

ARKANSAS' LOWER WHITE RIVER

A Systems Perspective toward an Ecologically Sustainable River Management Approach

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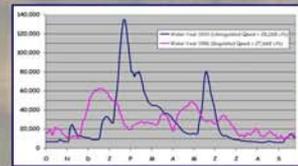
Our Influence to the Basin

The White River, Arkansas, has been extensively manipulated for flood control, navigation, municipal and infrastructure development, and as a water source for irrigation. Projects are planned, authorized, and constructed in the absence of any cohesive or coherent plan for assessing the river's response to the cumulative effect of these actions.



The White River has 7 large flood control and 3 low head dams, and about 150 miles of levees. Approximately 1.5 million cubic yards of sediment are dredged at 22-38 locations annually between River Miles 10 and 254, with an additional 0.5 to 3.5 million cubic yards dredged annually between River Miles 0 and 10.

Flow and Sediment Regime Alterations



Pre and Post Dam Median Flows Comparing Water Years 1930 and 1986.

Flow and sediment regime change alters geomorphic processes, flood frequency and timing, and degrades water quality adversely affecting waterfowl and fish habitat in the lower White River basin.

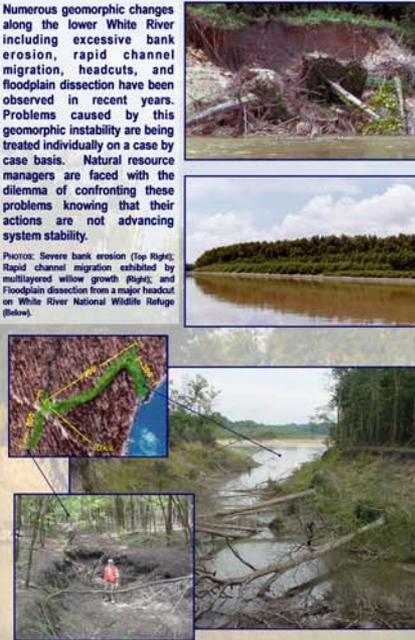


Increased sediment input observed in channelized section of the Cache River, a tributary of the White River.

The River's Response

Numerous geomorphic changes along the lower White River including excessive bank erosion, rapid channel migration, headcuts, and floodplain dissection have been observed in recent years. Problems caused by this geomorphic instability are being treated individually on a case by case basis. Natural resource managers are faced with the dilemma of confronting these problems knowing that their actions are not advancing system stability.

PHOTOS: Severe bank erosion (Top Right); Rapid channel migration exhibited by multilayered willow growth (Right); and Floodplain dissection from a major headcut on White River National Wildlife Refuge (Below).



White River Basin



Management Response (the "Band-aid" Approach)

Natural resource and infrastructure managers along the lower White River deal first hand with the effects of hydrologic and geomorphic change, the direct loss of terrestrial and aquatic habitat including dewatered floodplain lake complexes, collapse and retreat of riverbanks with the associated destruction of bottomland hardwood forest, and loss of in-channel habitat. Similarly, infrastructure managers have been confronted by threats to transportation (i.e., loss of roadways), damage to flood control structures, and destruction of public utility infrastructure.



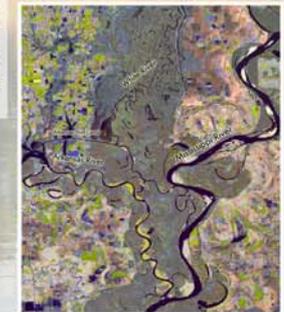
Natural resource and infrastructure managers almost invariably implement the most immediate and obvious "fix" to the problem. Such "fixes", however, focus on the immediate problem, are localized, and are not put into larger system-wide context.

Long Term Solutions

The long-term use of natural resources in an ecologically sustainable manner requires sophisticated approaches to resources management, protection, and regulation. Future river management actions must be accomplished within a framework that provides a comprehensive understanding of system-wide processes and controlling factors, including a diagnosis of alterations and associated impacts. A systems approach to managing the White River is needed if the ecological function of the system is to be protected.

Two such approaches to achieving geomorphic stability are being promoted within the lower White River: TNC's Ecologically Sustainable Water Management (ESWM) and a comprehensive study of the lower portions of the White and Arkansas rivers at their respective confluences with the Mississippi River (Three Rivers Study).

Satellite image of Three Rivers area.



Ecologically Sustainable Water Management (ESWM) Framework

