A TWENTY-FIRST CENTURY U.S. WATER POLICY

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Introduction: The Soft Path for Water

AS WE MOVE through the second decade of the 21st century, the United States faces a complex and evolving set of freshwater challenges. Despite the fact that the nation is, on average, a comparatively water-rich country, we are approaching "peak water" limits in many places, for many water systems. We are reaching absolute limits on our ability to take more water from many renewable water systems like the Colorado, Sacramento-San Joaquin, and Klamath River Systems. We are overpumping non-renewable groundwater aquifers in the Great Plains and California's Central Valley. Water quality threats are poorly understood, monitored, or addressed throughout the country. Important federal water laws are out-of-date or are not effectively or equitably enforced. Aquatic ecosystems, fisheries, and wetlands are threatened with destruction. Much of our urban water infrastructure has not been adequately maintained, and confidence in our tap water system is falling. Rising energy demands and shifts toward domestic fuels are adding new demands for water, in competition with the production of food and fiber. Climate changes are already altering water availability and the risk of extreme events. And the institutions put in place in the 20th century to manage our water needs are often inadequate, inefficient, and uncoordinated.

The public cares deeply about water—it consistently polls as the most important environmental issue in people's minds, yet it remains largely neglected in the halls of Congress, the White House, and in our federal agencies. Most water management happens at the local or regional level through complex mixes of public and private actors and activities. But there are clear roles for the federal government: setting consistent national standards and regulations for water quality and environmental protection, deploying advanced monitoring systems that collect global and national data vital for disaster planning and response,

providing funding for basic research on issues of national interest, intervening in legal disputes among the states, participating in international water policy and diplomacy, managing water on federal lands, and helping to ensure that states and municipalities are able to meet future water challenges. These objectives are not being adequately addressed by the federal agencies responsible for them. In some cases, agencies have overlapping and conflicting authorities. In other instances, the executive branch has failed to request sufficient funds to protect and manage our water resources, or the legislative branch has failed to appropriate and allocate those funds. And water policies have not been updated to account for advances in our scientific and technical understanding of both water problems and solutions.

It is time for a new 21st century United States water policy.

The need for national water policies and reappraisal of current strategies and approaches to water management is not new. Over 60 years ago, President Truman signed Executive Order 10095 to establish The President's Water Commission with the following charge:

> The President's Water Resources Policy Commission shall study, and make recommendations to the President with respect to, Federal responsibility for and participation in the development, utilization, and conservation of water resources, including related land uses and other public purposes to the extent that they are directly concerned with water resources. The Commission shall give consideration in particular to (a) the extent and character of Federal Government participation in major water-resources programs, (b) an appraisal of the priority of water-resources programs from the standpoint of economic and social need, (c) criteria and standards for evaluating the feasibility of water-resources projects, and (d) desirable legislation or changes in existing legislation relating to the development, utilization, and conservation of water resources.

That Executive Order led to "A Water Policy for the American People," published in 1950.

Over four decades ago, Congress acknowledged the need for a more rational, comprehensive approach to water resource planning and management, passing the National Water Commission Act (P. L. 90-515) on September 26, 1968. The act called for the creation of a National Water Commission to:

> review present and anticipated national water resource problems, making such projections of water requirements as may be necessary and identifying alternative ways of meeting these requirements—giving consideration, among other things, to conservation and more efficient use of existing supplies, increased usability by reduction of pollution, innovations to encourage the highest economic use of water, inter-basin transfers, and technological advances . . .

The commission's work culminated in a nearly 600-page report to Congress in 1973, concluding, among other things, that the federal government should improve collaboration among different agencies, collect and distribute more comprehensive water data, and

replace the financial model of taxpayer-funded water projects with the principle that project beneficiaries should pay for those benefits (NWC 1973).

Things have changed again since the mid-1970s. We have seen important strides in water management, including significant improvements in wastewater treatment and reductions in point source pollution. There have been some remarkable reductions in per capita water use associated with increased water conservation and efficiency and changes in the structure of our economy. New technologies have been developed to measure, monitor, and evaluate water quality and use. Public appreciation of environmental values has grown along with efforts to slow the rate of ecosystem destruction. New collaborations between public and private entities have been developed. Some of the recommendations in those early national assessments were adopted, while others are outdated, based on assumptions about economic, social, and environmental values and priorities that are no longer true or valid. Some of the recommendations are as relevant today as they were decades ago, but they've never been successfully implemented. And new challenges not faced by earlier generations are emerging and are unaddressed and unresolved, including new contaminants in public drinking water supplies, increased competition among water users, continued population growth, infrastructure decay, and climate change.

These water challenges are not unique to the United States. Water problems are being felt worldwide and have prompted many governments to reassess their approach to water management (Christian-Smith et al., 2011). South Africa's water reform efforts in the mid-1990s included constitutional efforts to guarantee basic water requirements for all humans and the environment; Russia and the European Union have moved toward water laws that provide a common commitment to more holistic water management; Australia implemented widespread reforms to water rights policies, pricing structures, ecosystem protections, and conservation in the face of a decade-long severe drought. Chile, the Netherlands, the Philippines, and Great Britain have tested combinations of public and private management systems. There are many new experiments underway to move to more sustainable, equitable, and efficient water systems. It is time for the US to move in this direction as well—toward a soft path for water that satisfies both human and environmental needs within the constraints of a scarce and precious resource.

The Soft Path for Water

While diverse national initiatives have differing cultural dimensions and political imperatives, they share a commitment to many "soft path" water solutions. The "soft path for water" defines a new approach to managing water resources. The soft path begins with the recognition that with few exceptions people do not want to "use" water—they want complex combinations of goods and services. People want to drink and bathe, grow food, produce and consume goods and services, and otherwise satisfy human needs and desires. While many of these things require water, achieving these ends can be done in different

ways, often with radically different implications for water. The soft path recognizes that there are two primary ways of meeting water-related needs, or, more poetically, two paths. The "hard" path relies almost exclusively on centralized infrastructure and decision making using technology and institutions developed in the 19th and 20th centuries: large dams and reservoirs, pipelines and treatment plants, public water departments and agencies, and private companies. The objective of the hard path is to deliver water, mostly of potable quality, and sometimes to remove wastewater.

The "soft path" has a different, broader set of goals—the delivery of water-related services matched to users' needs and resource availability. The soft path also uses centralized infrastructure, but as just one in an integrated series of tools. It also seeks to take advantage of the potential for decentralized facilities, efficient technologies, flexible public and private institutions, innovative economics, and human capital. It strives to improve the overall productivity of water use rather than seek endless sources of new supply. It works with water users at local and community scales and seeks to protect the critical ecological services such as nutrient cycling, flood protection, aquatic habitat, and waste dilution and removal that water also provides (Gleick 2002, Wolff and Gleick 2002).

Conventional management approaches in the US are based on the hard path and include a range of obstacles to the implementation of soft-path approaches, including ignorance of the links between human systems and ecological systems, the reliance on ineffective water-pricing structures and markets, and the segregation of agencies and policies into "silos" (Brooks et al. 2009). Many of the recommendations that we provide in the individual chapters of this book are part of a soft-path approach: they encourage better integration across sectors and scales, equitable access to water for both humans and ecosystems, proper application and use of technology and economics, incentives for efficient use, social objectives for water quality and delivery reliability, and public participation in decision making.

The soft path can also be defined in terms of its differences from the hard path (Wolff and Gleick 2002).

1. The soft path redirects government agencies, private companies, and individuals to work to meet the water-related needs of people and businesses, rather than merely to supply water. For example, people want to produce or consume goods and services, and increasingly to do so in cost-effective, environmentally sound, and socially acceptable ways. They do not fundamentally care how much water is used, and may not care whether water is used at all. If water utilities work to satisfy customers' demands for water-based services, rather than simply "sell" water, then new options open up for improving efficiency and implementing decentralized and more sustainable technologies. This book explores in great detail the differences between simply supplying water and the more complex objectives of satisfying the need for goods and services in a water-efficient manner. Among our conclusions are calls to expand efforts to

improve the efficiency and productivity of water use in agricultural and urban settings.

2. The soft path recognizes that different water qualities can satisfy different kinds of water demands and strives to reserve higher quality water for those uses that require it. Conversely, storm runoff, graywater, and reclaimed wastewater are explicitly recognized as water supplies suited for landscape irrigation and other nonpotable uses. The soft path recognizes that single-pipe distribution networks and once-through consumptive-use appliances are no longer the only cost-effective and practical technologies. This is almost never the case in traditional water planning: all future water demand in urban areas is implicitly assumed to require potable water. This practice exaggerates the amount of water needed and inflates the overall cost of providing it. We describe water quality challenges and solutions in chapter 5 and recommend new efforts to match water quality availability and needs – a key soft-path approach.
3. The soft path recognizes that investments in decentralized solutions can be just as cost-effective as investments in large, centralized options. For example, there is nothing inherently more reliable or cost-effective about providing irrigation water from centralized rather than decentralized rainwater capture and storage facilities. Decentralized investments are highly reliable when they include adequate investment in human capital, that is, in the people who use the facilities. And they can be cost-effective when the easiest opportunities for centralized rainwater capture and storage have been exhausted. Many of the recommendations here recognize the need for new forms of investment and financing, exploration of flexible pricing and markets, and more efficient use of limited federal funds for programs of truly national or international interest.
4. The soft path requires water agencies or company personnel to fully interact with water users and to effectively engage community groups in water management. Past water management was considered the purview of engineers and water professionals accustomed to meeting generic needs. But experience has shown that communities and water users can play vital roles in long-term planning and management of water. Users need help determining how much water of various qualities they need, and neighbors may need to work together to capture low-cost opportunities. By engaging in more effective and transparent communication, many of the objectives of the soft path will be easier to achieve, and many of the environmental justice and equity problems of the past, described in chapters 3 and 4, can be reduced.
5. The soft path recognizes that ecological health and the activities that depend on it (such as fishing, recreation, and natural water purification systems) are valuable services. Water that is not abstracted, treated, and distributed may still be "productive." The hard path, by ignoring or discounting these natural values leads to their destruction. A key conclusion of this book is that the trend toward

better integration of environmental values in federal water policies should continue. This includes continuing to improve methods for protecting and valuing ecosystem services, incorporating them into federal decision making and water management, and improving management of water on federally protected lands.

6. The soft path recognizes the complexity of water economics and management, including the power of economies of scope, by integrating across competing interests. The hard path looks only at projects, revenues, and economies of scale, and works with limited institutions. An economy of scope exists when a combined decision-making process allows specific services or benefits to be delivered at a lower cost than would result from separate decision-making processes. For example, water agencies, flood-control districts, and land use managers can often reduce the total cost of services (such as flood protection) to their customers by understanding and integrating factors that none of them can account for alone. This book recommends thinking about water in an integrated, not isolated, way, streamlining the complex and sometimes overlapping federal agencies with water-related responsibilities, and taking a broader view of the scope of water decisions.

Conclusions

In summary, the 21st century brings with it both persistent and new water challenges, including growing human populations and demands for water, unacceptable water quality in many areas, weak or inadequate water data collection and regulation, outdated laws and regulations, and growing threats to the timing and reliability of water supply from climate change. We have reached a fork in the road and we must now make a choice about how to address our water problems. Several countries have begun to reform their water policies to better address these challenges—it is time the US did as well. While the political and cultural contexts of these reforms have varied, international water reforms reflect a greater focus on "soft path" water solutions including new concepts of water supply, expanded efforts at improving water conservation and efficiency, smarter water pricing and economic strategies, and more participatory water management. The United States has not followed suit and continues to rely on a fragmented and outdated approach to water policy based on a patchwork of old laws, competing institutions, and aging infrastructure.

We know where the traditional, hard path leads us: to an impoverished environment, undemocratic decision making, and growing social, political, and economic costs. The soft path offers an alternative: a way to satisfy human and ecological needs, reduce pressure on limited resources, promote transparent and democratic decision making, and more efficient and rational economic choices. New and effective solutions are available

and are being explored at local, state, regional, and national levels. That experience should be tapped in efforts to develop new integrated federal water policies. In this book, we have laid out a path towards such policies. Progress will be slow as we learn how best to identify and overcome barriers, but effective and sustainable water management is a necessity. It is urgent that the United States accelerate efforts to develop a new 21st century water policy.

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