FLINT RIVER BASIN WATER POLICY AND MANAGEMENT: ACHIEVING SUSTAINABILITY THROUGH REGIONAL FLEXIBLITY

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Abstract. Regional approaches to comprehensive freshwater planning and management are emerging in Georgia. The evolution of public policy in the Flint River reflects the factors that are contributing to "regionalism" in problem identification and resolution. While the public policy process in the Flint River was similar in the initial stages, two distinctly different societal approaches are evolving to formulate and implement comprehensive freshwater planning. Regional patterns of water use, impacts on natural systems, and opportunities for achieving freshwater sustainability are resulting from the interplay of regional differences in water source and capacity with economics, demographics, and governance. Leadership and culture are important factors in the institutions and processes that are evolving to meet the challenge. An urban-business model is evolving in the upper basin and a rural-grassroots model in the lower basin. Such differences clearly point to the need for a flexible and adaptive approach to sub-state water resource planning and management.

WATER MANAGEMENT ISSUES

The Flint River basin typifies the challenges Georgia faces in formulating a comprehensive water management vision and plan. Georgia's societal thirst for water is running into direct conflict with the water requirements necessary to sustain natural resources (Kundell et al. 2001). The complexity of the scientific and societal issues, the intricate interactions within and between society and the natural resource, and the dynamic nature of both social and ecological systems make determining and balancing competing needs challenging (Likens 2001, Ludwig 2001). Both government funding and regulatory oversight are inadequate to solve these interlinked social and ecological issues. Government-funded scientific studies, engineering solutions, and administered regulations are increasingly less effective or efficient in addressing the broad spatial complexity and highly variable nature of these water resource problems (Adler et al. 1993, National Academy of Public Administration 1997). To achieve sustainability, a comprehensive yet flexible approach is needed to evaluate, manage, restore, and sustain water resources (Likens 1998).

The Flint River Basin was identified as "one of the most endangered rivers in the US" by the American Rivers Conservation Group (American Rivers 2001). The Flint River is one of only 40 remaining rivers in the US with greater than 125 miles without impoundments (Benke 1990). The unimpaired flows are critical to maintaining a remarkable diversity of plant and animal species, including federally listed fish and mussel populations (Ziewitz 1997, Ziewitz et al. 1997).

Water use, altered stream flows, natural resource impacts, interstate water allocation negotiations, and evolving water policy were factors contributing to it's endangered status. Atlanta resides in the headwaters, agriculture fuels the economy in the lower basin, and the entire basin is a critical component of the Alabama, Georgia, and Florida interstate water compact negotiations. Conflicts continually arise over water withdrawals to fuel growth, the economy, and sustain the natural resources. Concerns over unsustainable consumption of water resulting from rapid growth of metro-Atlanta; water quality issues associated with this urban storm water runoff; and agricultural withdrawals of groundwater in southwest Georgia have made water in this basin the focus of public policy debate.

BASIN DESCRIPTION

The Flint River has regionally distinct geology, water resources, demographics, water use, landuse, economics, social institutions, governance, and culture (Couch et al. 1996). The upper Flint River region lies in the Piedmont physiographic province with the Atlanta metropolitan area sprawling into the upper reaches. The mid to lower Flint River region lies in the Coastal Plain physiographic region with a highly dispersed rural, and in many areas declining,

population. Of the 588,000 people, 49% resided in the upper region with four times the population density (69 people per km^2) as the lower region (17 people per km^2) (US Bureau of Census 2000). From 1990 to 2000 the population in the upper region increased seven times that of the lower region (35% versus 5%).

Regionally distinct water sources, water use, and management occurred. Surface water streams provide water for municipal, industrial, and recreational uses for the Atlanta metropolitan area. For the Atlanta metropolitan residents of the Flint River basin, over 88% of the domestic supply came from surface water (Marella et al. 1993). Therefore, most water use decisions were made by counties and municipalities. In the lower region, extensive ground water aquifers provide water to support flows in the rivers and water use. In the lower region, domestic water use decisions were largely made by individuals. Self -supplied domestic water withdrawals provided 60% of the lower region's population with water from the Floridian aquifer. Municipal, commercial, and industrial sources were exclusively from groundwater.

Agricultural irrigation withdrawals were the largest water use in the lower region. The water use was dispersed and decisions made by individuals. Groundwater withdrawals from the Floridian aquifer averaged 70% of the groundwater used in the lower region (Hook and Blood, unpublished data). For many of the southernmost counties, irrigation water use was 90-95% of the total water used (Blood et al. 1999). Since the 1970's irrigation withdrawals have rapidly increased with predicted withdrawals exceeding the groundwater's capacity to sustain the Flint River's flow (Miller 1990, Harrison and Tyson 1999, EPD 2001b).

Water use and impacts were related to regional differences in economics. In the upper region, a multifaceted economic boom resulted in rapid urban growth. Construction was the fastest growing industry in the counties in the upper region (Bureau of Economic Analysis 1999). In the suburban counties such as Fayette, services, durable goods manufacturing, and construction were the three largest sources of income. The lower region's economy was largely dependent on agriculture for direct revenue, supporting industry revenue, and revenue from services surrounding agriculture (Boatright and Bachtel 2000). Outside of the Albany metropolitan area, 1999 county income from agriculture was the first or second largest source of income (Bureau of Economic Analysis 1999). Services, wholesale trade, and nondurable goods manufacturing were the next largest sources of income.

Regional culture and demographics influenced resource values, resource use, management options, decisions, and responsibilities. The lower basin rural values centered on family, community, traditions of self-reliance and self-sufficiency, and multi-generational land ownership created a strong sense of place, stewardship ethic, and personal responsibility in conservation and management of the resource (Kellogg Foundation 2001). The upper basin urban and suburban residents have a weaker sense of place because of transience, diversity and population density make it hard to have a sense of community, and their direct contact with the resource is limited. Individual stewardship and responsibility for the resource were diminished because major water use decisions were made by institutions. There was a greater reliance on professionals, institutions, governments, or other entities to manage water and resolve water resource problems (Atlanta Regional Commission 1997).

REGIONAL STRATEGIES

Climatic factors combined with regional changes in population, economics, and water use became drivers that created a sense of urgency and the perception of a water "crisis". During the past four years (1998-2002), regional concerns over water use in the Flint River were heightened by the most severe and prolonged drought of record (EPD 2001a, 2001b). The consequences of record low flows and water levels in reservoirs and aquifers on domestic, agricultural, and industrial supplies and impacts to natural resources raised concerns over long-term water security and natural resource viability. The combined socio-political and climatic "crises" fueled the drive for regional water resource planning and management.

Upper Basin – Business Leadership Model

In 2000, regulatory issues surrounding stormwater management heightened the perceptions of a water "crisis" that further motivated cultural change. At the heart of the regulatory crisis was federal intervention over Georgia's impaired waters including degraded water quality in the Chattahoochee River from excessive storm water and wastewater discharges, the inability to address the water quality problems by separate city and county governments working individually, and approaching wastewater capacity limits resulting from continued development in the Atlanta metro area (Clean Water Initiative 2000). Two Atlanta business leaders formed the initial vision for a regional response and a corporate or business leadership model evolved. The Metro Atlanta Chamber and the Regional Business Coalition appointed a task force, the Clean Water Initiative. Education on regional water quality and quantity issues was presented to the task force and meeting observers. Regional representation and education opportunities were limited because of time constraints, but were key to getting critical stakeholder buy-in. Regional

interests were represented by the business and economic development stakeholders, local governments, elected officials, state legislative leaders, environmental groups, attorneys, and downstream business representatives from Albany, Columbus and LaGrange. Concerned citizens and other stakeholder opinions and expertise were gathered through written submissions to web page, traditional public meetings, or other commentary approaches. The Clean Water Initiative recommendations were rapidly translated into state legislation and within six months the North Georgia Metropolitan Planning District was created. The entire process took about one year to complete from conception to implementation of the planning process. Because an eighteen month time frame for plan development was established in the legislation, the plans, databases, and models are being developed by a limited number of engineering consultants and technical committees (www.northgeorgiawater.org). An appointed board oversees a traditional planning process and the plans are being implemented by county and municipal governments within the District using a variety of tools, from water conservation pricing to model stormwater ordinances. Regulatory oversight is provided Environmental Protection Division (EPD) of the Georgia Department of Natural Resources (DNR) through the water and wastewater permitting process.

In the upper urban basin, regionalism is defined within the context of counties and municipalities and the inability to address regional water quality problems by separate city and county governments working individually. Therefore, individual "collective" decisions are not addressing the larger regional water use and quality issues. The larger regional context is evolving through consensus and coordination to a commonality in approach. Through common tools, assessments, strategies, and policies, the regional approach is providing a comprehensive, integrated plan for water supply, wastewater, and watershed management.

Lower Basin – Grassroots Leadership Model

In the lower Flint River region, the largest water resource issue was irrigation withdrawals, with water use decisions residing with individual farmers. It was important that individuals understand their individual stewardship responsibility within the larger regional water use. In the lower region, citizen education through regional summits, evolving interstate water policy (water allocation, irrigation permitting restrictions), and the regional drought combined to form the perception of "crisis" over several years. Stakeholder and concerned citizen involvement and regional education were cornerstones of the lower basin process. The region has responded with a grassroots process for planning and management to address water quantity issues in rural communities dependent on irrigated agriculture. The stakeholder-led process facilitated the emergence of citizen-based water resource management in Georgia.

The lower Flint River region pluralistic process involved multiple approaches to the development of water planning strategies, involved the evolution of committees and associations by regional leaders to become knowledgeable and participate, relied on effective networks to promote action (e.g. Farm Bureau, civic organizations), and established a broad suite of education, research, and policy efforts. Partnerships among private research institutions, academic institutions, and state agencies resulted in multiple research and science initiatives, management tool development, and policy evaluations. Examples include the Southwest Agribusiness Association, Southwest Georgia Health and Water Resource Initiative, Southwest Georgia Water Resources Task Force, and the Flint River Regional Water Council (Albany).

New institutions were created to develop knowledge, educate, evaluate policy decisions and management options, and foster the implementation of knowledge into conservation and management practices. The Stripling Irrigation Research Park, the Flint River Water Planning and Policy Center (Albany State University), and the Hooks-Hanner Environmental Resources Center (Dawson) are a few examples.

Currently no formal planning structure or institution has emerged in the lower region. A grassroots leadership has evolved a participatory democratic process in addition to the county governance infrastructure that relies on regulatory constraints. These approaches are consistent with rural cultural strategies for problem solving. The longer term process provides opportunity for co-evolution of the social system, technical knowledge, and its incorporation into individual and collective behaviors and norms. The process builds knowledge, trust, infrastructure, resources, support, consensus, negotiated solutions, and a collective regional vision. Such a grassroots process provides social flexibility as leaders, groups, and networks experiment in the management of natural systems. The grassroots strategy in the lower region because of the slowly evolving process has the potential for a lasting, self-sustaining water management plan. The co-evolution provides the foundation for freshwater stewardship and conservation while sustaining the natural resource, rural economy, and rural society.

SUMMARY

The rural and urban public policy processes taken to achieve sustainability of the freshwater resources in the Flint

River were similar in the initial stages, but two distinctly different societal approaches evolved to formulate and implement water resource planning. Visionary leadership, leadership task force, stakeholder representation, a facilitated visioning process, and a cooperative and consensus approach to formulate the planning framework were common to both in the initial stages. The processes differed in planning framework development, planning structure and formulation, management approaches to achieve sustainability, implementation strategies, and accountability. Culture, traditions, demographics, human system dominance, associations, and institutions were important human system factors in the evolution of strategies devised to achieve water resource sustainability.

Formulation of adaptive co-management strategies for the Flint River basin that foster both the vitality and sustainability of its intrinsically linked human and ecological systems typifies the complexity, challenges, and opportunities society faces in achieving sustainable freshwater resources. Regional differences require the maintenance of social flexibly and adaptive capability while facilitating constructive change through new freshwater resource management approaches. Finding the appropriate balance in sustaining culture, economics, and the natural resources will require broad participation in the adaptive co-management process. The planning and management options must be based on the best technical, scientific, local, and professional knowledge and judgment available. New social and institutional partnerships will be needed to effectively translate and integrate knowledge into societal beliefs and norms. Through communication, adaptation, and transformation, citizens can tackle the issues, construct a sustainable vision and knowledge, define the appropriate management prescriptions for their region, and assess their effectiveness.

LESSONS LEARNED

Several lessons emerged from the different management approaches that evolved in the Flint River basin. Management should be place-based and in a context that makes sense to the participants and their social institutions for effective implementation.

Education

For stakeholders, concern citizens, and evolving regional leaders to effectively participate, they must be empowered by education. Multiple education approaches such as, tours, facilitated dialog, workshops, civic presentations, presentations to special interest groups, conferences and summits on specific planning and management topics should be considered.

Knowledge

Planning and management options must be based on the best technical, scientific, local, and professional information and judgment. New social and institutional partnerships will be needed to effectively translate and integrate knowledge into societal beliefs and norms. Through communication, adaptation, and transformation of information and professional judgment, citizens can grasp the issues, construct a sustainable vision and knowledge, define the appropriate management prescriptions, and assess their effectiveness.

Regionalism

Each region has unique water issues, water resources, resource challenges, human and economic capital to resolve water resource challenges, culture and demographics; social networks and institutions, and governance. Therefore, a flexible regional approach should be taken that is defined by relevant regional criteria that make common sense to effectively formulating the management strategies and implementing them within the context of federal law and state water policies. The greatest challenge we face in sustaining our freshwater resources is meaningful and effective implementation of comprehensive and adaptable water management. For effective implementation, any management approach must effectively consider and embody these regional differences.

A regional vision

A facilitated dialog among all participating citizens and interested parties is critical to building a regional vision because mutual education promotes understanding and empathy for other's views, values, and perspectives. "Thinking-outside-the-box" and not being constrained by current social institutions and management structures will aid in developing a unique and appropriate vision for each region.

Visionary leadership

The emergence and development of citizen leaders is vital to participatory planning and management. Creative approaches and solutions are developed when leaders were not constrained by past policy or management paradigms.

Broad participation

At a minimum participation should include concerned citizens, stakeholders, and citizen leaders, elected officials, regulators, technical experts, and decision makers. Broad participation fosters cooperation, consensus, partnerships, and networks that build trust and opportunity for creative problem solving. The success-oriented process enhances

and fosters positive human behavior through education, leadership development, and incentive-based management. As citizens and leaders become empowered, they are motivated to invest their time and energy into the process. As a result, implementation and sustainability opportunity increases because citizens are vested in the outcome. The resulting process increases fairness and equity and reflects the region's collective values, beliefs, and culture.

Social flexibility and adaptive capability

Flexible co-management systems should be considered that incorporate regional differences, are adaptive to changing human and natural resource systems; and permit policy experimentation. These systems will provide the best opportunity for humans, economies, and nature to cope with change. Because the complex interactions of humans (and human use) and natural systems are not well understood, an emphasis should be placed on an adaptive management process rather than ultimate management structure.

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