

An Essay on 21st Century Management of the Mighty Mississippi

Gerald E Galloway, PE, PhD
University of Maryland

[US Water] Policy is ad hoc, implementation is decentralized, coordination is fragmented, and communication is non-existent or fails to connect. We need a national water policy and unifying vision and guiding principles.

Honorable James L. Oberstar, former Chairman, US House of Representatives Transportation and Infrastructure Committee, August 2009

As the Mississippi River Basin moves into the second decade of the 21st century and faces the water resources challenges that lie ahead, former Congressman Oberstar's words carry special weight. Although speaking of the need for a national approach to water resources, his call for policy, vision and guiding principles, applies equally to the challenges facing the many basins of the nation. It is difficult to efficiently move a basin towards a desired future state when you have not agreed on what that future should be and have the leadership and the resources needed to get there. This paper offers my observations on what organizational steps could be taken to move the Mississippi Basin towards a desirable and collaboratively determined future.

Roots

In one of the earliest known records of European awareness of the Mississippi River, in 1542 Hernando De Soto's band of explorers arrived at the banks of the Mississippi River somewhere south of Memphis Tennessee and found the river in flood, a condition which persisted for over a month. The magnitude of the flows gave some inkling to the party of the size of the river and the area that it was draining. Subsequent exploration identified that the Mississippi in fact was draining 41% of what was to be the 48 contiguous states of the United States. Its 1.25 million square miles touch parts of 31 states and two provinces of Canada. De Soto's Mississippi was and still is fed by five major river basins which stretch from the Rockies to the Appalachians (figure 1). Its nickname, the Mighty Mississippi, is well deserved.

The 16th and 17th centuries saw the continued exploration of the basin. During the 18th and 19th centuries, the rivers of the basin became highways for settlement and commerce, and agriculture became dominant across the landscape. The 20th century brought increased focus on the utility of the basin for municipal, industrial, and agricultural water supply including the reclamation of arid regions, the generation of electricity, and increased use of many rivers as valuable components of the nation's multi-modal transportation system. The latter half of the 20th century brought increased attention to the ecosystem goods and services that the river environment produces as well as the recreational opportunities that could be enjoyed. Over the same five centuries, those living in the basin struggled to deal with both too much water, the frequent floods, and too little water, periodic droughts.

The waters of the Mississippi basin, in many ways, have been the fabric that has pulled together people, land, and the products that are produced on these lands. However, much of the development of the water resources of the Mississippi River basin was accomplished on an ad hoc basis with little thought given to the integration of the various uses of the river to ensure that all

sectors could continue to grow over time and that no sectors were disadvantaged by actions of others. Decisions on use of water for agriculture were not always balanced against the use of these waters by the natural environment. Water for recreation or municipal water supply was not always given the same consideration as the use of that same water for navigation or hydropower.

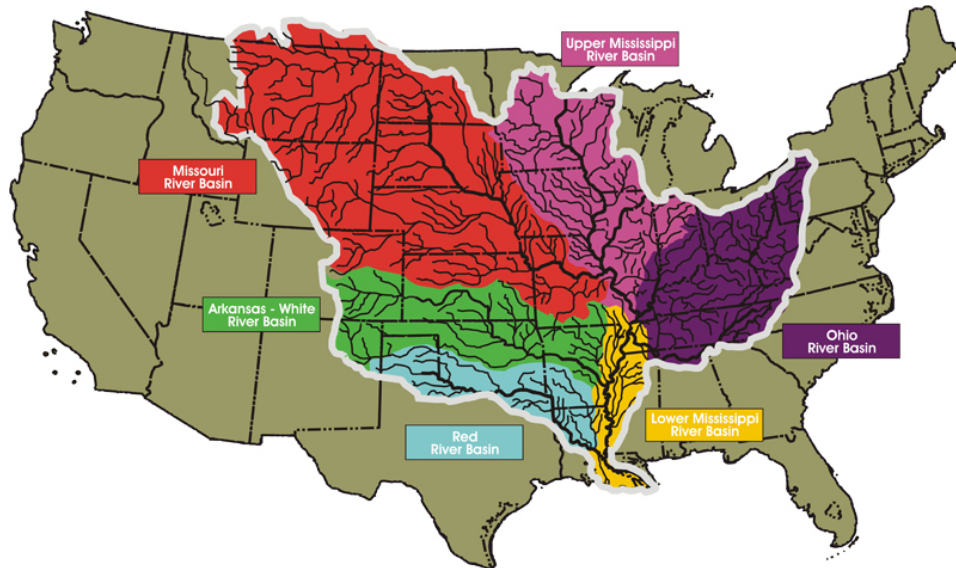


Figure 1. The Mississippi and Its Principal Sub-Basins (Source: Mississippi River Commission, 2012)

Getting Organized

How does a nation or those who live within its bounds manage the waters of the Mississippi River Basin? During the "early days," development was localized as were problems and basin residents fended for themselves. As the problems grew larger and demand for water greater there was need for some level of regional and governmental cooperation-allocation of water, coordination of levee construction, and use of locks and dams for river movement, etc. In many cases the federal government stepped in to provide broad support. The Swamp Land Acts of mid-19th century, the formation of the Mississippi River Commission (MRC) in 1879, the passage of the Reclamation Act in 1902, and the Federal Power Act in 1920 reflected federal attention to the problems that existed at those points in time.

Today we are faced with dealing with a river basin whose economic, social, environmental and engineering complexity is rivaled by few major rivers of the world and this complexity is growing. As the 21st-century moves into its second decade, both those living in the basin and those living in the remainder of the country, who rely in many ways on the strength of the economy of the basin, are faced with a management structure that represents a patchwork of policies and objectives, organizations that have been cobbled together to meet every challenge and then some, a lack of adequate resources and, as a result, is unprepared to deal with the uncertainties that lie ahead.

Management Today

What is the management structure of the Mississippi River Basin today? There is no national water vision or policy, no national agreement on roles and responsibilities for water management, and no national direction for how water issues will be addressed in the decades ahead. There is similarly no comprehensive approach to management of the Mississippi River Basin. As a result, each day tensions grow and opportunities disappear. Management of the Mississippi is carried out in a sometimes collaborative and sometimes coordinated manner by a combination of federal, regional, state, local governments and various public and private organizations. At the national level, the government operates through a number of programs or silos that were developed to meet specific needs at some point in the nation's or basin's history. To make matters more complex, under the federal system, several important aspects of water and related land-use management, including basic water law, are the responsibility of the states rather than the federal government and are reflected in the separate laws of the 31 states of the basin. At the federal level, primary responsibility for water quality rests in one silo and quantity is found in several others. Responsibility to deal with droughts is focused in one agency and floods in several. Oversight of environmental issues is similarly distributed among several agencies, each with a silo that reaches from federal to local level. Similar situations exist within most state governance structures. Only infrequently are the programs integrated with each other so that full costs and benefits are assessed and sound integrated solutions developed. There are few examples of success in developing an integrated management approach.

On the success side, the Tennessee Valley Authority (TVA) represents an organization that was given a comprehensive water resources mission and the resources to carry it out and, in general has done so. Both the MRC, and the Miami Conservancy District (Ohio) (MCD) have served as examples of organizations given responsibility by the federal government in the case of the MRC and state government in the case of the MCD, that have clearly defined, but more limited water resources missions that they have carried out in collaboration with state and local agencies for an extended period of time. In all three cases, the reach of these organizations was limited geographically to specified river basins. TVA brought the Tennessee Valley into the 20th century with power production, navigation, flood control, malaria prevention, reforestation, and erosion control. The MRC, since 1879, has, depending on the mood of the Congress, provided oversight and sometimes support for flood control and navigation on both the lower and the upper Mississippi Rivers. Since 1928, its management of the flood control and navigation in the Lower Mississippi Valley has significantly reduced the impact of flooding and increased the effectiveness of navigation as well as, more recently, providing attention to environmental stewardship of the riverine environment.

The MCD, founded after the great Miami River Flood of 1913, has efficiently managed the water resources of that basin and not only prevented recurrences of the great flood, but also has preserved the quantity and quality of the water resources of the region. All three of these organizations, deal with long-term planning, resource development, and system operations.

The Water Resources Planning Act of 1965 authorized the development of basin commissions across the country where state support for such organizations existed. Commissions were established in the Mississippi basin for the Ohio, Missouri and the upper Mississippi Rivers and operated until they were eliminated at the start of the Reagan administration. While they were in existence, the commissions provided coordination of water resource activity at all levels of government and with the public, but failed to convince their clients that the work they were doing had merit and was not interfering with the prerogatives of the states and localities as well as being

responsive to the public at large. The administrative and political problems that caused the downfall of the basin commissions is a subject for another paper but would need to be addressed before such an organizations were reconstituted.

When the 1965 Act was passed, the TVA was already providing water resource planning for its basin, the MRC was providing general planning for the lower Mississippi region, and a federal government created Arkansas-White-Red Basins Inter-Agency Committee was coordinating activity in those basins. As a result, little thought was given to creating basin commissions for those regions.

The Upper Mississippi River Basin Commission, which operated until 1981, prepared a comprehensive plan for the upper Mississippi basin that integrated federal, state, local, and public input and gained a substantial degree of support. On the demise of the Commission, the Upper Mississippi River Basin Association (UMRBA) was established by the governors of the five basin states to carry out as many of the coordination and planning functions as could be fiscally and legally supported. However, because the UMRBA is an organization supported only by the states and has limited resources, it has not been able to carry out the full functions of what would be necessary for strategic level planning and planning implementation. In the Missouri basin, several organizations followed in the footsteps of the federally supported Missouri River Basin Commission (MRBC) with far less success than UMBRA. In the summer of 2006, the Mni Sose Intertribal Water Rights Coalition and the Governors of the States of Wyoming, Montana, North Dakota, South Dakota, Nebraska, Iowa and Kansas authorized the creation of the Missouri River Association of States and Tribes (MoRAST) to succeed a somewhat unsuccessful Missouri River Basin Association. MoRAST was incorporated as a non-profit organization in the State of Nebraska in the fall of 2006. It was formed to “help resolve issues of concern to the basin states and tribes, to serve as a forum to foster communication and information exchange among the member states, tribes and various other governmental units, and to facilitate the management of the natural resources of the Missouri River Basin, including water resources, fish and wildlife while considering the impacts to the economic, historical, cultural, and social resource.” Just as is done by the UMRBA, the MoRAST has made provisions for federal agencies to participate in MoRAST activities in an advisory role.

Illustrative of the inability to develop a collaborative approach to some of the water resource issues in the Mississippi basin has been the development of the master manual for operation of the six main stem dams on the Missouri River. Following a major Midwest drought in 1988, the Corps of Engineers initiated an effort to reach out to Missouri basin states and the public as part of a review and updating of the existing master manual. The six main stem dams are operated under federal legislation that authorized their construction to provide support for flood control, navigation, hydropower, irrigation, recreation, water supply, water quality, and fish & wildlife. The challenge facing the Corps of Engineers was to develop a plan that would successfully balance the needs for water resources to support all of the project purpose.

24 years after initiation of this effort, the Corps has been unable to gain consensus among all of the basin parties on how the river should be operated. Upstream states have very strong views on the need to conserve water for their use within their states. During certain periods, downstream users seek release of water to provide space in reservoirs to store floods waters and, during other periods, seek releases to ensure that the appropriate depth is maintained in the authorized navigation channel from Sioux City, Iowa to the Mississippi River. In a 2002 study of the Missouri River ecosystem, a committee of the National Research Council reported that:

Current management protocols for operating the Missouri River system represent an accretion of federal laws, congressional committee language, appropriations instructions, and organizational

interpretations that have been enacted or developed over the past century. This guidance has generally not been updated to reflect changing economic and social conditions, scientific knowledge, economies, and social preferences which have clearly changed across the Missouri River basin since the mainstem dams were planned and constructed. However, the institutional and policymaking framework for Missouri River management has not changed accordingly. The decision-making context for the Missouri and its tributaries is characterized by prolonged disputes, disaffected stakeholders, and degrading ecological conditions. Barriers to resolving this policy gridlock on the Missouri River include a lack of clearly stated, consensus-based, measurable management objectives, powerful stakeholders' expectations of a steady delivery of entitlements, and sharply differing opinions and perspectives among some Missouri River basin states.

Extremely heavy rainfall during the spring and early summer of 2011 filled the flood control storage within the Missouri reservoirs and the uncontrolled river flows once the reservoirs were filled caused significant downstream flooding, once again raising questions of for what purposes the dams should be operated. Heated discussions in the basin and the Congress continue to this day and there is no management body established to deal with an issue of this breadth.

Your Local Watershed

It should be noted that while the above discussion focuses on the major sub-basins of the Mississippi, considerable activity is taking place in smaller watersheds throughout the basin. These efforts tend to be grassroots oriented and involve local, state and regional organizations, governmental and non-governmental, with some support from federal agencies. In many respects, because of their lesser complexity, planning and execution of water resource activities may face considerably fewer challenges than those efforts focused on the larger sub-basins. Quite obviously, any activities by the larger basin organizations must take into account and coordinate with the water resource planning and execution activities within the smaller basins.

What Is Needed for Effective Water Resources Management?

In 2002, several federal agencies asked the American Water Resources Association (AWRA) to bring together water experts from around the nation to discuss the need for increased focus on national water policy. Dialogues were held in Washington in 2002, in Tucson in 2005, and in Washington in 2007 and 2008. Noting that "the water resources of the United States are at risk and concerted action needs to be taken at all levels of government and within the private sector to deal with this challenge", AWRA reported the results of these dialogues to the President, the Governors of all 50 states and Congressional leaders recommending that:

- *The Administration and Congress should work with governors and tribal leaders to establish broad principles for water management—in essence, a national vision...*
- *The Administration and Congress should better coordinate water resources activities...*
- *The Administration, Congress, and the governors must encourage policies that promote watershed planning and change policies that do not...*
- *The Administration, Congress, and the governors must ensure that the Nation's vast scientific knowledge about water is available to all...*

Over the past two decades, the American Society of Civil Engineers (ASCE) has reported to the nation the perilous condition of the country's built environment. It has consistently found that the

water infrastructure is not being properly maintained and upgraded and giving it grades at the D level.

Looking at the results of the Dialogues and the ASCE reports, I would conclude that, quite simply, for management to be effective, it must have **direction** - the vision, goals and objectives mentioned earlier.

This direction must be **integrated** within a structure that links water development with development within other sectors.

It must have **leadership**. Someone, some group must be assigned and accept responsibility and authority to carry out the required tasks.

It must be supported - have **resources**. There must be a clearly defined stream of resources to support management and implementation activities.

Direction

As indicated earlier, participants in the National Water Policy Dialogues emphasized the need for direction - the development of a national (not federal) vision that addresses the long-term aspirations for the nation for use of its water resources. Development of the vision would also lead to the establishment of national goals and objectives to guide resource allocations at all levels of government and to clearly define for the public the path that should be followed. The dialogues emphasized that any development of a national vision, policy, goals, or objectives should be carried out in a collaborative manner that would involve not only the federal government, but also states, localities and the public at large.

Integration

Effective water resources management must integrate water resource management across all sectors of water resources as well as other national, regional, state and local planning and resource development activities. Soon to be released books by the China Ministry of Water Resources and the World Wildlife Fund examine basin planning and flood risk management from the international level to the local level and point out that basin planning and flood risk management planning must be responsive to and carefully integrated with the goals established at national, regional (state), and local levels for management of all resources. A comprehensive water resources plan or a comprehensive flood risk management plan will not be effective unless it considers the activities of parallel sectors and higher and lower levels of government (Figure 2). The book emphasize that all aspects of water development must be carried out with clearly defined ties among all sectors.

Leadership

While development of goals, objectives, policies, and a vision provide a direction of movement and sufficient guidance to develop implementation plans for integrated water resource management, ultimately a need arises for agreement as to how these plans will be executed and what organization will lead the effort. Management can be carried out by a single organization assigned the appropriate responsibilities, or by a corporate or collaborative structure in which the views of the members of the structure become part of the decision process. Commissions, councils, and similar bodies operate in this fashion with the leadership position rotating among members of participating organizations or being permanently assigned to one of the participating groups.

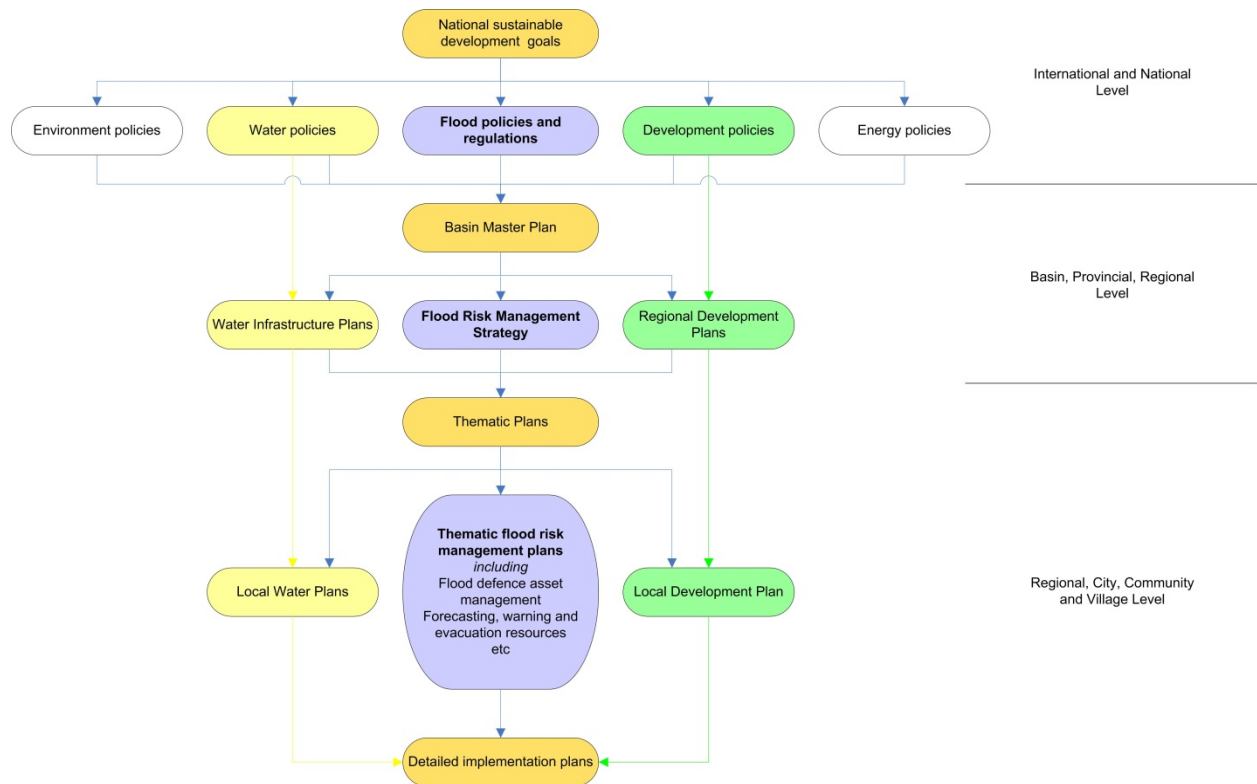


Figure 2. Vertical and horizontal integration of planning and implementation activities is often a chaotic process of integrating policies and plans in various stages of completion (Source: Sayers et al, 2012).

Resources

Reality says that organizations do not go far either in the planning or the execution stage without access to the fiscal and human resources they need to carry out the functions they are assigned. Such organizations need the funding and talent necessary to develop scientifically and socially supportable long-term plans and to execute these plans when given the necessary approvals. When inadequate support is given to either the planning or execution process, the results are generally unsatisfactory.

Some Options for Management of the Mississippi or Its Sub-Basins

Some form of governance needs to be put in place to guide the movement of the basin into the 21st century. In an ideal world, such a structure would oversee the entire basin. While technology may have advanced to the point that necessary information about the basin could be collected and placed in near real-time in the hands of one group to plan for and operate water resource related activities from the Rockies to the Appalachians and the Canadian plains to the Gulf of Mexico, such an approach would not be politically or fiscally feasible at this point in the nation's history. It would be more reasonable to focus on developing management structures for activities at the major sub-basin level.

In addition to the organizational approaches previously discussed, several other approaches have been tried or proposed. In 1968, following the direction of the US Water Resources Council, which had been established under the 1965 Planning Act, and with the authority of the Flood Control Act

of 1966, the MRC assumed the role as the lead agency for conduct of a comprehensive study that would lead to a framework plan for water resources development in the Lower Mississippi Region. To guide the study effort a coordinating committee was established under the President of the MRC with representatives of eight federal agencies and the seven lower basin states. Agency and state representative served as chairs of subgroups for components of the study (Figure 3). The final report, issued in 1974 was sent to the President and the Congress and was used to guide development activities in the Lower Mississippi Region in the years following its submission.

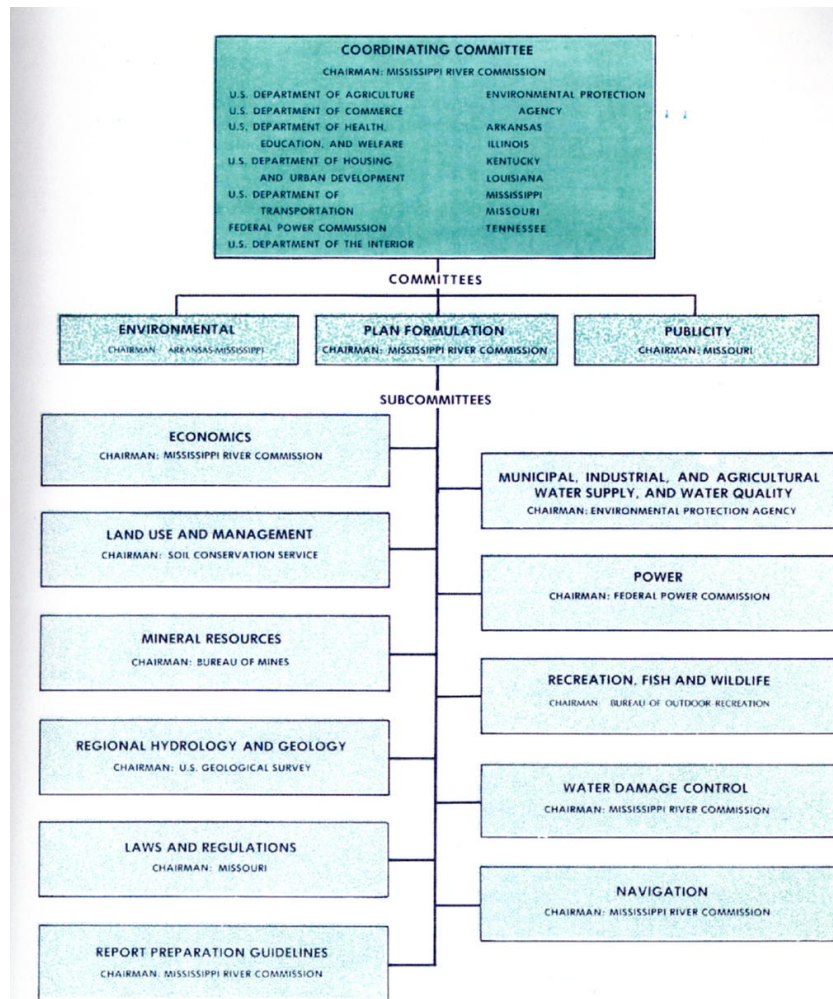


Figure 3. Organization for the Lower Mississippi Region Comprehensive Study (Source: Lower Mississippi Region Comprehensive Study Coordinating Committee, 1974)

In its report, *Sharing the Challenge*, produced for the White House following the Great Mississippi Flood of 1993, the Interagency Floodplain Management Review Committee identified two levels of activity needed to support basin water resources management. The Committee proposed that there be a strategic level organization that would be responsible for "development of comprehensive plans for water and related land resource development." It suggested that the responsibilities of this organization would parallel those that were established for the river basin commissions under the 1965 Water Resources Planning Act. It also proposed that another organization would be

needed at the operational level to provide coordinated execution of plans developed at the strategic level and offered the MRC as an example of such an organization, noting however that the charter of the existing commission would have to be expanded to provide for ecosystems stewardship responsibility.

In its report, the Committee also recommended that the operational mission of the MRC should be expanded to include the Missouri and upper Mississippi Rivers. It also recommended that ecosystem management be established as a co-equal objective to flood control damage reduction and navigation not only on those rivers but also nationwide (and that the federal Principles and Guidelines be amended to promulgate this co-equality.)

Recognizing the growing importance of ecosystem restoration not only on the upper Mississippi and Missouri, the Committee also recommended that the membership of the Mississippi River Commission be expanded to include representation from the Department of Interior.

Since resources would play a major role in any implementation of comprehensive plans, and recognizing the success of the Mississippi River and Tributaries Project, the Committee recommended that activity in the upper basin and in the Missouri fall under a to-be-created and Upper Mississippi River and Tributaries project, which would be funded by the federal government under a separate line item in the Corps of Engineers budget.

In 2006, Immediately following Hurricane Katrina, a working group for post-hurricane planning for the Louisiana coast was formed by an independent group of scientists familiar with challenges that had to be faced to slow erosion of the Louisiana coast, improve deteriorating navigation infrastructure, begin restoration of damaged ecosystems, and dampen the impact of potential hurricanes on the same area. As part of its effort, the working group called for the development of a new management framework "for coordinating and integrating planning decision-making implementation and evaluation" and that "a joint federal-State body should be given the responsibility of organizational and fiscal support for guiding the program." It called for this joint federal state body to provide high-level independent assessment and engineering and scientific support of the reduction of uncertainty in the decision process in the coastal area. The Corps of Engineers would continue to design, construct, and, as authorized, operate and maintain specific projects. At a regional workshop on "Envisioning the Future of the Gulf Coast," held in New Orleans later in April 2006 and subsequently in meetings with senior Administration officials, there were proposals for the MRC to work in tandem with a Coastal Louisiana Authority to be established by the Louisiana Governor and the President. The 2007 Water Resource Development Act (Title VI) established the Coastal Louisiana Ecosystem Protection and Restoration Task Force, a federal-state organization to ensure coordination of federal-state activities in the Louisiana Coastal region.

In partial response to the 2002 National Research Council report on the Missouri River, the 2007 Water Resource Development Act also established a federal-state-tribal-local interest Missouri River Recovery Implementation Committee (MRRIC) to provide guidance to the Secretary Army with respect to the Missouri River recovery and mitigation plan and "coordination of the development of consistent policies, strategies, plans, programs, projects, activities, and priorities for the Missouri River recovery and mitigation." The coordinating committee has been formed and is in operation and while it does not serve as the strategic planner for the basin, it does serve as an example of how a stakeholders can be brought together to address issues that cut across political borders and different levels of government.

There are other examples of organizational structures that attempt to address in some way the integration of water resource activities within a geographic area, but none rise to the level of what is needed in the Mississippi basin.

In 1948, the Ohio River Valley Water Sanitation Commission (ORSANCO) was established as an interstate commission representing eight basin states and the federal government to control and abate pollution in the Ohio River Basin. A Great Lakes Commission has been operating since 1955 as an interstate compact agency that “promotes the orderly, integrated and comprehensive development, use and conservation of the water and related natural resources of the Great Lakes basin and St. Lawrence River.” In 1961, the President and the governors of Delaware, New Jersey, Pennsylvania, and New York signed concurrent compact legislation into law “creating the Delaware River Basin Commission (DRBC) to “oversee a unified approach to managing” the Delaware Basin. When the DRBC was created, some “43 state agencies, 14 interstate agencies, and 19 federal agencies exercised a multiplicity of splintered powers and duties within the watershed.” Today, four state commissioners and a federal representative, act to provide basin level guidance on these activities.

One Person’s Opinion

There is no single solution for the governance of the water resources of the Mississippi River Basin. In fact, the use of multiple solutions reflecting the needs and differences among the basins make sense as long as the principles of direction, integration, leadership, and resources are given their due.

Because of the ongoing challenges facing both the Missouri the Upper Mississippi Basins and the absence within these basins of clearly defined visions, goals and objectives at the strategic level and the lack of a body with responsibility to coordinate water resources activities at the operational level, early attention should be given to these regions. Strong consideration should be given to a governance structure similar to that recommended by the Interagency Floodplain Management Review Committee in 1994 - basin commissions for strategic planning, use of an expanded Mississippi River Commission, and concurrent establishment of MR&T-like funding of operational activities.

The MRC remains the centerpiece of flood control, navigation and related environmental restoration in the Lower Mississippi Valley. To deal with the challenges of Louisiana coastal protection, restoration, and conservation, the efforts of the MRC should be more closely tied to the significant program being developed by the state of Louisiana. The management structure used for the lower Mississippi region comprehensive study could form the basis for comprehensive Lower Valley planning. In the case of projects as large and complex as the restoration of Louisiana coast, one of the suggested links between the MRC and the state of Louisiana should be considered. In this case, in the absence of a formal basin commission, the joint partnership of the Lower Valley states and the MRC would serve as the strategic level planning entity, and the MRC as the operational arm.

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