perceptions and constraints" based on 1) the nature of the problem, 2) the availability of financial resources, 3) the interest group structure within each state, 4) institutional capacities, and 5) the economic and political culture of each state.<sup>9</sup> This proliferation of management institutions at various governmental levels, each with its own political constituency and agenda, has impeded comprehensive and integrated water resources management.

Another complicating factor is the jurisdictional separation between water resources management and land-use control. Many important water resources management decisions are made at the federal, interstate, state, or substate regional levels, while land use is primarily governed at the local level through "home rule" ordinances.<sup>10</sup> Although jurisdictionally clear, in practice the distinction between water resources management and land-use management breaks down. All uses of land have water resources implications, and vice versa. Because water is a basic human need, any land development for agricultural, residential, industrial, commercial, or recreational purposes involves a diversion of water of suitable quality. Changes in the water regime—for example the construction of an impoundment for water supply, flood control, and recreation purposes—have profound implications for land use in areas within the impoundment's zone of influence.<sup>11</sup> For the most part, the municipalities that control land use lack jurisdiction over water diversion and water pollution control, which are primarily state and federal functions.<sup>12</sup>

### *C. Water Law Variability Among Political Units*

Water law in the United States is fragmented by political jurisdiction, hydrological feature, and management concern. The law relating to water diversion is essentially state law, although federal law is important with regard to federal reserved water rights, distribution of water from federal projects, and federal regulatory restrictions on water use (e.g., the Clean Water Act permits for dredging and filling activities in wetlands).<sup>13</sup> Each state has adopted its own version of the numerous legal rules relating to water diversion rights—prior appropriation, riparian rights, and riparian rights-based permit systems for surface water diversions; and absolute ownership, reasonable use, correlative rights, and prior appropriation for groundwater diversions.<sup>14</sup> Common law rules regarding diversions from surface and groundwater are inconsistent. For example the “reasonable use” element of riparian rights surface water diversion law is different from the “reasonable use” rule of groundwater diversion law.<sup>15</sup>

Water pollution control law, in contrast to water diversion law, is more consistent across state lines because it is based on the federal Clean Water Act which authorizes the establishment of uniform national effluent limitations for point sources of pollution.<sup>16</sup> But an individual state may impose stricter effluent limitations than the “federal floor” standards or interpret its antidegradation policy in a more lenient manner than a neighboring state.<sup>17</sup> Second, nonpoint source and groundwater pollution are unregulated at the federal level and thus controls, where they exist at all, tend to vary from state to state.<sup>18</sup> Third, separate federal statutory schemes exist to protect safe drinking water, the marine environment, the Great Lakes, wetlands, coastal zones, rivers suitable for hydropower development, wild and scenic rivers, and waterways on federal lands.<sup>19</sup> Finally, states may also regulate wetland, flood plain, lakeshore, and critical area development, with important consequences for water quality.<sup>20</sup> Where federal or state law does regulate the development of a water resource, for example wetlands, that regulation is ordinarily site-specific and ignores regional, cumulative, and secondary impacts of land use.<sup>21</sup>

### III. WATERSHED MANAGEMENT IN THE PAST

Watershed management’s closest antecedent is the concept of “unified river basin management,” which has been influential in the water resources management community since approximately 1900.<sup>22</sup> Commentators point out that the evolution of unified river basin

management can be divided into three periods: 1) 1900–1933; 2) 1933–1965; and 3) 1965–1990.<sup>23</sup> Over these periods, the emphasis of unified river basin management changed from multipurpose, basinwide development, to regional development, to nonstructural, basinwide flood and pollution control.<sup>24</sup>

Multipurpose, basinwide water resources development was the prominent feature of the first period.<sup>25</sup> Significant events during that period included the Reclamation act of 1902,<sup>26</sup> waterways commission reports from 1908–1917,<sup>27</sup> the Federal Power Act of 1920,<sup>28</sup> the Corps of Engineers “308” basin study authorizations from 1925–1927,<sup>29</sup> and the Boulder Canyon Project Act of 1928.<sup>30</sup> The underlying principle of multipurpose, basinwide water resources development was that large, federally planned and funded impoundments could stimulate basinwide economic development by combining flood control, municipal water supply, irrigation, hydroelectric power generation, recreation, and water quality improvement functions within single projects. The basinwide perspective was also carried over into the water pollution control area. During this period, the Public Health Service made pollution control studies of the Ohio River Basin beginning in 1912.<sup>31</sup>

The second period began with the New Deal and ended with the Water Resources planning Act of 1965.<sup>32</sup> The keynote of this period was the idea of regional socioeconomic development through publicly-owned hydropower.<sup>33</sup> The two major events of this second period were the establishment of the Tennessee Valley Authority (TVA)<sup>34</sup> and the reports of the National Resources Planning Board recommending the creation of additional federal corporations like TVA to promote economic development in economically depressed sections of the nation.<sup>35</sup> The concept of federal regional corporations that would construct impoundments intended to provide inexpensive electric power, in addition to other multipurpose benefits, substantially broadened the geographical scope of unified river basin management. A comparable expansion of scope occurred in the water quality area. This period saw the genesis of a federal presence in water pollution control, with enactment of the Federal Water Pollution Control Acts of 1948 and 1955.<sup>36</sup>

The developmental theme of the first two periods was carried over into the third period with the passage of the Water Resources Planning Act of 1965.<sup>37</sup> This statute established a federal interagency Water Resources Council to supervise and implement comprehensive, coordinated joint plans (CCJPs) prepared by river basin commissions consisting of federal, state, and local officials.<sup>38</sup> The CCJPs were to be

followed by more detailed basin studies (level B studies), which, in turn, were to form the bases for water resources development project planning.<sup>39</sup> This detailed planning mechanism was, in general, a failure, although a number of valuable CCJPs were produced.<sup>40</sup> One of the numerous reasons for this failure was the appearance of a new political pluralism in place of the development-oriented pork barrel system that had preceded it.<sup>41</sup> The environmental movement made major advances during this period, as reflected in the Federal Water Pollution Control Acts of 1965, 1966, 1972, and 1977.<sup>42</sup> Environmentalist visions of unified river basin management stressed nonstructural, basinwide flood and pollution controls, including wetlands preservation, critical area protection, and restrictions on floodplain development.<sup>43</sup> Environmentalists also called attention to the deleterious environmental impacts of large-scale irrigation, hydroelectric, water supply, and water-based recreation projects.<sup>44</sup> The anti-development orientation of environmentalists was frequently shared by fiscal conservatives, because "most of the major and more dramatic water projects were under construction or had already been completed [and] . . . [t]hose that remained were, by definition, small projects and more doubtful from a [benefit/cost] point of view."<sup>45</sup> Environmentalists and fiscal conservatives also tended to agree that future water resources development projects should be primarily funded by user charges, not federal grants.<sup>46</sup> Acting on his fiscal conservatism, President Ronald Reagan terminated the Water Resources Council and the river basin commissions in 1981, although the Water Resources Planning Act has not formally been repealed.<sup>47</sup> This third period came to an end with the completion or deauthorization of most of the major federal water resources development projects previously authorized.

Between 1900 and 1990, the prevailing definition of "unified river basin management" underwent major changes with regard to geographical scope, the locus of water resources planning and management, and the desirability and funding of water resources development projects. Having traced the evolution of unified river basin management, Wengert concluded that "agreement, except at a very general level, as to the details of policy and program meaning is still lacking."<sup>48</sup>

Unified river basin management has lost much of its appeal not only because of its vagueness but also because its development mission has been both successfully accomplished and also superseded by other national concerns. In addition, it is frequently associated with a single experiment in regional development—the federal corporation (TVA)—that has not been repeated. Watershed management adopts

the comprehensive and coordinated approach of unified river basin management without the latter's preoccupation with development.

#### IV. WATERSHED MANAGEMENT TODAY

The following analysis explores current applications of the watershed management concept in order to determine if there are specific commonalities of meaning among them. It will be argued that, except for the broad outlines of nonpoint source pollution control strategies, watershed management—like its predecessor unified river basin management—has no consistently accepted descriptive meaning, either conceptual or operational. This section is organized by levels of government and official management institutions at different governmental levels.

##### *A. International Level*

International customary law, and treaties based on these rules, recognize that international drainage basins—including both surface and groundwater—are governed by the principle of equitable apportionment among basin states.<sup>49</sup> Under this doctrine

[g]overnments apply . . . the right of each basin State to an equitable utilization and the duty not to cause appreciable harm to a co-basin State (including to the environment), and recognize the duty to exchange available relevant information and data, the duty to notify and consult reciprocally with co-basin States that may be adversely affected by a project or program planned by one or more of the basin States and the duty to consult concerning the institutionalization of co-operation or collaboration for basin development upon the request of any other basin State.<sup>50</sup>

International treaties have established numerous councils, committees, authorities, and commissions to administer specific treaty obligations.<sup>51</sup> An example is the International Joint Commission, established by the Boundary Waters Treaty of 1909 between the United States and Canada.<sup>52</sup> These treaty organizations differ widely as to 1) types of resources administered (e.g., surface, groundwater, or both; single sites or whole basins), 2) purposes (single, or multipurpose), and 3) institutional structures. Governments are flexible in designing noncoercive institutions to solve specific international water resources problems.

### *B. Federal (U.S.) Level*

In the United States, several federal administrative agencies and other institutions operating in the following functional areas profess to practice watershed management. However, their watershed management activities differ as to organizational locations and structures, scope of management responsibilities, and primary functional concerns based on congressional authorizations and historic missions.

#### 1. Water Resources Development

The U.S. Army Corps of Engineers, Soil Conservation Service, and Bureau of Reclamation are undertaking, providing partial funding for, supervising, or approving water resources development projects based on multi-objective, watershed-based planning and management.<sup>53</sup> These watershed management efforts have in common 1) an emphasis on surface water impoundment or diversion projects, 2) a need to primarily protect federal financial investment or congressionally-authorized federal concerns such as flood control, navigation, irrigation, or soil erosion control, and 3) a need to define watershed management in the context of the National Environmental Policy Act (NEPA).<sup>54</sup> But the watershed management programs of the three federal water resources development agencies differ markedly. The Corps of Engineers, located in the Department of the Army, has nationwide responsibility for implementing multipurpose water resources development projects in large river basins and coastal areas.<sup>55</sup> But the Corps' primary program areas are flood control and navigation enhancement.<sup>56</sup> The Bureau of Reclamation, a subagency of the Department of the Interior, has traditionally constructed irrigation projects in the West.<sup>57</sup> The Bureau's mission is currently in transition from irrigation development to multipurpose project management.<sup>58</sup> The United States Department of Agriculture's Soil Conservation Service primarily cooperates with farmers to implement soil erosion control projects in small watersheds.<sup>59</sup>

#### 2. Federal Lands Management

With regard to federal land management agencies, watershed management is ill-defined. One-third of the Nation's land mass is owned by the federal government.<sup>60</sup> Most of this area is administered by three federal agencies: the Bureau of Land Management (BLM) (United States Department of the Interior); the Forest Service (FS) (United States Department of agriculture); and the National Park Service



(NPS) (USDOJ). The FS and BLM are required by their authorizing legislation (the Multiple-Use, Sustained-Yield Act of 1960<sup>61</sup> and the National Forest Management Act of 1974<sup>62</sup> for the FS, and the Federal Lands Policy and Management Act of 1976 for the BLM)<sup>63</sup> to manage federal lands under their jurisdictions for multiple use and sustained yield.

"Watershed" is one of the multiple uses included in these statutes.<sup>64</sup> But according to Professor Coggins, despite this statutory foundation, watershed has been the forgotten multiple use in legal contemplation. No generally accepted definition of watershed exists beyond the merely geographical notion that a watershed is an area drained by a river or stream. The word, in fact, connotes two basic concepts: resource protection and increased water yield. These two aims often conflict.<sup>65</sup>

Federal land management agencies invoke the concept of watershed management when they manage for instream flow preservation; protection of riparian zones; protection of wild and scenic rivers; protection of endangered species; preservation of fisheries; promotion and regulation of forestry, grazing and mining; and control of nonpoint sources of water pollution. But the watershed element of these management goals is desultory, diffuse, ad hoc, and often self-contradictory.<sup>66</sup>

### 3. Water Pollution Control

Watershed management appears to mean anything and everything in the water pollution control area. The United States Environmental Protection Agency (EPA) uses the phrase "watershed management" to characterize diverse programs such as wasteload allocations for point sources under section 303 of the Clean Water Act (CWA);<sup>67</sup> elements of the point source stormwater management program, such as watershed-wide permitting;<sup>68</sup> the Clean Lakes Program;<sup>69</sup> supervision of state nonpoint source control programs under CWA section 319;<sup>70</sup> EPA-funded studies of point-nonpoint source pollution rights trading;<sup>71</sup> the National Estuary Program, with a special emphasis on Chesapeake Bay;<sup>72</sup> the Agency's Great Lakes Initiative;<sup>73</sup> and the Sole Source Aquifer and Wellhead Protection Programs under the Safe Drinking Water Act.<sup>74</sup> But we have already seen that EPA's definition of "watershed" is so broad that it can potentially apply to any regional water resources management program. Furthermore, EPA has provided little guidance about how the abovementioned EPA programs will be integrated, either conceptually or organizationally. For example, how will EPA reconcile point source control programs such as

NPDES or stormwater management, over which the Agency possesses statutory jurisdiction, with nonpoint source and groundwater protection programs that primarily reside at the state level and over which EPA has at best indirect control?

#### 4. Hydropower Regulation

There is an explicit statutory requirement for watershed planning with reference to development of hydroelectric power projects.<sup>75</sup> In practice, however, the meaning of watershed planning and management, as applied to hydropower, has been controversial. The Federal Energy Regulatory Commission (FERC) (United States Department of Energy) possesses the authority to regulate nonfederal hydroelectric projects.<sup>76</sup> The Federal Power Act provides that hydropower licenses be issued on condition that the project "be best adapted to a comprehensive plan for improving or developing a waterway or waterways for the use or benefit of interstate or foreign commerce, for the improvement and utilization of waterpower development, and for other beneficial public uses, including recreational purposes."<sup>77</sup> Thus, a comprehensive watershed plan must be developed before a license may be issued. However, conservationists have consistently alleged, before Congress and the courts, that FERC systematically neglects comprehensive watershed planning, fails to consider the cumulative effects of multiple hydropower projects in a single watershed, and undervalues environmental impacts of hydropower development, especially adverse impacts on anadromous fisheries.<sup>78</sup> In 1986, Congress amended the Federal Power Act to redress some of these grievances.<sup>79</sup> FERC's watershed planning process will undoubtedly be a contentious aspect of the current round of hydropower relicensing proceedings.

#### 5. Wetlands Protection

Watershed management in this area is espoused but not highly developed. The Corps of Engineers, in its joint administration of section 404 of the Clean Water Act, takes watershed impacts into consideration when determining 1) whether to issue permits for dredge and fill activities in wetlands and 2) how and where to mitigate the impacts of wetlands destruction.<sup>80</sup> But the Corps' watershed perspective in the 404 program is attenuated because of 1) the site-by-site nature of the permitting process and the scientific uncertainties involved in predicting watershed-wide effects of the proposed project and others proceeding in the watershed, 2) the many wetland-disturb-

ing activities that are exempt from the Corps' section 404 jurisdiction, 3) the automatic general permitting of categories of activities, such as road building, regardless of where in a watershed they occur, 4) the exclusion from federal jurisdiction of activities that directly affect groundwater, and 5) the cumbersome sharing of section 404 jurisdiction with EPA.<sup>81</sup>

## 6. Information Collection and Dissemination

A number of federal agencies collect data on a watershed basis. However, definitions of study areas, methodologies for data collection and analysis, and purposes for which data are utilized frequently differ from agency to agency. For example, the National Water Quality Assessment (NAWQA), conducted by the United States Geological Survey (USGS) (United States Department of the Interior), evaluates water quality and quantity data collected from USGS gauging stations interspersed throughout the United States.<sup>82</sup> The Man And The Biosphere (MAB) Program, carried out by the National Oceanographic and Atmospheric Administration (United States Department of Commerce), examines the impacts of development on biological diversity in watersheds designated as critical areas.<sup>83</sup>

## 7. Water Allocation by Watershed

Federal water allocation, on a watershed basis, has consisted of sporadic, ad hoc responses to interstate water resources problems. Congress has apportioned the water of the Colorado River among Upper and Lower Basin States.<sup>84</sup> The Supreme Court, following the international law doctrine of equitable apportionment among basin States, has apportioned the waters of the Delaware and North Platte Rivers, among others.<sup>85</sup> There has been little methodological consistency among Supreme Court apportionments of interstate rivers.<sup>86</sup>

### *C. Watershed Management Between and Among States*

Interstate watershed-wide compacts managing shared water resources are as variable as international agreements with regard to resources managed, purposes, and organizational structures. Over one hundred interstate compacts have been entered into under the Compact Clause of the United States Constitution in the areas of bridge and port management, water pollution control, and water supply with regard to interstate watersheds.<sup>87</sup> Some of these compact commissions include a federal representative,<sup>88</sup> but most do not. Sig-

nificantly, interstate compact commissions have been established for only a small percentage of major United States surface watersheds, and for only a few interstate aquifers. Where they exist, they often perform rather modest functions. For example, in the water pollution control area, a compact commission, such as the Ohio River Sanitation Commission (ORSANCO), is typically responsible for coordination, research, and ambient monitoring activities.<sup>89</sup> Regulation and enforcement is left to the signatory States. In addition to interstate compact commissions, states have forged other site-specific water resources management alliances such as the Northwest Power Planning Council and the Chesapeake Bay Initiative.<sup>90</sup> Once again, there is no standard model for an interstate watershed management agency.

#### *D. State Watershed Management*

In the American political system, states possess the inherent authority to enact legislation intended to protect the health, safety, and welfare of their citizens unless 1) authority to legislate in a particular area, for example to raise armies, has been relinquished to the federal government in the United States Constitution,<sup>91</sup> or 2) state legislation creates a conflict with validly enacted federal law.<sup>92</sup> State watershed management efforts are thus concentrated in three areas where Congress has chosen not to regulate: nonpoint source pollution control; water allocation and supply management; and management of the beds and banks of navigable waterways.

##### **1. Nonpoint Source Pollution Control**

In the series of water pollution control statutes enacted since 1972, Congress has explicitly determined that control of nonpoint sources of water pollution is the responsibility of state and local governments.<sup>93</sup> The watershed management concept and its attendant terminology is most consistently and credibly applied to state programs for control of nonpoint source pollution from agriculture, silviculture, and urban nonpoint stormwater runoff. The three most successful state nonpoint source control programs are Wisconsin's program to reduce agricultural runoff<sup>94</sup> and Maryland's<sup>95</sup> and Florida's programs to control urban stormwater runoff.<sup>96</sup> It is sensible and effective to view nonpoint source pollution from a watershed perspective because 1) nonpoint source pollution is caused by the effects of intermittent storm events on diffuse land use and management activities, 2) the water quality impacts of individual nonpoint sources are difficult, if

not impossible, to measure, and 3) a nonpoint source's location within a watershed is critical with regard to its contribution to nonpoint source waterbody pollutant loadings. Consequently, a nonpoint source pollution control process involving 1) targeting of priority watersheds, 2) watershed modelling and prioritization of nonpoint source categories or areas of primary concern, and 3) watershed-wide solutions emphasizing site-specific and cost-effective Best Management Practices (BMPs) is appropriate to the solution of this problem. Nevertheless, within the general framework of state nonpoint source control programs, individual state approaches differ widely.<sup>97</sup> Most state programs are voluntary, but an increasing number require mandatory compliance with BMPs.<sup>98</sup> Some states provide economic incentives to compliance, such as cost-sharing or tax abatements,<sup>99</sup> while other states do not offer incentives.<sup>100</sup> Many states provide technical assistance to property owners,<sup>101</sup> while other states do not provide these services.<sup>102</sup> Despite these differences, the surface watershed perspective is common to all effective state nonpoint source control programs.

## 2. Water Allocation and Supply Management

The federal government has traditionally deferred to state laws with regard to allocating rights to divert and supply water except where there have been severe interstate conflicts (e.g., the Colorado and Delaware River allocations discussed above).<sup>103</sup> But state water allocation and supply law differs markedly from region to region and from state to state.<sup>104</sup> Many states perform water supply planning on a watershed or aquifer-wide basis. Arizona has been a pioneer in controlling groundwater diversions based on aquifer capacities.<sup>105</sup> Some states, notably Georgia, Massachusetts, New Jersey, and North Carolina, are attempting to reorganize some or all of their state water resources programs along watershed lines.<sup>106</sup> In the Western United States, state agencies and courts adjudicate diversion rights for entire watersheds under state water codes.<sup>107</sup>

## 3. Management of the Beds and Banks of Navigable Waterways

Upon admission to the Union, states received title to the beds and banks of navigable waterways. These areas are administered by states as trustees under the public trust doctrine, even where shorelands have been alienated to private parties.<sup>108</sup> Many states regulate development in floodplains in order to reduce flooding and stream sedimen-

tation.<sup>109</sup> Approximately thirty states administer some form of state wild and scenic rivers preservation program.<sup>110</sup> Most coastal states have approved coastal zone management programs under the Federal Coastal Zone Management Act of 1972.<sup>111</sup> Although floodplain, coastal zone, and wild and scenic rivers management statutes may have watershed-wide implications, their jurisdictional areas are generally limited to stream corridors and coastal margins.<sup>112</sup>

### *E. Substate Regional Watershed Management*

Substate regional entities are creatures of state law. Some states, especially those west of the Mississippi River, have made extensive use of substate districts, commissions, and authorities in managing water resources.<sup>113</sup> State statutes have authorized the formation of districts, commissions, and authorities to carry out some or all of the following activities: conservation; irrigation; drainage; natural resource management; erosion control; provision of sewerage facilities; water supply; nonpoint source pollution control; and flood control. The most comprehensively multipurpose among these water management districts are the Nebraska Natural Resource Districts,<sup>114</sup> the Arizona Water Management Districts,<sup>115</sup> and the Florida Water Management Districts.<sup>116</sup> Some substate districts are organized along watershed or aquifer boundary lines,<sup>117</sup> while others conform to political boundaries such as municipal or county lines.<sup>118</sup> Some districts possess taxation and condemnation powers,<sup>119</sup> but others do not.<sup>120</sup> State authorizing statutes also differ appreciably with regard to the structures and governing systems of substate entities. Substate regional districts, commissions, and authorities perform watershed management only when their jurisdictional areas include or are contiguous with watershed or aquifer boundaries, and even then their management structures and functions can differ from state to state and from one type of district to another.

A few states have established critical areas based on watershed or aquifer boundaries.<sup>121</sup> In these protected areas, a regional commission closely regulates development within the watershed with authority to override "home rule" land-use decisions of local municipalities if they conflict with the commission's comprehensive plan.<sup>122</sup> The Adirondack Park Agency of New York is an example of a commission with supervening land-use powers within a number of watersheds,<sup>123</sup> while the New Jersey Pinelands Commission's jurisdiction is coextensive with one of the State's major aquifers.<sup>124</sup>

### *F. Local Watershed Management*

There are countless municipalities and counties that manage some aspect of water resources use, especially in the areas of water supply, provision of sewerage facilities, wellhead protection, regulation of septic systems, recreation, riparian buffer protection, road construction, wetlands protection, and flood control. Few of these local efforts rise to the level of watershed management because of the multijurisdictional nature of most watersheds. New York City, however, has zoning powers over the entire New York segment of the Delaware watershed, where its largest reservoirs are located.<sup>125</sup> New York City is now attempting to restrict development in this watershed in order to obtain an exemption from costly water filtration requirements that would otherwise be imposed under the Federal Safe Drinking Water Act.<sup>126</sup>

## V. WHAT DOES WATERSHED MANAGEMENT MEAN?

Watershed management is as ambiguous in theory as it has been in practice. Although there is no standard institutional model of watershed management, it is indisputable that the concept carries with it enormous emotive and hortatory appeal. When used by politicians, water resources professionals, and concerned citizens, watershed management appears to mean, *Let's do our best to solve water resources problems on a water resources problem-shed basis because such solutions will be most efficient, effective, equitable, and environmentally protective*. But this adjuration is disarmingly simple, and does not automatically translate into optimum water resources management policy. For example, given what we know about the extensive deposition of airborne nitrogen and toxic contaminants in Chesapeake Bay and the Great Lakes, should not the problem-shed include the relevant airshed as well? And should not the effects on water resources of extra-watershed hazardous and solid waste disposal, natural resources management, recreation, water transfer, and land use be taken into consideration in fashioning institutional solutions?

Norman Wengert, in discussing similar objections to unified river basin management, referred to the view that "regions should be defined in terms of problems and solutions to problems to be stated in comprehensive multidisciplinary dimensions, solutions to reflect the fullest possible government coordination."<sup>127</sup> These open-ended or

flexible regions are potentially even broader than EPA's expansive definition of "watershed" discussed above.

Problem-based regions may be coterminous with the problems to be solved, but such regions themselves raise institutional difficulties: 1) the larger the region, the more institutions and interest groups must be included in problem-solving, thus intensifying institutional conflicts and political rivalries; and 2) the larger the region, the greater is the possibility that only the federal government, which may be far removed from the problem area and lack political credibility there, will be capable of devising and imposing a solution. Institutional design for regional environmental management always requires a delicate balancing of problem-shed inclusiveness against the political feasibility of reaching and implementing a solution.

But despite these theoretical problems, it remains clear that in some cases addressing water resources issues in a watershed or aquifer-wide setting will lead to more comprehensive and better integrated solutions. Taking advantage of the highly honorific connotation accorded to watershed management, a number of groups have recently made proposals for institutionalizing it.

## VI. RECENT WATERSHED MANAGEMENT PROPOSALS

Within the past few years, systematic initiatives for implementing watershed management have been proposed by the Association of Metropolitan Sewerage Agencies (AMSA),<sup>128</sup> the Water Quality 2000 group,<sup>129</sup> EPA, and the drafters of S. 1114, the Senate Clean Water Act reauthorization bill.<sup>130</sup> These proposals will be evaluated with reference to an emerging body of institutional theory that envisions watershed management as a process for achieving consensus regarding regional water resources management rather than any particular institutional product. They will also be evaluated in terms of how each responds to the institutional challenges set out above.

Many commentators have agreed that unless overriding national interests dictate otherwise, watershed management should be a flexible, responsive, "bottom-up" consensus-building process rather than a universal, standardized, "top-down" product.<sup>131</sup> The watershed management process should stress negotiation and consent rather than command-and-control regulation. Planning should be participatory and proceed from the "bottom up." Management should be accomplished from the "inside out" rather than from the "outside in." That is, existing institutions should be used wherever possible in fashioning solutions. Finally, each planning unit, whether watershed or other-



wise, has a unique set of problems requiring a different level and intensity of management; resources should be directed to priority areas and institutional solutions should be individually tailored.

The first of these new proposals is contained in AMSA's draft Comprehensive Watershed Management Act of 1993.<sup>132</sup> According to this draft bill, governors would designate and rank the watersheds within their states—Class A, B, or C—in order to establish a targeted, ranked effort for watershed management.<sup>133</sup> Interstate watersheds would require cooperation among governors in creating enforcement boundaries.<sup>134</sup> Governors would then appoint Watershed Management Commissions of up to twenty-five members, including representatives of federal, state, and local agencies, water management districts, environmental groups, pollution sources, academia, and the scientific community.<sup>135</sup> Watershed Management Commissions would collect data on their watersheds and formulate watershed management plans identifying and prioritizing water pollution problems in the watersheds, taking economic and energy impacts into consideration.<sup>136</sup> Plan outcomes would be Minimum Standards of Operation (MSOs) for point and nonpoint sources or categories of sources in the watersheds.<sup>137</sup> Once a specific plan has been approved by a Commission, the regulatory community of federal and state agencies would be obligated to enforce the plan.<sup>138</sup> Federal funding would cover up to seventy-five percent of the cost of designing the watershed management plans, with the remainder of the management costs to be funded by states and sources of pollution.<sup>139</sup>

The AMSA proposal is essentially a top down process that concentrates almost exclusively on regulatory solutions to water quality problems. Other aspects of water resources management are referred to only peripherally. Although the new Watershed Management Commissions would be broadly representative, gubernatorial appointment of members and predominantly federal funding of operations would interject state and federal politics into the planning process and provoke suspicion among participants. Commissions would not possess the political constituencies or internal funding resources to restrain and resolve conflict. Moreover, the AMSA draft does not define "watershed" and relegates interstate water management problems to the vagaries of interstate cooperation.<sup>140</sup> On the positive side, the AMSA draft makes admirable use of the targeting and prioritizing approaches characteristic of successful nonpoint source pollution control programs.<sup>141</sup>

The second of these watershed management proposals has been put forth by Water Quality 2000, a working group consisting of repre-

sentatives from industry, government, and the consulting and environmental communities.<sup>142</sup> This is an elaborate set of recommendations that would recast American government in the cause of comprehensive water resources management.<sup>143</sup> Its “nested” structure is based on the USGS four-tiered system of watersheds: 1) the *Riverine Basin* (twenty-one have been identified in the United States); 2) the *Planning Sub-Region*, including a reach of a river and its tributaries in that region, a closed basin, or a group of streams forming a coastal drainage area; 3) the *Accounting Unit* within a planning sub-region (USGS has designated a set of 352 of these); and 4) the *Local Hydro-Region*, representing part or all of a surface drainage basin, a combination of drainage basins, or a distinct hydrologic feature (USGS calls these “cataloging units” and has identified 2,100 of them).<sup>144</sup>

The planning and management system based on these divisions would function as follows:

At the level of the *Local Hydro-Region*, basic planning and implementation would take place. The local plan would deal with surface and groundwater as well as water quality and quantity. All local government comprehensive planning, zoning, and subdivision ordinances would need to be consistent with that Hydro-Region plan . . . . And the Hydro-Region plan would emerge by consensus from a citizens committee, the makeup of which should be 20 percent from industry; 20 percent from the environmental community; 15 percent from professional organizations; 15 percent from academia; and 10 percent each from local, state, and federal governments. The committees could be appointed by metropolitan planning organizations or councils of government.<sup>145</sup>

At the *Accounting Unit* level, Clean Water Act sections 401 and 404 permits would be issued, consistent with the Hydro-Region plan and Best Management Practices . . . . The committee guiding the Accounting Unit would consist of representatives from the citizens committee in the Local Hydro-Region.<sup>146</sup>

At the next level, the *Planning Sub-Region*, a general water quality plan would grow out of negotiations between various Accounting Units, and the Sub-Region’s oversight committee would again be appointed by those who sit on committees at the lower levels.<sup>147</sup>

At the highest level, the *Riverine Basin*, rests the responsibility for setting water quality standards and administering the National Pollutant Discharge Elimination System. This would be geared to approved watershed plans, taking into account various climatic and physiographic differences in the regions.<sup>148</sup>

The Riverine Basin plan (watershed plan) would integrate the plans from the Planning Sub-Regions.<sup>149</sup> Citizens committees “at the Riverine Basin level would be appointed by the governor or governors of

the states involved, from among the members of the Planning Sub-Region committees.”<sup>150</sup> Riverine Basin plans would have to be approved by EPA based on overall federal water pollution control standards.<sup>151</sup>

The Water Quality 2000 nested watersheds approach is a bottom up, consensus-based, comprehensive planning and management system that adopts a problem-shed strategy for dealing with surface and groundwater quality and quantity problems. It also attempts to deal with the troublesome institutional disjunction between water resources management and land-use control by placing substantial implementation at the local level. But this proposal is vulnerable in its proliferation of new institutions without established constituencies or political credibility. Local governments would be indignant about the rescission of their “home rule” powers. Governments in general would resent constituting only thirty percent of the powerful Local Hydro-Regions. EPA and numerous members of Congress would strenuously oppose transferring the CWA permit programs to the Accounting Unit level. The sources of major funding that would be required to implement these monumental changes are undetermined.

The third of these proposals is EPA’s Watershed Protection Approach.<sup>152</sup> This is the ultimate in consensus-based, bottom up, inside out, problem shed-based, individualized, and targeted water resources planning and management. Watershed protection consists of three elements: 1) risk-based targeting of focus watersheds; 2) participation by all affected and interested stakeholders; and 3) integrated solutions established by stakeholder consensus.<sup>153</sup> Watershed protection activities identified by EPA have spontaneously arisen at all levels of government, although they have by no means occurred frequently. Watershed protection can take various institutional forms, but these efforts have most often been structured as a task force or work group, spearheaded by a State agency or EPA regional office. Most watershed protection groups have been oriented toward solving water quality problems, but the flexible, open-ended nature of this process also lends itself to more comprehensive water resources management. EPA has encouraged incipient watershed protection endeavors by directing Clean Water Act grant funds to them.<sup>154</sup> Additional funding is one of the items to be negotiated by the stakeholders.

EPA’s Watershed Protection Program is an enlightened attempt to encourage comprehensive watershed management, but—based as it is on voluntary negotiation and consensus—it overlooks three axioms of alternative dispute resolution theory: 1) parties will not negotiate unless they earnestly believe that they cannot achieve complete vic-

tory through the courts, the media, the political process, or otherwise; 2) parties will not negotiate matters of principle; and 3) parties will not negotiate unless their information gathering and presentation resources are roughly commensurate with those of their adversaries.<sup>155</sup> Unless these obstacles to negotiation can be overcome, watershed protection on the EPA model will continue to be sporadic and piecemeal.

In order to eliminate these obstacles to negotiation, Congress should authorize, and a consortium of the federal water resources management agencies should establish, a public education program in order to communicate 1) the need for watershed protection, 2) how it can be accomplished, 3) that watershed protection can be a "win-win" process for all participants, and 4) the disadvantages of other forms of dispute resolution (e.g., expense, delay, possibility of total loss, impermanence of solutions). The federal consortium should also be authorized to provide technical assistance in the form of information and experienced mediators to watershed protection efforts. Additionally, the consortium should undertake to enforce any solution (not contrary to federal law) that is negotiated by the participants.

Second, because matters of principle are generally non-negotiable, federal technical assistance should include issue identification and refinement expertise in order to distinguish those disputes that are genuine value conflicts from those that are the products of misunderstanding and misinformation. But it must be recognized that even if watershed protection is successful, there will remain roles for the courts, the political process, and administrative command-and-control mechanisms in resolving value disputes involving water resources.

Third, federal grant funds should be available to redress imbalances with regard to data collection, evaluation, and presentation. A stakeholder who feels that the negotiation process is dominated by her more affluent adversaries will neither negotiate in good faith nor honor a negotiated settlement. Once the negotiation process appears fair to all participants, they should all share the costs of implementing a solution under a negotiated formula that will assure an equitable allocation of costs. A further series of federal grants to encourage participation in watershed protection negotiations would be another incentive to initiate such a process.

The most recent of these watershed management proposals is contained in the Senate Clean Water Act reauthorization bill, S. 1114.<sup>156</sup> Section 302 of S. 1114, entitled "Comprehensive Watershed Management," essentially revives section 208 of the Clean Water Act of 1972,<sup>157</sup> which, for the most part, failed to control nonpoint sources of

pollution and was thus substantially amended by the Water Quality Act of 1987.<sup>158</sup>

Section 302 provides that

[t]he Governor of a State may at any time designate waters (including ground waters) and associated land areas within the State as a watershed management unit. To the extent practicable, the boundaries of each watershed management unit shall be consistent with the hydrological units identified by the [USGS] as the most appropriate units for planning purposes.<sup>159</sup>

Governors of adjoining states may designate interstate watershed management units. Each intra or interstate designation must be submitted to EPA for approval.<sup>160</sup>

After EPA approval, the Governor of a State must determine the entity responsible for developing and implementing a plan for each watershed management unit.<sup>161</sup> The management entity may be an agency of state government, a local government agency, a substate regional planning organization, a district or authority, or any other suitable public or nonprofit entity.<sup>162</sup> Approved management entities are eligible for grants under existing sections of the Clean Water Act.<sup>163</sup> S. 1114, however, authorizes no new funding for comprehensive watershed management.

If the management entity completes a comprehensive watershed management plan, the Governor "may" submit it to EPA for approval.<sup>164</sup> EPA's authority to approve plans may be delegated to qualifying states.<sup>165</sup> In order to be approvable, a plan must demonstrate that water quality or sediment standards will be attained within ten years, where nonpoint sources of pollution are a significant problem, or within five years where excessive pollutant loadings are attributable only to point sources.<sup>166</sup>

All federal actions within a designated watershed management unit must be consistent with the management plan, unless a presidential exemption is granted.<sup>167</sup> Point source dischargers within the watershed management unit are entitled to discharge permit modifications or term extensions if the management plan includes enforceable requirements for nonpoint sources that, in combination with point source controls, provide for the attainment and maintenance of water quality standards.<sup>168</sup>

Section 302 differs from section 208 in that section 302 focusses specifically on watersheds, embodies a broad federal consistency clause, includes time limits for compliance, and covers interstate watersheds, groundwater, and situations where point source dischargers are being

unfairly required to adopt more stringent control mechanisms because of the presence of unregulated nonpoint source pollution.<sup>169</sup> Nevertheless, section 302 shares the following defects of section 208 that led Congress to replace section 208 with section 319: 1) reliance primarily on substate planning and management agencies, thereby creating rivalries with state agencies; 2) discretionary participation by governors and potential planning and management agencies; 3) lack of enforcement "teeth" by EPA and states if approved plans are not enforced; and 4) insufficient funding to encourage participation.<sup>170</sup> More generally, Section 302 is a "top-down" command-and-control oriented system, although, in its favor, it does utilize existing institutions and recognize regional variations.<sup>171</sup>

Of the four recent watershed management proposals outlined above, only EPA's Watershed Protection Approach meets the recommended criteria for successful watershed management institutions, while also potentially dealing with the institutional obstacles that impede regional water resources management. However, EPA's proposal must be supplemented by federal technical assistance and incentives if productive negotiations over contentious water resources issues are to occur.

## VII. CONCLUSION

Watershed management is an attempt to surmount major impediments to regional water resources management that are inherent in the American political and legal systems. However, analysis of the concept's historical evolution and current applications discloses that it lacks specific descriptive or operational meaning. There are also significant theoretical problems in defining and applying watershed management. Nevertheless, there is frequently a need for watershed management, and the concept retains powerful prescriptive meaning. It should be defined not as a product or outcome but as a process for achieving consensus regarding regional water resources management. The most promising recent proposal for institutionalizing watershed management is EPA's Watershed Protection Program. But this proposal will not be effective without federally funded public education, technical assistance, and perhaps grants for participation.

## ENDNOTES

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\* Professor of Environmental Law, Cook College, Rutgers University, New Brunswick, New Jersey 08903. The author would like to express his appreciation to the New Jersey Agricultural Experiment Station, which provided partial funding for this study.

<sup>1</sup> See William B. Lord, *Unified River Basin Management in Retrospect and in Prospect*, in UNIFIED RIVER BASIN MANAGEMENT—STAGE II 58–67 (David J. Allee et al. eds., 1981).

<sup>2</sup> William Goldfarb, *Groundwater: The Buried Life*, in ECOLOGY, ECONOMICS, ETHICS: THE BROKEN CIRCLE 123–35 (F. Herbert Bormann & Stephen R. Kellert eds., 1991).

<sup>3</sup> Helen M. Ingram, *The Political Economy of Regional Water Institutions*, 55 AMER. J. AGRIC. ECON. 10 (1973).

<sup>4</sup> *Id.* at 10–11.

<sup>5</sup> *Id.* at 11.

<sup>6</sup> U.S. E.P.A., THE WATERSHED PROTECTION APPROACH: AN OVERVIEW (Dec. 1991).

<sup>7</sup> *Id.*

<sup>8</sup> See, e.g., Dean E. Mann, *Political Science: The Past and Future of Water Resources Policy and Management*, in WATER RESOURCES ADMINISTRATION IN THE UNITED STATES (Martin Reuss ed., 1993).

<sup>9</sup> Mann, *supra* note 8, at 62.

<sup>10</sup> Peter Marks, *Home Rule's Exclusive, Costly Kingdoms*, N.Y. TIMES, Feb. 1, 1994, at A1–B2.

<sup>11</sup> See Upper West Fork River Watershed Assoc. v. Corps. of Engineers, 8 ERC 2027 (N.D. W.Va. 1976), *aff'd*, 11 ERC 1097 (4th Cir. 1977).

<sup>12</sup> WILLIAM GOLDFARB, WATER LAW 15 (1988).

<sup>13</sup> 33 U.S.C. § 1344 (1988).

<sup>14</sup> See GOLDFARB, *supra* note 12, at 15–16; Goldfarb, *supra* note 2, at 123, 128; Lord, *supra* note 1, at 61–62.

<sup>15</sup> GOLDFARB, *supra* note 12, at 43–44.

<sup>16</sup> 33 U.S.C. § 1311 (1988).

<sup>17</sup> 33 U.S.C. § 1370 (1988).

<sup>18</sup> GOLDFARB, *supra* note 12, at 248–49.

<sup>19</sup> See, e.g., Safe Drinking Water Act, 42 U.S.C. § 300f *et seq.* (1988); National Forest Management Act, 16 U.S.C. § 1600 *et seq.* (1988).

<sup>20</sup> See GOLDFARB, *supra* note 12, at 138–44.

<sup>21</sup> ZYGMUNT J.B. PLATER ET AL., ENVIRONMENTAL LAW AND POLICY: NATURE, LAW, AND SOCIETY 967 (1992).

<sup>22</sup> Norman Wengert, *A Critical Review of the River Basin as a Focus for Resources Planning, Development, and Management*, in UNIFIED RIVER BASIN MANAGEMENT 9, 10–16 (Ronald M. North et al. eds., 1980); David J. Allee et al., *United States Water Planning and Management*, in UNIFIED RIVER BASIN MANAGEMENT—STAGE II 11, 21–26 (David J. Allee et al. eds., 1981).

<sup>23</sup> Wengert, *supra* note 22, at 10–11.

<sup>24</sup> *Id.* at 22–25.

<sup>25</sup> *Id.* at 9, 10–11; Leonard B. Dworsky & David J. Allee, *Unified/Integrated River Basin Management: Evolution of Organizational Arrangements*, in UNIFIED RIVER BASIN MANAGEMENT 9, 37–38 (Ronald M. North et al. eds., 1980).

<sup>26</sup> Wengert, *supra* note 22, at 11; Act of June 17, 1902, ch. 1093, 32 Stat. 388 (1902).

<sup>27</sup> Wengert, *supra* note 22, at 11.

<sup>28</sup> Dworsky & Allee, *supra* note 25, at 37; Federal Power Act, 41 Stat. 24 (1920) (codified as amended at 16 U.S.C. § 791a *et seq.* (1993)).

<sup>29</sup> Wengert, *supra* note 22, at 11.

<sup>30</sup> *Id.*; Boulder Canyon Project Act, ch. 42, 45 Stat. 1057 (1928) (codified as amended at 43 U.S.C. § 617 *et seq.* (1992)).

- <sup>31</sup> Dworsky & Allee, *supra* note 25, at 37.
- <sup>32</sup> Wengert, *supra* note 22, at 39.
- <sup>33</sup> *Id.* at 13–22.
- <sup>34</sup> *Id.* at 12–13.
- <sup>35</sup> *Id.*
- <sup>36</sup> 33 U.S.C. §§ 1151–65 (codified as superseded at 33 U.S.C. §§ 1251–1387 (1988 & Supp. IV 1992)).
- <sup>37</sup> 42 U.S.C. §§ 1962–1962d–20 (1988 & Supp. III 1991).
- <sup>38</sup> 42 U.S.C. § 1962a (1988).
- <sup>39</sup> See Allee et al., *supra* note 22 and accompanying text.
- <sup>40</sup> See *id.*
- <sup>41</sup> Wengert, *supra* note 22, at 9, 25.
- <sup>42</sup> 33 U.S.C. §§ 1251–1387 (1988 & Supp. IV 1992).
- <sup>43</sup> Wengert, *supra* note 22, at 24.
- <sup>44</sup> *Id.*
- <sup>45</sup> *Id.*
- <sup>46</sup> *Id.* at 23–25.
- <sup>47</sup> Liz Murther, *Champions of Champlain Make Polluters Come Clean*, CHRISTIAN SCI. MONITOR, April 1, 1992, at B28; Myron Struck, *Ring in the New Year and Wring Out the Old*, WASH. POST, Oct. 1, 1982, at A25.
- <sup>48</sup> Wengert, *supra* note 22, at 10.
- <sup>49</sup> Robert D. Hayton & Albert E. Utton, *Transboundary Groundwaters: The Bellagio Draft Treaty*, 29 NAT. RES. J. 3, 663–722 (1989).
- <sup>50</sup> *Id.* at 671–72.
- <sup>51</sup> See generally *Developments in the Law—International Environmental Law*, 104 HARV. L. REV. 1484, 1550–1579 (1991).
- <sup>52</sup> See *id.* at 1484, 1576.
- <sup>53</sup> GOLDFARB, *supra* note 12, at 73–112.
- <sup>54</sup> *Id.*
- <sup>55</sup> GOLDFARB, *supra* note 12, at 55.
- <sup>56</sup> *Id.*
- <sup>57</sup> *Id.* at 52.
- <sup>58</sup> *Id.*
- <sup>59</sup> *Id.* at 58.
- <sup>60</sup> G.C. COGGINS & C.F. WILKINSON, FEDERAL PUBLIC LAND AND RESOURCE LAW 125 (1981).
- <sup>61</sup> 16 U.S.C. §§ 528–531 (1988).
- <sup>62</sup> 16 U.S.C. §§ 1600–1687 (1988).
- <sup>63</sup> 43 U.S.C. §§ 1701–1782 (1992).
- <sup>64</sup> 16 U.S.C. § 528 (1988); 16 U.S.C. § 1604 (1993); 43 U.S.C. § 1702 (1993).
- <sup>65</sup> George C. Coggins, *Watershed as a Public Natural Resource on the Federal Lands*, 11 VA. ENV. L.J. 1 (1991).
- <sup>66</sup> *Id.* at 1–47.
- <sup>67</sup> 33 U.S.C. §§ 1311(e), 1312(a) (1988).
- <sup>68</sup> 33 U.S.C. § 1342 (1988).
- <sup>69</sup> 33 U.S.C. § 1324 (1988).
- <sup>70</sup> 33 U.S.C. § 1329(d), (h)–(m) (1988).
- <sup>71</sup> 33 U.S.C. § 1255(c) (1988).
- <sup>72</sup> 33 U.S.C. §§ 1267, 1330 (1988).
- <sup>73</sup> See Proposed Water Quality Guidance for the Great Lakes System, 58 Fed. Reg. 53168 (Oct. 14, 1993).
- <sup>74</sup> 42 U.S.C. §§ 300f, 300h–3(e) (1988).
- <sup>75</sup> Federal Power Act, 16 U.S.C. § 791a *et seq.* (1988).
- <sup>76</sup> 42 U.S.C. § 7172(a) (1988).



- <sup>77</sup> 16 U.S.C. § 803(a)(1) (1988).
- <sup>78</sup> GOLDFARB, *supra* note 12, at 61–66.
- <sup>79</sup> 16 U.S.C. § 791a *et seq.* (1988).
- <sup>80</sup> GOLDFARB, *supra* note 12, at 144–48.
- <sup>81</sup> *Id.*
- <sup>82</sup> UNITED STATES GEOLOGICAL SERVICE, NATIONAL WATER QUALITY ASSESSMENT.
- <sup>83</sup> NATIONAL OCEANOGRAPHIC AND ATMOSPHERIC ADMINISTRATION, MAN AND THE BIOSPHERE.
- <sup>84</sup> 43 U.S.C. § 617c *et seq.* (1993); 43 U.S.C. § 1523 *et seq.* (1993); GOLDFARB, *supra* note 12, at 32–33.
- <sup>85</sup> Nebraska v. Wyoming, 325 U.S. 589 (1945); New Jersey v. New York, 283 U.S. 805 (1931).
- <sup>86</sup> GOLDFARB, *supra* note 12, at 32.
- <sup>87</sup> *Id.* at 32–33.
- <sup>88</sup> *Id.* at 33.
- <sup>89</sup> See generally COUNSEL ON STATE GOVERNMENTS, INTERSTATE COMPACTS 1783–1977 (1977).
- <sup>90</sup> Northwest Electric Power Planning and Conservation Act, 16 U.S.C. §§ 839–839h (1988); See generally T. HORTON AND W. M. EICHBAUM, TURNING THE TIDE: SAVING CHESAPEAKE BAY (1991).
- <sup>91</sup> U.S. CONST. art. I, § 8, cl. 12.
- <sup>92</sup> U.S. CONST. art. VI, cl. 2.
- <sup>93</sup> PLATER ET AL., *supra* note 21, at 835, 854–55.
- <sup>94</sup> WIS. STAT. §§ 23.094, 92.11–.14, 144.241–.245 (1992).
- <sup>95</sup> MD. ENVIR. CODE ANN. §§ 9–345–9–350 (1993).
- <sup>96</sup> FLA. STAT. ANN. §§ 163.317B, 373.451–.456 (West 1992).
- <sup>97</sup> Thomas C. Brown et al., *Laws and Programs for Controlling Nonpoint Source Pollution in Forest Areas*, 29 WATER RESOURCES BULL. 1, 4–7 (1993).
- <sup>98</sup> See *id.* at 5–6.
- <sup>99</sup> See *id.*
- <sup>100</sup> See *id.*
- <sup>101</sup> See *id.* at 6–7.
- <sup>102</sup> *Id.*
- <sup>103</sup> See GOLDFARB, *supra* note 12, at 31–34; see also *supra* notes 87–88 and accompanying text.
- <sup>104</sup> See *supra* notes 7–8 and accompanying text.
- <sup>105</sup> ARIZ. REV. STAT. ANN. § 45–561 (1993).
- <sup>106</sup> GA. CODE ANN. § 12–2–8 (Michie 1993); MASS. GEN. L. ch 131, § 39A (1993); N.J. REV. STAT. § 32:11D–19 (1993); N.C. GEN. STAT. § 139–4 (1993).
- <sup>107</sup> See generally SAX ET AL., LEGAL CONTROL OF WATER RESOURCES 144–47, 307–13 (1993).
- <sup>108</sup> See PLATER ET AL., *supra* note 21, at 357–424.
- <sup>109</sup> See, e.g., NEB. REV. STAT. §§ 31–1017 (1992); ALASKA STAT. § 46.40.210 (1993); ARIZ. REV. STAT. ANN. § 9–461.08 (1993); FLA. STAT. ANN. § 163.3177 (West 1992).
- <sup>110</sup> E.g., ALASKA STAT. § 38.04.070 (1993); FLA. STAT. ANN. § 258.501 (West 1992); LA. REV. STAT. ANN. § 56:8 (West 1992).
- <sup>111</sup> 16 U.S.C. § 1451 (1992).
- <sup>112</sup> GA. CODE ANN. § 12–5–441 (Michie 1993); N.J. REV. STAT. § 52:18A–200 (1993); N.Y. ENVTL. CONSERV. LAW § 43–0112 (Consol. 1993).
- <sup>113</sup> See generally MEYERS ET AL., WATER RESOURCES MANAGEMENT 731–70 (1988); TRELEASE, WATER LAW 610–41 (1979).
- <sup>114</sup> NEB. REV. STAT. § 2–1504 (1992).
- <sup>115</sup> ARIZ. REV. STAT. ANN. §§ 48–3701–48–3718 (1988 & Supp. 1993).
- <sup>116</sup> FLA. STAT. ANN. §§ 582.01–582.49 (West 1987 & Supp. 1993).
- <sup>117</sup> See, e.g., MEYERS ET AL., *supra* note 113, at 731–70; TRELEASE, *supra* note 113, at 610–41; Swenson, *Local and Private Water Distribution Agencies*, in WATERS AND WATER RIGHTS (Clark ed., 1970).

<sup>118</sup> See, e.g., MEYERS ET AL., *supra* note 113, at 731–70; TRELEASE, *supra* note 113, at 610–41; Swenson, *supra* note 117.

<sup>119</sup> See, e.g., MEYERS ET AL., *supra* note 113, at 731–70; TRELEASE, *supra* note 113, at 610–41; Swenson, *supra* note 117.

<sup>120</sup> See, e.g., MEYERS ET AL., *supra* note 113, at 731–70; TRELEASE, *supra* note 113, at 610–41; Swenson, *supra* note 117.

<sup>121</sup> See generally Ingram, *supra* note 3, at 10.

<sup>122</sup> See *id.*

<sup>123</sup> N.Y. EXEC. LAW § 803 (McKinney 1993).

<sup>124</sup> N.J. STAT. ANN. § 13:18A–8 (West 1993).

<sup>125</sup> N.Y. CITY, N.Y., ADMIN. CODE § K51–44.0.

<sup>126</sup> 42 U.S.C. § 300f *et seq.* (1991).

<sup>127</sup> Wengert, *supra* note 22, at 9, 21.

<sup>128</sup> Section-By-Section Analysis of Water Act Proposal Drafted By Association of Metropolitan Sewerage Agencies, 23 Env't Rep. (BNA) no. 33, at 2058–59 (Dec. 11, 1992).

<sup>129</sup> See WATER QUALITY 2000, WATER ENVIRONMENT FEDERATION, A NATIONAL WATER AGENDA FOR THE 21ST CENTURY: FINAL REPORT (1992).

<sup>130</sup> Senate Clean Water Act Reauthorization Bill, S. 1114, 103rd Cong., 1st Sess. § 302 (1993) [hereinafter S. 1114].

<sup>131</sup> See Allee et al., *supra* note 22, at 9, 31–33; David C. Harrison, *Basinwide Perspective: An Approach to the Design and Analysis of Institutions for Unified River Basin Management*, in UNIFIED RIVER BASIN MANAGEMENT 427, 430–31 (Ronald M. North et al. eds., 1980); Leonard B. Dworsky et al., *Water Resources Planning and Management in the United States Federal System: Long-term Assessment and Intergovernmental Issues for the Nineties*, 31 NAT. RESOURCES J. 475, 483–84, 506–07 (1991); William Goldfarb, *The Trend Toward Judicial Integration of Water Quality and Quantity Management: Facing the New Century*, in WATER RESOURCES ADMINISTRATION IN THE UNITED STATES: POLICY, PRACTICE, AND EMERGING ISSUES 82, 91 (Martin Reuss ed., 1993).

<sup>132</sup> See *supra* note 128 and accompanying text.

<sup>133</sup> *Id.* at 2058.

<sup>134</sup> See *id.*

<sup>135</sup> *Id.* at 2058.

<sup>136</sup> *Id.*

<sup>137</sup> *Id.*

<sup>138</sup> *Id.*

<sup>139</sup> *Id.* at 2059.

<sup>140</sup> See *supra* note 128 and accompanying text.

<sup>141</sup> See *id.*

<sup>142</sup> WATER QUALITY 2000, *supra* note 129, at 32–40.

<sup>143</sup> ENVIRONMENTAL AND ENERGY STUDY INSTITUTE, A WATERSHED-BASED APPROACH TO WATER MANAGEMENT AND PROJECTION, in NEW POLICY DIRECTIONS TO SUSTAIN THE NATION'S WATER RESOURCES 23 (1993).

<sup>144</sup> *Id.* at 23, 30.

<sup>145</sup> *Id.*

<sup>146</sup> *Id.* at 31.

<sup>147</sup> *Id.*

<sup>148</sup> *Id.*

<sup>149</sup> *Id.*

<sup>150</sup> *Id.* at 23, 31.

<sup>151</sup> See *id.*

<sup>152</sup> See *supra* note 6.

<sup>153</sup> *Id.* at 2.

<sup>154</sup> *Id.* at 5.

<sup>155</sup> DOUGLAS J. AMY, POLITICS OF ENVIRONMENTAL MEDIATION (1987).

<sup>156</sup> S. 1114, *supra* note 130.

<sup>157</sup> 33 U.S.C. § 1251 *et seq.* Section 208 was entitled "Areawide Waste Treatment Management."

<sup>158</sup> Pub. L. 100-4. These amendments added § 319 to the Clean Water Act. Section 319, entitled "Nonpoint Source Management Programs," governs nonpoint source pollution control. In practice, however, § 319 has been no more successful in controlling nonpoint sources than was § 208.

<sup>159</sup> See Water Quality Act of 1987, 33 U.S.C. § 1251 *et seq.* (1993).

<sup>160</sup> See 33 U.S.C. § 1251 *et seq.* (1993).

<sup>161</sup> See 33 U.S.C. § 1251 *et seq.* (1993).

<sup>162</sup> S. 1114, *supra* note 130, at § 302(L)(1).

<sup>163</sup> S. 1114, *supra* note 130, at § 302(f)(3).

<sup>164</sup> S. 1114, *supra* note 130, at § 302(g)(1).

<sup>165</sup> S. 1114, *supra* note 130, at § 302(g)(3)(A).

<sup>166</sup> S. 1114, *supra* note 130, at § 302(g)(1)(C), (D).

<sup>167</sup> S. 1114, *supra* note 130, at § 302(h)(2).

<sup>168</sup> S. 1114, *supra* note 130, at § 302(h)(3)(A).

<sup>169</sup> Compare S. 1114, *supra* note 130, at § 302 with Pub. L. 92-500 § 208 (Oct. 18, 1972).

<sup>170</sup> See GOLDFARB, *supra* note 12, at 223-30.

<sup>171</sup> See S. 1114, *supra* note 130, at § 302.