



# Ecosystem flows defined for Bill Williams River

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The Bill Williams River was one of nine rivers enrolled at the inception of the Sustainable Rivers Project (SRP). The SRP, which started in 2002, is an ongoing nationwide partnership between the U.S. Army Corps of Engineers and The Nature Conservancy to improve the health and life of rivers by changing the operations of Corps dams, while maintaining or enhancing project benefits.

The Bill Williams is certainly unique to the SRP, and perhaps to the United States. A tributary of the Colorado River, the Bill Williams drains a remote area of the Sonoran Desert and adjoining chaparral and forested habitats in western Arizona. Aligned east-west, its watershed is a good precipitation trap for any Pacific storms bold enough to venture into west central Arizona.

Statistically, the Bill Williams is one of the most variable rivers in the United States. Historical peak flows approached or exceeded 100,000 cfs six times between 1916 and 1939 and summer flows routinely fell to near zero levels. Flows in the lower Bill Williams are now regulated by Alamo Dam, a Corps Reservoir Project built in 1968 and operated for water supply, rec-

reation, fish and wildlife, and flood control.

The Bill Williams River corridor contains the last remaining native woodland habitat of any size along the lower Colorado River drainage. Given the historic losses of this habitat – primarily cottonwood-willow and mesquite stands – and the limited ability to restore it along other portions of the Colorado River, the Bill Williams River corridor is disproportionately important for both existing habitat and habitat restoration potential.

“The riparian forest of the Bill Williams is a critical environmental resource for sustaining wildlife in the Southwest. More than 340 bird species have been observed within the Bill Williams River National Wildlife Refuge and for many migratory species the Bill Will is the only hospitable area for many miles,” said Dr. John Hall, Sonoran Desert Program Manager for The Nature Conservancy and member of the Bill Williams Steering Committee.

In March 2005, an ecosystem flow workshop was conducted with the purpose of defining a set of flow requirements for sustaining the long-term health of the Bill Williams River corridor. The workshop was sponsored by the Bill Williams River Corridor Steering Committee (BWRSCC), which is a group of delegates from nine organizations that works to provide a collaborative, science-based framework to inform decision-making for water related efforts on the river system.

“A momentous occasion...over 50 scientists,

engineers, and natural resource managers - representing more than 20 institutions - working together to reach consensus on a set of flow requirements in only two and half days,” said Andrew Hautzinger, U.S. Fish and Wildlife Service and chair of the Steering Committee.

The Bill Williams workshop began with introductory remarks that outlined the purpose and structure of the workshop, expected products, and how the products would be used to guide management decisions.

The remarks were followed by presentations highlighting important aspects of the Bill Williams from different scientific perspectives, including hydrology, geomorphology, fishes, aquatic macroinvertebrates, riparian vegetation, and terrestrial fauna.

Following the presentations, workshop participants were split into three groups tasked with drafting flow requirements – comprised of baseflows and flood flows.

Each specified baseflow and flood flow was defined in terms of magnitude, timing, frequency, duration, and rates of rise and fall. Ecological benefits associated with each “flow component” were also stated, along with key uncertainties regarding whether each specified flow component would achieve its desired ecological benefits.

The three groups were Aquatics, with a focus on fishes and aquatic macroinvertebrates; Riparian System - Birds; and Riparian System - Terrestrial Fauna (other than birds).

After recommendations were developed by the three groups, each was presented in a plenary session. Participants were then tasked with resolving differences between the three biotic-based groups. The process involved tweaking the timing and magnitude of flows recommended in the different groups without sacrificing any ecological purposes of the original flows. The process produced a single unified set of flow requirements for the Bill Williams River.

“These ecological flow requirements will enable modelers and water managers to begin weighing the tradeoffs that would occur if the flows were implemented...and knowing the strategies and uncertainties associated with the flows helps to illustrate relationships between water management and ecology and to point out opportunities for us to learn more about the ecological effects of reservoirs. The ecological flow requirements produced in the workshop are invaluable to planning efforts in the water-



Photo by Andrew Hautzinger, USFWS

The Bill Williams River and floodplain are shown during a time of high release from Alamo Dam. High flows in the Bill Williams are critical for renewing riparian forest and maintaining channel habitat.

shed," said Joe Evelyn, Chief of the Hydrology and Hydraulics Branch in Los Angeles District and a member of the Steering Committee.

Identification of ecosystem flow requirements is a milestone for Sustainable Rivers Projects. Similar workshops have been successfully conducted for the Savannah River in Georgia and South Carolina and Big Cypress Creek-Caddo Lake system in Texas and Louisiana. Water managers in Savannah District have already been able to implement portions of the flow recommen-

dations that were within the bounds of current operations.

For details about Sustainable Rivers work on the Bill Williams, please contact John Hall by email at [john\\_hall@tnc.org](mailto:john_hall@tnc.org), or Joe Evelyn at [joseph.b.evelyn@usace.army.mil](mailto:joseph.b.evelyn@usace.army.mil). For details on ecosystem flow workshops or the Sustainable Rivers Project, contact John Hickey at [john.t.hickey@usace.army.mil](mailto:john.t.hickey@usace.army.mil) or Andy Warner at [awarner@tnc.org](mailto:awarner@tnc.org).

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*Editor's note: This is the second in a series of articles about the Sustainable Rivers Partnership between the U.S. Army Corps of Engineers and The Nature Conservancy.*