



# Recommendations for Making Drone Light Shows Bird-Safe: A Report for the NYC Department of Parks & Recreation New York City Audubon, March 2024

## Executive Summary

New York City is critically important to the conservation of birds. More than 400 bird species have been recorded in the city, and each year 15-25 million birds migrate through this urban area. The city also contains the largest nesting population of wading birds in the northeast. Birds play a critical role in a healthy ecosystem, however they are in steep decline: over 1 in 4 birds in North America have been lost since 1970. These declines are due to habitat loss, climate change, predation by cats, and more, but the biggest continuing threats presented by New York City are artificial light at night and collisions with glass.

Drone shows—spectacles of artificial light, often held in otherwise previously dark skies—can be detrimental to birds if not timed or sited correctly. Artificial light at night is attractive and disorienting to birds, pulling them toward brightly lit cities, like New York City, and driving collisions with window glass. Colonial nesting birds, such as those on New York City’s islands and beaches, are at risk from drone shows because of their propensity for disturbance and nest abandonment.

To mitigate these risks and set a precedent for bird-safe practices, New York City Audubon hopes that the NYC Mayor’s Office and City agencies including NYC Parks will implement comprehensive guidelines for timing and siting of drone shows in NYC.

Priority recommendations include:

1. **Avoidance of High-Migration Nights:** During peak migration seasons in NYC (April 1 through May 31, August 15 through November 15), drone shows should not be held during medium or high migration nights over NYC, as forecasted by the bird migration tracking and forecasting tool, [BirdCast](#).
2. **Buffer Zones for Waterbird Nesting:** During waterbird breeding season (May 1 through August 15), drone shows should not be held within a minimum of 1,200 meters (~4,000 ft) from known colonial waterbird or beach nesting shorebird habitat (map included on page 4).

Additional recommendations:

3. **Consultation with NYC Audubon:** NYC Audubon should be notified of any upcoming drone shows with ample time to provide feedback on date, timing, and location.
4. **Scientific Data Collection:** Encourage scientific research by permitting researchers to use thermal cameras three days before, during, and three days after drone shows to understand the relationship between drones and birds, similar to NYC Audubon’s successful partnership established since 2002 with the 9/11 Tribute in Light Memorial.

## **Introduction**

New York City is a biodiversity hot spot, with over 300 species of birds using New York City's habitats, the largest nesting populations of shorebirds and colonial long-legged wading birds in the northeast, and up to 25 million migratory birds passing through the city annually. Birds are often New Yorkers' first connection with nature and urban sustainability, using New York City's parks and greenspaces—many of which are birding hotspots—to enjoy the outdoors. Biodiversity has been linked to ecotourism and economic sustainability with recreational birding generating \$85 billion per year in the United States.<sup>1</sup> According to the Fish and Wildlife Service, birding-related ecotourism generates approximately \$1.6 billion in New York state revenue annually.<sup>2</sup> Birds bring people to city parks and help improve the lives of those who live nearby, with birding improving physical and mental well-being, and these benefits disproportionately help lower-income residents.<sup>3</sup>

However, birds are in decline; over 1 in 4 birds in North America have been lost since 1970 with migratory birds demonstrating the steepest declines. Birds act as pollinators, control pests, stabilize ecosystems, and sequester carbon, but with populations in decline, we risk losing birds as a key component in urban sustainability. These declines are due to habitat loss, climate change, predation by cats, and more,<sup>4,5</sup> but the biggest continuing threats presented by New York City are artificial light at night and collisions with glass.

Increasing the frequency of drone shows in New York City may present another major risk to birds, adding new stressors and exacerbating the negative effects of artificial light at night and building collisions, further threatening bird populations. New York City drone shows must adhere to guidelines in order to not endanger the city's biodiversity treasures.

## **Artificial Light and Migration**

The majority of New York City's migratory birds migrate at night.<sup>6</sup> This should be a time when risk of long-distance flight (due to predation) is lower—but it is now a time when light pollution in urban areas peaks, and birds are in danger. Artificial light at night is attractive and disorienting to birds, pulling them toward brightly lit cities, like New York City, and driving collisions<sup>7,8</sup> with window glass. Artificial light at night is enough of an attraction to birds that the amount of light produced in a city directly correlates with migratory bird stopover densities,<sup>9</sup> concentrating birds in inhospitable landscapes of impervious surface and glass. In New York City alone, as a result of artificial light at night and glass, nearly 250,000 birds are killed annually.<sup>10</sup>

Drone shows are spectacles of artificial light, often held in otherwise previously dark skies, such as Central Park or over the Hudson River<sup>11,12</sup> Leading drone light show providers boast that their drones have “powerful LED lights that can be seen from several miles away.”<sup>13</sup> These colossal displays of moving artificial light are visible to birds and provide a new source of light that can be disorienting or attractive, interrupting night migrating birds, which may be flying from as far away as Brazil or Alaska, only to be disoriented by a drone in New York City.

## **Disrupting Critical Habitat and Nesting Areas**

New York City is home to the largest population of nesting long-legged wading birds in the northeast, with 10 species nesting in mixed-species colonies on islands throughout the harbor. Several species that

nest on these islands, like Black-crowned Night Heron and Glossy Ibis, are protected species in neighboring states (and are being considered for state protections in New York). Similarly, city beaches on the Rockaway Peninsula provide habitat for some of the largest populations of beach nesting American Oystercatcher, federally protected Piping Plover, state protected Least Tern and Common Tern, and Black Skimmer, which are a species of concern.

Small drones (less than 12 inches) are known to disrupt nesting birds if care is not taken to avoid disturbance.<sup>14</sup> Large commercial show drones, such as those used in the Fall 2023 Central Park show, are likely to cause significantly more disturbance to nesting birds because of their size and number. Having a “swarm of 1000 drones”<sup>12</sup> that are large near nesting birds would likely be disruptive enough to result in nest abandonment or deaths of chicks. Colonial nesting birds, such as those on New York City’s islands and beaches, are at high risk of disturbances because the density and proximity of nests may result in simultaneous disturbance to many birds and elicit social cues that lead to abandonment.<sup>7</sup> Predators, which drones are likely to be perceived as, have led to many colonies of these at-risk birds being abandoned, in New York City, like Common Terns on Governors Island and beyond.

### **Guidelines for Bird-safe Drone Shows in New York City**

*NYC Audubon recommends these priority guidelines to NYC Parks and the Mayor’s Office:*

1. During peak migration seasons in NYC (April 1 through May 31, August 15 through November 15), drone shows should not be held during medium or high migration nights over NYC, as forecasted by the bird migration tracking and forecasting tool, [BirdCast](#). This recent innovative technological platform provides real-time predictions of bird migrations using traditional weather radar. BirdCast migration predictions can be treated like weather forecasts, ensuring bird-safe events, and pre-scheduled “rain dates” could be used in place of original dates, if migration predictions are medium or high. Using Birdcast would let public participants know that bird safety has been considered before an event happens. Using BirdCast to avoid impacting migratory birds will be a cutting-edge approach that would be favorably received by conservation organizations and brings more support to the sustainable potential of drone show events.
2. Waterbird breeding season (May 1 through August 15) drone shows should not be held within a minimum of 1,200 meters (~4,000 ft) from known colonial waterbird or beach nesting shorebird habitats, to avoid nest or colony abandonment, especially for state or federally protected species. Figure 1 highlights all known colonial and beach nesting bird locations to avoid with a 1,200 meter (~4,000 ft) buffer.

*Additional recommendations for keeping drone shows bird-safe:*

3. NYC Audubon should be consulted on location and timing of these events to best protect New York City’s wild bird population. NYC Audubon should be notified of any upcoming drone shows with ample time to provide feedback and to communicate to the environmental and birding communities of New York City that, if safe, the drone shows are of little risk to birds.
4. In order to gain a clearer scientific understanding of the exact relationship between drones and birds, and to keep New York City on the forefront of technology and science, NYC Audubon recommends allowing researchers with thermal cameras to collect data three days before, during, and three days after drone shows. This would be similar to our partnership since 2002 with the

9/11 Tribute in Light Memorial: in cooperation with the sponsors, we monitor the National September 11 Memorial & Museum Tribute in Light to prevent migrating birds from coming to harm and to advance our understanding of the influence of artificial light at night on birds.<sup>15</sup>

## **Conclusion**

Drone shows—though an exciting, new phenomenon for New Yorkers— can be a threat to New York City’s wild birds if not properly sited or timed. Dazzling spectacles of artificial light can disorient and lead to the death of migratory birds and cause sensitive beach or colonial nesting species to abandon nests. With global bird populations in decline, it is crucial that the City of New York does everything it can to protect the more than 300 species of birds that use it, the 25 million birds that pass through it, and the rare species that nest within it. Doing so will establish New York City as the first in the nation to develop bird-safe protocol for drone shows and as a model for bird-safe cities globally. Drones can be engaging public art displays but to be truly successful, they must not harm the birds with which New Yorkers share the city.

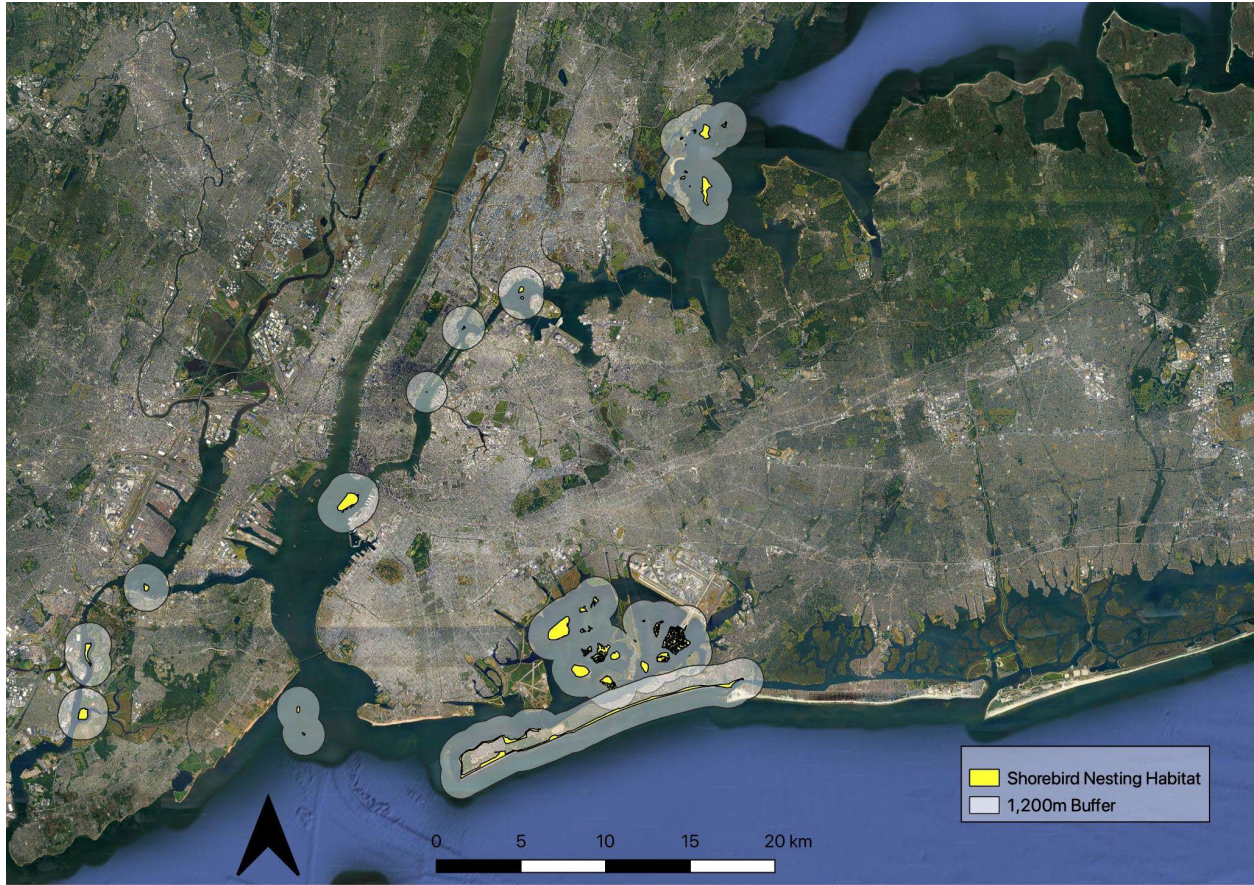
## **About New York City Audubon**

NYC Audubon, established in 1979, is an independent grassroots community with 10,000 members that works for the protection of wild birds and habitat in the five boroughs of New York City for the benefit of all New Yorkers. More info at [www.nycaudubon.org](http://www.nycaudubon.org).

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**Figure 1.** Map of known threatened and colonial nesting bird habitats in New York City with 1,200m (~4,000 ft) buffers. It is recommended that drone light shows should not be held within these areas during waterbird breeding season. *Source: NYC Audubon*

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