Studies confirm presence, severity of pollution in US national parks

Science Daily

In research performed by an international group of scientists over several years, pollution was found in all eight of the national parks and preserves that were studied, in terrain ranging from the Arctic to southern California. Most of it was caused by regional agriculture or industry, but some had traveled thousands of miles from distant sources in Asia and elsewhere.

The two recent reports, both published in Environmental Science and Technology, reinforce previous research that has identified such problems, scientists say, and better quantify the extent of the concerns.

"As scientists we're getting more used to these pollution problems," said Staci Simonich, an associate professor of environmental and molecular toxicology at Oregon State University, and lead investigator on both studies. "Pesticide pollution is now so routine that we've had to look at museum specimens to find baseline data that existed prior to pesticide use.

"But it still seems surprising that such remote and supposedly pristine areas are not all that pristine," she said. "You never really get used to that. And we're now nailing down just where the real problems are and what is causing them."

The biggest concern, Simonich said, appears to be pesticides, which can bioaccumulate in the ecosystem and food web, and were most often linked to regional agricultural activities. Of the areas studied, the largest problems with pesticides were found in Sequoia, Rocky Mountain and Glacier National Park.

This research did not attempt to evaluate the full scope of environmental impacts, but scientists did observe some disturbing evidence of male fish at some high-elevation locations becoming "feminized" and developing eggs -- a problem more commonly found at the outflow of wastewater treatment plants.

One of the studies also addressed polycyclic aromatic hydrocarbons, or PAHs -- the often-toxic compounds formed from incomplete combustion of fossil fuels, as well as from burning or decay of forests or other biomass. Anything from automobile exhaust to a forest fire or industrial activity can cause PAH emissions. One measurement of PAH concentrations in a sample taken from Glacier National Park, near a local aluminum smelter, were off the charts -- 60,000 times higher than most other samples.

Altogether, the scientists studied pollution issues at alpine, subarctic and arctic sites in Sequoia, Rocky Mountain, Glacier, Olympic, Mt. Rainier, Denali, and Gates of the Arctic National Park and Preserve, and Noatak National Preserve, from 2003-05.

The research should provide a better understanding of the risks, including which pesticides are most likely to accumulate and may require improved regulation.

Among the other findings of the studies:

- Every national park and preserve studied had a somewhat different pollution signature, reflecting localized and regional inputs.
- Most of the pesticide and PAH pollution came from local and regional sources, although some traveled in short-term, episodic pulses from Asia and other very distant locations.
- The comparatively cold temperatures in these alpine or arctic ecosystems tend to concentrate both PAH levels and pesticides.
- The study concluded that "potential risks exist for indigenous people and subsistence food consumers that rely on fish and meat from cold ecosystems."
- Local pollution sources can be very important. One lake in Olympic National Park had PAH deposition 10 times higher than another not far away, possibly because it was closer to Seattle and nearby ship traffic in the Strait of Juan de Fuca.
- Large-scale biomass burning near Glacier National Park seemed much less important in PAH deposition than some nearby aluminum smelting and oil and natural gas drilling operations.
- The majority of pesticide contamination in U.S. national parks is due to regional pesticide use.
- The magnitude of pesticide deposition varies from year to year, but the geographic sources of it generally do not.

This research was supported by various agencies, including the National Institute of Environmental Health Sciences, the EPA, the National Park Service, USDA Forest Service, U.S. Geological Survey and others.

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