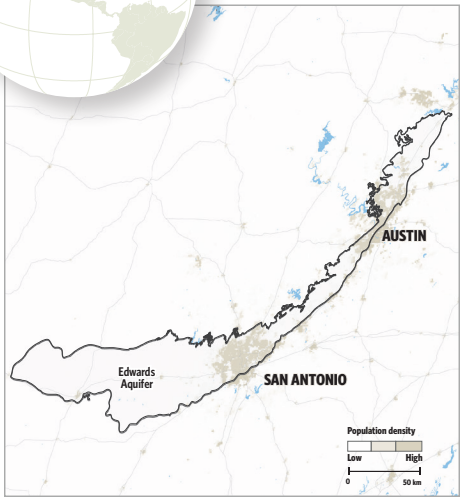
LOCAL SPOTLIGHT

Edwards Aquifer, San Antonio, Texas, United States—Protecting groundwater

Left. Officials release a benign "tracer dye" into Edwards Aquifer drainage systems to chart flows and track the underground water pathways. **Right.** Hydrogeologist descends into a sinkhole to check on the Edwards Aquifer.



The challenge

As one of the largest, most prolific artesian aquifers in the world, the Edwards Aquifer serves as the primary source of drinking water for nearly 2 million central Texans, including every resident of San Antonio—the second largest city in Texas—and much of the surrounding Hill Country. Its waters feed springs, rivers and lakes and sustain diverse plant and animal life, including rare and endangered species. The aquifer supports agricultural, industrial and recreational activities that not only sustain the Texas economy, but also contribute immeasurably to the culture and heritage of the Lone Star State.

The aquifer stretches beneath 12 Texas counties, and the land above it includes several important hydrological areas. Two areas in particular—the drainage area and the recharge zone—replenish the aquifer by "catching" rainwater, which then seeps through fissures, cracks and sinkholes into the porous limestone that dominates the region. While this natural filtration system helps refill the aquifer with high-quality water, the growing city of San Antonio is expanding into territories of the very sensitive recharge zone, increasing the risk of contamination. In addition to a rising population, the state's water supplies have been impacted by multi-year droughts. By 2060, Texas is projected to be home to approximately 50 million people while the annual available water resources are estimated to decrease by nearly 10 percent.

Note: Population data used for all local spotlight locator maps throughout the report are derived from Gridded Population of the World, Version 4 (GPWv4), NASA SEDAC, CIESIN, Columbia University, 2016 and WorldPop data (http://www.worldpop.org.uk/), accessed 30 Oct 2016 through Creative Commons Attribution 4.0 International License.

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Action and opportunity

With careful land management, there is the potential to avoid additional degrading impacts to the aquifer and reduce the need to expand water treatment for San Antonio. Being wholly dependent on an aquifer for drinking water, San Antonio has long understood the importance of its protection. In 2000, voters approved the city's first publicly-financed water fund measure to protect the Edwards Aquifer. The proposition passed with enthusiastic support and authorized US$45 million to purchase properties within the aquifer's most sensitive area. San Antonians have since voted three more times not only to continue the program, but to greatly expand it. The ensuing Edwards Aquifer Protection Program raised a total of US$315 million to protect the Edwards Aquifer in Bexar County, where San Antonio lies, and throughout much of the surrounding regions.

Since 2000, The Nature Conservancy has worked alongside city officials in San Antonio and surrounding communities to ensure these water funds have the greatest impact. To date, the efforts have helped local governments invest more than US$500 million dollars in water protection funds and protect more than 48,562 hectares above the Edwards Aquifer. That area includes 21 percent of the aquifer's recharge zone, its most sensitive area.

Source water protection efforts are expected to produce measurable water quality improvements, reducing risks to this critical drinking water supply. Model simulations indicate that landscape protection efforts may have already resulted in the avoidance of bacteria concentration increases of up to 23 percent, on average, in the streams draining into the recharge zone. Additionally, experts anticipate reductions in nitrogen, phosphorus, lead and zinc levels.

SAN ANTONIO DASHBOARD

Water fund start date	Number of upstream participants to date	Number of potential downstream beneficiaries	Number of partners to date	Primary funding sources	Activities	Anticipated co-benefits
2000	N/A	Between 1,000,000 and 5,000,000	7	Public (User-approved sales tax)		