Why S*&t@!n@bility is Not a Four-letter Word

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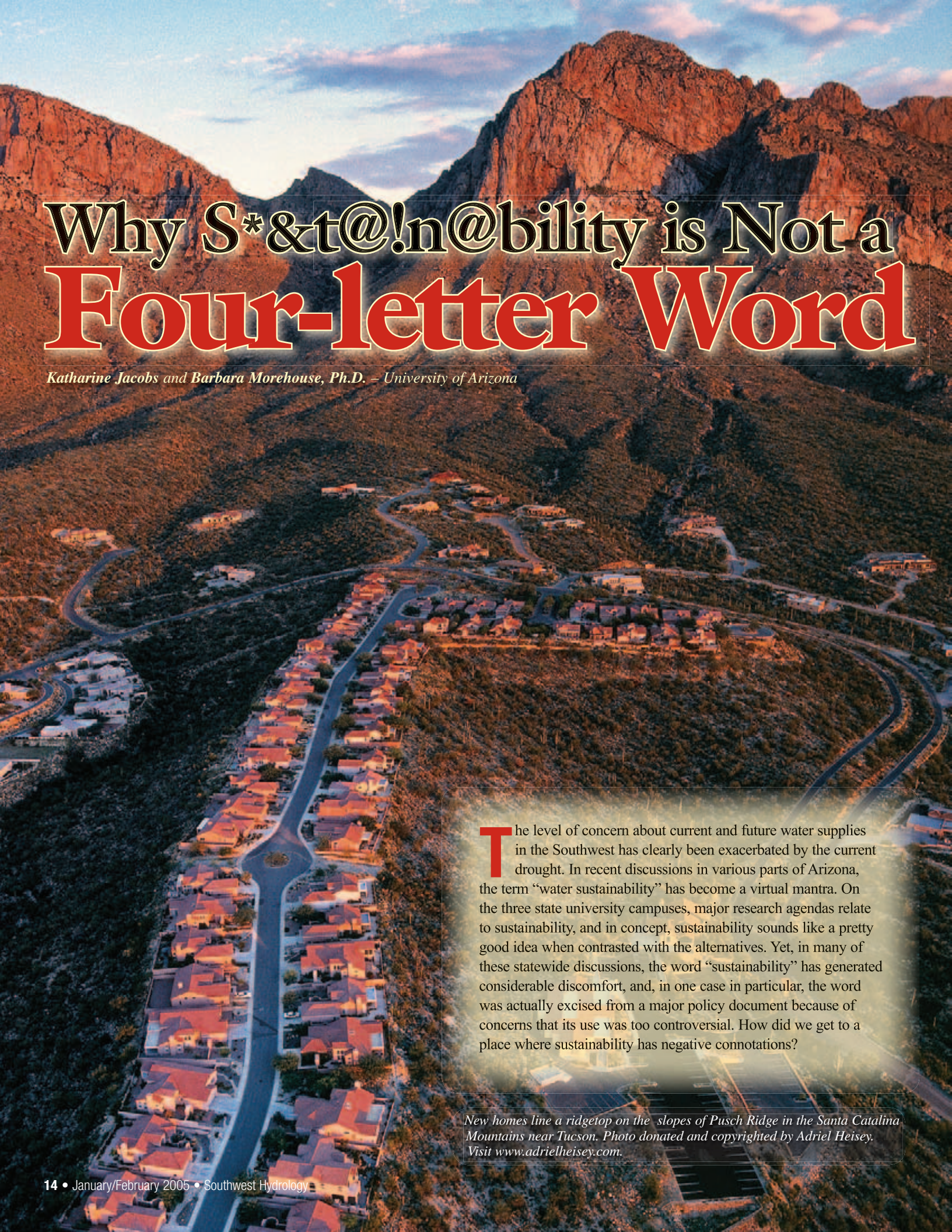

The level of concern about current and future water supplies in the Southwest has clearly been exacerbated by the current drought. In recent discussions in various parts of Arizona, the term "water sustainability" has become a virtual mantra. On the three state university campuses, major research agendas relate to sustainability, and in concept, sustainability sounds like a pretty good idea when contrasted with the alternatives. Yet, in many of these statewide discussions, the word "sustainability" has generated considerable discomfort, and, in one case in particular, the word was actually excised from a major policy document because of concerns that its use was too controversial. How did we get to a place where sustainability has negative connotations?

New homes line a ridgetop on the slopes of Pusch Ridge in the Santa Catalina Mountains near Tucson. Photo donated and copyrighted by Adriel Heisey. Visit www.adrielheisey.com.

"Sustainability" has multiple definitions and is used in multiple contexts. The word has value-laden and political overtones that cause reactions from many quarters. In fact, an Internet search for the term "anti-sustainability" results in 169 hits, some of which are entire Web sites dedicated to defeating the spread of sustainability concepts. How can this be?

Some of the angst is generated by private property rights advocates who are concerned their rights will be restricted in the name of sustainability. Others are concerned that if a policy in support of sustainability includes the sustainability of natural ecosystems, human needs may have to be balanced with those of other organisms. The concept of sustainability has apparently become associated with environmentalism, which is viewed with suspicion by some. An illustrative quote from the Internet:

> "Few seem to understand that environmentalism, hiding behind the mask of noble sounding goals, is in fact socialism with its goal of destroying property rights, the very pillar of capitalism!" (www.americandaily.com/article/1843)

Yet, a broader view may be that preservation of ecosystems and the services they provide is what gives value to private property and our quality of life. Protecting these systems could ultimately be a selfish, not a selfless act. In fact, the most commonly accepted working definition of sustainability, from the Brundtland Commission, is pretty clearly focused on human orientation: "The ability of current generations to meet their needs without compromising the ability of future generations to meet their needs" (World Commission on Environment and Development, 1987).

Water Sustainability

The politics of water touches virtually everyone, from climate change modelers trying to improve their predictions, to farmers growing crops, and ordinary citizens wondering if water shortages will diminish their property values. Ignoring questions about how much water will be available in the future is becoming increasingly difficult. When and how will sevaere, persistent shortages impact communities and livelihoods? Answering these questions demands consideration of the public policy of sustainability: for whom, for how long, and at what price?

In Arizona, the management goal for three of Arizona's five Active Management Areas (Phoenix, Prescott, and Tucson AMAs) is "safe-yield…a water management goal which attempts to achieve and thereafter maintain a long-term balance between the annual amount of groundwater withdrawn in an AMA and the annual amount of natural and artificial recharge in an AMA" (A.R.S. 45-562 A). By contrast "sustainable yield" or "sustainable development," which many hydrologists view as a more comprehensive concept, includes maintaining surface flows that recharge the groundwater and provide water for environmental uses, including maintenance of aquatic and riparian ecosystems and habitats (Alley and Leake, 2004). This broader definition has undeniable implications for water availability for human beings. However, a landscape devoid of flowing water, riparian trees, and wildlife would result in lower property values, reduced revenues from tourism, and a multitude of other negative impacts to private property.

Water Adequacy

The legal concept of adequacy in Arizona is based on availability of sufficient water of adequate quality to support a proposed use for 100 years. Since water of any quality can be treated to meet the water quality needs of any use, sustainability from a water quality perspective is controlled primarily by available financial resources. The 100-year time frame for the quantity calculation is viewed as inadequate by many who are concerned about sustainability in perpetuity. This is a major concern in areas that lack sufficient renewable supplies to support current uses; many areas that have inadequate water supplies continue to grow because no legal mechanisms exist outside of AMAs to ensure even short-term water availability, let alone a 100-year supply.

Scale, Values, and Sustainability

Spatial scale affects the ability to achieve sustainability. For example, Colorado River water that is imported into Arizona is viewed as a "renewable" supply, unlike groundwater, which is sometimes viewed as non-renewable because of the length of time it takes to recharge. However, diverting water from the Colorado River affects sustainability for downstream users and environments. The Colorado Delta environment has changed substantially over time as larger quantities of water have been dammed and diverted upstream, in turn affecting water flows to Mexico and the marine environment in the Gulf of California. The perspective of Arizona's water users may not be sufficiently broad to address the consequences of such diversions.

Adjusting values and expectations is part of the equation; so is enhancing the development and use of science that is relevant, useful, and usable under varying conditions.

Temporal issues also influence the level and nature of water resource sustainability. In some cases deterioration of sustainable water resource conditions may be discerned quite easily and rapidly, as when a surface reservoir level declines, leaving behind a telltale "bathtub ring." Other problems may take decades to be recognized, such as impacts on groundwater supplies from changes in climate or water use patterns. We don't usually know whether the conditions we are observing today are anomalous in the context of a long period of history, or whether we are seeing a steady state that has remained unchanged over the centuries. This argues for making decisions in the context of a longer-term perspective, using whatever data are available to test our understanding.

Changing perceptions and values also affect our ability to achieve sustainability. The case of salt cedar in the riverbeds of the West is a good example. Salt cedar is an exotic species that was once planted along the riverbeds to stabilize the banks during

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