

WILDLIFE BIOLOGY

Confused Pelicans May Have Lingered Too Long Up North

When pelicans start showing up in grocery store parking lots, backyards, and on roadways, something is seriously wrong. The large seabirds normally stay close to the shoreline and keep plenty of distance from humans. But in recent weeks, hundreds of disoriented and emaciated brown pelicans have turned up in strange places along the Pacific coast from the Baja peninsula to Washington state, prompting concern for this once-imperiled bird now on the verge of removal from the endangered species list.

More than 460 sick and dead pelicans were reported between 10 December and 14 January, says Rebecca Dmytryk, a spokesperson for the International Bird Rescue Research Center (IBRRC), a nonprofit organization headquartered in Fairfield, California. Although young pelicans often succumb to harsh weather during their first winter, Dmytryk says many of the affected birds are adults.

Brown pelicans have rebounded since the 1960s and '70s, when exposure to DDT and other environmental toxicants pushed some populations to the brink, says Daniel Anderson, an avian ecologist at the University of California, Davis. Both the federal government and the state of California are considering removing the birds from their respective endangered species lists as early as this spring. So far, the current outbreak doesn't seem dire enough to alter that decision, Anderson says, but federal and state agencies are keeping an eye on it.

One early suspect has been domoic acid, a neurotoxin produced by algae that has caused previous outbreaks of neurological problems in birds and other marine animals. But the symptoms don't entirely fit, says Heather Nevill, a veterinarian working with IBRRC. Domoic acid can cause erratic behavior and disorientation, but it also typically causes seizures and a characteristic head-weaving motion—neither of which has been seen in the recent cases.

The timing would also be unusual, because domoic acid toxicity is usually associated with algal blooms in springtime, says microbial ecologist David Caron of the University of Southern California in Los Angeles. Five of 14 water samples collected by Caron's lab in southern California in early January did test positive for the toxin but at very low concentrations. As *Science* went to press late last week, Caron's lab had tested blood and other samples from 18 afflicted pelicans. Four had detectable levels of domoic acid, but only two had levels comparable to those found previously in pelicans with classic symptoms of domoic acid



Lost? Earlier this month, a disoriented pelican ended up in a parking lot in Culver City, California.

toxicity, he says. These preliminary results suggest to Caron that domoic acid could be a contributing factor to the mysterious outbreak but not the primary cause.

Another leading suspect is a sudden cold snap that caught thousands of pelicans that lingered longer than usual at the northern edge of their range. "Twenty years ago, you couldn't find pelicans north of California in November," says Deborah Jaques, a wildlife biologist with Pacific Eco Logic, a consulting firm in Astoria, Oregon, near the Washington border. But the birds have been creeping northward recently, and a mild fall in 2008 may have

enticed them to stay even longer before migrating south. Jaques says several thousand pelicans lingered near Astoria into mid-December, when the first big winter storm made its belated arrival. "This was unprecedented in terms of the numbers of pelicans that were here, how late they were here, and the severity of the storm," Jaques says.

Pelicans fare poorly in subfreezing weather, in part because their feathers aren't completely water-repellent and they need to dry off on land after diving for fish. Temperatures below freezing would have made it harder for the birds to dry off, increasing their risk of hypothermia. The cold could also explain other symptoms Nevill and colleagues have seen in rescued pelicans: lesions on the feet and splotches of discoloration on the neck pouches that look suspiciously like frostbite. She and others think it's possible that the blast of cold may have weakened the pelicans, perhaps impairing their ability to hunt as they made their way south and perhaps making them more susceptible to domoic acid or other hazards they encountered along the way.

Still, the case is far from closed. Necropsies being carried out by the California Department of Fish and Game and the National Wildlife Health Center in Madison, Wisconsin, should provide valuable clues in the coming weeks. "We're keeping our minds open," Nevill says. "We want to make sure we've covered all the bases." —GREG MILLER

AWARDS

Two Americans Win Japan Prize

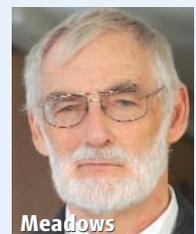
This year's Japan Prize goes to two U.S. academics, one a long-time advocate for sustainability and the other a radiologist who pioneered a standard tool for medical imaging.

Dennis Meadows, a professor emeritus at the University of New Hampshire, Durham, fueled the burgeoning environmental movement with a 1972 paper, *The Limits to Growth*, that highlighted the impact of pollution and the depletion of natural resources on the planet. Meadows, 66, has expanded on that work to advocate for a sustainable society.

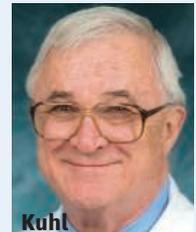
David Kuhl, 79, a professor at the University of Michigan, Ann Arbor, developed a method in the 1950s to image organs and tissues by injecting radioactive isotopes into the body. It became the foundation for positron emission tomography, which has become a standard tool for evaluating tumors and tissue damage inside the brain.

Each year, the Science and Technology Foundation of Japan chooses two fields. This year's categories were for "contributions toward a sustainable society in harmony with nature" and "technological integration of medical science and engineering."

—YUDHIJIT BHATTACHARJEE



Meadows



Kuhl

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