
Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554

In the Matter of)
)
Amendment of Part 1 of the Commission's Rules) WT Docket No. 08-61
Regarding Environmental Compliance Procedures) WT Docket No. 03-187
for Processing Antenna Structure Registration)
Applications)
)
Federal Communications Commission Announces) DA 11-300
Public Workshop for the Programmatic)
Environmental Assessment of Its Antenna)
Structure Registration Program)

To: Chief, Wireless Telecommunications Bureau

FURTHER COMMENTS OF THE INFRASTRUCTURE COALITION ON THE
PROGRAMMATIC ENVIRONMENTAL ASSESSMENT—SCOPING PHASE

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EXECUTIVE SUMMARY

The Infrastructure Coalition hereby files further comments to assist the FCC in its efforts to gather and utilize reliable and defensible data in its Programmatic Environmental Assessment (“PEA”). The Coalition was prompted to file its further comments by: a) the FCC’s statements at the April 1 workshop which made it clear that two manuscripts by Travis Longcore *et al.* concerning avian mortality and avian species composition would play an important role in the Commission’s PEA decisionmaking process; and b) the Coalition’s concern that the Longcore papers contain mistakes, misinterpretations and omissions that render them unusable for this purpose. In addition, the Infrastructure Coalition addresses a significant discrepancy in the new tower data contained in the FCC’s written presentation at the workshop.

To assist the Commission in evaluating the Longcore papers, the Coalition retained an expert environmental consultant, Environmental Resources Management (“ERM”), to peer-review the papers. ERM concluded that the Longcore papers, and their estimates of annual avian mortality and species composition, have “fundamental flaws involving dataset selection, data bias, variable development, statistical methodology and assumptions, extrapolation of results across geographic regions/Bird Conservation Regions, and conclusions reached, resulting in an estimate of annual avian mortality that is not scientifically defensible and potentially yields a significant overestimate of annual average mortality.” The studies are based on a flawed database of “anecdotal and empirical data derived primarily from towers and time periods in which bird strikes have occurred with greater frequency,” and thus there is “an inherent bias toward higher mortality.” ERM notes that the lack of information or analysis about the underlying assumptions, the consideration of alternative assumptions, and other uncertainties means that “the results have limited utility for use in the PEA and related decision making.”

In addition, the Coalition discovered a discrepancy in new tower construction figures in Slide 7 of the presentation at the April 1 workshop. This discrepancy appears to have been caused by the use of the most recent construction date for towers that have been modified, rather than the original construction date reflected in the antenna structure database. As ERM demonstrates, this error results in a significant overestimate of the number of towers constructed in recent years, which could, if not corrected, generate an inflated prediction of bird mortality.

Accordingly, as demonstrated by ERM, the Commission and its consultants must correct the errors and infirmities inherent in the Longcore data and studies, or alternatively must dismiss them from consideration as part of the PEA process.

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PROGRAMMATIC ENVIRONMENTAL ASSESSMENT—SCOPING PHASE

CTIA–The Wireless Association[®], the National Association of Broadcasters, the National Association of Tower Erectors, and PCIA–The Wireless Infrastructure Association (collectively, the “Infrastructure Coalition” or “Coalition”) hereby submit further comments on scoping of the Wireless Telecommunications Bureau’s Programmatic Environmental Assessment (“PEA”) of the Antenna Structure Registration (“ASR”) process.¹ The Infrastructure Coalition supports the Commission’s efforts to conduct a PEA to bring its ASR process into compliance with the mandate of the D.C. Circuit in *American Bird Conservancy, Inc. v. FCC*, 516 F.3d 1027, 1033 (D.C. Cir. 2008) that the Commission prepare an Environmental Assessment or an Environmental Impact Statement concerning its ASR process.

¹ These comments are in response to the April 1, 2011 public workshop regarding the scoping of the PEA. See Public Notice, *Federal Communications Commission Announces Public Workshop for the Programmatic Environmental Assessment of Its Antenna Structure Registration Program*, 26 FCC Rcd 1864 (WTB 2011).

The Bureau's consultant, URS Corporation, indicated at the April 1 meeting that it planned to rely on two manuscripts by Travis Longcore, *et al.*, (Longcore Mortality and Longcore Species, respectively; collectively, the "Longcore papers") which have been placed in the docket in pre-publication draft form.² In fact, the slides that the FCC employed at the April 1 meeting contained several charts concerning avian mortality that cited the Longcore papers.³

The Longcore papers contain serious known and potential flaws and errors that preclude their incorporation into the Commission's PEA decisionmaking. Specifically, the Longcore papers' estimates of annual avian mortality and species composition suffer from critical flaws involving dataset selection, data bias, variable development, statistical methodology and assumptions, and insufficient information across geographic regions/Bird Conservation Regions. These flaws are so fundamental that the papers' conclusions of estimated annual avian mortality are not scientifically defensible due to their significant overestimate of annual average mortality.

In addition, the Coalition discovered an apparent discrepancy in the antenna data depicted in Slide 7 of the FCC presentation on April 1, which was prepared by URS based on data from the Commission's ASR database. As detailed below, this discrepancy results in a significant overestimate of the number of towers constructed annually. An inflated estimate would produce ever-enlarging ripples of invalidity into the FCC's conclusions, as it would generate an exaggerated number of predicted future tower builds, which in turn would create an inflated prediction of bird mortality. Accordingly, the Commission and URS must account for and correct the errors in the tower construction data before it can be used as part of its PEA process.

² Travis Longcore *et al.*, *An Estimate of Avian Mortality at Communication Towers in the United States and Canada* (Jan. 14, 2011 draft) ("Longcore Mortality" or "2011a"); Travis Longcore *et al.*, *Species Composition of Birds Killed at Communication Towers in North America* (Jan. 14, 2011 draft) ("Longcore Species" or "2011b").

³ Slide 7 is available at <http://fjallfoss.fcc.gov/ecfs/document/view?id=7021237096>.

I. ERM'S ASSESSMENT OF THE LONGCORE ANALYSES

To assist the Commission in evaluating the Longcore papers, the Infrastructure Coalition retained Environmental Resources Management (“ERM”) to peer-review the papers and offer its conclusions and recommendations. ERM is a leading global provider of environmental consulting services. The ERM review was led by Senior Ecologist Julia L. Tims, a professional ornithologist who has conducted numerous environmental impact assessments and natural resources studies and developed avian protection plans. Philip E. Goodrum, Ph. D., a nationally recognized expert in probabilistic modeling who has conducted probabilistic risk assessment for the Environmental Protection Agency, was principally responsible for ERM’s statistical assessment. The ERM Report is included as Attachment 1.⁴

ERM’s overall assessment of the two Longcore papers demonstrates that they are flawed beyond the point of being a useful decisionmaking tool:

Due to the flaws and uncertainties described herein, the Longcore *et al.* findings should not be considered an accurate or substantiated estimate of avian mortality and risk to bird populations from communications towers and the ASR program and therefore should not be viewed as a scientifically valid determination or consensus in the context of the PEA analysis.⁵

One difficulty that ERM found with the Longcore analyses is that they attempted to draw conclusions about communications towers’ effects on avian mortality *in general* based on an analysis of data that has been collected, in large part, under non-representative conditions:

For example, the data used in the Longcore *et al.* (2011a and b) analyses involve extreme events at specific communications tower structures (e.g., poor weather conditions during migration and towers with historic known bird strike problems). Data collection

⁴ ERM, *Final Report: Peer Review of Longcore et al. 2011 Draft Papers* (May 13, 2011) (“ERM Report”), included as Attachment 1. The *curricula vitae* of the principal authors of the report are included as Attachment 2.

⁵ ERM Report at 1.

was often conducted in relation to specific weather conditions known to influence bird strike rates and the presence of high concentrations of migrating birds and so are not likely representative of most structures, locations, or conditions.⁶

In other words, these studies “rely on a non-random sample, meaning that survey data reflect a narrow range of exposure conditions that will tend to disproportionately reflect mortality rates at towers, geographic locations, and times of year when higher bird strikes may be expected.”⁷ It is difficult to draw valid conclusions from extraordinary conditions about what will happen under the conditions that prevail more generally.

Projecting avian mortality rates under average conditions from such data would be a bit like projecting auto accident rates by studying only zero-visibility multi-car collisions. The Longcore papers attempt to compensate for the biased data by what ERM describes as applying “statistical techniques such as bootstrapping, assumptions about the nature of the data, and lumping of variables that likely result in conclusions that are not supported by the data and show cause and effect relationships that may be weaker than indicated or may not exist.”⁸ ERM notes that the Longcore papers fall short in two key respects: methodological mistakes or misinterpretations, and conclusions lacking sufficient evidence to permit meaningful evaluation.

A. METHODOLOGICAL MISTAKES AND MISINTERPRETATIONS OF RESULTS

ERM finds a number of mistakes in methodology and misinterpretations of results in the regression model employed by Longcore to support the conclusion that tower height is the key determinant of avian mortality:

⁶ *Id.*

⁷ *Id.* at 8.

⁸ *Id.* at 1.

- Longcore appears not to have “properly account[ed] for transformation bias . . . associated with the use of a log-transformation that should be taken into account when solving for the dependent variable.”⁹
- Longcore’s regression analysis appears to link two populations of towers that should not necessarily be linked — those 200m or less in height and those over 200m in height. There is actually a large gap between the two (between 163m and 287m), and treatment of the two populations together in a single regression may result in inflated fit over a large range between the two populations for which there are no data. Moreover, the log-scale display of results “may in fact mask a significant difference in the relationship between mortality and tower height for the two groups.”¹⁰ ERM explains that separate regressions of the two populations may be a more appropriate way of performing the analysis, producing lower estimates of mortality for both the shortest and the tallest categories of towers.¹¹
- Longcore used bootstrap resampling “to show that the regression equation is insensitive to the subset of study results that were selected.”¹² Yet the bootstrap resampling in fact shows the opposite — that the regression equation is highly sensitive to the study values selected. ERM found that “[t]he range of coefficients that may be generated from subsets of data can yield results that differ by more than an order of magnitude.”¹³ For example, Longcore had reported an annual fatality estimate of 953 birds for a tower height of 300m, but the data from 20 studies resulted in annual fatality estimates ranging from 117 to 1056 birds.¹⁴

ERM’s summary of its conclusions about this Longcore regression analysis is as follows:

The regression analysis presented by Longcore *et al.* is overly simplistic and contains errors. The high r^2 is misleading given that almost no information is available to inform estimates for Category

⁹ *Id.* at 5. In addition, Longcore’s log-log plot of annual fatality vs. tower height depicts the log of 0, which is undefined, as 0, apparently due to an Excel error. This point should be removed from the graph, but the correction does not significantly affect the plot. *Id.* at 2-3.

¹⁰ *Id.* at 3.

¹¹ *Id.* at 3-4.

¹² *Id.* at 6.

¹³ *Id.* at 7.

¹⁴ *Id.* ERM noted that “the fundamental assumption in the bootstrap sampling procedure is that each study value is equally representative of the relationship between tower height and bird mortality,” but that the “non-random nature of the dataset introduces bias in the regression equation, regardless of whether or not confidence intervals are generated[,] . . . [and] this bias is expected to yield overestimates of annual average mortality.” *Id.* at 7-8.

2 tower heights. Therefore, the results are not useful for decision making.¹⁵

Unless these errors are corrected and other revisions to the analysis are made, ERM concludes that the Longcore mortality regression analysis “cannot be considered accurate.”¹⁶ Because this defective regression analysis is at the core of the Longcore Mortality paper, it would be serious error for the Commission to place any credence in Longcore’s estimates of avian mortality.

B. INSUFFICIENT INFORMATION TO FULLY EVALUATE LONGCORE RESULTS

ERM notes that both Longcore analyses rely on data from 40 studies of avian mortality in the Eastern United States that are largely non-random and from study areas with “disproportionately” high mortality rates.¹⁷ As a result, ERM concludes:

Before the model can be used to forecast average annual mortality across the continental US and Canada, sources of bias must be fully explored and addressed in the calculations. The validity of Longcore’s regression model and resulting mortality estimate as well as the application of the model to unsampled geographic areas and time periods is questionable and should not be relied upon for estimating avian mortality absent further clarification of the methods and analysis of the uncertainties.¹⁸

However, there is not sufficient information to evaluate and address the sources of bias. ERM notes that “a more thorough uncertainty analysis is needed.”¹⁹

ERM points out that there is also insufficient information to evaluate how the species-specific estimates were made in the Longcore Species paper: “[F]or multiple studies of the same

¹⁵ *Id.* at 6.

¹⁶ *Id.*

¹⁷ *Id.* at 8.

¹⁸ *Id.*

¹⁹ *Id.* at 11. ERM notes that, in addition, “a long term study of an unbiased random sample of a large number of towers that are representative of the range of tower configurations located in a wide variety of conditions and locations is needed. Only then should a mortality estimate be considered realistic and useful for impact analysis and associated decision making.” *Id.*

or adjacent towers, the authors summed all observations of each species (i.e., the mortality estimates are totals for multiple years) and should not be used as yearly estimates. Thus, the numbers overestimate annual mortality. It is not clear why the observations were summed and this puts into question the validity of the species-specific estimates.”²⁰

Next, ERM identifies several unexplained deficiencies in both the database of 40 studies employed by Longcore and the analysis of that data.

- ***Limited Geographic Coverage.*** First, the studies are of sites located in the Eastern United States, but “no information is presented with respect to spatial patterns and habitat associations in the available data or the final estimates of avian mortality.”²¹ To the extent that both tower height and location along a migration route may affect mortality, “and the dataset disproportionately represents towers in migratory routes and sampling during the spring or fall migration seasons, then the extrapolation across the US and Canada to locations and time periods that do not correspond with peak migration will significantly overestimate annual mortality rates.”²² Unfortunately, Longcore does not provide sufficient information to evaluate the extent to which such overestimation may occur, and “[w]ithout this information, the validity of the analysis is questionable and the annual avian mortality estimate should not be considered accurate or used as a basis for impact determinations in the PEA.”²³ ERM concludes that “[a]bsent a comprehensive, representative dataset and analysis that considers avian behavior, geographic location, and structural variables, the analysis presents only an illusion of a strong and objectively derived relationship and therefore calls into question the validity of the result.”²⁴
- ***Sensitivity of Results to Guy Wire and Lighting Type.*** ERM points out that Longcore employed overly simplified “[a]ssumptions regarding differences in mortality rates due to the presence of guy wires, lighting type, and migration season,” but did not explain how those estimates applied to the study data, “so it is impossible to assess the validity of the assumptions.”²⁵ Moreover, such simplifications and assumptions “obscure[] the relationships between guy wire and lighting type and avian mortality and again introduces bias to the mortality estimate. . . . [U]nderstanding how these factors were adjusted for in the analysis

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Id.

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Id.

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Id. at 12.

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Id.

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Id.

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Id.

is critical to determining the validity of the Longcore *et al.* regression analysis, which uses height as the key variable.”²⁶

Given the biased nature of the dataset used, Longcore had to use adjustment factors to attempt to normalize data over the course of a year. However, ERM points out that Longcore does not “describe the adjustment methods in sufficient detail to allow for critical evaluation.”²⁷ In particular, ERM finds there to be major issues with respect to Longcore’s creation of annual mortality estimates from daily search studies and its adjustments for scavenging and search efficiency.

- ***Reconstruction of Annual Record from Daily Search Studies.*** Because most of the studies were conducted for only a few days or weeks, creating an annual mortality estimate is not a simple extrapolation. Longcore employed data from two studies that covered longer periods to facilitate this. However, those two studies were from different regions, and Longcore supplied no basis for its “assumption that daily records apply to towers across all locations and height.”²⁸ Moreover, the validity of Longcore’s assumption that spring always accounted for 25% of all mortality and fall for 75% is unclear, given the geographic and year-to-year seasonal variability reflected in the two longer-term studies.²⁹
- ***Adjustments for Scavenging Rate and Search Efficiency.*** ERM observes that the Longcore Mortality paper disclosed the adjustment factors it employed for the efficiency of searchers, scavenging rate, and combined rate of detection for each of six categories of tower and terrain, but does not explain how those factors were derived, which “is important because the final estimates of average annual mortality are very sensitive to these assumptions.”³⁰

²⁶ *Id.* at 12-13.

²⁷ *Id.* at 13.

²⁸ *Id.*

²⁹ *Id.* at 13-14. There are also unexplained issues concerning how Longcore employed resampling to derive estimates by month and which months it employed to constitute a season, which could result in bias and introduce error to the estimated annual mortality rates. *Id.* at 14-15. In addition, it is unclear how and why Longcore employed seemingly different adjustment factors for the data from different studies. *Id.* at 15-17.

³⁰ *Id.* at 17.

C. ERM'S CONCLUSIONS REGARDING THE LONGCORE PAPERS

ERM concluded that the Longcore papers, and their estimates of annual avian mortality and species composition, “have *fundamental flaws* involving dataset selection, data bias, variable development, statistical methodology and assumptions, extrapolation of results across geographic regions/Bird Conservation Regions, and conclusions reached, resulting in an estimate of annual avian mortality that is *not scientifically defensible* and potentially yields a *significant overestimate of annual average mortality*.”³¹ The studies are based on a flawed database of “anecdotal and empirical data derived primarily from towers and time periods in which bird strikes have occurred with greater frequency,” and thus there is “an inherent bias toward higher mortality.”³² ERM notes that the lack of information or analysis about the underlying assumptions, the consideration of alternative assumptions, and other uncertainties means that “the results have limited utility for use in the PEA and related decision making.”³³

II. THE FCC PRESENTATION'S NEW TOWER TREND ESTIMATES ARE ERRONEOUS

Slide 7 in the FCC's presentation at the April 1 workshop³⁴ purports to graphically depict tower construction trends by year and tower height. However, based on industry input, the Coalition became concerned that Slide 7 appears to significantly overstate the number of new towers constructed in recent years. As a result of the Coalition's review of the tower construction data in the ASR database and inquiries with the FCC Staff and URS concerning the methodology used to develop Slide 7, it appears that the author of the slide used the “Construction Date” shown in the “Registration” table as the date when a tower was first

³¹ *Id.* at 18 (emphasis added).

³² *Id.*

³³ *Id.* at 19.

³⁴ *See* note 3 above.

constructed. That date, however, represents only the *latest* construction date for a tower that may have had multiple construction dates, representing when it was newly built and when it was modified on subsequent occasions. In contrast, the full listing of construction dates is found in the “Application” table.

Thus, a tower initially constructed in 1990, modified in 2000, and modified again in 2009 would have its three construction dates listed in the Application table, but only the 2009 construction date would be listed in the Registration table even though the tower was built almost two decades earlier. As a result, Slide 7’s chart of new towers constructed by year included towers under the year of their most recent modification, rather than the years when they were first constructed. This has the unintended effect of incorrectly understating the number of towers constructed in years past and overestimating the number in the most recent years.

The Coalition provided ERM with spreadsheets containing data from the Registration and Application files from the ASR database.³⁵ ERM’s independent review of the raw data validated the Coalition’s belief. It observed that “while the overall trend in recent years has been a reduction in the number of new towers constructed, the error tends to inflate the estimates in more recent years, thereby yielding a shallower slope.”³⁶ ERM then constructed graphs showing that the correction of the data had a significant effect, especially in the most recent years, with the slope of the downward trend from 2006 to 2010 increasing by a factor of 1.4:

³⁵ This data was filtered to include constructed TOWERS, NTOWERS, and NNTANN structure types, the same selection of tower categories as URS used.

³⁶ ERM Report at 8.

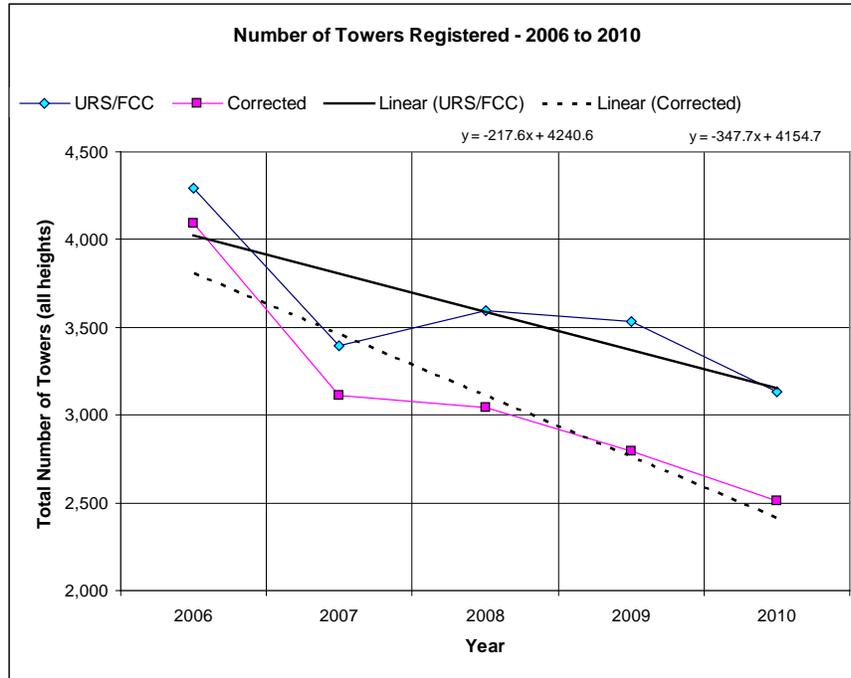


Figure 5 from ERM Report

ERM cautioned that correcting this matter “has important implications if these data are to be used to forecast estimates of avian mortality in the future, because an inflated rate of new tower construction would lead to an overestimate of future tower construction trends and thus inflate the projected mortality rates and make them appear more significant.”³⁷

CONCLUSION

While the Longcore papers represent a starting point for a meaningful assessment of tower related avian mortality they cannot provide reliable data or conclusions until such time as the improvements suggested by ERM are undertaken and completed.³⁸ For the foregoing reasons, the Longcore papers contain known and potential flaws and errors that render them unusable for the purposes of Commission decisionmaking. Accordingly, the Commission should

³⁷ *Id.* at 8-9.

³⁸ Although it might be tempting to utilize the Longcore Papers as the “best available data,” the ERM Report amply demonstrates that the Longcore Papers methodology and data are too flawed to utilize on any basis. *See, e.g., id.* at 1, 18-19.

not rely on the Longcore papers in drafting the PEA. In addition, if the PEA employs historical tower construction data to inform its estimates of how many towers may be constructed in coming years, the Commission should ensure that it uses the dates when towers were first constructed, rather than the dates of recent modifications.

Respectfully submitted,

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