Busting the Boom: The Unintended Harm from Fireworks

By Joyce Hildebrand

Many of us love the pyrotechnics and body-thumping booms of fireworks. We gaze upwards, often in the company of complete strangers, in awe of the fountains of colour against the blackness of space. A few years ago, I invited friends to join me on the rooftop patio of my apartment building to watch the Canada Day fireworks. I was blissfully blind to the harm that this spectacle inflicts on birds and other animals, including humans, and on the air and water that supports life itself.

But as 2023 collided noisily with 2024, I lay awake feeling the explosions reverberate in my chest and wondering how the birds and beavers in Prince's Island Park and the coyotes on McHugh Bluff were dealing with the sudden ear-splitting racket. The next day, I began looking for answers and discovered that the pleasure we derive from fireworks is profoundly nonaligned with the desires and needs of the web of life.

DOMESTIC ANIMALS

According to the Canadian Animal Health Institute, in 2022 Canadians owned 7.9 million dogs and 8.5 million cats. We love our pets. And many of us have seen their reaction to fireworks. A canine friend of mine scrambles in terror under her human's bed with the first boom, a bed so low that when the cacophony is over, she can't get out on her own. A New Zealand survey of owners reported that 74 percent of companion animals of various species and sizes showed fear responses to fireworks. Many horse owners have noted increased running by horses in response to fireworks, sometimes resulting in fence-breaking and serious injury. In January 2022, CBC reported on a horse who fled in panic when fireworks began in the small town of Canning, NS, and had to be euthanized because of a related injury. Animal shelters report an increase in stray animals after fireworks displays — pets who, in confusion and terror, flee from the deafening blasts and flashes of light, even breaking windows and screens and digging under fences, and then become lost.

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BIRDS AND OTHER WILDLIFE

Most of us living in towns and cities love the wild residents of our urban areas. We thrill at the sight of bobcats in our backyards, porcupines and coyotes in city parks, and songbirds at our feeders. Yet we tend to enjoy the splendour of fireworks with little or no awareness of the high cost to wildlife, who, like our domestic friends, experience fear, stress, disorientation, and panic. Even zoo animals, despite the best efforts of their keepers to protect them, show signs of anxiety and distress when they hear fireworks, according to recent studies. These responses to sudden loud noises aren't surprising: the use of cannons around tailings ponds in the tar sands to keep birds and wildlife away from these toxic lakes shows how sudden noises can frighten animals.

Wild animals are impressively resilient and adaptable in the heart of cities, often changing their activities, locations, and/or timing to avoid human contact. But unpredictable disturbances often lead them to respond as they would to predators — with flight. A 2023 study in the Netherlands found that when fireworks begin, many birds instantly leave their nests and nighttime roosts, flying much higher than they normally would. The researchers found that on New Year's Eve, the number of birds in flight in response to fireworks was about 1,000 times more than the number of birds in flight on other nights. Only at 10 kilometres away from the explosions did the numbers begin to even out.

Fireworks are most damaging at times when wildlife are especially vulnerable to stress, such as during breeding season and while birds are raising their young. Young storks and herons who have not yet learned to fly have been known to jump out of their nests during fireworks displays, becoming easy prey for predators as they are unable to get back to safety.

Because of their limited nighttime vision, many birds crash into power lines, buildings, automobiles, trees, and even each other during fireworks displays. Such high-speed collisions often result in serious injury or death. Fireworks in Beebe, Arizona, as 2011 became 2012 caused huge flocks of red-winged blackbirds to leave their night roosts and collide with each other in their confusion, causing thousands of deaths. Birds need all the energy that they build up from daytime feeding to cope with the challenges they face, and panicked flight,

Smoke from fireworks wafts into the night air during a Calgary Stampede firework display in July 2023.
Photo © A. Tucker

even if it doesn't result in immediate death, can cause weakened immune systems, vulnerability to parasites and disease, and breeding failure. A study in *Environmental Claims Journal* reports that in Valencia, Spain, the breeding success of house sparrows was lower in towns hosting festivals with fireworks than in towns without festivals. During COVID, when no festivals were held anywhere, the breeding success in all the towns equalled out.

As for wild mammals, the little research that exists shows that their lives are also disrupted by fireworks. In California, sea lions and seals were observed leaving their resting places and entering the water when Fourth of July fireworks

began. A study conducted in Chile on sea lions in their breeding season showed that they immediately stopped vocalizing when fireworks began and a significant number left the breeding colony, taking more than a day to return.

Fireworks are very different from thunderstorms for birds and other wildlife. Like many domestic animals, they perceive the warning signs for storms long before the wind and weather arrive, but they have no such warning before the sudden boom of fireworks.

AIR, WATER, AND NOISE POLLUTANTS

A 2020 paper in *Environmental Monitoring and Assessment* describes fireworks as "composed of oxidant and fuel agents and other components such as agglutinants, colouring agents, smoke, and propellants." The chemical reactions of these ingredients produce a fabulous light show, but they also permeate the air with harmful substances such as greenhouse gases, sulfur dioxide, particulate matter, and heavy metals. All present an immediate health risk to humans, including breathing difficulties in those with respiratory issues. In 2020, researchers from the NYU Grossman School of Medicine reported on how fireworks affect human health. They found that two of the 12 common brands of fireworks contained "harmfully high lead levels," and their study detected "high levels of toxic metals lingering in the air" after big celebrations that included fireworks.

Fireworks have been identified as one of the main contributors to perchlorate contamination, a chemical that is a potent thyroid disruptor. Perchlorates have also been implicated in causing reproductive, neurodevelopmental, immunotoxic, and carcinogenic harm. Among the most vulnerable are children, including those still in utero.

Many of these chemicals, as well as the debris from fireworks, enter the soil and leach into groundwater, streams, and rivers. They are then consumed by fish, waterfowl, and other aquatic life, thus entering the food chain and polluting the water and soil on which we, and our non-human kin, depend for life.

In addition to the harm to human and non-human physical health, fireworks impact those who suffer from PTSD. The sudden noise of fireworks can be extremely triggering for veterans, those who have lived in war zones, and anyone who has experienced intense trauma. According to clinical psychologist Leah Blain, "fireworks serve as a very significant reminder of these experiences, PTSD or no. So this really does impact people. It really disrupts sleep. It increases stress."

ALTERNATIVES TO FIREWORKS

"Modern societies," writes philosopher Freya Matthews, "will become environmentally sustainable when they fit into nature." Fitting into nature, she explains, "is a matter of wanting what the biosphere needs us to want" and viewing ourselves as what we are — ecological beings, part of the web of life, with the same constraints and needs as the rest of the living world.

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Human desires, unlike those of the non-human world, are largely created by culture, and many of our wants harm the living world. While the Elders of this planet have long known that we are interconnected with the rest of nature, many of us act contrary to that understanding. What if we lived with an embodied awareness of our ecological selfhood? What would our lives and cultures be like if we aligned our desires with those of the rest of the web of life? What if, as Matthews suggests, we were "to allow the wider life systems to dictate our desires?"

In a world where many of us struggle with a sense of agency, we can start with the low-hanging fruit — small local changes that are easily within our power. Modern alternatives to fireworks, including reusable drones and laser-based light shows, offer safer, greener alternatives. We can maintain our beloved traditions with less harm to people, other animals, air, and water. Some municipalities have taken steps to address the concerns. In 2018, Banff moved to lower-impact pyrotechnic displays, and even these are now on hold as the town searches for alternatives with less impact on wildlife and birds. (One alternative, a friend suggested, would be to turn off all the lights and look upward into the star-filled sky!)

I wrote to the Mayor and Council of Calgary in early January requesting a change to less damaging alternatives to fireworks but received no reply from any of the 15 recipients of my email. Perhaps we — in an expression of care for ourselves, our domestic non-human companions, the wildlife and birds in our parks and backyards, and the more vulnerable humans among us — could support such a move by spreading the word and contacting our elected officials. A barrage of letters, emails, and calls might have some effect.

"The love of place can sustain a life," writes American historian Rebecca Solnit, "and we usually talk as though it's an unreciprocated love." This is wrong, she says. "The places love us back in how they steady and sustain us, teach us, shelter us, guide us, feed us." Botanist Stephen Harrod Buhner tells us, for example, that plants analyze our exhalations, detect signs of ill health, and then produce compounds that will move us toward healing. We can begin to respond to the Earth's love for us by celebrating important occasions in ways that honour the needs and desires of all of the inhabitants of our place.