

Hit or miss: Collisions affect raptors on a global scale

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White-tailed Eagles (*Haliaeetus albicilla*) transiting a wind farm in west-central Norway. Credit: T. Katzner

What do windows, vehicles, power lines, fences, communication towers, wind turbines, and airfields all have in common? They block the flight

path of raptors—sometimes with fatal consequences.

According to a new Conservation Letter [published](#) in the *Journal of Raptor Research*, collisions pose a conservation threat to [raptors](#) globally. While there is much to learn about population-level effects, it is clear from rehabilitation and veterinary records that collisions are a common issue for these winged top predators in rural, suburban, and urban settings. Solutions exist, but their efficacy relies on support and innovation across industries.

In their letter, "Raptor Collisions in Built Environments," lead author Heather Bullock and co-authors call these obstacles "built environments," and define them as "landscapes modified by humans, including structures and infrastructure systems." Unfortunately, raptors are drawn to a number of these structures, either for perches, nesting sites, or hunting habitats. Incidents of collision have increased significantly for raptors since the 1900s, as human-driven development has bloomed at staggering scales and altered countless tracts of habitat that birds used to traverse without collision risk.



Crested Caracaras (*Caracara cheriway*) foraging on a vehicle-struck mammal along a road edge in southern Florida, U.S.. foraging on a vehicle-struck mammal along a road edge in southern Florida, U.S.. Credit: J. Dwyer

Bullock and her team conducted a literature review to provide a birds-eye-view of how collisions impact raptors, as well as offer potential solutions and directions for future research. In their letter, they identify vehicles, [wind turbines](#), and windows, as consistently problematic obstacles. They also address structures that are confirmed to impact raptors but are far less studied, such as aircraft, powerlines, communication towers, and fences.

However, not all built environments affect raptors the same way. Vehicle collisions are especially detrimental for owls due to temporary blinding

by headlights. Soaring raptors like eagles and vultures, which rely on updrafts and thermals for efficient flight, are more susceptible to collision with wind turbines. Quick and agile songbird-hunting raptors, like sharp-shinned hawks (*Accipiter striatus*) and Eurasian sparrowhawks (*Accipiter nisus*), are at higher risk for window collisions, especially given the widespread stewardship of backyard bird feeders, which are often stationed close to windows.

Proposed solutions for vehicle collisions include flight diverters, colored flags, management of less attractive habitats next to roadways, and hedging to redirect raptors away from dangerous zones. Wind farm site managers can build away from raptor hotspots, including migration corridors. For window collisions, bird-friendly products like decals can alert birds to the presence of glass. However, most of these methods have only been tested on songbirds, whose flight behaviors are markedly different from their predatory cousins.



Barred Owl (*Strix varia*) impact smear on a window in Kansas, U.S.. Credit: K. Anton

One of the key takeaways from this review is that more research is needed to formulate mitigation strategies that are tailored to raptors, and to better understand population-level effects of [collision](#) fatalities.

Data from rehabilitation centers and veterinary clinics confirm that collisions are responsible for a significant percentage of admitted cases, and those are just the raptors that are discovered prior to death. Those that perish from collisions are rarely reported. Bullock says she hopes this Conservation Letter will help expand public awareness about the scope of these deaths, and "serve as evidence of the need for policies to help protect raptors in increasingly human-dominated landscapes."

She is currently helping lead a more extensive review of raptor rehabilitation admission records with the goal of quantifying the impact of human activities on raptors at a global scale and identifying existing trends across taxonomic groups, regions, and threat statuses.



Golden Eagle (*Aquila chrysaetos*) likely killed by a vehicle collision but lying below a distribution power line, which can also cause collision mortality, in Wyoming, U.S.. Credit: E. Fairbank

"Such a mammoth undertaking has yet to be done," she says, "and we are excited about what this study will reveal and its potential impacts on

raptor conservation worldwide."

Protecting raptors from built environments requires a cooperative effort by the public, policymakers, industry leaders, and conservationists due to the widespread prevalence of human-made structures that put raptors at risk.

This Conservation Letter can be used as a guide to what is known about raptor collisions, action steps to help prevent them, and which topics need further study. As top predators, raptors are key participants in ecosystem health around the world. Collisions are something that collectively, we can reduce—and this will not only strengthen the environment but also allow an impressive group of birds to remain in the sky where they belong.

More information: Heather E. Bullock et al, Conservation Letter: Raptor Collisions in Built Environments, *Journal of Raptor Research* (2024). [DOI: 10.3356/jrr248](https://doi.org/10.3356/jrr248)

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