United States Department of the Interior
Fish and Wildlife Service
Washington, D.C. 20240

In Reply Refer To: FWS/AMB/DMBM/DCN029118

February 2, 2007

Mr. Louis Peraertz, Esq.
Spectrum and Competition Policy Division
Wireless Telecommunications Bureau
Federal Communications Commission
445 12th Street, SW
Washington, DC 20554

Dear Mr. Peraertz:

The U.S. Fish and Wildlife Service is pleased to provide the attached comments and recommendations to the Federal Communications Commission on WT Docket No. 03-187, FCC 06-164, Notice of Proposed Rulemaking, "Effects of Communication Towers on Migratory Birds."

We strongly encourage the FCC to include in rulemaking the recommendations we are providing herein. If you do, avian collision mortality at communication towers should be significantly reduced, based on the best scientific evidence currently available. We look forward to working collaboratively with the FCC to allow providers to continue full communication services and capabilities while protecting migratory birds. Should you have any questions about our comments, please contact Dr. Albert Manville, Division of Migratory Bird Management, at 703/358-1963.

Sincerely,

/s/

Kenneth Stansell
Acting Deputy Director

Attachment

Office of the Director
U.S. Fish and Wildlife Service
Washington, D.C. 20240

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Mr. Louis Peraertz, Esq.
Spectrum and Competition Policy Division
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445 12th Street, SW
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Re: Comments of the U.S. Fish and Wildlife Service Submitted **Electronically** to the FCC on 47 CFR Parts 1 and 17, **WT Docket No. 03-187**, **FCC 06-164**, Notice of Proposed Rulemaking, "Effects of Communication Towers on Migratory Birds"

cc: Louis.Peraertz@fcc.gov, hard copy via mail.

Dear Mr. Peraertz:

The U.S. Fish and Wildlife Service (the Service, or FWS) is pleased to provide comments on the Notice of Proposed Rulemaking (NPRM), WT Docket No. 03-187, FCC 06-164, published in the *Federal Register* on November 22, 2006 (volume 71[225]: 67510-67518), addressing issues pertaining to the "effects of communication towers on migratory birds." Kindly also include in the record our Service comments submitted to the Federal Communications Commission (FCC) on November 7, 2003, and Service reply comments submitted to FCC on February 11, 2005, and March 9, 2005, all applicable to Docket 03-187 .

SYNOPSIS; COMMENTS ON LEGAL FRAMEWORK AND STATUTORY AUTHORITY (*Federal Register* pp. 67510-67512, 67515)

FCC NPRM Request: "*We seek comment on the extent of any effect of communication towers on migratory birds and whether any such effect warrants regulations specifically designed to protect migratory birds. We request comment on the Commission's legal framework governing the Commission's obligations in this area. We seek comment on the nature and scope of the Commission's responsibilities, if any, under the [Migratory Bird Treaty Act]. We seek comment on the take of migratory birds and endangered species*." (pp. 67510-67511)

Service Response: We are providing our comments pursuant to the Migratory Bird Treaty Act (MBTA; 16 U.S.C. 703-712), the Bald and Golden Eagle Protection Act

(BGEPA; 16 U.S.C. 668-668d), and the Endangered Species Act (ESA; 16 U.S. C. 1531 *et seq.*). The MBTA prohibits the taking, killing, possession, transportation, and importation of migratory birds, their eggs, parts, and nests, except when specifically authorized by FWS. The word "take" is defined as, "to pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to pursue, hunt, shoot, wound, kill, trap, capture or collect." The unauthorized taking of even one bird is legally considered a "take" under MBTA and is a violation of the law. Bald and Golden Eagles are afforded additional legal protection under BGEPA.

Section 9 of the ESA prohibits the take of any Federally-listed animal species by any person subject to the jurisdiction of the U.S. The term "person" is defined as, "... an individual, corporation, partnership, trust, association, or any other private entity; or any officer, employee, agent, department, or instrumentality of the Federal government, of any State, municipality, or political subdivision of a State, or any other entity subject to the jurisdiction of the United States." Section 11 of the Act provides for both civil and criminal penalties for those convicted of Section 9 violations. As defined in ESA, take means, "... to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to engage in any such conduct." "Harm" in the definition of take means an act which kills or injures wildlife. Such acts may include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding or sheltering (50 CFR Part 17.3). "Harass" means an intentional or negligent act or omission which creates the likelihood of injury to wildlife by annoying it to such an extent as to disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding, or sheltering.

Executive Order 13186 (January 10, 2001), "Responsibilities of Federal Agencies to Protect Migratory Birds," states that, "each Federal agency [taking] actions that have, or are likely to have, a measurable negative effect on migratory bird populations is directed to develop and implement… a Memorandum of Understanding (MOU) with the Fish and Wildlife Service that shall promote the conservation of migratory bird populations." (Section 3). Each agency is further "encouraged to immediately begin implementing the conservation measures set forth in this section, as appropriate and applicable" (*Federal Register* 66(11): 3853-3856). The Service is of the opinion that the actions of the FCC with respect to communication towers are the type of actions intended to be covered by this Executive Order even though the FCC is not defined as a "Federal Agency" under 5 USC 104. However, to date, the FCC has decided against developing an MOU with the Service.

Currently, migratory birds (except those listed under ESA or critical habitat designated by this statute) are not subject to National Environmental Policy Act (NEPA; 42 U.S.C. 4332(2)(C)) review under FCC's tower permitting and licensing process. The Service has asserted since 1999 (Willis 1999) that such exclusion is a major shortcoming of the FCC tower review and permitting process. The Service continues to feel that the assessment of each tower as it may impact migratory birds and the cumulative impacts of all towers on migratory birds must be part of FCC's required review process under NEPA. We have raised these issues at all meetings of the Communication Tower

Working Group since 1999, in an all-day seminar to FCC staff conducted by the Service, in a Service briefing to the senior attorneys for all of the FCC Commissioners, and in our comments in the NOI. FCC's tower review process constitutes, in the Service's mind, a major Federal action affecting the "quality of the human environment." The Service, however, is pleased to learn that,

> *"[the FCC] tentatively conclude[s] that the obligation under NEPA to identify and take into account the environmental effects of actions that [it] undertake[s] or authorize[s] may provide a basis for the Commission to make the requisite public interest determination under the Communications Act to support the promulgation of regulations specifically for the protection of migratory birds, provided that there is probative evidence that communication towers are adversely affecting migratory birds."* (p. 67511)

Some of the evidence that communication towers are adversely affecting migratory birds is detailed below.

As the action agency designated by law and regulation to license communication towers, the FCC regulates the operation of communication towers transmitting and/or receiving signals within certain frequencies. These include but are not limited to radio, television, cellular telephone, pager, emergency broadcast, ship-to-shore, and electronic communications for other purposes. In the Service's view, the FCC should also regulate those entities which operate communication towers that have been well documented to kill migratory birds.

By rulemaking, the Commission can establish regulations designed to minimize "take" of migratory birds, discussed below in considerable detail. In the Service's view, the Commission has the authority (spelled out in Executive Order 13186) to draft regulations that minimize take of migratory birds. Where a tower erector, owner or operator fails to comply with FCC regulations, and migratory birds are killed, FCC can refer that case to special agents within our Office of Law Enforcement (OLE). However, if an erector, owner, or operator complies with all FCC regulations and "take" still occurs, the Service's OLE has clarified in our voluntary communication tower (and, more recently, in our voluntary wind turbine guidelines) its investigative and prosecutorial responsibilities and obligations. That explanation reads,

> "The Migratory Bird Treaty Act prohibits the taking, killing, possession, transportation, and importation of migratory birds, their eggs, parts, and nests, except when specifically authorized by the Department of the Interior. While the Act has no provision for allowing unauthorized take, it must be recognized that some birds may be killed at structures such as communication towers even if all reasonable measures to avoid it are implemented. The Service's Division [*sic* Office] of Law Enforcement carries out its mission to protect migratory birds not only through investigations and enforcement, but also through fostering relationships with individuals and industries that proactively seek to eliminate their impacts on migratory birds. While it is not possible under the Act to absolve

individuals or companies from liability if they follow these recommended guidelines, the Division of Law Enforcement and Department of Justice have used enforcement and prosecutorial discretion in the past regarding individuals or companies who have made good faith efforts to avoid the take of migratory birds." (Director's September 14, 2000, cover memorandum to the Regional Directors)

We thus feel that regulations implemented by the Commission to minimize take of migratory birds would not impede the Commission's responsibility under the Communication Act of 1934, as amended (47 U.S.C. 151, 154(i), 301, 303(q), 303(r)).

FCC NPRM Request: *"Some commenters argue that under the MBTA, a party may be liable for any unintentional, incidental death of a migratory bird, such as through a collision with a communication tower. Others contend that the MBTA has a narrower purpose to prohibit only intentional kills of migratory birds, such as by hunting or through a program to control a migratory bird population. We seek comment on the nature and scope of the Commission's responsibilities, if any, under this statute."* (p. 67511)

Service Response: This request raises 2 separate legal issues. First, do the prohibitions of the MBTA apply to deaths of migratory birds caused unintentionally, as by operation of a communication tower? Second, if they do, can a regulatory agency like the Commission be held liable?

Regarding the first issue, in United States v. Moon Lake Electric Ass'n, Inc., 45 F. Supp.2d 1070 (D. Colo.1999), the issue was also liability for migratory bird deaths caused by introducing a structure hazardous to birds into the environment, in that case electric power lines. The Court held that 1) the BGEPA and MBTA applied to both intentional and unintentional harmful conduct, and 2) proscription against killing birds, contained in both Acts, was not limited to physical conduct normally exhibited by hunters or poachers. While this is a U.S. District Court decision, it nonetheless provides a thoughtful analysis of the legislative history of the MBTA, concluding that there is no clearly expressed legislative intent that the MBTA regulates only physical conduct associated with hunting or poaching. We note that the court in Moon Lake was endorsing the position of the Department of Justice, which brought the prosecution at issue, and which ultimately sets the litigation position of the United States. We also note that the fact that the MBTA applies to some unintentional take does not mean that it applies to all unintentional take. See Seattle Audubon Society v. Evans, 952 /f,2d 297 (9th Cir. 1991) (making a distinction between "direct" and "indirect" unintentional take).

Nonetheless, an agency of the Federal Government should not require the threat of criminal liability to ensure compliance with other Federal laws when carrying out its responsibilities. Thus, it is our opinion that the Commission should require its licensees to adopt and comply with all reasonable and prudent measures to avoid take of migratory birds, particularly endangered and threatened birds, bald eagles and species of

conservation concern. Requiring licensees to maximize collocation opportunities is an excellent example of such a "reasonable and prudent" measure.

Summary of Avian Mortality.

The U.S. peer-reviewed scientific literature documents many examples of substantial tower kills. For example, since 1948 when Aronoff (1949) described a large bird kill at a radio tower near Baltimore, Maryland, the scientific literature has been replete with references to large bird kills and results of long-term tower mortality monitoring studies. These include but are by no means limited to the following studies. Kemper (1996) conducted the longest avian-tower collision study yet completed – over 38 years – beginning in 1957. He collected nearly 121,560 birds representing 123 species and he still holds the all-time record for most birds collected and identified from a single-night tower strike. More than 12,000 birds were retrieved and identified one night in 1963 from the base of a tall television tower in Eau Clair, Wisconsin, not accounting for almost certain scavenging by wild and domestic predators. Able (1973) reported single night kills exceeding 1,000 birds at television towers in Tennessee and Florida during the fall 1972. The first long-term study of the impact of a television tower on migratory birds was begun in 1955 at Tall Timbers Research Station, northern Florida. After the first 25 years of the study, 42,384 birds representing 189 species were tallied (Crawford and Engstrom 2001). They reported on average, 1,517 birds killed per year over the entire 29-year period of the study, 65% of the mortality documented in the fall and 20% in the spring. Kills occurred nearly every night from mid-August through mid-November. Moderate numbers of migrants were killed under perfectly clear skies, but the toll increased markedly with overcast conditions at the Tall Timbers Research Station. Theoretically, the small kills on clear nights were not from birds drawn to the tower lights, but from birds that happened to be flying near the tower and did not see a guy wire, resulting in a "blind collision" (S. Robertson, FWS 2007 pers. comm.). Several hundred birds retrieved from single night mortality events at a television tower in Kansas have recently been reported in the literature (Ball *et al.* 1995, Robbins *et al.* 2000). Manville (2005) and Gauthreaux and Belser (2006) cited a number of additional literature references regarding avian-tower collisions.

In continuing studies conducted over 29 years at 3 tall television towers by A. Clark in Buffalo, New York (Morris *et al.* 2003), Clark noted a gradual decrease in the number of bird kills at the towers he studied – ranging from a high of 4,787 in 1982 to a low of 6 in 1992. The authors hypothesized the decline in the rate of mortality to 4 possible factors: 1) an overall decrease in migratory bird populations, 2) change in weather and wind patterns, 3) increases in predation and scavenging around tower bases, and 4) changes in migration patterns. However, during the fall 2005 migration season, Clark (Buffalo Museum of Science, ret., 2006 pers. comm.) documented the largest annual kill at his study towers since 1982. That year, he retrieved 1,223 birds at the bases of the 3 western New York towers (878 whole carcasses and 345 "parts thereof" representing 55 species). This included more than 200 Golden-crowned and Ruby-

crowned Kinglets. This information was provided to FWS as a yearly condition of Mr. Clark's scientific collecting permit.

During the fall 2005 migration season, additional troubling reports from the East of large bird kills at both tall and short communication towers surfaced, particularly kills that occurred during a week-long inclement weather event that coincided with songbird migration in October. W. Evans (Executive Director, Old Bird, Inc. 2005 pers. comm.) estimated more than 500 songbirds killed in a 3-night period in mid-October at an 1,100-foot-tall above-ground-level (AGL) tower near West Monroe, New York. During this same period, the U.S. Coast Guard reported retrieving 5-6 bird carcasses from a parking lot in front of their station, but admitted that most of the grounds around their 700-foot LORAN tower in Romulus, New York, had not been surveyed for dead birds. Evans also reported "scattered feather spots" at an 850-ft television tower in Elmira, New York, surveyed on October 15. Of particular interest, because they are so infrequently reported at communication towers, was his discovery of a Red-tailed Hawk carcass adjacent to this tower. Evans also reported several intact, but decaying warbler carcasses including a Hooded Warbler at a 200-foot cellular telephone tower near Alfred, New York, on October 15.

Evans also indicated that significant mortality had been documented at towers in Pennsylvania during that same weather event. He reported one observer near a cellular telephone tower, who "went up the hill to get better cell phone reception found 'dead Goldfinches and Bluebirds' everywhere near the cell phone tower. The observer estimated that there might be 'a thousand birds total.'" At another nearby cellular telephone tower in Pennsylvania, Evans also reported "147 salvaged birds, mostly Blackpoll Warblers." Both cellular telephone towers appeared to be less than 150 feet AGL in height. Evans reported the above-reference information on the Cornell University (CAYUGABIRDS-L@cornell.edu) and New York State list serves (nysbirds-l@cornell.edu). In the cases of the cell phone towers, nearby solid/steady-burning bright light sources appeared to result in the bird congregations that led to the kills.

On September 7-8, 2005, and again on September 13-14, an estimated 400 birds were killed each night at the 1,100-foot WMTV tower near Madison, Wisconsin. In the second kill, 172 carcasses of 23 species were retrieved, including 5 Golden-winged Warblers – of particular concern to the FWS since these warblers are declining species designated in the FWS's 2002 *Birds of Conservation Concern*, a report mandated by Congress. Scavengers including crows and cats were implicated in the removal of many of the injured and dead birds (S. Ugoretz, wildlife biologist, Wisconsin Dept. Natural Resources 2005 pers. comm.). Searchers did not survey the heavily timbered area north of this tower (Seely 2005).

A 2003-2005 multiple tower study in Michigan by Gehring *et al.* (2006) has validated that birds are killed at both lit unguyed and lit guyed towers, including relatively short 380-480 ft AGL towers. Mortality, not unexpectedly, was far greater at tall (> 1,000 ft AGL) lit, guyed towers.

Reviewing the Gehring *et al.* (2006) 2005 study results, 203 birds representing 47 species were collected at 24 towers during spring 2005, while 173 birds representing 42 species were collected at the same 24 towers during fall 2005. Most were night-migrating songbirds – Red-eyed Vireos and Gray Catbirds during the spring, and Blackpoll Warblers and Mourning Doves (generally considered a diurnal migrant) during the fall. The highest 2005 single-night kill was 16 birds at a > 1,000-ft AGL guyed tower. All 24 study towers were lit (see beyond for more details on lighting impacts) and were further divided into unguyed (N=9 total State Police towers) and guyed towers (N=12 total State Police towers, N= 3 private towers). Previous 2003 and 2004 field research showed that unguyed, self-support towers killed significantly fewer birds than towers supported with guy wires. It is important to note that the research protocol used by Gehring *et al.* (2006) was anonymously peer-reviewed by 3 professional ornithologists recommended by the Ornithological Council. J. Gehring has presented the results from this study at 4 professional wildlife conferences, and the preliminary results of the study have been made public in multiple reports to the State of Michigan, the FCC, and the Service.

Communication towers in aggregate nationwide are estimated to continue to take a significant number of migratory birds each year in the United States. Since the mid-1970s, the Service has developed several estimates of mortality from collisions with communication towers. We did this because the FCC does not require licensees or operators to monitor or even report bird mortality and because reported mortality in the literature only represents a small fraction of total number of collision deaths. Banks (1979) assessed avian mortality at some 505 of the then existing 1,010 tall radio and television towers in the U.S. in 1975, estimating 1.25 million birds killed/year at towers. Evans (1998), collaborating with FWS, reassessed mortality based on increased numbers of tall towers considerably greater in number than what Banks had studied in 1975, estimating 2-4 million birds killed/year. Manville (2001a), based on a 1999 evaluation, estimated some 4-5 million bird deaths per year from tower collisions in the U.S. as tower placement continued to grow exponentially. However, in 2000, Manville (2001b) again cited the 4-5 million annual mortality estimate, but indicated that mortality could range as high as 40-50 million birds deaths per year, the latter estimate, however, predicated on validation through a nationwide cumulative impacts analysis of U.S. communication tower effects on migratory birds. The Service more recently reiterated the latter mortality estimate – conservatively 4-5 million, to perhaps as high as 40-50 million birds killed per year (Manville 2005).

In addition to the fact that these "takings" are in violation of the MBTA and the spirit and intent of Executive Order 13186, they may also be impacting avifauna at a population level, especially for "species of conservation concern" and State and Federally-listed birds. In 1995, the Service designated 124 species of "migratory nongame birds of management concern" (USFWS 1995). However, by the next mandated update of this publication in 2002, 131 "birds of conservation concern" were delineated (USFWS 2002). In addition, there currently are 77 Federally endangered and 15 threatened birds listed on ESA.

Evidence collected on the make-up of species most frequently killed by collisions with communication towers indicates a high number of "species of conservation concern" that fall victim to tower collisions. The Service has raised concerns – most recently in the 2005 literature (Manville 2005) -- that nearly 350 species of neotropical songbirds are vulnerable to collisions with tall structures. In their literature review, Shire *et al.* (2000) found 230 bird species documented killed at communication towers. They reviewed 47 avian collision tower studies in 31 States and 2 Canadian Provinces east of the Rocky Mountains, tabulating a total of 184,797 birds killed and identified from these studies. Of these 230 species, 52 (N= 23%) were listed either as "nongame birds of management concern" (USFWS 1995), and/or were listed on the Partners in Flight (PIF) Watch List. In addition, 2 Federally-threatened Red-cockaded Woodpeckers were retrieved from 1 tower. The birds most frequently killed include members of the warbler, thrush, and vireo families. In one case, 164 Cerulean Warblers – a FWS "species of conservation concern" and a PIF Watch List "extremely high priority" species – were reported collected at 5 towers.

Longcore *et al.* (2005) extrapolated from the Shire *et al.* (2000) report those birds most frequently reported killed at communication towers, including " birds of conservation concern" (BCC). Based on the Service's estimated range of mortality, they developed their own ranges of estimated mortality based on bird numbers tabulated from the Shire *et al.* (2000) report, assuming the proportion of birds collected equaled the proportion of birds killed nationwide at towers each year. For example, 10,397 Common Yellowthroat (subspecies *sinuousa* a BCC) represented 5.6% of the birds reported killed from the 47 studies. Longcore *et al.* (2005) then estimated from 225,047 to 2,250,469 Yellowthroats were being killed per year at communication towers. For the Bay-breasted Warbler (BCC), 10,396 specimens were collected and identified representing 5.6% of the collected dead birds. Their estimated mortality range was nearly identical to that of the Common Yellowthroat. For Blackpoll Warblers (BCC), 6,304 specimens (3.4%) were identified, providing an estimated range of 136,452 to 1,364,524 birds killed per year. For the Federally threatened Red-cockaded Woodpecker, 2 carcasses were collected (0.001%) representing 43 to 433 Woodpeckers being killed per year. Based on an estimated population of Red-cockaded Woodpeckers of ~11,000 (Jackson 1994, Longcore *et al.* 2005), this could represent an annual loss of 0.4 to 4.0% of the population – a negative population effect, significant at the high end of the estimate. While one can argue that the true percentages of birds killed may differ, even the low end mortality estimates for these species could be having impacts on their populations.

Collision mortality has been reported at communication towers and other tall structures throughout Alaska. The extent of the Service's concern regarding bird strikes is largely a factor of tower location and construction. While the reports of tower strikes from Alaska are limited, most documented fatalities involve waterfowl and other water birds striking communication towers and power lines along the coast (E. Lance, Anchorage Fish and Wildlife Field Office, FWS 2007 pers. comm. and unpubl. data). Bird fatalities have included Spectacled and Steller's Eiders, both listed as "threatened" under ESA. In addition, museum collectors have used tall communication towers in

coastal Alaska as a sampling tool to supplement their documentation of bird species ranges (Dickerman *et al.* 1998).

When discussing the impacts of communication towers on migratory birds – especially warblers, thrushes, and vireos – it is important to note that anthropocentric-caused mortality is only one of the impacts to these species. Natural mortality from predation (*i.e.*, including wild, feral and domestic predators), disease (*e.g.*, West Nile virus, avian influenza, botulism, or avian cholera), and non-human-related accidents (*e.g.*, nestlings falling out of nests) – although very difficult to cumulatively quantify – may already be negatively impacting avian populations. Habitat loss and degradation, including the growing documented impacts of global climate change, can hugely impact avifauna.

As warblers, thrushes, vireos, and other songbirds are killed by communication towers, they are removed from those populations which could otherwise benefit humans. Birds pollinate flowers and remove insect pests from many important commercial food crops and forest species, making possible a multi-billion-dollar industry extremely dependent upon birds for its success. One pair of warblers can remove the defoliating caterpillars from more than 1 million leaves during the 2-3 week period that they are feeding their nestlings. In the Pacific Northwest, 24 species of neotropical songbirds feed on the western spruce budworm and the Douglas fir tussock moth, 2 of the most destructive defoliating insects found in that region. Birds also remove countless weed seeds, including exotic plant species that compete for food crop and forest production. Birds distribute seeds of important forest tree and shrub species whose survival could not exist without seed dispersal by birds (Smithsonian Migratory Bird Center 1994, Ornithological Council 1997, Manville 2001a). If avifauna are removed by tower kills, the benefits they provide are lost.

Birds are also big business in North America. In 1996, some 63 million Americans 16 years and older enjoyed activities such as feeding, photographing, and watching birds. These wildlife watchers spent an estimated $28.9 billion pursuing these activities (USFWS 1997, Fenwick 1997, Manville 2001a). In a slightly more recent estimate, more than 71 million adult Americans – 1 in 4 – were estimated to feed, photograph, and watch birds (Manville 2001b).

In summary, the Service feels that immediate action needs to be taken to reverse these tower collision impacts on migratory birds, which may, upon more detailed examination, prove to be additive mortality to some populations, especially listed and BCC species.

COMMENTS ON SYNOPSIS, PART 3, SIGNIFICANT EFFECTS (*Federal Register* p. 67511)

> **FCC NPRM Request:** *Can the Commission rely upon anecdotal evidence of bird kills at individual towers or must it have broader studies before taking action*

specifically for the protection of migratory birds? (p. 67511) *What is the relevance, if any, of other causes of avian mortality, such as buildings, transmission lines, and vehicles?* (p. 67511)

Service response: Anecdotal evidence may be the best biological information available if robust studies have not been conducted. However, anecdotal evidence of bird mortality studies at towers in Alaska, for example, can be a significant underestimate of total mortality due to carcass removal by scavengers. Scavenging removal is presumed high in many of Alaska's remote tower sites due to the density of terrestrial and avian scavengers such as foxes, bears, mink, otter, rats, eagles and ravens. Preliminary results of a scavenging removal study at one location on the Alaska Peninsula suggest that carcass removal from scavenging is as high as 50% removal/day (P. Flint, USGS Alaska Science Center and E. Lance, Anchorage Fish and Wildlife Field Office, FWS 2007 unpubl. data). This degree of scavenging is consistent with what Stoddard (Crawford and Engstrom 2001) found in Florida where ~92% of the tower killed carcasses were removed by predators and scavengers within 24 hours before a scavenger removal program was initiated. Further, because there have been significant documented events resulting in the death of thousands of birds in 1 night (Seets and Bohen 1977, Carter and Parnell 1978, Kemper 1996, Nehring and Bivens 1999), best biological information, which may be anecdotal in nature, must be used to assess conservation risks to migratory birds at individual communication towers.

The impacts of all avian mortality, both natural and human-induced, must be factored into the cumulative impact analysis for each species of migratory bird that is vulnerable to tower collision. Building windows, for example, are estimated to take from 97 to 980 million birds per year in the U.S. (O'Connell 1998, Klem 1990, Manville 2005), vehicular strikes may kill from 60-80 million birds per year, power line electrocutions from tens to hundreds of thousands per year, and power line collisions from hundreds of thousands to perhaps 175 million birds per year in the U.S., based on extrapolations (Manville 2005). While at the moment it may be very difficult to seriously reduce window strike and automobile collisions, very positive steps have been taken by the electric utility industry to reduce power line electrocutions and collisions. If the FCC implements what we recommend here in our Service comments, avian collisions at communication towers should significantly be reduced, thus lowering the potential cumulative impacts of towers on migratory birds. When installing new towers, however, care must be taken not to resolve one problem by creating yet another one. Communication towers in remote Alaskan villages sometimes require the installation of lengthy power transmission lines, creating an increased threat of collisions. ESA-listed Spectacled and Steller's Eiders, other waterfowl, Bald Eagles, Gyrfalcons, and shorebirds have all been documented in collisions with power lines in Alaska (E. Lance, Anchorage Fish and Wildlife Field Office, FWS 2007 unpubl. data). We, therefore, strongly recommend that tower erectors work with transmission line authorities to minimize impacts from power line collisions and electrocutions by using electric utility best management practices when power lines are being installed, published in *Suggested Practices* documents (APLIC 1994, APLIC 2006).

The Service stresses the need for the FCC to address the cumulative impacts of some 100,000-FCC registered towers across the U.S. landscape on migratory birds. In our Southwest Service Region (2), for example, a minimum of 6,600 existing communication towers greater than 200 ft AGL in height are currently estimated to exist there. One tower that kills 2 birds per night might seem to be practically inconsequential when viewed as an individual unit or a one-time event. However, in the larger picture, if 6,600 communication towers are each taking 1 bird per night during spring (generally 60 days in length) and fall migration (generally 90 days in length), this alone could result in the death of 990,000 migratory birds within the Service's Region 2. While some towers may not kill a minimum of 1 bird per night during migration, others may kill far greater numbers. When the estimated mortality figures for all the Service's 7 Regions nationwide are combined, the total truly becomes quite significant. Additionally, mortality during breeding and wintering seasons may not be as high, but it still adds to total annual mortality (D. Krueper, Migratory Bird Program, FWS 2007 pers. comm.).

COMMENTS ON THE FCC's PROPOSAL TO CHANGE OUT LIGHTING AND USE OF GUY WIRES (*Federal Register* pp. 67512-67514)

White Strobe Lights.

> **FCC NPRM Request:** *The FCC "tentatively conclude[d] that medium intensity white strobe lights[1] for nighttime conspicuity is to be considered the preferred system over red obstruction lighting systems[2] to the maximum extent possible without compromising aircraft navigation safety. We seek comment on this tentative conclusion and on issues related to its implementation."* (p. 67511)

Recommendation to FCC: The Service generally concurs with the FCC's recommendation. To insure minimum avian attraction to strobe lights, to diminish public sentiment against use of white strobe lights at night, and to maintain proper pilot warning (*i.e.*, conspicuity) at night, the Service continues to recommend use of minimum intensity nighttime white strobe lighting (ideally less than 2,000 candela [cd]; FAA 2000, A1-15, Fig. 14), illuminated at the maximum "off" time currently allowed by the Federal Aviation Administration (FAA 2000:A1-1; *i.e.*, 3 seconds between flashes/20 flashes per minute). Where possible, we also recommend up-shielding of strobe lights to minimize their impacts on local residents at night. These continue to be recommendations presented in our September 2000 voluntary communication tower guidance (recommendation no. 5).

[1] By "medium intensity white strobe lights," the Service presumes FCC is referring to L-865 lighting as described by the Federal Aviation Administration (FAA 2000: A1-1).

[2] When the FCC refers to "red obstruction lighting systems," the Service presumes that they are referring to solid/steady burning incandescent (L-810) and pulsating/flashing (on-off; L-864) red incandescent lights (FAA 2000:A1-1) and not to red strobe-lit systems (which unfortunately the FAA does not differentiate from red flashing incandescent lights).

Because the FCC is recommending "medium intensity" L-865 flashing white strobe lighting (FAA 2000: A1-15, Fig. 14) which illuminates 40 times per minute, we would suggest that FCC recommend to FAA that they conduct further conspicuity pilot tests on white strobe lights flashing at 20 times per minute, with intensity reduced below the currently recommended 2,000cd for nighttime warning (FAA 2000: A1-15, Fig. 14) such that pilots are still well aware of the lighting but which is least attracting to migratory birds, especially in inclement weather.

Justification for Service Recommendation: Past and recent scientific research supports the FCC's white-strobe-light recommendation. Two key elements – inclement weather and steady-burning lighting on towers – have been implicated in the published literature to be major impediments, when combined, to bird survival. Light appears to be a key attractant for night-migrating songbirds, especially when nighttime visibility is poor, cloud ceilings are low, fog is heavy, or various other forms of precipitation are associated with either passing or stationary cold fronts (Tordoff and Mengel 1956, Ball *et al.* 1995, Manville 2005).

The attractant effects of steady-burning lights were first reported in Forest and Stream (1874) and later Allen (1880, cited in Cochran and Graber 1958) reported birds killing themselves by flying against lighthouse lights. Cochran and Graber (1958) reported that songbirds were heavily attracted to steady-burning L-810 red incandescent lights at a television tower during inclement weather. In 2 studies where lighted towers attracted songbirds, and the lights were extinguished, birds continued on their migrations leaving previously lit, cloud enshrouded towers (Cochran and Graber 1958, Avery *et al.* 1976). In both studies, when the lights were turned back on, within minutes birds began circling the towers in large numbers. Larkin and Frase (1988) used modified marine radar to document the deviations in flight patterns of birds and their likely attraction to lit communication towers. Gauthreaux and Belser (1999, 2006) showed a greater proportion of bird attraction to red flashing (non-strobe lighting) and red-solid incandescent lights than to white strobes; strobes still attracted some birds compared to unlit controls that attracted none. Whether birds were attracted to white strobes or whether the less linear tracks of birds in the vicinity of white-strobed towers versus the control towers was due to bird avoidance of the tower structure remains unclear. When nighttime weather conditions and visibility improved, in all cases reported in the literature, the birds left the lighted towers, apparently continuing on their migrations.

J. Johnson (Swarthmore College undergraduate research project, unpublished data, 2005 pers. comm.; April 2005 report to the Communication Tower Working Group [CTWG]) replicated the studies by Larkin and Frase (1988) and Gauthreaux and Belser (1999, 2006) using modified marine radar to track "target" movements in relation to their attraction to 8 tall (> 1,080 ft AGL) lighted communication towers northwest of Philadelphia, Pennsylvania. All towers were lit with both steady burning red (L-810) incandescent lights and red pulsating (L-864) beacons. She also used microphones to record bird flight calls and "ground truth" radar images. The study was conducted for 4 seasons in 2002 and 2003, providing 1,871 bird tracts. In good visibility with no fog or precipitation, a high density of birds moved away from the towers, appearing to actively

avoid them. However, during conditions of low clouds and fog, she found distinct curvilinear movements and aggregations of birds (1,300 of 1871 "targets" were curved) toward the lights at the study towers versus her control towers – just as Larkin and Frase (1988) and Gauthreaux and Belser (2006) had found. The towers examined in the studies by Cochran and Graber (1958), Avery *et al.* (1976), Larkin and Frase (1988), Nehring (1998), and Gauthreaux and Belser (2006) all had multiple tiers of slow flashing red light beacons each alternating with a tier of steady burning red incandescent lights. Two Gauthreaux and Belser (2006) study towers were only white-strobe-lit.

In bad weather, bird strikes have been recorded near or at ground level, usually associated with steady-burning lighting. Lord (1951) reported 200 birds of 23 species killed after apparently being confused by floodlights and striking a lodge on the Blue Ridge Parkway during a foggy night in the fall 1950. James (1956) retrieved 2,421 bird carcasses of 39 species (mostly warblers) beneath light poles on a coastal island following a single stormy spring night in 1951. Findings from existing research therefore strongly suggest a relationship between nighttime tower lighting systems and the likelihood of collisions particularly during inclement weather. Especially implicated are the effects of solid/steady burning and pulsating (non-strobe) incandescent lighting, especially when these lighting systems are used together on the same tower.

To assess avian impacts from communication towers in a more systematic and robust way, research was begun in Michigan in 2003 on 24 tall towers (21 belonging to the Michigan State Police [MSP] and the remaining 3 privately owned). J. Gehring served as the principal investigator (PI) for this study, and P. Kerlinger (Curry & Kerlinger, LLP) and A. Manville (FWS) were co-PIs. A peer-reviewed pilot study was initiated during the fall 2003, and in 2004, 2 peak-season, 20-day-each peer-reviewed surveys were performed on 24 towers with the "status quo" lighting regime (red-strobe at the top and mid levels, and steady-burning red incandescent lighting at the ¾ and 1/3 height levels for MSP towers; steady burning and blinking red incandescent lighting on the privately-owned towers [FAA 2000 A-14, FAA Style A red obstruction lighting standards]). The FAA kindly provided variances in 2004 that allowed lights to be changed on 18 of the MSP towers for the 2 seasons of monitoring in 2005. Once lights were changed out, the 18 MSP towers included unguyed and guyed towers, N=6 (3 unguyed, 3 guyed) with all white strobe lights, N=6 (3 unguyed and 3 guyed) with all red strobe lights, N=6 (3 unguyed and 3 guyed) with all red-blinking incandescent lights, and N=3 guyed with "status quo" lighting. This represented the first time the FAA did not require lit study towers to contain any steady burning red incandescent (L-810) lights.

With the changed out lighting, the results from the 2005 field seasons were very telling. Of the MSP towers with changed out lighting that did <u>not</u> contain any steady burning L-810 red incandescent lights, on average 3.72 birds/tower were killed during the 2 seasons at towers with either all strobe (L-865 white strobes or L-864 red strobes) or all blinking red incandescent lights (L-864 flashing beacon lights[3]). On average, 13.0 birds/tower were killed during the 2 seasons at towers that contained steady-burning

[3] The FAA does not differentiate between L-864 red lights other than that one is a flashing beacon (FAA 2000: A1-14, Fig. 13) and the other is a strobe light (FAA 2000: A1-18, Fig. 17).

lights and blinking or strobe lights. Although a slight trend exists toward less attraction to white strobe than to red strobe lights, Gehring *et al.* (2006) and J. Gehring (manuscript in prep., statistical analysis, 2006 pers. comm.) did not find a statistical difference between white strobes and red strobes provided that no steady burning L-810 lights were present. P. Kerlinger (partner, Curry & Kerlinger, 2006 pers. comm.) and W. Erickson (consultant, WEST Inc., 2006 pers. comm.) reviewed lighting and bird attraction data from studies conducted at wind turbine facilities. Their reviews suggested the same trend that blinking and strobe lights are not as attractive as steady burning lights.

Evans *et al.* (2007) subjected night-migrating birds in cloud conditions at ground level (100% cloud cover) to alternating short periods of different artificial light, including lights of various intensities, wavelengths, and flash rates from a ground-based lighting device. The study, conducted in October 2005 in Ithaca, New York, represented the first direct investigation of these variables causing bird aggregation in inclement weather. An acoustic transducer and directional microphone, positioned 16 feet from the light source, were used to identify a strong or weak presence of birds near the light source. Spectrographic analysis was performed on loud calls and species classification was based on the flight call reference guide by Evans and O'Brien (2002). Bird aggregation was also visually documented at the site. Birds were induced to congregate at all wattage levels of white steady-burning light tested, included the lowest lumen output of a 250W halogen lamp in a reflector housing. However, no aggregation was noted during any of the 5 nights of 100% overcast conditions at the 1,500W white flashing halogen light (24 flashes/min., 0.2 sec. on-time/flash). The results from this study further reinforce the conclusions reached by Gehring *et al.* (2006), Gauthreax and Belser (2006), and J. Johnson (CTWG report 2005 pers. comm.).

Based on recent lighting research, the Service feels there exists adequate, statistically significant data to support recommending use of medium -- or if allowed by FAA, minimum intensity (< 2,000cd) – white strobe lighting flashing ideally 20 times per minute provided no steady-burning (L-810) lighting is used in conjunction with strobe lighting.

> **FCC NPRM Request: "***We invite comments on the possible use and benefits of other lighting systems, such as red strobe or red blinking incandescent lights…"* (p. 67512)

Red Strobe and Red-blinking Incandescent Lighting.

Recommendation to FCC: If minimum intensity white strobe lights cannot be used on a communication tower (*e.g.*, a local zoning ordinance prohibits it), the Service recommends that the FCC provisionally require use of minimum intensity, maximum off-phased red strobe lighting (L-864 red strobe; 20 flashes per minute, $\leq$ 2,000 cd) and/or red flashing incandescent lighting (L-864 red beacon, 20 flashes/min., $\leq$ 2,000 cd) as a secondary option. This recommendation is made provided that no steady-burning lights (L-810) are used in conjunction with strobe or blinking lights. Once future research results become available in 2007 and beyond, we hope to better understand the role of

light color, flash rate, duration and intensity. Studies are slated to begin in spring 2007 at 6 tall (> 1,000-ft AGL) towers in Michigan using the 3 tall (> 1,000 ft AGL) private towers from the MSP study, 3 other tall towers in that State, and a 650-ft AGL LORAN tower in Cape May, New Jersey. It is hoped that the FAA will also allow lighting variances on these towers as they did in 2004 for 18 of the MSP study towers. If these findings and perhaps others further reinforce the Gehring *et al.* (2006) research results showing minimum bird attraction to towers illuminated only with red strobe or red blinking lights, this leaves open the opportunity for FCC to modify the regulation requiring secondary use of red strobes or red blinking lights without re-instituting proposed rulemaking.

Justification for Service Recommendation: Gehring *et al.* (2006) found that by extinguishing steady-burning/non-blinking L-810 red lights, avian fatalities at Michigan towers were reduced by 71%. While there is a possible trend and some statistical support that white strobes (L-865) are involved in the fewest avian fatalities, followed by red strobes (L-864 strobes), and then by blinking red incandescent lights (L-864 beacons), Gehring *et al.* (2006) did not find a statistical difference in avian fatalities among towers lit by white and red strobes, and red blinking incandescent lights. The findings suggest that a blinking light versus a steady-burning light is more important than the color of the blinking light. These findings have been reinforced by research conducted by Avery *et al.* (1976), Gauthreaux and Belser (2006), and others.

Evans *et al.* (2007), however, did not find either steady-burning red (L-810) or red flashing lights (L-864 beacons) induced bird aggregation when tested separately at ground level in 100% cloud cover in Upstate New York. As one possible explanation, they suggested that the disorientation to red light only occurs if birds are actively using magnetoreception and the red light creates an imbalance in the magnetoreception mechanism. On clear nights, for example, some avifauna use star and moon light as sources for navigation, especially stellar arrays around the North Star (Sauer 1957, Emlen 1967). On cloudy nights, however, evidence suggests that birds may orient by sensing the axial inclination of the earth's magnetic field through a light-dependent mechanism, probably located in the avian eye (Wiltschko *et al.* 1993, Ritz *et al.* 2004, Thalau *et al.* 2005, Wiltschko *et al.* 2006). Gauthreaux and Belser (2006) first published this hypothesis in a peer-reviewed publication (Rich and Longcore 2006) that aggregation around communication towers with red lights may be due to disruption of magnetoreception caused by the red light. Their theory was based, in part, on the laboratory studies conducted by Wiltschko *et al.* (1993), Deutschlander *et al.* (1999), Wiltschko and Wiltschko (1999), and Wiltschko and Wiltschko (2002). The Evans *et al.* (2007) study was conducted over 5 nights of 100% cloud cover down to ground level, allowing light manipulation during 29 hours. Because of the challenges in sorting out the mechanism(s) of bird aggregation to artificial lights, the short duration of the Evans *et al.* study, and the lack of replication of this research, more laboratory and field studies will be necessary to better understand aggregation to certain light types as well as the role of magnetoreception.

While further research is needed, especially focused on blinking/strobe versus steady-burning lights, and on lighting color, the Service concurs that evidence from Gehring *et al.* (2006) study is substantial and statistically significant to provisionally support use of red strobe and/or red blinking lighting regimes as a secondary option if white strobes cannot be used. This recommendation is predicated on the use of no steady-burning lights. The Service suggests that such rulemaking should be written in a manner that accommodates later changes in FAA Advisory [lighting] Circulars, and inclusion of later research findings, without a future change in FCC's rules. This lighting change would require the approval of the FAA and the re-issuance of any no-hazard determinations for pilots.

Red Strobes or Red Blinking Incandescent Light Use Without Steady Burning Lights.

> **FCC NPRM Request: "***We invite comments on the possible use and benefits of lighting systems … including the use of red strobe or red blinking incandescent lights without the use of red steady lights."* (p. 67513).

Recommendation to FCC: The existing research strongly suggests that there is a relationship between a communication tower's nighttime lighting system and its propensity to cause avian collisions. The 5-season MSP tower study (Gehring *et al.* 2006) clearly documented in a statistically significant fashion that by eliminating (extinguishing) steady-burning L-810 lights on communication towers avian injuries and fatalities were reduced by 71%. The scientific evidence also supports the conclusion that lights that flash or blink appear to be more important in minimally attracting birds than is the color of the blinking light (currently only white and red lights are allowed by the FAA as pilot warning colors on communication towers).

We encourage the FCC to work directly with the FAA's Hughes Technical Center, encouraging the FAA to perform conspicuity tests evaluating red and white strobe and red-blinking tower lighting systems without the presence of any steady-burning L-810 lights. We suggest this recommendation be included as part of the rulemaking. Once the FAA conducts pilot conspicuity tests on these lighting regimes and feels comfortable amending their most recent lighting Advisory Circular, the FCC should include this update as a part of their regulations without a future change in FCC's rules. This recommendation would allow tower erectors and owners/operators additional options which also should significantly reduce avian collision injury and mortality.

> **FCC NPRM Request:** "*We seek comment on any action we should take regarding the lighting of existing towers."* (p. 67513)

Recommendation to FCC: To minimize the financial burden on tower owners and operators currently managing existing towers while minimizing impacts to migratory birds, the Service recommends that:

1) once tower broadcast licenses expire and must be re-issued, tower lighting systems must be retrofitted preferably with minimum intensity, maximum off-phased white strobe lighting as a first option; followed by minimum intensity, maximum off-phased red strobe lighting; and finally with minimum intensity maximum off-phased red blinking incandescent lighting. Pending FAA approval, all L-810 steady burning lights should also be removed as part of the retrofit.
2) All new towers must be fitted in decreasing order of priority with white strobes, red strobes, or blinking incandescent lighting as previously recommended. No L-810 side lights should be used.
3) When L-810 lights burn out, they should each be replaced in decreasing order of priority with white strobe, red strobe, or red blinking incandescent lighting as previously recommended.
4) From the time this rulemaking is finalized and published as regulation, we recommend that all towers be retrofitted within no longer than 5 years of that date (preferably a shorter duration) in decreasing order of priority with white strobe, red strobe, or red blinking incandescent lighting as previously recommended. No L-810 side lights should be used.

Guyed *vs.* Unguyed (self-supporting) Towers and Tower Height.

FCC NPRM Request: "*We seek comment on whether we should adopt any requirements governing the use of guy wires because of the potential impact posed to migratory birds."* (p. 67513-67514). "*We seek comment on whether to adopt any requirements relating to the height of communication towers in order to minimize the impact of such towers on migratory birds."* (p. 67514)

Service Response: Virtually all the previously cited literature in this review indicates that large bird kills occurred at tall, guyed towers (Manville 2005, Gauthreaux and Belser 2006). These collision events tend to occur in both spring and fall when weather conditions are inclement and songbirds are migrating. During nighttime bad weather, broad front neotropical songbird migrations may be disrupted. Clouds, precipitation, fog or related inclement weather force birds down to lower altitudes. This puts songbirds in direct contact with lighted structures and thus at risk. It has been proposed by Graber (1968) that birds are not attracted to tower lights from great distances but rather bird aggregation around lights results when bird migratory trajectories by chance intersect with the lighted auras of towers created by the water droplets in clouds, fog, or precipitation. Later studies by Avery *et al.* (1976) and Larkin and Frase (1988) reinforced this conclusion. Whatever the specific mechanism of the attraction, a detailed list of literature sources (*e.g.*, Manville 2005, Gauthreaux and Belser 2006) confirm that tall, guy-supported towers put birds at serious risk in inclement weather.

In a recent study at guyed communication towers in Wisconsin, Kruse (1996) found a high correlation between the specific locations of dead birds and their immediate

proximity to guy support wires. The study strongly implicated the guy wires as the cause of death.

The MSP tower study (Gehring *et al.* 2006) provides the most definitive evidence yet available regarding the impacts of tall-guyed (> 1,000 ft AGL) and medium-height guyed (380-480 ft AGL) towers on migratory birds. Based on the results of three, 20-day field seasons in 2003 and 2004 in Michigan, 7.5 birds per tower were found dead under guyed towers 380-480 ft AGL in height while a mean of 0.5 birds per tower were found under un-guyed towers the same height. Guyed towers > 1,000 ft AGL killed significantly more birds – averaging 32.5 birds per tower -- than both guyed and unguyed 380-480 ft AGL towers. As expected, unguyed towers proved to be least impacting to migratory birds. While the focus of 2005 research was on bird attraction to various lighting regimes, the tall (> 1,000 ft AGL), guyed towers killed on average 42.0 birds/tower during those 2 seasons of study (Gehring *et al.* 2006).

Recommendation to FCC: These findings further reinforce the Service's second and seventh recommendations in our voluntary communication tower guidelines to avoid using guy wires whenever possible, and to construct towers no higher than 199 ft AGL, avoiding lighting. The Service recommends that:

1) the FCC – provided they have the authority – require tower owners and operators to collocate proposed new communication towers on existing towers or other tall structures such as water and electric transmission line towers, where practical.[4] New towers should be designed structurally and electronically to accommodate the applicant's antenna and antennas for at least 6 to 10 additional users, unless the design would require the addition of lights and/or guy wires to an otherwise unlit and/or unguyed tower. This suggestion coincides with the Service's first 2000 voluntary tower guideline.
2) The FCC establish by rule that communication towers, where practicable, be less than 200 ft AGL in height,
3) be of monopole or lattice design,
4) contain no guy wires and no lights[5], and
5) that this rule represent the environmentally preferred industry standard for tower placement, construction, and operation.
6) We suggest the FCC require this standard for the construction of all new communication towers, where possible[6], and the repair or re-construction of outdated or existing damaged towers, and the upgrade and modification of existing towers, again where monopole or lattice replacements can be used.

[4] Where frequencies compete (*e.g.,* cellular phone frequencies overlap/"bleed") or where frequency length or broadcast distance requires higher towers, collocation may not be feasible.
[5] Pilot warning lighting may be required for towers less than 200 ft AGL within 3.8 statute miles of airport approach and departure control runways, and along major highway travel corridors.
[6] We recognize that some towers, such as radio, television, LORAN, and others, by their very nature and frequency – must be taller than 199 ft AGL.

7) We suggest that the FCC require that towers no longer functioning be removed within 12 months of becoming inoperative, coinciding with our 12th voluntary guideline.

8) Where tower height and guy wires become an issue, the Service recommends more, shorter, un-guyed towers as opposed to fewer but higher, guyed and lighted towers in order for operators to provide equivalent service. This coincides with the seventh recommendation in our guidance where we suggest that a larger footprint is preferable to the use of guy wires.

9) Taller towers exceeding 199 feet in height, up to some 800+ ft AGL, do not necessarily need to be guyed. For example, an un-guyed, lattice tower near the campus of Catholic University, Washington, DC, is some 750 ft AGL in height. We recommend that the FCC work with tower owners and operators, environmental representatives, and agencies to agree upon a minimum communication tower threshold height above the 199-ft AGL level where towers would remain unguyed (*i.e.*, monopole or lattice), recognizing that in areas subjected to hurricanes, tornadoes, williwaws and high winds, they may need to be guyed.

Marking Guy Wires.

FCC NPRM Request: "*We seek comment on the effectiveness of [guy] wire markings in mitigating migratory bird collisions with communication towers."* (p. 67514)

Service Response: Considerable research has been conducted on the effectiveness of bird deterrent devices (*e.g.*, marker balls, bird diverters, and paint) in the reduction of avian collisions at high-tension transmission power lines, with some results published in the scientific literature. For example, strikes were reduced by 53% at a South Carolina transmission line outfitted with yellow marker balls (Savereno *et al.* 1996). In southwestern Colorado, polyvinyl chloride plastic dampers reduced collisions of cranes and waterfowl by 61% while yellow fiberglass square plates reduced mortality to the same species by 63% (Brown and Drewien 1995). In Alaska, where wind and ice loading are serious concerns for tower stability, guy wires have been marked with a number of devices, primarily to prevent wire collisions by ESA-listed Spectacled and Steller's Eiders (E. Lance, Anchorage Fish and Wildlife Field Office, 2007 FWS pers. comm.). Balls, coils and sections of guy guards have withstood severe weather without compromising the integrity of towers. Flapper type bird flight diverters have less successfully met the challenges posed by Alaskan weather.

However, while considerable research continues on the efficacy of bird diverters and other warning devices on electric transmission lines (see Bridges *et al.* 2005 for an overview), there are many deterrent products on the market purported to reduce avian strike mortality at wires including guy supports at communication towers. Virtually all the scientific evidence supporting their efficacy at guy wires, however, is at best based on anecdotal reports. The Service is unaware of any peer-reviewed journal-published studies

of such devices on communication tower guy wires. While the issue involves making the wires visible to birds, diurnally active avifauna tend to avoid marked wires by flying above them (Manville 2005). Whether the same mechanism occurs at marked guy wires on communication towers remains unclear. There is yet no published scientific studies on the effects of marked guy wires on night migrating songbirds, particularly in inclement weather.

If the major purpose of marking guy wires is to minimize nighttime songbird collisions, the Service is unable to support their use until peer-reviewed studies are published in the scientific literature validating their efficacy. We continue to encourage the developers of deterrents to test them in scientifically rigorous ways and publish their results in pertinent scientific journals.

Recommendation to FCC: The Service currently recommends limited use of bird deterrent devices on tower guy support wires. In the case of endangered species such as the Whooping Crane, the loss of even 1 bird is significant when the total number of birds in the only remaining natural wild flock is less than 250. Collision with power lines is the number one source of mortality of fledged Whooping Cranes (Manville 2005). Although a Whooping Crane has never been documented hitting a communication tower or its guy support wires, most collisions go undetected. It is reasonable to expect that a Crane would have as much difficulty seeing a guy wire as it would seeing a power line, especially when Whooping Cranes are flying in low light conditions, when the weather is inclement, or when they occasionally fly at night. To reduce the chance of even a single mortality event of a Whooping Crane hitting a tower, guy wires should be marked on all towers within the Whooping Crane migration corridor. This corridor is a pathway approximately 150 miles wide running through the middle of the States of North Dakota, South Dakota, Nebraska, Kansas, Oklahoma, and Texas, and includes extreme eastern Montana (T. Stehn, FWS Whooping Crane Coordinator, 2006 pers. comm.). These marking devices should also protect Sandhill Cranes that also migrate through this area.

In the case of threatened Spectacled and Steller's Eiders, the Service continues to recommend using marking devices on guy wires best able to withstand the severe weather conditions in Alaska without compromising tower integrity. Unpublished data supports this recommendation (E. Lance, Anchorage Fish and Wildlife Field Office, 2007 pers. comm.).

As new studies are conducted on the efficacy of deterrents on guy wires, and the results are published in scientific journals, the Service recommends that FCC provide an opportunity to amend their regulations regarding use of guy wire markers without a change in rulemaking.

Tower Location.

FCC NPRM Request: *"We seek comment on whether towers located in certain areas might cause a significant environmental impact on migratory birds."* (p. 67515) *"We seek comment as to whether to amend section 1.1307(a) of the Commission's rules*

to routinely require environmental processing with respect to migratory birds."(p. 67515).

Service Response: The FCC procedures for NEPA compliance require applicants to consider the potential environmental effects, as well as the effects on historic properties, from construction of antenna facilities or structures if the proposed facility is located in or may affect resources identified within 1 of 8 listed categories. Those effects must be disclosed in an environmental assessment (EA) filed with the FCC for review. Migratory birds, however, unless Federally listed or their habitats are designated "critical," are not included in the FCC location review process. Neither the individual impacts of a tower nor the cumulative impacts of all communication towers are included as part of the NEPA review process. The Service first raised this concern in 1999 at a public workshop on avian collisions at towers held at Cornell University (Willis 1999). More recently, we have raised it at all meetings of the Communication Tower Working Group, in a Service briefing for FCC staff, in a Service briefing for the senior legal advisors to the FCC Commissioners, and in the NOI.

The Service developed voluntary guidelines for the wind turbine industry, published in July 2003, outlining the need for a voluntary site evaluation and review process for wind development on private lands. We provided a series of recommendations for an environmental review in our wind turbine guidance (http://www.fws.gov/habitatconservation/wind.pdf; this website also includes the appended 2000 voluntary FWS communication tower guidelines). The intent, primarily, is to minimize impacts to birds, bats,[7] other trust resources and their habitats from wind development. Where a Federal nexus exists (*e.g.*, public land, public funding, or a Federal permit), birds are considered part of the NEPA review process for wind energy development. The Service feels the same should hold true for the communication tower industry. Since the FCC already includes listed avifauna (and other listed species) and their critical habitats in their NEPA review process, migratory birds should also be included as part of their NEPA review requirements.

In the Service's voluntary 2000 communication tower guidelines, we suggested the need for a post-construction monitoring and review process (recommendation no. 11). Conducting such a review at each communication tower, or at least at a statistically significant sample of communication towers of different height classes, would validate (or negate) the pre-construction tower assessment conducted through NEPA review suggested herein.

Permanent, bright, steady-burning lights on the ground near towers can further contribute to the hazards posed by an FCC-regulated communication tower, especially

[7] Bat carcasses are invariably discovered during bird mortality studies conducted at communication towers around the country, but until very recently have not been included as part of the mortality datasets in reports released to the public or published in the scientific literature. However, with recent documented high levels of bat mortality at 2 wind energy facilities in the East, the Service recommends that bats – especially any State-listed or "candidate" species – should be included as part all communication tower reviews. Any Federally listed bats should already be covered under the existing NEPA review process.

during nighttime inclement weather conditions. The situation of ground lighting was implicated in the October 2005 Pennsylvania bird kill, previously referenced. It was also documented in September 1999 at a brightly-lit television station at the base of a 533-ft AGL tower in Binghamton, New York. Especially during inclement weather, birds appeared to be more attracted to and congregated in the spotlight-illuminated area that remained lit all night (W. Evans, Old Bird Inc., 2006 pers. comm.). Bright, steady-burning lights near the base of wind turbines in West Virginia were very likely responsible for the largest yet-recorded bird kill at a U.S. wind turbine facility during heavy fog in fall 2004 (P. Kerlinger, Curry & Kerlinger LLP, 2004 pers. comm.).

The impacts from tower location in Alaska tend to be coastal-based. Most tower collisions noted in the Service's Alaska database occurred at coastal locations, and many occurred during periods of low visibility, including fog and darkness (E. Lance, Anchorage Fish and Wildlife Field Office, 2007 FWS unpubl. data). The mean number of days of heavy fog in coastal Alaska, 1971-2000, was approximately 26 days/year. However, the greatest risk of bird collisions occurs within coastal villages, generally those that do not exceed a few hundred residents and are situated in compact communities. As a result, most towers – regardless of their height – are considered within aircraft navigation safety corridors and are lighted with steady-burning red lights.

Disturbance can result in effects to populations which may cumulatively impact their survival. The FWS Wyoming Field Office, for example, recommends maintaining a disturbance-free zone of 0.5 mile around raptor nests during the nesting season (February 1 through August 15) for all species except Ferruginous Hawks and Bald Eagles. The latter should be protected by a 1-mile, disturbance-free buffer (B. Kelly, Field Supervisor WY Field Office, FWS 2006 pers. comm.). Little attention in this NPRM has been given to the visual disturbance of communication towers to avifauna, especially impacts to "prairie grouse" (*e.g.*, Greater and Lesser Prairie-chickens, Gunnison and Greater Sage-grouse, and Columbia Sharp-tailed Grouse) and other grassland (*e.g.*, Bobolink, Savanna Sparrow, and Sedge Wren) and shrub-steppe avifauna (*e.g.*, Sage Sparrow, Brewer's Sparrow, and Sage Thrasher). Tall structures have been shown to result in abandonment of nest site areas and leks, especially for "prairie grouse" (Manville 2004). Site disturbance is another issue which needs to be reviewed as part of procedures for tower placement (see beyond for recommendations).

The placement of communication towers continues to be of concern to the Service, and should be addressed on a site by site basis. For example, a tower's location on the landscape may impact migratory birds. Diurnal raptors use escarpments and ridges preferentially due to favorable wind conditions. Like the Service's recommendation to set wind turbines back from ridge and escarpment edges, placing communication towers several hundred feet back from ridge fronts, cliffs, and escarpment edges should decrease risk of raptor collisions (D. Krueper, Migratory Bird Program, FWS 2007 pers. comm.).

Another issue of communication tower siting concern involves wetlands, as has been mentioned elsewhere in this document. The Service wishes to stress the importance

of avoiding tower siting in wetlands whenever possible. This issue needs especially careful consideration by the FCC in regard to proposals for siting towers.

In the Service's earlier NOI response to Docket 03-187, we discussed at length the need for additional research. The Services' New Jersey Field Office (NJFO) has, for example, recommended that their State be considered a priority area for tower research. The Field Office is aware of only 1 small study conducted to date in New Jersey. Due to a high human population density with its incumbent demand for more phone, radio, television, and Internet access, growth of towers in New Jersey continues at an exponential rate. New Jersey is also a critically important area for migratory birds due to its latitude, geography, and high diversity of ecosystems and habitats in a small State (Dunne 1989, Vernachio *et al.* 2003). Recently, the Cape May Bird Observatory agreed to study towers in the Meadowlands with funding from the State, but work has yet to begin due to access and other issues. If funding becomes available, staff from the NJFO are available to facilitate tower research. As previously mentioned, a tower study at a U.S. Coast Guard LORAN tower in Cape May is slated to begin this spring.

Not all communication towers pose a serious risk to migratory birds, bats (including Federally listed chiropteran) and/or their habitats. As previously documented, unguyed and unlit towers less than 200 ft AGL generally pose the least risk to trust resources and/or their habitats – with the exception of short towers that may impact wildlife species on wildlife refuges, conservation areas, native prairies, hill or mountain tops, wetlands, rookeries, and breeding colonies and major foraging areas, or where Federally listed threatened and endangered species are present and/or their habitats are designated as "critical." If unguyed, unlit towers pose the least risk it seems reasonable and prudent to recommend that they generally be exempted from resource review and assessment for birds, bats, and their habitats – with the exceptions mentioned above. If the FCC agrees to establish into rulemaking an "environmentally preferred industry standard" that addresses height, lighting, and tower construction (*i.e.*, unguyed lattice or monopole), as we have previously recommended in these comments, then deviations from such standards could be one of the criteria requiring an applicant to perform a detailed study of a proposed tower along with the preparation of an EA. The determination of risk to migratory birds, bats, and their habitats, and thus the possible need for more study, could also be based on Service review of a revised Tower Site Evaluation Form, similar to the one developed by the Service that accompanied the 2000 tower guidance (see the previously referenced wind turbine guidance website above to access this form). If an amended evaluation form could be agreed upon by the Service, the FCC, industry, and the conservation community, the FCC could require through rulemaking that the industry use, complete, and submit this form to the appropriate Service Field Office for review. This would allow the Service to make "study-no study" and "go-no go EA" determinations. Work loads would be minimized on our Field Office and FCC staff, and it would not place undue burden on applicants.

Service Recommendation: We recommend the following:

1) The FCC establish by rule that communication towers, where practicable, be less than 200 ft AGL in height, be monopole or lattice in design, contain no guy wires and no lights, and that this rule represent the environmentally preferred industry standard for tower placement, construction and operation (see recommendations to the FCC under "guyed vs. unguyed [self-supporting] towers and tower height", previously suggested).

2) Determining risk from communication towers to migratory birds and their habitats – and thus the need for future study and a possible EA – is very important. We recommend that the FCC through rulemaking require the development and use of a Tower Site Evaluation Form, similar to the one created by the Service that accompanied the 2000 tower guidance. The Evaluation Form should be developed by the FCC in consultation with the Service, industry, and the conservation community. Once completed, the FCC should require through rulemaking that the industry use, complete, and submit this form to the appropriate Service Field Office for review, allowing the Service to make a "study or no-study" determination and a recommendation for conducting an EA.

3) If the FCC is willing to establish an environmentally preferred industry standard and require the applicants to complete a Site Evaluation Form to be provided to the Service for review, we recommend a ninth category be added to the FCC's NEPA procedures at 47 CFR 1.1307(a) which should read as follows: "(9) Facilities that due to their proposed location and/or structural makeup (height, support, and lighting) may result in substantial risk of collisions by migratory birds and/or adverse modification of habitats supporting migratory birds. To ascertain whether a proposed action may affect migratory birds, an applicant shall complete a Site Evaluation Form and provide it to the U.S. Fish and Wildlife Service Ecological Services Field Office having jurisdiction for the area in which the facility is proposed to be located. If, after review of the Site Evaluation Form, the Service is of the opinion that the applicant has made all reasonable efforts to minimize the impacts of the proposed facility on migratory birds, including compliance with the Commission's environmentally preferred industry standards, the Service will advise the applicant of that fact. If, however, the Service is of the opinion that the applicant has not made all reasonable efforts to minimize the impacts of the proposed facility on migratory birds and that an EA should be prepared by the applicant for the facility, the Service will forward the Site Evaluation Form and the Service's recommendation to the Commission for its consideration and will alert the applicant of that action."

4) This evaluation process should include reviews of all proposed new and modified towers.

5) Where further environmental studies are recommended by the Service, these studies should include review of on-the-ground and airspace resources.

6) For airspace resources (*i.e.*, birds and bats) we recommend that FCC require applicants to provide data from remote sensing studies involving the uses of radar and supporting technology such as acoustic and/or infrared monitoring to demonstrate that the airspace that would be occupied by the tower(s) at the applicant's preferred site(s) does not present a substantial risk to migratory birds and/or their habitats. This airspace review should include the spatial habitat at least to the height of the proposed tower(s), and if the tower(s) is to be guyed, the spatial area that is to include the guy support wires.

7) For on-the-ground resources, we recommend that FCC require studies commensurate with the setting and site conditions. A brownfield site or an urban setting, for example, would not need the same level of study and analysis as an unfragmented area containing native vegetation and natural habitat.

8) Where towers are to be constructed, we recommend that FCC strongly discourage proponents from installing and using ground-based, steady-burning lighting.

9) We recommend that FCC require through rulemaking a post-construction monitoring process that assesses and evaluates mortality and/or habitat fragmentation and disturbance at a statistically significant sample of communication towers of different height classes (*i.e.*, unlit, lit, un-guyed, guyed, cellular, radio, television, DTV, emergency broadcast, and others) within the United States. Ideally, post-construction monitoring should be required for at least 3 years post-development, and mortality would be reported annually to the FWS as a condition of a scientific collecting permit.

10) We recommend that FCC implement the Service's 2000 voluntary communication tower guidelines into rulemaking. The FCC would be responsible for informing license permit applicants of the guidelines, overseeing implementation of the guidelines, and would not depend on applicants independently contacting the Service for recommendations. Adopting the guidelines into rulemaking would expedite the consultation process, eliminate the need for the Service to review every communication tower project other than through a Site Evaluation Form, and would establish a basis for programmatic consultation.[8]

[8] During the past 2 years, for example, the Wyoming Ecological Services Field Office (WYFO) has reviewed on average 1 FCC communication tower project per month. The WYFO is aware of additional towers built in Wyoming without the benefit of Service guidance since project proponents have not contacted the Field Office. The Service's NJFO has reported that, among others, very tall broadcast towers have often not been submitted for Service review. These have included towers at Corbin City (765 ft AGL), Little Egg Harbor (1,000 ft AGL, at a coastal site), and Bayonne (2,000 ft AGL, a key migratory pathway). In each case, the NJFO learned of these proposals from third-party or media sources rather than project proponents or the FCC. When proposed tower projects are not submitted to a Field Office for review, there is the potential for towers to be built without the project proponent's full understanding of FCC responsibilities under MBTA, BGEPA, and ESA.

Summary

Thank you for the opportunity to comment on this very important initiative. We have been working with the FCC for more than 7 years to include migratory birds as part of the tower siting, review, and licensing process. We encourage the FCC to include in rulemaking the recommendations suggested herein by the Service that will significantly reduce avian impacts but continue to allow providers full communication services and capabilities. Should you have any specific questions about this review, kindly contact Dr. Albert Manville, Wildlife Biologist, Division of Migratory Bird Management, at 703/358-1963 or Albert_Manville@fws.gov.

Respectfully submitted,

/s/

Kenneth Stansell
Acting Deputy Director

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