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Mission Reach



from **Engineering With Nature: An Atlas, Volume 3.**

by **US Army Engineer Research and Development Center**



San Antonio, Texas, United States

Restoring an urban river's riparian and aquatic ecosystem. Throughout the twentieth century, the San Antonio River was heavily modified to mitigate flooding in downtown San Antonio, largely stripping it of its natural ecological function and productivity. A concerted revitalization effort began when Bexar County, the City of San Antonio (CoSA), and the San Antonio River Authority (River Authority) created the San Antonio River Oversight Committee in 1998. The 13-kilometer Mission Reach Ecosystem Restoration and Recreation Project (Mission Reach) was one component of the resulting program that came to be known as the San Antonio River Improvements Project, a \$384.1 million investment by CoSA, Bexar County, the River Authority, the San Antonio River Foundation, and the U.S. Army Corps of Engineers (USACE). Completed in 2013, the Mission Reach had three goals: flood conveyance, urban ecosystem restoration (resulting in the largest in the country), and community recreation opportunities. To accomplish this, the team restored the natural pool, riffle, and run sequences; reconnected two historical river remnants; restored natural backwater habitats; and restored the native riparian corridor, including

planting over 20,000 young trees. Immediately downstream of the seventh largest city in the country, the Mission Reach is a truly unique amenity where its 500,000-plus annual visitors can see Engineering With Nature in action.

Article Cover: The hike and bike trail, paddling trail, and native flowers a few months before the grand opening. Extensive signage is located throughout the site, discussing the importance of the restorative measures employed and various native species. (Photo by River Authority)

Producing Efficiencies

Historical observations and an extensive network of stream monitoring gauges allowed the project team to evaluate flow conditions in detail prior to design and construction. Knowing the river's flow tendencies through observations and hydrological and hydraulic modeling allowed the team to plan for intense flooding and resulting scouring events. As the river has moved within the project boundaries and additional improvement opportunities have arisen, the team has continued using green infrastructure, including installing toe wood, root wads, and j-hooks to control erosion and provide in-stream habitat. The team eliminated the need for potential future mitigation by disposing of contaminated soils.

Using Natural Processes

Restoration focused on recreating natural riffle, run, and pool sequences and adding embayments for water storage and flood mitigation. The embayments have become much-needed wetland and backwater habitats, capturing sediment from stormwater outfalls and improving water quality through natural filtration processes. Engineered riffle structures aerate the water, providing oxygen for in-stream species and diverting primary flows to encourage smaller microhabitats critical to species like the Guadalupe bass (*Micropterus treculii*). The project also reconnected two historical remnant channels to the main stem, allowing accessibility to these unique habitats that provide further water storage and are home to once-isolated populations of freshwater mussels.





Whispers, a public art installation by Arne Quinze on the west bank of the Mission Reach segment.

(Photo by River Authority)

Broadening Benefits

The Mission Reach was planned, designed, and constructed to provide multiple benefits to an area with tremendous cultural importance; then–Secretary of the Interior Ken Salazar announced support for the project and for the designation of the San Antonio Missions as a UNESCO World Heritage Site. The project channel can contain a 100-year flood event, protecting thousands of residential and commercial properties. Since its opening, more than 200 bird species have been observed at the park, and over five million people have used its trails, pavilions, and picnic areas, providing a major economic boost to an area of town identified as disadvantaged.





Top and bottom: Typical scenes of the project site during construction. A traditional trapezoidal channel design was in place for decades.

(Photos by River Authority)

Promoting Collaboration

The local leaders appointed to the San Antonio River Oversight Committee oversaw project planning, design, management, construction, and funding. The committee also provided a public forum for citizen input during project development. The most significant partner throughout design and construction was USACE, who funded a substantial portion of the project and worked closely with local engineers and scientists to ensure its success. The San Antonio River Foundation, a nonprofit organization committed to preserving and enhancing the San Antonio River basin, incorporated public art installations along the riverbank. This art recognizes the history of the city, its people, and the river.



The project site at dusk. After construction, water quality, habitat, and biological surveys have monitored project performance and documented lessons learned.

(Photo by River Authority)



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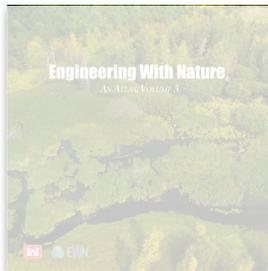


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