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Vicky S. Jackson

Birdstrike Avoidance Team, Central Science Laboratory, Sand Hutton, York, UK

J. Brown

Birdstrike Avoidance Team, Central Science Laboratory, Sand Hutton, York, UK

J. R. Allan

Birdstrike Avoidance Team, Central Science Laboratory, Sand Hutton, York, UK

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A Fixed Netting System as a Means of Excluding Birds From a Domestic Waste Landfill

VS Jackson

J Brown

JR Allan

Birdstrike Avoidance Team, Central Science Laboratory
Sand Hutton, York, YO41 1LZ, UK

Abstract

Many bird species are attracted to landfills which take domestic or putrescible waste. These sites provide a reliable, rich source of food which can attract large concentrations of birds. The birds may cause conflicts with human interest with respect to noise, birds carrying litter off site, possible transmission of pathogens in bird droppings and the potential for birdstrikes. In the UK there is an 8 mile safeguarding radius around an airfield, within which any planning applications must pass scrutiny from regulatory bodies to show they will not attract birds into the area and increase the birdstrike risk. Peckfield Landfill site near Leeds, West Yorkshire was chosen for a trial of a netting system designed to exclude birds from domestic waste landfills. The site was assessed for bird numbers before the trial, during the netting trial and after the net had been removed. A ScanCord net was installed for 6 weeks, during which time all household waste was tipped inside the net. Gull numbers decreased on the site from a mean of 1074 per hourly count to 29 per hourly count after two days. The gull numbers increased again after the net had been removed. Bird concentrations in the surroundings were also monitored to assess the effect of the net. Bird numbers in the immediate vicinity of the landfill site were higher than those further away. When the net was installed, the bird concentrations adjacent to the landfill site decreased. Corvids were not affected by the net as they fed on covered waste which was available outside the net throughout the trial. This shows that bird problems on a landfill site are complex, requiring a comprehensive policy of bird control. A supporting bird scaring system and clear operating policy for sites near to airports would be required.

Introduction

It is well known that landfills attract large numbers of medium to large sized birds especially corvids and gulls. These can be a major birdstrike hazard. Starlings may also be attracted which are another particularly hazardous species due to their flocking habits. Gulls are perhaps the most hazardous species as they frequently travel long distances from roost to feeding sites daily, often following regular flightlines (Horton *et al*, 1983). A distance of up to 20 miles each way is not uncommon. If these flightlines pass close to an aerodrome, or are in the vicinity of the approach paths, a significant increase in the birdstrike hazard could arise. For this reason, proposals for landfill sites near to aerodromes in the UK can be refused planning permission if it is judged that the birdstrike risk will be increased. Unless approved management practices are put in place to prevent an increase of birds on these sites, the landfill will be refused permission to open or will not be allowed to tip putrescible or domestic waste. Even landfill sites which state in management plans that they will employ bird control measures such as active bird control and netting systems have still been refused as these methods have had no scientific studies to prove their efficacy.

North West Environmental Trust Limited, sponsored by Caird Environmental Limited, commissioned a study of a new netting design to exclude birds from a domestic waste landfill site near Leeds. The net, designed by ScanCord, a Swedish company, is a fixed construction which is made to cover the whole of a waste disposal cell. All domestic and putrescible waste which is a potential food source for birds is tipped inside the net. The door to the net is in the form of a tunnel and is designed to be kept closed to prevent birds gaining access to the waste.

The aim of the research project was to assess the effectiveness of this netting system for keeping birds off the landfill site. Three stages of monitoring took place; the first phase monitored the numbers,

species and behaviours of birds using the site before the net was installed. This was to ensure there were enough birds utilising the site to make the trial a rigorous test of the net. The second phase, after installation of the net, monitored how birds reacted to the presence of the net, whether the net was effective in deterring birds, and recorded the causes of any failures of the net as a bird deterrent method. The third phase of the trial, after the net had been dismantled, assessed whether birds returned to the site once waste was again available, to rule out the possibility that birds had left the site for reasons unconnected with the net (e.g. migratory movements). If found to be effective on this site it was hoped that the system would then be deemed acceptable for use on landfills near to airfields.

Methods

Peckfield Landfill Site was chosen as it takes in excess of 200,000 tonnes of domestic and putrescible waste per annum, and large numbers of gulls (Black-headed *Larus ridibundus*, Common *L.canus*, Herring *L.argentatus*, Lesser Black-backed *L.fuscus* and Great Black-backed *L.marinus*), corvids (Rooks *Corvus frugilegus*, Carrion Crows *C.corone* and Jackdaws *C.monedula*) and Starlings (*Sturnus vulgaris*) are found there on a regular basis.

The net-off monitoring stage of the trial ran from 17th November 1997 to 27th January 1998. The net-on stage of the trial ran from 28th January to 10th March 1998. The final monitoring phase with no net ran from 11th March until 1st April 1998.

Four half-day surveys were carried out each week. Morning surveys involved a count each hour on the landfill from dawn until midday. The afternoon surveys involved an hourly count from midday until dusk. Each hourly count consisted of identifying and counting all birds present on the landfill site, and noting their location and behaviour.

A driven transect survey of the local area was also carried out in order to establish the effect of the net on birds in the surrounding area. A 14 kilometre route was devised and surveyed on alternate visits. All fields on both sides of the road were surveyed and the numbers and behaviour of all birds seen was noted.

Results

Figure 1.
Peak gull count on each survey date.

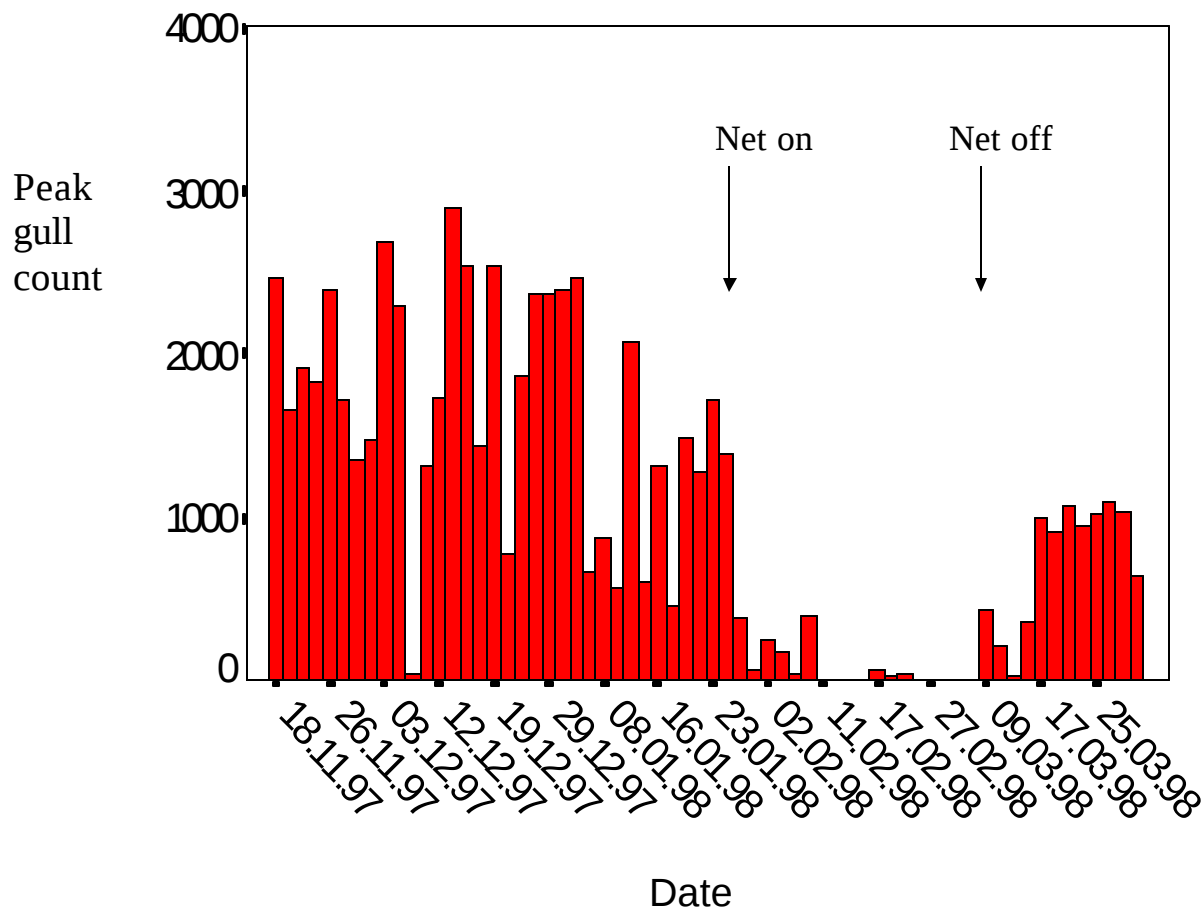
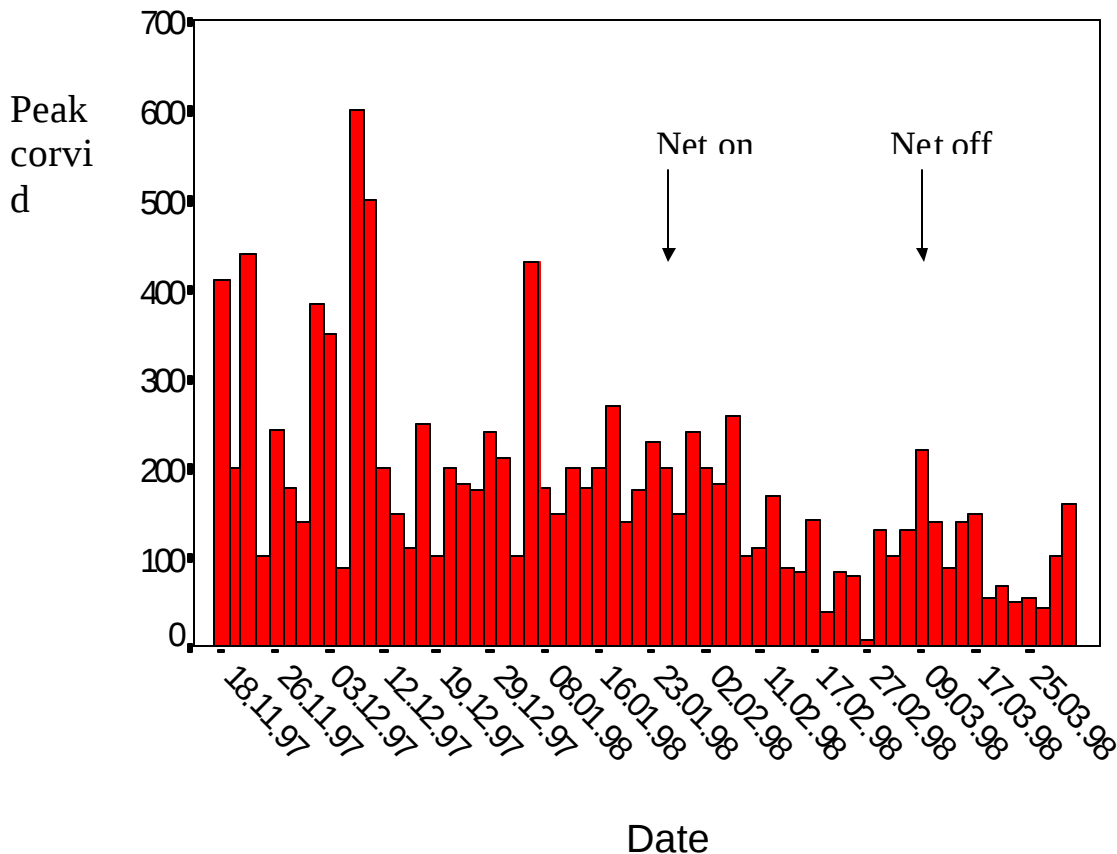


Figure 1 shows the effect of the net on gull numbers. Before the net was installed there was a consistently high number of gulls on the site at each hourly count (Mean=1074, Standard Deviation=799). When the net was installed and operational, the number of gulls declined to a mean of 79 per count (SD=234.28). Excluding the first two days when birds were presumably learning that they no longer had access to food, the mean number fell to 29 per count (SD=74.86) over the 6 week period when the net was in place. In both cases, these are statistically significant declines (Mann-Whitney U-test $p < 0.00001$). After the net had been removed, the gull numbers rose again to a mean of 486 per hourly count (SD=399.82). This is a significant increase compared to the net-on phase of the trial (Mann-Whitney U-test $p < 0.00001$).

Corvid numbers declined throughout the trial. However, this decline is thought to be independent of the installation of the net as there was a consistent presence of birds feeding on covered waste throughout the trial (Figure 2). 70.5% of corvids recorded displayed this behaviour. The mean for the initial net-off phase was 129 birds per hourly count (SD=107.89) which decreased significantly to 76 per hourly count

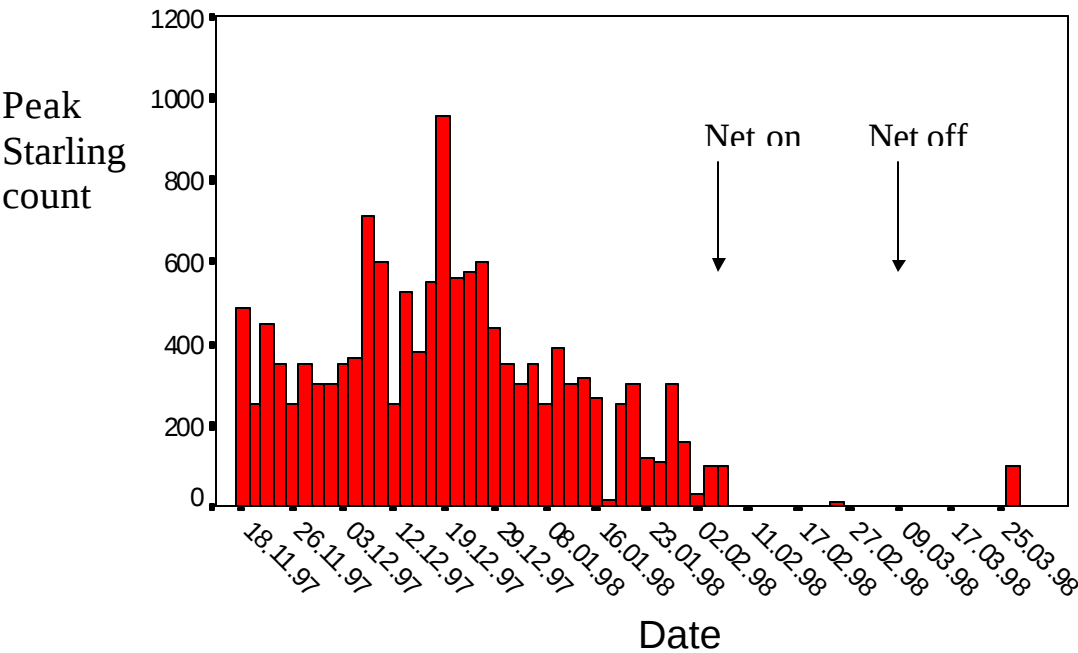
(SD=58.65) when the net was installed (Mann-Whitney U-test $p < 0.00001$). The numbers declined further to a mean of 55 (SD=34.52) after the net was removed. This was also a significant decline (Mann-Whitney U-test $p = 0.0187$), suggesting that corvid numbers declined independently of the installation of the net and continued to decline (possibly due to the departure of birds to breeding sites) after it was removed.

Figure 2
Peak corvid count on each survey date



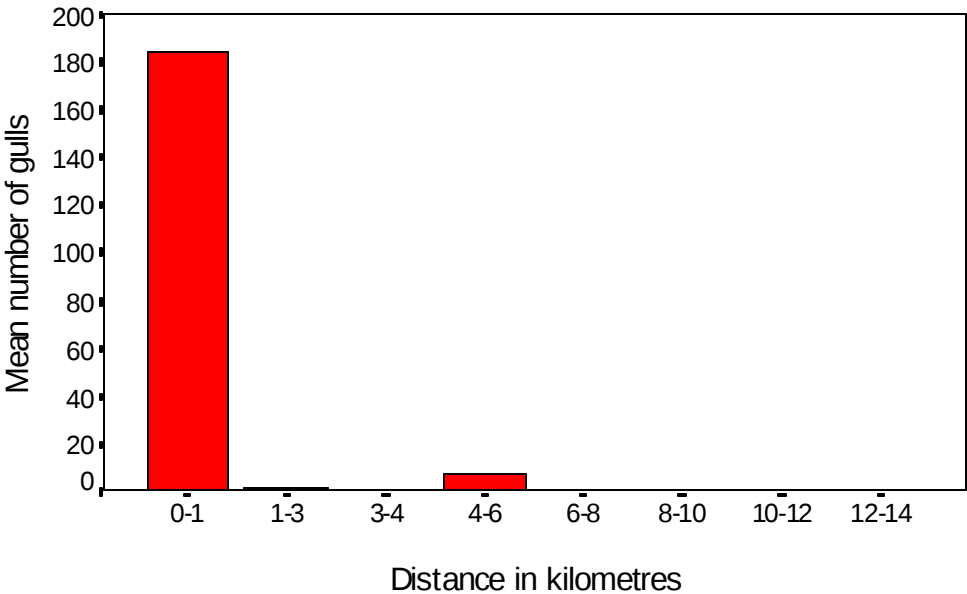
Starling numbers decreased significantly when the net was installed, from a mean of 196 birds per hourly count (SD=179.49) to a mean of 12.52 per hourly count (SD=37.75) Mann-Whitney U-test $p < 0.00001$. There was a further decline in Starling numbers when the net was removed (Mean=1, SD=12.71 Mann-Whitney U-test $p = 0.0099$) which, as with corvids, suggests that the decline of Starlings is independent of net installation and may be connected to seasonal population changes (Figure 3).

Figure 3
Peak Starling count on each survey date



The ambient bird concentrations showed a peak in gull numbers within 1 kilometre of the landfill site when the net was not in place. This was largely accounted for by loafing birds which had been feeding on the landfill site. Birds further than 1 kilometre away showed an irregular pattern with no large concentrations. (Figure 4).

Figure 4
Gull numbers with distance from Peckfield Landfill Site - Net off



During the net-on phase, there was a significant decrease in the number of gulls within 1 kilometre of the landfill (Mann-Whitney U-test $p < 0.006$), from a mean of 184 birds per hourly count ($SD = 246.28$) to 49 per count ($SD = 18.72$) (Figure 5). When the net was removed, the mean number of gulls in the first kilometre increased to 149 birds per count ($SD = 142$).

Figure 5
Gull numbers with distance from Peckfield Landfill Site - Net on

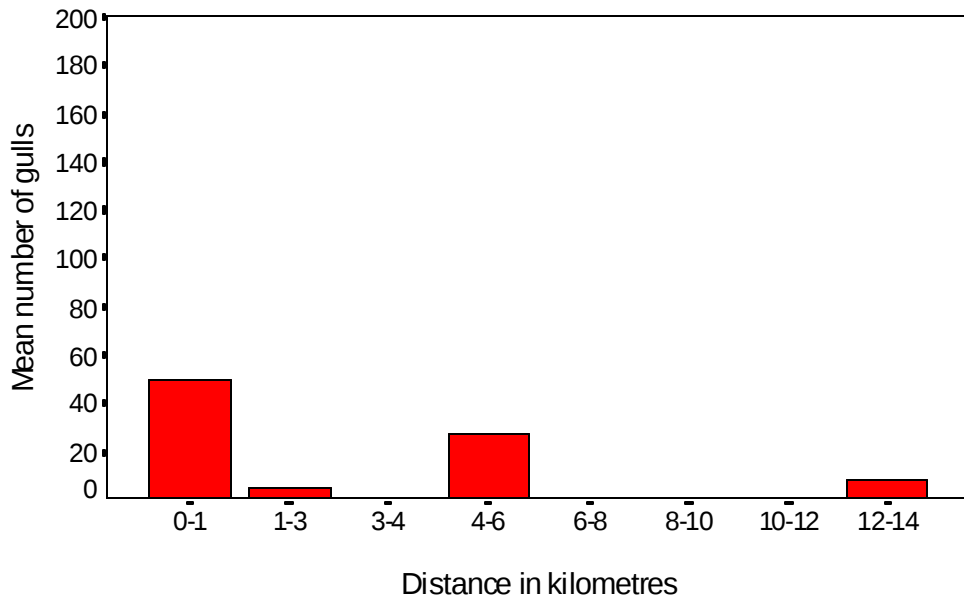
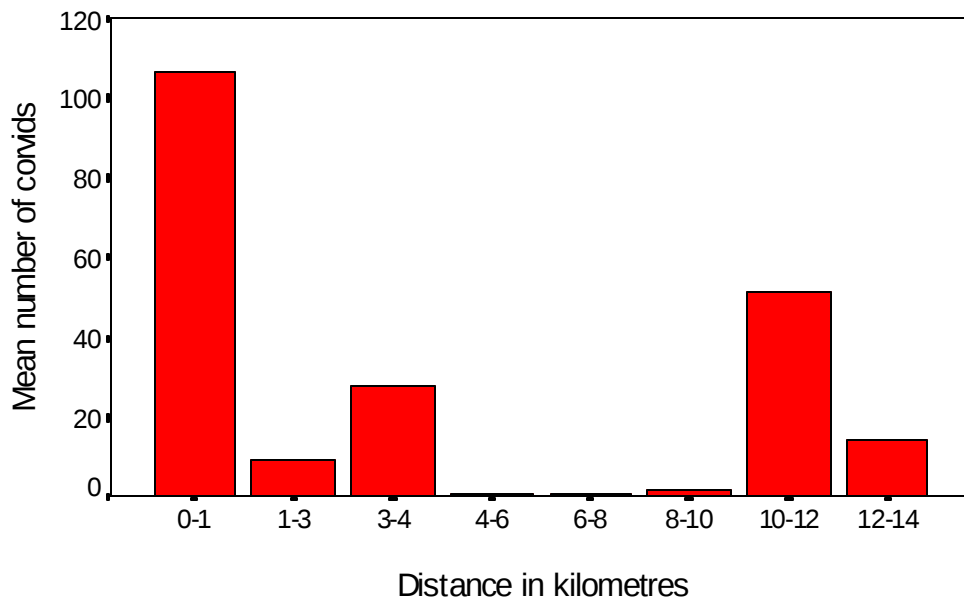


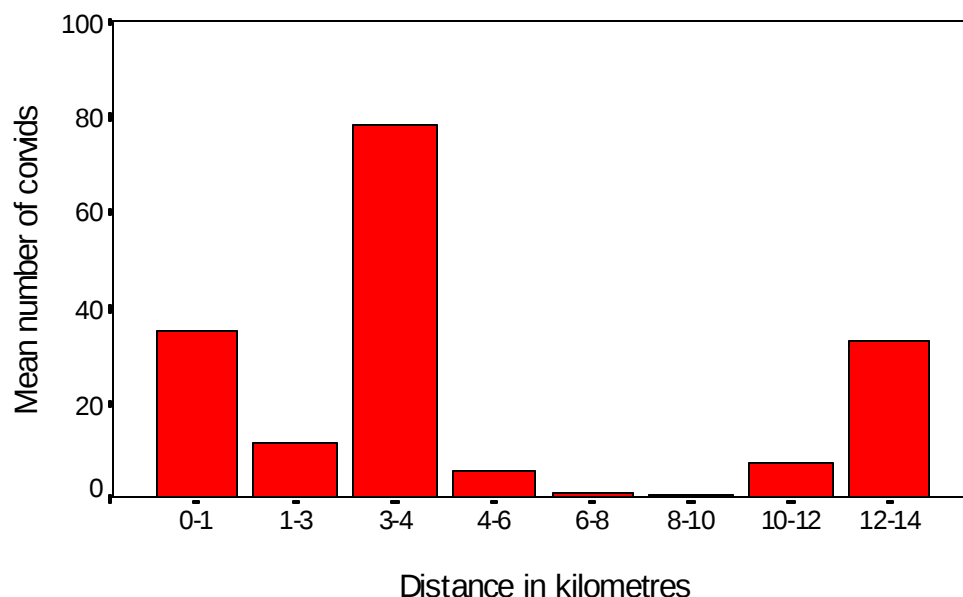
Figure 6
Corvid numbers with distance from Peckfield Landfill Site - Net off



There was a significant decrease in the number of corvids (Mann-Whitney U-test $p=0.0262$) within 1 kilometre of the site when the net was installed, from a mean of 106 birds per count (SD=113.92) to 35 per count (SD=44.45), and when the net was removed this figure decreased further to 22 birds per count (SD=26.2). (Figures 6 and 7).

Figure 7

Corvid numbers with distance from Peckfield Landfill Site - Net on



Discussion

Figure 1 shows how a well operated netting system can effectively remove feeding gulls from a landfill site although some birds did remain on adjacent cells waiting for an opportunity to feed. There are large numbers of gulls present in the general area as there is a large gull roost at Fairburn Ings Nature Reserve 5 kilometres South of Peckfield. Many gulls will therefore pass over the site as they leave the roost and may alight to determine whether food is available. There were a number of occasions when the net was in place when gull numbers increased. These occasions corresponded to the net doors being left open, or tearing of the net which suggests that gulls were attracted back to the landfill site in the hope of gaining access to the waste, whether or not they could immediately feed there. A strict operational regime needs to be employed to ensure that gulls are not allowed access to waste on a netted landfill site. When bird control is critical, for example within the 8 mile safeguarding radius of an airfield, a supporting system of bird deterrence should also be in place on the landfill in case of breakdown of the netting system. This would ensure that should the netting system fail due to a tear in the net or operational failures, a backup system would be employed to prevent birds gaining access to any putrescible waste.

Corvids feed on covered waste so for a netting system to deter corvids from a landfill site, the covering material needs to be of a sufficient depth to prevent birds probing through the cover to reach waste, or the whole cell must be under a net and a deep layer of topsoil used to cap the cell before the net is removed.

Starlings appeared to be deterred from feeding on the landfill site by the net. However, as there was no return of the birds after the net was removed, it is not possible to prove that the decline in numbers was due to the presence of the net as they could represent natural decreases in populations at this time.

Ambient bird concentrations were affected by the net within 1 kilometre of the landfill site. There was a significant decrease between the numbers of gulls seen before the net was installed and those recorded when the net was operational. Corvid numbers in this area were also markedly reduced. These data

suggest that large concentrations of birds occur relatively close to the landfill site and the presence of a net reduces these concentrations.

This study has shown that the ScanCord netting system, if operated properly, is effective in deterring gulls from a large domestic waste landfill site. For a landfill site to be approved near to an airfield where the birdstrike risk could be increased, a management plan incorporating a full netting system with supporting bird management methods would be required in order to ensure that any breakdown in the netting system did not attract hazardous birds.

Acknowledgments

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