

settings, including proximity to migratory bird flyways; different lighting systems; and different tower structures, including the use of guy wires? Have studies used Geographic Information Systems (GIS), radar, acoustical monitoring, or other methods to assess migratory bird presence, help conduct risk assessments, and determine high bird density areas or areas of critical importance to birds? On the other hand, is it necessary for research to examine different towers in order to reflect these and other variables? For example, does a study that is conducted at a single location over a long period of time provide reliable scientific results for the Commission to use to propose changes in its rules and processes, or is it necessary for numerous towers at different locations to be studied?

16. We also seek comment on whether the research included effective protocols to account for the actual numbers of birds killed at specific towers. Specifically, did the research employ standard metrics to count dead birds at individual towers in order to provide a uniform analysis of results from all towers for comparative purposes, or was some other method used? How often and at what times of day were searches conducted, and what other methods were used to promote searcher efficiency and control scavenger removal (*e.g.*, clearing of areas around the base of the tower or use of netting)? Comments should also address any other measures that were or were not used to account or control for other relevant variables, such as whether efforts were made to reduce lighting located near but not on the towers that otherwise could attract migratory birds. We seek a critical analysis of the research, which examines both the adequacies and inadequacies of the research, its methodologies, findings, and conclusions.

1. Tower Lighting

17. Lighting may be an important factor in attracting and/or disorienting migratory birds at communications towers. Particularly in inclement weather, including cloudy nights, birds entering an illuminated area may be reluctant to leave and may be susceptible to colliding with lighted towers, their supporting guy wires, or each other. It has been suggested that the color of tower lights, such as white, white with ultraviolet, or a specific color like red, and the duration of any pulse in the lights, such as strobe, slow flash, or steady pulse, may be factors that can alter the attraction of lighting to migratory birds. The intensity of

light, *e.g.*, in lumens, also may play a role. Some reports suggest that white strobe lights may be less attractive to neotropical migratory species than steady or flashing red incandescent lights, while the attraction of red strobe lights to migratory birds is currently unknown.

18. We seek comment on whether and why lighted towers attract birds, and whether different lighting systems increase the potential for migratory bird collisions with communications towers. We seek information on whether studies document any difference in risk posed by lighting systems that use lights of different color or different rates of flash, pulse, or strobe (including red or white strobe). Comments also should address the effects of lighting color, duration, intensity, and type (*e.g.*, incandescent, strobed, neon, or laser) on bird attraction, especially at night during inclement weather and during spring and fall migrations. In addition, we ask that commenters take into consideration, where appropriate, the impact of different tower lighting systems on human communities. Further, are particular lighting systems or colors more or less attractive to migratory birds based on differing tower heights? We also ask that commenters recommend specific lighting systems to minimize migratory bird collisions with towers, to the extent supported by scientific findings.

19. Air safety and navigation issues are related to the painting and lighting of towers. The FAA has established painting and lighting advisory specifications for air safety and navigation purposes, and our rules require that the owners of communications towers paint and light their antenna structures in accordance with those advisory specifications. We seek comment on the impact, if any, that our painting and lighting requirements may have on migratory bird collisions with towers. Comments should address and suggest solutions to any conflicts that may exist between the advisory specifications and other related rules on the one hand, and causes of migratory bird collisions on the other. Comments and suggestions also should consider air safety and navigation concerns relating to towers and their lighting and marking (*e.g.*, towers are marked and lighted to be visible by pilots), and the obligations of the Commission with respect to air safety and navigation.

2. Tower Height

20. The height of towers may contribute to the extent of their impact on migratory birds. One report suggests that an important analysis would be to

compare towers of different heights, that there have been relatively few studies of towers less than 400 feet in height, and that certain literature, although perhaps only suggestive, does not generally implicate such shorter towers in a significant number of bird deaths. Research conducted at two specific locations suggests that taller towers, and the structures associated with them, may increase avian mortality at those sites. However, it has been suggested that these and other studies do not definitively establish that tall towers are responsible for more bird deaths than shorter towers, and the apparent lack of mortality studies at short towers may make it premature to assume that short towers cause fewer bird deaths than tall towers.

21. We seek comment on the role of tower height as a cause of collisions by migratory birds with communications towers. Are there reliable scientific studies that compare the impacts on migratory birds of towers of different heights, and do they control for other variables such as geographic location, proximity to bird movement corridors, and prevailing weather conditions? If there are such studies, what are the results and the significance, if any, for determining the height of tower that may pose the greatest or least risk to migratory birds? Do studies examine whether short towers have less impact on migratory birds than tall towers, and do they identify the heights of the towers that were studied? The comments should consider and document, to the extent possible, whether there is a height threshold at which avian mortality becomes significant to an avian population, and any other factors that may lead to a determination of critical tower height for purposes of minimizing migratory bird collisions with towers, including whether the critical height threshold may be different in different geographic locations or weather conditions. We also ask that comments address the relationship, if any, of tower height with other factors, such as lighting, and whether there are situations where tower height could be limited to deter collisions by birds with towers yet still allow the provision of reliable communications services.

3. Type of Antenna Structure

22. The type of antenna support structure may be another important factor in the extent to which communications towers have an impact on migratory birds. For example, guy wires could create a level of risk to migratory birds that is not present with unguyed towers. We seek comment on