



Excessive dust can be hazardous to visitors and vegetation. Last summer, Hagerman National Wildlife Refuge in Texas was the site of the first of at least three new U.S. Geological Survey studies about dust suppression on refuge roads. Left: A passenger car is obscured by dust kicked up by an oil and gas-related truck. Right: Green oak leaves on the refuge are cloaked in white road dust. (Bethany Kunz/U.S. Geological Survey)

Hagerman Refuge, USGS Lead the Way on Dust Suppression

By Bill O'Brian

If you think dust is trivial, talk to Hagerman National Wildlife Refuge manager Kathy Whaley or U.S. Geological Survey biologist Bethany Kunz. Last summer, they oversaw the first of at least three new studies about dust suppression on refuge roads.

“As an ecologist, I have always been interested in conservation biology and questions of how wildlife populations persist in areas that are used by humans,” says Kunz. In five years with the USGS in Missouri, Kunz has studied the effects of chemicals introduced into the environment for management purposes—herbicides, fire retardants and, now, dust suppressants.

“Dust seems inconsequential, but it’s actually a safety concern and a money concern,” she says.

Kunz will tell you that there are more than 150 road dust control products of various chemical compositions on the market—even Elmer’s Glue-like products. “Millions of gallons are being applied,” she says, “and we don’t always have an idea of what they are doing to the environment.”

Kunz will also tell you that “dust costs road managers money,” and that proper dust control can reduce maintenance expenses by minimizing gravel loss,

cutting new gravel cost and decreasing road-blading frequency.

Whaley, the manager at Hagerman Refuge in drought-prone north Texas, will tell you that dust control is important to improve visibility and, therefore, safety for visitors.

“To ensure a high-quality experience, it is imperative that visitors are able to drive and stop their vehicle on wildlife drives to observe birds and wildlife or take photographs without being subjected to severe dust from passing vehicles,” she says.

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Whaley will also tell you that dust can damage often-expensive binoculars and cameras, and that “bicycles and dusty roads do not go together well.”

Both Whaley and Kunz will tell you that heavy dust can harm vegetation. It can inhibit photosynthesis. It can affect the health and appearance of trees, grasses, wetlands and wildflowers. Limestone dust can increase soil pH levels and, thus, foster invasive species.

So last summer, they conducted a study on two stretches of road at the 11,300-acre Hagerman Refuge—one an auto tour route and the other frequented by heavy equipment used in oil and gas extraction. Because environmental safety is of vital importance to National Wildlife Refuge System dust control programs, the study tested three non-toxic products: Dust Stop (a cellulose-based powder); Durablend (magnesium chloride with a bonding polymer added); and EnviroKleen (a biodegradable synthetic fluid with binder).

The goal was to learn which would be the most effective, environmentally safe product for refuge dust control. Other factors, Whaley says, were ease of application, sustainability of the road surface after application, length of time the product remains effective, impact of precipitation on effectiveness, and product cost related to longevity and overall success rate.

From Whaley’s practical perspective, “the Durablend-treated sections of road consistently produced the least dust with passing traffic. From just a dust standpoint, there was a clear winner. However, the results become more complicated when you take into consideration surface condition after traffic use and cost.”

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Studying Water at Kanuti Refuge Is an Icy Proposition — continued from page 1

“maintain the water quality and quantity to conserve fish and wildlife and their habitats in their natural diversity.” The National Wildlife Refuge System Improvement Act of 1997 directs the Service to obtain, under state law, water rights needed to meet refuge purposes.

Flying over Kanuti Refuge, it's clear that water is a main ecological driver. The refuge encompasses more than 70,000 acres of wetlands and waters, including thousands of miles of meandering rivers and streams.

The study's baseline data will be coupled with biological data to quantify the water needed to protect fish and wildlife. That information is needed to file for in-stream water rights to protect refuge waters from potential upstream threats, including oil, gas and mineral exploration and development.

Gathering the data is labor-intensive. During the six-year study, the hydrology staff has made up to seven multi-day trips to Kanuti Refuge annually. Hardison has made about 30 such trips. And the work of a hydrologist doesn't end when the water turns to ice. Winter lasts eight months. Because water flow is critical for overwintering fish, it's important to get an estimate of the flow—or lack of it. For Hardison, this means making the most of limited daylight hours and unpredictable ice conditions.

The first refuge stop today is Holonada Creek. After the helicopter settles onto the tundra, Hardison hauls gear through knee-deep snow down to the creek. He'll spend the next 2½ hours in below-freezing temperatures. He'll

drill 15 eight-inch holes through nine inches of ice with a gas-powered auger. This will enable him to measure the water's depth and velocity beneath the ice as well as pH, specific conductivity, temperature, salinity and dissolved oxygen. He'll also download information from a data logger that records water flow. He'll analyze that data back at the regional office in Anchorage.

His work done at Holonada Creek, Hardison packs up and flies to another of Kanuti Refuge's eight gauging stations. His work continues over two days, despite temperatures that dip to 20-below zero. Soft ice limits work at some sites today, but when Hardison returns in March the ice will be up to six feet thick. When he finds open water on Henshaw Creek, he pulls waders over his insulated flight suit and wades in to measure stream flow.

The work requires persistence. Engines and instruments can become balky. Calibration fluids can freeze up. LCD screens can fog up or blink out. Augers can die; batteries regularly do. Keeping fingers warm requires vigilance.

But the work is rewarding. “You're out there. It's wild. It's untouched,” says



Alaska Region hydrologist Jasper Hardison measures water flow in a creek at Kanuti National Wildlife Refuge. Hardison and three other regional hydrologists are finishing up a six-year study of water resources on the Interior Alaska refuge. (Maureen Clark/USFWS)

Hardison. “Doing something to keep it that way is very satisfying.”

By the time he wraps up the trip, all data-logger information has been collected and all gauging stations have been shut down for winter. Hardison and fellow regional hydrologists will be back in spring to begin a final season of data collection.

“The water resources folks are the unsung heroes of the Refuge System,” says Kanuti Refuge manager Mike Spindler. “Gathering hydrology data is difficult and time consuming, but by securing water rights their work provides lasting value for the refuge.”

Maureen Clark is an Alaska Region public affairs specialist.

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From Kunz's research perspective, all three were successful, but she stresses that “we're not trying to identify one magic-bullet *product*—because it doesn't exist.”

Instead, Kunz says, the USGS studies—which are scheduled to continue at

Squaw Creek and Swan Lake Refuges in Missouri this year and perhaps at Hart Mountain Refuge in Oregon after that—are trying to identify an *approach* to environmentally friendly dust control on refuges nationwide. 🦋

For more information about dust suppression, contact BKunz@usgs.gov or Kathy_Whaley@fws.gov or go to <http://go.usa.gov/W7fP>.



RefugeUpdate

National Wildlife Refuge System

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INSIDE: A roadrunner holding a lizard pauses in Congressionally designated wilderness at Bosque del Apache National Wildlife Refuge in New Mexico. There are 75 wilderness areas on 63 refuges in 25 states, and this year is the 50th anniversary of the Wilderness Act of 1964. See Focus section, beginning on Page 8. (Aaron Drew/USFWS)

Studying Water at Kanuti Refuge Is an Icy Proposition

By Maureen Clark

It's a blustery November morning. Jasper Hardison has been up for hours, checking weather, conferring with his pilot and loading the helicopter that will take him to stream-gauging stations on Kanuti National Wildlife Refuge.

Hardison and three other U.S. Fish and Wildlife Service Alaska Region hydrologists are wrapping up a six-year Kanuti Refuge water resources study.

In the Lower 48, Hardison says, such a study might be 90 percent project work and 10 percent logistics. At 1.6 million-acre Kanuti Refuge, which straddles the Arctic Circle, is roughly the size of Delaware, is roadless and is accessible only by air, "it's exactly the reverse"—90 percent logistics and 10 percent project.

Today in Bettles, AK, Hardison is awaiting sunrise. This time of year daylight is short—5½ hours. He already has lost a day this week to fog. Finally, just before 10 a.m., the sun edges above the southern horizon, the helicopter lifts off, and Hardison is on his way.

His work is fundamental to legally protecting refuge water. Under the 1980 Alaska National Interest Lands Conservation Act, one purpose of Kanuti Refuge is to

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Vision Quickly Becoming Practical Reality

By Bill O'Brian



Conserving the Future: Wildlife Refuges and the Next Generation is rapidly moving from

the theoretical vision phase of the past few years into the practical implementation phase.

U.S. Fish and Wildlife Service employees across the National Wildlife Refuge System should "be on the lookout for the resources that are coming out of the implementation teams," says *Conserving the Future* coordinator Anna Harris. "These products were developed by our colleagues to provide details and direction to sustain healthy wildlife and habitats, and remain relevant in a changing world."

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