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How Do Fireworks Harm Wild Birds?

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How Do Fireworks Harm Wild Birds? | @GrrlScientist

Fireworks mean that New Year's Eve can be a dangerous time for birds. Should we try alternatives to blowing stuff up?



Dahlia fireworks at the 2010 Adelaide Skyshow. (Credit: Anthony Cramp / CC BY 2.0) ANTHONY CRAMP VIA A CREATIVE COMMONS LICENSE

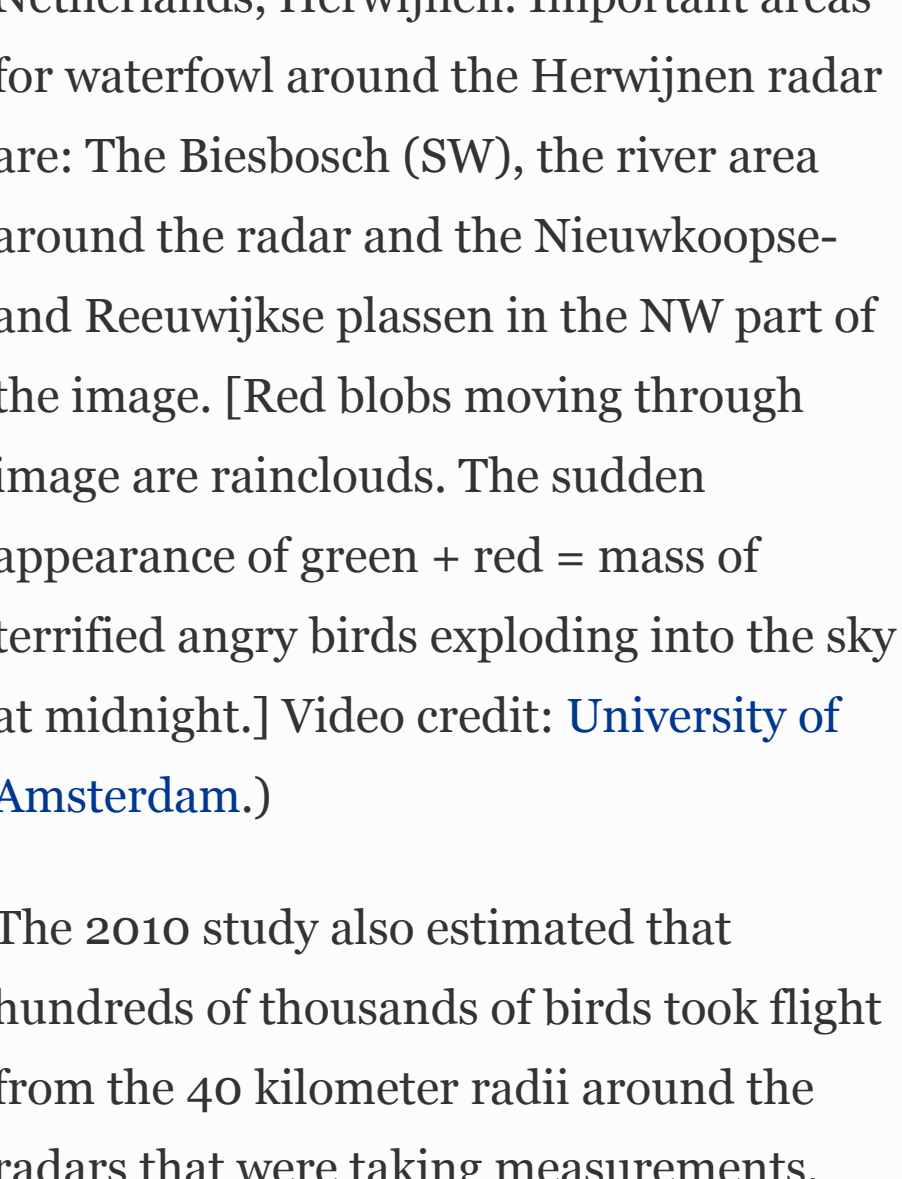
A couple years ago, I wrote about a multi-disciplinary study of how New Year's Eve fireworks displays affect wild birds in the Netherlands (more here), so I'm following up because New Year's Eve is almost here and all across the world, countless numbers of people and thousands of cities are preparing to celebrate with fireworks. Although fireworks' negative impact on public health is at least occasionally the topic of public concern, potential negative impacts on birds and wildlife are rarely considered. What happens to wild birds during a fireworks display? In view that fireworks are often used to disperse wild birds away from airports, it's obvious that birds do not share our fondness for these small exploding missiles.

Fireworks on New Year's Eve and the 4th of July (and other summertime holidays) pose similar, but not identical, problems for wild birds, in particular. In contrast to summertime, when birds are distributed across the landscape, nesting in pairs and living in small family groups, in winter, many wild birds roost in large communal flocks at night. But wild birds' responses to fireworks are difficult to study at night, so little is known about the negative effects that fireworks may have on them. Nevertheless, we've recently learned that when a fireworks display occurs near a wild bird roost, the birds simultaneously explode into the night skies in utter panic (more here), which can lead to huge numbers of deaths, usually because these birds either smash their skulls or break their necks as the result of flying into trees, fences, billboards, houses and other solid objects that they cannot see in the gloom and ensuing chaos. Probably the most infamous example of massive bird deaths after a fireworks display were the 5,000+ dead or dying red-winged blackbirds that rained down from the skies onto the small Arkansas town of Beebe in 2010 (more here), leading some residents to fear an impending apocalypse.

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According to a 2010 study by a multi-disciplinary team of researchers from the Netherlands, when a fireworks display starts, waterfowl erupt into flight en masse from nearby bodies of water and fly to altitudes of 800 metres above the ground (data video & ref; more here). The altitudes reached by these terrified birds were far higher than their local commuter flights, and are comparable to altitudes reached for migratory flights. Further, the fleeing birds remained aloft as long as 45 minutes. The altitude reached and the duration of these birds' midnight flights suggests that fireworks displays are energetically costly and physiologically stressful for birds, and also put the survivors of the original explosive flight in great danger because these birds were forced to find a safe place to roost in the middle of the night.



(Video shows radar tracings of birds exploding into flight as the result of the 2017-2018 NYE public fireworks display near the KNMI weather radar in the Netherlands, Herwijnen. Important areas for waterfowl around the Hertwijnen radar are: The Biesbosch (SW), the river area around the radar and the Nieuwkoopse- and Reeuwijkse plassen in the NW part of the image. [Red blobs moving through image are rainclouds. The sudden appearance of green + red = mass of terrified angry birds exploding into the sky at midnight.] Video credit: University of Amsterdam.)

The 2010 study also estimated that hundreds of thousands of birds took flight from the 40 kilometer radii around the radars that were taking measurements, and when those data were extrapolated to the entire country, it suggested that millions of birds could be similarly disturbed throughout the Netherlands. In view of the larger landmass of the United States, the relative ubiquity of fireworks in America and, considering that the Christmas Bird Count recorded more than 56 million birds in 2016-2017 (more here), the numbers of birds in the United States that are affected by fireworks on this one night of the year becomes truly mind-boggling. It doesn't take much of an imaginative leap to realise that, if these birds are located near an airport, vast numbers of them suddenly becoming airborne can pose a significant threat to aircrafts full of people.

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But birds die from other causes than broken necks or smashed skulls after flying into each other or into stationary objects in their environment. Smoke from fireworks contains a mixture of sulfur-coal compounds, traces of heavy metals, and other toxic chemicals or gases, such as ozone, sulfur dioxide and nitric oxide. These toxins become airborne after fireworks combustion, and create dangerous levels of air and water pollution. Although the effects on wild birds has not been directly studied, a 2010 study found that the toxins and air pollution created by fireworks consistently trigger spikes in human illness and deaths, mostly from respiratory and cardiovascular causes (ref) -- and this is seen in people who remain on the ground, far below the massive clouds of poisonous gases that wild birds are flying around in for 45 minutes. But toxic gases are not the only threat. The casings and other bits left after a firework has detonated or burned end up littering the area with a variety of toxins, where they can poison birds, wildlife and children for a long time after the fireworks themselves have been forgotten.

Wild birds aren't the only ones who freak out as the result of fireworks displays. Domesticated animals and pets also are terrified by fireworks, and have been reported to break leashes, jump fences, and even jump through glass windows in their panic. Despite this, Americans remain enthralled by fireworks. Last year, 285 million pounds of fireworks were detonated, but surprisingly, only 25 million of those pounds were detonated in municipal displays.

There are a few ways to wean the public off fireworks. First, it should be illegal for the public to have or use fireworks. That alone, would reduce fireworks consumption by a whopping 260 million pounds. Instead, large municipal fireworks shows should be more available. This would reduce and contain the disturbances created, contain damages and pollution into a manageable area, and these large municipal displays are far better than any little backyard affair could possibly hope to be, anyway. But an even better idea -- one that I prefer to allowing any use of fireworks at all -- are laser shows accompanied by live music. Laser shows are more affordable than fireworks, less polluting, and are kinder to birds, wildlife and pets.

But unfortunately, most people refuse to make sacrifices for wildlife. For example, in 2008, citizens of the small California town of Gualala filed a lawsuit after town officials banned fireworks without a permit because they caused local seabirds to abandon their nests (more here). After a two-year legal battle, the state Supreme Court ruled in favor of the city's fireworks ban.

It's clear that fireworks are dangerous for birds -- and people. So I ask you: are fireworks really necessary for a good holiday? Should we try alternatives to blowing up stuff?

Source: Judy Shamoun-Baranes, Adriaan M. Dokter, Hans van Gasteren, E. Emiel van Loon, Hidde Leijnse, and Willem Bouten (2011). Birds flee en mass from New Year's Eve fireworks, Behavioral Ecology, 22(6):1173-1177 | doi:10.1093/beheco/arr102

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NOTE: this piece was updated on 1 January 2018 with a new video depicting radar tracings of wild birds reacting to the 2017-2018 New Year's Eve public fireworks display. This update occurred at 1030 GMT, after that newest radar data became available.

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