NEW MEXICO DEPARTMENT OF GAME AND FISH GUIDELINES FOR MITIGATING BIRD MORTALITY FROM COMMUNICATIONS TOWERS CONSERVATION SERVICES DIVISION, JULY 2001

BACKGROUND

Communication towers pose a significant threat to migratory birds, killing an estimated 4–5 million birds per year. Especially vulnerable are some 350 species of neotropical migratory songbirds. Of these, thrushes (Muscicapidae), vireos (Vireonidae), and warblers (Parulidae) are apparently the most vulnerable, although smaller numbers of waterfowl, shorebirds and other species have been documented. These migratory songbirds breed in North America in the spring and summer and migrate south in the fall and winter. These species also generally migrate at night and appear to be most susceptible to collisions with towers with lights on foggy, misty, or low-cloud-ceiling nights during migration. Lights on the towers seem to be the primary factor causing large mortality events.

There are only a few long-term studies of bird mortality at tall communications towers in North America, all indicating that large kills occur on a regular basis often, but not always, in conjunction with these adverse weather conditions. The first long-term study of the impact of a television tower on birds began in 1955 at the Tall Timbers Research Station in northern Florida. Kills occurred nearly every night from mid-August through mid-November. Moderate numbers of migrants were killed under clear skies, but mortalities increased markedly with overcast conditions. After the first 25 years, 42,384 birds representing 189 species were counted. Beginning in 1957, the longest study yet conducted identified 121,560 birds of 123 species killed in Wisconsin over a 38-year period. During this study, on one night in 1963, over 12,000 birds were collected, the largest single-night kill ever documented. Another large kill occurred in 1998, at three towers in western Kansas, where an estimated 10,000 lapland longspurs were killed. Large kills are thought to occur regularly over a wide area of North America, primarily east of the Rocky Mountains and along the Pacific Coast.

Two types of bird mortality occur at communications towers. Blind collision occurs when birds flying in poor visibility conditions strike the tower. Communications towers that are lighted at night for aviation safety (the Federal Aviation Administration requires towers over 200 feet above ground level (AGL) to be lighted) may help reduce bird collisions caused by poor visibility, but they can cause a second, potentially more deadly mechanism for mortality. When low cloud ceiling or foggy conditions occur, tower lights refract off water particles in the air, creating an illuminated area around the tower similar to that created by automobile headlights on bright in a snowstorm. Migrating flocks of birds numbering in the thousands can lose stellar cues for nocturnal migration in these weather conditions, entering the lighted area around the tower from which they are reluctant to leave. Visual and radar observations have documented hundreds or thousands of birds circling lighted towers, emitting warning calls. Mortality occurs when the birds hit the tower structure, guy wires, the ground or each other, as more and more passing birds become "trapped" in the lighted space. "Entrapment" of birds in the tower light sphere has been documented by turning off the lights while "swarming" is occurring, which allows the migrating birds to continue on.

Current research suggests that white flashing strobe lights are less likely to cause large kill events than are either solid or blinking incandescent red lights. Long wavelength illumination, such as in the red-orange spectrum, has been shown to interfere with the avian magnetic compass. However, current hypotheses suggests that light flash duration, rather than color, is a more critical factor. Therefore, it is thought that the longer the "off" phase between the flash phases of the light pulses, the less likely birds are to be attracted to the lighting.

Height is also a factor, with taller towers presenting more of a hazard to migrating birds. Also, because towers over 199 feet AGL must have lighting for aviation safety, towers over this height compound the risk of large kill events.

Construction of communications towers (including radio, television, cellular, and microwave) in the United States has been growing at an exponential rate due to the deregulation of the telecommunications industry, increasing at an estimated 6 to 8 percent annually. According to the Federal Communication Commission's *2000 Antenna Structure Registry*, the number of lighted towers greater than 199 feet above ground level (AGL) is estimated at more than 45,000, and the total number of towers is estimated at over 74,000. Non-compliance with the registry program is estimated at 24 to 38 percent, bringing the total to 92,000 to 102,000 towers currently nationwide. By 2003, all television stations must be converted to digital, adding potentially 1,000 new towers exceeding 1,000 feet AGL. In November 1998 approximately 370 towers over 200 ft AGL had been constructed in New Mexico.

Communication Tower Guidelines

Communications towers have the potential to cause significant impacts to night-migrating bird populations. We offer the following recommendations to reduce or mitigate adverse impacts:

Location

- If significant numbers of breeding, feeding, or roosting birds are known to habitually use a proposed tower construction site, relocation to an alternate site is recommended. If this is not an option, seasonal restrictions on construction may be advisable in order to avoid disturbance during nesting (i.e., not during spring and summer).

- Co-locate communications equipment, antennas, etc. on existing towers or buildings (water towers, church steeples, etc.), or within existing groups of towers or "antenna farms", if feasible.

- New towers should be designed structurally and electrically to accommodate the applicant's antenna(s), and comparable antennas for at least two additional users, to reduce the number of future towers, unless this design would require the addition of lights or guy wires to an otherwise unlighted and/or unguyed tower.

- If constructing multiple towers, consider the cumulative impacts of all those towers, as well as the impact of each individual tower.

- Towers should not be located in or near wetlands, riparian areas, playas, lakes, state or federal waterfowl refuges, staging areas, rookeries or other known bird concentration areas, in known migratory or daily movement flyways, or in habitat of threatened or endangered bird species that could be prone to tower-caused mortality (i.e. night-migrating species). If location near or within one of these areas is deemed necessary, the Department requests the opportunity for additional consultation.

- Local meteorological conditions should be reviewed, and areas with an especially high incidence of fog, mist, and low cloud ceilings should be avoided.

- Towers no longer in use or determined to be obsolete should be removed within 12 months of the cessation of use.

Construction

- Lights on towers attract night-migrating birds, and can cause large mortality events when birds strike the tower or guy cables. Towers taller than 200 feet (61 m) above ground level (AGL) are required by the Federal Communications Commission (FCC) to have lighting for aircraft safety. Therefore, if construction of new towers is required, we recommend that they be less than 200 feet AGL, if possible, so lighting is not necessary.

- Solid or pulsating red lights attract night-migrating birds at a much higher rate than white strobe lights. Therefore, where permissible by FCC and local zoning regulations, we recommend that white strobe lights be used and solid or pulsating red warning lights be avoided. The minimum amount of lighting required by the FCC should be used, with minimum intensity and number of flashes per minute (longest duration between flashes) allowed by the FCC.

- Construction techniques should be used which do not require guy wires, as these components are thought to be a primary cause of tower-related bird mortality. Alternative construction techniques include using a lattice structure or a monopole. Towers using guy wires for support should install daytime visual markers (i.e., bird diverter devices) on the guy wires to prevent collisions by diurnally active bird species. For guidance on markers, see Chapter V in *Avian Power Line Interaction Committee, 1994. Mitigating Bird Collisions with Power Lines: The State of the Art in 1994. Edison Electric Institute, Washington, D.C., 78 pp*.. Copies can be obtained via the Internet at http://www.eei.org/resources/pubcat/enviro/, or by calling 1-800/334-5453.

- Security lighting for on-ground facilities and equipment should be down-shielded to keep light within the boundaries of the site and minimize its potential attraction for birds.

- Tower construction, including road access and fencing, should be designed to minimize habitat loss and fragmentation, and to reduce above-ground obstacles that might impact birds in flight. A larger tower footprint, however, is preferable to construction of a guy-supported tower.

This guideline was in large part adopted from recommendations published by the U.S. Fish and Wildlife Service, September 14, 2000. The guidelines were reviewed, by the Department, in September, 2003.

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Tower numbers by height class and location by state can be accessed at http://www.towerkill.com/.