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## SUMMARY OF COMMENTS

PCIA is the principal trade association representing the wireless telecommunications and broadcast infrastructure industry. PCIA represents companies that manage and develop communications towers and antenna facilities for all types of wireless and broadcast services. As the trade association of the tower industry, PCIA is very familiar with anecdotal reports made by environmental and wildlife conservation groups of massive “bird kills” from collisions with towers. PCIA consistently has taken the position that given the scarcity of reliable scientific data on this issue, no reasonable conclusions can be drawn from these reports.

In these Comments, PCIA states that conclusive scientific research establishing a consistent, causal connection between communications towers and migratory bird deaths presently does not exist. Based on our members’ collective experience, PCIA believes that communications structures do not play a significant role in migratory bird deaths. Indeed, the attached report prepared by environmental consultant Woodlot Alternatives, Inc., provides a scientific basis for that belief. Consequently, given the lack of reliable, scientific data available on this issue, PCIA believes that it is premature for the FCC to consider changes to the current regulatory scheme applicable to communications towers.

**Before the  
FEDERAL COMMUNICATIONS COMMISSION  
Washington, DC 20554**

In the Matter of )  
 )  
Effects of Communications Towers on ) WT Docket No. 03-187  
Migratory Birds )

**COMMENTS OF PCIA**

PCIA, The Wireless Infrastructure Association (“PCIA”), by its attorneys and pursuant to the Notice of Inquiry released in this docket<sup>1</sup>, hereby files these comments in the Commission’s inquiry into whether communications towers pose a risk to migratory birds. As detailed below, PCIA submits that, individually or cumulatively, conclusive scientific research establishing a consistent, causal connection between communications towers and migratory bird deaths presently does not exist. Indeed, in our members’ collective experience, communications structures do not play a significant role in migratory bird deaths. Consequently, given the lack of reliable, scientific data available on this issue, PCIA believes that it is premature for the FCC to consider changes to the current regulatory scheme applicable to communications towers.

**I. Background**

**A. PCIA’s Role**

PCIA is the principal trade association representing the wireless telecommunications and broadcast infrastructure industry. PCIA represents companies that manage and develop communications towers and antenna facilities for all types of wireless and broadcast services. PCIA members build and manage the antenna structures that are needed to provide Americans

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<sup>1</sup> Notice of Inquiry in WT Docket No. 03-187, *In the Matter of Effects of Communications Towers on Migratory Birds*, FCC 03-205, released August 20, 2003 (“NOI”).

with the universal, seamless, digital and broadband services for wireless and broadcast communications. PCIA members currently own or manage approximately 50,000 towers throughout the United States, its territories and possessions. Accordingly, PCIA and its member companies have a wealth of direct experience in assessing the impact of U.S. communications structures<sup>2</sup> on their surrounding environments. As the trade association of the tower industry, PCIA is very familiar with anecdotal reports made by environmental and wildlife conservation groups of massive “bird kills” from collisions with towers. However, PCIA consistently has taken the position that given the scarcity of reliable scientific data on this issue, no reasonable conclusions can be drawn from these reports.<sup>3</sup> With the FCC’s release of the *NOI* in this proceeding, PCIA is hopeful that a more rigorous, analytical review of both the issue and the existing research will be conducted so that any future decisions regarding regulatory policy changes can be premised on a solid, scientific foundation.

## **B. PCIA’s Contribution to this Proceeding**

Given the Commission’s recognition that the little scientific research that does exist on this issue has not been thoroughly studied and analyzed, PCIA determined that a key step toward advancing the record in this proceeding is to perform a comprehensive review of the extant literature to determine what, if any, correlation exists between communications structures and migratory bird mortality. To this end, together with the Cellular Telecommunications & Internet Association (“CTIA”) and The National Association of Broadcasters (“NAB”), PCIA retained Woodlot Alternatives, Inc. (“Woodlot”), a Maine-based environmental consultancy, specializing in wildlife biology and ornithology. Founded in 1987, Woodlot lists federal, state and local

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<sup>2</sup> Because wireless facilities may be installed on a wide variety of support structures, including rooftops, monopoles, utility poles and towers, PCIA prefers to use the term “Communications structures”. However, in order to be consistent with the terminology used in the *NOI*, in these Comments PCIA will use the two terms interchangeably.

<sup>3</sup> See, e.g., “PCIA Signs Industry Letter on Avian Mortality Research”, June 25, 2002, [http://www.pcia.com/pcia\\_advocacy\\_filings.htm](http://www.pcia.com/pcia_advocacy_filings.htm).

governmental agencies, universities, and nature conservancies throughout North America and abroad among its clients.<sup>4</sup> Pursuant to the *NOI*'s request for "comment and analysis of existing scientific research and studies relating to the impact that communications towers may have on migratory birds",<sup>5</sup> Woodlot was asked to analyze the existing scientific literature, and also to assess the State of Michigan Avian Collision Study ("Michigan Study") currently being conducted.<sup>6</sup> As detailed in the attached report,<sup>7</sup> Woodlot conducted an exhaustive review of the published literature in order to determine the sufficiency and validity of the existing data regarding migratory bird collisions with communications towers.

### **C. PCIA's Member Survey**

To ensure that the record reflects the experiences of all stakeholders most directly affected by this proceeding, PCIA conducted an avian mortality survey of its members, focusing on incidences of avian mortality around members' towers, as well as the various factors that the FCC has identified as possibly contributing to bird/tower strikes.<sup>8</sup> As mentioned above, PCIA members own or manage some 50,000 towers. PCIA received responses from members who own or manage more than 37,000 towers, which translates into a response rate of approximately 74% of our membership's tower inventory. The tower siting experience level of the individual survey respondents ranged in duration from five to 22 years. As elaborated on below, PCIA members overwhelmingly state that they do not observe nor find evidence of bird collisions around their towers. PCIA's members did not report *any* incidences of significant bird kills, and the few respondents who did note evidence of dead birds around towers state that these were

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<sup>4</sup> For more information about Woodlot, see [www.woodlotalt.com](http://www.woodlotalt.com).

<sup>5</sup> *NOI* at ¶ 14.

<sup>6</sup> See FCC News Release, "Wireless Bureau Announces the State of Michigan to Initiate a Study Assessing the Impact of Communications Towers on Migratory Birds, released September 17, 2003 ("News Release").

<sup>7</sup> See Exhibit A, "An Assessment of Factors Associated with Avian Mortality at Communications Towers – A Review of Existing Scientific Literature and Incidental Observations", November 2003, prepared by Woodlot Alternatives, Inc. ("Woodlot Report").

<sup>8</sup> See Exhibit B for a copy of the questionnaire circulated to all PCIA member companies.

single, isolated incidents that occurred over a lengthy period of time and usually after inclement weather. Accordingly, based on our members' direct collective experience, PCIA firmly believes that communications towers do not significantly contribute to migratory bird mortality rates, especially when compared to other human-caused avian mortality statistics.

## II. ASSESSMENT OF EXISTING SCIENTIFIC LITERATURE

In the *NOI*, the Commission states “it appears that the current knowledge about both the extent to which communications towers kill migratory birds and the specific factors that may contribute to any danger is limited.”<sup>9</sup> The Commission also noted that there has been very little recent research on this issue, and that other than a few scientific reviews conducted in the late 1970s, most literature on this issue is “anecdotal” and “the literature itself has not been examined analytically.”<sup>10</sup> The findings in the Woodlot Report completely support the Commission’s assessment. The report explains that Woodlot conducted a review of the published literature, including scientific journals, ornithological publications and regional wildlife society newsletters “to determine what is, and what is not, known about the effects of communications towers on avian mortality.”<sup>11</sup> Then, based on “the scientific strength of the presented data or observations”,<sup>12</sup> the available literature was segregated into two categories: peer-reviewed studies and incidental reports. According to Woodlot, “[t]he most important conclusion reached after reviewing the current literature on avian mortality at communications towers is that there is a need for further research.”<sup>13</sup>

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<sup>9</sup> *NOI* at ¶ 13.

<sup>10</sup> *Id.*

<sup>11</sup> Woodlot Report at p. 4.

<sup>12</sup> *Id.*

<sup>13</sup> *Id.* at p. 39.

In addition to Woodlot’s assessment of the existing scientific research, just as noteworthy is Woodlot’s conclusion that “the majority of documented sources of avian mortality. . .include window/building collisions, vehicle collisions, wind turbine collisions, mortality associated with transmission lines, pesticide/oil pollution, domestic cats, and hunting.”<sup>14</sup> According to Woodlot, there is “no evidence in the literature that we have been able to identify that states that communications towers are having a statistically significant impact on migratory bird populations.”<sup>15</sup> In fact, according to Woodlot’s calculations, assuming *arguendo* that communications towers contribute to an avian mortality rate of four million per year, this figure represents .004% of annual bird death estimates from human-caused sources.<sup>16</sup> Looked at from another perspective, communications towers have significantly less of an impact on avian mortality rates than does any other human-caused factor, except perhaps for wind turbines, an energy technology which has not yet been extensively deployed.<sup>17</sup>

#### **A. The Current State of Scientific Information**

The Commission’s first area of inquiry in the *NOI* seeks comment on the current state of scientific information regarding migratory bird deaths from collisions with communications towers.<sup>18</sup> Specifically, the *NOI* requests comment on the “adequacy and reliability of [the] scientific research”,<sup>19</sup> “whether the research was conducted in a scientifically-acceptable and rigorous manner . . . [and] over an adequate period of time”,<sup>20</sup> whether a “sufficient number of towers were studied in order to provide an adequate sampling”,<sup>21</sup> and whether the research

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<sup>14</sup> *Id.* at p. 7.  
<sup>15</sup> *Id.* at p. 14.  
<sup>16</sup> *See Id.*  
<sup>17</sup> *Id.* at p. 15, Figure 1.  
<sup>18</sup> *See NOI* at ¶ 14.  
<sup>19</sup> *Id.* at ¶ 15.  
<sup>20</sup> *Id.*  
<sup>21</sup> *Id.*

“included effective protocols to account for the actual numbers of dead birds killed at specific towers.”<sup>22</sup>

One of the first observations made in the Woodlot Report is that “[a]vailable scientific data on the effects of communication towers on migrating avian populations is currently limited and mostly based on a relatively large volume of incidental reports and observations and a few peer-reviewed, scientific research studies.”<sup>23</sup> With regard to the large body of incidental report literature, the report notes that:

“Despite the amount of incidental reports and observations on this phenomenon, there have been relatively few scientific studies of the causes or factors of this mortality, or of the overall significance of this particular type of impact on the migrating bird population. In addition, the quality of available information contained in the incidental reports varies widely, with no standard methodology used in collection of data.”<sup>24</sup>

In assessing the existing peer-reviewed scientific studies, Woodlot generally observes that the majority of peer-reviewed studies focus on individual towers, that the studies themselves were conducted over short periods of time, and that they “have not been conducted in a scientifically rigorous manner.”<sup>25</sup> Indeed, according to the Woodlot Report, “[c]ollectively, these studies do not ... provide sound data on the specific factors associated with the tower that may affect mortality, nor do the towers studied necessarily provide an unbiased, representative sample.”<sup>26</sup>

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<sup>22</sup> *Id.* at ¶ 16.

<sup>23</sup> Woodlot Report at p. 2.

<sup>24</sup> *Id.* at p. 3

<sup>25</sup> *Id.*

<sup>26</sup> *Id.*

While these Comments will summarize many of Woodlot’s findings, the full report is attached to these comments as Attachment A.

## **B. Tower Lighting**

The *NOI* inquires about several tower-specific factors, and their potential impact on migratory birds. For example, the *NOI* asks about the impact of tower lighting on migratory birds, whether differences in lighting systems could contribute to collisions, and if changes are to be considered in the lighting requirements to address this effect, what impact might there be on human communities.<sup>27</sup> A review of the relevant literature by Woodlot establishes that: 1) no peer-reviewed studies have been published on the effects of different tower light schemes on avian mortality; and 2) only 4% of all of the incidental reports document the specific lighting scheme and color of tower lights.<sup>28</sup> According to Woodlot, this is too small of a sample to provide reliable trend analysis.<sup>29</sup>

Some of the incidental report literature suggests that birds are attracted to lighted towers and that this may contribute to collisions as the birds circle the tower. For air safety and navigation, the Federal Aviation Administration (“FAA”) requires that all towers measuring 200 feet and taller must be lighted and marked. Obviously, the lighting of towers is critical to ensure the safety of pilots and all air travelers. Lighting also can be a contentious issue for tower neighbors who may object to the intrusion of lighting, particularly intermittent or strobe lighting, into their neighborhood. In our member survey, PCIA asked respondents how many of the towers covered by the response were lighted, the type of lighting, and whether the respondent observed that lit towers tended to have more evidence of dead birds. Approximately forty percent (40%) of the towers represented in the survey are lighted. The types of lighting represent

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<sup>27</sup> *NOI* at ¶ 18.

<sup>28</sup> *See* Woodlot Report at pp. 27-28.

<sup>29</sup> *See Id.* at p. 28.

the entire range of FAA-mandated types. Only one respondent indicated a correlation between lighting and bird collisions. This same respondent stated that evidence of bird collisions is found at only 0.5% of tower sites.

Since this issue was raised in the *NOI*,<sup>30</sup> our member survey also asked for comment on the voluntary interim guidelines (the “FWS Guidelines”) that were issued by the US Fish and Wildlife Service (“FWS”) following the work of the Communication Tower Working Group. Survey responses regarding the FWS tower lighting guidelines are particularly instructive here.

Several of the FWS guidelines concern lighting. FWS Guideline 2 encourages the use of towers less than 200 feet in order to avoid FAA lighting requirements. FWS Guideline 5 states that if lighting is required, “only white (preferable) or red strobe lights should be used at night, and that these should be the minimum number, minimum intensity and minimum number of flashes per minute (longest duration between flashes) allowable by the FAA. The use of solid red or pulsating red warning lights at night should be avoided”. In general, PCIA members report that they implement the FWS Guidelines - but not all of the guidelines, and not all of the time. One frequent criticism raised in survey responses concerning the FWS lighting guidelines is that these recommendations do not appear to be based on scientific research, but rather on anecdotal evidence. In addition, survey respondents noted that strobe lights can be objectionable to neighbors, and often will be prohibited during the tower zoning approval process. Moreover, it is common sense that there is an overriding *public safety* concern, to which the FWS Guidelines do not give sufficient weight. The FAA’s lighting requirements are designed primarily to address aviation safety concerns, and the FWS Guidelines seem to marginalize these public safety concerns, without an adequate scientific explanation.<sup>31</sup>

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<sup>30</sup> *NOI* at ¶¶ 30-32.

<sup>31</sup> *See, e.g.*, FWS Guideline 5, which states that unless otherwise required by the FAA, “only white (preferable) or red strobe lights should be used at night, and these should be the minimum number, minimum intensity, and minimum number of flashes per minute”.

### C. Tower Height

The *NOI* inquires as to whether studies assess the role of tower height as a cause of collision with migratory birds, and if so, whether appropriate controls for other variables were included in these studies.<sup>32</sup> Woodlot's literature review indicates that the vast majority of peer-reviewed tower studies conducted have been of taller towers, which often utilize guy wires. According to Woodlot, approximately 91% of the towers that were the subject of these studies are in excess of 900 feet. However, the report continues that there is "little evidence of a threshold tower height that is more dangerous to birds."<sup>33</sup>

Anecdotal reports exist that towers that have either been increased or decreased in height experience a corresponding increase or decrease in bird collisions, which perpetuate the perception that taller towers have a greater impact on bird/tower collisions, as is evidenced in the FWS Guidelines, wherein height is identified as a factor. Consequently, FWS Guideline 2 encourages the use of towers 199 feet or less in order to avoid the FAA lighting requirements, and to avoid the need to use guy wires. This recommendation does not appear to be based on any specific, reliable scientific data, but rather on a perception that a 200, 300 or 400 foot tower will have greater impact on birds than a 199 foot structure. According to the Woodlot Report, there is no scientific basis for such a conclusion.<sup>34</sup>

Incidentally, while wireless service networks have some flexibility in antenna deployment on towers, FWS Guideline 2 ignores the fact that the technical requirements for placement of broadcast facilities typically are much less flexible. However, even for the more flexible wireless services, coverage objectives and topographical features often dictate tower heights exceeding 200 feet. It is also interesting to note an internal inconsistency in the FWS

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<sup>32</sup> *NOI* at ¶¶ 20-21.

<sup>33</sup> Woodlot Report at p.25.

<sup>34</sup> *See Id.* at pp. 25-27.

Guidelines. FWS Guideline 1 calls for collocation of up to ten service providers on one tower; however FWS Guideline 2 calls for tower height to be limited to less than 200 feet. With the vertical separation typically required to prevent interference among service providers, it is difficult - if not impossible - to imagine a 199 foot tower that could accommodate ten wireless service providers. The facilities located on the lower portions of the tower would likely experience significant blockage and yield minimal coverage.

It is important to note that the literature regarding other types of human-caused bird mortality rates, particularly those relating to buildings, does not appear to make any connection between the size of the structure and the likelihood of bird collisions. For example, the Klem Report, which estimated that between one and ten birds were killed per building, per year, does not appear to make any attempt to distinguish the difference in height and size of a commercial office building and a house. Woodlot's conclusion on the issue of tower height is that no specific conclusions can be drawn until research is completed "that examines a range of tower heights in different geographic and topographic locations".<sup>35</sup>

#### **D. Type and Location of Antenna Structure**

The *NOI* asks whether the type of tower (e.g., guyed towers, monopoles, self-supporting lattice structures) might have an impact on migratory birds.<sup>36</sup> In addition, the *NOI* seeks comment on research or data relating to the impact of tower location on migratory birds. Specifically, the *NOI* inquires if locating towers on ridges or mountains versus lower ground has a differential impact on migratory bird populations, and whether any "scientifically rigorous studies" have been conducted addressing this issue.<sup>37</sup>

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<sup>35</sup> *Id.* at p. 27.  
<sup>36</sup> *NOI* at ¶ 22.  
<sup>37</sup> *Id.* at ¶ 23.

It appears that very little research has been done examining tower types and potentially corresponding impacts on avian mortality. While Manville has speculated that taller towers are more likely to use guy wires and that consequently, guy wires are one of the most important factors affecting bird mortality, no specific scientific studies are cited to support this claim.<sup>38</sup> According to the Woodlot Report, of the 173 incidental reports studied, only 32 reported on the presence of guy wires. Consequently, Woodlot concludes that “no observable trend can be reported due to the limited reporting on this factor”.<sup>39</sup> This conclusion is borne out by PCIA’s member survey. According to our survey, only two respondents expressed the opinion that tower type might have an impact on bird/tower collisions, and the respondents were split over whether birds are more likely to collide with guyed or self-supporting towers.

With regard to location, Woodlot reports that peer-reviewed scientific studies of avian mortality in general have been limited to nine states, which primarily are located east of the Mississippi River. Further, they note that there is no indication the “tower selections for these studies were randomized or that they are representative of similar studies in other states.” Indeed, the Woodlot Report states that “*the potential exists that these tower locations were specifically studied because of a documented mortality incident*” and that “*findings relevant to this factor are likely biased.*”<sup>40</sup> Woodlot further opines that a “significant degree of geographic bias also exists among the incidental reports”.<sup>41</sup> Interestingly, the incidental reports studied do not describe any avian mortality incidents west of Kansas/Nebraska/Texas, and, according to Woodlot, the sites covered by these reports “were not randomly selected and no control was established.”<sup>42</sup> Accordingly, the Woodlot Report concludes that “[t]oo little is currently known

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<sup>38</sup> See Woodlot Report at p. 27.

<sup>39</sup> *Id.* at p. 26.

<sup>40</sup> *Id.* at pp. 16-17.

<sup>41</sup> *Id.*

<sup>42</sup> *Id.*

about the specific regional factors that contribute to tower kills to make any conclusions on this geographic bias.”<sup>43</sup> Finally, the Woodlot Report advises that none of the peer-reviewed scientific studies conducted analyzed topographic location relating to avian mortality, and the incidental reporting on topography was so limited that no trends could be observed.<sup>44</sup> Again, the data simply is insufficient to support any reasoned conclusions relating to a correlation between tower types or locations and migratory bird deaths.

In sum, the Woodlot Report confirms PCIA’s long-held position that there is insufficient data to establish that communications towers contribute significantly to migratory bird deaths. In addition, Woodlot verifies that there have been *no* published studies systematically examining whether certain factors, such as tower height, type or lighting, contribute to migratory bird mortality at tower sites.

### **III. NEED FOR ADDITIONAL STUDY AND ASSESSMENT OF THE MICHIGAN STUDY**

The *NOI* inquires whether additional study is needed “to permit the Commission to address fully the issue of migratory bird collisions with towers”.<sup>45</sup> As PCIA has consistently stated, and the Woodlot Report emphasizes, the state of existing research on this issue is completely inadequate to provide a sufficient legal basis for any changes to the Commission’s tower regulations. As Woodlot stated in its summary: “Very few in-depth studies on avian mortality at communication towers have been conducted. The majority of studies have examined only single towers and made no comparisons between different towers in different sites. ... No published research has systematically examined the host of specific factors that may contribute

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<sup>43</sup> *Id.* at p. 18. In addition, as discussed further below, the current Michigan Study almost necessarily will suffer from this same type of geographic bias.

<sup>44</sup> *Id.* at pp. 18-19.

<sup>45</sup> *NOI* at ¶25.

to mortality at tower sites.”<sup>46</sup> Consequently, PCIA submits that additional study clearly is needed.

Subsequent to the release of the *NOI* in this proceeding, the Commission announced that the Michigan Study would be conducted. The Michigan Study will occur over a two and one-half year period, and will include 20 towers located throughout the state of Michigan. The primary goal of the study is “to systematically research the effect of lighting, height and guy wires on avian collisions at selected towers in the 350-500 foot height range”.<sup>47</sup> Given the obvious dearth of reliable data and scientifically rigorous studies on the impact of communications towers on avian mortality (much less the impact on migratory birds), PCIA supports this study and hopes that it will help in shedding much-needed light on this subject. PCIA consistently has called for an independent study of avian mortality issues to be conducted by the appropriate federal agencies,<sup>48</sup> and is pleased that the Michigan state and federal governments are collaborating on this study.

Due to the importance of the Michigan Study to the tower industry, PCIA asked Woodlot to review and assess the proposed study design. Based on the Woodlot’s assessment, PCIA makes the following observations, among others, of the study plan:

- It is unclear whether a two-year study will be sufficient to answer the questions posed;
- It does not appear that the Michigan Study results would be applicable to other parts of North America;
- Tower heights should be defined;
- Given the study design, it is unclear whether the size of the proposed sample is sufficient;

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<sup>46</sup> Woodlot Report at p. ii.

<sup>47</sup> News Release at p.1.

<sup>48</sup> See footnote 3, *supra*.

- Two of the three independent variables – height and guy wires – may not be truly independent, and the study would benefit from a discussion of how each variable will be treated statistically; and
- The study plan would benefit from a more detailed discussion of how weather data will be collected, recorded and treated in the statistical analysis.<sup>49</sup>

#### IV. CONCLUSION

As explained above, and detailed in the attached Woodlot Report, the existing research on the impact of communications towers on migratory birds is completely inadequate to provide a sufficient legal basis for any changes to the Commission’s tower regulations. Given the lack of reliable, scientific data available on this issue, PCIA believes that it is premature for the FCC to consider changes to the current regulatory scheme applicable to communications towers.

Respectfully submitted,  
**PCIA**

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November 12, 2003

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<sup>49</sup> See Woodlot Report at pp. 36-37.

**CERTIFICATE OF SERVICE**

I, Elinor McCormick, hereby certify that on this 12th day of November, 2003, I had copies of the foregoing "Comments of PCIA" hand-delivered or sent by U.S. first class mail, postage prepaid, to the following:

\* William Stafford  
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/s/ Elinor McCormick  
Elinor McCormick

\*Via Hand Delivery

**EXHIBIT A**

**Woodlot Report**

**EXHIBIT B**

**Copy of PCIA Member Avian Mortality Survey**

## Section A – General

- |  | Yes, there<br>is evidence | No, there is<br>no<br>evidence |
|--|---------------------------|--------------------------------|
| 1. In your experience, is there evidence to suggest that birds – migratory or other – are colliding with the towers that you oversee? For example, do the equipment compounds have signs of bird kills that <i>could</i> have been caused by such a collision? | <input type="checkbox"/>  | <input type="checkbox"/>       |
| 2. Please add any comment, clarification or other narrative, anecdotal or otherwise, in the space below or on additional pages.  |                           |                                |

## Section B – Tower Portfolio

- |  | Number of<br>Towers |                          |                          |
|--|---------------------|--------------------------|--------------------------|
| 1. How many tower facilities do you presently oversee?   |                     |                          |                          |
| 2. Of the total, how many are:   |                     |                          |                          |
| Less than 200'?  |                     |                          |                          |
| Greater than 200', but less than 500'?   |                     |                          |                          |
| Great than 500'  |                     |                          |                          |
| 3. Of the tower facilities you oversee, please estimate:   |                     |                          |                          |
| Number of free standing towers   |                     |                          |                          |
| Number of guyed towers   |                     |                          |                          |
| Number of monopoles  |                     |                          |                          |
| 4. Have you had experience with a tower site requiring an EA or EIS due to the potential impact on migratory birds? <i>If no, please proceed to Section C.</i> |                     | <b>Yes</b>               | <b>No</b>                |
|  |                     | <input type="checkbox"/> | <input type="checkbox"/> |
| 5. Was the tower constructed? <i>If no, please proceed to Section C.</i>   |                     | <input type="checkbox"/> | <input type="checkbox"/> |
| 6. Was the tower <u>location</u> or <u>type</u> altered as a result of the EIS?  |                     | <input type="checkbox"/> | <input type="checkbox"/> |
| 7. Did you reduce the height to accommodate the findings of the EIS?   |                     | <input type="checkbox"/> | <input type="checkbox"/> |
| 8. Were there topographical features that contributed to the findings of the EIS?  |                     | <input type="checkbox"/> | <input type="checkbox"/> |

- |     |  | <b>Yes</b>               | <b>No</b>                |
|-----|--|--------------------------|--------------------------|
| 9.  | Was the tower facility identified as being in proximity to a migratory feeding ground or wetland?                                  | <input type="checkbox"/> | <input type="checkbox"/> |
| 10. | Are you aware of any incidences of bird fatalities at this facility that you consider to be greater than at any other tower sites? | <input type="checkbox"/> | <input type="checkbox"/> |

## Section C – Lighting

- |    | <b>Raw<br/>Number</b>  | <b>Percentage</b>        |
|----|--|--------------------------|
| 1. | Of the tower facilities that you oversee, how many are lit?  |                          |
| 2. | Please describe the type of lighting (e.g., medium intensity flashing white, etc.). <i>(If multiple types of lights are used, please also provide percentages, i.e., 90% are medium intensity flashing white lights; 10% are steady red lights.)</i> |                          |
| 3. | In your experience, are lit towers any more likely than unlit towers to have evidence of dead or injured birds in the vicinity of the tower?   |                          |
|    | <input type="checkbox"/> lit towers are more likely  |                          |
|    | <input type="checkbox"/> lit towers are less likely <i>(Please proceed to Section D)</i>   |                          |
|    | <input type="checkbox"/> I have not found evidence of dead or injured birds. <i>(Please proceed to Section D)</i>  |                          |
| 4. | <b>Strobe<br/>Light</b>  | <b>Solid<br/>Light</b>   |
|    | <input type="checkbox"/>   | <input type="checkbox"/> |

## Section D – Tower Types

- |    |   |                          |                             |                          |
|----|---|--------------------------|-----------------------------|--------------------------|
| 1. | In your experience, are guyed towers or self-supporting towers more likely to be struck by birds? | <b>Guyed</b>             | <b>Self-<br/>Supporting</b> | <b>I don't<br/>know</b>  |
|    |   | <input type="checkbox"/> | <input type="checkbox"/>    | <input type="checkbox"/> |
| 2. | In your experience, are monopoles or lattice towers more likely to be struck by birds?            | <b>Monopole</b>          | <b>Lattice</b>              | <b>I don't<br/>know</b>  |
|    |   | <input type="checkbox"/> | <input type="checkbox"/>    | <input type="checkbox"/> |

## Section E – Contributing Factors

1. On a scale of 1 to 4 (1 = does not contribute; 4 = significantly contributes) please rate the following factors in terms of their contribution to bird strikes on towers. For example, to what extent does locating a tower near a mountain range or other large obstruction contribute to the tower's vulnerability to bird strikes?

	<u>1</u> Does not contribute	<u>2</u> Probably does not contribute	<u>3</u> Probably contributes	<u>4</u> Significantly contributes	<u>?</u> I don't know
Seasons (time of year)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Weather (e.g., fog, rain, snow)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Proximity to other obstructions	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Time of day	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

2. In your opinion, what other factors, if any, significantly contribute to bird strikes on towers?

## Section F – U.S. FWS Guidelines

- |   | Yes                      | No                       | I don't know             |
|---|--------------------------|--------------------------|--------------------------|
| 1. You may be aware that the U.S. Fish and Wildlife Service issued a set of voluntary tower siting guidelines in September 2000 that contain specific recommendations regarding migratory birds and towers. To your knowledge, does your company use these guidelines to assist in site selection and construction? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2. The guidelines contain 12 recommendations. If you have an opinion on these guidelines, positive or negative, please provide it to us. If there are changes you would make, please let us know.   |                          |                          |                          |

## Section G – Your Credentials

- How many years do you have in the wireless industry?
- How many years do you have in the tower/siting/wireless infrastructure industry?
- What is your current title?