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Bird control on landfill sites– Is there still a hazard to your aircraft?

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Abstract

Birds attracted to domestic waste landfill sites situated close to airfields may represent a significant flight safety hazard. Local planning controls may be used to prevent the establishment of such sites or to enforce bird control measures as part of site management plans. Different bird control techniques may have different levels of effectiveness and little consideration is given to the period of time (Dawn to dusk or operational hours), over which they are applied. CSL is currently undertaking a four year study to evaluate bird control techniques on landfill sites in the UK. The following paper shows how bird control on a landfill site which may appear successful, may not reduce the birdstrike risk at your airfield.

Introduction

Birds are well known visitors to landfill amenities (Mudge & Ferns 1982). They are frequently cited as a cause of nuisance and noise, are known carriers of disease (Ortiz & Smith 1994), and may carry litter and other waste off site causing potential health hazards. Scavenging birds such as gulls may range over a wide geographic area to search for food (Baxter, 2001). They can travel upwards of 30 miles each day from feeding to roosting sites (Horton et al 1983), and commute regularly between breeding colonies and landfills to provision young during the breeding season. Birds such as these, which fly in groups or lines (Parr 1968), and cross the approach and departure paths of aircraft can thus pose a serious risk to aircraft flight safety. If a landfill site is situated directly under the approach to a runway, aircraft may also be at risk from soaring birds which may thermal above a site. In countries such as the UK, safeguarding legislation has been developed along ICAO guidelines to assist an airfield to protect flight safety in its surrounding airspace. The UK Civil Aviation Authority (CAA) now insist on bird netting exclosures for any landfill site within 8 miles of an airfield. Bird netting exclosures cover the whole of the working area of the landfill and, when properly operated, have been proven to prevent any scavenging birds from gaining access to feed at a site (Jackson 1998). By preventing access to edible waste at a landfill, birds are no longer attracted and the hazard should thus cease to occur. Netting systems are, however, expensive to install with a typical exclosure costing upwards of £750k. Their use is also subject to a variety of operating restrictions including opening and closing the net door on entry and exit of each vehicle, ensuring all waste is tipped within the netted area at all times, and closing the site to domestic waste when the net itself is moved to a new tipping cell. The cost and operational difficulty of running such bird exclosure netting systems has thus led the UK landfill industry to propose alternative methods of bird control which are both less expensive and operationally less intrusive. The effectiveness of these alternative techniques have not however, been scientifically validated. Until the level of deterrence has been proven, they can not be recommended for control of birds at landfill sites close to airfields. The Bird Management Unit at the UK Central Science Laboratory is therefore undertaking a four year study to assess the effectiveness of a variety of alternative bird control techniques and to develop an auditable standard from which different methods can be evaluated. It is essential to understand the level of control which can be achieved at a diversity of sites in order to allow sensible recommendations to be made for controlling birds on landfills close to airfields. During the course of this trial some bird control techniques have been shown to be able to clear all hazardous birds from certain landfill sites over limited periods. This paper outlines a series of results from the Central Science Laboratory's trial of individual techniques depicting a variety of factors which contribute to failures in control. Understanding the reasons behind these breakdowns may lead to a better understanding of how to combine techniques and thus ensure that birds on landfills do not continue to create a strike hazard to airports.

Methodology

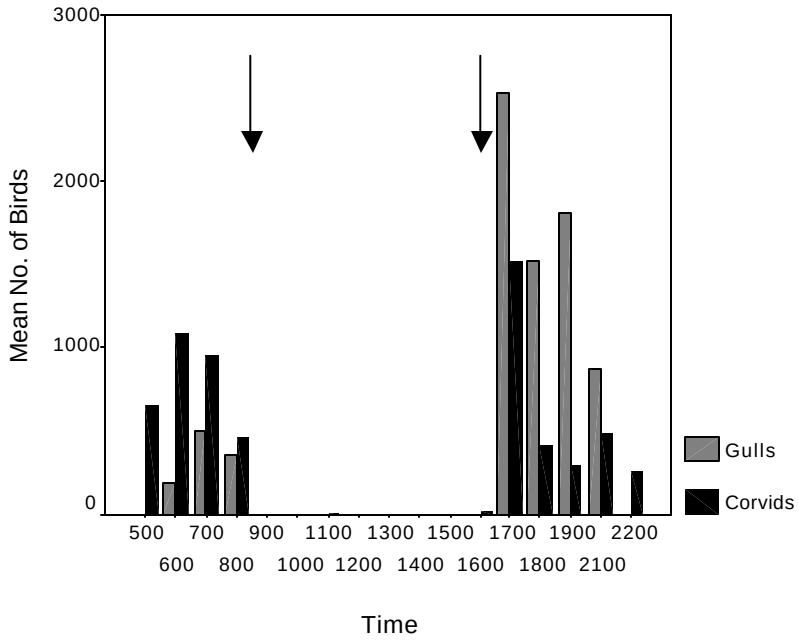
Bird numbers have been monitored on and around six different landfill sites in the UK prior to, during and after periods of bird control. Hourly counts were undertaken between dawn and midday, or midday and dusk on two random days each week. Numbers of birds feeding, loafing, circling, bathing or flying over the site, or loafing in the surrounding environment were recorded. Three to four weeks monitoring was undertaken prior to implementing a control technique, followed by two to twelve weeks control and a further three to four weeks subsequent to control being removed. The following results are presented.

Results:

1. Operational Hours Bird Control

Bird control implemented during the operational hours of a site may only be present between c.8am and 5pm. During long summer days, or on weekends when the landfill site may be closed, birds may be able to gain access to feed at the site. During operating days, gulls in particular may loaf in the surrounding environment, awaiting feeding opportunities during the early mornings or late evenings. Visits to such a site during operational hours can thus give a false impression of a bird free landfill site. The following result shows the effect of a handheld distress call unit used for one month during operational hours only.

Figure 1. Four week operational hours control using distress call unit.



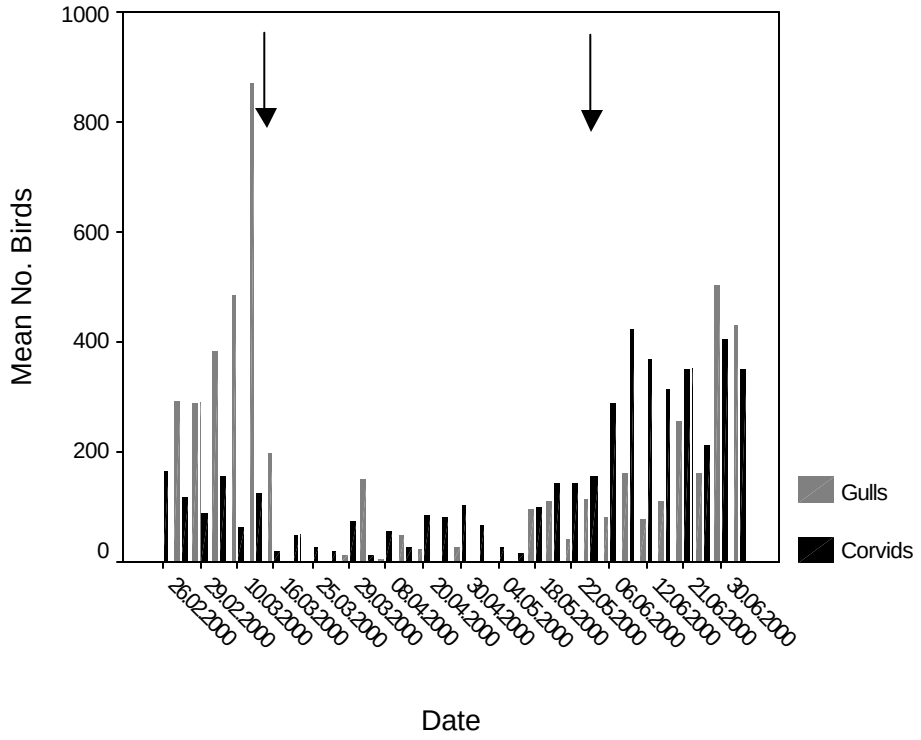
These results represent birds seen either feeding or loafing on site and clearly show that birds are present prior to commencement of, and after the cessation of tipping. In order to minimise any birdstrike risk created by the hazard associated with a landfill site, it is essential therefore, that birds are deterred from site at all times. Birds must be preventing from gaining access to feed at the site otherwise the birdstrike hazard will remain. A site visit during a working day would suggest that the birdstrike hazard does not exist.

2. Weather

Results consistently show that certain bird control techniques are affected during periods of wet or windy weather. During CSL's trial, Falcons have successfully been used to maintain several bird free landfill sites

for extended periods of time. These have however, been tempered with failures in control when wet or windy weather have prevented the falcons from being flown. The following figure provides an example of breakdowns in bird control due to poor weather conditions.

Figure 2. Ten week dawn to dusk control using Falcons.



The implementation of falcon control, without any other back-up techniques, resulted in a sustained reduction in bird numbers over a ten week period. Control was implemented from dawn to dusk, seven days a week in order to attempt to prevent scavenging birds from gaining access to the site at any time. Periods of wet weather prevented falcons from being flown and correlated to a presence of gulls on site during the control period (Spearman's rank correlation $r = 0.225$, $p < 0.01$). Periods of stronger wind did not prevent falcons from being flown but did correlate to greater numbers of corvids being present on site ($r = 0.261$, $p < 0.01$). Weather conditions thus play an important part in bird control at landfill sites. A site visit during good weather would suggest that the birdstrike hazard is under control.

3. Location

The geographic location of a landfill site may affect the numbers of birds it will attract. The presence of suitable roosting areas such as reservoirs and coastal zones, or the proximity to breeding colonies or bird migration routes may increase the chances of a sites being used by birds. In contrast, the presence of alternative feeding resources such as other landfill sites, or site management regimes such as the level of inert material used to cover tipped waste each day may allow successful bird control to be achieved more readily. The following figures show the numbers of birds present during an operational hours only trial of blank firing pistols used at two geographically independent landfill sites during summer 2000. The pistols produced a loud muzzle retort but did not fire a pyrotechnic into the air. Different species of birds were present at each landfill site with one site local to a small Black-headed Gull (*Larus ridibundus*) breeding colony and the other over 30 miles from the nearest gull colony.

Figure 3. Six week operational hours trial using blanks pistol at site local to a gull breeding colony.

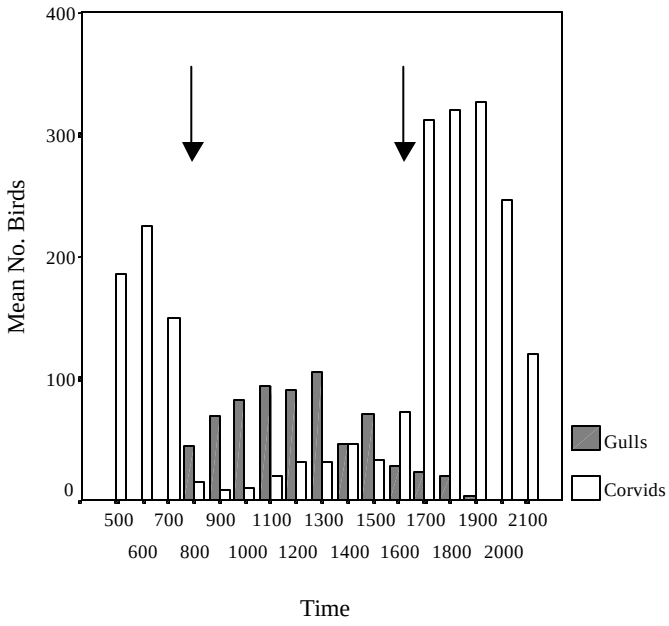
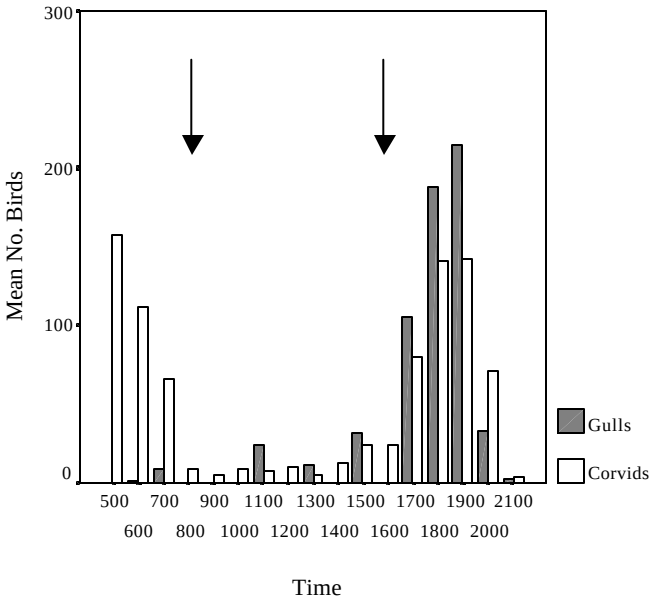


Figure 4. Ten week operational hours trial using blanks pistol at site located 30 miles from nearest gull breeding colony.

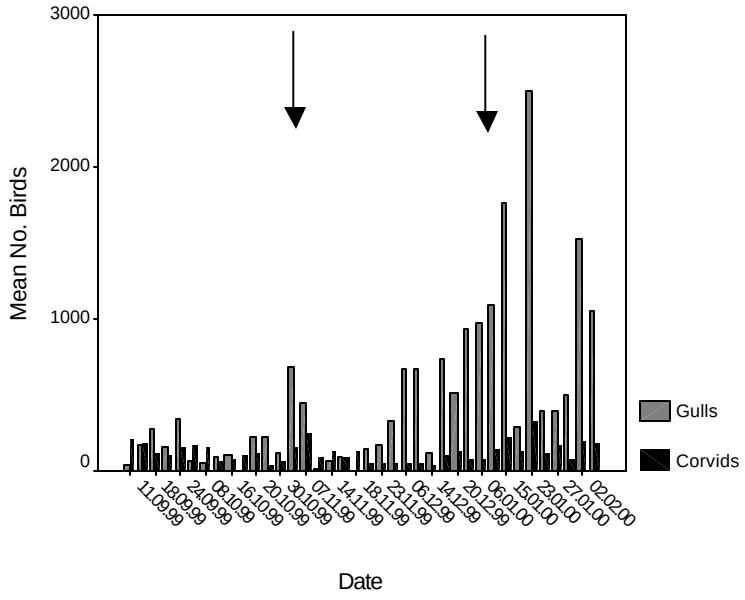


The above figures shows that blanks pistols were effective at reducing, but not completely eliminating scavenging birds from using both landfill sites during summertime operational hours. A greater overall reduction was achieved at the site situated further from a breeding colony, thus suggesting that location of a site with reference to existing bird colonies is a key aspect for determining successful methods of control. Even at the site distant from a breeding colony birds were again present during the late evenings and early mornings thus highlighting the need for dawn to dusk, not operational hours control.

4. Habituation

Techniques which are widely used for bird deterrence both on airfields and at landfill sites may become less effective when used on their own. The following figure shows the effect of using a handheld distress call unit to disperse gulls and corvids over a nine week period during winter 1999 / 2000.

Figure 5. Nine week dawn to dusk trial using distress calls.

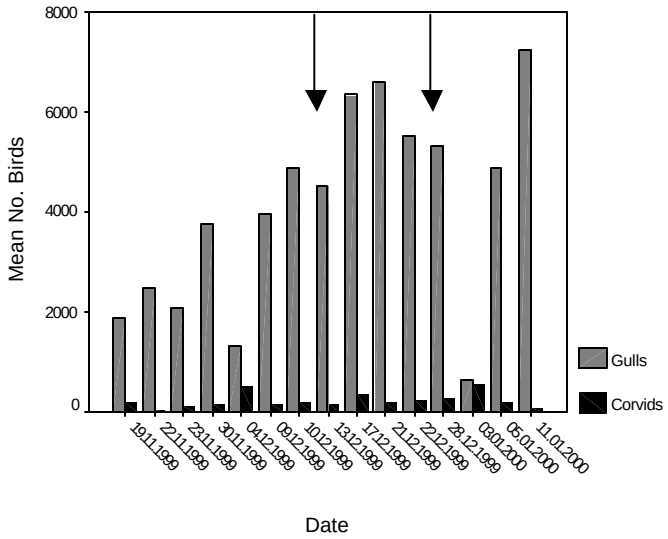


Following an initial reduction in bird numbers over a period of a few weeks, the numbers of both gulls feeding and loafing at the site began to increase. Corvid numbers remained relatively unaffected. The lack of any other techniques to re-enforce the effect of the distress calls resulted in complete habituation occurring after approximately five weeks (Numbers of birds present on site = Number of birds present prior to implementation of control). In order to maintain the effectiveness of distress calls and other techniques to which birds habituate, it is essential that they are used sparingly and in combination with other techniques. Site visits to assess control at landfills must be undertaken frequently enough to ensure that failures are not beginning to occur due to habituation.

5. Use of Ineffective Techniques

Techniques which may be suitable for deterring birds in other situations may not be suitable for deterring birds from landfill sites. Our evaluations of helium filled bird scaring kites showed that they were ineffective when used on their own at deterring gulls and corvids from three independent landfill sites. They would not therefore, reduce the birdstrike hazard if these landfill sites were close to airfields.

Figure 6. Two week operational hours control trial using helium filled bird scaring kites.



It is essential to ensure that any techniques used to control birds at landfill sites which may present a birdstrike hazard to aircraft are appropriately assessed to ensure that they are effective against the target species found at that site.

6. Use of Inappropriate Techniques

Whilst results can show that some techniques may be successful at deterring birds from landfill sites, other factors may prevent their use. Landfill sites situated in residential areas at which dawn to dusk control is recommended may not permit the use of noise based systems such as static distress call units, pyrotechnics and some sound generating units. Safety issues on the working face may necessitate the removal of automated sound generating equipment due to sounds similar to the reversing noise on machinery causing confusion amongst staff. It is not only essential therefore, to ensure that the techniques employed to control birds at a landfill site are successful, but that it is acceptable to use them.

7. Site Management

Site management practices including tonnage and type of waste tipped, type and amount of covering material used and the size of the tipping area may all affect the success of bird control. Well managed sites with a small tipping face, high levels of and regular cover using inert materials and a minimal input of edible wastes may assist in reducing bird numbers prior to implementing any control.

Discussion

Landfill sites can provide a rich and regular feeding opportunity on which birds may require as little as 20 minutes a day to forage (Baxter pers obs). Given this limited foraging time, gulls in particular, may be present on or around a site throughout the day awaiting opportunities to feed. The priority for bird control at landfill sites near airports must therefore be to ensure that birds are deterred from feeding or loafing on the

site from dawn to dusk on all days. It is apparent from the results that it is unlikely that any one technique will prove to be completely successful at achieving this outcome. A variety of techniques therefore need to be integrated and tailored to the specific factors affecting an individual site. Birds have been shown to habituate to techniques if used too frequently, control may not be practicable in poor weather conditions, whilst material considerations at the landfill site may restrict the use of some systems. Seasonal factors, geographic location and the presence of existing bird populations in an area all affect the attractiveness of a site to scavenging birds and thus the efficacy of control techniques.

The results of these trials clearly show that almost all techniques are affected by one or more adverse factors when used to control birds at landfill sites. Individual techniques which have been demonstrated as successful at preventing birds from using one landfill site, may fail at another. Successful control is thus only likely to be achieved through the integration of a variety of methods specifically targeted to each particular site. It is essential that bird control personnel are adequately trained and that the likely bird attraction of each landfill site close to an airfield is evaluated prior to determining a regime of combined techniques.

Birds which have the opportunity to gain access to feed at a landfill site for even short periods of time will continue to give rise to daily flightlines from their roosting / breeding sites to the feeding area ensuring that the birdstrike hazard to the airport remains.

CSL are now integrating control measures to try and determine whether the observed failures in single techniques can be mitigated through the use of combinations of techniques.

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