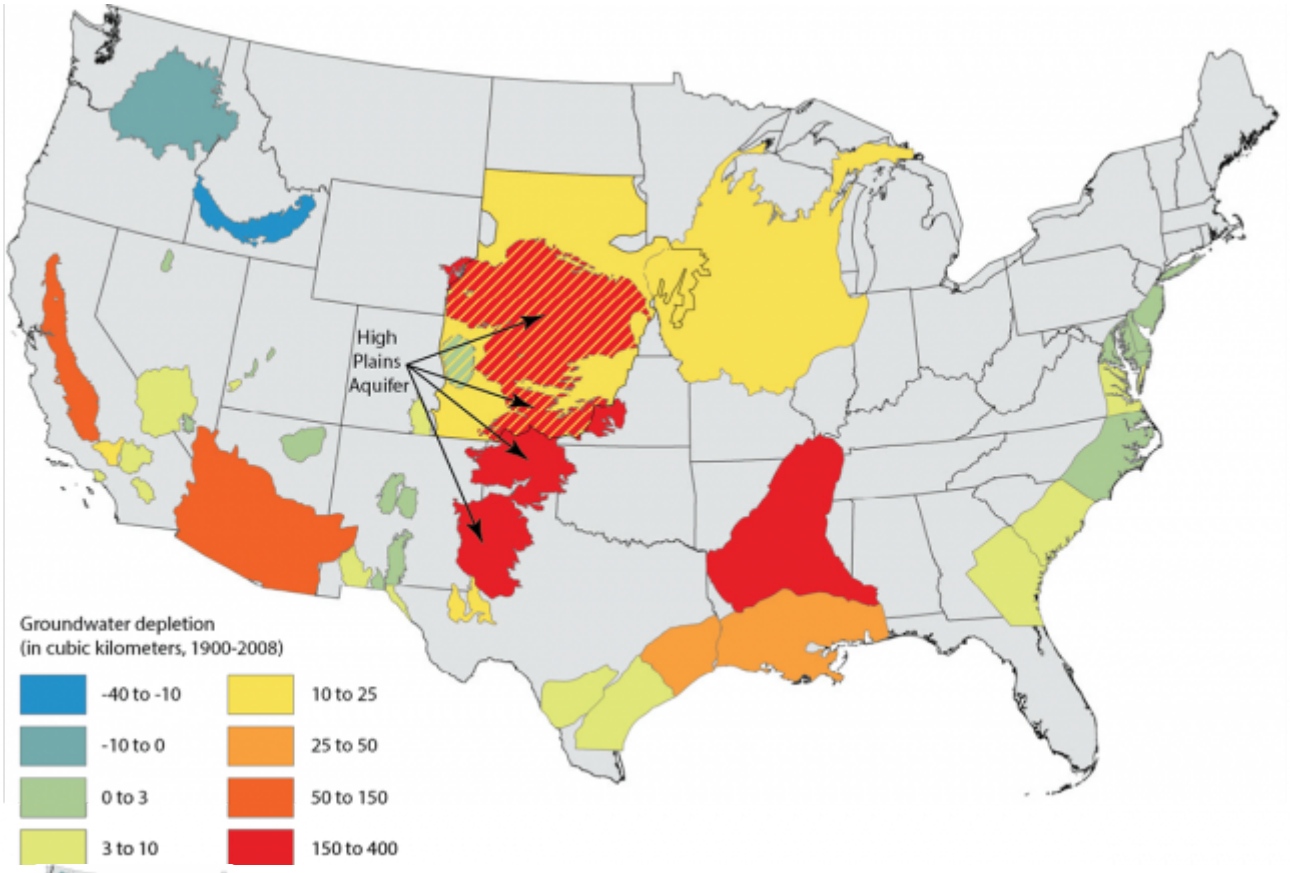
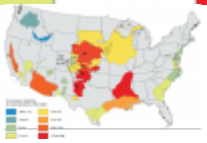
2016 AGI Critical Issues Forum: Final Report



- 

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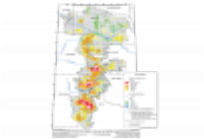
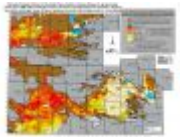
- 
- 

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Addressing Changes in Regional Groundwater Resources: Lessons from the High Plains Aquifer

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Look out the window of an airplane while in flight over the U.S. High Plains and odds are good — particularly during the growing season — that you'll see swaths of green-hued squares and circles standing out amid otherwise dusty brown landscapes. On the ground, these geometric patchworks are clustered fields of farmland and pasture that both provide a living for many of the people who call these regions home and feed much of the country. These verdant patches are made possible mainly by the presence of groundwater, the lifeblood of irrigation systems in the High Plains region.

Widespread use of groundwater for irrigation in the United States emerged in the early- and mid-20th century, with withdrawals growing for decades subsequent as more — and higher capacity — wells were drilled. Access to abundant groundwater allowed farmers to grow more food on more land and to better withstand crop-withering droughts. The ensuing agricultural boom fed a growing U.S. population and fueled increasing national health, prosperity and food security. Today, roughly 11 percent of U.S. cropland is located in the High Plains Aquifer (HPA) region [Figure 1], and the aquifer supplies water for about a quarter of U.S. agricultural production, more than 40 percent of U.S. feedlot beef cattle, and drinking water supplies for 82 percent of the people who live within its boundaries.

But along with the prosperity driven by groundwater have come significant concerns about undesired impacts arising from our reliance on the HPA and other aquifers. In particular, due to heavy use and slow recharge of the aquifers, groundwater levels have declined dramatically in many areas [Figure 1], forcing shifts in agricultural practices, jeopardizing the livelihoods of individuals — and whole towns in some instances — and causing collateral damage to the environment. Concerns over groundwater depletion are not limited to the U.S. — major aquifers in China and India have experienced high levels of depletion, for example. Neither are these concerns new. Domestically, however, recent severe droughts in California and in parts of the High Plains, combined with outlooks based on groundwater monitoring data, have brought renewed attention to the fate of the country's most prominent groundwater supplies.

The American Geosciences Institute (AGI) — with generous support from AGI's Center for Geoscience and Society, the Payne Institute for Earth Resources at the Colorado School of Mines, and AGI member societies, including the Geological Society of America, the American Institute of Professional Geologists, the Association of American State Geologists, the International Association of Hydrogeologists – U.S. National Chapter, the National Association of State Boards of Geology (ASBOG), and the National Ground Water Association — recently convened an open meeting of expert speakers and interested individuals from academia, consulting, professional societies, and local, state and federal agencies to discuss the use, monitoring, and management of groundwater in the United States. The assembled group at this second-ever Critical Issues Forum focused on experiences from the High Plains Aquifer (HPA) region.

The HPA was chosen as the forum emphasis not only because it features prominently in U.S. agriculture and faces significant current and future challenges, but also because — as it extends beneath multiple states — there are a variety of groundwater management practices in use across the High Plains that offer ample opportunities for comparison, information sharing, and learning.

The aim of the forum was to foster open and honest conversation about lessons learned in the region. This report provides an overview of the key lessons and ideas that emerged during the forum, and outlines approaches identified as being potentially beneficial in helping states and municipalities fulfill their own designated groundwater management goals.

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