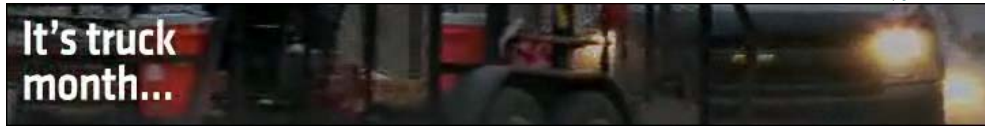


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Environment

Less fog puts redwoods at risk, scientists say

February 16, 2010 | By David Perلمان, Chronicle Science Editor

A gradual decrease in summer fog along the California coast over the past century may be endangering the region's giant redwoods and affecting the ecology of the area surrounding the trees, according to a study by UC Berkeley scientists.

"The redwoods along our coast are highly dependent on fog as a source of water during the summer when water in the ground is scarce," Todd E. Dawson, one of the study's two authors, said in an interview. "Foggy nights are needed to rehydrate the trees that can't tolerate long droughts."

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Mature redwoods are unlikely to die if the decrease in fog persists, he said. But fewer seeds are likely to sprout, take root and grow to maturity.

A report is being published today in the online edition of the Proceedings of the National Academy of Sciences.

Dawson and James A. Johnstone, both of Berkeley's Department of Environmental Science, Policy and Management, analyzed 110 years of temperature records gathered by 114 weather stations along the Pacific Coast, and studied fog levels recorded hourly since 1951 at eight local airports from Oregon to the Mexican border.

Using that information, Johnstone calculated that early in the 20th century the frequency of summer fog was 33 percent greater than it has been in recent decades - which could be enough to pose a significant threat of drought stress, particularly to younger trees.

Redwoods are dependent on cool, humid summers, and without enough days of fog the heat becomes too intense for growth, Johnstone said.

Fewer foggy days

In one comparison of two years, for example, Johnstone found that in 1951 the summer evenings along the redwood coast were free of fog for only 13 out of 122 days, while in 1997 the summer was completely clear of fog for a total of 62 days.

In the interview, Dawson said he is concerned for the trees, but also for the plants and animals that live beneath their canopy and that form part of their ecology.

"Salamanders, worms and many plants like the giant sword ferns that are abundant in the shaded ground beneath the trees all depend on fog drip for their water, and we're concerned that if the loss of fog continues they will all be threatened too," he said.

Dawson and Johnstone are now studying tree ring data from fallen redwoods and using isotopes of carbon and oxygen in the wood to look into the past for evidence of climate conditions that may have affected growth patterns over the past thousand years, Dawson said.

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Three species

The coast redwood region forms a belt about 30 miles wide that stretches about 415 miles from the Oregon border to the Big Sur area in Monterey County. The tallest known tree in the region towers more than 379 feet high, and seedlings can grow at almost a foot a year.

These redwoods - *Sequoia sempervirens* - are an entirely different species from the giant sequoias of the High Sierra (*Sequoiadendron giganteum*) and the dawn redwoods of China (*Metasequoia glyptostroboides*).

Habitat destruction

Although some old-growth forests are protected in parks and reserves, heavy logging and urban development has cut the area where they flourish from about 2 million acres in Gold Rush days to little more than 100,000 acres now, according to the Save the Redwoods League, a conservation and advocacy group based in San Francisco.

The organization and the Berkeley Atmospheric Sciences Center funded the research by Johnstone and Dawson.

E-mail David Perlman at dperlman@sfgate.com.

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