

WATER POLICIES FOR THE FUTURE: BRINGING IT ALL TOGETHER

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INTRODUCTION

This issue of *Water Resources Update* has focused on the past, present, and future of U. S. water policy. Fifteen blue-ribbon authors have addressed a multiplicity of water policy issues and related case studies. All have identified the need to establish a coherent, dynamic, and implementable national water policy. Global, national, regional, state, and local forums have been explored. It is clear that contemporary water policies must embrace technological, ecological, social, institutional and economic issues, and that institutional reforms are sorely needed.

This paper summarizes the principal findings and recommendations of the contributions to the Spring 1998 issue of *Water Resources Update*. The statements are generally in the originating author's words, with some editing to make them fit the format used herein. Each contribution is referenced to the author and paper.

OBSERVATIONS AND LESSONS LEARNED

There is a need for improved coordination and collaboration among governments and agencies engaged in water management (Viessman, 1998).

Improving coordination is the most promising route to the conceptual and perhaps utopian vision of integrated water management. The aspect of coordination that offers most hope for improvement is coordination through voluntary means. The categories that seem most amenable to voluntary improvements are local and regional concerns, coordinating intergovernmental issues, and maintaining time-wise coordination (Grigg, 1998).

Shedding light on the various paths of water management coordination can aid in understanding where improvements in water policy are most needed. In particular, improvements in regional and intergovernmental coordination would likely reduce friction in government without interfering with private

markets or property rights or with people's basic values (Grigg, 1998).

The U.S. federal government is deficient in its structure for assessing the status of the nation's and the globe's water resources, coordinating the water planning and management functions of the states, and fostering regional and global approaches to water management (Viessman, 1998). Water resources management problems are becoming more difficult to handle. Yet we have decreased our ability to deal with them by dismantling basin-wide planning efforts and decreasing research on water management (Schad, 1998).

Voters do not appreciate ground water limits. The fact that desert aquifers can become so depleted that they cannot support the demands expected of them by current populations, let alone larger ones, seems to be lost in the heat of discussion. Policy makers must take steps to wisely incorporate scientific and engineering expertise in their decision making processes. And they must make certain that a sound water information dissemination plan is in place to educate and allay the fears of voters (Smerdon, 1998).

The water policy implications of global climate change are significant. The time for developing plausible climate change scenarios and exploring alternatives for dealing with them is now. Engineers and hydrologists must become key players in this process (Smerdon, 1998).

The Central and Southern Florida (C&SF) Project Restudy is focused on the restoration of the Everglades. But the public policy debate regarding what the restoration goals for this ecosystem really should be needs to be brought to closure. The goals have yet to be defined in a manner that provides a useable guide for action by the affected policy makers (Vogel, 1998).

It is not clear that integrative regional water plans can be fitted within the geographic limits of large river basins or watersheds. Questions of scale, boundary, and geographic planning unit are of central concern relative

to problem definition, identification of parties-at-interest, and implementation of options. Can integrative planning and management work in the vast expanses of the Nile, the Amazon, the Parana/LaPlata, or should it be restricted to more regional, specific socio-political conflicts of rather well-defined geographic, cultural, environmental, physiographic, economic boundaries (Vlachos, 1998)? One of the lessons learned through the C&SF Project Restudy is how difficult, if not impossible, water resource planning is on a scale as large and complex as that of the Everglades. There is ready agreement that we can no longer do water resource planning in a piecemeal fashion and that we must integrate at a watershed or basin level but the experience of the C&SF Project restudy may demonstrate that such a philosophy is noble but impractical on such a grand scale (Vogel, 1998).

Geographic ties prescribe the unitary development of river basins, but politics and history distort this process. The nation-state covets its sovereignty. Moreover, the desire to maximize benefits for itself provides the nation-state with a powerful incentive to exploit resources unilaterally. This myopic behavior can generate international frictions, confrontations, conflicts, and even war. We are faced with a situation in which states, confronted with sub-optimal choices tend to adopt a non-cooperative stance, although cooperation, on specific issues, would be in their mutual interest (Vlachos, 1998).

International river basins' institutions have largely proven unsatisfactory. Beyond broad legal imperatives and implicit or expressed political will for cooperation, the practice has been predominantly one of no authority, of rare meetings of interested and/or affected parties, unwillingness to pay, and little or no information exchanged (Vlachos, 1998).

The task of gaining international agreement on anything is extremely difficult. The procedures currently used to formulate global agreements were not designed for complex ecosystemic and environmental problems. Negotiators need to have unique interdisciplinary and technical skills, linkages among environmental concerns and other policy issues must be adequately established, and, effective monitoring and enforcement arrangements must be devised and implemented (Vlachos, 1998).

One of the most challenging problems faced by water managers is that of achieving integrated planning and management within institutional frameworks which have evolved under different historical and socio-economic conditions and for needs which are

incongruous with the present and that will differ from projected or desired futures (Vlachos, 1998).

In general, policies governing industrial water use are a patchwork of inherited public health and water availability concerns which do not allow for modern control and regulation of the water resource as an integrated whole. (Rogers, 1998).

Despite the overall apparent shortage of water, there are few incentives for efficient use of water in many parts of the world. This is because most countries have not developed instruments (either regulations or economic incentives) and related institutional structures for reallocating water between sectors, or for internalizing the externalities which arise when one user affects the quantity and quality of water available to another group. Water tariffs are typically based, at best, on average cost pricing (rather than marginal cost pricing) and typically ignore the opportunity cost of water (i.e., benefit foregone in alternative uses). As a result, excessive quantities of water are used, and excessive pollution is produced (Rogers, 1998).

Current regulatory decision-making processes do little to encourage regulators to account for the economic impacts of mandatory reallocations because the cost to the regulator for acquiring that water essentially is zero; the person who gives up the water bears the entire cost of the reallocation (Wodraska and von Haam, 1998).

To make a water transfer work, the affected community must support it. The Metropolitan Water District of Southern California found that it was preferable to deal directly with both the local water district and individual water users. In many cases, purchasing water supplies directly from the district rather than individual users increases transactional efficiencies and better addresses broader community concerns. Successful water transfer and storage agreements must be "win-win" arrangements for both sides (Wodraska and von Haam, 1998).

In the water market, when there are numerous potential sellers and buyers, noncompetitive prices and excess profits may not be a serious concern. However, under circumstances where the market may be dominated by a relatively small number of sellers or buyers, policy makers may seek to develop regulatory or other approaches to help assure that the public receives water at competitive prices (Wodraska and von Haam, 1998).

Public values associated with water in the western states cannot be ignored. Despite the current trends toward privatization of utilities industries, the widely held perception of the public nature of water resources will

temper the move toward pure market-based approaches. In the future, would-be water marketers must learn to appreciate both the private and public aspects of this vital resource (Wodraska and von Haam, 1998).

Throughout history, water management “systems,” have been developed in a linear fashion. Piece by piece, as the need arose, the components of such systems were put into place. As a result, each piece is largely independent of the others. Because of this piecemeal development, these “systems” have failed in assuring efficient, sometimes even effective, water management. Furthermore, the linear thinking from which they result fails, for the most part, to allow cooperative planning endeavors among impacted parties for unified water resource management (Hall, 1998).

Effectively integrating the management of water quality into the larger context of water resources management requires robust new policies in several areas. Chief among these are (Hall, 1998):

- a strong commitment to *Pollution Prevention*
- a requirement for the application of the *Best Available Technologies* in the treatment of all waters and waste waters
- a new definition of *Beneficial Use* that addresses tomorrow’s environmental, social, and economic conditions, and a restatement of water use *Priorities*
- a *Pricing* structure that reflects the full cost of making water available for a particular use or user, including the cost of restoring it to its original quality
- adherence to the ideals of “*Sustainable Development*,” with special emphasis on conservation, reuse, working with nature, and the health of aquatic ecosystems

Wastewater treatment has been a “stepchild” in the struggle to attract political favor and financial resources. This is true, in the U.S., for all levels of government. It matters not that the safe treatment of these wastes is absolutely essential to the public’s health, those who parse a government’s capital are never willing to spend a dime on the operation of, maintenance of, or improvements to treatment facilities until they are compelled to do so by a regulatory agency. The result is that such facilities are never “*state-of-the-art*,” and never can be relied on to operate at design efficiencies (Hall, 1998):

The prevailing single-purpose regulatory model appears to be insufficient, costly, and absent a larger context. While the need for capital, along with an increased demand for water, has encouraged better pricing and

valuation of water, brought about more local cost sharing and responsibility for water resources development, and more explicit attention to subsidies, the need for integration of water quantity and quality management as a public responsibility is still not well addressed (Schilling, 1998).

Today’s emerging watershed protection approach, which is providing the impetus for funding and the formation and proliferation of watershed organizations, hardly refers to planning much less a structured iterative or multi objective planning process characteristic of the past. The current orientation seems to focus on single purposes and existing resource use, failing to recognize, forecast and compare alternatives, let alone costs and the likelihood of success. The irony of this situation seems to be, if the watershed approach is so good, why aren’t we returning to comprehensive river basin planning, linking the watersheds and all water management functions at a larger level? On the other hand, the focus on community involvement for consensus will inevitably create a demand for comparison of alternatives in some watersheds if only through inclusion of different interest groups (Schilling, 1998).

An analytical framework is necessary to achieve effective local, regional and national water management. Expanded data bases, and computer software and hardware developments are helping to improve the dialogue among water professionals and the publics they serve. Real-time, interactive simulation models are on the verge of revolutionizing the processes of water negotiation. A high priority should be placed on the development and promulgation of easy-to-use models and on training planners and others to use them effectively in their planning and decision-support activities (Schilling, 1998).

GUIDELINES FOR ACTION

Water policies should be crafted in forums designed to address the totality of the outcomes that would flow from them if they were implemented (Viessman, 1998). The lack of forums to coordinate state/Federal programs is one of the most often and significantly cited voids in U.S. national water policy (Schilling, 1998).

Institutional formats having some of the attributes of the former Water Resources Council are needed to provide guidance in designing federal water policy; coordinate federal water programs and agencies; assess the status of the nation’s and the world’s water environment; provide foresight capability; facilitate research; and to coordinate and support state water resources planning and management programs (Viessman, 1998).

A broad understanding of the functioning of entire ecosystems must become the basis for unified action. Institutions to do the job can vary from regional authorities with broad powers to international cooperative agreements among nations. There is no uniformly acceptable format -- what works well under one circumstance might not work under another (Viessman, 1998).

There is an increasing trend toward privatization of water and waste water utilities. Accordingly, this occurrence must be taken into consideration as new water policies are designed.

There is an urgent need for intergovernmental integration (through coordination, cooperation and consolidation) of:

(1) hydrological interdependencies in terms of both uses (rural, urban, industrial, recreational, etc.) and water regime (i.e., surface and ground water, quality and quantity); (2) political interdependencies both in terms of horizontal coordination in space and vertical cooperation between levels of government units; (3) transboundary interdependencies, representing both social and hydrological trans-state interdependencies; and (4) exogenous interdependencies, most notably the potentially dramatic impacts and consequences of climatic shifts and emerging hydrological alterations (Vlachos, 1998).

The use of economic incentives for both the water supply and the wastewater sides of industrial water use in the U.S. is sorely lacking. Federal and state agencies should accept the challenge of integrating price reforms in water supply with incentives for waste water reduction. This would go a long way toward developing a sensible industrial water policy. In the U.S., there is great asymmetry between the efforts spent by the national government in regulating industrial water pollution as opposed to water supply. The EPA has spent an enormous amount of time and effort in issuing more than 75,000 effluent permits to industry based upon allowable concentrations and masses of effluents and relatively little effort on relating these permits to ambient water quality in other than the grossest of terms (Rogers, 1998).

Making users pay the cost of water and wastewater treatment is a necessary first step in the integration of water quality considerations into overall water resources (Hall, 1998).

Consolidating environmental water management functions would enhance organizational efficiency. Combining the expertise of various environmental managers into a single entity where a unified decision

must be made would *facilitate* more lasting and powerful environmental decisions. The success to date of the Accord and the CALFED Bay-Delta Program suggests the effectiveness of this sort of coordinated state-federal decision-making (Wodraska and von Haam, 1998).

A workable market for water transfers is necessary to meet future urban water needs. Much of the debate over water transfers has centered on the private and public values of water. This issue has arisen in two contexts: (1) the role of locally affected areas in approving a proposed transfer; and (2) the issue of "excess profits" from sale of a "public" resource (Wodraska and von Haam, 1998).

To achieve a more sustainable economy and use of our watershed resources we will have to modify our management objectives and reduce, if not eliminate, the production of pollutant byproducts at their sources. To do this we must change our production and consumption habits (Loucks, 1998).

If the nation is to achieve the goal of a collaborative, integrated water resources management approach, which includes environmental protection objectives, along with the traditional water resources purposes of serving human needs, there must be a new federal water policy coordinating body to resolve emerging resources management issues (Schad, 1998).

There should be a central national water presence and the capacity to stimulate and encourage regional water resources initiatives within acceptable problem-sheds, but these elements should be facilitative, not directive in nature. Flexible mechanisms will be needed to put together the right combinations of resources and talents (Foster, 1998)

A broadly-based intergovernmental regional coordinating institution for water and related natural and environmental resources management has been proposed by Dworsky and Allee. The objective of the proposed institution would be to assist in regional policy formulation, agenda building, and implementation of regional goals, bounded by existing, revised or new state and federal authority within broad constitutional guidelines. An "Advisory Commission on National Water Resources" is suggested. Regional forums would be designed primarily in accord with regional desires of the States concerned, on the basis of hydrologic systems, defined ecosystems, or on some other basis. Watershed organizations would bring together: (1) interested citizens, especially those already organized locally on some other geographic logic by relevant

stakeholder interests; (2) local governments, especially those agencies that relate to user services, land use and other aspects of water management; and (3) the relevant local representatives of federal and state agencies (Dworsky and Alice, 1998).

The objectives of the Dworsky/Allee model are to:

- provide information and to advise governments so that the full implications of possible policies are examined and information can be processed into wisdom from which the public and policy makers can make decisions;
- define problems and issues and recommend action agendas to serve the publics within the several regions of the nation, based on regional findings by regional entities of regional needs, thus giving greater consideration to national goals, policies and activities established by proper authority;
- define opportunities and issues, recommend action agendas to serve the local level based upon local findings by local entities of local needs, thus giving greater consideration to national goals, policies and activities established by proper authority, and being better informed providing a greater likelihood of more effective coalition building at the basin level;
- establish a “chain of communication” thereby reflecting both bottom-up and top-down approaches among the several regions of the nation and a national water advisory entity to facilitate policy and agenda implementation;
- recognize and responsibly act in conformance with the allocation of functions between the States and the Federal Government that may be established by custom, by constitutional provisions, by statute, by court determinations, or by other means approved by proper authority from time to time; and
- respond to the urge for systemic planning by providing a process that educates and incubates issues and their resolution to facilitate the support for action when crises allow water to win a place on the public action agenda (Dworsky and Allee, 1998).

CONCLUSIONS

It is not the physical limit of the water resource that presents the greatest challenge to society, rather it is transitioning to policies and management modes that fit today's, not yesterday's, needs. Water policies of the future must be sized to fit. They must be flexible, holistic, environmentally sound, and supportive of sustainable development. We must move from narrow

interest-based water policies to ones that are objective and knowledge-based (Viessman, 1998)

National water policy formulation has been pursued in an ad-hoc manner during the past few years in response to episodic events of floods, droughts, and other man-made and natural hazards, and particularly by the needs of the environmental regulatory agencies. The Council on Environmental Quality serves as the only central coordinating mechanism for environmental protection policies which now dominate federal water resource management policies. This has led to an almost intractable problem-solving problem, acted out under the rubric of “watershed planning” in a way which contrasts the principles of traditional multiple objective water resources planning and management espoused by the U. S. Water Resources Council and the narrower, single-objective regulatory perspectives of the Environmental Protection Agency based on its own interpretation of the uncoordinated environmental regulatory laws (Schad, 1998)

If future water demands are to be met, there must be a reconciliation of the single-objective environmental and regulatory planning used by the EPA, which is the dominant federal water resources management agency, with the multi-purpose, multi-objective planning system which evolved over a long period of time to guide federal investments in water management. This could be done by requiring all federal water-related programs to be governed by the Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies. Administration of the coordination function should be either by a reconstituted Water Resource Council in the Executive Office of the President or by the Council on Environmental Quality (Schad, 1998).

In revisiting national water resources policy, the role of regions should be accorded increased prominence, for in this era of diminished federal roles and devolved national responsibilities, getting something done is now the primary realm of state, local, and private jurisdictions. But the regionalism of tomorrow will have to be markedly different from the regionalism of yesteryear. Gone will be the inevitable comprehensive, basin plan, devised and carried out by a distant technical agency with only token input from non-governmental advisors. The new regionalism must be bottom-up, rooted in a sense of place, and composed of a series of modest, short-term steps. It is likely to begin with a single river reach or issue, coalesce around tangible problems and doable remedies, and only then grow to comprehensive watershed or basin proportions (Foster, 1998).

A revived Water Resources Council is needed, but one with representation from state and non-governmental parties, not just federal administrators. We need a Council attached firmly to the White House policy apparatus, not stuck in the tar pit of interagency politics. We need the counterpart regional councils represented by the river basin commissions, but ones more deliberative than operational and with the capacity to pass on to properly scaled subregional entities the day-to-day responsibilities for water resources planning, coordination, and implementation. Most particularly, between now and the advent of the next administration, we need to convene the nation's principal water resources organizations around one topic only - how the existing provisions of the Water Resources Planning Act of 1965 can be used to provide the commitment necessary to meet the water resources needs of the coming millennium (Foster, 1998).

Despite growing concerns about water, and a resurgence of watershed organizations, a quick return to river basin and traditional planning processes is unlikely. National and river basin approaches have been receiving diminishing support and new opportunities to apply a traditional planning process are small in number. The present consensus-oriented watershed approach focuses on water quality protection absent a clear planning paradigm. Nevertheless, this approach is likely to create a renewed demand for improved and more contemporary planning methods and tools (Schilling, 1998).

A complex water policy issue is: How can we solve today's, and attempt to prevent many of tomorrow's, problems when spending money to build things is not sufficient? How can we change our production and consumption habits? One suggestion is by forcing us to do what we might not otherwise do by enacting laws and regulations "for the common good." But many will not view such regulations as being for their common good. Regulations work only if people want them. We are demanding less governmental control of our activities, not more, and this attitude is not likely to change unless some unforeseen crisis occurs. An alternative course of action, perhaps the only one, is the use of a combination of education and economic incentives (Loucks, 1998).

Water management in the next century will be stressed by *climate change* and the accompanying disruption in global weather patterns. New, more complex, more menacing, water quality problems will be encountered by the water managers of the future. Technical solutions for these problems which are both chemical and biological in nature, do not exist, and little progress is being made toward their development. Current water

and wastewater treatment standards and technologies are not protecting receiving waters or municipal water supplies from the chemical and biological dangers let loose on the world by a modern industrial society. These circumstances, if ignored or given inadequate attention, will produce spreading, perilous degradation of water quality, and in many locations, a continuously widening gap between water needs and the availability of useful water (Hall, 1998).

If the nation is to make the best future use of its water, it must develop new policies concerning the uses to which its waters may be put, and the priorities for those uses. Included among those needs are (Hall, 1998):

- safeguarding water supplies, aquatic habitat, ground waters and surface waters from further despoliation;
- preventing the use of water, and its concomitant pollution, for things such as irrigation of low value crops, and the transport and dilution of industrial and agricultural wastes;
- redefining beneficial use and priorities to assure that future distribution of the resource is made fairly and equitably among those who can make the best social, environmental and economic use of it; and
- defining the allowable amount of water that can be used for priority purposes, based on the best available conservation, reuse, and water needs technology

Reforms in water management institutions are needed to effectively incorporate environmental values into the economics of water allocation. Policy-makers and academics must realize that the public and communitarian values of water mean that: (1) local rural support for water transfer agreements, which is very difficult to obtain, is nonetheless absolutely necessary; and (2) the issue of excess profits in water transfers must be handled appropriately in order to promote market-based water allocations (Wodraska and von Haam, 1998).

Finally, water policies for the future should have the following attributes (Viessman, 1998):

- They should focus on the right "problemsheds." That is, they should be system-encompassing, to assure that policy boundaries are defined by their true temporal, spatial, environmental, and institutional dimensions.
- They should be flexible -- standardized, uniform formats for dealing with water management should be avoided. The key is to look for the approach that

works for the watershed and problem to be addressed.

- They should be holistic, considering all of the relevant interacting components of the system of concern.
- They should be designed to support sustainable development.
- They should embrace public views.
- They should encourage partnership approaches to resolving conflicts and designing water management strategies.
- They should be the driving force for regulatory programs, not the result of them.

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