

# LIVING RIVER PROJECT

WHAT WE ARE LEARNING ABOUT THE LOWER SANTA CRUZ RIVER



The Lower Santa Cruz River in northwest Tucson and Marana flows year-round and provides the principal wetland habitat in Pima County. River flows are sustained by effluent discharges from two regional facilities that treat and reclaim water from sewage. In December 2013, Pima County completed the largest public works project in Southern Arizona by investing over \$600 million to upgrade the treatment process. Improved treatment affords the opportunity to enhance the aquatic environment along the river, reduce odors, and increase re-use of reclaimed water. The Living River Project aims to track and communicate changes in the river environment that result from these upgrades.

## CHANGES IN WATER QUALITY AND AQUATIC CONDITIONS

- **Ammonia no longer limiting life:** Ammonia, which can be toxic to aquatic organisms, was appreciably reduced to low levels. Nitrate, also at low levels, is now the prevalent nitrogen form.
- **Oxygen availability not a stressor:** Dissolved oxygen, essential for aquatic life, remained at steady levels and well above the problem conditions of past years. Biochemical oxygen demand (an indirect measure of pollutants that use

up oxygen in the water) declined to nearly non-detectable levels, indicating that there is more oxygen available for organisms to thrive.

- **Water clarity much improved:** Elevated levels of suspended solids can increase water temperature and rob water of dissolved oxygen. Suspended solids in the effluent flows greatly decreased, yielding a much clearer flow.
- **More diverse life:** Fish, turtles, and a greater diversity of pollution-sensitive aquatic invertebrates (which include insects, crustaceans, and worms) are being seen in the river.
- **Vegetation changes will be longer term:** No significant changes in herbaceous vegetation along the water's edge. Changes in trees and shrubs will be evaluated next.
- **Urban stormwater a source of pollutants:** Stormwater was sampled in two monsoon flood events upstream of the effluent flows. Besides high concentrations of suspended solids like clay and silt, pollutants in stormwater included organic nitrogen, copper, and selenium.

## EDUCATION/PUBLIC PERCEPTION

- **Reduced odor:** Extent and intensity of odors from treatment facilities have diminished with completion of upgrades. Complaints have decreased significantly.
- **Many kids have never been to a river:** The Living River of Words youth art and science program provided the first contact with a flowing stream for numerous Tucson schoolkids. The Lower Santa Cruz River provided meaningful inspiration for youth art and poetry projects.
- **Easy viewing of flowing water limited:** Although many parks and the Loop trail are close to the river, actual physical access to the river bed and easy visual access to flowing river views is limited.
- **Public knowledge about the river is limited:** Research by the U.S. Environmental Protection Agency found that many people in Tucson were unaware that the river has flowing water today.



Cloudy water, before upgrade



Clear water, after upgrade



## CHANGES IN PHYSICAL CHARACTERISTICS

- **Increased infiltration rates & groundwater recharge:** Groundwater recharge in 2014 has more than doubled over the prior year. Improved water quality reduced the nitrogen and solids that can hinder infiltration. A flood in September 2014 scoured the bed, removing "muck" and further improving infiltration. Increased infiltration means that less water flows downstream and more groundwater recharge credits are accrued.
- **Decreased flow extent:** In the early summer and fall, corresponding with times of highest reclaimed water demand, the river goes dry upstream of Ina Rd and upstream of Trico Rd. These seasonal peaks in irrigation use divert water which would otherwise flow in the river.

## LEARN MORE

For reports and additional information visit [www.tiny.cc/lscr](http://www.tiny.cc/lscr)

## ACKNOWLEDGEMENTS

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### Photo Credits

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