

Where is the southwest getting all of its water?

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Picture a nation-wide system of pipes and waterways connecting watershed basins all around the country.

There's a reason most major cities are built by water's edge. From energy to [drinking water](#) to sanitation, an abundant supply of water is necessary for the survival of any settlement. But as urban centers have grown, our [water supplies](#) have not, and with more than 15% of the U.S. population considered "at risk" for [water scarcity](#), we are always looking for more efficient and effective ways to move water to the places it's needed most.

Interbasin Transfers (IBTs) are one such way: man-made transfers of water between naturally occurring watershed basins that are used to distribute water resources according to supply and demand. Picture a nation-wide system of pipes and waterways connecting watershed basins all around the country. New York City, for example, imports approximately 90% of its water from the Catskill and Delaware watersheds through the use of IBTs. This water, connected through networks of IBTs throughout the country, is necessary for the city's operation.

However, this national network of has not historically been well mapped, and before now, modern methods have never been used to understand the landscape of IBTs in the U.S. Without this understanding—which is currently severely lacking—we won't be able to meet evolving water demands in the future. But thanks to CEE Ph.D. student Kerim Dickson and Department Head David Dzombak, our knowledge of this IBT network has exponentially increased.

"This is the first inventory of IBTs occurring across the U.S. that's been done since 1985," says Dzombak. "And that one was done by mail survey. But we now have access to water resource databases, such as the U.S. Geological Survey's National Hydrography Dataset, that we have been able to use to compile a much more comprehensive survey than has ever been done before."

The results of the survey allowed Dickson and Dzombak to create a comprehensive map of all of the IBTs in the country. That map demonstrates that there is a lot more water being moved around the U.S. than many would expect—with a few specific hotspots. Florida, Southeast Texas, California, and Arizona have the largest numbers of transfers across watershed basins. This is due to a number of factors, and while population density and climate definitely have something to do with it, Dzombak says the exact reasons require further study.

"Without IBTs, cities wouldn't be sustainable in large sections of the country, such as the southwest," Dzombak says. "Los Angeles, Phoenix—much of their water is brought in from the Colorado River. That's a critical lifeline for the city of Phoenix. These two locations, along with much of the Southwestern U.S., are under pressure from [climate change](#) that is only going to get worse."

Though IBTs have gone largely unstudied, they have been, and continue to be, one of the primary shapers of life in the U.S. Without them, the country would be a very different place.

"This survey helps us understand where the IBTs are," says Dzombak, "which then gives us some ability to look ahead and gain insight. With this understanding, we can start to pose questions like: If the populations in Denver or Phoenix or Houston increase by X, how will that affect the city's ability to acquire enough water? How will that change pressure for bringing water in from elsewhere? You can ask questions about what changes in population, agriculture, and economy will put on different parts of the country for IBT. The work we're doing helps make these kinds of assessments possible."

Climate change will only continue to put strain on the U.S. water supply, by making the dry areas drier and the wet areas wetter. But IBTs have made it possible for cities to thrive in places that would otherwise have

been impossible. As the climate changes, IBTs will be examined by cities to ensure the adequacy of [water](#) supply for these places and their inhabitants.

More information: Dickson, Kerim E. and David A. Dzombak, 2017. Inventory of Interbasin Transfers in the United States. *Journal of the American Water Resources Association (JAWRA)* 53(5):1121-1132. doi.org/10.1111/1752-1688.12561

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