

The Ogallala Aquifer

Information from National Geographic:

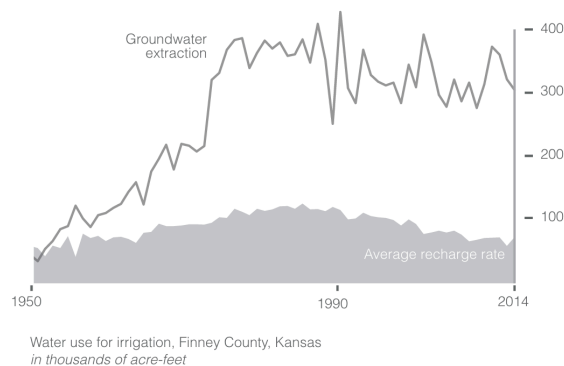
<http://www.nationalgeographic.com/magazine/2016/08/vanishing-aquifer-interactive-map/>



Thirty percent of all water used to irrigate U.S. agriculture is pumped here.

Out of Balance: Mining Water Like Coal

Across western Kansas, water levels in the aquifer have declined in some places by 60 percent. The gap between what is withdrawn for irrigation and what is recharged is significant.



Robbing Peter to Pay Paul

Even in water-rich Nebraska, overpumping the High Plains aquifer, also known as the Ogallala, is a problem. Two-thirds of the Ogallala's water reserves underlie the state, but pumping by thousands of Nebraska farmers has reduced the flow of the Republican River, which is fed in part by groundwater seeping into the streambed. Nebraska, Kansas, and Colorado share the river's waters, based on a 1943 agreement.

In 1998 Kansas sued Nebraska, demanding that Nebraska permanently shut down irrigation on some 300,000 acres of farmland and pay \$80 million for failing to deliver enough water downstream to Kansas. To finally settle the case, four Nebraska groundwater management districts built a six-mile pipeline to transfer water pumped from the aquifer into a tributary of the Republican River to increase stream flow.

The true test of this solution will come in drought years, when groundwater pumping for irrigation increases. Meanwhile, a group of Nebraska farmers downstream from the pipeline sued Nebraska for disrupting water that would normally have flowed to them.

Oasis of Water Conservation: Will It Spread?

In an effort to narrow the gap between water withdrawal and recharge, 70 farmers around the tiny town of Hoxie have done what no political leader in Kansas has dared—they required irrigation be cut back to conserve water. In 2013, the farmers set up a 99-square-mile conservation zone, where they agreed to a 20 percent reduction in irrigation for five years. It is the first such zone in Kansas, and setting it up wasn't easy. "Nobody is willing to stick their neck out," says Mitch Baalman, a fourth-generation farmer and leader of the conservation effort. "We had to change the culture. We took water for granted," he says. "You didn't talk about it. It was a taboo subject, and as we had these meetings and got to talking about it, people said, 'Our wells are dropping off too.'"

The talks lasted three years before the group agreed to the terms and the zone boundaries. "At every meeting, it came up—life's not fair," Baalman says. "That's right. Somebody is always going to be on the line." Jeff Torluemke, a banker and farmer, is on the line. His wheat field lies inside the zone. The cornfield across the road is outside the zone. Torluemke turned off his center-pivot irrigation sprinkler last year on June 4. The sprinkler in his neighbor's cornfield ran until the first week of September. Torluemke wants to conserve the aquifer for future generations. Yet, standing in his field, the view across the road pains him. "It is irritating to me," he says. "I feel no ill will towards the farmer. I feel ill will towards the system. Everyone should be doing what we're doing."

Reindeer farming

Information from *The Economist* at

<http://www.economist.com/news/christmas-specials/21712045-rounding-up-reindeer-feels-coming-home-finlands-reindeer-herders-get-lot>



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But this long relationship may be drawing to a close. Mr Aatsinki is finding it harder to make ends meet. The average herder has lost money for more than a decade and earns less than one-third of a Finnish farmer's average wage. Mr Aatsinki and Ms Korpela both have second jobs. They worry that their children may not continue in the millennia-old tradition.

Today most of Europe's 2m reindeer live in Russia, with another 600,000 split almost evenly across Finland, Norway and Sweden.

In Finland both Sami and ethnic Finns, like Mr Aatsinki and Ms Korpela, herd reindeer. Nomadic herding is no more. Since 1898 Finland has divided the area in which herding is permitted into *paliskunta*, or co-operatives, which today number 54 (see map). At an annual "reindeer parliament" their representatives discuss how to meet Finland's annual reindeer quota, which is meant to avoid overgrazing.

A herder can have no more than 500 reindeer. How many any particular herder has, though, is hard to say. Asking is considered rude, says Ms Korpela—like asking a city-dweller how much he earns. Faced with such affrontery, a herder will be resolutely non-quantitative: “I have reindeer on both sides of the tree,” is the most you are likely to get.

Soil Erosion

Information from the NRCS at

<https://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/technical/nra/nri/?cid=stelprdb1041887>

