Evolution of U.S. Water Policy: Toward a Unified Federal Policy

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ABSTRACT

Water, everybody needs it -- and as our population grows, our demands become more and priority uses of water, who uses it, and how it is used become more important. This paper traces almost 200 years of water law history in the United States from the development of water rights doctrine to a current federal water policy that is unclear, has conflicting goals, is implemented by a maze of agencies and programs, lacks a clear policy and coordination, and creates gridlock. The Unified Federal Policy was developed to ensure a consistent approach to managing Federal lands on a watershed basis, to protect, maintain, and improve watershed conditions and water quality. The Unified Federal Policy is a beginning, but it does not go far enough. The Nation needs to implement a unified, powerful, and overarching policy framework and operating system that regularly and periodically integrates the shifting water use priorities as American megatrends evolve, measures changes in priorities when and where they occur, and then creates and incorporates a concomitant learning system that anticipates and makes changes in policies and practices to meet newly emerged needs and uses. Hydrologic, ecological, social, and economic issues must be appropriately addressed and tailored to meet the water management challenges of the next century. Only if this, or other like actions are taken will we truly have a unified policy for managing water.

When water is plentiful for everyone, people are not concerned much about water policy, but when droughts occur in different parts of the Nation, and there is less water to go around for many uses, the rights to who has access to the water and how they came to have it is very important.

It seems that locational demands for water in the United States do not always coincide with supplies. The western U.S. receives less rainfall than the east—San Diego receives less than 10 inches of rain a year, compared to 33 inches in Chicago and 44 inches in New York (Anderson & Snyder, 1997). Yet, 80 percent of the Nation's water is consumed in the West. Both population and water demand have increased substantially since 1971. Water tables have dropped, resulting in increased costs for food and energy production. Urban areas are experiencing water shortages as their populations expand and compete with agricultural irrigators for limited water supplies (Case & Alward, 1997).

Although many previous studies have documented the West's chronic water problems (Anderson & Snyder, 1997; Bell, 1997; Frederick, 1988; Glasser, 2000; Guldin, 1989; Kenney, 1999; Pisani, 2000; Riebsame, 1997), it has been only recently (1992) that Congress established a commission to investigate and review Western water policy and institutions. Section 3{3003} of The Act of 1992 directed the President "to undertake a comprehensive review of Federal activities in the nineteen Western States which directly or indirectly affect the allocation and use of water resources, whether surface or subsurface, and to submit a report to Congress on the President's findings, together with recommendations." No specific actions were intended, though this information would be used to develop proposed legislation. Thus the Western Water Policy Review Advisory Commission was established.

Among Congress's reasons for forming the Commission was its determination that current federal water policy suffered from unclear and conflicting goals, was implemented by a maze of agencies and programs, and that the resulting lack of clear policy and coordination created gridlock that could not be resolved without addressing fundamental changes in institutional structures and governmental processes.

To better understand the origins of these complex institutions and different legal doctrines governing water resources in the United States, this paper will first explore:

- The origins of the riparian and appropriation doctrines of water rights including historic influences of Spanish and English law
- How the California Gold Rush changed historic water use patterns
- How the prior appropriation doctrine developed; and,
- Why there is no federal water law.

It will conclude with a brief overview of major findings and recommendations of the Western Water Policy Review Advisory Commission, some alternative proposals to provide answers to the dilemma of how best to manage water resource issues in the Western United States and the development of an overarching framework to manage Western water for the 21st century.

Brief History and Evolution of U.S. Water Use and Water Law

The Spanish explorers of the 16th Century brought with them their experience in diverting water from natural water courses to make arid lands productive. In their efforts to "civilize" native populations in what is now California, they collected and settled Indians into central communities that were often built around Catholic missions. One of the other goals of Spanish settlements was to mine the rich ore bodies of the New World, and collecting Indians at missions was in large part designed to assure adequate labor forces for the mines. Production of food and fiber in quantities beyond those required by the farmers themselves was necessary to support the mines, as well as the military bases that accompanied Spanish development. Irrigation was essential to accomplish these tasks, and the diversion of water for irrigation became widespread around Spanish towns and missions (Gillilan & Brown, 1997; Wilkinson, 1992).

The mines themselves required substantial quantities of water, often requiring more water than half a dozen towns or missions. Mining was a new water use in the West, and one that had significant potential, after mines became prevalent throughout New Spain by the 18th century, to affect both water quantity and quality for downstream users (Gillilan & Brown, 1997).

The use of water in the Spanish West was governed by the same laws as Spain used, water was owned by the Crown and was available to all for purposes such as drinking, fishing, and navigation. Spanish law in the New World continued to protect public uses of water, giving first priority to the use of water by communities as a whole. Water was allocated to individuals only after sufficient quantities had been secured to meet the needs of the town itself. The law included protections for private water uses. Grants of water for specific purposes were generally associated with grants of land—but were issued separately. A land grant by itself entitled the grantee to the use of water only for domestic purposes. The grantee's right was to use the water, while the state retained actual ownership (Gillilan & Brown, 1997; Wilkinson, 1992).

Spanish water law emphasized the need for fair division of the available water. While the water rights of individuals were to be protected, in the Spanish and Mexican judicial systems, the rights of the corporate community weighed more heavily than those of the individual.

In the East, the American colonies were established under the auspices of the English Crown, and were subject to English laws. English water law was relatively simple and undeveloped, having unfolded in a land where water was abundant and conflicts over its use were correspondingly rare. The navigable waters of England belonged to the Crown and were available to the public for the purposes of navigation and fishing. The Crown's ownership prevented these important economic activities from being monopolized by individuals, thereby reducing the potential for conflict. Rights to the use of waters not being used for navigation were held by those who owned the banks of the streams, and were therefore known as riparian rights (Wilkinson, 1992)

Water resource conditions in the American colonies were similar to those in England, and there was not much incentive to adopt a different set of water use rules after American independence from
England. Water use conflicts were so rare in England and in the original American States that a body of water law was not well developed. Therefore, there was no comprehensive legal doctrine governing water use.

Riparian Doctrine

The heart of the original riparian doctrine was the idea that rivers had value primarily as an amenity. Rivers enhanced the value of surrounding land, and each landowner along a river was entitled to receive the benefit of free-flowing water. This came to be known as the "natural flow" interpretation of the riparian doctrine. It held that landowners were allowed to

remove water from streams only for basic domestic purposes such drinking, bathing, cooking, and watering of limited numbers of livestock. Landowners were otherwise required to leave rivers in an undiminished and unpolluted condition. This doctrine made sense where water was abundant and there were few out-of-stream uses of water. The natural flow doctrine often gave way, however, when advances in technology made rivers valuable as a source of energy for turning the wheels of industry and then as a waste disposal or coolant in next generations of industrial processes (Anderson & Snyder, 1997; MacDonald, 1990).

The riparian doctrine was modified during the Industrial Revolution to allow riparian landowners to make reasonable use of the waters flowing over their lands. This "reasonable use" interpretation gave each landowner the right to the use of water flowing over the land without diminution or obstruction, though the landowner did not own the water itself – the right was solely to the use of the water. When water flows were insufficient to meet all uses, the deficiencies were borne as a common loss, with each user cutting back by the same proportion. The extent to which any particular use was allowed was determined by the potential injury to other riparian landowners should that use occur (Gould, 1990; Witte, undated).

The features of the reasonable use riparian doctrine were:

Only riparian landowners could have rights to the use of water.

Owners of non-riparian lands and any others wishing to preserve free-flowing waters could not have any legal rights to the water.

- An exception to this general rule was the development of water rights under the riparian doctrine through direct appropriation. Appropriation of water for out-of-stream uses was legal under the English-American common law system if the new water user was able to obtain the consent of all affected riparian landowners. Consent was explicit, but may have been assumed, if the new water use negatively impacted riparian owners, but was nevertheless allowed to continue without interruption or objection usually for 20 years. Rights developed through implied consent were often referred to as "prescriptive" rights.

3. As the water right is a consequence of land ownership rather than a separate piece of property, the right is not lost simply because it has not been exercised.

4. The relationship among riparian landowners is one of "parity" rather than "priority," and the doctrine allows the entry and accommodation of new water users. Water rights are relative rather than absolute; riparian rights do not attach to a fixed amount of water.

5. As conditions change, riparian rights for specific water uses may not be secure in situations where there is not enough water to accommodate all desired uses.

The riparian doctrine of water rights was born in lands with humid climates where precipitation was sufficient to grow crops and plentiful water supplies made conflicts between water users infrequent. Most of the American West was different, and as settlers moved west, the aridity of the land bore little resemblance to the eastern climates from which the first settlers had come. Politically, westerners were far from the national government in Washington DC, and other sources of governmental authority were rudimentary or nonexistent. With respect to water, the new rules that they created were often different than those they had used in the East.

How the California Gold Rush Changed Historic Water Use Patterns

Miners provided the primary impetus for changing the rules allocating water in the American West, especially after gold was discovered in California in 1848. The population of California, and later the entire West, increased enormously as mining became the principal industry in California and the rest of the West

The first gold deposits were found primarily along streams, and the first miners usually established claims along their banks, where they could pan for gold directly. Those arriving later, after the streamside locations had all been claimed, were forced to establish "dry diggings" some distance removed from the streams and then haul gravel in sacks or wheelbarrows to the water to be washed. As mining operations grew in size and sophistication, instead of bringing gravel to the water, streams were diverted from their natural channels to bring water to the claims (Gillilan & Brown, 1997). Hydraulic mining, in which water pushed through hoses under great pressure, was used to wash entire hillsides directly into wooden sluices, became widespread in the 1850's. It required the diversion and delivery of huge volumes of water to sites often far from natural channels (Wilkinson, 1992).

The use of water was so basic to the production of gold that enterprising forty-niners discovered they could make more money providing water to the mines than they could from mining the gold itself. Private companies were organized to build dams and canals. The size of the companies, and the scale of their waterworks, was huge, and reservoirs impounded billions of gallons of water.

The Prior Appropriation Doctrine

Spanish colonists settled the West under sponsorship of the Spanish Crown, which provided the colonists with established systems of government and law. When the forty-niners moved to California, no government awaited them. The Gold Rush occurred near the end of the U.S.-Mexican War, after the Mexican government had been expelled, but before the region had been officially transferred to the United States. There were no rules to define property rights in the gold fields—either between individual miners or between miners and the U.S. Government (Fischer & Fischer, 1990).

The miners did not own the land they were occupying, or the minerals they were seeking to remove, or the water they were using. It was not even clear what rules should eventually apply – those of the federal government, which owned the land, or those of the state government, which had not yet been created, but was widely anticipated. Rather than waiting for clarification of the rules by some level of government, the miners treated the problem as an opportunity. As there were no existing rules to guide their use of land and its resources, they made their own.

The miners' rules were created independently in each mining camp and administered by committee. Adjudication of disputes and enforcement of rules was undertaken by committees–if not by the aggrieved individuals themselves. The miners' greatest need was to establish rules governing access to the gold. Because they did not own the land or minerals, the usual rules of property ownership did not apply. Instead, the miners adopted the "first come, first served" principle already in wide use on the public domain, where rights were based on occupation rather than ownership (Gillilan & Brown, 1997).

The miners also needed rules to govern the allocation of water. The first to arrive at the gold fields, in the earliest months of the rush, often had their choice of land to claim and water to use. The later arrivals often were able to find promising, previously unclaimed land, but discovered that there was not enough water available to work the claims. Water was frequently the limiting factor in the production of the region's mineral wealth.

The riparian principles used to allocate water in the East would have been of little use to the miners even if they had been inclined to use them. Water allocation principles based on plentiful rainfall, numerous streams, and the need to leave water in the stream for downstream users made little sense in regions where rainfall and streams were less abundant. Instead, using riparian principles, the miners applied the same rules they used to govern access to mining claims. When applied to water, these rules became known as the prior appropriation doctrine.

The miners staked a claim to water by physically taking – "appropriating" – what they needed. Construction of the diversion necessary to take the water served as notice to other miners that the water was being appropriated. The first miners to appropriate water had the best right to continue using it. Subsequent appropriators were required to make do with what was left, if anything. Even if located upstream from a prior user's diversion works, a subsequent "junior" water user was required to allow enough water to pass to meet the need of the downstream "senior" appropriator.

The "use it or lose it" principle was also incorporated within the prior appropriation system, so that miners not making beneficial use of their water were forced to surrender it to those who would. Limits were seldom placed on the amount of water that an individual could use. A miner or company was free to appropriate as much water as could be put to use, even if that meant there would not be any left for those who arrived later, or to sustain the integrity of the stream and its biota (Anderson & Snyder, 1997).

California gold soon attracted investments from all over the world, and the gold fields became dominated by increasingly larger and more sophisticated mining and water supply operations. In the absence of definitive guidance from federal or state legislatures, the task of defining uniform principles fell to the California State courts.

The California courts faced a different task. The courts had been organized following California's admission to the Union as a state in 1850 and derived their jurisdiction and powers from the California State constitution. The mining camps, however, were located almost exclusively on federal land and it was not clear whether the state or the federal government had jurisdiction over activities occurring there. The courts had also been given conflicting directives from the state legislature. California's first legislature in 1850, had adopted the common practice (or common law) as the state's legal foundation, which meant that the allocation of water would be governed by riparian principles. But just one year later, the legislature adopted a statute that sanctioned the use of prior appropriation (Gillilan & Brown, 1997).

The uncertainty of their jurisdiction and the conflicting guidance given by the state legislature made it difficult for the early courts to define a uniform set of water allocation principles. Occasionally the courts developed hybrid doctrines that merged aspects of both the competing doctrines. Over time their rulings increasingly reflected the precepts of the prior appropriation doctrine that prevailed in the mining camps. In 1855, the California Supreme Court clearly set forth its justification for adopting priority principles to resolve water disputes on the public domain. The court reasoned that the federal government had implicitly validated the new legal system by failing to object to it. *Irwin v Phillips* (1855) is often cited as marking the birth of the prior appropriation doctrine. By the 1860's, the use of the prior appropriation doctrine was firmly established as the mechanism by which the California courts would resolve water conflicts occurring on the public domain.

Miners were not the only ones to divert water from rivers and streams. There was a massive infusion of settlers to the West throughout the latter half of the 19th century, and many of these settlers needed to divert water out of natural channels to sustain their livelihoods. Those who were able to claim land near rivers and streams were able to raise crops with the aid of relatively primitive diversion and irrigation works. But more widespread settlement required more sophisticated irrigation methods.

Irrigation soon became the dominant water use in the West, far exceeding mining in terms of number of locations in which it was practiced and the total volume of water used.

By the turn of the century, the principles of the prior appropriation doctrine had been widely adopted throughout the West. The basic features of the prior appropriation doctrine were:

1. The right to use water could be obtained by taking the water and putting it to beneficial use.

2. The right was limited to the amount of water that is beneficially used.

3. First in time was first in right

4. The water must be used or the right was lost.

These rules had a major impact on the uses of western rivers and streams. For instance, to take water and put it to a beneficial use, one had to exercise some form of physical control over it. Control was exercised by building storage and diversion dams or otherwise "developing" rivers, thereby altering natural patterns of water flow. The allocation of water to those who took it first provided incentives for settlers to take and put to use all the water that they could possibly use as quickly as possible, rather than leaving it for instream use or for potential out-of-stream use by future settlers. Furthermore, beneficial use requirements had the effect of excluding some water uses – such as many of those that took place instream – that were not considered beneficial at that time. Leaving water in streams was widely considered to be a waste of water.

Allocation of water according to the principles of the doctrine of prior appropriation was consistent with the cherished American ideal that individuals, not society, should control their destiny. It soon became apparent that operation of this system was accompanied by a number of problems. One of the greatest problems was the prevalence of claims for excessive amounts of water. These problems eventually led people to call for a more active role in the administering water resources by adopting new administrative systems to control the allocation and distribution of water.

To ensure that water was distributed in accordance with the priorities of the rights, any water user not receiving their legal share of a river's flow could place a "call" on the river. In response to the call, agents of the state required any water users with rights junior to those of the calling water user to curtail their diversions until the senior right was satisfied. Diversions of the most junior water rights on the watercourse were shut down first, the next most junior, and so on until enough water was left in the stream to fulfill the senior right.

The shift to the prior appropriation doctrine was handled differently by each state. Some states, particularly those where rainfall was more abundant, saw no reason to completely eliminate the riparian doctrine as they expanded the appropriation doctrine, and so made great efforts to accommodate both doctrines. The Pacific states of California, Oregon, and Washington, and the states of North and South Dakota, Nebraska, Kansas, Oklahoma, and Texas all tried to take advantage of the developmental benefits of the new prior appropriation doctrine without upsetting the expectations of citizens who based their water claims on the common law riparian doctrine (Fischer & Fischer, 1990).

The accommodation of both doctrines was largely accomplished by applying each within its own limited sphere of influence. For example, in California, the state best known for its adoption of both doctrines, the State Supreme Court decided in an 1886 case that common law riparian rights – authorized by the state's first legislature in 1850 – would prevail on lands the federal government granted to the state or to private individuals, whereas

appropriative rights – as authorized by the General Mining Law of 1862 and the state legislature's adoption of appropriative principles in 1872 – would prevail on the public domain (Wilkinson, 1992).

Texas, on the other hand, segregated the domains of the two doctrines through geography, passing legislation that authorized appropriative rights only in the arid western half of the state, leaving the riparian doctrine as the sole method of establishing water rights in the more humid eastern half of the state (Gillilan & Brown, 1997).

Over time most of the mixed doctrine states took steps to ensure the supremacy of the appropriation doctrine, and that has become the primary means by which the western states allocate and administer property rights in water.

Why was no Federal Water Law ever Developed?

Before 1890 the federal government's primary emphasis was on settling the west and public land disposal. The transfer of public lands to private ownership generated concern about the application of the riparian doctrine to those lands. Under the assumption that there would be no lands retained in federal ownership, Congress addressed this issue through a series of laws passed in the 1800's that rejected the riparian doctrine, but did not develop an independent, federal system for allocating water on federal lands. Through laws such as the General Mining Law of 1862, the Act of 1870, and the Desert Land Act of 1877, Congress acquiesced the allocation of water to the states (Rogers, 1990).

Beginning in approximately 1890, Congress changed its public land policy and began to retain and develop federal lands by passing laws that established the Forest Reserves, National Parks, and National Monuments. It also started managing water resources and developing large-scale water development and allocation projects through the 1902 Reclamation Act and the 1920 Federal Power Act. Congress's new policy for retaining federal lands and actively managing them in a manner that required water, did not agree with its previous policy of leaving water allocation to states and local users (Wilkinson, 1992; Witte, undated).

A fundamental tenet of water law widely ignored or misunderstood was that a water right gave someone the right to use water *rather than actual ownership of water*; ownership resided with the public. When they adopted their administrative systems, many states chose to clarify this fact. In general, the creation of such administrative systems, though supported by reformers, seems to have been more a result of efforts to make the existing priority system work better, rather than to make substantive changes in the system. However, the shift to public administration of water rights did result in some changes in the way water was allocated. These changes were accomplished through the use of public interest or public welfare requirements in state constitutions and statutes. Constitutions or statutes of many Western states emphasize the fact that appropriations will no longer be valid just because they benefit someone; rights will be granted only if proposed water uses are also consistent with the public interest.

The "public interest" is, however, very difficult to define. Most states have left questions of the public interest to the discretion of administrative officials. Many of the Western states have also established water use preferences among beneficial uses. Preferences accomplished some of the same goals as public interest requirements because establishing preferences promoted water uses thought to be of the most benefit to the state.

Presently, water for domestic and for municipal needs receives the highest priority in all of the states that have established preferences, although there is considerable variation in other preferred uses among the states. For instance, the use of water for agriculture is favored over all but domestic uses in most states because agricultural interests usually dominated state legislatures in the early part of the century when preference statutes were written. Industrial, manufacturing, and electrical generation purposes are usually less preferred, and the use of water for recreation, fish, and wildlife purposes is usually at or near the bottom of preference lists, if listed at all. The order of these preferences may have recently changed with the requirements of the Endangered Species Act.

Maintaining supplies of clean water and protecting watersheds are major reasons why public domain forests and rangelands were reserved. It was the headwaters of the western rivers, and the cutover and eroded lands in the East, that became the National Forest System. With passage of environmental laws, such as the Clean Water Act and Endangered Species Act, clear standards for water quality are being set by federal and state agencies (Sedell et al., 2000).

Given all this history, water rights and water allocation are still an issue in the Western states until this every day and will probably continue to be into the future.

Increasing population and demographic changes in the U.S. will intensify public concern about adequate future supplies of clean water. The population of the West has increased 50 percent in the last 20 years and is expected to increase another 300 percent by 2040 (Case & Alward, 1997) and the U.S. population will nearly double within the next 50 years. The population surge in the West is increasing the diversion and consumption use of water and, at the same time, the demand for water-based recreation (Brown 1999). This trend will continue and intensify. Most recreation in the U.S. takes place on national forests and is associated with some body of water such as lakes, reservoirs, or streams. Recent publications (Gillilan & Brown, 1997) have more closely linked instream flow issues to recreational activities and have described the complex relationships of recreation uses and water. For example, even without incorporating many of the economic facets of the recreational uses documented in the arid West, the value of instream flows for recreational fishing is greater than the value of water for irrigation (Hansen & Hallam, 1990).

Considering the existing challenges and the likely increasing conflicts over water policy in the future, the time has come for Congress to seek solutions for how best to manage the Nation's water resources.

Findings of the Western Water Policy Review Advisory Commission

The Western Governors in a 1989 report identified some major causes of conflict and frustration with current federal water policies:

> A principal characteristic of federal water policy is that policies are made in an ad hoc, decentralized manner. No agency of the executive branch or committee of Congress is responsible for keeping an eye on the "big picture." Thus, federal water policy lacks a unifying vision or even a set of guiding principles. This state of events is not appropriate in an era in which supplies are threatened by chronic drought, likely aggravated by global warming, while demand continues to grow. A host of on-the-ground problems are created by, or at least related to, the absence of a unifying vision, including redundance of functions across programs, protracted disputes, interagency turf battles, absence of policies, and lack of finality of many water disputes (Western Governors Association, 1989, p. 1).

In 1992, Congress established the Western Water Policy Review Advisory Commission and directed it to make recommendations about the proper role of the federal government in Western water management for the next 20 years. Commission members learned that western water planners for the 21st century would be addressing staggering population growth projections. For the past 15 years, the West has been experiencing the most dramatic demographic changes of any region or period in the country's history (Case & Alward, 1997). The West is rapidly becoming a series of urban archipelagos (such as Denver, Salt Lake City, Boise, Portland, Phoenix, Albuquerque, Dallas, Houston, and Seattle) arrayed across a mostly arid landscape. Should present trends continue, by 2020 the West's population may increase by more than 30 percent with its attendant pressure on the West's limited water resources.

Recall that part of the impetus for establishing the commission was Congress's finding that current federal water policy suffered from unclear and conflicting goals implemented by a maze of agencies and programs. For example, Congress, the Nation's primary water policy-making body, has 14 House committees with 102 subcommittees, plus 13 Senate committees with 82 subcommittees, exercising responsibility over various aspects of water resources. Seventy-six separate congressional appropriation accounts for water have been identified, resulting in legislative enactments that overlap, duplicate, and are often inconsistent (Rogers, 1996).

The Commission concluded that these problems could not be resolved piecemeal but, rather, had to be addressed by fundamental changes in institutional structures and government processes. The Commission's work led them to an even more basic conclusion: *That the geographic, hydrologic, ecologic, social, and economic diversity of the West would require regionally and locally tailored solutions to effectively meet the challenges of 21st century water management.*

The commission offered suggestions for addressing water problems in a proactive manner to foster the necessary policy discussion and integrate the increasingly complex interests in Western water. Of the numerous recommendations the Commission offered, two received the widest support among the diverse group of Commission members — Principles of Water Management for the 21st Century and New Governance of Watersheds and River Basins.

Recommendation 1 — Principles of Water Management for the 21st Century

The Commission proposed fundamental water management principles to guide and judge any federal water program. These are:

1. Ensure sustainable use of resources.

2. Maintain national goals and standards to ensure quality of water and related resources.

3. Emphasize local implementation, innovation, and responsibility. Federal, tribal, state, and local cooperation toward achieving national water standards should be the basis of water policy, and where possible, responsibility and authority for achieving these national standards should rest with non-federal governing entities.

4. Provide and use economic and other incentives, wherever possible, to achieve national, regional, or local water resource goals.

5. Organize around hydrologic systems. To help address the problems that multiple and often conflicting jurisdictions, authorities, and program objectives create, organize or integrate water planning, programs, agencies, funding, and decision making around natural systems—the watersheds and river basins. This will require conflicting jurisdictions to integrate their institutional missions, budgets, and programs.

6. Employ participatory decision making (Riebsame, 1997; Rieke & Kenney, 1997).

The first principle, sustainable use of water, was adopted from the President's Commission on Sustainable Development and forms the backbone of the Commission's recommendations. Sustainable development links the diverse elements of the water use community together and provides for common dialogue and problem solving. Sustainable water use seeks to achieve a balance between a system's capability to meet social needs and its biological and hydrological capacity.

Recommendation 2 - New Governance of Watersheds and River Basins

To address critical water quality and supply problems, environmental degradation, quality of life concerns, and compliance with interrelated federal, state, and local laws, the Commission examined numerous examples of local watershed initiatives, watershed councils, basin trusts,

citizen advisory groups, and collaborative government partnerships that are springing up around the West.

The second proposal is the new model of governance

1. From the bottom up, federal agencies would be encouraged to develop innovative methods at the local level to effectively participate with local stakeholders in watershed groups and watershed councils, and to integrate their priorities with federal, tribal, local, and state governmental requirements.

2. From the top down, the federal challenge would be to establish policies that would direct federal resource agencies to coordinate their activities around hydrologic regions--actions that would require better budgetary coordination to stimulate true integration of all federal water activities in each locale.

3. The Commission proposes the federal resource agencies' function and approach be changed to a "nested" governance structure, where different levels of government coordinate with each other on issues affecting them--a collaborative rather than a top down approach. Such structures would enhance regional flexibility and increase participation by all affected stakeholders in formulating joint programs to achieve shared objectives.

4. A successful coordination strategy would proceed on two fronts:

   - Federal agencies would be given a mandate and a mechanism to cooperate and coordinate with each other; and federal goals and programs would be integrated with state, tribal, and local activities.

   - The vertical integration would go in both directions. Appropriate federal objectives and requirements would be clearly expressed and communicated from the basin level to local watershed groups. In turn, those very federal objectives and requirements would take local needs and objectives into account.

5. In order to accomplish the desired level of coordination and cooperation, river basin forums would be created in which federal agencies, state, tribal, and local governments, and stakeholder groups could come together to set joint goals for improving river basin conditions. The federal government would continue to support experimentation by sponsoring river basin pilot projects. Watershed councils, where they already exist, would not be bureaucratized nor recruited as arms of the federal government. Federal agencies would, instead, cooperate with them.

6. To encourage more public participation and democracy in managing a basin's rivers, this proposal would require federal agencies to coordinate their budget submittals and seek public comment on them before they approached Congress, and require that federal agencies fully disclose to the public how money is being spent in each river

basin. (The Everglades and in the Columbia River Basin experiences demonstrate that this can be done, and could be adopted across the West.)

A Unifying Framework That Incorporates New Learnings And Evolves As Demands Change

While the Commission identified a comprehensive list of issues and processes that would improve coordination of water resource management in the U.S. (Riebsame, 1997; Rieke & Kenney, 1997), the following proposal is a more dynamic systems-based approach that will be to rapidly respond to complex changes, including ecological constraints, human population pressures, and changes in water use demands and priorities.

We can identify and measure a variety of top priority water uses that have shifted in primacy over the last two centuries as the Nation has grown and evolved. These might be:

1800 - 1850 Transportation & Agriculture
1850 - 1900 Agriculture & Mining
1900 - 1950 Agriculture, Industrial & Manufacturing, Sanitation
1950 - 2000 Agriculture, Drinking Water & Recreational Use

While prior uses continue, the emphasis shifts between them, and new priorities are developed. For example, the importance of water in mining expanded greatly in the mid-19th Century and waned a century later. Over the last half-century, fossil fuels have displaced water as a major power source in most places. The importance of water for agriculture, our primary national use, has grown steadily over the last two centuries, but the rate of growth has not kept pace with the more rapid growth in importance of water use for urban needs that has arisen over the last half century. The importance of water for manufacturing rose to very high importance in the 20th Century, but may now decline as the knowledge-based service economy of the 21st Century gains ascendance over manufacturing as the dominant economic activity in the U.S. (MacDonnell & Bates, 1993).

In the 21st Century all the prior water priorities will meet a new and more important one--the sustainable yield of fresh water resources. Increased demands by an expanding population for clean drinking water, and water for recreational purposes will become dominant new priorities to meet the demands by this more urban and wealthier population with more leisure time (Case & Alward, 1997; Brown, 1999).

While the priority for drinking water has been included throughout all these periods, only recently has it become a dominant concern. A key action of the Clean Water Action Plan, as well as the reauthorization of the Clean Water Act in 1987, directed the Departments of Agriculture and the Interior to consult with other federal agencies, states, tribes, and other stakeholders to develop a Unified Federal Policy to improve watershed management to protect water quality and the health of aquatic ecosystems on federal lands (Sedell et al., 2000). The Unified Federal Policy was developed to ensure a consistent approach to

managing federal lands on a watershed basis, to protect, maintain, and improve watershed conditions and water quality.

Attributes of the Next Overarching Framework

While the Unified Federal Policy is a beginning, it does not go far enough. The Nation needs to complete and implement a unified, powerful, and overarching policy framework and operating system that regularly and periodically integrates the shifting water use priorities as American megatrends evolve, measures changes in priorities when and where they occur, and then creates and incorporates a concomitant learning system that anticipates and makes changes in policies and practices to meet newly emerged needs and uses. The new system must find ways to prevent most current obstacles and conflicts along the path toward new and more fitting policy—such as by assigning only one agency and one committee in each body of Congress to have jurisdiction over water. It must be able to modify, diminish, or escape the constraints of historic priority uses as they become obsolete or less significant and it needs to be a be able to correct itself with sound hydrologic data and set sustainability and renewability as its absolute constraint to prevent depletion of fresh water supplies or damage to watersheds.

Solutions to these problems need to be coordinated so that hydrologic, ecological, social, and economic issues are appropriately addressed and tailored to meet the water management challenges of the next century.

Only if this, or other like actions are taken will we truly have a unified policy for managing water.

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