

WATER MANAGEMENT DISTRICT

Walter Harrison and Chip Morgan
Delta Council
Stoneville, Mississippi

Note: This slide presentation on the formation of a Delta Water Management District was produced by the Delta Council staff for Delta Council's Water Resources Committee. The committee is chaired by Rex Morgan of Indianola. The slide presentation will be shown to the Boards of Supervisors of the 18 Delta and part Delta Counties in Northwest Mississippi in an effort to form a Delta Water Management District. The following is the script from that slide presentation.

The Mississippi Delta is endowed with some of the most abundant ground water resources to serve both agriculture, industry and municipal water supplies of any region in the world.

In the last two decades agricultural and industrial technology has changed, creating increased demands on this natural resource. Rice acreage has dramatically increased, catfish farming has become a leading agricultural enterprise, and cotton and soybean farmers are relying more heavily on irrigation today. Even though research and technology have enabled agricultural use of the Delta's water resources with a much greater emphasis on conservation, the future of American Agriculture is becoming more closely related to the availability of water than ever before. Industries that rely on a reliable source of quality ground water have also chosen the Delta as a site for locations and expansions because of the abundance of availability of this natural resource. In 1978 Delta Council recognized that the Delta's ground water resources for agriculture and industrial purposes, needed to be monitored to determine the relationship between the level of recharge and drawdown on our alluvial aquifer.

By an act of Delta Council and the Mississippi Farm Bureau Federation, a request was made to the U.S. Geological Survey and the Mississippi Department of Natural Resources to initiate a comprehensive hydrology study at more than 500 well sites throughout the entire Northwest Mississippi area.

A number of points should be made about the alluvial aquifer. One is that most towns and cities in the Delta get their municipal water supplies from deeper wells and not from the alluvial aquifer, although it is not unimaginable to forecast that our shallow aquifer may be a potential source of municipal supply, someday. Vicksburg and Eagle Lake are the only exceptions. They get their municipal water supplies from the alluvial aquifer. Another is that the alluvial aquifer is largely charged by hydraulic pressure from a variety of sources. Scientists estimate that the Mississippi River is responsible for 47.5 percent of the recharge to our shallow aquifer. Rainfall, flooded rice fields, catfish ponds, and other small bodies of surface water account for 21.9 percent of the recharge, 20.7 percent comes from the Eastern side of the Delta, or the Bluff-Hill line and other interior streams and lakes account for the remaining 11.7 percent. For this reason, the aquifer level is higher in the spring when the Mississippi River and other sources remain at higher stages resulting in varying degrees of recharge to the aquifer. The Alluvial Aquifer also has

certain physical characteristics that are unique. Many of these characteristics tend to emphasize the need for attention to be focused on the Alluvial Aquifer in a uniform manner. Near the Mississippi River, the aquifer can be reached at shallower depths and the top of the aquifer gets further below the ground surface as it moves eastward toward the center of the Delta. This slide shows a cross section of the Delta with the River on the left and hills on the right. This demonstrates how deep the aquifer is at various points as we travel from west to east.

The aquifer thickness is less at the river and the bluffs than in the geographical middle of the Delta. This physical characteristic is true for the entire length of the Delta. This slide shows a cross section of the Delta with the River on the left and hills on the right. This demonstrates how deep the aquifer is at various points as we travel from west to east.

The aquifer thickness is less at the river and the bluffs than in the geographical middle of the Delta. This physical characteristic is true for the entire length of the Delta. This slide shows the thickness of the aquifer for the entire Delta. Notice how thick it is in the middle and more shallow on the eastern and western fringes of the aquifer.

In the early 1970's use of water from the Alluvial Aquifer in the Delta averaged approximately 200 million gallons per day. By the early 1980's this usage had increased to an average of 1,100 million gallons per day. In 1985 and 1986, this average rate was even higher.

Because of this increased average usage, Delta Council initiated a comprehensive quantitative study of approximately 500 well sites in the Delta. Measurements included the thickness of the aquifer, the amount of water being withdrawn, and a simulated computer model on the effects on projected ground water uses through the remainder of this century.

Data gathered by monitoring these well sites allowed the U.S. Geological Survey to offer us some positive data for future planning.

Based on historical data provided by the U.S. Geological Survey, Delta Council was asked to estimate future demands that might be placed on our groundwater resources under annual minimum average, median average, and maximum average utilization of this resource for its various applications in agriculture, industry, and municipalities.

This slide depicts the simulated drawdown assuming average annual recharge from September 1983, to September 2003, with a pumping rate of 670 million gallons a day, or the estimated minimum use of our ground water resources. As you can see, at this rate the entire Alluvial Aquifer is affected with a drawdown of up to 10 feet. Areas in orange will result in a 10- to 20 foot drawdown and the blue area which is farthest from the points of maximum recharge on the River and bluff-hill line, will see a drawdown greater than 20 feet.

The next scenario is at 1,100 million gallons a day, or the expected median average use in the area. This shows even greater drawdowns

over a wider area. The orange now shows a 10-to-20 foot drawdown, the blue is 20 to 40 feet and the portion of the Delta in green is projected at greater than 40 feet.

At 1,900 million gallons a day, or the estimated maximum average utilization, the drawdown is even more dramatic by the year 2003. The yellow is from 0 to 20 feet, orange from 20 to 40 feet, blue from 40 to 60 feet, and green is greater than 60 feet. In 1985 and 1986, the rate of pumping exceeded the maximum average utilized rate of 1,900 million gallons per day. This next series of slides shows the saturated thickness of the alluvial aquifer at various sites with the same three pumping rates from September, 1983 to September, 2003.

This illustration shows saturated thickness in the aquifer by the year 2003, with a minimum average projected pumping rate of 670 million gallons a day. The yellow area indicates greater than 100 feet of thickness, the orange represents those areas with less than 100 feet and the pink outlines an area with less than 75 feet. The medium average projected usage of 1,100 million gallons per day shows greater reductions in aquifer thickness. The yellow areas have greater than 100 feet of saturated thickness, the orange represents less than 100 feet, and the blue is less than 75 feet. This next slide shows the reduction in thickness at a maximum projected average usage of 1,900 million gallons per day. I would remind you that this is very similar to 1985 and 1986 usage rates. The yellow again is greater than 100 feet in thickness, the orange represents that which is less than 100 feet and the blue is less than 75 feet. Please note the substantial increase in the blue area and the projections that emphasize the aquifer thickness that persists mostly along the Mississippi River and bluff-hill line.

Wells withdrawing water from the Alluvial Aquifer will create a cone of depression. For instance, a well pumping 3,500 gallons per minute for one day will create a cone of depression which will be 25 to 30 feet below the pre-pumping level of the aquifer, while the pump is operating. At the end of a growing season for a crop such as rice, or a major industrial user, the cone of depression will return to pre-pumping levels when operations of the well cease for the year. However, as the aquifer level declines, the cone of depression becomes a more significant factor in such important considerations as location of wells, second-stage pumping and other economic factors.

In 1983, after a three-year study period, the results were presented to Governor William Winter. Governor Winter called on the Legislature to establish the Mississippi Water Management Council consisting of 32 members from across the state. Four Delta Council Board members served on the Mississippi Water Management Council as appointees by Governor Winter.

The Water Management Council was established to review the status of existing laws and determine if further statutory provisions were needed to properly manage and conserve the total water resources of the State of Mississippi.

In 1984, the State Water Management Council presented two Bills before the Mississippi Legislature which were adopted into law by overwhelming margins of support. House Bill 762, which became known as the "Omnibus Water Bill" or General Legislation, provides language to include State groundwater policy with existing surface water laws that have been enforced since 1957.

Basically, the law clarifies and defines State water policy and specifies that all water, whether surface or groundwater, is among the basic resources of the State and is subject to regulations to effectively and efficiently manage, protect, and utilize this resource. Provisions of H.B. 762 require that all surface water and groundwater users obtain a permit within three years of enactment and call for permit renewals every 10 years. Exempt from the permit are domestic users of both surface and groundwater and wells with outside casings of six inches or less.

House Bill 149, is the enabling legislation set up to allow the formation of Water Management Districts in various areas of the State that wish to have input and direction in the management and conservations of their resources. Basically, this legislation allows any

two or more local government units to create a Joint Water Management District for the purposes of establishing a water supply system, conservation of water, the development of additional water resources, or any other water management functions. It also authorizes counties to levy up to two mills on all real property to pay for the district operating expenses and authorizes a competent water management district staff to carry out the Administrative and technical functions of the District.

After enactment of these two bills, efforts immediately began in order to study the formation of Water Management Districts in the Delta, in the Tupelo area and on the Mississippi Gulf Coast. As you can see, the interest in water resources management is not confined to Northwest Mississippi, but fortunately, our area is ahead of others in terms of a well-documented data base. With proper long-range planning and the implementation of sound management and conservation practices, Northwest Mississippi can adequately address its challenges in water resources.

Five regional meetings were held in the Delta during 1985, attracting approximately 750 participants including Boards of Supervisors, Soil Conservation Districts, Farm Bureau representatives, manufacturers, municipal officials, and farm leaders.

A common resolution was adopted requesting that Delta Council initiate action to develop a formal resolution to be presented to the Boards of Supervisors of the Delta and part-Delta counties explaining the need for the Delta Water Management District.

In an attempt to carefully examine the many dimensions and complex nature of establishing the Water Management District for the Delta area, we enlisted the legal counsel of the author of the water laws of 1984 to assist us in formulating a common resolution that would serve the interests of the area, as a whole, and fully subscribe to the intent of the law. Also, we continue to gain valuable input from the State regulatory agencies such as the Mississippi Department of Natural Resources and the Bureau of Land and Water Resources in support of our efforts to form a district. There are several major components of the resolution for formation and the charter of the Water Management District which should be highlighted prior to a thorough review by local governmental officials.

First, it should be noted that the resolution recommends that common boundaries of the district lie within the Yazoo-Mississippi Delta Region consisting of 18 Delta and part-Delta counties in Northwest Mississippi. You will notice that it is recommended that the exact geographical boundaries will be confined to those areas commonly referred to as the Delta because of the geological characteristics that are unique to the surface water and ground water land area that lies between the loess bluffs and the Mississippi River for a distance from the Tennessee State Line to a point north of Vicksburg in Warren County. Geologists and regulatory specialists assure us that it is extremely practical to view the region as one geological water resource region from a water resources evaluation.

The governing body of the Water District will consist of one elected commissioner from each county, since the value placed on water resources in all counties is equal, not to mention the common effect which will be felt by every county in this region if proper management is not applied with a high degree of uniformity in all of the counties collectively and individually. All commissioners will be elected through a public election process provided for in the statutes of House Bill 149.

The scope of responsibility and powers granted to the District result from a formal request from the District to the Mississippi Department of Natural Resources. The Water Management District can seek and the Mississippi Department of Natural Resources is empowered to grant such authorities as reviewing the permitting process, outline water management and conservation plans for the region, insure the appropriate water management and conservation practices that protect the economic outlook of the region, and generally protect the interest of the region from unrealistic and arbitrary standards that may be proposed for future water management in the absence of the

necessary scientific data to support such a proposal. The power to incur debt, enforce eminent domain, initiate the necessary improvement to accommodate a water management plan that is required by provisions in the law, and many other responsibilities are placed on the Commission by House Bill 149. All of these responsibilities are moved from a regional level to the designated state agency if local citizens determine that they would prefer to yield this right of water management to the State Department of Natural Resources. House Bill 762 empowers the Department Of Natural Resources to exercise all enforcement and permitting provisions of the law, if a local district is not formed and granted these authorities at the local level.

Finally, it should also be noted that House Bill 149 proposes that a Water Management District can obtain its funding from the levy of millage, not to exceed two mills, and specifies that this millage can only be utilized for the operation of the district, and not for the construction of projects and water management facilities.

The goals and objectives of this new Water Management District will be to develop plans for use of all water, both ground and surface water, develop a water conservation education program, and develop proposals for communities, manufacturers, and farmers in maintaining current and future water use standards.

At the request of Delta Council, The Corps Of Engineers is conducting a surface water utilization study which will help us evaluate the feasibility of more efficiently using surface waters from our interior streams, the Mississippi River, and area reservoirs for the various purposes needed in the future economic outlook of this area. The study will be partially complete in 1987, and will combine the

dynamics associated with the groundwater alluvial aquifer with the potential use of available surface waters in high-demand areas to attempt to alleviate the drawdown on the groundwater aquifer. The next step in this study will be to develop alternatives where there is insufficient surface water to compensate for the demand on the alluvial aquifer.

The benefits of a water management district are multi-fold and include not only agricultural efficiency but also for the location of new industry in the area. Ample supplies of water are becoming one of the chief incentives in persuading many industries to invest. An excellent example of this is Travenol in Bolivar County, Uncle Ben's in Greenville, Vlastic Pickles, Inc., in Washington County, Mississippi Power and Light Generating Plant in Cleveland, City of Vicksburg, City of Clarksdale Electric Generating Plant, and catfish processing operations in five Northwest Mississippi counties, only to identify a few.

It will be the role of this organization to maintain cooperation and to interact with the State Health Department, the Department of Natural Resources, the Bureau of Air and Water Pollution Control, the Environmental Protection Agency, the Soil and Water Conservation Service, and the Corps of Engineers in efforts to represent the total economic interests of Northwest Mississippi.

The Mississippi Delta's water supply and quality are the most valued resources in the area's future. Through this Delta Water Management District, this resource will be preserved and maintained to assure a continued supply for future generations of economic prosperity for the area.