

ARE WE STILL ON THE WRONG ROAD?

Warren Viessman, Jr.

Associate Dean of Engineering
University of Florida

LOOKING BACK – SOME HALLMARKS AND LESSONS

I first became engaged in the water management game in 1962 as a commissioned officer in the United States (U.S.) Army Corps of Engineers during the Korean War. Later I was associated with a consulting firm designing urban water distribution, storm water, sewerage systems, and developing urban flood management plans. I entered the water resources arena just before the great transition of focus from water resources development to water quality management and environmental protection. That transition, still underway, spawned a number of new and revisited approaches to water policy design and implementation. There were also notable changes in the public's perception and attitude regarding water management policies and practices. Some of my observations about the period follow:

- The Water Resources Planning Act of 1965 was a milestone in water management. It recognized that there were several levels of scale that had to be dealt with in identifying water management problems and in seeking their efficient solutions. It provided a much needed coordinating/collaborating mechanism. And, it provided a database for policymaking at all levels of government. It wasn't perfect, but its demise in 1982 left a void that is yet to be dealt with effectively.
- The National Environmental Planning Act (NEPA) of 1969 ushered in a solid federal commitment to environmental protection with significant implications for water policy. The requirement for environmental impact statements initiated an indirect movement toward more holistic water planning and management.
- The 1973 report "Water Policies for the Future" by the National Water Commission explored the status of the nation's waters and recommended new directions for water policy. Although more than 25 years old, the report's seven recurring themes still stand as guidelines for the future. This suggests that progress

in implementing the proposed directions has been slow. The lack of progress and the escalating number and seriousness of problems our society is being confronted with merits a warning: If we do not act definitively and soon, we may be facing some intractable outcomes.

- The Water Resources Council's 1975 assessment included a first cut at identifying and quantifying water needs for environmental protection. For the first time, to my knowledge, it also projected a future water use trend that indicated that water use could be decreased in the future even though the population was increasing. The council's projections have essentially been substantiated by the United States Geological Service (USGS) water use statistics through the year 1995.
- The U.S. federal government needs a new structure for assessing the status of the nation's water resources, coordinating the water planning and management functions of the states, and fostering regional and global approaches to water management. At a time when water resources problems are becoming more complex and more global in nature, we have decreased our ability to deal with them by dismantling many basin-wide planning efforts and decreasing research on water management topics.
- The solution to the water supply problems of the Washington, D.C. metropolitan area demonstrates that creative, holistic approaches to water management have much to recommend them and that they can be implemented without the need for massive institutional reforms. There are other examples as well and they serve as excellent models for us to follow. They are based on fitting the solution to the problem as opposed to putting the solution to every problem into the same old mold.

- Effective coordination in water management remains a goal still to be adequately met. More meaningful coordination among governments, agencies, and interest groups engaged in land-water management is needed.
- Compartmentalization has been the byword and getting the compartments to engage in a useful dialog has not been easy. Coordination remains, however, a key element if we are to reach a goal of integrated water management.
- Many of the most vexing water management problems, climate change for example, are of global dimensions. Dealing with major water issues in a single nation is tough at best; but when the problem transcends national boundaries we find that the institutional arrangements for this are often nonexistent, or are not backed-up by any authority so that they can be effective. International institutions for river basin management have largely proven unsatisfactory and attempts to get international agreement on anything is very difficult. Problems of cooperation, coordination, political boundaries, distrust, and turf protection are global in scale and they affect water management directly.
- Many institutions related to water management limit innovation and flexibility. Legislative committee structures, conflicting and constraining regulations, agency and interest group missions, and outdated laws are only a few examples. Furthermore, these institutional influences seem to be increasing, or at least not declining in number. They are a major force to be reckoned with as we attempt to achieve the goal of integrated water management.
- Much of our focus remains on dealing with the “crisis of the moment.” Far too few resources are allocated to longer-term problems, ones that need to be addressed today so that decisions can be made in advance to minimize their threat to future generations.
- Effective forums for developing implementable water management policies and programs are needed. In some cases, existing arenas are adequate (city councils, state legislatures, special interest group committees) but these do not always bring the major stakeholders to the table. Two types of forums are needed: those related to resolving or avoiding conflicts (consent building) and those related to solving problems that transcend normal political and/or agency boundaries (system-encompassing).

Historically, little has been done to organize such forums but there is evidence that progress is being made on this.

- The commonly-used, single-purpose regulatory model operates in opposition to integrated water resources planning and management. It provides non-optimal solutions and does not deal with the true dimensions of the problem it is imposed upon. The need for integration of water quantity and quality management as a public responsibility is not addressed by such models.
- The watershed protection approach promoted by the Environmental Protection Agency (EPA), while supporting broad-based forums to achieve consensus, is in itself narrow in focus and does not embrace an integrated planning effort. Instead, it focuses on solving a problem or problems that have been identified. It is often single purpose in character and does little to identify and compare alternatives and consider their economic implications.
- Contemporary trends are toward more conservative use of water, low impact developments, embracing environmental protection and restoration as equal partners in water allocation decisionmaking, taking public involvement seriously, educating the public so that there is a broader understanding of water/environment issues, recognizing that water management should be practiced within the true dimensions of the problemshed of concern, expanding research in areas such as ecosystems’ needs for water, and valuing water dedicated to environmental purposes.

THE FUTURE WITH LIMITED REFORM

Having reviewed some of the features and occurrences relevant to water management over my professional career, I find it appropriate to comment on where I think we are going and where I think we should be going. If we do not make some fundamental changes in the way we do things, I believe the following type of scenario is likely to unfold:

- There will be a continuation of efforts to protect the environment and restore critical environmental systems. But the actions taken to achieve this will be sub-optimal and more cost oblivious than cost effective. This outcome will be related to the tendency to continue problem solving in a piecemeal fashion,

and to the limited funding of research on valuing and understanding the functioning of environmental systems.

- The present trend of focusing on today and letting tomorrow wait will continue and this path will increase the likelihood of future catastrophic events. Such events will be related to circumstances such as ignoring climate change scenarios, failing to reach international agreements on cross-boundary water management problems, and on putting off actions that could be taken to ameliorate other recognized emerging, but not yet critical, problems.
- Research on critical issues will be deferred due to assignment of low priority for such needs. Some areas of concern that will be affected by such an action would include water needs for ecosystems protection and/or restoration, understanding the interactions of ecosystem elements, valuing water allocations for environmental protection, improved modeling techniques for water management problems, and models for evaluating the impacts of global climate change.
- The single purpose agendas of many agencies and interest groups will result in widespread gridlock in dealing with water management issues. Slow progress in institutional reform and hesitancy in adopting models designed to serve holistic planning and management goals will fuel this stagnation.
- Needed water resources development will be limited because of conflicts over water allocations to various sectors and the failure to develop forums where stakeholders acknowledge the need to solve identified problems and agree to work together to seek options that create win-win situations.

THE PREFERRED FUTURE

The future we seek is not typified by the previous scenario, but history has shown that our worthy goals are often only words and the reality of the world is different. The time has come, I believe, to face up to what is needed and make some hard choices. The changing public attitude toward water and environmental management, the rapidly increasing global population, the impacts of economic development on the world's natural resources and ecosystems, the emergence of global problems such as climate change and the need to transfer water across international boundaries, and other issues make it clear that if we do not accelerate our actions to deal with them,

the long-term outcome may be one of irreversible damaging conditions. This is not the future we want, but to make it different we will have to implement many changes in the way we do things. The recipe is fairly simple, mixing the ingredients is not.

My impression of the preferred future is one that is characterized by understanding, communication, education, collaboration, selflessness, flexibility, innovation, a strong information base, and a global outlook. We must recognize that we are more than citizens of a particular nation—we are citizens of the planet Earth. Many of the actions that we take in the United States have implications for parts or all of the planet. The same goes for everywhere else. We must embrace a holistic concept of water management and recognize that most of the troublesome problems we face can only be solved if they are addressed in their full dimensions. And it must be recognized that political and social acceptability will determine what actions will be supported. Institutional reform is the key to success. Many existing and emerging water-related problems have been identified. The tools are available to address them, the information needed to solve the problems, although not adequate in every case, can give us a start; but the ability to bring stakeholders together in successful forums, the boundaries on agency missions, entrenched “turf-oriented” attitudes, and a host of single purpose rules and regulations make it almost impossible to produce the types of solutions that are needed.

The first step in reform is to understand the constraining influences that must be overcome. These include the following: (1) agency, interest group, and political boundaries (boundaries of authority and space); (2) government, agency, and professional biases and traditions; (3) the lack of effective forums for assembling and retaining stakeholders; (4) the narrow focus, lack of implementation capability, poor public involvement, and limited coordination attributes of many water resources planning and management processes; (5) the separation of land and water management, water quantity and water quality management, surface water and ground water management, and other direct linkage actions; (6) poor coordination and/or collaboration among state, local, and federal water-related agencies; (7) gaps in scientific knowledge related to ecosystem functions; (8) limited ability to value environmental systems on monetary or other scales; (9) the public's perception of risk as opposed to the reality of risk associated with water management options; (10) suspicion regarding the formation of partnerships; and (11) poor communication links among planners, managers, stakeholders and others. Identifying

the constraints is relatively easy; finding ways to eliminate or modify them is the heart of the problem.

It is my view that 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. We must push our imaginative and innovative talents to the limit, break loose from historical constraints, and seek solutions to problems with respect to their total dimensions. No other approach can be expected to yield substantial gains. 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.

THE BOTTOM LINE

Design and implementation of holistic water management policies for the 21st century requires the following:

- Improved coordination and collaboration among governments and agencies engaged in water resources planning and management. The large number of committees in the U.S. Congress involved in some aspect of water management compounds the problem and needs attention. A similar problem exists with some state legislatures. Collaboration is a key word here.
- The provision of forums for designing water policies that address the totality of the outcomes which would flow from these policies if they were implemented. The lack of effective forums is one of the most frequently cited voids in U.S. water policy. Two types of forums are needed—those related to resolving or avoiding conflicts (consent-building) and those related to solving problems that transcend political and/or agency boundaries, and that can support holistic analyses (system-encompassing).
- Creation of system-encompassing local, regional, national, international, and global institutions to overcome the fact that cities, counties, states, and even nations, are often too limited in jurisdiction to deal appropriately with water management issues that transcend their geographical and institutional boundaries. These institutions must have the expertise to understand and manage multiparty, multi-jurisdictional water management systems. A broad understanding of the functioning of entire ecosystems

must be present. The 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.

- Making integrated water management the goal at all levels of government. The true spatial, environmental, and institutional dimensions of problems must be recognized and dealt with accordingly. Integrated water management plans should drive water resources decisionmaking processes and serve as the basis for developing regulatory programs. A challenge here is to deal with existing institutional frameworks which evolved under various historical and socioeconomic conditions, and which were developed to meet now-outdated needs that differ from those anticipated for the future.
- Developing water management policies that embrace system-wide dimensions. Preventive, rather than remedial actions, should be emphasized.
- Recognizing and supporting the important role that educators can play in the development and implementation of strategies for integrated water management. The teaching, research, and service functions of universities are ideally suited to educate a variety of publics on water management issues.
- Establishing a new federal water policy coordinating institution. A format having some of the attributes of the former Water Resources Council would (1) provide guidance in designing federal water policy, (2) coordinate federal water programs and agencies, (3) assess the status of the nation's and the world's water environment, (4) provide foresight capability, (5) facilitate research, and (6) coordinate and support state water resources planning and management programs. The new council should also have the authority to stimulate and encourage regional water resources initiatives for appropriate problem sheds. The council should be designed to facilitate such ventures but not direct them. The new council should have representation from state and non-governmental organizations as well as federal agencies. There is a sound rationale for having this council attached firmly to the White House: it is removed from interagency politics. Regional councils represented by the river basin commissions should also be established. These should be more deliberative than operational.

- Restoring the focus on regions or problemsheds as platforms for water resources planning and management. These planning/management institutions should be designed bottom-up to reflect the needs and character of the area to be served. Participating would be concerned citizens, local governments, appropriate representatives of federal and state agencies, and interest groups. These regional institutions would be charged with making assessments, suggesting regional policies, and identifying paths that should be taken to deal with plausible future scenarios.
- Providing the resources needed to plan for meeting potential global climate change scenarios. The water policy implications of global climate change are significant. Water management in the next century will be stressed by climate change and the accompanying disruption in global weather patterns. The time for developing plausible climate change scenarios and exploring alternatives for dealing with them is now.
- Reviewing regulatory policies and exploring options for making them relevant to holistic plans so that they enhance, rather than constrain, opportunities for optimal water resource management. For example, current regulatory decisionmaking processes do little to encourage regulators to account for the economic impacts of their actions.
- Consolidation of water quantity and water quality planning and management.
- Bringing the single-objective regulatory approach used by the EPA into conformance with the multipurpose, multi-objective planning system which, for many years, has provided guidance for federal investments in water resources management. EPA's watershed protection approach focuses almost exclusively on water quality and existing resource use. It is narrowly oriented and is generally lacking in the identification and comparison of alternatives. Reconciliation of the two approaches could be facilitated by requiring that all federal water-related programs be subject to the *Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies*. A reconstituted Water Resource Council could serve to coordinate this activity.
- Supporting analytical and database initiatives. Good decisionmaking is heavily dependent upon the quality of the database and the ability to analyze this data so that information can be presented regarding the outcomes to be expected from exercising the options proposed to deal with the issues under consideration. The value of interactive simulation models in aiding decisionmakers is well documented. Resources are needed to further develop and promulgate these decision-support tools and to develop and maintain the databases needed to assure that they can be used effectively.
- Revisiting the idea of consolidation of water resources activities of agencies and exploring options for fostering intergovernmental integration. Consolidating water management functions would enhance organizational efficiency. Coordination, cooperation, and consolidation are approaches that could be taken. The problem is that there are too many fingers in the pie. A reduction in number could facilitate the resolution of problems being dealt with.
- Incorporating environmental values into the economics of water allocation. Reforms in water management institutions are needed to address this problem. Protocols for making trade-offs and establishing relative values for making water allocation decisions for environmental purposes are needed. Casting the value of a constructed waterway in monetary terms is relatively easy to do; but when it comes to establishing a value for a wetlands, a natural habitat, or an instream flow to support fish and wildlife, problems abound. This is a critical issue; one still in need of research.

Finally, it is my view that water policies for the future should: focus on the right "problemshed," be flexible, be holistic, support sustainable development, embrace public views, encourage partnership approaches, and be the driving force for regulatory programs, not the result of them.

AUTHOR

Warren Viessman, Jr. is Associate Dean for Academic Programs and Professor of Environmental Engineering Sciences in the College of Engineering at the University of Florida. He has been Director of Water Resources Centers at the Universities of Maine and Nebraska, and Senior Specialist in Engineering and Public Works in the Congressional Research Service, Library of Congress. He is Past President of the American Water Resources Association (AWRA) and Past President of the Universities Council on Water Resources (UCOWR). He is the recipient of ASCE's Julian Hinds Award, AWRA's Caulfield Medal, and UCOWR's Hall Medal.