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Science, 7th Grade

**THE DUST BOWL**

The most visible evidence of how dry the 1930s became was the dust storm. Tons of topsoil were blown off barren fields and carried in storm clouds for hundreds of miles. Technically, the driest region of the Plains – southeastern Colorado, southwest Kansas and the panhandles of Oklahoma and Texas – became known as the Dust Bowl, and many dust storms started there. But the entire region, and eventually the entire country, was affected.

The Dust Bowl got its name after Black Sunday, April 14, 1935. More and more dust storms had been blowing up in the years leading up to that day. In 1932, 14 dust storms were recorded on the Plains. In 1933, there were 38 storms. By 1934, it was estimated that 100 million acres of farmland had lost all or most of the topsoil to the winds. By April 1935, there had been weeks of dust storms, but the cloud that appeared on the horizon that Sunday was the worst. Winds were clocked at 60 mph. Then it hit.

"The impact is like a shovelful of fine sand flung against the face," Avis D. Carlson wrote in a New Republic article. "People caught in their own yards grope for the doorstep. Cars come to a standstill, for no light in the world can penetrate that swirling murk... We live with the dust, eat it, sleep with it, watch it strip us of possessions and the hope of possessions. It is becoming Real."

The day after Black Sunday, an Associated Press reporter used the term "Dust Bowl" for the first time. "Three little words achingly familiar on the Western farmer's tongue, rule life in the dust bowl of the continent – if it rains." The term stuck and was used by radio reporters and writers, in private letters and public speeches.

In the central and northern plains, dust was everywhere.

Source: <http://www.livinghistoryfarm.org/farminginthe30s/water_02.html>

**The Great Plow-Up**

In the 1910s and 1920s the southern Plains was "the last frontier of agriculture" according to the government, when rising wheat prices, a war in Europe, a series of unusually wet years, and generous federal farm policies created a land boom – the Great Plow-Up that turned 5.2 million acres of thick native grassland into wheat fields. Newcomers rushed in and towns sprang up overnight.As the nation sank into the Depression and wheat prices plummeted from $2 a bushel to 40 cents, farmers responded by tearing up even more prairie sod in hopes of harvesting bumper crops. When prices fell even further, the "suitcase farmers" who had moved in for quick profits simply abandoned their fields. Huge swaths of eight states, from the Dakotas to Texas and New Mexico, where native grasses had evolved over thousands of years to create a delicate equilibrium with the wild weather swings of the Plains, now lay naked and exposed.

**The Dirty Thirties**

Then the drought began. It would last eight straight years. Dust storms, at first considered freaks of nature, became commonplace. Static charges in the air shorted-out automobiles on the road; men avoided shaking hands for fear of shocks that could knock a person to the ground. Huge drifts of dirt buried pastures and barnyards, piled up in front of homesteaders' doors, came in through window cracks and sifted down from ceilings.Some 850 million tons of topsoil blew away in 1935 alone. "Unless something is done," a government report predicted, "the western plains will be as arid as the Arabian desert." The government's response included deploying Civilian Conservation Corps workers to plant shelter belts; encouraging farmers to try new techniques like contour plowing to minimize erosion; establishing conservation districts; and using federal money in the Plains for everything from grasshopper control to outright purchases of failed farms.

**"We Survived"**

In 1944 just as it had thirty years earlier, a war in Europe and the return of a relatively wet weather cycle brought prosperity to the southern Plains. Wheat prices skyrocketed, and harvests were bountiful.In the first five years of the 1940s land devoted to wheat expanded by nearly 3 million acres. The speculators and suitcase farmers returned. Parcels that had sold for $5 an acre during the Dust Bowl now commanded prices of fifty, sixty, sometimes a hundred dollars an acre. Even some of the most marginal lands were put back into production.

**Lessons of the Dust Bowl**

Then, in the early 1950s, the wet cycle ended and a two-year drought replaced it. The storms picked up once more. Bad as the "Filthy Fifties" were, the drought didn't last as long as the "Dirty Thirties." The damage to the land was mitigated by those farmers who continued using conservation techniques. And because nearly four million acres of land had been purchased by the government during the Dust Bowl and permanently restored as national grasslands, the soil didn't blow as much. At least a few lessons had been learned.But now, instead of looking to the skies for rain, many farmers began looking beneath the soil, where they believed a more reliable – and irresistible -- supply of water could be found: the vast Ogallala aquifer, a huge underground reservoir stretching from Nebraska to north Texas, filled with water that had seeped down for centuries after the last Ice Age. With new technology and cheap power from recent natural gas discoveries in the southern Plains, farmers could pump the ancient water up, irrigate their land, and grow other crops like feed corn for cattle and pigs, which requires even more moisture than wheat.

Soource: http://www.pbs.org/kenburns/dustbowl/legacy/

**Geoscientists Predict a Dry, Dusty Future for the American West**

Haboobs walloped Arizona last summer. Locals long ago adopted the Arabic word for a major dust storm, but even old-timers say they can’t remember anything quite like this year’s aerial assaults.One that struck Tucson in July reportedly towered more than 1.6 kilometers in the air, had a 160-kilometer breadth and featured scouring winds of up to 112 kilometers an hour. Phoenix was hit three times, including a haboob in July that topped out at about 1.2 kilometers and stretched 80 kilometers. The massive dust storms knocked out power, grounded flights, caused car accidents and, perhaps most significantly, gave us a glimpse of the potential future of the American West.

Researchers from a variety of disciplines concur on this forecast: Over the next two or three decades, the American West — from West Texas to New Mexico, Arizona, Colorado and on into Southern California, Nevada and Utah — will transition to a climate that may make the 1930s Dust Bowl seem mild and brief.The grim forecast is no simple extrapolation from climate models. Rising temperatures will contribute directly and indirectly to rising dust, but that is only one of many converging causes, both natural and human. Persistent drought, increasingly violent and variable weather, urban and suburban development, off-road recreational vehicles, and even the installation of large-scale solar energy arrays threaten to shroud the West in dust.

The rise in dust, which includes any solid particle small enough to become an aerosol, can’t be ignored. As last summer’s haboobs demonstrated, great volumes of dust can wreak havoc. Worse yet, the composition of today’s dust — which includes industrial pollutants from as far away as China, heavy metals such as mercury and lead, potentially deadly soot from wildfires and a local pestilence known as Valley Fever — poses a threat to public health.

**Dust Rises Up**

To understand why the West is headed for a Dust Bowl future, scientists first need to understand dust itself. Dust has always been part of our environment, explains Jason Neff, a geochemist at the University of Colorado at Boulder. It performs valuable ecosystem chores, such as transporting minerals from barren deserts to the oceans, where they support life.Most of the dust in the West formed through erosion over millions of years in places like the Mojave and Sonoran deserts, and it remained grounded most of the time — until people, with their herds, homes and machines, came along and kicked it up into the atmosphere. Neff says that he and a small band of scholars who study dust had no idea how much influence humans have on the dust “flux” — the volume lofted into the air — until the mid-2000s, when they studied lake sediments in Colorado’s San Juan Mountains, far from any grazing or mining. Through analysis of the sediment composition, they measured the amount of the dust trapped in each annual layer.

What they found was astonishing. From the 1860s to the early 1900s, the dust load of the atmosphere shot up 500 percent. The main reason for the upsurge was cattle. During that period, railcars transported more than 50 million head of cattle to graze out West, Neff says. “Overall, nearly 70 percent of the natural ecosystems of the Western United States have been affected by livestock grazing,” which has resulted in the loss of soil stability and increases in wind erosion of soil, Neff and his colleagues reported in Nature Geoscience in 2008. That, in turn, released great volumes of dust into the atmosphere.

Eventually, the dust settled down again with the passage of the 1934 Taylor Grazing Act, which set restrictions on the use of public lands for grazing, followed by a switch from free-ranging cattle to feedlots. But many experts think the dust flux may be headed for another spike, likely due to a combination of natural and human factors.

Source: http://www.earthmagazine.org/article/return-dust-bowl