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Principles for Water

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Principles for Water

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I. INTRODUCTION

Water issues are often contentious. How much water can one individual use? What must the water quality of water returned from use be? How much water must be allocated to uses such as maintaining sufficient instream flows for aquatic species? For the last century, the United States has largely such answered questions through command and control regulatory schemes rather than through markets and common law dispute resolution processes. The choice of regulation by institutions over other mechanisms has meant a reliance on centralized decision-making and a rejection of both the market's more decentralized institutions and the common law.

Recently, water market proposals have become a significant part of the debate over how to resolve competing claims on water. In addition to the United States, active water markets are present in Chile and

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Australia.[1] Spain, France, and Great Britain are also considering market-oriented water policies.[2]

Water markets create incentives for conservation by offering water rights holders the potential to sell the water they conserve. Markets also facilitate reallocation of water to alternative uses. Many fear, however, that water markets will harm environmental quality and some countries have incorporated restrictions on market transfers with the purpose of protecting the environment.[3] Such restrictions hamper the development of markets by increasing the cost of trading thereby limiting the potential to improve the efficiency of water allocation or encourage conservation.

In this Article we propose a set of principles to guide policy makers as they consider water law reform measures. In Part II, we describe a set of principles for water law reform. In Part III, we evaluate existing institutions based on these principles. Part IV concludes the Paper with an agenda for reform.

II. PRINCIPLES FOR WATER LAW REFORM

Why choose one institution over another? Examining the structure of institutions requires having a standard against which to measure the institutions' advantages and disadvantages. Choosing institutions therefore requires both understanding the institutions and being willing to make choices among competing values where those values conflict. In this Section we set out ten principles for water law reform for use in evaluating alternative institutions for water.[4]

There are (at least) three reasons to begin with a clear statement of principles. First, all institutional solutions (except, perhaps, very silly ones) rest on some set of principles. Making those explicit is merely recognizing that the principles exists. Second, debating explicit principles subjects proposals to an internal consistency check. If consistency is lacking, then either the principles need to be reformulated or the proposal changed. Third, putting the principles on the table allows a more informed debate about reform proposals.

Our ten principles are: (1) optimize information requirements, (2) facilitate use of local knowledge, (3) encourage experimentation, (4) avoid waste, (5) recognize existing explicit and implicit property

1. Clay Landry, Environmental Water Markets in the United States (unpublished paper, on file with authors).

2. *Id.*

3. *Id.*

4. Other principles are, of course, possible. A society that values tradition, for example, would likely have a principle that urged continuity with past practices.

rights claims, (6) allow competing values, (7) get the incentives right, (8) do what works, (9) require liability for violation of others' property rights, and (10) protect and enhance individual freedom. We discuss each below.

Principle 1: Optimize information requirements

Information is costly to acquire and to process. All else equal, therefore, a solution that requires more information is more costly than one that requires less. A water pollution control system that relies on individual permits for discharges, as does the Clean Water Act National Pollution Discharge Elimination System (NPDES) program,[5] for example, requires the central decision maker to have information about the relative costs and benefits of discharge permits in order to optimally set discharge requirements.[6] To set permits that rationally determine the disposal capacity of the water, the decision maker must know about the total loadings of various pollutants in the water body in various locations, the water body's ability to eliminate pollutants, and the impact of the pollutants on the ecosystems involved.[7] To set permits that fairly allocate the burden of pollution prevention, the decision maker must know about the various sources of pollution,[8] including the costs of remediation

5. 33 U.S.C. § 1342(a) (1994).

6. *Id.* § 1342(a). The NPDES does not explicitly require benefit/cost information. The statute and regulation are about discharge control, not maximizing benefits. Moreover, there was nothing in current practice, until Total Maximum Daily Loads (TMDL), that gave an inkling of EPA's loading concerns. Our point is merely that to optimally set discharge permit requirements a decision maker would need to have this information.

7. 40 C.F.R. § 122.21 (2001). Permit applicants must provide extensive information in their permit applications. As an example, consider Illinois' requirements, under which applicants must provide information

> on the amount and nature of the proposed wastewater discharge: number of gallons per day; strengths of sanitary wastes, industrial wastes, or cooling water; whether any toxic pollutants or other materials that would interfere with the operation of the treatment plant are present; the receiving body of water; and whether any of the wastes have been pretreated. The Illinois Environmental Protection Agency (IEPA) may also require the submission of a plan and specifications for treatment works and summaries of design criteria. ILL. ADMIN. CODE tit. 35 § 309.103(a). The permit applicant may also be required to perform toxicity testing as part of the NPDES permit application process. 35 ILL. ADMIN. CODE tit. 35 § 309.103(a)(3) (1996).

See Susan M. Franzetti, *Water Pollution in* ENVIRONMENTAL LAW IN ILLINOIS 9-9 (Jeffrey C. Fort et al. eds., 2001).

8. *See* Michael P. Healy, *Still Dirty After Twenty-Five Years: Water Quality Standard Enforcement and the Availability of Citizen Suits*, 24 ECOLOGY L.Q. 393, 449-50 (1997) (discussing fairness issues in enforcement of water quality standards and the relationship between sources).

measures,[9] impacts on other media of shifting pollution from one to another,[10] and alternative uses for the facilities.[11] In contrast, a program that charged sources based on the amounts of their discharges would need to know less about the technical problems with reducing discharge because it would set the price and let dischargers make appropriate tradeoffs between control expenditures and discharge fees.[12]

The important consideration here is what are the costs of centralized versus decentralized information collection and what are the costs and benefits to the decision maker of collecting the appropriate quantity and quality of information. Centralized collection requires experts who may have general information, but will not have knowledge of the special circumstances of time and place. Decentralization may sacrifice some of the expert knowledge, but take advantage of the special circumstances. Moreover, decentralization forces the decision maker to consider the benefits and costs of information collection, while centralization encourages the decision maker to collect more and more information to avoid mistakes that may get him or her in trouble.

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9. *See* Richard B. Stewart, *A New Generation of Environmental Regulation?*, 29 CAP. U. L. REV. 21, 109 (2001) (stating that "most cost savings [under the CAAA] have come from internal trades within utilities and from the flexibility which the program has afforded utilities to reduce emissions in the most cost-effective way"). Remediation costs may vary widely among sources. Allowing the shifting of such costs to lower cost remediators is one of the rationales behind emissions trading schemes, such as that created by the Clean Air Act Amendments of 1990 for SO_2 emissions. *See id.* at 109.

10. *See* Peter J. Fontaine, *EPA's Multimedia Enforcement Strategy: The Struggle to Close the Environmental Compliance Circle*, 18 COLUM. J. ENVTL. L. 31, 56 (1993). As the disposal of waste into water becomes more expensive, for example, firms are likely to shift to disposing waste in landfills or by incineration. Some commentators have noted that this suggests that a multimedia approach is superior to EPA's current media-by-media approach. *See id.* at 96-97 (stating that "permit systems are currently structured along single-media lines. Large regulated facilities may have [various] ... permits, each of which contains limits on the amounts of pollution that can be released into individual media. For example, a facility might have a CWA NPDES permit that controls the amount of pollution it can legally discharge into the surface waters, a RCRA Part B treatment, storage and disposal permit that requires the proper management and disposal of hazardous waste, and a CAA PSD ("Prevention of Significant Deterioration") permit that limits the amount of certain air pollutants the facility can emit if it is located in an attainment area for the particular pollutants.").

11. Molly Elizabeth Hall, *Pollution Havens? A Look at Environmental Permitting in the United States and Germany*, 7 WIS. ENVTL. L.J. 1, 29 (2000) ("Certainly, one requirement of any environmental permitting system is that the system be fair. This means that guidelines are clear, that officials apply the law consistently, and that there are no 'sweetheart deals.'").

12. *See* Stewart, *supra* note 9, at 109 (noting that most savings under SO_2 trading program stem from utilities' ability to use measures "including fuel switching, the use of low sulfur or washed coal, energy conservation measures, and development in 'scrubbers' alternatives that would not have been feasible under 'one size fits all' [technology] controls").

Principle 2: Facilitate use of local knowledge

One of the most powerful insights in law and economics is found in a 1945 article written by Nobel Laureate Friedrich A. Hayek.[13] In this seminal piece, Hayek explores the question of what is the basic economic problem and offers an answer.[14] In his view, the problem is not, given all the relevant information, how to find the most efficient and effective solution to the provision of some valuable good, such as improved water quality.[15] That task, Hayek reminds us, is already worked out.[16] It is just a matter of applying logic to the facts at hand.[17] The real problem, he suggests, is how to get all the relevant information, since it is highly dispersed.[18] He describes the situation this way:

> The peculiar character of the problem of a rational economic order is determined precisely by the fact that the knowledge of the circumstances of which we must make use never exists in concentrated or integrated form, but solely as the dispersed bits of incomplete and frequently contradictory knowledge which all the separate individuals possess. The economic problem of a society is ... a problem of the utilization of knowledge [which is] not given to anyone in its totality.[19]

Few goods that humans value collectively and individually could be more complex than the water quality and quantity available in streams, rivers, and lakes. Imagine a water planner who tries to solve the problem of determining the appropriate level of water quality and quantity for one major river, doing so for a diverse population of people and water users along the river. Just determining the technical characteristics of water biology, climatic conditions, and riparian land use for one major body of water is a high-cost task. After all, technical knowledge is constantly changing, and major breakthroughs often occur in the heat of task. If it is possible for the task to be any more challenging, coming up with an optimal solution becomes even more daunting when the planner has to identify and include the social and economic dimensions of the problem.

Hayek's point is compelling. If it is truly impossible for a single mind to solve this problem for one major river, it is ludicrous to think that

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13. Friedrich A. Hayek, *The Use of Knowledge in Society*, 35 AM. ECON. REV. 519 (1945).
14. *Id.*
15. *Id.*
16. *Id.*
17. *Id.*
18. *Id.*
19. *Id.* at 519-20.

a few individuals could resolve just the data problem for all rivers, lakes, and streams in the United States.

But how can local knowledge be tapped? How can major elements of the problem be decentralized?

Decentralized approaches for managing rivers and streams dominate the developed world.[20] The management of rivers in Germany, by river basin associations, is decentralized, with some of the associations dating back to the nineteenth century.[21] Interestingly, the associations compete for economic development, which is to say that different water quality standards are set and different prices are charged water users.[22] Through time, water quality has improved markedly, and communities that rely on the water determine water use and prices.[23] Local knowledge is thus brought to bear on these important water use decisions.

A somewhat similar approach is found in France, where, since 1969, every major river has been managed by local and regional river basin associations, with the composition of managing commissions specified by the national government.[24] In each case, members of the river-using community define water management goals, and, as might be expected, the goals vary across rivers and river segments.[25] To make matters even more interesting, or challenging, the national government provides no funds to the associations—they raise their own revenues by imposing fees for discharge and withdrawal of water.[26] As self-funded enterprises, the associations are sensitive to the cost of managing the rivers and are also aware of competition from other associations.[27] After all, people and industry can "vote with their feet" if fees are raised too high or water quality deteriorates.

Even the United States, with its current system of top-down, command-and-control regulation, allows for some modicum of variation

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20. ALLEN V. KNEESE & BLAIR T. BOWER, MANAGING WATER QUALITY: ECONOMICS, TECHNOLOGY, INSTITUTIONS 258-62 (Henry Jarrett et al. eds., 1968).

21. *Id.*

22. *Id.* at 261-62.

23. *Id.* at 259-62.

24. David W. Riggs & Bruce Yandle, *Environmental Quality, Biological Envelopes, and River Basin Markets for Water Quality, in* WATER MARKETING—THE NEXT GENERATION 147 (Terry L. Anderson & Peter J. Hill eds., 1997).

25. *See* Hayek, *supra* note 13, at 521 (questioning the efficiency of decentralized planning as compared to centralized planning).

26. Riggs & Yandle, *supra* note 24, at 153-54.

27. *Id.*

among the states.[28] While the federal government defines and requires the application of technologies for discharge control, the states can set water quality standards, and these vary across the country.[29] In this way, local knowledge of streams, populations, and the diverse interests of people become folded into a highly centralized management system.

As Hayek implies, no one can predict how problems of water quality and use will be resolved when decentralized management provides incentives for individuals to solve the management problem.[30] For example, along the Ruhr River in Germany, the managing association has found that the level of dissolved oxygen in the river can be increased in several ways.[31] An obvious way is to limit the discharge of oxygen-using wastes.[32] Another way is to place large boulders in the stream so that water turbulence will bring increased aeration.[33] A third approach involves the direct introduction of oxygen into the water.[34] The managers of the associations discovered these approaches when, with limited budgets, they realized that the rivers were theirs to manage and improve.[35] Use of local knowledge allows institutions to vary with local conditions. This brings us to our third principle.

Principle 3: Encourage experiments that build on local knowledge

If we lived in the world posited by most economic models, there would be no difference in conditions from one place to another.[36] In the real world, however, local conditions, and our knowledge of them, matter a great deal. The Cuyahoga River is not the Gallatin River and Cleveland, Ohio is not Bozeman, Montana. People who live near one river know more about it than they do about the other rivers, and people who live in one place know more about it than they do about the other places. As a result it is quite likely that people in Bozeman will make different choices about how the Gallatin River should be treated than people in Cleveland would make about the Cuyahoga. They will do so both because their values may differ and because their information may suggest different actions are appropriate. Few people would suggest

28. Karol Ceplo & Bruce Yandle, *Western States and Environmental Federalism, in* ENVIRONMENTAL FEDERALISM 225 (Terry L. Anderson & Peter J. Hill eds., 1997).
29. *Id.* at 226.
30. *See* Hayek, *supra* note 13, at 521.
31. *See* KNEESE & BOWER, *supra* note 20, at 241-42.
32. *See id.* at 252.
33. *See id.* at 38.
34. *See id.* at 6.
35. *See id.* at 238.
36. *See* Hayek, *supra* note 13, at 520-21.

having the Cuyahoga managed by people from Gallatin County, and vice versa. Avoiding "one-size-fits-all" solutions is therefore important.

Prior to the 1972 passage of the first federal water quality statutes, the management of water quantity and quality were matters to be resolved by communities, states, and regions.[37] No two states handled water problems in identical ways.[38] Every state, however, had a body of water law that addressed water quality and quantity.[39] In addition, each state's water law rested on a common law foundation that applied common law rules for protecting environmental property rights, and, of course, each state's common law was unique.[40]

Generally speaking, states and regions with greater water scarcity had more elaborate water regulations, and a more highly developed body of common law.[41] Where economic development and population growth were most advanced, systems of stream classification were used, with the water quality parameters determined partly by local conditions.[42] For example, Massachusetts established a river classification system in 1887, with some streams classified as industrial and others as recreational.[43] The latter rivers were maintained as trout streams.[44] People in the various communities participated in determining river classifications and after doing so, resisted making changes in the system.[45] The Merrimack, Blackstone, and Neponset rivers were classified as industrial streams, which meant that they would be specialized in transporting waste.[46] These rivers were not to be used for the drinking water supply nor recreational use.[47] Other nearby rivers served those purposes.[48] It was not until the federal government offered to fund the cleanup of rivers, with

37. Ceplo & Yandle, *supra* note 28, at 225.

38. *Id.*

39. *Id.* at 227-43 (reviewing waters laws in selected states before and after the 1970 Clear Water Act).

40. *Id.* at 227. We recognize that Louisiana with its code law is thought to be an exception to this statement. However, Louisiana's use of its code comes very close to common law. *Id.* at 234-37. Roger E. Meiners, *Elements of Property Rights: The Common Law Alternative*, *in* LAND RIGHTS: THE 1990S—PROPERTY RIGHTS REBELLION 277-73 (Bruce Yandle ed., 1995); Ceplo & Yandle, *supra* note 28, at 243-44. *See generally* ELIZABETH BRUBAKER, PROPERTY RIGHTS IN DEFENCE OF NATURE (1995).

41. *See generally* Ceplo & Yandle, *supra* note 28, at 227-43.

42. *Id.*

43. BRUCE YANDLE, THE POLITICAL LIMITS OF ENVIRONMENTAL REGULATION 51-52 (Bruce Yandle ed., 1989).

44. *Id.* at 51.

45. *Id.* at 51-52.

46. *Id.* at 51.

47. *Id.*

48. *See id.*

no apparent cost to local citizens, that the people supported a move to end the classification system.[49]

In some states, such as California, water quality was set in decentralized regions where local citizens set the standards.[50] In other states, Louisiana, for example, water quality was determined by means of local water boards who were subject to private law suits if property rights were not adequately protected.[51] The idea of having one standard for all bodies of water in a state, enforced with command-and-control regulation specifying uniform technologies was unheard of. The protection of environmental assets afforded by common law was an important component of the state systems.[52]

When not constrained by statute, a common law regime yield water quality outcomes that vary across locations.[53] A review of the record tells us that public and private nuisance suits are brought when individuals and communities feel inclined to show that they are damaged by the action of a polluter.[54] Arguably, the disposition to sue and the decisions of common law judges are conditioned by the customs and traditions of local communities. In this way, there can be "different strokes for different folks."

Principle 4: Avoid waste

In an old joke, an economist refuses to pick up a $100 bill lying on the sidewalk in front of him, arguing that if such a bill was there, someone would have already picked it up. In the real world, however, there is wealth to be had all around us in the form of unrecognized opportunities. When individuals discover such opportunities, they often can "pick up" the wealth through entrepreneurial activity. Institutions that block entrepreneurs prevent the creation of such wealth and waste it. All else being equal, such institutions should be avoided.

Waste generally rears its ugly head where a transfer of resources is not permitted.[55] An example of this is a water right that requires a specific quantity of water to be used in agriculture. This type of regulation overlooks the opportunities to transfer water to more highly valued uses, including urban consumption and in-stream flow

49. *Id.*
50. Ceplo & Yandle, *supra* note 28, at 230-31.
51. *Id.* at 234-37.
52. *Id.* at 227.
53. *Id.* at 242-43.
54. *Id.* at 243-44.
55. BRUCE YANDLE, COMMON SENSE AND COMMON LAW FOR THE ENVIRONMENT 50-56 (Terry L. Anderson ed., 1997).

preservation to enhance fisheries, which could ultimately enhance environmental quality.[56]

Avoiding waste requires more than permitting specified activities, however. As noted earlier in the discussion of Principles 1 and 2, limitations posed by the centralization of knowledge means that existing opportunities remain unknown to central authorities. Maximizing the freedom of entrepreneurial individuals with local knowledge is thus critical to minimizing waste. Ensuring that such knowledge is considered is part of the rationale for our next principle.

One approach for improving the likelihood that waste will be avoided is found in cases in which communities have had the responsibility of solving their own water quality problems.[57] The case of Vermillon County, Illinois, illustrates the point.[58] In 1996, the quality of the community drinking water was questioned in a major news media story.[59] Taking charge of the problem, community leaders formed an environmental working group and determined that they would find a way to reduce the flow of sediments and chemicals that were polluting the North Fork Vermillon River.[60] They set about achieving their task by first defining the biological envelope that contained the problem.[61] With a 120,000 acre watershed circumscribed, they began testing various discharge points, hoping to find the culprit.[62] Unfortunately there was no single major culprit.[63] Runoff from streets and other nonpoint sources of discharge were as much to blame as point sources.[64]

Instead of demanding that command-and-control technology-based controls be placed on all point source dischargers, which would have been very costly and of questionable effectiveness, the group decided to pursue passive controls.[65] They called on community clubs, civic groups, farmers, and garden clubs to plant seeds in an attempt to form permanent filter and buffer strips near the banks of the threatened river.[66] In one year, 200 acres of filter strips were planted and 300 acres were planned for the year ahead.[67] Drawing on creativity and local spirit, the

56. *Id.* at 56.
57. *Id.* at 58.
58. *Id.*
59. *Id.*
60. *Id.*
61. *Id.*
62. *Id.*
63. *Id.*
64. *Id.*
65. *Id.*
66. *Id.*
67. *Id.*

community group is achieving a water quality goal at a minimal cost when compared to the expense of installing advanced treatment machinery.[68]

Sometimes, it takes more to solve a water quality problem than can be generated by the volunteer actions of garden clubs and farmers. Consider a typical water quality management problem. The activities of multiple waste dischargers, whether they are farmers fertilizing their fields, industrial plants, or operators of sewage treatment plants, determine the quality of water in receiving rivers and lakes. If it is cheaper for one of the users to clean up the same waste than another, then it is possible to save some resources such as reducing waste by allowing the discharger with high treatment costs to clean up less and by having the cheaper source clean up more. But how can knowledge of such cost savings opportunities be discovered? And how can two dischargers be encouraged to cooperate by minimizing their combined costs?

These questions were answered in an incident centered in North Carolina's Tar-Pamlico river basin, a region in the eastern part of the state that adjoins the Pamlico Sound and the Atlantic ocean.[69] In the mid-1980s, the people in the 4300 square mile region faced a severe problem.[70] Fish were dying in the Tar and Pamlico rivers and in the Pamlico Sound.[71] Nutrient discharge and runoff were the problems, but every regulated discharger was operating within the limits of the EPA-issued permits.[72] No one was breaking the law, but the rivers were dying.

Faced with an almost impossible problem, it was obvious that something had to be done. Indeed, the U.S. Environmental Protection Agency informed the community that unless community leaders found another approach, the agency would require all dischargers to install advanced technologies with an estimated cost of $50 to $100 million.[73] And it was doubtful that even these would make much difference.[74] Most of the problem, it seemed, originated with farmers and nonpoint sources of nitrate and phosphate runoff.[75]

After the completion of some background studies, community leaders learned that the farmers' cost of reducing a unit of nitrate

68. *Id.*
69. *Id.* at 58-59; Riggs & Yandle, *supra* note 24, at 154.
70. *Id.*
71. YANDLE, *supra* note 55, at 58-59.
72. *Id.* at 59.
73. *Id.*
74. *Id.*
75. *Id.*

discharge averaged $67 to $119 per pound.[76] Likewise, sewage treatment plants were faced with an average cost of $860 to $7,261 per pound of sewage sludge, to decrease nutrient discharge concentrations.[77] The potential for eliminating wasted resources while simultaneously saving the river were huge. But how could the farmers and the managers of the treatment works come together and cooperate?

The community leaders gained EPA approval to form the Tar-Pamlico River Basin Association, which is made up of point-source dischargers, such as the local sewage treatment plant operators in the region.[78] The association charges a fee for discharging nitrates and phosphates which is assessed according to the concentration level of discharges.[79] The revenues collected are used to provide assistance to farmers in changing their farming practices.[80] Farmers are reducing the flow of nutrients into creeks which then flow into the affected rivers, and the point-source operators, in some cases, are expanding their discharge.[81] Taken together, all water quality users have cut back significantly, and the river is healthy again.[82]

It is estimated that what might have cost $50 to $100 million cost less than $12 million.[83] Waste was avoided by defining and enforcing the right to trade discharge cleaning services among the water quality users. The gains from the trade were large.

Principle 5: Recognize existing explicit and implicit property rights claims

One important economic justification for property rights is that the holders of these rights have an incentive to learn about the costs and benefits of their actions with respect to their property.[84] Such learning can occur through a study of the property or from market signals.[85] Thus a property owner may conduct extensive research into how a particular

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76. Bruce Yandle, *Community Markets to Control Agricultural Nonpoint Source Pollution*, *in* TAKING THE ENVIRONMENT SERIOUSLY 193 (Roger E. Meiners & Bruce Yandle eds., 1993).

77. *Id.*

78. YANDLE, *supra* note 55, at 59.

79. *Id.*

80. *Id.* at 59-60.

81. *Id.*

82. *Id.* at 60.

83. *Id.*

84. Bruce Yandle & Andrew Morriss, *The Technologies of Property Rights: Choice Among Alternative Solutions to Tragedies of the Commons*, 28 ECOLOGY L.Q. 123, 135-39 (2001).

85. *Id.* at 139-41.

property can be used most effectively or she may receive an offer to purchase the property from someone else in the marketplace. In either case, the owner learns about the alternative uses of her property and can evaluate her actions in light of the information.

Despite the lack of clarity in the specification of property rights to water under current institutions, whether in the eastern riparian states or the western prior appropriation states, many rights holders view themselves as holding legitimate rights.[86] The political success of reforms will often depend on whether the new institutions recognize those preexisting claims, despite their lack of legal status.[87] For example, when then Prime Minister Margaret Thatcher privatized public housing in Britain during the 1980s, she gave the current residents of the housing the opportunity to purchase their home at below market rates.[88] This converted opponents of the plan into supporters.[89]

New institutions will often not be able to recognize the full extent of claims asserted by holders of implicit rights, particularly where the total of such rights claims exceed the resources to be allocated.[90] A failure to provide some measure of recognition, however, will galvanize opponents to change.

In addition to practical political considerations, providing recognition to implicit rights claims is useful because it puts those rights

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86. *Id.* at 153-58.

87. *Id.* at 167-68.

88. Raymond J. Friel, *Blair's Third Way-Thatcher's Enduring Legacy*, 48 U. KAN. L. REV., 861, 873-74 (2000).

89. *Id.* at 874-75. The Thatcher program is described by Professor Raymond Friel as follows:

> Thatcher purported to break this particular log-jam [tenant opposition] to pay through another program of privatisation: selling off council houses to the sitting tenants. To make this more palatable to the occupiers of such housing, the standard privatisation mechanism was used: sale at undervalue, giving the tenant an automatic profit. Thus, the sales of these houses were made not at the commercial value, but at a value which took into account the length of time the tenant had occupied the property and the diminished value of the property if it were to be sold with a sitting tenant. People could thus become owners of their council houses for about thirty to forty percent of the property's true value on the open market. Most people grabbed this opportunity. But many failed to realise there was a sting in the tail. In order to finance the reduced purchase price, people had to obtain mortgages from financial institutions. Most could, and many in fact did, borrow far more than the purchase price because they now had an asset of far greater value upon which to secure a loan. A good deal of this borrowed money was invested in further privatisations in the search of more profit. Thus, the ending of socialised housing was bought through sale at knock-down value, but much of the additional money went back to the state through the process of privatisation of commercial companies.

Id. at 874.

90. *See id.* at 873-75.

into the hands of those with local knowledge about the resource in question, facilitating implementation of Principle 2. Those who use a river, for example, will know more about the river than those who do not.

Principle 6: Allow expression of competing values

Environmental policy debates are often conducted in black and white terms. For example, political candidates are labeled "pro-environment" or "anti-environment" in a framework where economic growth and environmental values are seen as competing values.[91] Such characterizations oversimplify the policy choices in several ways. First, they suggest that there is a single value labeled "the environment." In fact, environmental systems are complex, dynamic systems and actions beneficial to one set of species are often detrimental to another. Reintroduction of an animal predator into an ecosystem, for example, may benefit the predator species but may be harmful to plant species that flourish due to heavy grazing by the prey species in the area.

Second, such characterizations suggest that we know what is the "natural" state of the world and implicitly refers to a world without humans. Damming a river is natural when beavers do it, but not when humans do it.[92]

How individuals value different aspects of nature varies with philosophy, religion, recreational preferences, and a host of other factors. One man's views of salmon fighting their way upstream and whales swimming in the ocean as symbols of the glory of the power of nature is another woman's views of potential dinners to be speared and tribal fishing rights to be asserted.[93]

Rather than define a single state of the world as the "natural environment," water institutions should offer space for multiple conceptions of "nature" and "the environment." As discussed above with respect to Principle 3, diversity in environmental approaches is preferable to a single value system because of the possibility of error and the imperfection of human knowledge. In addition, allowing the expression of diverse values fosters individual freedom, as discussed below with respect to Principle 10. Finally, diversity in environmental approaches

91. *See, e.g.*, CARLA RAVAIOLI, ECONOMISTS AND THE ENVIRONMENT 58 (1995) (quoting Herman Daly that "[t]he equilibrium of our planet's ecosystem is threatened by unlimited growth, which means it is threatened by our very economic system").

92. There are, of course, often tremendous differences between human dams and beaver dams—but there are also many cases (small scale hydro dams) where a human dam is closer to a beaver dam in many respects than to, say, the Aswan Dam.

93. *See generally* ROBERT SULLIVAN, A WHALE HUNT (2000) (describing conflicts between environmentalists and the Makah tribe over the tribe's resumption of whale hunting).

recognizes the diversity of motivations and values people hold, allowing them to concentrate resources on their priorities. There is thus room for individual entrepreneurs to act on issues of concern to them. Given the importance of private conservation efforts to key environmental policies, such as species preservation and river conservation, a diverse approach is critical to improving environmental quality.[94]

Principle 7: Get the incentives right

Enforcement of rules is costly. Institutions that create or reinforce incentives, such as those adopted by the Tar-Pamlico River Basin Association, rather than ask individuals to behave against their interests, are more likely to be successful at a lower cost.[95] For example, if a river has been treated as a free resource with respect to waste disposal, simply forbidding waste disposal in the river is likely to cause some individuals to invest in evading the rules rather than complying with the prohibition. Unless the enforcing authority is willing to sufficiently invest in monitoring and prosecution to make the expected cost of a violation exceed the cost of compliance, the institution will fail to produce adequate compliance.

Incentives can be used in many ways. For example, the citizen suit provisions of the Clean Water Act provide an incentive for nongovernmental organizations to monitor and enforce NPDES permits.[96] Similarly, the common law rights available to British fishermen allow private associations to sue polluters for damaging fish stocks.[97] The story behind *Pride of Derby & Derbyshire Angling v. British-Celanese Ltd.* is a case in point.[98]

The common law British action came when a fishing club, Pride of Derby, and its association, Derbyshire Angling, brought suit against a city, a chemical company, and a government-owned electricity plant for damaging the fish in the River Derwent.[99] As is true throughout the United Kingdom, and in parts of Canada, angling clubs own the rights to

94. Roger E. Meiners et al., *Burning Rivers, Common Law, and Institutional Choice for Water Quality*, *in* THE COMMON LAW AND THE ENVIRONMENT 54 (Roger E. Meiners & Andrew P. Morriss eds., 2000) (describing role of private institutions prior to Clean Water Act).

95. *See supra* notes and text accompanying notes 69-83.

96. Clean Water Act, 33 U.S.C. § 1365 (1994).

97. *See also* Roger Bate, *Protecting English and Welsh Rivers: The Role of the Anglers' Conservation Association*, *in* THE COMMON LAW AND THE ENVIRONMENT, *supra* note 94, at 86, 92-93.

98. [1953] ch. 149; *see also* Bate, *supra* note 97, at 94-95; YANDLE, *supra* note 55, at 107-08.

99. YANDLE, *supra* note 55, at 107.

fisheries.[100] They have a cause of action against any person who harms their property.[101] In this case, heated water was being discharged into the river, as well as untreated sewage and industrial waste.[102] The interaction of the waste made it difficult to determine which of the polluters was most harmful.[103] But the common law court did not care.[104] The plaintiff asked for injunctive relief, preying that all three parties be ordered to cease and desist from harming the fishery.[105]

The court ruled for the plaintiff, as is almost always the case in the panoply of angling club cases.[106] On appeal by the defendants, the Chancery Court upheld the injunction.[107] As a result, water quality in the Derwent improved for all parties, including the anglers; the incentives of the polluters were changed; and the rights of the anglers were made secure.[108]

It is standard fare for individuals, business firms, communities, and other organizations in making decisions to want to minimize costs. If the cost of consuming environmental quality is imposed directly on the decision maker, normal incentives to deflect costs and seek benefits can generate a desired result.

Consider the case of Shaeffer International and a massive effort to clean the Chesapeake Bay.[109] The story begins in 1983, when governors of Virginia, Maryland, and Pennsylvania, and leaders of the District of Columbia petitioned the U.S. EPA to form a commission for preserving the Bay.[110] The problem was a familiar one: too much phosphorous and nitrate runoff.[111] Over the next seventeen years, some progress was made toward achieving a forty percent reduction in runoff, but not enough.[112] Moreover, the search for meaningful solutions plagued the water quality planners. Eventually, Shaeffer International entered the picture with the Shaeffer system, a passive system designed to treat and process the disposal that polluters located along the Shenandoah River were

100. *Id.*
101. *Id.*
102. *Id.*
103. *Id.*
104. *Id.*
105. *Id.*
106. *Id.* at 107-08.
107. *Id.* at 107.
108. *Id.*
109. Bishop Grewell & Clay Landry, The Ecological Agrarian (unpublished manuscript, on file with authors).
110. *Id.*
111. *Id.*
112. *Id.*

discharging such as that from poultry plants, communities, and food processing plants, which discharge directly into the Potomac, and thence to the Bay.[113] Shaeffer offered to treat all the waste from the major discharger, eliminate odor, and do it for less than the cost associated with EPA-approved technologies.[114]

Shaeffer has discovered a way to make money by treating the combined wastes of multiple dischargers.[115] The Shaeffer system takes in waste, treats it biologically, and then releases clean water to be used as irrigation for farmers' fields.[116] The Shaeffer system is now in place.[117] Nitrogen discharge from Shaeffer customers has been reduced fifty-four percent and phosphorous loads reduced forty-seven percent.[118] Farmers receiving Shaeffer-produced irrigation water, at no charge, are spray-irrigating fields of corn, soybeans, and hay.[119] Indeed, for the system to work, Shaeffer must have the cooperation of farmers to dispose of the process water.[120]

Incentives matter and so we should pay attention to them. This leads us to our next principle: we must focus on what works rather than on what symbolizes our desires.

Principle 8: Do what works

Broadly speaking, institutions have impacts along two axes. First, an institution can create incentives to enhance or detract from an environmental feature.[121] Offering farmers payments to leave no-plough buffer zones along waterbodies, for example, will lead to less runoff of potentially damaging substances from farmers' fields.[122] On the other hand, offering farmers incentives to intensively cultivate fixed quantities of land, as many agricultural price support programs do, will lead to more potentially environmentally harmful practices such as intensive

113. *Id.*
114. *Id.*
115. *Id.*
116. *Id.*
117. *Id.*
118. *Id.*
119. *Id.*
120. *Id.*
121. Jan Lewandrowski & Kevin Ingram, *Policy Considerations for Increasing Compatibilities Between Agriculture and Wildlife*, 39 NAT. RES. J. 229, 258 (1999) (describing how Conservation Reserve Program provides incentives for buffer strips and other environmental management measures).
122. *Id.* at 258-59.

fertilizer and pesticide use.[123] Second, an institution can stand as a symbol of a commitment to a particular set of environmental values.[124] Not drilling for oil in the Arctic National Wildlife Refuge, for example, is a potent symbol of national commitment to "protecting the environment," regardless of the actual environmental impact of allowing oil drilling.[125] Similarly, restoring the wolf to Yellowstone National Park has enormous symbolic value as a sign of commitment to preserving "wilderness"[126]—just as earlier efforts to eradicate predators like wolves served as symbols of "civilizing" the West.[127]

When an institution both creates positive incentives for enhancing environmental attributes and symbolizes important environmental values, it is worthwhile. When an institution symbolizes important environmental values but creates incentives to degrade environmental attributes, however, we must choose between symbolic politics and reality. The Endangered Species Act, for example, creates incentives for landowners to destroy habitat that might harbor endangered species

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123. John R.E. Bliese, *Conservative Principles and Environmental Policies*, 7 KAN. J.L. & PUB. POL'Y 1, 35 (1998):

> For many years, agricultural price supports made it "profitable" for farmers to drain critical wetlands and plant marginal and highly erodible land, using massive amounts of chemicals, to grow crops no one needed. Without those subsidies, we would probably not have a crisis of wetland loss, we would not have lost so much soil to erosion, and we would not have many of our current problems with agri-chemicals polluting streams and ground water.

124. *See, e.g.*, Jo Sandin, *Preserving Arctic Refuge Deemed Worth the Fight*, MILWAUKEE J. & SENTINEL, May 29, 2001, at 2A, *available at* 2001 WL 9358883.

125. *Compare* Marego Athans, *A Fierce Fight for Alaska's Riches Battleground*, BALT. SUN, May 6, 2001, at 1A (quoting Dale DuFour, facilities manager at the Kaveolook School in Kaktovik, Alaska, as saying, "This [Sen.] Kerry fellow in Massachusetts, saying we're going to protect the wildlife refuge," he said. "It's like me telling people in Massachusetts that they can't cut their grass."); *see also* Sandin, *supra* note 124, at 2A. Sandin quotes Wilderness Society Alaska Regional Director Allen Smith, saying that

> [t]he arctic refuge has become the symbol of protecting our wilderness values, and it's become a symbol of what many of us feel is wrong with our society's preoccupation with occupying every square foot and developing every square acre. I think the real value of the arctic refuge is not just in how incredibly wild a place it is itself—and every time I've been there I learn something new—but I think its value is that here is a place that is largely as it was created, very undisturbed, and that has an intrinsic value, a real biological value, to the Earth because we cannot 'save ourselves' if we occupy all of it and destroy all of it.

126. Jennifer Li, *The Wolves May Have Won the Battle, but Not the War: How the West Was Won Under the Northern Rocky Mountain Wolf Recovery Plan*, 30 ENVTL. L. 677, 685 (2000) (describing that wolves became seen "as a symbol of the "freedom and independence" of the wilderness").

127. HANK FISCHER, WOLF WARS 10-23 (1995) (describing eradication campaign).

because maintaining it reduces the value of the property.[128] This principle makes the explicit choice for reality over symbol. If institutions do not work, they should be abandoned. If institutions work, they should be left alone rather than sacrificed to the demands of symbolic politics.

Even under the most carefully designed institutions, sometimes individual actions cause harm. How to handle those situations is the subject of our next principle.

Principle 9: Require liability for violation of others' property rights

Thus, when one person harms another in every day life, the person who causes the harm is liable for the damages suffered by the person he harmed. Ordinary principles of tort, property, and contract law create the liabilities that prevent most such harms from occurring and ensure that compensation is paid for those that do occur. The incentives created by requiring those that do harm pay for the injury they cause are critical to the functioning of society. If it is to successfully function, the mechanisms of water law must recognize equivalent principles.

When one person holds a property right to some attribute of water and another person harms that attribute, the former must be entitled to compensation from the latter. In many cases, an application of a preexisting principle of tort, property or contract law provides an adequate remedy for harmful conduct. Indeed, that is precisely what has been done in Britain to address water quality problems that affect fishing rights.[129] The holders of fishing rights have banded together to sue polluters and have received remedial injunctive relief.[130] United States courts have experience with some aspects of this principle—someone who misappropriates water rightfully belonging to another in the West, for example, is quickly dealt with by the courts[131]—but not as much as they might, since statutory regulatory schemes have preempted the development of the common law in this area.[132]

There are limits to the application of this principle. Compensation is due for harm, but only for actual harm. To receive compensation, injured parties must be able to prove in court that they have been harmed

128. *See* Andrew P. Morriss & Richard L. Stroup, *Quartering Species: The "Living Constitution," the Third Amendment, and the Endangered Species Act*, 30 ENVTL. L. 769, 794-98 (2000).

129. *See* Bate, *supra* note 98 at 93.

130. *Id.* at 97-98.

131. Andrew P. Morriss, *Lessons from the Development of Western Water Law for Emerging Water Markets: Common Law vs. Central Planning*, 80 OR. L. REV. 861, 895 (2001).

132. *See* Meiners et al., *supra* note 94, at 39 (describing how statutory protections for polluters prevented common law actions).

by conduct of the alleged injurer in a court of law. In addition, the harm must be an actual harm to the rights held by the plaintiff. Grief over an alleged injury to an aquatic species in a river thousands of miles away is insufficient to provide standing. The harm must be significant enough to warrant the effort to seek compensation.

Requiring compensation for inflicted harm limits the actions of members of society to only acting in ways that do not harm others. This brings us to our final principle, protect and enhance individual freedom.

Principle 10: Protect and enhance individual freedom

This is perhaps the most controversial of our ten principles. For some, humans have no more rights than other species to the use of water or other resources.[133] We believe, however, that institutions that fail to recognize the centrality of human needs will fail to win acceptance from the most important audience: humanity. We therefore unapologetically place human needs at the center of our proposed principles and individual freedom at the center of human needs.

Application of this principle requires simply that, when two sets of institutions are being compared, we should prefer the set that provides for more individual freedom. Thus if water conservation is an important goal and water can be conserved through an authoritarian regime or a regime that relies on voluntary behavior and incentives, the latter is to be preferred.

Summary

We have set out ten principles for use in evaluating water law reform proposals. These ten principles provide a framework for comparison; they do not dictate a result. No solution is likely to score high on all ten measures and so tradeoffs must be made. Making those tradeoffs within the context of an open debate about underlying principles will, however, provide a means for informed decisions. We

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133. *See, e.g.*, Susan Emmenegger & Axel Tschentscher, *Taking Nature's Rights Seriously: The Long Way to Biocentrism in Environmental Law*, 6 GEO. INT'L ENVTL. L. REV. 545, 592 (1994). The authors advocate:

> Nature's rights in a biocentric perspective can be assigned a specific content and a balancing procedure to accommodate competing interests between humans and other living entities of nature. Further practical implications of taking nature's rights seriously include organizing legal and political representation of nature, correcting damage assessment under a "marketplace of interests" perspective, and developing supportive action plans to compensate for the historical disadvantage nature has suffered in terms of the protection of its interests.

now turn to brief evaluations of existing water law institutions in the context of these principles.

III. WATER LAW INSTITUTIONS

In this Section we discuss three important attributes of U.S. water law institutions: (1) the substantive rules governing water, (2) the means of allocating rights, (3) the type of decision making mechanism, and (4) the location of the decision.

Substantive Rules

There are three major sets of substantive rules governing water rights in the United States. Eastern states largely follow the riparian doctrine, whereas western (and more arid) states generally follow the prior appropriation doctrine. More recently, federal environmental laws have also become a significant factor in water rights.

As developed in Britain and applied in the United States, the riparian doctrine has three key features: (1) ownership of land on the banks of a body of water created the water right,[134] (2) all landowners held equal water rights,[135] and (3) landowners' use of the water must be "reasonable."[136] The rules of nineteenth century riparian doctrine were relatively vague, e.g., "reasonable use," and left a great deal to case-by-case decision-making. Thus riparian common law left a great deal to both the judge and the jury in any given case.

Although substantively different, the law of prior appropriation that grew up in the western states had many similarities to eastern water law. The common law of prior appropriation presented relatively clear cut factual issues to juries. Its differences from riparian common law largely clarified rather than complicated factual issues.[137] For example, the concept of the seniority of rights provided an important innovation: "A sharp-edged rule, ranking the quality of rights' titles by their dates of issue ... prevents disputes and reduces bargaining costs drastically by

134. Anthony Scott & Georgina Coustalin, *The Evolution of Water Rights*, 35 NAT. RES. J. 821, 825 (1995).

135. *Id.* at 825; *see also* JOSEPH R. LONG, A TREATISE ON THE LAW OF IRRIGATION § 9, at 19 (1902).

136. LONG, *supra* note 135, § 9, at 19.

137. Scott & Coustalin, *supra* note 134, at 901. This is not to discount the substantive differences. There were also important differences in legal rules. Riparian rights did not allow one individual to claim an entire stream, while prior appropriation did. LONG, *supra* note 135, § 17, at 33. Prior appropriation also introduced "three features not found in the earlier common law system: precedence by seniority; the requirement of beneficial use; and a locational arrangement which was conducive to transferability." Scott & Coustalin, *supra* note 134, at 916.

saying that the most senior user gets all his water before the next gets any."[138] The system of rules produced by the common law were thus an effective institution built around private rights and markets to handle a situation where water was far more scarce than in the more humid east. As an institutional response, the development of common law of prior appropriation economized on a scarce resource in the less populated west—decision makers' time and energy.[139] Similarly, deciding only actual disputes meant that no decisions were needed on the hypothetical disputes necessary to make a complete, consistent allocation of all rights to a particular body of water. As the west was troubled by an unaccountable, and sometimes corrupt, territorial judiciary, this was an important feature.

Increasingly, however, national environmental statutes are affecting local water rights. Not only does the national government directly regulate water through statutes like the Clean Water Act, but other environmental regulatory regimes, such as the Endangered Species Act, are affecting how water can be used.

Summary

The key focus on U.S. water law in the nineteenth century was that it was common law, and the focus should not be on the differences between prior appropriation and riparianism. The traditional emphasis on differences in substance neglects the important similarities between the common law of riparian rights and the common law of prior appropriation. The most important of which was its adaptability where in developing the prior appropriation doctrine out of riparianism, nineteenth-century water users "were merely following a self-help experimental approach in organizing their respective rights and obligations in a new land as best they could."[140] Indeed, University of Colorado Professor Charles F. Wilkinson termed the early decisions developing the prior appropriation doctrine "common-law judging at its best. With no statutes to speak of, western courts looked where they should have looked—to custom, to conditions in the field, and to

138. Scott & Coustalin, *supra* note 134, at 919. The introduction of seniority alone meant that many disputes never needed to reach a court as lay individuals could determine their relative rights by simply comparing priorities in many instances. It also significantly limited the potential for bias by shifting decisions to clearer issues (e.g., priority, beneficial use) from muddier issues (e.g., reasonableness of use). *Id.*

139. *See, e.g.*, Paul H. Rubin, *Growing a Legal System in the Post-Communist Economies*, 27 CORNELL INT'L L.J. 1, 9-13 (1994) (describing the need to conserve legal resources where scarce).

140. Scott & Coustalin, *supra* note 134, at 910 (citations omitted).

economic and social needs."[141] Both doctrines were simply common law responses to different conditions.

In contrast, the modern development of both doctrines and of modern environmental law has been largely a statutory process. Rather than common law, large areas of water law today are administrative processes built around frameworks of statutes and regulations derived not from case-by-case decision making but from legislative and bureaucratic processes.

Allocation Mechanisms

Water rights are allocated through two main types of institutions: (1) administrative and (2) market.

Administrative Allocation

Administrative allocation of rights occurs when a state body grants rights based on nonvoluntary transactions.[142] For example, if the owner of a water right wishes to transfer that right to another individual, most western states require that a state agency, usually the state engineer, approve the transfer.[143] This approval is not based on a voluntary transaction but instead on criteria defined by statutes and on political considerations.[144]

Administrative allocation mechanisms have, for our purposes, four relevant characteristics. First, they require that the decision maker have sufficient knowledge to apply the relevant criteria.[145] Thus if the decision maker is required to consider the impact of the transfer on pollution levels in the body of water, the decision maker must know the pollution levels before the transfer, how the transfer will affect the pollution levels, and the alternative means of protecting water quality.

Second, administrative allocation mechanisms require that the decision maker have sufficient knowledge of the criteria to be used to evaluate the decision.[146] Some of these criteria may be stated in a statute or regulation, but others may be implicit.[147] For example, a quote stated

141. Charles Wilkinson, *Aldo Leopold and Western Water Law*, 24 LAND & WATER L. REV. 1, 6-7 (1989).

142. Deborah Moore & Zach Willey, *Water in the American West: Institutional Evolution and Environmental Restoration in the 21st Century*, 62 U. COL. L. REV. 775, 822 (1991).

143. *Id.*

144. *Id.*

145. *Id.*

146. *Id.* at 822-23.

147. *Id.*

such as, "don't interfere with the state senate president's favorite trout stream," might be an important but unstated constraint on water transfers.

Third, the decision maker must be constrained to follow the appropriate criteria and not follow an inappropriate one.[148] In short, the decision maker must implement the public interest, not his own private interests.[149] Finally, there must be a mechanism for determining what the appropriate criteria are.[150]

Each of these characteristics raises important issues. First, gathering knowledge is expensive. Second, preventing decision-makers from departing from the public interest requires monitoring and sanctions. Lastly, public decision-making has costs and raises public-choice issues.

Markets

Markets are decentralized mechanisms for allocating rights.[151] When an individual wishes to acquire rights held by another, she must offer the rights holder sufficient compensation to acquire the rights through a voluntary transfer.[152] By relying solely on individual voluntary transfers, markets avoid the collective choice problems and need for constraints on decision makers required in administrative allocations.[153]

The information requirements for markets are significantly lower than for administrative allocations because markets are able to rely on price signals.[154] By conveying the alternative valuations of resources, prices enable market actors to compare their present use of a resource to the potential use others might make of it without knowing the details of those potential uses.[155]

Dispute Resolution

Disputes over water are handled through two main types of institutions: (1) administrative and (2) common law.

148. *Id.* at 822.
149. *Id.*
150. *Id.*
151. Barton H. Thompson, *Institutional Perspectives on Water Policy and Markets*, 81 CAL. L. REV. 671, 701 (1993).
152. *Id.* at 702-03.
153. *Id.* at 703.
154. *Id.* at 709-10.
155. *Id.* at 710-14.

Administrative Decision-making

As with initial allocation decisions, disputes can be handled administratively.[156] Such procedures incorporate many of the same problems of administrative methods arise from initial allocation.[157] Administrative dispute resolutions raise an important additional problem, however. Such agencies have more specialized missions than generalist courts. As a result, they are more susceptible to influence by special interests.[158] Indeed, specialist bodies are often created "when some interest group does not believe that equal application of the law by judges applying the traditional canons of statutory interpretation and the traditional values of the common law will result in decisions that favor its own ideology and interests."[159]

Specialist institutions are more likely than generalist institutions to be influenced because their specialized nature provides an incentive for special interests to invest in lobbying efforts.[160] Consider the case of a judge in a court of general jurisdiction. Any particular type of case is likely to make up only a fraction of the judge's docket.[161] Interest groups concerned with particular types of cases will therefore be reluctant to invest in the political process to ensure an advocate is placed in the judgeship.[162] Now consider a state administrative agency focused on a single issue, such as water rights. Special interests concerned with water will have a much greater incentive to secure control of the agency, since virtually all of the agency's actions will affect their interests.[163]

Common Law

Two major sets of water rights rules arose out of the common law. The first, the riparian system, developed in England and in the eastern United States.[164] Although it was often carried west with other parts of the common law,[165] the riparian system did not flourish in the more arid

156. Harold Bruff, *Specialized Courts in Administrative Law*, 43 ADMIN. L. REV. 329, 345-52 (1991).

157. *Id.*

158. *Id.* at 330-31.

159. BERNARD ROBERTSON, THE STATUS AND JURISDICTION OF THE NEW ZEALAND EMPLOYMENT COURT 15 (N.Z. BUS. ROUNDTABLE 1996).

160. Bruff, *supra* note 156, at 332.

161. *Id.* at 331.

162. *Id.*

163. *Id.*

164. *See* Lux v. Haggin, 10 P. 671, 746-51 (Cal. 1886) (describing impact of 1850 statute adopting common law and requiring riparian rights to be recognized).

165. *Id.*

Western states and territories. Those states developed a second new system of rules, the prior appropriation system, initially through customary legal institutions[166] but eventually recognized by the common law legal system as legitimate rules.[167] Western states adopted a variety of pure and mixed appropriation systems.

In both cases, however, the common law system's rules defined water rights, the means of acquiring and losing those rights, and the means of resolving disputes among rights holders. Most of these rules were not detailed "legalistic" rules (such as modern regulations) but were, like rules in other common law areas, general principles.[168]

At common law, disputes were resolved through trials, usually before a jury.[169] As a rule generating system, the common law had four key features. First, rules developed primarily incrementally, adjusted largely as the result of the discovery of relevant new facts rather than in response to an outcry for change.[170] Second, common law rules grew out of custom.[171] Third, cases arose out of real disputes.[172] Courts therefore addressed only questions brought to them by litigants. Finally, the common law was more than the content of legal rules. It was, as one nineteenth century writer termed it, "a particular system of reason,"[173] rather than a specific set of rules.

The above features of rule promulgation vis-à-vis the common law method are important since they played a key role in the common law water right's system. Water rights were defined incrementally in the course of the resolution of actual disputes.[174] These disputes would be decided piecemeal in many instances, where not every potentially relevant party appeared before the court in a given action.[175] Finally, the

166. *See* Norman K. Johnson & Charles T. DuMars, *A Survey of the Evolution of Western Water Law in Response to Changing Economic and Public Interest Demands*, 29 NAT. RES. J. 347, 349 (1989) (listing Native American practices, Spanish and Mexican colonial practices, Mormon practices, and miners' practices as sources for prior appropriation).

167. *See, e.g.*, Coffin v. Left Hand Ditch Co., 6 Colo. 443, 446 (1882) (stating that appropriation rights existed prior to legislation).

168. *See id.*

169. *See* David Schoenbrod, *Protecting the Environment in the Spirit of the Common Law*, *in* THE COMMON LAW AND THE ENVIRONMENT, *supra* note 94, at 3, 18.

170. *See id.*

171. *See id.* at 17.

172. *See id.* at 18.

173. JOEL PRENTISS BISHOP, COMMON LAW AND CODIFICATION 3 (Chi., T.H. Flood & Co. 1888).

174. Roger E. Meiners et al., *Burning Rivers, Common Law, and Institutional Choice for Water Quality*, *in* THE COMMON LAW AND THE ENVIRONMENT, *supra* note 94, at 54, 70.

175. *See id.* at 70-71.

process of resolving the dispute was case-specific and did not require resorting to a more utilitarian analysis of the impact of rules.[176]

The combination of these factors gave the common law several important characteristics. First, common law decision-making was extremely difficult for special interest groups to influence. Even if an interest group wanted to "buy" a decision, the availability of juries ensured that many decisions were entirely out of the hands of decision makers who could "stay bought" for more than one case, reducing the incentive to invest in buying decisions. Second, the common law's rules were based on the practices of the community, a constraint that could not be altered easily. Third, rules changed incrementally, making it harder to bring about major reallocations of rights.

Location of Decisions

Decisions about water rights are made at various levels of society. Some decisions are made at the national level (e.g., by the federal Environmental Protection Agency) and some are made at the state or regional level (e.g., through state courts).

Jonathan Macey and Henry Butler have proposed a "Matching Principle" to determine where the optimal location of decision making authority is.[177] This principle "suggests that determining the efficient level of regulatory authority within a federal system is not very complicated. In general, regulatory authority should go to the political jurisdiction that comes closest to matching the geographic area affected by a particular externality."[178] Further, decentralizing authority, and so allowing competition among regulatory authorities, is superior when four conditions are fulfilled:

> (1) the economic entities affected by the law must be able to move to alternate jurisdictions at a relatively low cost; (2) all of the consequences of a particular jurisdiction's laws must be felt within that jurisdiction; (3) lawmakers must be forced to respond to adverse events (such as a decrease in population or falling real estate prices, market share, or revenue); and (4) jurisdictions must be able to select any set of laws they desire.[179]

Historically, these conditions were largely met with respect to numerous aspects of water law. American water law began as state

176. *See* Schoenbrod, *supra* note 169, at 18.

177. Jonathan R. Macey & Henry N. Butler, *Federalism and the Environment, in* THE COMMON LAW AND THE ENVIRONMENT, *supra* note 94, at 158, 160.

178. *Id.*

179. *Id.* at 165.

property law, defining rights to water.[180] Individuals were free to locate in any state they wished and states were free to adopt any set of water laws they chose.[181] Cross-border effects do exist in water between upstream and downstream states, but such effects are present only in a limited number of states (those on a particular river, for example) and so justify regional, not national, intervention.

Over time, federal law began to play an increasing role, as the federal government sponsored water projects in the west and, since the 1960s, through federal involvement in water pollution control programs. Although many aspects of water law remain primarily state law questions, federal law plays an increasingly important part.

IV. CONCLUSION

In the mid-nineteenth century, Americans in the new states and territories of the West had a blank slate on which to write their water law. They opted for a new substantive doctrine, prior appropriation, but the time tested procedures of state-based common law won out. Over the next century, these institutions were increasingly supplanted by administrative procedures and national substantive law. If we were in the position of those nineteenth century pioneers today, what choices should we make?

In this Article we have presented ten principles we think could guide such a choice. These principles point toward a water law system built around private property rights, common law legal doctrines, and individual court actions. They suggest a water law that incorporates local knowledge through decentralized decisionmaking and limited involvement of government. What would such a system of water law produce? Because it would be the result of countless individual decisions based on local knowledge we cannot possess or integrate, we cannot describe the result in detail. We can, however, offer several predictions:

- water would be conserved where it is scarce.
- water would be available for environmental purposes such as maintaining instream flow.
- water shortages would be reduced or eliminated.
- disputes over water would be no different than other disputes between individuals, rather than major political crises.

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180. *See* Meiners et al., *supra* note 174, at 70.
181. *See id.* at 70-73.

These things would come about because markets would allow water to flow to its most valued uses, disputes would be brought only when real injuries existed, and markets would allow a diversity of water uses to coexist.

Would all streams have enough water to support environmental goals such as the restoration of salmon fisheries in the Pacific Northwest? It is possible, although it would be unlikely that any single value would monopolize a market-based process. But we think it likely that more environmental goals would be met under such a system than under present water law regimes because a market-based approach would allow those who value such water uses to make them a reality.

Five years ago, one of us concluded a book on water markets as follows:

> Some would say that water cannot be entrusted to markets because it is a necessity of life. To the contrary, because it is a necessity of life, it is so precious that it must be entrusted to the discipline of markets that encourage conservation and innovation. Unless distortions created by governmental intervention are corrected, water shortages will become more acute and crises will be inevitable. When this happens, it will be difficult to suppress market forces. It would be better, however, if we could get political and legal impediments out of the way of markets before necessity becomes the mother of invention.[182]

These ideas remain true today.

182. TERRY L. ANDERSON & PAMELA SNYDER, WATER MARKETS: PRIMING THE INVISIBLE PUMP 204 (1997).