

**RIVENHALL AIRFIELD: INTEGRATED WASTE MANAGEMENT FACILITY  
STACKS AND BIRD/BAT STRIKES  
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**General**

Issues relating to bird and bat mortality in relation to buildings and related infrastructure as well as the usage of those structures eg from flares is emotive but with little supporting evidence. Recently a number of research projects have been initiated in particular in relation to the increasing number of wind turbines proposed and evidence is beginning to become available.

The main issues or potential threats to aerial wildlife at the proposed Rivenhall IWMF is in relation to the required stack, its potential mirroring surface, the thermal plume and the increased height recently proposed. An investigation has been undertaken by way of a literature search and consultation with experienced ornithologists and bat surveyors associated with Green Environmental Consultants.

Most research in to the effects of vertical linear structures on wildlife have been undertaken in relation to stacks near airports, and wind turbines.

**Birds**

Common species of birds are known to use the scrub surrounding the IWMF site, and also the arable fields and other habitats in the wider Blackwater Aggregates quarry area. Surveys over a number of years for a variety of wildlife, have not identified any particular ornithological sensitivities of this site.

A review of issues in the US (Avery 1979) found that significant bird mortality can occur around chimneys. But these cases have been when the structure is located on a migration route. This is very similar to results in the UK from research in to potential effects of wind turbines on avian mortality. Resolutions included turning off floodlighting during the migration period. The stack at Rivenhall will not be floodlit and will not have lights that could attract migratory birds.

Research undertaken in 2010 (Santolo and Williams 2010) in relation to thermal plumes attracting birds was more concerned with the proximity of the potential "attractant" to an airport and the potential for increased bird/plane strikes. This included accumulating records for other power stations with thermal stacks over a period of years. This research showed that:

*'Results of avian collision studies conducted from 1998 through 2008 (for the Sutter Energy Center, Delta Energy Center, Los Medanos Energy Center, and Walnut Energy Center, all located within the Central Valley and Sacramento/San Joaquin delta), show no avian collisions with the stacks at any of the sites. The studies at each site included 3 to 5 years of monitoring with ongoing requests from the plant managers to report any avian collisions with the stacks. No avian collisions with stacks have been reported.'*

Also:

*'A literature search was conducted to determine if other facilities that generate thermal plumes had known issues with attracting or deflecting birds. The literature search did not reveal any reported instances of bird behavior (sic) in relation to industrial thermal plumes.'*

Bird collisions with windows have also been widely reported. Birds cannot see glass and particularly when there are large expanses of glass eg on office blocks or large domestic buildings this can cause mortality. However a simple measure to prevent or reduce this can be achieved by breaking up the window surface. There are many ways of doing this such as planting close to the window so that the shade from branches break up the surface; putting stickers on the window surface; or spraying it to reduce the glare. The least effective are bird decals.

A table of projects mortality causes based on research of projects around the world, in Erickson, Johnson and Young 2005, produced the following table.

**Table 2 Summary of predicted annual avian mortality.**

<u>Mortality source</u>	<u>Annual mortality estimate</u>	<u>Percent composition</u>
Buildings	550 million	58.2 percent
Power lines	130 million	13.7 percent
Cats	100 million	10.6 percent
Automobiles	80 million	8.5 percent
Pesticides	67 million	7.1 percent
Communications towers	64.5 million	0.5 percent
Wind turbines	728.5 thousand	<0.01 percent
Airplanes	25 thousand	<0.01 percent
Other sources (oil spills, fishing by-catch, etc.)	not calculated	not calculated

Although this was compiled in 2005 and some features such as wind turbines have increased in number and distribution since then, the design of them to avoid potential impacts has also improved. It is also clear that other sources of impact such as buildings and cats, have a far greater impact on bird mortality, than bird strikes in to a static structure (or stack).

Since the IWFM site is not on a bird migration route nor is it known to have any special bird sensitivities, mortality caused by collision with the stack is not anticipated.

The stack will be a narrow and static structure, and not comparable with the large flat surfaces of office buildings or the rotation of wind farm turbines. The lower levels at least will have some shadow from the retained planting thus breaking up the reflective surface. The revised plan will require a much taller stack which will be unscreened. However, as bird collisions in relation to narrow stacks (as opposed to larger structures or those of wind farms with large moving blades) is unproven, even if there is a limited additional effect of unscreened mirroring, it is unlikely that this would result in bird mortality.

## **Bats**

There has been less research in to the effect of structures on bats. Research by the University of Exeter on to wind turbines and bats found that:

Hundreds of bat deaths at on-shore windfarms in the UK could be prevented by better risk assessments and simple changes to the operation of turbines. At the 29 windfarms studied by the researchers in work published in the journal *Current Biology*, 194 bats were killed per month.

Casualty rates varied from 1 to 64 per month across the sites.

Dr Fiona Mathews said: *"An open field might not be very interesting, whereas once new structures are built the bats may investigate it or feed around it. Bats have been around for at least 30 million years and during that time have been able to fly happily without the risk of colliding with a spinning object. They may even 'switch off' their sonar at the height of turbines, because they are not used to encountering objects at that altitude. Alternatively they may be attracted to insects flying around the turbine blades."* Bats switching off sonar at height is speculation but an issue which deserves further investigation.

To reduce casualties, the rotation of turbines at night in the summer and early fall (*sic*) when bats are most active should be minimised, she said. Some operators of turbines were already adopting this approach to saving bats which she and other researchers were testing for effectiveness.

Co-author Dr Lintott said: *"Although bats are killed by wind turbines it is important that this is put into context alongside the many other causes of bat mortality caused by humans including collisions with vehicles, kills by domestic cats, and range contraction due to climate change. Our findings demonstrate that costly pre-construction surveys are relatively poor at predicting if bat casualties will occur. However, by focussing resources on stopping turbines during high risk periods we should be able to minimise the collision risk to local bat populations whilst also benefiting globally from the transition to a greener economy."*

It is clear from this and other research that the risk to bats from tall linear structures is from the blades or moving object, rather than the height of the static object. As the proposed stack will be a static structure within the environment and without blades, the risk to bats is considered to be minimal.

## **Conclusions**

Most mortality to birds and bats from tall linear structures is caused by factors such as moving parts at height (blades) or large expanses of glass, and especially where these are located on migration routes. None of these factors will be present at Rivenhall. It is considered that the stack and its proposed increase in height will have minimal effects, if any, on aerial wildlife.

## **References:**

Avery, M L. November 1979. *Review of Avian Mortality Due to Collisions with Manmade Structures*. U.S. Fish and Wildlife Service, Ann Arbor, Michigan

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Wallace P. Erickson, Gregory D. Johnson, and David P. Young Jr. 2005. *A Summary and Comparison of Bird Mortality from Anthropogenic Causes with an Emphasis on Collisions*. USDA Forest Service Gen. Tech. Rep. PSW-GTR-191. 2005