

THE APALACHICOLA-CHATTAHOOCHEE-FLINT RIVER BASIN: A MODEL FOR SUSTAINABILITY?

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Abstract. Both scarcity and uncontrolled excess of water in the South-eastern U.S. have been much in evidence of late, calling into question the adequacy of the region's current water management. Expected future population growth and urbanization, as well as expanding public recognition of water's value in the good husbandry of other resources make it likely that its management will face additional, increasingly difficult, near term challenges. The strong possibility of global climate change in the years ahead expands the dimension of uncertainty about meeting these challenges. In addition, federal support for water management, excepting the management of its quality, has nearly vanished in the past thirty years. Clearly, the region's traditional approach to water management, trying to meet, piecemeal, the demands of uncontrolled development, is not working. This situation, now building toward crisis proportions in the ACF Basin, cannot be sustained.

A fresh strategy of water management is proposed, derived by: inverting the historical policies of "top down" water resources planning and management, led chiefly by federal and/or state entities; placing much more of the responsibility for managing this resource at the local (basin or sub-basin) level; redefining flood control and water supply priorities; giving a new emphasis to conservation and reuse, powered by a new water pricing structure; and recasting the water management roles of federal, state and local governments. Instead of management by broad, sweeping national and/or state policy and institutions, most often aimed at meeting demands for water supply and flood control as they arise, let water resources be managed from the "bottom up", placing the focus on the needs of a particular basin (or sub-basin), regardless of the number of states in which it falls. Instead of treating water management as if it is a public right, let it, within well defined priorities, be managed and paid for largely by the beneficiaries of its management, in accordance with value received. To a degree much larger than in the past, let those most affected by a basin's waters, rather than the general public, pay for its management. And require of these same entities more decision making within a public policy framework which allows them greater latitude in meeting the needs of their basins.

INTRODUCTION

The awesome drowning of vast portions of Alabama, Georgia and Florida during the summer of 1994 offered dramatic new proof of mankind's unwillingness to confront the terrible realities of nature. While the immediate cause of these happenings was rainfall of almost unprecedented intensity and duration, a deeper, more elemental reason exists for the occurrence, and recurrence, of these types of devastatingly tragic events. It is that the U.S., speaking through its elected representatives has always had, and continues to have, a schizophrenic approach to the management of its water resources.

On the one hand, it has insisted on, and spent vast sums on, water management of a "developmental" nature. For example, water supply and flood control activities involving the construction of "projects", such as dams, reservoirs, canals and related structures, that facilitate the development of lands for agriculture or the growth of cities.¹

On the other hand, it has turned its back on other types of water needs, such as the maintenance of in-stream flow for habitat protection, fisheries, and recreation. And it has failed, for the most part, to support or even allow joint, cooperative planning endeavors among regions, states or basins for unified, comprehensive water resource management in non-traditional, non-developmental spheres of public need, such as wetlands, conjunctive management, or the maintenance of ecosystems.² Efforts of this last type are more likely to produce "government planning reports"³ than plans for "projects", whose soaring, highly photogenic structures can be named for some politician: one who will gladly pose beside it. The recommendations of these reports, instead of enhancing the short - term value of property, are more likely to result in restrictions on its use, leading to decreased immediate value. There are few in elected office who will endorse such results. Thus, government and property owners alike are prone to leave resolution of these concerns to the unseen hand of a "free market" economy: not planned, only allowed to happen -- God willing.

Inevitably and unfortunately, when applied to water management, this approach leads in time to the situation faced in the Apalachicola-Chattahoochee-Flint (ACF) River

Basin and nearby basins last summer. The unseen hand of the market fails to control where, how hard, how long, and when it rains. Neither does it provide protection from these failures. The future "just happens" all right, but it is impelled by *natural* instead of *market* forces, sometimes flood, sometime drought, in a personally and publicly devastating way. Observing this, many in the water management establishment, and a number outside this circle, have concluded that "nobody's minding the store" with respect to managing water in the ACF and other southeastern state basins. Risky business. Troubling business.

THE TROUBLE OF IT IS!

As has been observed by others, perhaps "The easiest way to predict the future is to invent it."⁴ But inventing the future for a nation, or a state, necessarily involves governmental intervention. In the conservative southeastern U.S., such intervention generally is equated to something approximating original sin. Many landowners in this region are, with considerable justification, suspicious of the findings and actions of government, perhaps regarding them as unwarranted intrusions⁵ on freedom of choice, especially choice about the use of property.

But such views no longer serve the region well. Time and events are making it clear that the water resources of the southeastern U.S. are finite; although until recently they were managed as if they were limitless. It also is evident that this region is experiencing a vigorous, largely uncontrolled, growth; which is multiplying the region's storm water management, wastewater control and water supply problems, alike.

The 1990 estimated population for the ACF Basin (based on the 1990 U.S. Census Bureau (U.S. Census Bureau, 1990) data for the counties which lie totally or in part in the Basin (56 in Georgia, 10 in Alabama, and 7 in Florida) is 4,255,491⁶. The 2025 projected population for these same Basin counties is 5,807,535 (Harrison, 1994); an expected increase of more than 36% over the thirty-five year period. More important, perhaps, these projections indicate that 15 Georgia counties and 3 Florida counties may increase by more than 40% during that interval. Ten of these counties, nine in Georgia and one in Florida, already are among the Basin's largest in population; more than 50,000, each. Thus, in places where water management is already the most difficult, the crunch may rapidly become a crush.

The more distant future appears to hold more of the same, as the Southeast continues to be a popular place to live and do business and no one, in government or out, seems willing to initiate the process of controlling development of its lands.⁷

In terms of water management, the potential results of these facts represent a dual threat to the region's continued prosperity: scarcity and uncontrolled excess - drought and

flood. In fact, recent experience in parts of this territory includes visitations from both these threats, in the same basin, in the same year. Thus, it should be evident to even casual observers that continued unplanned, uncontrolled growth in these states, along with inadequate water management, will lead eventually to a kind of a "tragedy of the commons", southern style.

When the ACF Basin is considered in this context, its vulnerability to such events becomes obvious; indeed, the future has arrived. Some of the Basin's communities already have a water demand that exceeds the sustainable supply. And in many locales, overdevelopment assuredly contributed to the severity of last summer's floods, and to the losses that accompanied them. Without more controls than now exist, continued, perhaps even increasingly rapid growth in population, commerce and industry are inevitable.

The ACF also is a good example of the assault on the traditional with regard to concepts and policies related to water allocation, water use priorities, and water rights. As upstream users have demanded an increasing share of the Basin's water, the anxiety of downstream users concerning the security of their future supply has escalated; all the way to federal court. In turn, this concern has had the not surprising effect of forcing new consideration of the place of in-stream flow maintenance, habitat protection, recreation, and other environmental values, in the equitable allocation of limited water supplies.

Furthermore, it now seems clear that the Basin's climate will undergo significant change, soon. While there is disagreement about the direction and severity of this change, there seems to be an increasing likelihood that the ACF of the next century will be hotter, wetter, and perhaps more endangered by hurricanes and tornadoes. If this proves to be correct, the Basin's water management problems likely will continue, and increase in severity.

HANGING ON TO PAST WAYS

The last half century has been a time of extraordinary change in the Southeastern U.S. The approaching millennium finds the region enjoying a period of prolonged prosperity: a protracted "boom" in the growth of its population, commerce and industry. It also finds the region's water management systems, a critical element of this prosperity, almost overwhelmed by problems resulting from this good fortune. Such observations lead to a crucial question: How much further can the Southeast go with its present concept of economic development before its existing water management practices are completely swamped? Or, putting it another way: How much longer can it hold on to water policies and procedures created to serve a time that is long past?

These, essentially, are the same questions that many in the entire industrialized world have been asking since it began to be obvious that the earth's resources are limited, and that

mankind's activities are altering the global environment. Responses to them have included: denying the existence of a problem, a stubborn "hanging on" to a faith in technological fixes, such as building a new reservoir or flood control structure, rather than addressing underlying causes, and acknowledging that the existing management systems - policy, planning, implementation and operation - are outmoded, about to collapse, and desperately in need of change. (Meadows, 1992).

The Southeastern U.S., in general, and the ACF in particular, seem to have passed through, for the most part, the stage of denying the existence of their water management problems. Thirty or more years ago, most of the state and local governments in this region began to recognize that their water resources didn't fit their demand, and that storm water management was becoming a widespread and serious problem. They entered then the phase of seeking technological fixes: creating additional reservoirs, moving water from one basin to another, increasing the already significant reliance on groundwater, desalting brackish waters or reusing wastewater. To better control runoff, they began to require detention and retention ponds, and other structures, or the use of "sheet flow" principles for new developments. In short, they acknowledged the problem, but not its nature, and insisted that solutions could be found by using old systems to apply new technology. New wine in old bottles, so to speak. Few, if any, addressed the problems of encouraging unlimited growth in a place and time of limited resources. Unwilling to embrace a new reality, they choose instead a continuing devotion to the old solutions -- to "hanging on".

But as each passing day makes more clear, the old approaches are barely adequate to the meeting of today's needs. They offer little promise of being able to continue supporting the Basin's ever growing economy, and the quality life that has accompanied it. Assuredly, something more is needed. Part of that is a new vision of the Basin's future; an image grounded not in ever increasing growth but in sustainable development and resource management.

GETTING TO THE FUTURE

The design of water supply and flood control programs is based on events of some specified magnitude and duration. It is expected that all such events will sometime be exceeded. Thus, all such programs have failure designed into them. This "design for failure" approach is acceptable only because the marginal costs of preparing for events having lower probabilities of occurrence is regarded as more than the marginal benefits that might be attained from doing otherwise.

As communities grow, they find themselves needing an ever increasing supply of water, and having an ever expanding amount of runoff to control. Inevitably, a point is reached at which the costs of further "traditional water

management", i.e., additional development of water supplies, water works and sewerage systems, start to increase rapidly (Falkenmark and Lindh, 1993). Eventually, this approach is likely to become more costly than it is worth. At this juncture, non-conventional water management techniques, such as demand management through limiting the use of water for certain purposes, water reclamation and reuse, the encouragement of water conservation through education and pricing, and xeriscaping, are called for. Even these however can only go so far in successful water management for ever expanding populations.

The Western and Southwestern U.S. offer good examples of the expected outcome to such situations. Without adequate control, their growth in water demand has exceeded all reasonable⁸ expectations of supply. As this region is now learning, it may be near, or beyond, its potential for further, "sustainable" development (Brown, 1995).

The term "sustainable development" has become a buzzword of the 1990's, a phrase with as many meanings, perhaps, as there are users. One that seems particularly useful here has been offered by the World Commission On Environment and Development. It is " ... development that meets the needs of the present without compromising the ability of future generations to meet their own needs." (World Commission On Environment and Development, 1987)

That this phrase is in the current lexicon reflects the fact that many informed persons believe humankind's present mode of life, based on a concept of linearly increasing economic development, where nearly every human act -- especially industrial and commercial ones -- results in degradation of the environment, can only lead to planetary destruction. They propose, as an alternative, that socio-economic intercourse be restructured so "... that it mimics nature at every step, [creating] a symbiosis of company and customer and ecology." (Hawken, 1993).

This constitutes a new socioeconomic ideal wherein there is no such thing as waste, per se. Instead, raw materials energy, product, and what has historically been known as waste are manipulated in support of one another, within a complex of feedback loops, as they are in the natural world. This approach minimizes the expenditure of renewable resources and energy by making what has been waste a continuously renewed source of material for the production process. Thus, it promises to allow for existing or increased levels of economic activity while decreasing negative impacts on resources and the environment.

Many, of course, question the possibility of such a transformation in economic enterprise. Others, however, see it as not only possible but inevitable if the human community is to survive. One scholar, for example, (Hinterberger, 1994) has observed that both economic systems and biological systems evolve ... or expire. These evolutions take place in historical time, and the driving force behind both is relative scarcity. Further, the biological evolutionary concept views nature as

a complex system in which non-linear feedbacks are important. This is not an entirely new concept, as is obvious when the historical emergence and change of institutions, law and values are considered. And while he recognizes that economic selection, triggered by high demand for scarce resources, is by no means future oriented, ... resources may be selected out today that could be of higher value tomorrow⁹ (Hardin, 1985), it also is possible that entrepreneurs of intelligence and consciousness can perceive the selection process and make decisions that go beyond today's immediate demands.

What many fail to recognize is that for any community or culture, there always are several sustainable futures. For example, one of these may be a world laid waste by environmental disasters, with survivors reduced to a hunter/gatherer existence. Another might be one in which the quality of life, for all, is no less than that experienced today by the U.S. middle-class. Still another might actually be a more abundant, fulfilling life for all, one in which western mankind gets beyond its current philosophy of: He who dies with the most toys wins. There is a choice.

But the choice is not between changing or not changing; the future will occur, and its occurrence will mean change. The question is about the kind of change that will come, and the results of that change in terms life's quality for those who will live this future. And if the moment is seized, the fears of some notwithstanding, sustainable development can mean not only continued economic prosperity but greater opportunity for development in all aspects of human life.

John Stuart Mill noted this possibility more than one-hundred years ago, and writing in 1857 observed:

It is scarcely necessary to remark that a stationary condition of capital and population implies no stationary state of human improvement. There would be just as much scope as ever for all kinds of mental culture and moral and social progress; as much room for improving the art of living and much more likelihood of its being improved when minds cease to be engrossed by the art of getting on. (In: Cunningham and Saigo, 1995).

What a towering concept!

Can a high quality sustainable future be had in the ACF Basin? Probably. Can it be had without significant changes in the Basin's water management practices? Perhaps not. While it is recognized that, "Water resources management ... cannot ... ensure socioeconomic development in the absence of ... other conditions" (Cox, 1987), it also is clear that socioeconomic development may be inhibited in the absence of adequate water supplies and good wastewater - including storm water - management. Furthermore, as one source puts it: "In a few decades, unrestrained water demand will outstrip the amount that can be sustainably provided ... Conventional ways of handling ... wastewater are also unsustainable." (Falkenmark, Lundqvist and Widstrand, 1989).

Policy Issues

What then, does a quest for a sustainable socioeconomic future for the ACF Basin imply? What might it require in the way of water resources management? Nothing less, perhaps than a paradigm shift in several important aspects of water resources policy, planning, and operation. Not all, perhaps, can be resolved by the Basin's inhabitants acting alone, for they involve neighboring basins and regions, as well as the nation. They must, however be made a part of the Basin's agenda for change.

Considering first the realm of public policy, several issues are apparent. These include¹⁰, but probably are not limited to:

- ◆ Giving water its legitimate priority among the many competing claims on the region's human and fiscal resources;
- ◆ Controlling the growth of population, commerce, and industry in water scarce or flood prone areas;
- ◆ Lowering population densities in water scarce or flood prone areas, perhaps by encouraging a return to rural living;
- ◆ Requiring and facilitating a bottom-up approach to water resources planning;
- ◆ Requiring that non-structural approaches be the preferred alternatives in planning for water resources management;
- ◆ Requiring that water resources management activities work with nature to the fullest degree possible;
- ◆ Requiring an assessment of risks as a part of all water resources planning;
- ◆ Requiring a full assessment of impacts, adverse and beneficial, for all water management activities;
- ◆ Requiring integration of all water management systems planning and operation into the region's general sustainable development plan;
- ◆ Requiring that water resources management systems be planned and operated to assure the equitable intrabasin and interbasin allocation of the resource;
- ◆ Requiring a standing authority to resolve and/or eliminate detrimental intrabasin and interbasin conflicts;
- ◆ Requiring all water resources planning to consider the conjunctive management of water quantity and water quality, as well as the conjunctive management of surface water and ground water;
- ◆ Requiring that all water resources management systems be equipped to deal with change, be it caused by altered climate, socioeconomic, environmental or other conditions.

In terms of water resources planning and operation, the Basin is faced with two seemingly unanswerable questions as it contemplates a sustainable future. These are:

- How much water will be required tomorrow, next year, and forever?

- How many acres of roofs, highways, parking lots and the like can be allowed if runoff and flood damage is to be adequately controlled?

While unanswerable in a scientific sense, functional answers can be provided for either or both queries *if* they are asked in a slightly different way. Let the question become, for example:

- What future demand levels (or flood control goals) could realistically be met, considering the dependably available quantity of water? (Gleick, 1993).

By definition, these quantities are the sustainable supply (or, the sustainable excess) of water. Established on the availability of water, and the ability to control its movement, these amounts allow a realistic estimate of the Basin's "limits to growth".

Knowledge of the Basin's water related limits to growth would permit its inhabitants to begin a much needed, fact-based debate on four issues:

- What Futures Seem Most Possible?,
- Which of These Possibilities Is Sustainable?,"
- Which of These Sustainable Futures Is Most Desirable?,"
- How Do We Create That Future?.

Basin-wide Water Management Authority

But who should be given the task of determining this sustainable supply (or, excess) of water? And who should lead this debate? A logical candidate for both tasks, one that has had success with similar tasks in other places, is a basin wide water management authority.

In the ACF, such an entity would, by its nature, be primarily an organization of states, having as its core representation from each of the states of the Basin. Because of its long and important role in planning, construction and operations on the Basin's major tributaries, the federal government, as represented by the U.S. Army Corps of Engineers, would also be a logical choice for membership.¹¹ And certainly, each of the major sub-basins of the ACF - as representatives of the communities most effected by its deliberations - should have a place at the table. Other representation could be included as deemed appropriate by its creators.¹²

The members of this entity, other than federal members, might be elected or appointed. Supported by a professional staff, they might *be* the management authority, or they might be limited to making recommendations to higher authority. This body might be given the power of taxation, or be funded from other sources. It might have the power of taking by eminent domain. And, it might have numerous responsibilities, such as data collection, water supply allocation, research coordination, public education and technology transfer. But its primary function, its *raison d'etre*, would be to insure the ongoing, continuous, comprehensive joint management of the Basin's waters.

In fulfillment of this responsibility, this organization would, perforce, begin putting an end to the piecemeal, top-down water management, driven largely by political expediency,

that has existed in the ACF Basin, and most others, for decades. It would put the public directly into the planning and management process, at an early point in the process. In doing so, it would shift more responsibility on to the local public, particularly the land-holding public. And, it might make all parties more accepting of the idea of limits; especially limits on the uses to which lands can be put in order to preserve property values, and prevent or mitigate flood or drought.

In addition to the broad, major water questions noted above, this proposed authority should be required to confront and decide on a host of other Basin water policy, planning and operational issues designed to stretch water supplies, eliminate waste, insure that competition for water use is settled fairly and equitably, and prevent damage from runoff. These might include consideration of:

- * limits on the amount and location of urbanization, industrialization and/or agriculturization;
- * redesignation of beneficial water uses;
- * priorities for water use;
- * allowable water use amounts for priority purposes;
- * prevention or mitigation of climate change, and
- * development and use of new water management regulations and technologies.

The latter would help to:

- * minimize demand, through altered pricing structures, elimination or reordering of priority water uses, elimination of waste, and required conservation measures;
- * maximize supply, through water reclamation, renovation and reuse;
- * require land developers to hold floodwater control and water supply "rights" as a condition for development permits;
- * require developers to use on-site water retaining construction, landscaping and water conservative technologies in home building;
- * require farmers/ranchers to use water saving measure and water holding cultivation technology,
- * minimize or eliminate runoff by increased use of small-scale storage and/or keeping precipitation in place via such non-structural measures as natural or constructed wetlands, green spaces, terracing, no-till agriculture, and land/water banks.

CONCLUSIONS

The ACF Basin, and the rest of the Southeastern U.S., badly needs to get over its historical aversion to planning, and get on with the job of "creating" a bright, sustainable future for itself. Blessed with large, renewable water supplies a moderate climate, a topography that is "flood control friendly" and an abundance of other resources, it should be able to make itself immune to the ravages of drought and flood, alike. A needed catalyst in this effort is an ability to take the

long view, and to act across political borders. An entity designed to help the region in this regard, an interstate agency charged with "minding the store" *vis-a-vis* water resources management has been proposed and described. Involving the public, through a "bottom-up" approach, its major function will be to focus both governmental and private attention on the "need to know" questions regarding regional water policy and its impact on the Basin's future.

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ENDNOTES

1. It should be noted, however, that the past thirty years have seen even this type of water management all but disappear, as budgetary and environmental concerns have taken their toll on benefit-cost ratios.
2. The U.S. Water Resources Planning Act of 1965 (PL 89-80) was an effort to remedy this. Unfortunately, after fifteen years of gradually increasing successes, the Act was gutted in 1980 by being zeroed out of the Reagan Administration budget.
3. Or, as one prominent Congressional Staff member once termed them, "door stops".
4. This is the motto of the Xerox Corporation's Palo Alto Research Center, as reported by Wolkomir, R., "The Chips Are Coming, The Chips Are Coming ...".
5. Except, for example, such incidentals as Social Security, Medicare, Medicaid, agricultural and industrial subsidies, aid to education, public health programs, power production, transportation, navigation and mail delivery.
6. This is considerably higher than the estimated 1990 basin population of 2.636 million, as noted in the USGS Water Resources Investigation Report 93-4084.
7. Indeed, as a nation, we seem to be headed in the opposite direction. Given recent U.S. Supreme Court Decisions, and the recently elected conservative Congress, current and future landowners may encounter fewer restrictions on the use of their property than they have for the past several years.
8. This adjective is not one that would be used in this context by many of the inhabitants of this country's southwestern deserts, where a large portion of the water supply -- much of it used for lawns, golf courses and car washes -- is imported from hundreds of miles away.
9. Because, as Hardin notes so well in his *Filters Against Folly*, externalities or "side effects" are not always, perhaps not even often, considered.
10. E.J. Plate's "Sustainable Water Resources Development" must be credited with several of the policy needs presented here.
11. Because of the interstate nature of the Basin's waters, it seems likely, as well as wise, that the federal government be a party to the creation and the operation of this authority. However, it is also prudent, when considering this point, to remember the Golden Rule of government: "He who has the gold, rules!"
- One of the lessons that came out of the experiment with interstate regional water resources planning agencies such as the Missouri River Basin Commission, is that for the agency to be effective, the states must not be overpowered by the federal government, as the objectives and priorities of the federal agencies are likely to be fundamentally different from thus of the region and the states of the region. To remain assured of their primacy in such an agency, the states cannot allow all federal agencies with some interest in the region's water resources to sit as equals around the meeting table. Likewise, if they are to remain in control of their own waters the states must pay their own way as a part of the regional entity.
12. There are several options for the creation of such a body. They include, among others, petition of the U.S. President by the state governors, pursuant to The Water Resources Planning Act of 1965 (PL 89-80), and petition of the U.S. Congress for the formation of an Interstate Compact agency.