Multiple Ways of Knowing Water Resources: Enhancing the Status of Water Ethics

David L. Feldman
Helen Ingram

Follow this and additional works at: http://digitalcommons.law.scu.edu/scujil

Recommended Citation
Available at: http://digitalcommons.law.scu.edu/scujil/vol7/iss1/1
Multiple Ways of Knowing Water Resources: Enhancing the Status of Water Ethics

David L. Feldman\(^1\) and Helen Ingram\(^2\)\(^3\)

Introduction

The management of water resources can be summed up as a “wicked problem” characterized by multiple conflicting, non-commensurate perspectives.\(^4\) The

1. David Feldman is the Professor and Chair of the Department of Planning, Policy and Design at The University of California, Irvine’s School of Social Ecology.
2. Helen Ingram is a Professor Emeritus in the Department of Planning, Policy and Design at The University of California, Irvine’s School of Social Ecology.
3. We would like to thank Max Broad, an undergraduate student in Social Ecology at the University of California, Irvine, for his excellent footnote and reference preparation and for his editorial assistance.
4. The concept of “wicked problems” was first introduced by H. J. Rittel and M. M. Webber (1973) in the context of social planning. In solving a wicked problem, they suggest solving one aspect may reveal another, more complex problem. They further state that the following rules define a wicked problem:
   
   There is no definitive formulation of a wicked problem.
   Wicked problems have no stopping rule.
   Solutions to wicked problems are not true-or-false, but good-or-bad.
   There is no immediate and no ultimate test of a solution to a wicked problem.
   Every solution to a wicked problem is a "one-shot operation"; because there is no opportunity to learn by trial-and-error, every attempt counts significantly.
   Wicked problems do not have an enumerable (or an exhaustively describable) set of potential solutions, nor is there a well-described set of permissible operations that may
tendency among water scholars is somehow to integrate the way in which we think about water into some coherent, comprehensive, coordinated whole. Our intent in this article is to do the opposite — to pick apart the different "ways of knowing" people have about water into four separate kinds of networks or associations. We argue that one way of knowing, what we call the ethical perspective, has received much less serious attention than it deserves. Our argument is that viable solutions to water problems are reasonably sought in the areas where different ways of knowing overlap. Unfortunately, all too often ethical and human rights concerns are left by the wayside. We argue that democratic decision-making must reflect the full range of values with which water is associated.

By democratic decision-making, we mean a process that permits the systematic appraisal and choosing among various policy options advanced by different water policy advocates — e.g., between those who aspire to preserve scenic rivers, pristine waters, and the ecological resources that depend on them against those whose goals revolve around regional development and who demand additional water to support economic growth and larger populations. Democratic decision-making for water — as for anything else — requires more than freely-contested, majoritarian-based elections: it implies representation, and direct participation of affected groups in decisions, achievement-based values in making policy choices, and decentralized, open decision making which permits wide policy debate.

Because many of the water issues encountered in the past and likely to be dealt with in the future are complicated by competing equity claims, no simple utilitarian formula of serving the greatest number of people, or the highest economic value, or the alternative least damaging to the environment or other single-dimensional metric will work. Instead, multiple kinds of rationality and

be incorporated into the plan.

Every wicked problem is essentially unique.

Every wicked problem can be considered to be a symptom of another problem.

The existence of a discrepancy in representing a wicked problem can be explained in numerous ways. The choice of explanation determines the nature of the problem's resolution.

The planner (designer) has no right to be wrong.


reasoning must be embraced that encompass fair, open and transparent decision-making processes in which individuals and groups affected by water decisions can equally participate, and where no constituency or alternative management approach is categorically – or capriciously – excluded.7

Ways of Knowing

A way of knowing (WOK) (see Figure 1) is how one interprets the elements in a policy space and makes sense of the relationships among them. It is a narrative, story, network, or analytical frame that holds all of the pieces together in a relatively coherent way.8 People come to knowing through experience, faith, logic, intuition, moral reasoning, and other forms of cognition. Because water is a multifaceted good, and despite the attempts of many scholars and policy makers to capture water through utilitarian rationality – a self-interested perspective wherein water can be made to serve the greatest needs of the many – people persist in seeing it among other things as a symbol of opportunity and security, a cultural artifact, part of their identity and sense of place.

Moreover, demands on water resources have traditionally been classified by their many competing uses: urban water supply, agriculture, industry, energy, recreation, the environment, and so forth.9 Viewed from only this narrow, utilitarian perspective, competition for water resources promises to intensify as not only demands for the production of energy, but as demands for most other uses grow. Irrigated agriculture is expanding as are the domestic water demands of megacities around the increasingly urban world10. The lower limits of water supplies and water quality needed to sustain nature and the environment is turning out to be much higher than once imagined. As difficult as it would be to negotiate claims among these users, all are arrayed along the same utilitarian dimension. Additional levels of complexity and conflict arise because there are many other

8. BLATTER, Supra note 5.
10. See, Ezcurra and Mazari-Hiriart, Are Megacities Viable? A Cautionary Tale from Mexico City, ENVIRONMENT 38 (1), JAN/FEB, 6-15, 26-35 (1996) (explaining that “Megacities” are typically defined as having populations exceeding 10 million inhabitants. Many, though by no means all, of these urban centers are located in countries with low per capita gross domestic product.
values that are not utilitarian in nature. In short, meanings of water vary depending upon different ways of knowing, varying relationships of water to territory and the state, material and symbolic attachments and other facets or elements. Each of the various meanings is the source of claims to legitimacy, voice, and fairness.

Much of water politics and policy revolves around attempts to deal with the stresses and conflicts involved in trying to reconcile different ways of knowing in particular real world water issues. As Ken Conca concludes in his book about water governance "[t]here is little evidence of a common normative structure in the form of interstate cooperation has taken across the world's shared river basins, and there is no compelling evidence that international legal principles are taking on greater depth of meaning or even moving in an identifiable direction."12

**Figure 1** illustrates four different ways of knowing the issue of water resources. Each way of knowing embraces some of the concepts, ideas, documents, and physical and organizational structures common to other ways of knowing, but not others. As the figure portrays, the area of overlap is quite limited. Some elements take on the same interpretation in two ways of knowing, whereas others have a different interpretation from one WOK to another.

The way of knowing portrayed in the far left oval is the 'ethical' or 'human rights' way of knowing, widely identified as important by some domestic and international water scholars as well as many cultures and communities. This way of knowing is informed by moral and ethical reasoning, logic and direct experience, and includes the losers or victims of the many water projects that have exploited available water supplies by damming, diverting and pumping. Nationally and internationally it includes disadvantaged peoples, including indigenous peoples and the urban and rural poor with insufficient affordable clean water supply. Worldwide there are over a billion people currently without access to drinking water services and, by 2020, 2.2 billion will be without proper sanitation.13

Even in the U. S., the differences between the quantity and quality of water at the disposal to different economic, racial, and ethnic groups is considerable. This

way of knowing is largely embraced by organizations like Oxfam and the International Rivers Network, and is also reflected in the World Commission on Dams Report issued in 2000 which acknowledged this disparity in stating that “social groups bearing the social and environmental costs and risks of large dams, especially the poor, vulnerable, and future generations, are often not the same groups that receive the water and electricity services, nor the social and economic benefits of these.” Moreover, the UNESCO-formed World Commission on Ethics of Scientific Knowledge and Technology (2002) articulated a set of six ethical principles toward water (see Figure 2) which seek to embrace universal aspirations. All six principles are predicated on the notion that access to water is a basic human right.

Equities often require balancing and are sometimes inconsistent. For instance, equity considerations are built into many longstanding water rules like “first in time means first in right” – the basis for the Law of Prior Appropriation that is the basis for much Western U.S. water law. The principle argues that it is not fair to deprive investors of water after they have worked to divert and develop the resource. This principle protects rural farmers who have been, in effect, guaranteed a commitment that water will be provided in lean times as well as good ones. At the same time the growing numbers of humans dependent upon water resources suggest that an inflexible application of prior appropriation would not serve equity, in part because it would not serve to conform management practice to variations in stream flow or watershed characteristics, and in part because it is biased toward off-stream and consumptive water uses. These biases of the “first in time, first in right” doctrine have only been reformed on a state-by-state basis in the past two decades, prompted by concerns over environmental damage, the need to protect public lands, and the interests of tribal nations.

The few overlaps between the ethical way of knowing and other ways of knowing are an indication of the importance of marginalization—i.e., that some issues are pushed so far out on the periphery of a way of knowing that it is considered as mostly falling under another category of knowing. In effect, many times ethical issues in water are shunted aside because they are viewed as either irrelevant to the knowledge domains of other water-related professions (i.e., as normative or judgmental, as opposed to logical or empirical), or as technical issues (i.e., “equity” means ensuring that there are procedures in place to permit public expressions of “preference” in, say, reservoir operations. For instance, among such overlapping items may be the infrastructure necessary to deliver the water to people that must be constructed and has a cost. Also, there may be fish and other wildlife that are dependent on water but also important to cultural values closely associated with the dignity aspects of fundamental human rights.

The round circle in Figure 1 represents the ‘ecological’ way of knowing water resources. This way of knowing comes from moral reasoning, science studies, and experience. This way of knowing has only limited overlap with the human rights way of knowing. Note that in the UNESCO principles, stewardship is taken to mean balancing between human needs and nature. The ecological way of knowing tends to see humans as an invasive species already oversupplied with water. The narrative interprets the large star, which reflects GCC as clear physical evidence that humans are out of balance with nature. This way of knowing is bolstered by many ecological science studies that show flooding and drought as natural and even inevitable processes so that the precautionary principle, another element, is advisable. The narrative in the ecological way of knowing sees water as an essential element of nature that never should be disembodied and treated as a human right or as property. Environmentalists often clash with the ethical dimension on such issues as endangered species, where some indigenous peoples assert their historic fishing rights in face of the Endangered Species Act, a core idea for the Ecological WOK.

For water, the most central and most inclusive way of knowing water resources is as a product of natural and humanly constructed water systems, necessary for human social and economic development. It includes the great bulk of water

---

Multiple Ways of Knowing Water Resources

agencies charged with this function, including irrigation districts, municipal water supply agencies, and regional and federal public works-related water agencies. It is a thoroughly utilitarian way of knowing and sees most elements as means to develop, channel and divert water to human uses including municipal water supply, industry, and irrigation and so on. In the course of developing means to serve important human wants for irrigation and domestic water uses, human rights interests may incidentally also be served as they are in Native American water settlements like the Navajo irrigation project (the sad history of that project also indicates that the concern for delivering equity to disadvantaged people was not a high priority). There is a lot of overlap between this way of knowing and the ecological ways of knowing but the same elements tend to be viewed differently. For example, the Endangered Species Act is generally regarded as a constraint instead of core text support, and fish and wildlife tend to be seen as yet another set of demands upon a product in limited supply. Moreover, global climate change is recognized as quite important, and as an emerging challenge that may make providing water more difficult and require more dams and diversions, as well as better information about how regional precipitation, drought, variability, streamflow, and other factors are likely to change.

The third way of knowing is informed by instrumental reasoning and sees water as an economic commodity that can be assigned an economic value and subject to exchange through markets. There is considerable overlap between this way of knowing and that of ecology, since many ecologists have come to see subsidies provided by government to various groups of water users as a major cause of overdevelopment and damage to the environment. Also, many ecologists have come to think of ecological services as consistent with their way of knowing and these services can be translated into commodity values. However, there is one distinct difference. The economic commodity way of knowing sees ecosystems

and the services they provide as positive "externalities" that producers do not directly pay to support – but which benefit society. By contrast, the ecological way of knowing sees the ecosystem as natural capital that must be preserved, and, being irreplaceable, as not reducible to mere dollars and cents.\textsuperscript{22}

Overlapping with the "water as product way of knowing" are elements including municipal water supply agencies that have gotten increasing proportions of their water supplies through rural urban water sales and leases. Water banks, institutional arrangements that have emerged in California, Arizona and elsewhere are also overlapping elements fully accepted in both the production and economic ways of knowing water. In the international arena, water as an economic product underlies the expansion of international water corporations aimed at privatizing water services. There is very little shared space between the economic way of knowing and the human rights way. Attempts to compensate indigenous peoples with money rather than water for water rights they have lost are consistently rejected. It is usually argued from an equity perspective that water is irreplaceable, and that there is no future that money can buy without water. Further, the equity notion that all people should have access to clean affordable water counters the economic principle that cost of service pricing sends an important economic signal about scarcity.

When water issues arise, very often contention revolves around different ways of knowing, and solutions are elusive because participants, coming from different places talk past one another. That said, the most successful strategies for contemporary water management are successful in large part because they draw upon most of the ways of knowing by fashioning policy tools that have multiple appeals. Consider for instance, ecological services that are quantified, where costs are included in decision making.

An example is the way New York City protects its water supply. The city's water comes from reservoirs in the Catskill Mountains. Since the 1970s, sewage and agricultural runoff, exacerbated by land clearance for farms and homes, has degraded water quality. A filtration plant with an estimated cost of $6-8 billion and annual operating costs of $300 million was proposed to manage the issue. As an alternative, a consortium of environmental advocates and city officials proposed

\textsuperscript{22} See, e.g., KENNETH BOULDING, TOWARDS A NEW ECONOMICS: CRITICAL ESSAYS ON ECODLOGY, DISTRIBUTION, AND OTHER THEMES, (Mark Perlman & Mark Blaug eds., Edward Elgar Publishing) (1992).
reforesting the watershed, issuing bonds to purchase undeveloped lands, placing restrictions on further development, and providing subsidies for homeowner septic system improvements. This option was adopted because it was perceived as not only less expensive, but more equitable because it restored a scenic watershed, compensated land owners, and helped sustain New York’s image as one of the few cities in the nation that does not have to treat its drinking water. In this search for “clumsy solutions” that have appeals across different ways of knowing, those that explicitly include issues of equity are in short supply.

Means to Incorporate Equity: Covenants, Categorical Imperatives, and Stewardship

We have identified three means for incorporating equity into water resources decisions: covenants, categorical imperatives, and environmental stewardship. These three approaches have been widely employed in some manner historically, are based in distinctive sets of principals, and – as shall be shown – pose unique challenges. Table 1 summarizes the major features of these approaches.

Covenants as an Equity Alternative for Water Resources Management

Covenants as both a moral and legal concept for managing resources originated in the Middle East some 4000-5000 years ago. Both the Hebrew Torah and official documents used by officials in ancient Assyria and Sumeria cite the concept. Covenants are predicated upon three principles. First, by agreeing to specific laws and responsibilities regarding the management of natural resources, people achieve a “dominion,” or right to rule, over nature. It is not enough for an individual to agree to these stipulations; an entire society and culture must submit to this framework. Only a few individuals need to “break” this covenant for many to suffer the consequences of doing so; the entire society bears collective responsibility for the protection of natural resources. Second, covenants, unlike mere contracts, are deemed permanent. Third, covenants often derive their

25. See, e.g., Deuteronomy 4:5–6: “See, I have taught you decrees and laws as the LORD my God commanded me, so that you may follow them in the land you are entering to take possession of it. Observe them carefully, for this will show your wisdom and understanding to the nations, who will hear about all these decrees and say, ‘Surely this great nation is a wise and understanding people.’”
authority from a deity—God, or in more recent experience, upon a global accord that places the agreement to manage water on a higher moral plateau than mere contracts.

Today, it might seem strange to use the term “covenants” in regards to equity in water resources policy but covenantal language is found throughout current water resource management and can be found in many international agreements. Recall the UNESCO example cited earlier in this article which articulated six-principles which predicate that access to water is a human right. In effect, adoption of these principles by nations constitutes a kind of covenant in which it is agreed that water must be provided to all, that our human fate is inextricably tied to that of ecosystems, that justice and equity are universally obligated provisions of government—as well as a common good, and that we are all required to preserve, protect, and sustain water resources.

Another UN-based covenantal example with water and environmental implications is the 1948 Universal Declaration of Human Rights, promulgated by the General Assembly in a period of post-war optimism. The declaration enshrined two important environmentally-relevant principles: (1) everyone has a right to marry and have a family and (2) “(e)veryone has the right to a standard of living adequate for the health and well-being of himself and of his family.” This includes food, clothing, housing and medical care. Somewhat problematically, the first of these “covenants,” by implying that decisions regarding family size and reproduction rest solely with the family (re-affirmed by the United Nations in 1967) – engenders potential resource management problems, since it does not address the implications of over-population for the provision of adequate water supplies. Nonetheless, the entire Universal Declaration was issued as a “proclamation” of the General Assembly of the United Nations of a “common standard of achievement for all peoples and all nations,” with the expectation that all peoples, institutions, and nations should “strive by teaching and education to promote respect for these rights and freedoms and by progressive measures, national and international, to secure their universal and effective recognition and observance.” In effect, the act of securing these rights would serve as a

27. Id.
28. Id.
29. Id.
permanent, perpetual commitment enshrined in law “both among the peoples of Member States themselves and among the peoples of territories under their jurisdiction”.  

Finally, an instructive U.S. policy example of a covenant pertaining to the management of natural resources generally – and water resources in particular – is the National Park Service Organic Act of 1916. This act not only established a commitment to conserve scenery and natural and historic objects, but endowed the agency created by the Act (the National Park Service) with authority “to conserve the scenery and the natural and historic objects and the wildlife therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations.”

While covenants focus on the mutuality of civic obligations and provide guidance useful for the structure of political frameworks for management, they harbor three potential drawbacks – in part, illustrated by the above examples. First, evidence of actual historical covenants that exist in more than name and are actually followed is difficult to identify – unless one can point to a specific law, treaty, or agreement in which the covenant is enshrined in law. In fact, covenants are more logical than empirical artifacts; they illustrate how political and legal obligations should come about in the absence of authoritative institutions.

Second, since a covenant is rooted partly upon the principle of perpetuity (e.g., protecting future generations), it is difficult to change once consummated, even if conditions for change are warranted based on new knowledge about the actual distribution and availability of a resource, or because of demographic or other social change (e.g., the example of population growth exemplified by the Universal Declaration of Human Rights previously mentioned). A final problem with covenants is that our resulting obligations to nature remain unclear: are we permitted to subjugate other forms of life within watersheds for our own benefit, or must we protect nature for its own sake? The National Park Service Act – in implementation – exemplifies this problem.

Under the National Park Service Act of 1916, NPS is responsible for protecting the natural, unimpaired flow of rivers flowing through its parks and other protected areas. However, in the western U.S., another agency – the Bureau of Reclamation...
(BOR) – established in 1902, is responsible for developing irrigation and other water development projects in the West. On occasion, the missions of these two agencies have come into conflict in a way that illustrates the third problem with covenants – how protective they can reasonably be expected to be.

In 1947, Congress intervened to allow the BOR to construct a water diversion project (the Colorado-Big Thompson Project) through a portion of Rocky Mountain National Park in order to transfer water from the uppermost reaches of the Colorado River, which rises on the state’s western slope, to the Platte River basin northeast of Denver. To compensate for potential harm to National Park resources, storage reservoirs were constructed for the project, in part, to ensure adequate instream flow to Upper Colorado River users and to permit reliable transfers to the eastern slope. From an ethical perspective, this project and the compensatory measures adopted for it exemplify the objective of reconciling a covenantal view of protecting national parks with the utilitarian objective of serving the economic needs and aspirations of the many (i.e., the irrigation of some 600,000 acres on the eastern slope of the Rocky Mountains). This has been a not untypical objective in the development of western water resources in the U.S.

Categorical Imperatives, Environmental Ethics, and Water Management

Immanuel Kant, the German philosopher most closely identified with the concept of the “categorical imperative,” was interested mainly in moral philosophy and ethical relationships among people. Nevertheless, because Kant’s ideas were partly a response to the dominant position held by utilitarian views, his ideas have important implications for natural resources management. The categorical imperative, says Kant, is a:

command [...] which present(s) an action as of itself objectively necessary, without regard to any other end [...]. It is (to) act only according to that maxim by which you can at the same time will that it should become a universal law. 33

A moral decision should not aggrandize our own happiness, Kant believed, but be generalizable to all who face a comparable choice in a similar situation. This core ideal is not radically divergent from a covenantal approach. In practical terms, Kant was really asking us to “do unto others as we would have them do to

Multiple Ways of Knowing Water Resources

us. What is good or right is determined by the intrinsic properties of an action, such as promises, commitments, and obligations.

Two imperfect but instructive water policy examples of categorical imperatives are the *Wild & Scenic Rivers Act* and the Riparian Water rights doctrine practiced in much of the eastern U.S (as well as in the United Kingdom). The *Wild and Scenic Rivers Act* is explicitly predicated upon “compensation” for previous losses of streams that were deemed historically significant, and embraces the principle that the “established national policy of dam(s) must be *complemented* by preserving other [. . .] selected rivers” and avoiding significant future harm to them through adopting a uniform national policy.35

The common-law based riparian rights doctrine, on the other hand – a doctrine practiced in most of the eastern U.S., where surface water is relatively abundant – predicates that rights to water use resides or “inheres” in owners of land adjacent to streams, and that the right to withdraw both surface and groundwater are to be constrained by the *equal rights* of others with land-adjacent rights to the same water sources.36 Landowners have the general right to reasonable use of the water flowing past their property, subject to the equal rights of other riparian landowners. Water used but not consumed must be returned to the watercourse without impaired quality.37

A practical issue that arises in applying categorical imperatives to the problem of water and equity, illustrated by these examples, is: what happens if the conditions existing when a freely made commitment or promise initially made change, as could occur through urbanization or climate change? Moreover, how does a promise made to one generation inhibit opportunities for future ones? There is clear consensus among ethical theorists that any environmental decision made by people in any society that precludes or denies this capacity for exercising free will to others is morally wrong because it denies future generations the ability

34. See, Matthew 7:12 (In covenantal terms, as found, for example in the New Testament: “So in everything, do to others what you would have them do to you, for this sums up the Law and the Prophets”).
to select the benefits they feel are most important, and denies future generations the opportunity to freely change decisions in ways that best fit their choices. The more reversible the action, the less risk we impose on the future; thus, the less obligated we are to consider the long-term impacts of our decisions. The less reversible an action is, the greater the risk it poses to future generations.\footnote{38}

A particularly problematic challenge to categorical imperatives for water management is climate change which, as we know, may dramatically alter streamflow.\footnote{39} Hypothetically, the “promise” of a given allocation of water within, say, a river basin compact (the Colorado River basin, for example) is based on an assumed annual flow that may not hold true is climate changes—leading to diminished supplies, and thus, inability to “deliver” a promised flow.\footnote{40} These possible scenarios underscore the difficulty in meeting even freely made and articulated promises and commitments in the ethical management of water.

**Environmental Stewardship and Environmental Ethics: Ruling like a Servant**

Perhaps the simplest way to conceive the meaning of stewardship is via the aphorism: “we have not inherited the environment from our grandparents, we are only borrowing it from our grandchildren.” Not unlike the two previous approaches, stewardship ethics are based on the premise that we are obliged to care for creation and to concern ourselves with what anyone—regardless of her or his generation—must do in order to ensure that creation is sustained. This obligation is rooted in a “humble anthropocentrism” that, instead of putting mankind at the center of the world, asserts that all species have inherent value and all individuals have moral standing.\footnote{41}

\footnote{38. TIMOTHY BEATLEY, ETHICAL LAND USE: PRINCIPLES OF POLICY AND PLANNING (1994); HOLMES ROLSTON III, ENVIRONMENTAL ETHICS: DUTIES TO AND VALUES IN THE NATURAL WORLD (1988).}
\footnote{40. ROBERT MERIDETH, A PRIMER ON CLIMATIC VARIABILITY AND CHANGE IN THE SOUTHWEST, (Udall Center for Studies in Public Policy & Institute for the Study of Planet Earth, the University of Arizona 2001).}
\footnote{41. Raymond E. Grizzle & Christopher B. Barrett, The One Body of Christian
While the exact meaning of stewardship is subject to wide debate, at its center is the notion that humans are responsible for caring for the natural environment. Contemporary stewardship ethics owe a debt to the Judeo-Christian tradition, and is also partly indebted to the more pragmatically derived ecological views that emerged in the late nineteenth and early twentieth century's—most notably through the writings of Gifford Pinchot, the first director of the U.S. Forest Service; John Wesley Powell, the first director of what would become the U.S. Geological Survey, and later — the naturalist and forester Aldo Leopold. These advocates of the so-called “progressive conservationist” tradition understood humanity’s obligation to care for nature to be rooted in the unique stature held by people—as creatures of reason with a capacity to serve as caretakers and guardians of natural resources. Leopold added another stricture: in caring for natural resources, we care for our own welfare and are cognizant of nature’s limits. As he stated it: “A thing is right if . . . it preserves the integrity, stability, and beauty of the biosphere.”

A number of stewardship principles are important to ethical management of water, including the central idea that resources are neither inherited nor owned, but “relinquished” by past generations and “loaned” to future ones; that a healthy environment is characterized by integrity and stability; and that we humans do not have unbridled “dominion” over nature, but that our “rule” should be one of service leadership in which we view ourselves as a part of all creation — and not apart from it.

An example of stewardship principles applied to water management is afforded by the Endangered Species Act which bars federal agencies from actions that jeopardize water-dependent resources or seriously impairs habitat, and that makes litigable the protection of species. Stewardship language is apparent in several passages of this sweeping legislation. Section 2 of the ESA finds that “various species of fish, wildlife, and plants in the United States have been rendered extinct


44. **Aldo Leopold**, *A Sand County Almanac* (1949).
as a consequence of economic growth and development untempered by adequate concern and conservation” and that other species of fish, wildlife, and plants “have been so depleted in numbers that they are in danger of or threatened with extinction.” These species are declared to be of “esthetic, ecological, educational, historical, recreational, and scientific value.” Moreover, Section 2 (4) acknowledges that the U.S. has, in effect, given its tacit agreement to stewardship through its pledge “as a sovereign state in the international community to conserve” these threatened species to the extent possible.

Of equally compelling import is the fact that stewardship language is embedded in the concept of conservation itself, as used repeatedly in the Act, and which is frequently referred to. The act defines “conservation” and “conserving” in proactive ways — as “the use of all methods and procedures which are necessary to bring any endangered species or threatened species to the point at which the measures provided pursuant to this Act are no longer necessary.”

As previously alluded to, stewardship approaches to water policy do not obviate, supplant, or replace the other two approaches discussed in this article. It could in fact be argued that one should (perhaps must) adopt a sort of covenantal understanding of one’s obligations to nature in order to practice stewardship — because to care for nature assumes a willingness to take on the long-term responsibility for protecting it. Likewise, there is intrinsic value — a categorical imperative, as it were — in the stewardship stricture to “care for creation” unselfishly, as a servant-ruler. This imperative is illustrated in the notion that one is obliged to put into place practices which fulfill one’s promises and commitments.

**Conclusion**

We have tried to show that unless equity becomes part of water solutions, the future will be fraught with conflict and a sense of unfairness that will undermine cooperation. Future water decisions must embrace multiple values and multiple ways of knowing. We have suggested some means that may be used to appropriately include equity concerns into water resources decisions. These

47. _Id._
48. _Id._ at §2.
49. _Id._ at §4.
50. _Id._ at §3.
Multiple Ways of Knowing Water Resources

approaches have been, with various degrees of success, incorporated into water decisions, and have been enshrined in laws, regulations, and even international treaties. The central point, however, is that there is no way to avoid ethical conflict through some science or expert based formulation alone.

Two documents associated with the 2002 World Summit on Sustainable Development underscore this fact. First, as a memo prepared by a group of environmental activists and scientists stated prior to the World Summit on Sustainable Development in 2002.

There is no universal way of seeing; there are only context-bound viewpoints that offer particular perspectives. Any architecture of global governance is therefore well-advised to start with the assumption that conflicts bubbling up from society are neither avoidable nor finally resolvable.51

The second relevant document is the report of the Commission on Sustainable Development acting as the preparatory committee for the World Summit on Sustainable Development in January 2002 which, in its introduction, noted the Herculean challenge of producing a “global deal” that can bridge policy differences on sustainability between the developed nations of the North and the less developed countries of the South. This global deal must include considerations over:

*equity* — eradicating poverty through equitable and sustainable access to resources; *rights* — securing environmental and social rights; *limits* — reducing resource use to within sustainable limits; *justice* — recognition of ecological debts and cancellation of financial debts; *democracy* — ensuring access to information and public participation; and *ethics* — rethinking the values and principles that guide human behavior.52

As we have suggested in this article — and as these two sets of observations underscore — a continuous process of finding resolutions that appeal to more than one way of knowing is the only viable course of action. That course of action must, importantly, include continued concerns with equity. Problematically,


52. U.N., Econ. & Soc. Council [ECOSOC], World Summit on Sustainable Development.
however, while there seems to be common global agreement that ethical considerations revolving around fairness, justice, and participation must be embraced in decisions over sustainability, political, economic, and cultural differences ensure that divergent views over what is, and is not, thought to be ethical are inevitable because these views are contextually framed. As we have also tried to show, however, such differences need not be a cause of alarm – or ethical cynicism – but a clarion for openness and dialogue.

As these three approaches have shown, no ethical approach that categorically excludes any constituency or alternative approach should be accepted, and any approach to equity must emphasize process as well as substance—providing a means for wide debate and deliberation over a broad range of viable, realistic unbiased alternatives. Such a diagnosis is consistent with the fact that natural phenomena such as water have different meanings to different groups, and different ways of knowing, as we have discussed. It is also consistent with the ultimate value placed on humility and self-effacing admission of the possibility of error common to all three of the approaches to equity we have discussed in this article.
### Three Means to Incorporate Equity in Water Resources Decisions – Comparative Criteria

<table>
<thead>
<tr>
<th>Ethical Approach</th>
<th>How approach addresses water disputes</th>
<th>Advantages</th>
<th>Disadvantages/drawbacks</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Covenants</strong></td>
<td>1) Seek “righteous” solutions; 2) favor comprehensive planning; 3) encourage public participation in decision-making &amp; public responsibility for outcomes.</td>
<td>1) Focus on mutuality of obligations; 2) offers guidance on how to structure governance frameworks (e.g., river basin compacts).</td>
<td>1) Evidence of historical covenants hard to find – are logical not empirical artifacts; 2) covenants hard to change once consummated – a problem for popular sovereignty; 3) unclear if we are obliged to exercise dominion over nature, or protect it.</td>
</tr>
<tr>
<td><strong>Categorical Imperatives</strong></td>
<td>1) Key issue = fulfilling promises &amp; commitments; 2) planning needed to ensure obligations are fulfilled &amp; to enforce them in perpetuity; 3) participation needed to ensure promises freely</td>
<td>1) Management approaches can be modified in face of new information; 2) provides early warning of problems that inhibit judicious decisions (e.g.,</td>
<td>1) Does not adequately embrace non-renewable or endangered resources; 2) does not provide clear means of determining whether an intrinsic promise or other commitment outweighs traditional “benefits” vs. “costs” (utility) approach.</td>
</tr>
<tr>
<td><strong>Stewardship</strong></td>
<td>1) Planning should be organized &amp; comprehensive; 2) human and ecological needs – rejects the notion of human “dominion” over nature; 3) public participation must embrace broad range of human/natural issues &amp; concerns.</td>
<td>1) Tries to balance human and ecological needs – rejects the notion of human “dominion” over nature; 2) does not supplant or replace other approaches, but supplements them.</td>
<td>1) Reasons for caring for nature ambiguous – is it a “moral imperative” enforceable by public policy, or an act of unselfish love dependent on attitude? 2) Requires a deep sense of humility toward nature.</td>
</tr>
</tbody>
</table>
**Figure 1. Multiple Ways of Knowing Water Resources: Equity; Product; Environment; Economic Good**

**Figure 2. UNESCO Commission on Ethics – Water Principles**

- **Human dignity** – water is a basic human right,
- **Participation** – focus on citizen participation in decision-making,
- our upstream and downstream dependency on these systems,
- **Human equality** – incorporating the values of justice and equity,
- **Water is a common good** and essential to the realization of full human potential and dignity, and
- **Stewardship** - moving toward sustainable ethic and finding a balance between using, changing, and preserving our land and water resources.
***