

Avian Mortality at Communications Towers

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Presentation Number 8

Standardizing methods and metrics for quantifying avian fatalities at communication towers: Lessons from the windpower industry

Paul Kerlinger, Ph.D.
Curry & Kerlinger, L.L.C., P.O. Box 453, Cape May Point, NJ 08212
Phone - (609) 884-2842 E-mail - pkerlinger@aol.com

Al Manville's introduction of the eighth speaker, Paul Kerlinger.

Our next speaker is an environmental consultant and a principal with the firm of Curry and Kerlinger in New Jersey. He, among other things, works with the wind power industry. Paul Kerlinger is going to be speaking on the issue of standardizing methods and metrics for quantifying avian fatalities at communication towers and lessons from the wind power industry. Paul.

Paul Kerlinger

I was asked to speak to you today about some of the lessons we have learned in the wind power industry which has experienced problems and recognized those problems since the late 1980s. Specifically, I want to talk to you about the methods and metrics that are now being used to assess avian fatalities at wind turbines. Many of the lessons that have been learned are applicable to the communication tower industry and some of these techniques have also been used to assess fatalities at transmission wires and other such situations – tall buildings, etc. First of all you have to ask the question, why standard metrics and methods? Most of you here are scientists or are involved with environmental organizations so you can understand why we need to be able to compare or make some sorts of comparisons among different types of towers, different sites, different lighting conditions – so the first reason for establishing standard metrics and methods is comparability. We want to be able to make inferences. If you don't have that capability, you are out of luck.

For the first few years in the wind power industry, people were using many different metrics and methods and various studies were not comparable. Some people still complain that in that industry not all the studies are comparable. But we are rapidly working toward a time when we will be able to compare fatalities at one site with another – come up with methods for looking at that. We also need these comparative methods and metrics to evaluate various prevention and mitigation schemes, as well as looking at prosecution. Unfortunately, there is a legal issue here, as Al pointed out, so every time we collect birds it obviously raises the specter of litigation and prosecution.

Finally, we'd also like to be able to compare in a very statistically rigorous way the types of mortality at various types of structures – windows, other sources of mortality such as cats, highways, and wind turbines – with communications towers. So once we have estimates and methods and metrics that are comparable, we can achieve that. In the wind power industry there are only a few things that are generally agreed upon today. One metric and one set of methods are fairly well agreed upon. The first is the numbers of dead birds found per turbine per year.

So, in other words if you have a turbine out there, and if you can figure out how many birds per year it kills, then you can generalize. If you have a whole turbine field, you can average that out and you can compare it to other sites to find out what's actually going on. So that's one of the things that is generally agreed upon. However, I have to be careful what I say here because we have a couple of people here with the National Wind Coordinating Committee who are working on turbine kills as well. So, not all of us agree on all of these things, but generally these things we do agree on. And the actual method that we really agree on the best is the actual search methods – the area that is searched, the frequency of searches, and how we go about doing those searches.

Looking at the metrics, we are mostly talking about dependent variables – the use of those metrics we must establish first – in other words, what do we want to use the metric for. Obviously the most important thing is establishing impact. As far as impact goes, we can look at dead birds – this is obviously a legal issue as well. We can also look at behavior. There are many metrics and methods we can use to study different types of behaviors.

To recap, you may want to look at dead birds or at behavioral impacts. I should also mention that behavioral impacts are not subject to litigation unless they involve threatened or endangered species. That's one of the reasons you might want to separate those [dead birds v. behavior] and look at them for the larger species as well. You also want to take a look at documented fatalities, or the estimated numbers of fatalities at towers. The documented fatalities per turbine or per tower in the case of the communications industry would have implications for law enforcement, but for those of us who are also interested in conservation – in other words, preventing mortality or looking at population impacts – we want to look at the larger number. This larger number includes the birds that are not found for lack of 100% observer efficiency and because of scavenging (carcass removal). For example, when you find 10 birds out there it is likely that there were more out there because observer efficiency is not 100% and cats or skunks or raccoons or harriers or whatever may have removed those carcasses.

By using a standard metric in the tower industry, we might come up with a metric such as the number of birds killed per tower per unit of time. This unit of time may not be per year but in some cases may be per evening depending upon the statistical analyses you wish to use. You also have to consider things like species-specific fatality rates. The reason you need to consider this is that you may have 100 or 200 or 1,000 birds at a tower. As one of the earlier speakers pointed out, this is a skewed distribution. Certain species are more subject to fatality. So, separating out those hundreds or dozens of birds into species-specific entities and coming up with your numbers of, for example, Redstarts per tower per year would be very helpful as far as population impacts because the population impacts obviously are related to specific entities. It is also important to use standard metrics. Within the tower industry, we are going to have to come up with independent variables that are standardized such as the lighting, the guy wires, tower height, location (*e.g.*, geography and topography), where you put these towers, and be able to compare these independent variables. We also need to look at various mitigation or prevention techniques. You must have some means for comparing those things.

As far as fatality search methods are concerned, I think most of us agree that the methods are fairly standardized now in the wind power industry. As far as time or frequency, and the number of searches, it is much different from the studies you heard before regarding the Florida Tall Timbers television tower. In the wind power industry, we generally look for larger carcasses because many of the birds involved are raptors – species like Red-tailed Hawks seem to be more susceptible as are Golden Eagles. They also remain on the ground a much longer periods. So searches on the order of one month versus every day in the case of small birds – nocturnal migrants – are used. The area searched should be determined by the height of the tower. In the wind power industry we search areas with a radius of about 50-60 meters from the tower. This is probably a larger area than we used to search because turbines previously were smaller. Now the turbines are poking through 76 meters (250 feet) above ground level. We are going to have to look at a larger area to evaluate if we are finding a high proportion of the carcasses. But just to let you know, most of the carcasses fall within about 35-40 meters of the bottom of turbines. Those, again, are primarily large carcasses. We agree pretty much on carcass removal and scavenging

Earlier studies relied on using chickens which seemed to taste better than some of the real birds that were put out. So researchers are now using actual specimens of Red-tails, Red-winged Blackbirds, or whatever other specimens are available so that there is an element of reality in the carcass removal studies. You may have anything from carrion beetles burying warblers and woodpeckers, to even a Red-tailed Hawk removing a larger carcass. This is extremely variable as is searcher efficiency. This precludes the use of dogs, which some people are talking about right now, which may be much more efficient and effective than humans, and they are also cheaper to operate. We pretty much agree on this in the wind power industry, although things are changing because there has been an evolution to taller turbines and bigger machines, and there has also been an evolution to smaller numbers of turbines at a given site. So there are all sorts of things going on now.

As far as behavioral methods, I probably shouldn't even get into this, because you've heard many experts earlier talk about radar, infrared techniques, ceilometer techniques, acoustical techniques, and others. But behavioral methods are important for both a basic and applied sense here. I admonish you to be careful about panaceas. Many times these techniques will have to be used together. We are arguing still in the wind power industry on what techniques can be used when. And I guess this is no different from any other academic endeavor where very few people agree. And also again, it raises the specter of legal versus conservation issues. Dead birds versus behavior – do you have to really worry that much about behavior. But without being able to measure behavior and coming up with standard metrics like the curving of flight paths in response to lights that we heard about before, you really can't evaluate what the impacts some of these lights have on behavior that may lead to fatality.

It is difficult to generalize from the wind turbine industry to the communication tower industry because the types of birds that are impacted are different. Wind turbines impact diurnal birds which frequently are raptors, although others may be involved. In the communication tower industry, most of the birds impacted seem to be nocturnal migrants. So far nocturnal migrants have not shown up in large numbers among the towerkills at wind turbines, primarily because the wind turbines are much shorter than the tall communication towers.

There is a document about to be published in the wind power industry and one of its authors is in our audience, Dale Strickland. It has been reviewed many times. To determine when and how we should establish standard metrics and methods, I think it is important to emphasize that right now is the time to get those methods established because over the past 10 years in the wind power industry, I think we have found ourselves behind where we could now be – we could have learned a lot more if we had agreed on some of those metrics and methods. One of the ideas that came out of the wind power industry was to establish a committee, and that committee is to put together a document called the methods and metrics document. I urge you to keep any methods and metrics documents for this industry very simple. If you put this committee together you will need to bring in various stakeholders including the industry, academics, conservation organizations, and finally the agencies that regulate these birds. Put that together, get those stakeholders together, and establish what metrics and methods you want to see used. We have actually been doing that over the past 5-6 years, and have had fun in the process. The methods and metrics document, as Dale painfully knows, is on its seventh draft. Parts of it are very very technical. I'm not sure how many people are going to want to read some of those chapters. But there is some very valuable information in that document that is applicable.

The last thing Al wanted me to mention, are there any standard practices for reducing risks in the wind power industry that are applicable to the communication tower industry? There are some, however not all of us agree on what they may be, or how important they may be. But the first and most important, I believe as Bill Evans was also saying, is location – where you put your towers is very very important. I think that this is going to be a much more difficult situation for nocturnal migrants, especially with these tall communications towers, than it is in the wind power industry, primarily because the types and numbers of birds that are impacted by wind generators are raptors, and in very specific locations where raptors are foraging.

Any of you in the wind power industry can correct me if I'm wrong, but nocturnal migrants simply have not been implicated in the kill list for wind generators that often. The other things that can be done include site layout; some of us have been involved in laying out sites where Golden Eagles or other birds are foraging. You keep these turbines off the steep slopes where these birds are soaring. Finally, avoid lattice-type structures for wind turbines which will allow birds to perch. By allowing perching sites, though perching sites may not be directly related to mortality, if you have 20 turbines out there in a wind farm, you have lots and lots of perch sites that keep birds in – especially raptors – or bring them to the site, where eventually they might be killed.

These are some of the lessons we've learned from the wind power industry. Good luck with this effort.

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