FISH AND WILDLIFE CONCERNS IN MISSISSIPPI'S WATER MANAGEMENT WITH PARTICULAR REFERENCE TO THE UPPER TOMBIGBEE BASIN

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I would like to address the issue of how fish and wildlife resources relate to water management in Mississippi by examining several questions. What is the status of these water related resources? What have been the historical concerns associated with Mississippi's water resources? What new concerns are developing related to these important natural resources of the state? What needs to be done to sustain these resources? Through examination of an emerging water conflict in the Upper Tombigbee Basin, I would like to demonstrate one possible approach toward answering some of these problems.

HISTORICAL PERSPECTIVE

Mississippi's water resources have historically been viewed as abundant. High rainfall and abundant groundwater have been considered among the state's most prominent assets. These abundant water resources provide the base for significant fishery resources in Mississippi's streams, the Mississippi Sound estuarine area, and aquaculture operations developed in the state. Substantial commercial and sport fish industries having values amounting to several hundred million dollars every year are supported by these resources.

Fish and wildlife-related uses have been taking place since the first native Americans inhabited the area. Those people, and the subsequent European settlers that came to Mississippi, relied on fish and shellfish resources for their basic sustenance. These resources were critical to the well-being of the people. Intensive development of Mississippi from the mid-1800's to the mid-1900's drastically affected fish and wildlife resources and the status accorded those resources. During that time, both the resources (in terms of health and abundance) and their status as a public benefit were significantly diminished. As a result, many people began to consider these resources in a different light, more as a "frill" than as a necessity, and certainly of less relative value than other water users such as industry, municipal water supply, and agriculture, to mention just a few. The less abundant resource base in turn leads to more restrictive harvest limitations and seasons. Water pollution was a significant cause of the resource decline. Some streams became grossly polluted, fish kills took place regularly, and after World War II non-point pollutants like pesticides became a problem. Vast areas of Mississippi Sound, encompassing approximately 100,000 acres, were closed to the harvest of shellfish because of contamination. Many of these areas remain closed today.

Corrective actions to address water pollution problems began in the 1950's and 1960's. Federal and state water pollution control laws began to address the problems of point source discharges to Mississippi's waterways, and today many of the chronic problem areas have been cleaned up or substantially improved. At the same time a historically less-recognized problem of non-point pollution sources has started to get attention. Pesticides, herbicides, urban run-off, and other contaminant sources have been recognized as factors contributing significantly to water quality degradation. Some of these sources have been addressed while many have not.

However, another water-related problem began to emerge in the 1970's that is receiving some attention. That is the problem of maintaining adequate streamflow in Mississippi's waterways in the face of increasing demands for surface water resources by the state's populace. Growth of demand in certain areas is already causing conflicts between users or is on the verge of causing such conflicts. Caught in the midst of these struggles are the fish and shellfish resources of the state and their human users. My great fear is that unless these conflicts are dealt with properly and up front, then they will be settled in the same historical pattern I described above, with fish, shellfish, and wildlife relegated to a less important status, subordinate to the needs of industry, agriculture, and municipal water supplies among other things. Such a scenario need not be fulfilled if we properly study, analyze, and plan for use of our water resources.

EMERGING WATER USE CONFLICTS

Two good examples of the emerging conflict are found at opposite ends of the state: (1) the Jackson County-Pascagoula area and (2) northeast Mississippi in the upper Tombigbee basin. The Jackson County area has historically relied on a mix of ground and surface water supplies to meet domestic and industrial needs. As Jackson County has rapidly grown the demands on groundwater have become severe to a point where salt water intrusion has taken place or is feared. Jackson County has quite logically looked at its current surface water source, the Pascagoula River, to obtain additional supplies. It is projected that the withdrawal demand on the Pascagoula River will be such that flows downstream of the county intake will be diminished below the current 7-day/10-year low flow level (7/Q10) on a much greater frequency than has historically taken place. I should note that the Bureau of Land and Water Resources of the Mississippi Department of Natural Resources has quite properly indicated to Jackson County that withdrawal of water from the Pascagoula should not take place when such withdrawals would diminish instream flows downstream of the diversion to less than the 7/Q10 flow. If they choose to pursue this alternative, then Jackson County will be required to provide supplementary water to the Pascagoula River downstream of the diversion.

A point here that deserves some amplification is that while it has been common practice to rely on 7/Q10 flow levels to establish baseline pollutant assimilation flows, little consideration has been given to the water quantity implications to instream fish and shellfish resources. In a competitive situation for water resources, what will be the impact on fish and shellfish if water withdrawals take place causing streamflows to diminish to 7/Q10 levels on a greater frequency than has happened in the past? In my opinion, the result will be a regression to virtually perpetual worst case situations akin to those which depressed fish and shellfish resources when water pollution was widespread. In the case of the Pascagoula River, we have an additional complicating factor of needing to maintain an inflow of freshwater to the valuable Pascagoula estuary to sustain seafood production through maintaining habitat availability. We

cannot determine the impact of sustained recurring 7/Q10 flow events on these coastal resources with our current state of knowledge. This research gap needs to be filled because Mississippi will no doubt at some point face proposals to obtain water from other coastal streams that would reduce flows to 7/Q10 levels at greater frequency than has historically occurred.

The Upper Tombigbee Basin presents a more immediate and critical competitive problem. Shortages exist today and are obviously going to get more acute. Again, groundwater resources have been exploited and now surface water resources are being examined for supply, particularly the East Fork Tombigbee River (East Fork). The City of Tupelo has proposed to withdraw water from the East Fork and others are likely to follow as this region grows. The question again from a fish and wildlife resource standpoint is what are the impacts to stream fish and mussels of reducing flows on a more frequent basis to 7/Q10 levels? Is 7/Q10 flow adequate for maintaining existing natural stream fish populations? Again, we have no solid answers to these questions other than an aversion to possible worst case situations on a regular basis.

ALTERNATIVES TO SOLVE WATER USE CONFLICTS

The Upper Tombigbee Basin is a severely modified watershed that is extremely complex. The construction of the Tennessee-Tombigbee Waterway has added to the complexity of the situation by relocating inflows of tributary streams, constructing impoundments, adding Tennessee River water, and reducing the floodplain of the East Fork by almost one third. Given the substantial modifications and increasing demands for water withdrawal, we have been fortunate in having the combined Corps of Engineers and Soil Conservation Service Tombigbee Basin Land and Water Study underway. The study is being conducted to determine the long range needs of people in the Tombigbee Basin that pertain to use of land and water resources. We have worked with the Corps of Engineers in an effort to use this study to determine the flow levels needed in the East Fork to sustain fish and mussel resources. If successful, this combined effort could serve as a demonstration of comprehensive water management using hydrological, engineering, and biological information instead of more traditional approaches.

In cooperation with the Mobile District Corps of Engineers and the Mississippi Department of Wildlife Conservation, we are in the process of using the Fish and Wildlife Service's Instream Flow Incremental Methodology (Stalnaker and Arnette, 1976) to determine flow needs for fishery resources that could lead to establishment of flow requirements in the East Fork, integrated with operation of the Tennessee-Tombigbee Waterway and water withdrawal needs of users in the basin. The Instream Flow Incremental Methodology was developed by the Fish and Wildlife Service and has been used extensively in the western United States. It has had some limited application in the southeast. The methodology combines hydrological information in terms of water flow, streambed coverage, and depth, together with the biological requirements of the endemic fish and shellfish resources to give an assessment of what any given flow would produce in the way of fish and shellfish resource habitat. It has been demonstrated that under normal circumstances streams will produce a given amount of fish/shellfish at given flows. The methodology can be used to determine optimum-minimum flows and thereby be used to evaluate alternative levels of withdrawal from a watershed. This study has been underway for approximately six months and should be completed in 1989. The information produced by the study should promote consideration of a number of alternatives for any given water supply need beyond those which are cheapest or most convenient.

Drawbacks to the methodology are that it is relatively complex, time-consuming, and can be expensive to use. However, because competition for instream water resources undoubtedly will take place in other areas of Mississippi, if we are going to maintain our fishery resources, we will need to thoroughly evaluate the instream needs of those resources, and give full consideration to alternatives that will minimize damages. Likewise, it is very possible that interbasin water transfers will be examined and a detailed evaluation of the consequences need to be carried out. The Instream Flow Incremental Methodology or other acceptable quantitative techniques should be used to aid in making those decisions. One method offering some considerable promise for use in large parts of Mississippi is the Arkansas method (Filipek, et al., 1987). This method has been used in a neighboring state and addresses many of the particular needs of fishery resources while being sensitive to the hydrological conditions found in the south. It is not extremely complicated and is relatively inexpensive to use. In cases of water use conflicts where quick results are needed and financial resources limited, it can offer an excellent option to more complex and expensive methodologies.

A great deal of progress has been made in water management in Mississippi. New more complex challenges will confront us. Through careful examination of the potential impacts using available techniques, I am confident that we can avoid worst case streamflow situations and capitalize on alternative water supply options.

REFERENCES

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