Scientists determine geese involved in Hudson River plane crash were migratory

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US Airways Flight 1549 bird strike to determine not only the species, but also that the Canada geese involved were from a migratory, rather than resident, population. This knowledge is essential for wildlife professionals to develop policies and techniques that will reduce the risk of future collisions. The team's findings are being published in the journal "*Frontiers in Ecology and the Environment*".

The US Airways plane took off from New York's LaGuardia Airport, colliding with a flock of geese approximately 2,900 feet above the ground, extensively damaging both engines five miles from the airport. The pilot was able to conduct an emergency landing in the Hudson River—all 155 people on board survived with few serious injuries. Investigators at the National Transportation Safety Board later sent feathers and tissue extracted from the plane's engines to the Smithsonian in Washington, D.C., for analysis.

Researchers in the Feather Identification Laboratory at the Smithsonian's National Museum of Natural History used molecular genetic techniques and feather samples from museum collections to determine that the birds involved were Canada geese (*Branta canadensis*). This is one of the largest species of birds in North America, and the individual birds involved are estimated to have weighed about 8 pounds.

The next step for the scientists was to find out if these geese were migratory or non-migratory (resident) birds. "Determining whether these birds were migratory or not was critical to our research and will help

inform future methods of reducing bird strikes," said Peter Marra, research scientist at the Smithsonian's Migratory Bird Center located at the National Zoo and lead author of the project's paper. "Resident birds near airports may be managed by population reduction, habitat modification, harassment or removal, but migratory populations require more elaborate techniques in order to monitor bird movements."

The team took their research to a molecular level at the Smithsonian's Museum Conservation Institute labs in Suitland, Md., where they examined stable-hydrogen isotopes from the feathers to confirm whether the geese were from resident or migratory populations. Stable-hydrogen isotope values in feathers can serve as geographic markers since they reflect the types of vegetation in the bird's diet at the time it grew new feathers after molting. Using a mass spectrometer, which measures the masses and relative concentrations of atoms and molecules at high precision, the scientists compared the bird-strike feather samples with samples from migratory Canada geese and from resident geese close to LaGuardia Airport. Analysis revealed that the isotope values of the geese involved in the crash of Flight 1549 were most similar to migratory Canada geese from the Labrador region and significantly different from resident feathers collected in New York City.

"It is important to not only know what species of birds are involved in collisions, but to also understand the role that migration plays in the larger picture," said Carla Dove, program director at Feather Identification Laboratory. "The more information we are able to gather in cases like this, the more we will be able to reduce the risks of bird strikes in the future."

Although reporting bird strikes is not currently required by the Federal Aviation Administration, it is critical for researchers, according to Marra. "Knowing the frequency and timing of collisions is important," he said. "Otherwise we are missing valuable information that could

reveal patterns of frequency, location and species involved." Integrating this information with bird migration patterns and existing wildlife mitigation programs at airports could minimize the risk of collisions with birds.

Ultimately, the team's research demonstrated how molecular genetic tools and stable-hydrogen isotope analyses can be applied in a forensic fashion to provide essential, detailed data on the species involved and their geographic origin—information that is essential to develop strategies to avoid such human-wildlife conflicts in the future. Aviation is not the only field that may benefit from this type of scientific research, however. The team believes their methods could also be applied when birds (and bats) strike and are killed by cell-phone towers, wind turbines, buildings and oil platforms.

Source: Smithsonian (news : web)

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