

# Lost California rangeland is said to pose greenhouse gas risk

**Edward Ortiz, Sacramento Bee, 12-27-14**

A comprehensive inventory of Central Valley, Sierra foothills and Central Coast rangelands between 1984 and 2008 found that almost half a million acres of rangeland has vanished from California's landscape.

The disappearance of rangelands – the large and open lands synonymous with the West – will make it harder for the state to reach its greenhouse gas emissions goals and may imperil endangered species, scientists say.

State pollution regulators are now looking at whether rangelands should be included in California's cap-and-trade program, which allows businesses to offset their carbon emissions by investing in natural landscapes that trap carbon – such as forests.

The U.S. Department of Agriculture recently announced that General Motors Co. had purchased 40,000 tons of carbon credits from a North Dakota grassland owner. In essence, General Motors will pay the landowner to keep carbon in the ground by not plowing up the grass.

California says carbon permits sell out at auction with Quebec

Rangelands include prairies, grasslands and ranch land, and were once the dominant landscape feature in the Central Valley.

The conversion of rangeland to crops and development was measured in the Central Valley, the Sierra foothills and the Central Coast.

“Those areas cover 80 percent of all the open rangeland in the state,” said Dick Cameron, a conservation scientist with The Nature Conservancy, and author of the inventory.

The inventory established that 20,000 acres of rangeland were lost each year between 1984 and 2008.

Half of the rangeland acreage was changed to residential or commercial uses. Another 40 percent was lost to agricultural use – most of it as orchards and vineyards.

Cameron said that the survey identified land-use changes and matched those to aerial imagery to determine what happened after rangeland was converted.

In the Sacramento Valley, the largest rangeland conversions were for commercial uses or housing development, Cameron said. In the San Joaquin Valley, the largest conversions were to crops.

When rangeland is converted to cropland, the soil becomes exposed and the carbon is released as carbon dioxide.

“As much as half of the carbon in the soil is lost to the atmosphere when grasslands and oak woodlands are converted to things like vineyards,” Cameron said.

He said growing crops as opposed to cattle ranching or other rangeland uses leads to even more emissions because farming demands the use of fertilizer and tractor equipment, both greenhouse gas contributors.

“You're getting conversions to things that have little habitat value and that are also net consumers of

water,” he said.

Under Assembly Bill 32, California’s climate change law, the state has set a goal of reducing greenhouse gas emissions to 1990 levels by 2020. Carbon dioxide is one of the major greenhouse gases.

“Avoiding (rangeland) conversion is going to have an important impact,” said Valerie Eviner, a population biology professor at UC Davis.

A study by UC Davis plant scientist Louise Jackson found that conversion from rangeland to irrigated cropland correlated to a threefold increase in greenhouse gas emissions per unit of land. When rangelands were converted to development that number increased exponentially. Urban areas account for 217 times more greenhouse gas emissions.

The idea of rangelands as a carbon sequestration tool is playing out nationally. The General Motors purchase is the first partnership of private, public and nonprofit organizations of its kind. The purchase – for an undisclosed price – creates a perpetual easement where the owner is allowed to graze or grow hay on the land, but cannot till it or convert it.

The credits allow GM to offset 40,000 tons of greenhouse gas emissions. That’s the equivalent of what 5,000 cars emit yearly.

“This purchase sends a strong signal,” said Adam Chambers, an air-quality scientist with the U.S. Department of Agriculture’s Natural Resources Conservation Service. “It’s the first avoided grassland conversion.”

Chambers hopes that the purchase will be the first of many. “Although 40,000 tons is not going to change the planet’s atmosphere that much, if you stack these projects together, you begin to see real change,” he said.

In California, the carbon-sequestration aspect of rangelands is also being considered for possible carbon offset purchase. The California Air Resources Board has expressed interest in including rangelands in its offset program.

“For our protocols, carbon has to stay in place for 100 years,” said Dave Clegern, spokesman for ARB. “This can be an issue with grassland because the grass itself dies every year and re-releases carbon. Also, grasslands are prone to fire and that’s a heavy release of carbon.”

Some, like UC Berkeley ecology professor Whendee Silver, see soil as an ideal and long-term holder of carbon.

Silver has done research exploring the use of compost as a soil additive.

“Our research has shown increased soil carbon storage and suggests it may stick around for a long time,” she said.

“You get the biggest benefit in the first 30 years, but the effect lasts for about 100 years,” Silver said. “From an ecosystem perspective, that’s pretty long-term.”