

what happens when the wells run dry?

JAMES BRUGES**Cadillac Desert**

Mark Reisner

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Fly over the prairie states of America and you will see clusters of dark circles like tiny coins on the ground far below. Each circle is a field of crops, half a mile in diameter, irrigated by a rotating arm from a single well. In the past the land's thin grass fed wandering herds of buffalo. Now the grain exports from this area are vital for financing America's imports and are a major contributor to feeding the growing world population. The transformation is a miracle of modern agriculture.

Underneath seven states lies the biggest aquifer in the world. It was created when water from melting glaciers seeped into gravel at the end of the last ice age and has been there ever since. It was found in the 1920s but water extraction only really got under way in the 1960s. Four to six feet are now pumped out each year and nature puts back just half an inch. For how long can this go on? It could last five years, it could last thirty, no one knows.

The farmers of the area once believed that the breadbasket they had developed was too valuable for the country to lose and the government would come to their aid when the waters dried up – the government had, after all, provided many massive water projects elsewhere. So they did nothing to economise when 'putting water to good use'. But their hopes are fading. The dust bowl that devastated the area in the 1930s is likely to return.

While Mark Reisner's authoritative book deals with exploitation of the aquifer, it is largely a detailed history of water projects in the American West. River water that was once lost to the ocean now provides electricity, municipal water for cities and irrigation for agriculture. Desert states like California are habitable only because of these projects. He points out, however, that all but one of the great civilisations of the past which depended on irrigation were ultimately destroyed by salination. Egypt was the sole exception because the Nile's annual flood washed surface salts out to sea – but the Aswan dam has changed that.

No natural water source is entirely pure and if an impervious substrate prevents irrigation water from draining away, the salts it contains will accumulate around the roots of the plants. If, on the other hand, the land is drained, the salts will accumulate in rivers where they are liable to be concentrated by evaporation, especially in dams. This is the reason that the salinity of the Colorado River where it crosses the border into Mexico's most fertile region had become so great by 1973 that it was liquid death to plants and caused an international incident.

80,000 dams were constructed in the US in the 20th century; so many that there is hardly a free-flowing stretch of river left. 2,000 of them are among the biggest engineering projects in the world. Despite the fact that the dams were built with over-capacity, so that the build-up of silt would not seriously reduce water retention during the first 50 to 100 years; some have already been abandoned. In due course the majority of the rest will have to be abandoned too leaving a country of artificial waterfalls in place of rivers.

The construction achievements in the 'can-do' years from 1940s to 1980s were so great that many Americans came to believe that their technology and enterprise could solve all their problems. Having tapped most of their own water, they seriously considered diverting the Yukon river from Alaska or building a massive lake filling much of Canada's uplands. But Canada was not so keen to lose its salmon and white-water rafting!

This eminently readable book is full of fascinating stories and gives an insight into American politics. The two national organisations responsible for water development repeatedly deceived the public, Congress and the Senate; they ignored presidential directives and they frequently acted outside the law. Congressmen voted for political reasons, not through conviction. Many of their projects had little, or negative, value and provided breathtaking examples of creative accounting.

The consequences were dire: salmon, previously a staple food, has been largely eliminated; some of the worst and most predictable ecological disasters the world has ever seen were perpetrated; sustainable farms were flooded and replaced with unsustainable irrigated areas; minority communities were dispossessed with derisory compensation. The staggering cost of the federal water projects means that US agriculture is subsidised on a massive scale – the richest farmers with the richest farmland are in California and 70% of their profits come from water subsidies. Small farmers (and Third World farmers) are undercut and put out of business.

The book shows how big construction and agribusiness controls Congress, milking the federal budget for centralised projects that would have been the envy of any communist dictatorship to the detriment of social programmes. While reading the history of these two organisations with their blinkered interest in water projects, I kept finding parallels with the powerful world organisations which are similarly allied to commercial interests: the IMF, the WTO and the World Bank. Will their myopic interest in free trade also leave a legacy of crippled agriculture, ecology and culture?

The book is a detailed study of how one country is drifting towards a water crisis. It does not suggest solutions, or analyse the consequences to the world of the loss of one of its main grain-growing areas, or suggest how the most powerful country in the world will react.

Mark Reisner, who died in 2000 aged only 51, researched the story for over a decade. Some parts are difficult for those unfamiliar with the US and its history, and this may be why the book has not been published on this side of the Atlantic before. But the detail only makes the conclusions more alarming. There is currently much talk about climate change but at least the extent of that can possibly be contained by a switch to renewable energy sources. Can anything be done about emptied or poisoned aquifers, about silt-filled dams, or about salt-laden soil?

James Bruges is an architect living in Bristol where he is concerned with issues of urban sustainability. His book, *Little Earth*, a wide-ranging guide to the global sustainability crisis and the solutions to it, is reviewed later in this book.



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