

Monitoring the effects of deterring gulls from a major landfill site - a two week trial in March 2004



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Preamble

This short paper is a distillation of the results obtained from a study carried out between 23rd February and 16th April 2004 with Gloucester Landfill being the major landfill (Rock, 2004a).

Introduction

It is well known that gulls utilise landfills throughout Britain and abroad as feeding sources (CRAMP & SIMMONS 1984). Indeed, after the Second World War a great many new landfills were opened accepting household (putrescible) waste where, before, the largest percentage of waste material dumped was inert (mostly ash) (Institute of Waste Management *in litt*). This post-War proliferation of landfills signalled the beginning of 'Throw-Away Society' in Britain.

Gulls were quick to take advantage of this new food source (PARSLOW, 1967). However, it was the Clean Air Act of 1956 (which forbade the burning of rubbish at landfills and, instead, required that tip faces should be covered with inert material at the end of a day's tipping) which turned this new food source into a massive feeding opportunity for gulls - particularly the resident breeders. This abundance of food resulted in rapid population expansions. Numbers in the Severn Estuary Region rose 15-fold by the mid-1970's (MUDGE & FERNS, 1980). The upshot of large population rises was that traditional breeding grounds were outgrown and gulls began to colonise towns and cities (e.g. ROCK, 1990). The first recorded urban breeding in the Severn Estuary Region was in Merthyr Tydfil in 1958 (MORREY SALMON, 1958).

Cardiff followed in 1962 (CRAMP, 1971), Gloucester in 1967 (OWEN, 1967), etc.

Since then urban populations have grown exponentially (ROCK, 2005a) and most urban conurbations in the Severn Estuary Region, as of 2003, supported colonies of varying sizes from two pairs in Bradford on Avon (ROCK, 2003a) to 2,727 pairs in Cardiff (ROCK, 2003b), making Cardiff an urban colony of national significance. It now stands at 3,475 pairs (ROCK, 2005b), making it an urban colony of international significance and, possibly, the largest in the world.

Gloucester's roof-nesting gull population in 2003 was 1,688 pairs (ROCK, 2003c) and the public perception was that easy feeding at Gloucester Landfill was entirely responsible. The local newspapers had frequently called for culls of roof-nesting gulls, but there were also suggestions that Gloucester Landfill should institute control measures.



Fig. 1 - Principal sites mentioned in the text. -
Sites principaux mentionnés dans le texte.

Methods

Gloucester Landfill (51.51N, 02.17W), operated by Cory Environmental, is the largest and most important landfill in the Severn Estuary Region for resident, passage and wintering gulls (ROCK, 2003d). Fifteen gull species have been recorded there (P. Stewart, various Severn Estuary Gull Group reports) and counts of >10,000 gulls are common (pers. obs.) especially in winter, but turnover may account for four times this number daily. The prime reason for its importance is that it receives more than 1,000 tonnes of organic waste every day and is open six days per week (G. Ricketts (Cory Environmental) pers. comm.).

Mindful that the Environment Agency (EA) is increasingly requiring landfill operators to ensure that gulls do not feed at landfill, Cory Environmental proposed (at the Gloucestershire Gull Action Group (GGAG) meeting of 18/12/2003) that a short term scaring trial at the landfill would provide an insight into the complications/issues of possible long term bird control measures at the landfill.

Gull control measures had never before been instituted at Gloucester Landfill due, for the most part, to fears expressed by Gloucester City Council that deterrence at the landfill would result in large numbers of gulls descending upon Gloucester City centre (approx. 2 km distant) and due also to concerns that Gloucestershire Airport (less than 10 km distant) might be made more prone to bird strikes. It was, therefore, decided to conduct a deterrence trial for two weeks in the spring of 2004 on the proviso that if any serious problems arose, the trial would be terminated immediately.

This provided a 5-fold opportunity to investigate alternative feeding locations, whether or not gull numbers would rise in Gloucester City, whether or not deterrence would have any effect upon breeding numbers in Gloucester and in other urban colonies and if there were any lasting effects at Gloucester Landfill.

The principal data gathering method was the identification of colour-ringed gulls by four full-time



Picture 1 - Herring Gull WHITE F:H (GN49300) ringed 1/7/2003 as a pullus on a rooftop in Bristol. - Goéland argenté blanc F:H (GN49300) bagué comme pullus le 1/7/2003 sur un toit à Bristol.

observers and several part-time observers. Colour-rings are large, brightly coloured and engraved to show a code which identifies individual birds. The Severn Estuary Region has a very high proportion of gulls marked in this way (principally from the Bristol Scheme) and, possibly, rather higher than any other region in Britain (ROCK, 2005a).

Additionally, numbers of birds controlled (i.e. checked for rings) were estimated during every site visit and counts were made at each site visited. Colour-ring observations were timed in five minute intervals in order to calculate stay lengths at landfills and, if possible, speeds of same-day movements.

The study was split into three phases:
1. Pre-Deterrence (23rd February 2004 - 7th March 2004)
 Gloucester Landfill was visited daily for periods

of between 6-8 hours to make counts, identify colour-ringed gulls during "normal conditions" and to establish which birds were regular visitors. Other landfills in the region (possible alternative feeding sources) were also visited.

2. Deterrence (8th March 2004 - 21st March 2004)

Deterrence was achieved by using falcons (*Peregrine* (*Falco peregrinus*) x *Saker* (*Falco cherrug*) crosses) and, to a lesser extent, distress calls and pyrotechnics from dawn to dusk each day. All possible alternative feeding locations, breeding and other sites were visited and Gloucester Landfill was also visited 4 times during this phase.

3. Post-Deterrence (22nd March 2004 - 16th April 2004)

It was anticipated that "normal conditions" would not be resumed immediately and a further time allowance of two weeks was made. Again, Gloucester Landfill was visited daily, as were other landfills and breeding sites.

With Bristol Scheme recovery rates in excess of 60% (ROCK, 1999), many of the birds observed during the study already had post-fledging life histories above 50 events and one bird (a regular at Gloucester Landfill) had a life history of more than 300 events. These data were also used during the final analysis.

Results

During the study 186 visits to 26 sites were made. 351,000 gulls were counted and 120,000 controlled. Some 1,863 records of 701 colour-ringed individuals were collected from all sites during the period (mean = 2.7 records per individual), producing a strike rate of one colour-ring

identified for every 64 birds controlled. This is a very high strike rate (the mean strike rate from recent expeditions to Portugal, for instance, is one colour-ring in every 220 birds controlled (pers obs)) and reflects the high proportion of individually-marked birds in the population.

Various gull taxa carrying colour-rings were observed during the study (Table 1). However, of 701 colour-ringed individuals, 686 (97.9%) were Herring and Lesser Black-backed Gulls, the vast majority of which were local birds.

As expected, the majority of colour-ringed birds (Table 2) were from the Bristol Scheme (which included Bath, Cheltenham and Worcester) and, together, made up a total of 415 individuals (59.2%). Since 1980, 4,949 birds had been individually colour-ringed in the Bristol Scheme. The SEGG scheme (Gloucester Landfill, Gloucester, Hereford and Stoke Orchard) had marked 236 birds in this way and the Flat Holm scheme 1,200, making a total of 171 ringed individuals (24.4%) observed during this study. 115 individuals (16.4%) were recorded during the study which originated away from the study area (including other countries), underscoring the region's importance to passage birds.

The seven feeding sites (landfills) given the greatest attention during the study were Calne, Frampton, Gloucester Landfill, Hallen, Northwick, Stoke Orchard and Throckmorton. Dix Pit (Stanton Harcourt, near Oxford) was also visited twice. These landfills receive between 400 and 1,500 tonnes of waste per day, with percentages of organic waste varying between almost nothing (Northwick) to 70% (Gloucester Landfill).

SPECIES	Individuals	%
Black-headed Gull (<i>L. ridibundus</i>)	9	1,30 %
Caspian Gull (<i>L. cachinnans</i>)	1	
Common Gull (<i>L. canus</i>)	1	
Great Black-backed Gull (<i>L. marinus</i>)	1	
Herring Gull (<i>L. argentatus</i>)	172	24,50 %
Lesser Black-backed Gull (<i>L. fuscus</i>)	514	73,30 %
Yellow-legged Gull (<i>L. michahellis</i>)	1	
Mediterranean Gull (<i>L. melanocephalus</i>)	1	
Hybrid LBBxHG (<i>L. fuscus x L. argentatus</i>)	1	
TOTALS	701	99,10 %

Table 1 - Numbers of colour-ringed individuals of each species recorded during the study. - Pour chacune des espèces, nombre d'individus bagués en couleur observés pendant l'étude.

Individually-marked Lesser Black-backed Gulls outnumbered Herring Gulls by 3:1. This ties in with the 2004 regional breeding figures at 3.2:1 (ROCK, 2004b). - Les Goélands bruns marqués étaient 3 fois plus nombreux que les Goélands argentés.

Table 2 - Ringing locations and numbers of individuals recorded during the present study. Origins shown in bold = foreign; origins shown in blue = Bristol scheme; * = local origins. -

Lieu de baguage et nombre d'individus contrôlés durant la présente étude. En gras, origine étrangère; en bleu, centre de baguage de Bristol; * = origine locale.

Origin/Origine	Inds	%
Denmark/Danemark	3	
Estonia/Estonie	1	
Finland/Finlande	1	
France	2	
The Netherlands/Pays-Bas	14	2,0
Iceland/Islande	3	
Norway/Norvège	3	
Poland/Pologne	1	
Spain/Espagne	2	
Bath *	16	2,3
Bristol *	396	56,5
Cheltenham *	2	
Flat Holm *	36	5,1
Gerrards Cross (Heathrow)	8	1,2
Glasgow	7	1,0
Gloucester *	13	1,9
Gloucester Landfill	76	10,9
Heathfield (Devon)	3	
Hereford *	6	
Isle of May	1	
Lancs. (Ribble)	8	1,2
Lancs. (Tarnbrook)	24	3,4
Lancs. (Walney)	17	2,4
Llyn Trawsfynydd (Gwynedd)	4	
Mallydams (Hastings)	1	
Orfordness (Suffolk)	5	
Pilsworth (Bury)	2	
Isles of Scilly	1	
Skomer Island (Pembroke)	3	
Stoke Orchard	40	5,7
Worcester *	1	
Unknown	1	
Totals	701	93,6

Alternative feeding sources

Some 332 individuals were recorded at Gloucester Landfill prior to the Deterrence Phase (none was recorded during the deterrence phase). Of these, 235 (70.8%) visited one or more of the six alternative landfills (with no control measures in place) during the deterrence phase (i.e. excluding Gloucester Landfill), but 93 (28%) did not and, instead, **found food from other sources**.

Both Stoke Orchard and Calne receive significant tonnages of organic waste (i.e. potential gull food) every day. However, Calne is 49 km from Gloucester Landfill whereas Stoke Orchard is only 19 km away. It was concluded, therefore, that the selection of alternative landfills was based on availability of organic waste, distance (i.e. flying time involved) and whether or not gull control was in operation. Landfills receiving small quantities of organic waste, or heavily controlled (e.g. Swindon), were positively rejected.

By the end of the deterrence phase it was found that gulls had gravitated to Stoke Orchard. Feeding possibilities at Stoke Orchard were easier there than at other landfills (pers obs), but it was also concluded that the majority of these birds were probably local breeders (i.e. within a radius of circa 20 km of Gloucester Landfill) and that flying time had become an important consideration at this stage of the breeding season (i.e. absence from territories for lengthy periods could result in an increase in territorial disputes). It therefore appears that for those gulls utilising landfills, the next nearest, viable and dependable food source is a sensible survival strategy.

Table 3 - Alternative feeding sites showing percentages of 235 individual gulls moving away from Gloucester Landfill during deterrence and moving back to Gloucester Landfill after cessation of deterrence. - Sites de nourrissage alternatifs où a été noté un certain pourcentage des 235 goélands quittant le centre d'enfouissement de Gloucester (GLS) pendant la dissuasion et y revenant après la fin de cette expérience.

Site	Dist. from GLS/Dist. de GLS	Moves Away/Quittant GLS	Moves Back/Revenant à GLS
Frampton	11 km	3,8 %	<1 %
Stoke Orchard	16 km	74,7 %	90,3 %
Throckmorton	36 km	1,1 %	<1 %
Northwick	39 km	1,1 %	<1 %
Hallen	45 km	5,4 %	<1 %
Calne	49 km	13,4 %	6,7 %

Site	Stays/séjours	Indvs
Stoke Orchard	101	83
GLS	42	34
Calne	14	14
Throckmorton	7	7
Hallen	2	2
Total	166	140

Table 4 - Number of stays at five feeding sites and number of individuals (indvs) involved. - Nombre de séjours sur 5 sites de nourrissage et nombre d'individus impliqués.

With only 14 stays at Calne and less at Throckmorton and Hallen, stays from these sites were discarded for the analysis below, but included for analysis of stay lengths by age. Nine individuals were recorded staying at more than one site.

Stay Lengths

In order to assess stay lengths at feeding sites colour-ringed birds were recorded in five-minute intervals and repeat sightings were noted only if they were still present at the site after half an hour (a shorter period, it was felt, would add unnecessary complication to the recording process).

131 individuals were recorded more than once at the same site on the same day with 166 stays in total. Stay lengths (in hours and minutes) ranged between 0:30 and 6:20 with a **mean stay length of 2 hours and 4 minutes**.

The major sites are Stoke Orchard and Gloucester Landfill with 143 stays (Calne is shown as an illustration).

The difference in mean stay lengths at Stoke Orchard and Gloucester Landfill is 29 minutes. The difference is not significant (Mann-Whitney, $P < 0.24$). No significant difference was observed between Herring and Lesser Black-backed Gulls and no difference between sexes.

Herring and Lesser Black-backed Gulls colour-ringed as nestlings offered the opportunity to analyse stay lengths according to age (full-grown birds rin-

ged at landfills were therefore omitted). There was insufficient data available for birds older than 10 years (sample size = 120 individuals).

The general trend is for younger birds to stay longer than adults (breeders) with first year birds staying for the longest periods. Immature (non-breeders) are less experienced (and, possibly,

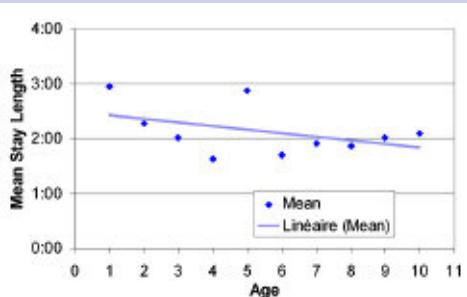


Figure 3 - Mean stay lengths (in hours and minutes) of gulls of known age (in years) at four landfills (Gloucester, Stoke Orchard, Calne & Throckmorton). - Longueur moyenne du séjour (heures et minutes) des laridés d'un âge déterminé (en années) sur quatre décharges (Gloucester, Stoke Orchard, Calne & Throckmorton).

less aggressive) at foraging than adults and it is thought that they need more foraging time. They also have no breeding pressure.

Non-breeders appeared to spend uniform amounts of time wherever they were feeding. Adult stay lengths appeared to be in line with tolerable absence times from territories (estimated to be approximately 4-4½ hours, particularly when territory defence is of critical importance (February-March) (ROCK, 2004a)).

Feeding journeys (i.e. flying time plus feeding time (and, possibly, bathing, preening and loafing time)) are, it is suggested, of less importan-

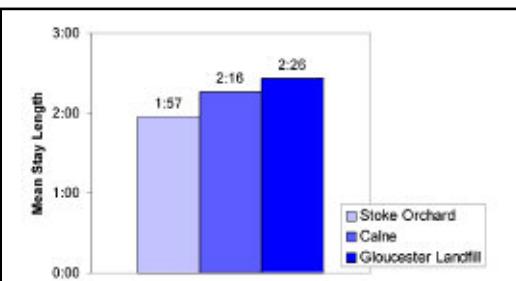


Figure 2 - Mean stay lengths (in hours and minutes) of gulls recorded at three landfills. - Longueur moyenne du séjour (heures et minutes) des laridés observés sur trois décharges.

ce for passage migrants and non-breeders than for breeding birds. Indeed, the majority of movements between distant sites were made by young birds and birds on passage, or by more distant breeders (e.g. Bristol).

For Gloucester and other local breeders, however, absence from breeding territories is of considerable importance. It is suggested, therefore, that for these birds feeding journeys are completed in the least possible time. It is further suggested that the shorter stay lengths at Stoke Orchard (mean = 1:57) were dictated by Gloucester and other local breeders with little time to waste (9 confirmed Gloucester breeders stayed on average for 1:26).

During the study, the fastest, same day movement was at an average speed of 10.2 kph. After the study, one bird travelled between Calne and Gloucester landfill at an average speed of 32 kph (P. Rock, unpubl. data). However, from radar observations at Gloucestershire Airport it became clear that groups of gulls (of indeterminate size) were transiting airport approaches at speeds between 35-50 knots (65-93 kph) on 01/03/2006, but with following winds of 3 knots (ROCK, 2006).

If Gloucester breeders were making same day feeding journeys, in order to meet tolerable absence times, flying speeds would have to be of the order of 40 kph.

Stoke Orchard was selected as the nearest, viable, alternative feeding site by a large number of gulls when Gloucester Landfill became unavailable. The time required for feeding journeys was within acceptable absence tolerances (effectively ruling out utilising landfills further afield later in the study) and it is suggested that this is why Stoke Orchard was chosen by Gloucester breeders in particular.

However, from observations during the study and after it is clearly the case that birds are alternating between feeding sites on a regular basis (pers obs). Intimate knowledge of home ranges would appear to be a vital survival strategy.

Other Aspects

No increase in gull numbers in Gloucester as a consequence of deterrence was observed. In fact,

greater numbers were observed in the city prior to deterrence.

Negative effects on breeding numbers of gulls in Gloucester as a consequence of deterrence were not observed.

Effects on other colonies within the study area as a consequence of deterrence were not discernible.

Immediately after the cessation of deterrence gulls were reluctant to visit Gloucester Landfill (probably because they were expecting falcons). This nervousness, however, decreased steadily and, 19 days later, gulls had reverted to normal, pre-deterrence behaviour.

Discussion

Urban breeders in the Severn Estuary Region outnumber wild breeders by circa 4:1, so it was expected (and confirmed) that the vast majority of birds observed during the study and, particularly towards the end, would be urban breeders. The region's urban gull population in 2004 was estimated to have been circa 24,000 pairs (ROCK, 2005a) and the problems associated with urban breeding by the large gulls had already been highlighted repeatedly for some years by the Media, with demands for action.

Clearly, the proximity of suitable and dependable feeding sources (i.e. landfills) plays an important role in colony selection by the large gulls. However, almost 30% of gulls displaced from Gloucester Landfill were never recorded at other landfills, though were regularly recorded in breeding colonies and other non-feeding sites. When species other than Herring and Lesser Black-backed Gulls were excluded, this percentage rose to 31%. These birds, therefore, were able to find food from sources other than landfills, but these sources are unknown.

Whilst a great deal is known about the biology of Herring and Lesser Black-backed Gulls (the two principal species involved in urban breeding), almost all of this information has been derived from studies at traditional, wild colonies (e.g. CRAMP & SIMMONS, 1983). There is a dearth of up to date and useful information in the literature on the ecology of urban gulls.

Urban gull populations throughout Britain are growing exponentially (ROCK, 2005a) and despite the pest control industry's increasing interventions over many years, there has been no noticeable effect on population growth.

Birds colour-ringed on rooftops under the Bristol Scheme nowadays breed in almost all of the region's urban colonies and less than 1% of urban-hatched gulls recruit into wild colonies once they are old enough to breed (ROCK, 2005a). It is clear, therefore, that the issue of urban gulls is not just a local, but a regional and national one. And if the problems associated with urban breeding by the large gulls are to be solved in a socially acceptable way, researching urban gull ecology (in the light of burgeoning populations and spiralling costs to local authorities, businesses and tourism) would appear to be a matter of considerable urgency.

Landfills, whilst providing ample, easy to access food, have the added advantage that food supplies are dependable (ROCK, 2005a). However, in line with the European Framework Directive on Waste (75/442/EEC) and the Landfill Directive (1999/31/EC), Government is acting to reduce waste to landfill (Waste Strategy 2000). Clearly, landfills play an important role within the urban gull issue, but what, precisely, is their significance? It is clear that urban gulls forage widely and know their home ranges (potential food sources) intimately (ROCK, 2004a) in order to cope with any sudden food shortages. Where, though, did the 31% of gulls not utilising landfills during the time Gloucester Landfill was unavailable obtain their food? These and other questions require more detailed investigation because as landfills receive less organic waste these alternative food sources may become critically important.

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Suivi des effets de l'effarouchement des laridés sur une importante décharge - une expérience de deux semaines en mars 2004

Suite à l'augmentation de la population nicheuse de laridés sur les toits de Gloucester, les habitants ont demandé un contrôle du nombre de couples nicheurs ainsi qu'une prise de mesures de dissuasion dans la décharge, responsable selon eux de l'augmentation rapide des effectifs et utilisée comme source d'alimentation par les laridés.

Le gestionnaire de la décharge, Cory Environmental, a proposé de fournir à brève échéance un bilan sur les complications/résultats que des mesures de contrôle des oiseaux à long terme entraîneraient. Une crainte des responsables de la ville était que les laridés ne se réfugient davantage dans le centre-ville et l'aéroport proche, augmentant le risque de collision avec les avions. Il fut donc décidé de mener des actions de dissuasion durant deux semaines au printemps 2004 pour déceler une éventuelle augmentation des problèmes.

Ceci permettait d'investiguer 5 points : (1) les zones de nourrissage alternatives, (2) si oui ou non le nombre de laridés augmenterait en ville et si les efforts de dissuasion ont des effets sur la population reproductrice, (3) à Gloucester et (4) dans les autres colonies urbaines et (5) s'il y a un

effet d'effarouchement durable à la décharge de Gloucester.

Cette recherche peut être décrite en 3 phases : 1^o la "pré-dissuasion" (23 février 2004-7 mars 2004) : recherche et identification des laridés marqués, 2^o la dissuasion (8 mars 2004-21 mars 2004) : effarouchement à l'aide de faucons, diffusion de cris de détresse et moyens pyrotechniques et 3^o "post-dissuasion" (22 mars 2004-16 avril 2004) : délai imparti aux laridés pour reprendre leurs activités à la décharges après les dérangements.

Le baguage couleur fut la méthode choisie pour effectuer le suivi des laridés.

351.000 laridés ont été comptés, 120.000 contrôlés, donnant une moyenne de 1 oiseau bagué couleur pour 64 oiseaux contrôlés. Les laridés se sont nourris sur d'autres décharges, 30% des oiseaux se nourrissent sur des sites non fréquentés auparavant. Aucune augmentation du nombre de laridés n'a eu lieu à Gloucester. Aucun effet négatif n'a été noté sur les effectifs nicheurs de la ville de Gloucester, ainsi que dans les autres colonies de la zone d'étude. 19 jours furent nécessaires pour que le comportement des oiseaux revienne à la normale.

Keywords : gulls, colour-ringing, landfill, deterring