Baltray Little Tern Colony Report 2025

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Contents

Abstract

2025 was an extremely successful season for the Little Tern Project, with a record number of fledglings produced. Wardening of the little terns (*Sternula albifrons*) colony in Baltray started on 29th of April and finished on the 1st of August. The night wardens began on the 12th of May, which started the 24/7 coverage of the site. The first egg was found on the 15th of May, and the first chicks were found on the 6th of June. The last successful nest was laid on the 17th of June and hatched on 8th of July.

A total of 158 nesting attempts were made by an estimated 143 pairs. 308 eggs were laid in total giving an average clutch size of 1.949. Of the 308 eggs, 19.8% (61 eggs) were lost throughout the season. Corvids predated 25 eggs at the start of the season, 20 eggs were abandoned, 7 eggs taken by the tide, 2 failed while hatching and 7 had an unknown fate. The average incubation period of an egg to hatch was 21.1 days. No chick predation was observed and there was very low predator disturbance during the season.

143 estimated pairs created 127 successful nests producing 247 chicks. Therefore, 247 chicks were presumed to have fledged due to absence of predation, which equates to a productivity of 1.72 chicks per pair. 247 fledged chicks is the highest recorded number of fledglings since the project began in 2007. This year exceeded the previous record of fledged birds in 2013 by 54.

Introduction

Background

Sternula albifrons, the little tern is the smallest of Ireland's five tern species and is also considered the scarcest. They are a migratory bird that overwinters in West Africa, and travels to Ireland to nest in April and May, returning to West Africa in late August. The species is protected by the EU Birds Directive as an Annex 1 species (Birds directive 2009/147/EC), meaning the species is protected through special conservation measures concerning their habitat, survival and reproduction. In Ireland, Little Tern nests, eggs and breeding areas are protected under the Wildlife Act (1976, Amended 2000). BirdWatch Ireland and the RSPB (Royal Society for the Protection of Birds) in Ireland and the UK respectively, have amber listed the species, meaning that they are of medium concern. As a ground nesting bird that makes its nest on shingle beaches just above the tide line (unique to other Irish tern species) means that nests are particularly vulnerable to human disturbance, tides and predators (Ratcliffe et al., 2008).

Little terns in Ireland

Little terns form relatively small colonies along the west and east coast of Ireland, with 14 of the 24 colonies found in 1995 on coastal islands and ten colonies on the mainland. On the east coast there are colonies from Wexford to Louth, and on the west coast from Kerry to Donegal (Hannon et al., 1997). The number of breeding pairs of little terns on the west coast is less well known than that on the east, but in 2016 a minimum of 100 pairs was reported in the NPWS Seabird Survey in Kerry, Galway, Mayo and Donegal (Newton et al., 2016). Colonies on the east coast are much better reported on which includes Baltray (Co. Louth), Kilcoole (Co. Wicklow), Wexford Harbour and Tacumshin (Co. Wexford), and Portrane/Rogerstown (Co. Dublin).

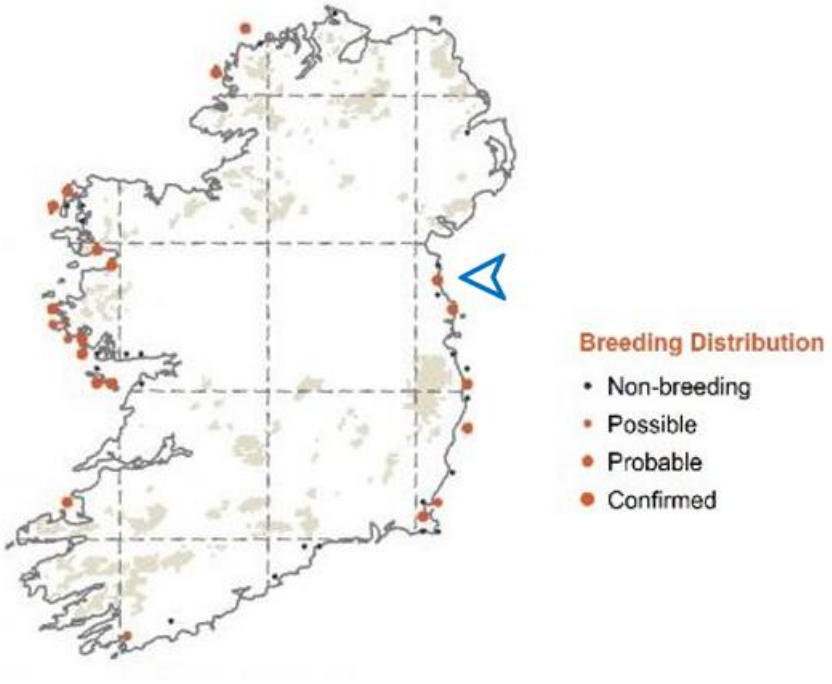


Figure 1: Recorded Nesting colonies of Little terns in Ireland (birdwatchireland.ie/birds/little-tern/)

In County Wexford Little terns have been recorded nesting in new breeding locations at Raven Point and a site known as "New Tern Island" off the Rosslare Backstrand in Wexford Harbour since 2009. Elsewhere in Co. Wexford, there are reports of nesting at Cahore in recent years. Despite the success at sites such as Baltray (up to 2014) and the apparent expansion to former breeding locations, Kilcoole is most likely the most numerous and reliable site on the east coast to having attracted nesting little terns every year since 1984. Kilcoole in 2015, recorded 155 pairs producing 301 chicks, 289 of which were presumed successfully fledged (Doyle et al., 2015). Last year, during the 2024 season, there were 285 nesting pairs and an estimated 312 birds fledged at Kilcoole (Johnson et al., 2024).

Little terns in Baltray

19th – Early 20th Century

Little terns were first definitively reported breeding in county Louth in 1900 by RJ Ussher: "Little terns have laid on the coasts of Louth..." and this refers to records collected from 1866 (Ussher & Warren, 1900); unfortunately, Ussher does not mention the location in county

Louth. Kennedy refers to a possible decline in little tern numbers since Ussher's report but reports one unidentified area in county Louth with up to ten nests in 1946 (Kennedy, 1953). Subsequently Kennedy reported a possible decline of little terns, however Hutchinson (Hutchinson, 1994) thought that this may have more accurately reflected changes to their nesting site, a phenomenon well known in the ecology of little terns (Cabot & Nisbet, 2013).

The late twentieth century (1960s and 1970s onwards)

The Little terns were present on Baltray beach in the 1960s-70s and was observed nesting on the beach and sandbanks, as well as in the estuary (Hartigan, pers. comm. 2013). During this time, recreational use of the beach spiked in Ireland and An Foras Forbartha reported in 1970 that the disturbances had become a major issue for the nesting birds (NPWS). A variety of surveys proved the continued existence of a viable colony such as 1968–72 Breeding Atlas (Gibbons, 1973), Operation Seafarer (1969–70), the All-Ireland Tern Surveys (1984, 1995), and Seabird 2000 (1998–2002) (Le Moënner et al, 2022).

In a 1984 tern survey (Whilde, 1985), an effort to fence and warden the area was made by the Irish Wildbird Conservancy (now BirdWatch Ireland) after a noticed decline in tern numbers. However, the results in the following years were mixed as it was dependant on volunteer action. The site saw very low productivity due to disturbances and high predation (Larry Lenehan, pers. comm.).

Wardening in the 21st century

The Baltray Little Tern Project started in 2007, as a volunteer run project lead by Sandra McKeever and Margaret Reilly. The beginning of the project led to the founding of the Louth Nature Trust which permitted funding from the NPWS, the Heritage Council and the Louth County Council.

In 2007, fences and dedicated conservation measures were undertaken resulting in a major increase in successful breeding in Baltray. They had a total of 21 pairs and 41 fledged chicks with the highest predation coming from hooded crows (*Corvus cornix)*. Other aerial threats from raptors were low (McKeever and Reilly, 2007). In 2008 fledged birds dropped to 29 but rose significantly to 91 in 2009. This was likely because additional funding from 2009 onwards allowed for more monitoring by wardens on-site (Reilly, 2009)**.** In 2010, 96 birds

fledged with spring tides accounting for the only egg losses (Reilly, 2010). 2011 saw 84 fledged chicks with very high predation from ground predators such as foxes (*Vulpes vulpes*) and Eurasian otters (*Lutra lutra*). Wardening on-site was deemed the problem as there was not 24/7 monitoring and a 5 hour gap between 11pm-4am with no warden or volunteers present (Reilly, 2011). The 2012 season saw only 24 fledged, although this was deemed good considering challenges faced. Foxes predated 45 eggs early in the season and high spring tides took another 41 eggs. Wardening was not full time again, but monitoring was prioritised when predation was likely to happen (Reilly, 2012). The 2013 season was highly successful and was the previously most successful season on record. 193 birds fledged the site, with very minimal predation or egg loss. The success of the season was attributed to 24/7 wardening on-site (Doyle, O'Connell and Newton, 2013)**.** In 2014, high predation led to low egg success with a 57% hatch rate, and a low fledgling success with a 53.5% success of those hatched. 91 birds fledged out of 170 chicks. Despite 24/7 wardening predation of eggs by foxes and chicks by sparrowhawks (*Accipiter nisus*) and kestrels (*Falco tinnunculus*) severely reduced success even with such a high number of nesting attempts. 2014 is a season that shows the vulnerability of the little tern nesting habits, and how easily an entire colony could be wiped out if there were no conservation efforts made (Egerton and Newton, 2014). 2015 was the lowest number of fledged birds since the project began, with 20 terns fledged. Total breeding pairs in 2015 was only 25, with a low productivity of 0.80 (Boué and Newton, 2015).

The seasons of 2016 and 2017 were very unsuccessful. The 2016 season failure was attributed to environmental factors out of the control of wardens (Delahunty, Somers and Newton, 2016). While there were birds present on-site, numbers remained low, and no nests were produced despite evidence of courtship and nest scraping. During the little tern migration from West Africa towards Europe there were some continuous days of very strong easterly winds, and it is possible that some birds got blown off course and did not make it to Ireland (B. Martin, pers. comm.). This weather phenomena effected all Irish and UK colonies except Gronant in Wales (P. Manley, pers. comm.), which has a westerly exposure rather than easterly, and could explain the low numbers of birds seen in the Baltray area. The Gronant colony recorded two adult little terns that had been ringed in Baltray, leading to the idea that birds intending to nest on the east of Ireland were deflected to the west coast of the UK. Another possible explanation for the lack of little terns at Baltray in 2016 may have been a food shortage. Food shortages have been reported causing major mortality at both the

Kilcoole nesting site and for the Common and Roseate Terns on Rockabill in 2016 (S. Newton & P. Manley, pers. comm.). Multiple dead chicks, with no external physical damage, were found along the foreshore in Kilcoole, some near fledgling age, indicating that they had probably died of starvation. On discussing this issue with the local anglers in the Baltray area, we were informed that a possible cause of this problem was that the mackerel had not begun to move in close to the coast yet (R. McElhinney, pers. comm.). As the mackerel move in, they push the sandeel (*Ammodytes tobianus*) and sprat (*Sprattus sprattus*) closer to the coast, with sprat going up the estuary, moving into the shallower water in which the little terns prefer to hunt. The presence of corvids on-site likely disturbed any terns that did arrive successfully.

2017 was another failed year, however the lack of nesting was unlikely caused by natural environmental factors such as weather or predation. An increase in dredging activity on the river Boyne from the end of 2016 through the 2017 season, had a significant knock-on effect on the food availability. As result of the two consecutively failed years, the 2018 season was cancelled and not funded**)** (Lynch et al., 2017). A grant was not applied due to the severe deleterious effects of the dredging (Breffni Martin, pers comm.).

2019 saw an improvement compared to the prior years with an estimated 20 chicks fledging from the site (Martin, 2019). In 2020, number rose to pre-2016 levels with 90 fledged birds from Baltray. Very little predation was observed however, avian influenza was a cause for concern meaning no ringing was undertaken (Normanly, 2020). In 2021, the number of fledged birds continued to rise with 142 terns fledging from Baltray, comparable to the success of the 2013 season (Kenny, 2021). The 2022 season produced 90 fledglings, with low predation, and the highest percentage of egg loss came from the tide (Le Moënner, 2022). Predation by ground predators and nest losses from the tide significantly impacted the 2023 season. Only 80 terns fledged out of 125 nesting attempts (Rogerson, 2023). Last year, 2024 was a very successful year with 167 fledged chicks. Ground predation was very low compared to the previous year, and corvids accounted for the highest egg loss near the beginning of the season (Barnes et al., 2024).

The graph below, figure 2, shows how the number of adults and fledged birds increase from season to season. It also highlights how quickly fledgling numbers can drop off despite successful seasons prior and how the presence of adult birds does not necessarily mean fledglings produced from the colony.

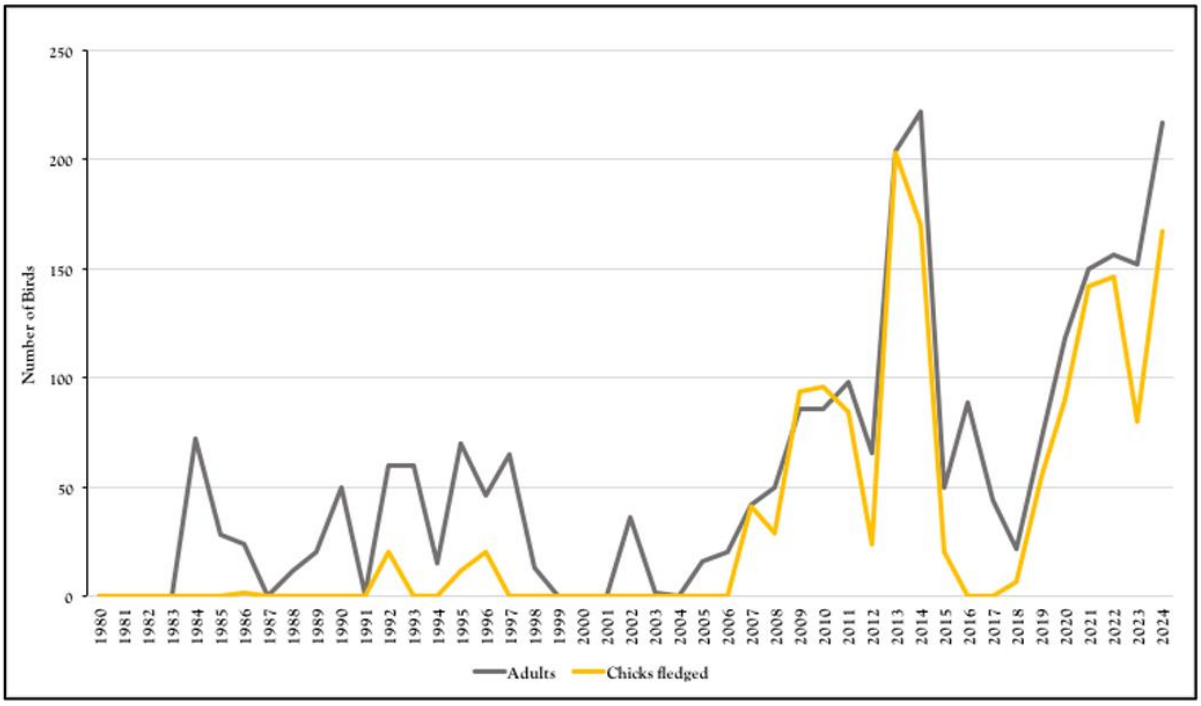


Figure 2: Little tern adults & chicks recorded at Baltray (Barnes et al., 2024)

The Baltray Study Site

The little tern colony nests on Baltray Beach, Co. Louth, in an area known as the Haven. It is a relatively undisturbed beach compared to other locations along the same stretch of sandy shoreline such as Clogherhead and Termonfeckin beach. This is due to the inconvenience of accessing the area as the access road is closed to the public users and the closest carpark is a 20 minute walk to the site. Access to the road is given to volunteers. The Haven is an established coastal sand dune system, with a rocky beach and sand/shingle beach, the preferred habitat of the little tern. The site is considered part of the Boyne Estuary, Special Area of Conservation (SAC) and Special Protected Area (SPA). The proximity of the river Boyne allows for an adequate supply of fish and other food species that can supply a highly productive breeding colony. In previous studies of the Boyne estuary, it was established that it hosted both marine migrant and estuarine species, and between 2009-2015, juveniles made up a high proportion of these populations. It was found that 95% of sprat (*Sprattus sprattus*) and 96% of sand eel (*Ammodytes tobianus*) were caught in their juvenile form (Connor et al., 2019). These are the main food species of little terns in Baltray and is indicative of how the area is supported in terms of food.

As a sand/shingle beach, winter storms and rough weather mean that the site can significantly change from year to year. Sand blow has an evident effect even during the summer months, and nesting areas at the end of the season can look considerably different from the start. Since the project has begun in 2007, records of the site and nesting area preferences have shown where the highest concentration of nests can be found. Throughout the years, nests have generally migrated north, up the beach from the rockier substrata to the finer shingle substrata.

The dune system behind the beach, and the sea wall that was built to aid Drogheda Port has led to the beach encroaching seaward. Plant species such as *Cakile maritima*, *Tripleurospermum maritimum* and *Honckenya peploides* which are commonly found on shingle beaches act as colonising species that trap sand. This allows the formation of embryonic dunes with species such as *Elytrigia juncea*. As these dunes develop into fixed dunes, the beach and dune system moves forward. The movement of the beach can be seen in figure 3, which shows aerial photographs of Baltray in 1995, 2013, and 2025. These photographs show how dramatically the shoreline has and can change over time.

Figure 3: Maps of Baltray beach compared between 1995, 2013 and 2025. (Source- Bibliography, Maps)

Aims

The aim of the Baltray Little Tern Project is:

“To ensure the survival and breeding success of Little terns at Baltray by minimising disturbance by humans and predators, in order to help fulfil Ireland’s legal obligations under the EU Birds Directive”.

Strategies employed by the Louth Nature Trust to achieve this aim are:

• To promote awareness amongst the beach users, the local community and interested parties, to reduce human disturbance through co-operation and education.

• To create physical barriers to prevent terrestrial predators accessing nest sites, where possible.

• To maintain colony surveillance for the detection of both avian and terrestrial predators, and take appropriate steps to prevent loss of eggs, chicks and adults to predators.

• To monitor and record activity at the nesting site, to measure the success or failure of the colony and to better understand little tern ecology.

• To survey and monitor other species and habitats at the Boyne estuary

Methods

Fencing

Fencing was erected on-site to protect the nesting areas of the little terns. The fencing consisted of perimeter fencing, electric fencing, and the buffer zone. Perimeter fencing was put up first, followed by the electric fencing and the buffer zone was put up last. The perimeter fencing was green mesh plastic fencing, that spanned the entire back of the site, encompassing an area of semi-fixed dune. This served as a deterrent to humans, dogs and predators, which limited the public interaction to walkers which were on the beach side of the fencing. It also served as a protected nesting area for other ground nesting species such as, the amber listed, Eurasian skylark (*Alauda arvensis*) and the red listed meadow pipit (*Anthus pratensis*). Areas of fencing were occasionally chewed through by resident Irish hares (*Lepus timidus hibernicus*) which could be patched. The electric fencing was the primary protective fencing from predators. It was a red electric fencing commonly used to protect sheep from predators. It encompassed parts of the embryo dunes, the shingle and highest summer tide line, which is the main nesting area for the little terns. The fences were powered by batteries and required long metal grounding rods to be driven into the sand due to its low resistance. Both the perimeter and electric fencing was held up by wooden posts and zip ties. The buffer zone was the last to be erected. It consisted of 8ft wooden posts being set upright in the sand by digging a hole using a small digger. Burying the posts at depth was crucial as the buffer zone posts had to be placed where the tide reached and often rose past. Each post was linked together using blue rope. This served to keep beach walkers from walking too close to the nesting area. As observed in previous years, often little terns would nest outside the electric fencing (Rogerson, 2023) despite its potential vulnerability to the tides, so the buffer zone was essential to protecting as many nests as possible.

Fencing began on the 12th of April, starting with perimeter fencing, and the primary area of fencing (perimeter and electric fencing) was completed by the 6th of May. The primary nesting area was divided into pens and numbered 0-8. This area was prioritized as it was where most (if not all) little tern nests had been found in previous years. After this the electric fencing was extended to all the way down to the river as tern activity was spotted in the area. This area was recorded as the ‘river’ pen. On the 10th of May the buffer zone was erected. Much later in the season little tern activity (courtship, scraping and nesting) was observed

north of pen 8, and as a result, the electric fencing was extended again. This was completed on the 31st of May. This area was recorded as the overflow pen.

Figure 5: Electric fencing enclosing the site.

Figure 4: Front of pens and buffer zone.

Figure 6: Green mesh perimeter fencing.

Mapping

Mapping the site is essential to understanding the preferred nesting areas for little terns and informs us of the priority areas for protection and fencing next season. The Garmin ETREX 32x was used to accurately take coordinates of each point of interest. The electric fencing and buffer zone was the focus area as very few nests occurred outside the perimeter. The access points to the beach were also noted as these were the areas of highest human traffic, which could potentially alter the positioning of nests. Throughout the season as nests with eggs present were created, the GPS coordinates were taken directly above the nests. QGIS v3.36.0, a free and open source mapping software was used to map the site.

A manual mapping system was also implemented. Using wooden clothes pegs, a coordinate grid system was used to quickly find nests of interest, particularly for when the ringing sessions were ongoing. The aim was to quickly enter and leave the pens to reduce the

disturbance. The x-axis, the back of the pens, was divided by each electric fence post and lettered. The y-axis was split into x, y and z, x being the back third of the pen, y being the middle third and z being the front third. The y-axis was required as x-axis coordinates often doubled up due to the high nesting density. For example, if nest 1 was found in x-axis letter C, and in the front third of the pen, it would be noted at C-Z.

Figure 7: Garmin ETREX 32x used to plot nests and pens.

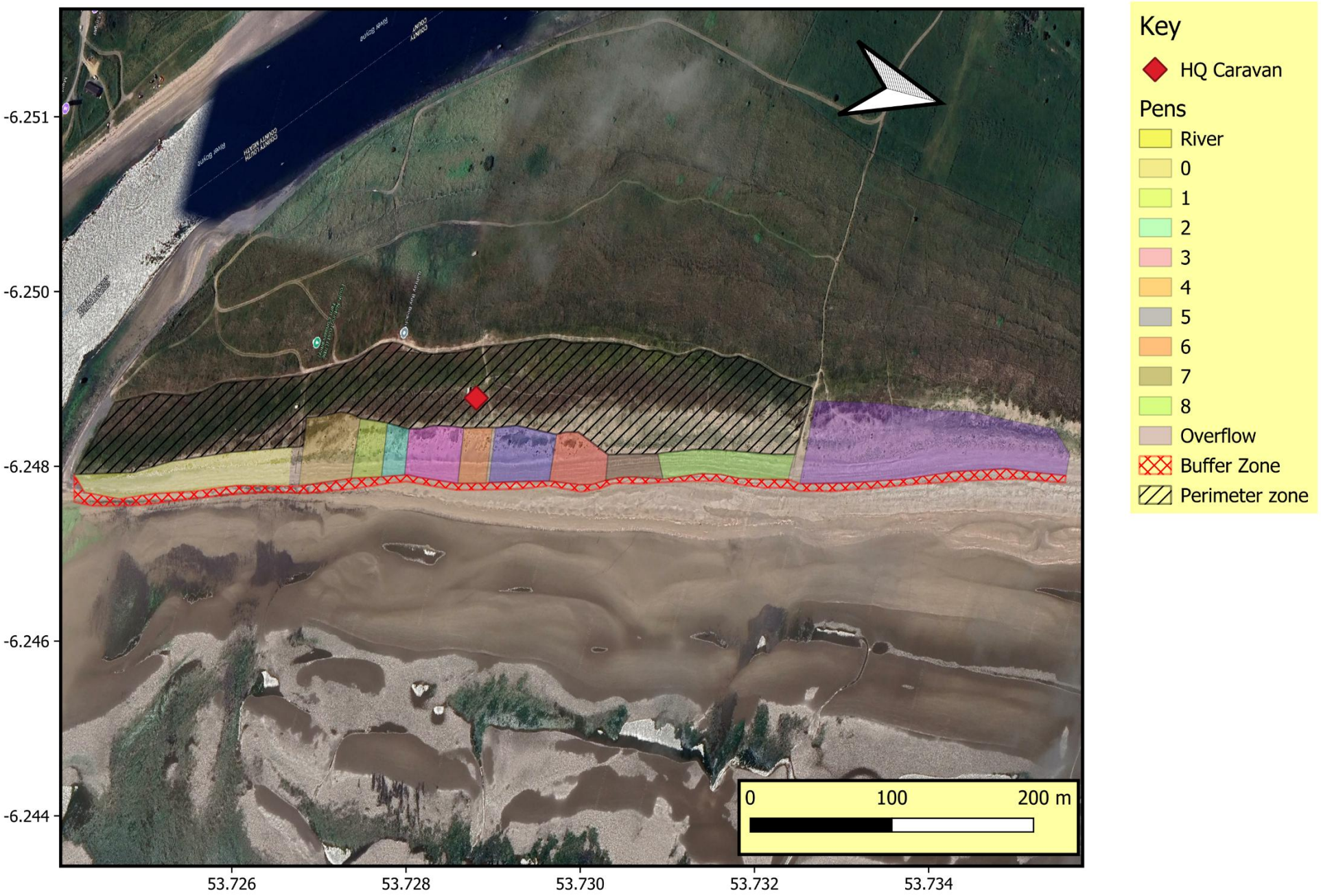


Figure 8: Map of the Baltray Little Tern nesting site created using QGIS. North Arrow in top right.

Monitoring

Wardening on-site began on the 29th of April and ended on the 1st of August. Two, day wardens were employed to cover 9-5pm, 7 days a week. Their job was to record data from the colony, and work to ensure the best possible outcome for the colony. Three night wardens were also employed to cover 10pm-6am. Their job was to keep lookout for any nocturnal predators that may threaten the colony. Volunteers filled the gaps between these times, from 6-9am, and 5-10pm. Without the help of all the volunteers, the colony would be vulnerable to predators and disturbances.

Wardening during the day involved the use of scopes and binoculars to monitor the site and the little terns. Day-to-day jobs includes searching for nests, observing behaviours, maintaining the fences and facilities, and reducing human or predator disturbance. It was important to stay vigilant as raptors and ground predators could strike very quickly and silently. Signs indicating disturbance was loud chirping and a dredd of little terns (large group of terns lifting from brooding on sand) circling and divebombing the area. Little terns will protect their nesting site by dive bombing predators or humans too close.

Figure 9: Ivan McKenna, day warden monitoring the site using a scope.

Nest Location and Marking

Little Tern nesting locations vary along the shoreline making it important to note where each nest is found. While mixed shingle is the preferred substrate for nesting on, nests are often found on sand and stone substrate. Little terns often decorate their nests using shells and seaweed.

Figure 10: Nest decoration by Little terns

Nests can be found anywhere from the vegetation line where the embryo dunes are best established to the highest parts of the intertidal zone. Combined with camouflage of both eggs and chicks, nest marking can be difficult especially over such a large nesting area of approximately 37166.862 m² this year.

Two methods were used to identify and locate potential nests. Primarily, the pens were observed daily by the two on-site wardens which looked for adult birds sitting on nests, either scraping, laying, incubating or brooding. These were giveaway signs which allowed us to mark or note the location of nests. At maximum, the pens were swept twice per week by the two on-site wardens. This involved walking through the pens, scanning for eggs and scrapes. While it was important to remain cautious, spending too long inside the pens could mean major disturbance, potentially increasing nest abandonment or egg/chick loss. Pens were also only entered at low tide when activity in the pens was low, and when there were appropriate weather conditions. In some cases, nests were observed even after marking as ringed plover eggs are very similar and could be easily mistaken for tern eggs.

Nest marking was undertaken to allow for continuous observation of nests, accurate nest counting and monitoring. Nests were marked in various ways using black fence pegs, stones, sticks and shells. The nests were also marked with a number assigned to it in the order of nests counted. The varied use of markers prevented predators such as hooded crows from recognising visual patterns, potentially increasing predation.

Another function of visual markers was in the ringing effort, where nest trapping could be carried out swifter and with reduced disturbance of the nesting area.

Figure 11: Nest 102 marked with stones, shells and labelled.

Relocation of Nests

Often, terns may lay their eggs in the highest areas of the intertidal zone within the buffer zone, and as a result spring high tides under unfavourable conditions can put nests at risk of being washed away. The high tide mark could be estimated by looking at the seaweed washed ashore, and the gradual progression of tidal height was monitored using tide tables (https://www.tide-forecast.com/locations/Drogheda/tides/latest). When high tides were approaching their highest levels, the location of vulnerable nests were noted. To prevent the vulnerable nests from being washed away, relocating nests further inland was undertaken. To do this, a safe location inland, directly in line with the nest, where the tide did not threaten egg was decided (usually 2-3m). The nest was then reconstructed first by creating a divot in the sand and then visual markers near the nest like shells, rocks, and seaweed were moved from the original nest to the new nest. Finally, the eggs in the nest were moved and the original nest scraped away to prevent the bird from sitting on an empty nest. Taking a picture

of the nest, allowed the most accurate reconstruction to be created, increasing the chances the bird would find and continue incubating the eggs.

Chick Management

Shelters

It was essential that protective measures were taken on-site to maintain the survival rate of the chicks and that was the utilization of the shelters. Plastic pipes and tubing was placed near the highest concentrations of nests as shelter against wind, rain, cold or predators. The shelters were placed in the open sand where vegetation was not abundant as young chicks would be unable to move too far from the nest after hatching. However, as the season progressed, the tubing would be expected to be used less as the older, more mobile chicks would move into the denser dune vegetation.

Ringing

Bird ringing was undertaken weekly, by a licenced ringer. Data collected on both adult and chicks is a valuable data source allowing for a better understanding of how population dynamics change. Ringing began early in the season when there were only eggs. Adult birds were captured by nest trapping, where a nest was identified, the eggs replaced with decoys (to prevent damage by parent when trapped) and then a trap was placed over the nest. Birds incubating eggs had the highest chances of capture as they would be eager to continue incubation after a disturbance. Once caught, it was important to move quickly to prevent the bird from injuring itself in the cage. Adult birds can have no rings (bird never caught), metal ringed (most likely ringed when young or there was no coloured ring available) or colour ringed (also known as darvic ringed). Appropriate data was taken including ring number (if applicable), weight, wing and bill lengths. Chicks were captured through the sweeping of pens using known nests as key locations where chicks were most likely to be found. Later in the season, the thicker dune vegetation was swept as older chicks used that area for cover. Young chicks under 25g were metal ringed, and any chick over 25g were colour ringed. Little terns, ringed plovers and Eurasian oystercatchers were all targeted when possible. In prior years, ringing was not a priority as predators and the bird flu made it too risky, fortunately we had no major setbacks allowing us to ring all season.

Figure 12: Delicate ringing operation of adult bird run by Jan Rod, licensed ringer.

Predator Management

The study site was generally monitored 24/7 for the nesting season. Two full time day wardens and three night wardens monitored the site for most of the time, with gaps being filled by volunteers. On-site wardens were essential to prevent aerial predators such as corvids (Rooks (*Corvus frugilegus*), hooded crows, grey crows (*Corvus tristis))*, sparrowhawks, kestrels, and peregrines (*Falco peregrinus*) from predating on adult birds, eggs, or chicks. The main method used was by clapping or making loud noises to drive them off, however consistency was difficult due to the size of the nesting area.

The electric fencing served to protect against ground predators that had previously been seen during past seasons in the nesting area such as stoats (*Mustela erminea*), foxes, and brown rats (*Rattus norvegicus*). Electric fencing had to be monitored as if a battery powering it was depleted; it would leave a vulnerability in the fencing.

Motion activated lights were placed around the perimeter fencing as a secondary measure to potentially scare predators or alert the night warden where a predator may be. Sometimes these lights could be activated by hares or other non-predators.

The posts used to secure the fences to the ground could be used a perching spot for aerial predators. Corvids and sparrowhawks often use perching spots to watch the colony for movement. Plastic bottle ring cuttings were used on the posts, to prevent birds from alighting on them.

The night wardens were mainly on watch for foxes as a single fox could devastate the entire colony in a single night. In previous years such as 2022, 45 eggs were lost from fox predation

in a single night (Le Moënner, 2022). Other land predators like mink (*Neovison vison*), hedgehogs (*Erinaceus europaeus*) could potentially eat eggs or chicks. The night wardens also used thermal cameras to identify heat signatures of potential predators.

Public Awareness

Signage

Signs were placed along the paths leading to the site to warn beach users about the enclosed area as well as some information on the little terns themselves. Other signs asked dog walkers to put their dog on a lead and keep it under control. Signs along the path leading to the beach were pivotal for creating awareness for the conservation project and the vulnerability of both eggs and chicks nesting on the beach. The buffer zone posts often had signs attached to them which spanned the length of the pens. Large standing signs with photographs of eggs, chicks, and adults were positioned strategically before the entrance to the nesting areas so that beach users would understand what they were looking out for.

A blackboard was placed at the main entrance to the beach which was updated throughout the season. It reiterated the importance of keeping dogs under control and also displayed the number of eggs or chicks in the colony at that time. It allowed the project to keep local people updated in the progress of the project and showed how active the colony was, and the importance of keeping the suggested guidelines in place.

Figure 13: Signs used to dissuade beach users.

Interaction with Beach Users

Many beach users were unaware of the project and were approached by the warden on duty or a volunteer if they were walking too close to the fencing or had a dog off its lead. It was important to approach them calmly and inform them of the conservation-site and ask them to follow the suggested guidelines in place. Other beach users such as birdwatchers, wildlife enthusiasts, and photographers often visited the site, often in search of the least tern (*Sternula antillarum*), a very rare, American species of tern which frequented the site. Again, it was important to tell them to not go too close to pens as well as the law around photographing active nests and unfledged young (under Section 22 (9)(f) of the Wildlife Act, 1976).

Outreach and Events

It is important for any conservation group to reach out through many different avenues to bring awareness to the project and attract new volunteers to help on-site. This is important on both local scales and national scales. A group of volunteers attended and set up a booth at Dublin Zoo's, native species weekend on the 17th and 18th of May. This allowed volunteers to inform interested members of the public about the lesser known conservation activities in Ireland, like this project. Throughout the season, different groups visited the site including members of the local community, members of Birdwatch Ireland's Meath branch and groups of birdwatchers. Visitors to the site are extremely important as it allows the project to become more widely known and educate more people about ground nesting birds. Without public engagement there would be no volunteers, therefore no success in a project like this.

Figure 14: Louth Nature Trust Dublin Zoo, native species weekend booth.

Statistical Analysis

Pen x Time: Chi-squared Test

To evaluate if the number nests created in each pen changed over the course of the season, nests were grouped by pen (River, 0, 1, 2, 3…) and by time. The time was grouped using the average egg incubation time of 21 days, as by doing this, you would expect cycle 1 (the first 21 days, from when the first nest was created) to hatch during cycle 2. A frequency table was then used to compile the data using pens as the x-axis and time as the y-axis. In a separate table, expected counts were calculated from the total number of nests in each cycle, and the total number of nests in each pen. A chi-squared test of independence was used to compare the observed versus the expected values. If $P < 0.5$, less nests were created than expected in the pen during a cycle and, if $P > 0.5$ more nests were created than expected. Analysis was completed and graphed using Excel v2509.

Clutch size x Time: Spearman Rank Correlation

To evaluate if the clutch size of nests changed as the season progressed, the clutch size and the time days from when the first clutch was laid was put in a table. Using the RANK.AVG function in excel for every clutch, returned where each was ranked compared to the other clutches in the list. This was repeated for the time too. Then the difference between the rank of each clutch and time in days was calculated (time - clutch). The difference was then squared in each case, and all values were summed. Then the formula $1 - (6 * \Sigma d^2) / (n * (n^2 - 1))$, where n = the number of data points and d = difference in rank was used. This will return a value between -1 to 1. Negative 1 indicating perfect negative correlation and positive 1 indicating perfect positive correlation. All nests (both successful and failed) were included as success was not of interest. Analysis was completed using Excel v2509

Results

Weather

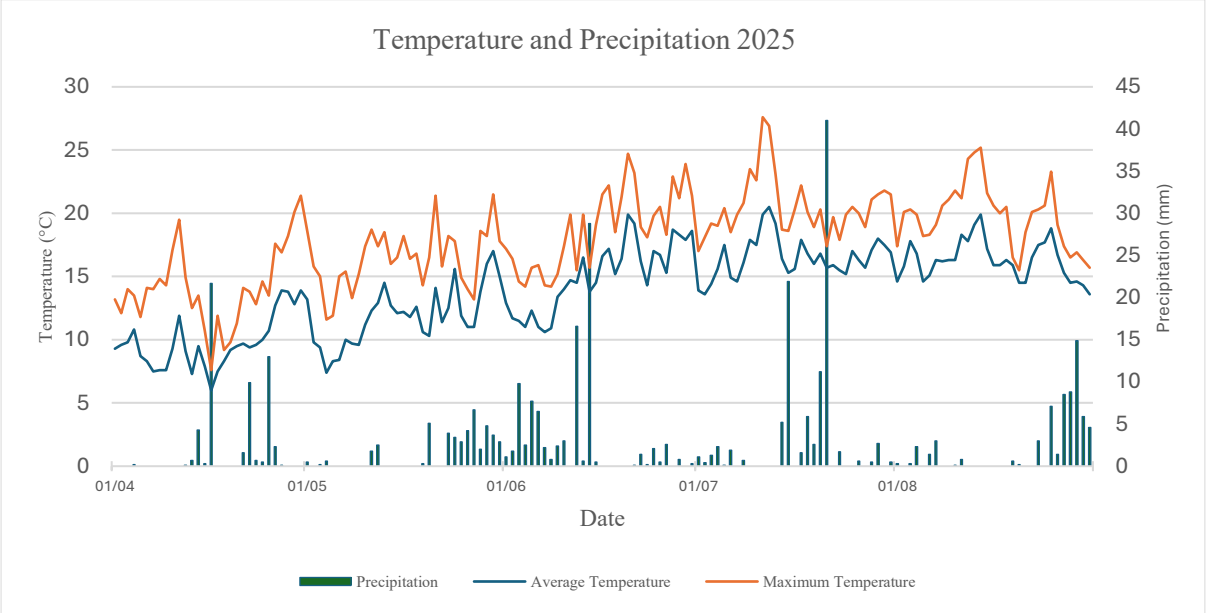


Figure 15: Temperature and precipitation data for Dublin airport between April and August 2025 (https://meteostat.net/en/station/03969?t=2025-09-14/2025-09-21).

Overall, the season had very good weather and was Ireland's warmest summer on record with an average temperature of 16.19°C (Bergin et al., 2025). The season started with warm, dry weather in May with highs of 20°C. June was wetter but the temperature remained high, and it gave way to another dry spell of weather. While there were some clear hot days, a constant breeze on the beach kept temperatures relatively regular. Strong east winds were uncommon and did not coincide with high spring tides.

Breeding Pairs and Nesting

Breeding Pairs

Due to the high number of nests and the extensive nesting area size, it was difficult to ascertain the exact number of breeding pairs. Assuming all nests found on the site were unique pairs, there were 158 breeding pairs (316 breeding individuals) at maximum. However, it is likely that at least some the nests were re-nests after a failed nesting attempt initially (whether due to predation, tide or other egg loss event). The total failed nest count

was 31, meaning the minimum number of breeding pairs was 127 pairs (254 breeding individuals). The real number of breeding pairs is likely somewhere between the two, with the average of the minimum and maximum being 143 pairs.

Nest Count and Eggs

Throughout the season, there were a total of 158 nests, with 127 successful or partially successful clutches. There were a total of 308 eggs, 247 of which were successful and 61 which failed, giving an 80.2% hatching success rate. Of the 158 nests, the average clutch size was 1.949 (33 clutches of one, 100 clutches of two, and 25 clutches of three). 23 out of 25 clutches of three, were laid within the first 3 weeks of nesting.

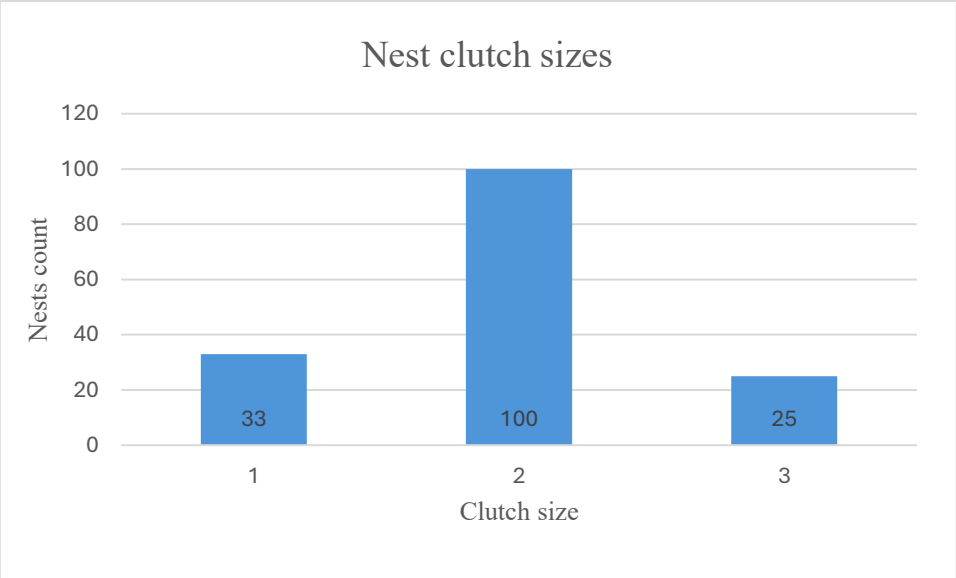


Figure 16: Bar chart of nest clutch sizes.

Spatial Patterns of Nesting

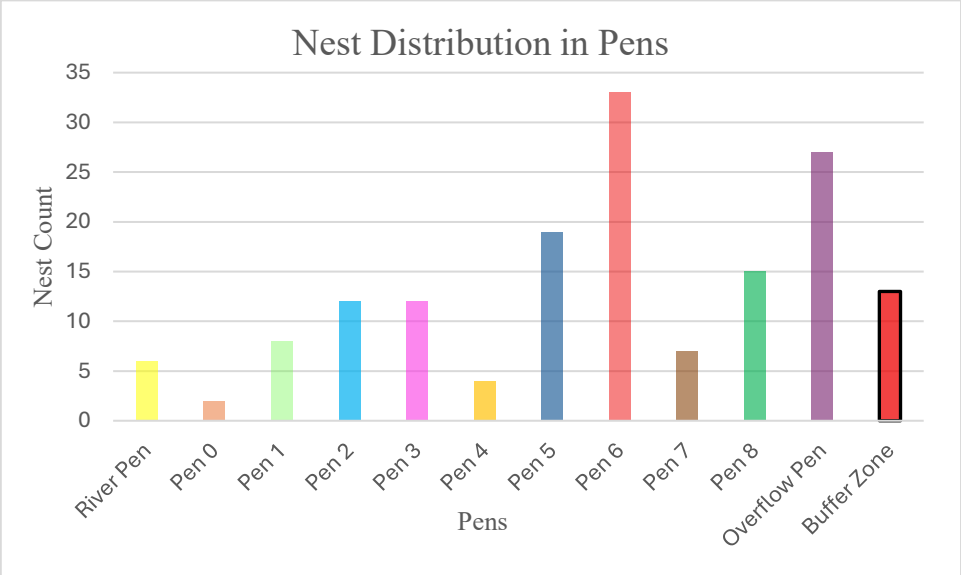


Figure 17: Bar chart of nest distribution in pens.

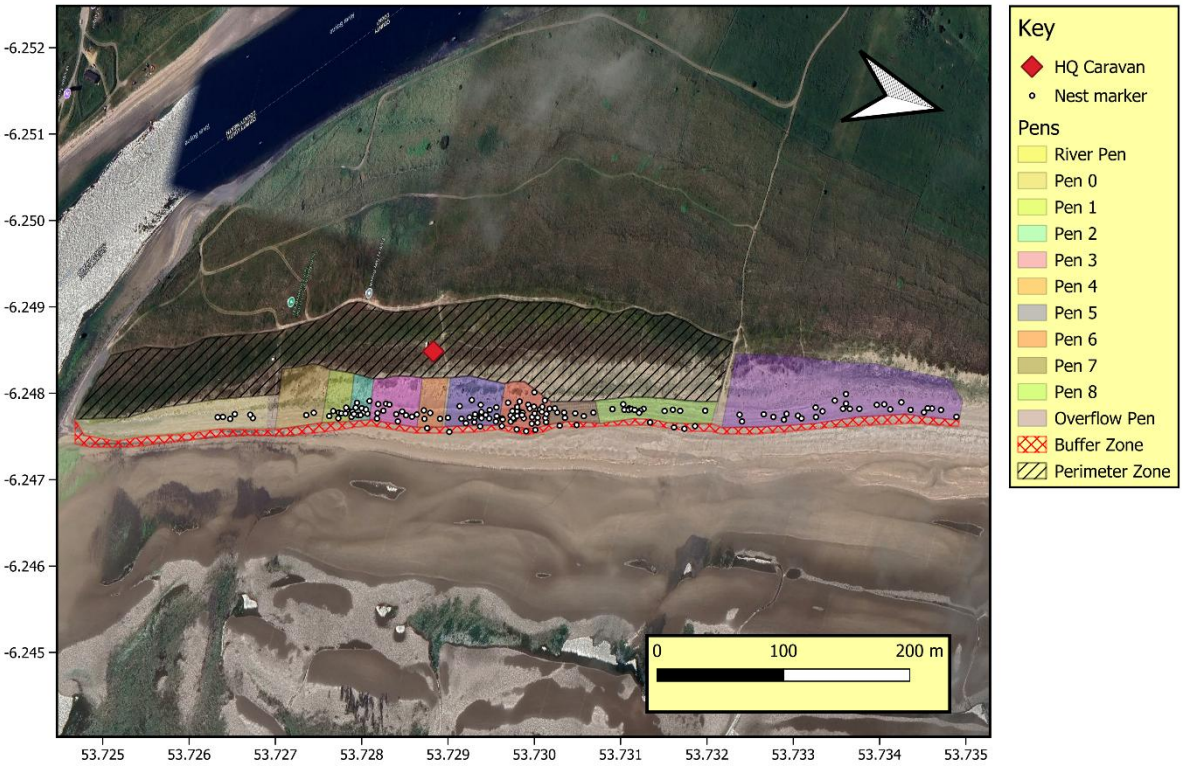


Figure 18: Map of Baltray nesting colony with each nest plotted using GPS data. (QGIS)

There was a definite nesting location preference for the little terns. The pen with the highest concentration of nests was pen 6 with 33 nests and next being the overflow pen with 27 nests. HQ caravan was located between pens 4 and 5 to survey the site from its centre however only 44 nests (27.8%) were located to the right of the caravan in the river pen and pens 0 – 4. 13

nests were located outside the electric fence in the buffer zone and all but one was located to the left of HQ. Substrate and vegetation of each pen differ slightly, which may influence nesting locations. The river pen, which in prior years had higher concentrations of nests, has predominantly rocky substrate with small patches of sandy substrate. The profile of the pen, especially closer to the river, is a steep incline with a flat rocky top as you move inland. Pens 0 – 6 have similar, and ideal shingle substrate but the pens this year encompass a lot of vegetation. Pens 7 and 8 have less vegetation but the substrate is slightly sandier and became sandier throughout the season due to aeolian transport of fine sand. The overflow pen is much like pen 8 but the substrate remained the same throughout the season. This pen also has a lot of vegetation. The buffer zone has very little shingle but a lot of seaweed. It is vulnerable to the tide meaning some nests may have been washed away before being found.

Predation and Egg Loss

Predation of the colony was extremely low this season, accounting for only 13 lost nests with 25 eggs by corvids within the first four weeks nesting began. Grey crows, hooded crows and rooks where the only observed predators of eggs on-site. Predation of eggs by rooks occurred in the river pen, pen 8 and the overflow. Other avian predators were seen rarely on-site such as the European kestrel (1 sighting), the peregrine falcon (2 sightings), the Eurasian sparrowhawk (approx. 10 sightings). There was evidence of the predation of 1 adult tern. On the 25th of June the remains of an adult little tern were found in the dunes, and the plucking pattern was consistent with that of a sparrowhawk. A sparrowhawk was also observed catching and injuring a weak common tern; however it was chased off before it could feed.

Figure 19: Predation of Little Tern adult by sparrowhawk.

Figure 20: Egg failed while hatching.

No other avian predation (or evidence of predation) was observed. There were also very few ground predators active near the site. The night wardens spotted two foxes during the season, but they were successfully deterred without disturbing the colony. There was no observed predation of chicks by ground predators.

Other egg losses were attributed to abandonment, tidal loss, failure while hatching and unknown causes. 18 nests, with 20 eggs were lost to abandonment. Most of these nests were clutches with only a single egg and abandonment was likely caused by sand blow (obscuring the egg), area disturbance (unlikely) or failure to hatch despite incubation (infertility). 4 nests with 7 eggs were lost to the tide as they were laid in the buffer zone (extreme upper intertidal zone only submerged at spring tides) and washed away. 3 of the nests were washed away on the 25th of May, which was a spring tide. It is likely more nests were in the buffer zone and had not been found before washing away as the spring tide in May occurred when a lot of nests were being created. 2 eggs, in 2 separate nests failed while hatching despite other eggs in the same nest being successful. 7 eggs, from 7 nests were lost, however it is unknown how these eggs were lost, with no evidence of a predation event or abandonment. One possible explanation could be that very heavy sand blow fully buried the egg making them impossible to find.

The peak of egg loss and egg predation was when the greatest number of eggs were being laid during the third week after the first egg was laid. Total egg loss for this season was 61.

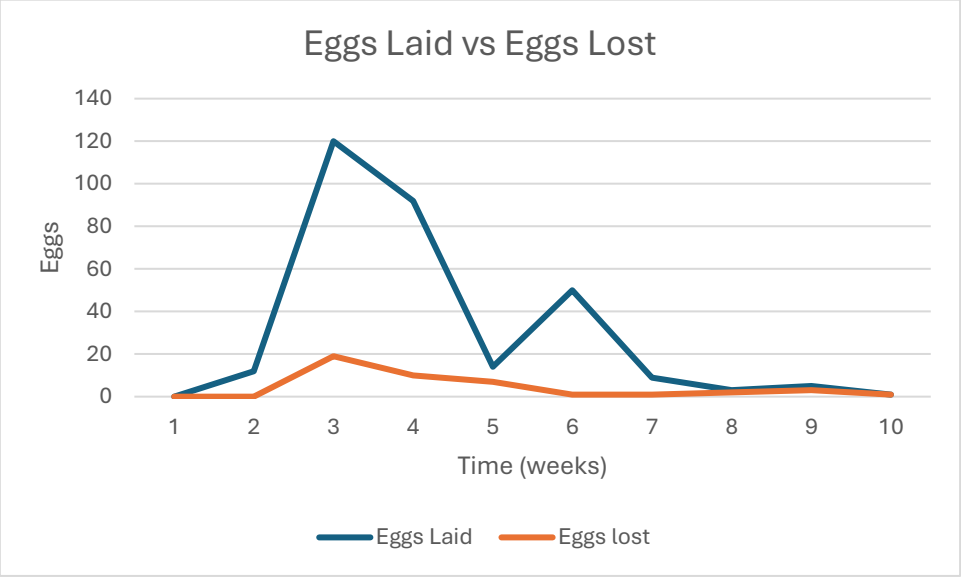


Figure 21: Line graph of the number of eggs laid vs the number of eggs lost over the 10 weeks of nesting.

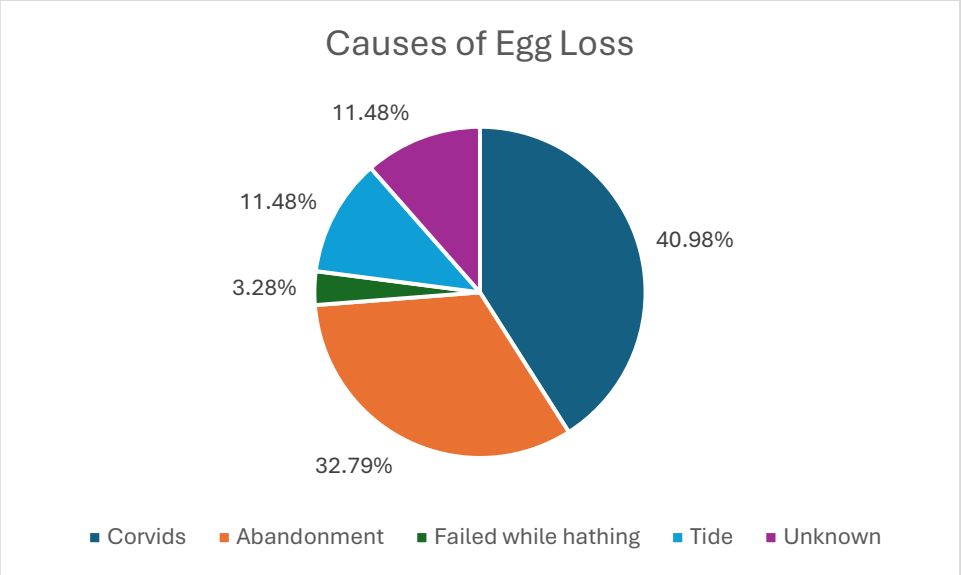


Figure 22: Pie chart showing the causes of egg loss.

The table below shows the pens with the highest egg loss. The buffer zone had the highest egg loss as it was an area exposed to the tide while also enduring the same vulnerabilities such as predation and abandonment, that eggs elsewhere had. The second highest egg loss was in the river pen where the main corvid predation event took place.

Table 1: Number of eggs lost per pen.

Pen	River	0	1	2	3	4	5	6	7	8	Overflow	Buffer
Egg Loss	12	1	2	2	1	1	2	9	1	9	7	14

Incubation Period

The average time to incubate a nest was calculated by first calculating the number of days between finding the nest and the nest hatching. Due to the size of the nesting area not all nests were found the day they were laid nor the chicks found the days they were hatched.

However, it is more likely that chicks were discovered the day that they hatched as it would be much more visible and simpler than finding a new nest. To calculate the mean incubation period only incubation records between 17-24 days were included as literature and past reports calculated incubation being between 18-22 days (Cramp, 1985). The mean incubation time was calculated at 21.1 days using this method. If the incubation for any nest found was below 17 days, the lay date was adjusted by backdating 21 days from the day it hatched. However, if the hatching date was over 24 days, the hatching date was adjusted, so that incubation was 21 days long. The goal of doing this is to properly represent the time at which eggs were laid throughout the season and remove error due to late observation. 21.1 days is a longer mean incubation period compared to the 2024 incubation period of 19.99 days.

Chicks and Fledglings

The first two chicks hatched on the 6th of June. Over the season 247 eggs hatched, and there were no evidence of chick death or predation. Out of 308 eggs that were laid, 80.2% hatched and fledged.

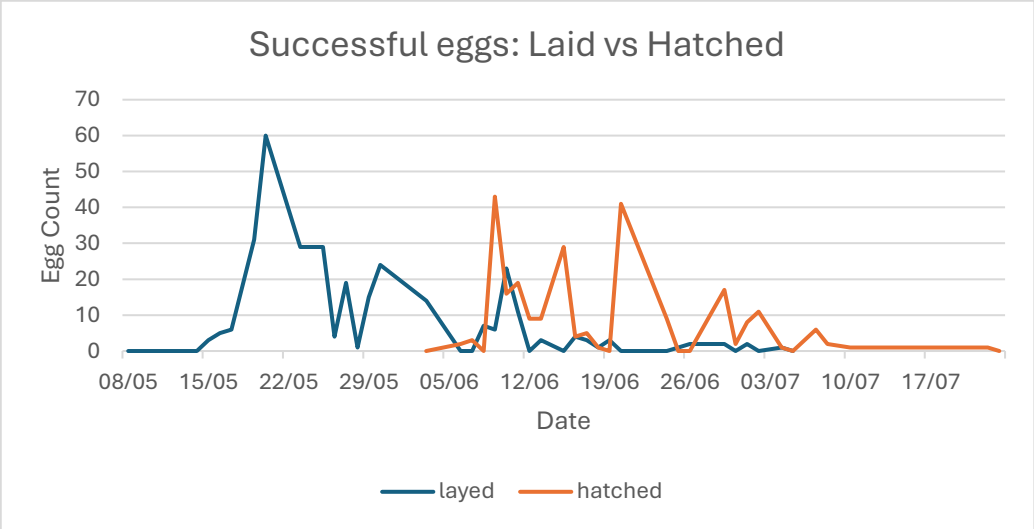


Figure 23: Line graph of eggs laid vs eggs hatched throughout the season

While no chicks were observed to have died to environmental or biological factors, there were likely a small number of chicks that did not survive despite no evidence.

Productivity of the colony is calculated based off chicks assumed to be alive and the estimated number of breeding pairs. Assuming the average number of pairs, 143, and estimated number of fledged chicks, 247, the productivity of the colony this year was 1.72.

Figure 24: Little tern chicks in nest

Ringing

Adult Little terns

A total of 37 adult terns were ringed on-site through nest trapping efforts. Trapping of adult terns began on the 26th of May and ended on the 8th of July. Notable rings included a yellow ring from a bird that had been ringed in Gronant, Wales in 2019. 25 of the adult terns caught were fitted with a darvic (colour) ring.

Little Tern Chicks

114 unique little tern chicks were captured throughout the season through pen sweeping. 64 chicks received metal rings and 50 chicks received both metal and darvic (colour) rings. Chicks with both metal and darvic rings often did not get both at the same time and were ringed twice at different dates during the season, as darvic rings could only be put on chicks heavier than 25g.

Other species

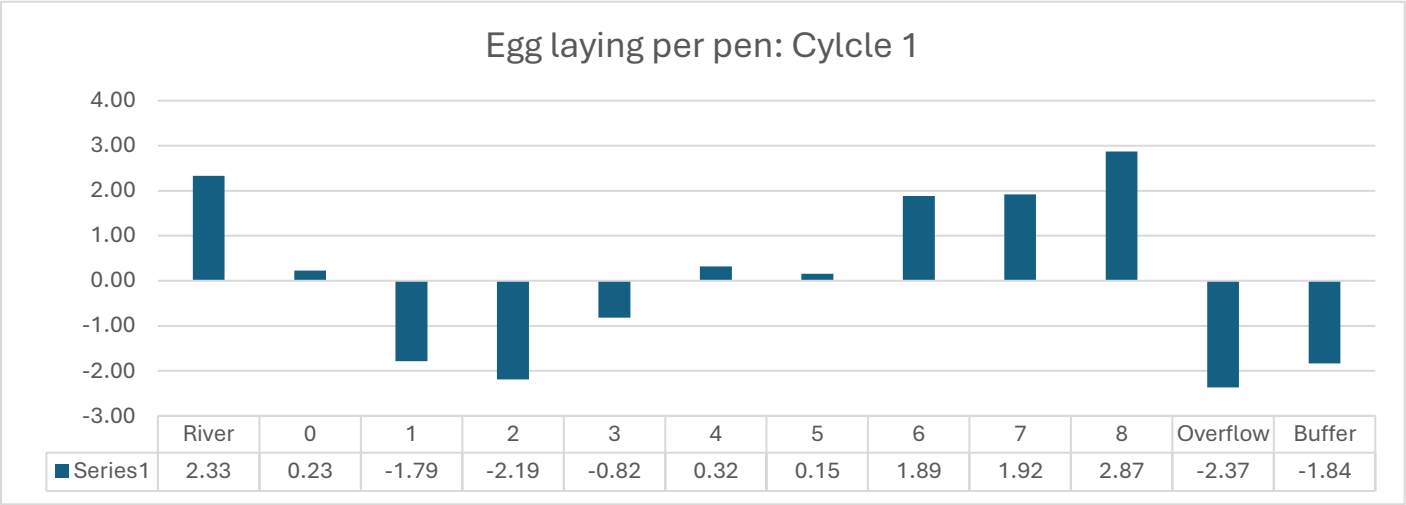
Ringed plover adults and chicks were also ringed on-site. 4 adult and 11 chicks were metal and darvic (colour) ringed, through nest trapping (adults) and pen sweeping (chicks). Weight restrictions for darvic rings do not apply to ringed plovers due to their extended tarsus and tibiotarsus compared to little terns.

The successful oystercatcher nest on-site allowed the successful ringing of 1 adult and 3 chicks, all of which survived. The adult and one chick (eldest and largest) were metal and darvic ringed, and 2 chicks were only metal ringed. Attempts to recapture the other two chicks for darvic ringing failed.

Statistical Analysis

Chi Squared of Independence

The data showing the number of nests created in pens over time was split into 4 graphs by each cycle (21 days). Cycle 1 showed an increased use of the pens R (river), 6, 7 and 8. Pens 0, 4 and 5 showed expected usage and pens 1, 2, 3, OVF (overflow) and B (buffer zone) were significantly underused (signifying 0 nests in this cycle. Cycle 2 showed an increased use of pens 1, 2, OVF and B. Pens 0, 3, 4 and 5 had the expected number of nests and pens R, 6, 7 and 8 were underused. Cycle 3 showed an increased use of pens 3 and B. Pens 0 and 2 had the expected number of nests and pens R, 4, 5, 7 and 8 were underused. Cycle 4 only had one nest in pen 2, leaving an expected value for the remaining pens. Every pen except 0, 4 and 5 had an overuse in at least one cycle. Pens 0 and 4 had very few nests spread across all time periods but pen 5 showed consistent use despite having many nests.



	River	0	1	2	3	4	5	6	7	8	Overflow	Buffer
Series1	2.33	0.23	-1.79	-2.19	-0.82	0.32	0.15	1.89	1.92	2.87	-2.37	-1.84

Figure 25: Bar graph showing the chi-squared of independence test results for each pen in the cycle.

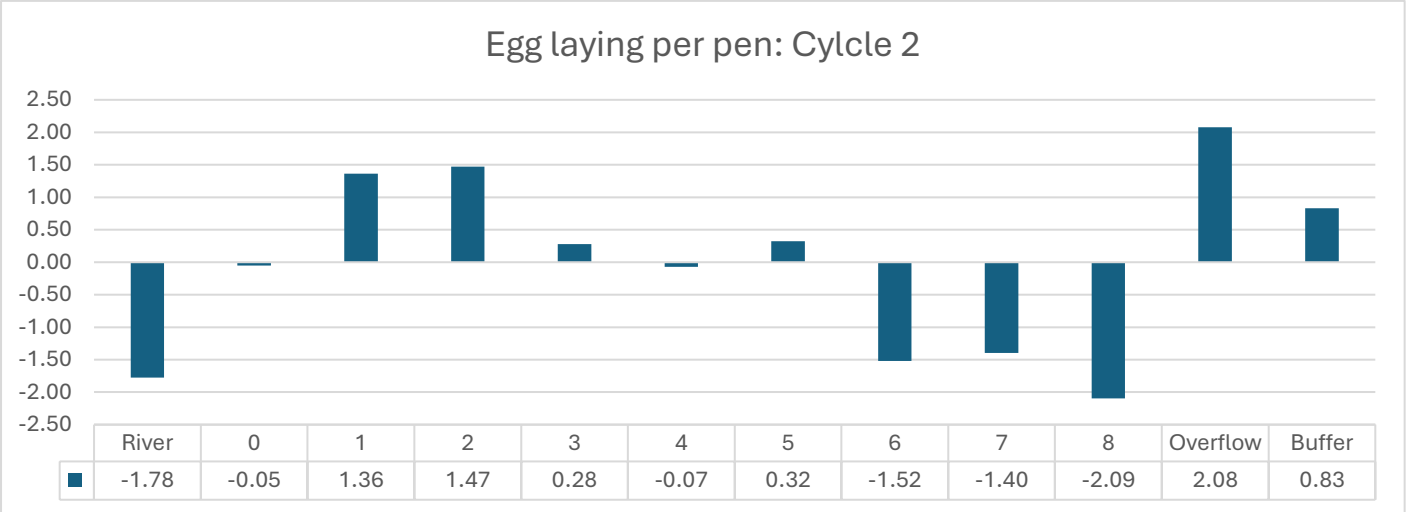


Figure 26: Bar graph showing the chi-squared of independence test results for each pen in the cycle.

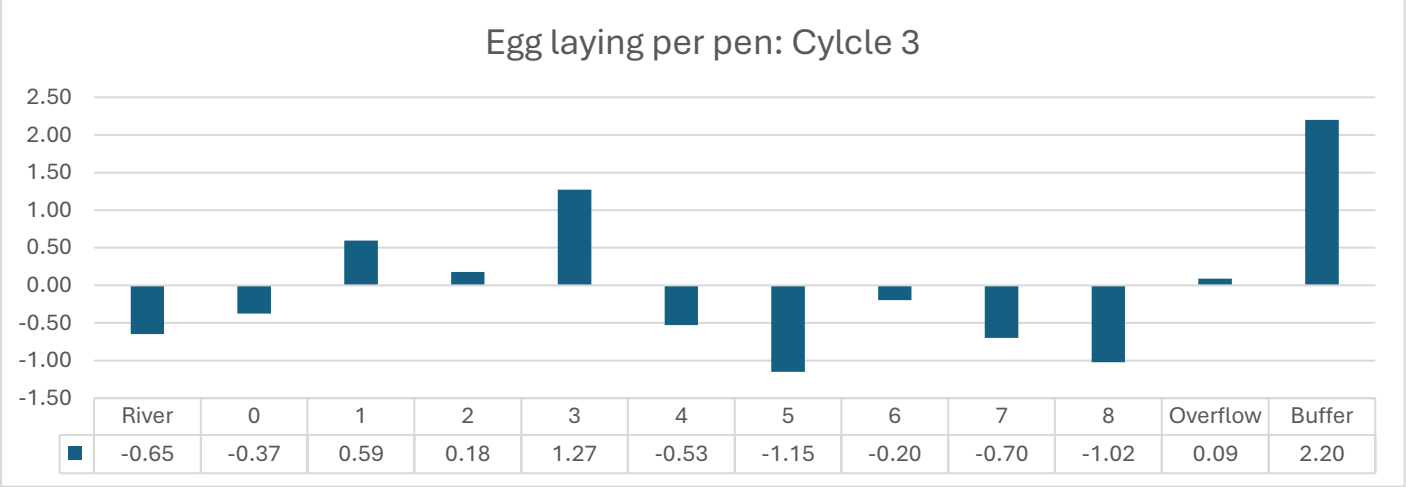


Figure 27: Bar graph showing the chi-squared of independence test results for each pen in the cycle.

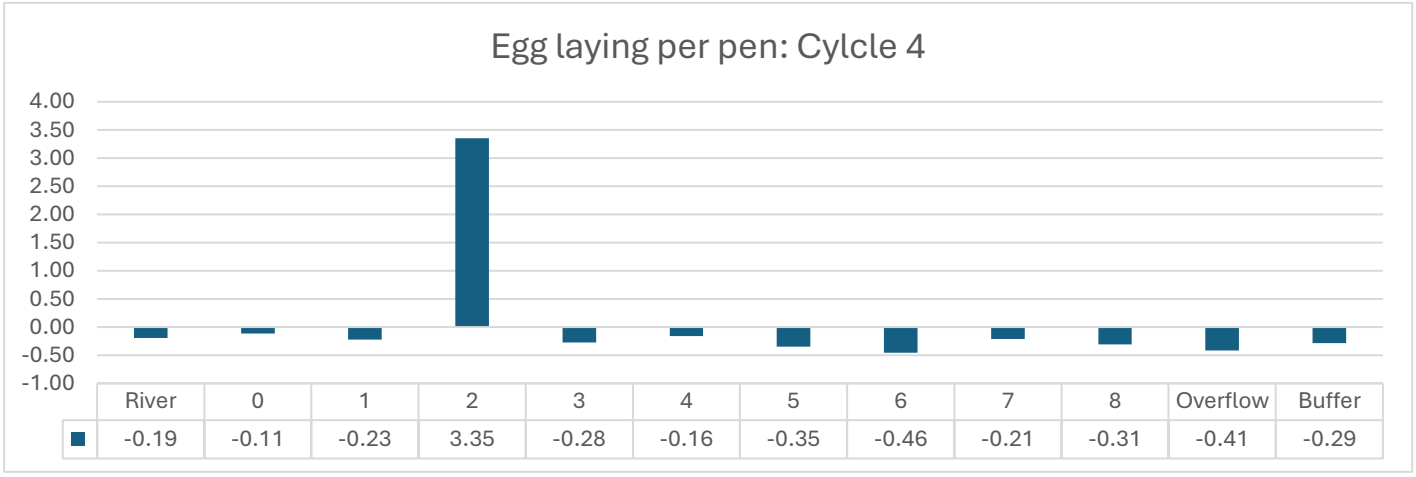


Figure 28: Bar graph showing the chi-squared of independence test results for each pen in the cycle.

Spearman Rank Correlation

The spearman rank correlation test returned a p-value of -0.11435. The spearman rank correlation suggests a very weak negative correlation between clutch size and laying date meaning that as the date increases clutch sizes became slightly smaller.

Discussion

The criteria for success for the project is primarily based off the number of breeding pairs, and the number of successful fledglings for the season. This year estimated 143 breeding pairs and 247 fledged chicks, assuming no predation of fledglings (not observed). This is the most successful breeding season recorded since the project started in 2007. The previous most successful season, 2013, had 102 breeding pairs and 193 fledglings (Doyle, O'Connell and Newton, 2013), making this season exceed the previous record by an additional 41 breeding pairs and 54 fledged chicks. The productivity for the season was 1.72 chicks per pair. Despite having a higher output this season, 2013 had a higher productivity of 1.89 chicks per pair.

This raises some interesting questions about why this season produced so many more fledglings compared to 2013 and other seasons with higher productivity. The answer lies with the additional 41 pairs which produced 54 chicks. One explanation is that the population of little terns has increased due to the more intensive conservation measures at breeding sites in Kilcoole and Portrane, as well as the more successful years in Baltray. Another explanation could be that terns from another colony which is lacking in food, or terns re-nesting in Baltray after a first failed attempt. Kilcoole is considered the largest breeding colony in Ireland each year, with estimated fledglings in 2024 reaching 312 (Johnson et al., 2024). This year however early reports indicated reduced numbers of pairs in Kilcoole, and ringing efforts allowed us to identify at least two Kilcoole adult birds nesting in Baltray. Ringing efforts also allowed us to identify at least one little tern with a yellow ring, signifying it came from Gronant, Wales, which was nesting in Baltray. Combining the existing population of terns that nest in Baltray, with other individuals that usually nest elsewhere, could be a potential reason for the success. Other ringing successes include the 37 adult terns, nest captured, and the 114 tern chicks that were ringed. Of the 114 chicks, 50 received darvics. This successful ringing operation will be instrumental in the coming years and will give us very useful information on how population dynamics change. The ability to undertake such a thorough ringing operation was thanks to the lack of disturbance on-site meaning ringing was undertaken more often. If there were predators like kestrels harassing the site, additional disturbance could have serious consequences. Unlike previous years, avian influenza was not an issue (Le Moënner, 2022), and birds could be handled. A pair of oystercatchers also nested in Baltray producing 3 chicks. One adult and all three chicks were ringed. As a red listed

species, additional data is welcome to better understand how conservation efforts can be focused, potentially even on-site in Baltray.

The estimated 143 pairs created 158 nests, 127 of which was successful or partially successful. It indicates that there were approximately 15 re-nest attempts from pairs that remained at Baltray after their first failed attempt. It suggests that conditions were favourable enough to not move to a different colony. The 158 nests contained 308 eggs, giving an average clutch size of 1.949 (33 clutches of one, 100 clutches of two, and 25 clutches of three). The consistency of clutch size throughout the season was investigated using a spearman rank correlation test, which returned a P-value of -0.11435. It tells us that as the season progressed, the clutch sizes very slightly decreased in size. For example, a slightly higher number of single egg clutches were found near the end of the season. A study by Ramos (et al., 2013) showed that there was a positive correlation between the relative occurrence of their primary food species (sandeel or sprat), and the number of eggs laid in a clutch. While the P-value does show there to be a slight decrease in clutch size, it is not an extremely high negative correlation. Therefore, it could be inferred that food supply remained fairly stable and reliable throughout the breeding season, else a sharp decrease in clutch size would be evident as the season went on.

Feeding was observed during the season, and the primary food species was lesser sandeel and sprat. Little terns were observed feeding in the Boyne estuary, the shoreline of the beach, as well as the small reservoir near the entrance of the Haven. No chicks were found dead on the beach that could be linked to starvation, and observation showed no indication of a lack of food. Around the 26th of July, very large numbers of mixed tern species such as the sandwich tern (*Thalasseus sandvicensis*), common tern (*Sterna hirundo*), arctic tern (*Sterna paradisaea*) and roseate tern (*Sterna dougallii*) were roosting on the shoreline in Baltray. This large grouping remained at Baltray for over a week and showed that food was abundant if it could support such large numbers of terns, including the breeding colony of little terns itself.

The nesting season began on the 15th of May when the first nest was found, 5 days earlier compared to last year. In 2013, nesting only began on the 30th of May (Doyle, O'Connell and Newton, 2013), which may address why more terns nested in Baltray. The earlier they begin nesting, the longer the opportunity to breed. The nesting season began relatively warm with days reaching 20°C+ and very little rainfall. The warm temperature continued into the summer months and Met Éireann reported that it was Ireland hottest summer on record with

an average temperature of 16.19°C (Bergin et al., 2025). Despite this, there were no obvious long stretches of hot weather nor long stretches of cold wet weather, meaning no chicks died of dehydration from sun exposure, or hypothermia. In previous years, nest loss because of spring high tides was devastating. Fortunately, no strong easterly winds nor low pressure systems coincided with these tides.

Incubation was calculated to 21.1 days on average. This is within Cramp's (1985) calculation of 18-22 days on average for little tern eggs to be incubated. This shows that conditions on-site were ideal, and the lack of disturbance allowed for eggs to be incubated continuously. The warm weather likely had a positive effect on this also.

Predator disturbance was confined to the beginning of the season, where Corvids predated 13 nests and 25 eggs. Previous seasons also tended to have issues with corvids early on, and it is important to quickly discourage this activity. To reduce the impact of corvid predation, when marking nests a variety of nest markers were used as corvids are known to notice patterns, and careless marking may have only increased the chances of a nest being destroyed (O'Donovan and Boyce, 2021). The only ground predators observed were two foxes that were deterred, and while raptors were spotted very occasionally on-site, there was only one observed predation of a little tern adult, but no fledgling predation. The lack of predation of chicks was what allowed such high fledgling numbers. In other season, such as 2014, it was reported that a pair of Kestrels predated 26 chicks, and a Sparrowhawk predated 10 chicks (Egerton and Newton, 2014).

Another important aspect of nesting is the spatial distribution of nests. The chi squared independence test showed us that different pens were prioritised by terns during different parts of the season. Almost all the pens had a peak period in which the most nests were created, except pen 0, 4 and 5. These pens showed expected and consistent nesting throughout the season based on the total number of nests recorded in their pen. Pen 0 and 4 however, were the pens with the fewest nests which eliminates it as the most consistent pen but pen 5 had 19 nests as the third most popular pen. Pen 6 had the most nests with 33 nests, that were mainly created at the start of the season, with a sharp decrease after 21 days (cycle 1). This may suggest that the pens hit a nest density ceiling, meaning not enough space was available, pushing them to other pens. 21 days after cycle 1, terns created nests in pens 1 and 2, in addition to the overflow pen. These pens were distant from pens 6, 7 and 8, which were primarily used in cycle 1. In cycle 3, the pen most used was the remaining pen 3. The river pen was used at the start of the season, but predation wiped out all nests, and no other nesting

attempts were made in that pen. The buffer zone while an area for nesting, was the extension of the existing pens that couldn't be erected in the tidal zone and was spread the entire length of the colony. In cycle 4 the only nest was in pen 2, so the data isn't significant. The most egg loss occurred in the buffer zone as it was an area exposed to the tide while also enduring the vulnerabilities such as predation and abandonment, that eggs elsewhere suffered. The second highest egg loss was in the river pen where the main corvid predation event took place.

In the least successful seasons of 2016, 2017 and 2018, dredging of the Boyne estuary was determined to have significantly impeded the colony's success. It was suggested that turbidity of the water increased as dredging disturbed the sand. This may have caused difficulty for the terns in catching their primary food species, sandeel. This year dredging was not undertaken during the active breeding season. Dredging was active on the 12th of March, depositing dredged sand off Baltray beach. The dredger was not seen again until after the 15th of July. At that point almost all tern chicks had fledged. As highlighted by the clutch sizes and site observations, food remained high throughout the season, meaning it was unlikely that turbidity was major issue for tern feeding this year.

Recommendations

- Fencing this season was more extensive than any prior season, creating a new pen, named this year as the overflow pen. This pen was only erected 2 weeks after the original pens were finished as nests had not been present there in such high concentrations previously. It would be prudent to erect all the pens at the same time including the overflow next season, as the area the overflow pen covered had high foot traffic before being fenced in.
- The buffer zone was also extremely useful for protecting the pens from disturbance and was the perfect distance from the electric fence. Blue rope connected the posts and indicated for beach users to keep out. I recommend that more blue rope is used to further section the buffer zone i.e. between the buffer posts and the electric fencing, as it may discourage individuals that disregard the fence.
- While the electric fencing was adequate, better setup and fence placement at the beginning of the season, would improve the efficiency of the system making it more robust.
- The blackboard was very successful, and many beach users were made aware of the risks before entering onto the beach. I would recommend that it is used in future seasons.
- The additional signs this year showed great results, and reduced interference of the dune system behind the beach. Older signs should be replaced each year to make the site look active and professional, indicating to beach users the importance of respecting the nesting terns.
- The Little Tern's Louth Nature Trust blog was updated weekly, but a better social media presence may have brought more awareness to the project.

Other Species On-site

55 unique species of birds were recorded on-site throughout the season.

Common Name	Latin Name	Conservation Status
Arctic Tern	*Sterna paradisaea*	Amber-Listed
Black Headed Gull	*Larus ridibundus*	Red-Listed
Buzzard	*Buteo buteo*	Green-Listed
Common Eider	*Somateria mollissima*	Red-Listed
Common Gull	*Larus canus*	Amber-Listed
Common Ringed Plover	*Charadrius hiaticula*	Amber-Listed
Common Sandpiper	*Actitus hypoleucos*	Amber-Listed
Common Starling	*Sternus vulgaris*	Amber-Listed
Common Tern	*Sterna hirundo*	Amber-Listed
Common Woodpigeon	*Columba palumbus*	Green-Listed
Cuckoo	*Cuculus canorus*	Red-Listed
Curlew Sandpiper	*Calidris ferruginea*	Red-Listed
Dunlin	*Calidris alpina*	Red-Listed
Eurasian Curlew	*Numenius arquata*	Red-Listed
Eurasian Oystercatcher	*Haematopus ostralegus*	Amber-Listed
Eurasian Skylark	*Alauda arvensis*	Amber-Listed
Eurasian Sparrowhawk	*Accipiter nisus*	Green-Listed
Eurasian Spoonbill	*Platalea leucorodia*	Amber-Listed
European Herring Gull	*Larus argentatus*	Amber-Listed
European Shag	*Phalacrocorax aristotelis*	Amber-Listed
Great Black-Backed Gull	*Larus marinus*	Amber-Listed
Great Cormorant	*Phalacrocorax carbo*	Amber-Listed
Great Northern Diver	*Gavia immer*	Amber-Listed
Grey Heron	*Ardea cinerea*	Green-Listed
Herring Gull	*Larus argentatus*	Red-Listed
Hooded Crow	*Corvus cornix*	Green-Listed
Kestrel	*Falco tinnunculus*	Amber-Listed
Lapwing	*Vanellus vanellus*	Red-Listed
Least Tern	*Sternula antillarum*	* Not Designated
Lesser Black-Backed Gull	*Larus fuscus*	Amber-Listed
Linnet	*Linaria cannabina*	Red-Listed
Little Egret	*Egretta garzetta*	Green-Listed
Little Gull	*Hydrocoloeus minutus*	Green-Listed
Little Tern	*Sterna Albifrons*	Amber-Listed
Magpie	*Pica pica*	Green-Listed
Mallard	*Anas platyrhynchos*	Green-Listed
Meadow Pipit	*Anthus pratensis*	Red-Listed
Northern Gannet	*Morus bassanus*	Amber-Listed
Peregrine Falcon	*Falco peregrinus*	Green-Listed
Pied Wagtails	*Motacilla alba*	Green-Listed

Red Breasted Merganser	*Mergus serrator*	Green-Listed
Red Knot	*Calidris canutus*	Red-Listed
Rook	*Corvus frugilegus*	Green-Listed
Roseate Tern	*Sterna dougallii*	Amber-Listed
Ruddy Turnstone	*Arenaria interpres*	Amber-Listed
Sand Martin	*Riparia riparia*	Green-Listed
Sanderling	*Calidris alba*	Amber-Listed
Sandwich Tern	*Sterna sandvicensis*	Amber-Listed
Shelduck	*Tadorna tadorna*	Green-Listed
Sparrowhawk	*Accipiter nisus*	Amber-Listed
Stonechat	*Saxicola rubicola*	Green-Listed
Swallow	*Hirundo rustica*	Green-Listed
Wheatear	*Oenanthe oenanthe*	Amber-Listed
Whimbrel	*Numenius phaeopus*	Amber-Listed
Yellowhammer	*Emberiza citrinella*	Red-Listed

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