

Migration study of Little Terns breeding at Gronant Dunes, North Wales

Project name (if applicable): Migration study of Little Terns breeding at Gronant Dunes, North Wales

Project outline (continue on separate sheet if necessary):

Please note WOS requires confirmation of a Schedule 1 licence if one is required for this project and that Natural Resources Wales (NRW) must be consulted if the work takes place on a SSSI.

Background - Gronant Dunes SSSI, managed by Denbighshire County Council Countryside Service is the last remaining breeding site for Little Terns in Wales. This species is Amber listed on the British Birds of Conservation Concern list, protected under Schedule 1 of the Wildlife and Countryside Act 1981 and listed in Annex I of the European Commission's Birds Directive. Nationally Little Terns have been undergoing a long-term decline which is now stabilising under an EU Life+ Recovery Project and covers Gronant as one of the twenty project colonies. Very little is known about where the Little Terns at Gronant go once leaving the site. Their migratory route, staging areas and wintering grounds remain largely speculative but there have been a few ringing recoveries of Gronant birds in Guinea Bissau and adjacent countries in West Africa. Despite 1400 chicks ringed during a 35 year period on site (under licence from Natural Resources Wales) there have been too few recoveries to be sure where birds spend the eight months away from the colony and the routes they take. This study would be a first for Western Europe with the only other Little Terns tracked previously being in Lithuania and Japan. Without knowing where the Welsh birds specifically go away from the breeding grounds any threats to them or their feeding-grounds remain unknown and a barrier to conserving them throughout their life-cycle. This study will be a joint partnership by the volunteer-based North Wales Little Tern Group and Merseyside Ringing group.

Specific Aims - To ascertain the migratory route, staging areas and wintering grounds of adult Little Terns breeding at the Gronant colony using geolocators. This data will be used to inform the species' conservation on an international level through report publication

Methodology - <25x Geolocators (miniature archival light-level loggers) will be calibrated to collect data for locations twice a day. They will then be fitted to breeding terns on the nest during the 2019 breeding season (June-July). Ringing of adults, under Schedule 1 licence by Professor David Norman from the Merseyside Ringing Group, has been conducted over the last four years with success, two adults each year from 2015-17 and 51 in 2018. This last year demonstrated the ability to catch enough adults to attach trackers to 25 and colour-ring another 25 as a control group. The adults will be caught during the final few days of incubation (to minimise any risk of nest desertion) using a spring-trap placed over the nest to which the adult will return. Previous studies have struggled to locate the birds back on the breeding grounds but by placing go-pro cameras (already owned by the NWLTG) adjacent to nests during the season, target birds will be located if present. However, consideration has to be given to the likelihood that not every bird will be recovered hence the aim to place locators on a sizeable percentage (7%) of the current breeding population (171 pairs in 2018). The birds will then be re-trapped the following breeding season (2020) to retrieve the data off the geolocators using an interface unit. If the geocator is still functional it can be left

on for a further year (model proposed has 1-2 year battery life). It is planned to involve Bangor University at the data analysis stage who will assist in data conversion of light-level and timings using algorithms to longitude and latitude of data. Findings will be published in a relevant journal and shared with funding bodies and relevant conservation organisations.

Currently it is not known how to sex Little Terns, even in the hand, visually and/or with biometrics. Consequently this project offers the opportunity to further ornithological knowledge of the species which could inform the conservation of the species. A feather will be taken from each adult (with relevant permissions in place from the BTO) and sent off for DNA analysis to add to what is learnt from the project. The results will allow the sexing of individual birds and when compared with biometrics taken at the time of capture could give a better idea of the measurement ranges for each sex. By sexing the birds it will also be possible to analyse the information gained from the geolocators for variations in the migratory patterns and wintering areas between the sexes.

Timescale -

Purchase of equipment to take place in March, 2019.

Attachment of geolocators in June-July, 2019.

Retrieval of geolocators in June-July, 2020.

Data analysis and report publishing during the remainder of 2020 and 2021.

Animal Welfare - An adult Little Tern weighs 56g on average (BTO). Tracking devices weighing up to 4% of the weight of a seabird or wader have been used historically but with some noted impacts on smaller species in terms of survival (e.g. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4850671>). Loggers planned for use in this project have significantly less weight. They weigh 0.7g, which equates to 1.25% of the weight of an average adult. Studies on other tern species where the logger weighed around 1% have reported all birds returning the following year inferring no negative effect on survival (e.g. <http://www.bioone.org/doi/abs/10.5253/078.101.0102>). Concerns of drag from a small geolocator placed on a leg-ring on a bird in flight have been considered and it is noted that due to gravity the device will likely show below the leg in flight causing some drag (see attached photo). BTO Special Methods Technical Panel approval is being sought, who will consider ethical concerns, and give additional advice on tag attachment method. There will be disturbance caused to birds whilst catching adults but it is only carried out in good weather and time spent trapping birds in any one part of the colony is limited to 30 minutes which we know doesn't cause issues.

Exploring key dietary elements of the Hawfinch – is food choice causing a population decline?

As we are currently in the middle of the Anthropocene, with species loss at a vastly elevated rate, it is absolutely crucial to increase knowledge of the factors behind species decline. Due to the complexity of natural systems, studying population dynamics is challenging, and it is vital to consider many differing ecological factors.

The Hawfinch (*Coccothraustes coccothraustes*) is the largest member of the Fringillidae family in the UK. The Hawfinch is one of many bird species closely associated with woodland habitats which has shown major declines over a period of a few decades, with the UK estimated to hold only 500-1000 breeding pairs. Due to the scarcity of Hawfinch they cannot be monitored through national, annual monitoring schemes due to a lack of data, and as a result their decline has been monitored through bird breeding atlases from 1968-72 through to 2008-11. Data from the atlases show a 76% reduction in the number of 10km occupied squares from the earliest to latest atlas, with a more prominent decline occurring between the second and last atlas. Within Britain, Hawfinch have very localised distribution with population strongholds showing a strong western bias. There are a number of hypotheses implicated within the wider overall decline of woodland birds including; changing land use, climate change, increasing scarcity of invertebrate food supplies, adjacent land use change and increased avian and mammalian predation. Further potential contributory factors include under-planting of ancient woodland with conifers in the 1970's and a storm in 1987 which caused the loss of mature food trees - predominantly *Prunus* species. Using funds generously donated by the Welsh Ornithological Society I was able to visit population stronghold sites throughout Wales to collect data on this charismatic species in order to investigate if dietary choice is a key factor for Hawfinch population decline.

Very little is known about Hawfinch diet. During the breeding season diet (typically from April to August), Hawfinch have been observed feeding most regularly on the seeds and buds of Cherry (*Prunus* species) and the seeds of Wych elm (*Ulmus glabra*). Other notable components of the diet include sycamore (*Acer pseudoplatanus*), hawthorn (*Crataegus* spp), blackthorn (*Prunus spinosa*), wild service tree (*Sorbus torminalis*), dogwood (*Cornus alba*), larch (*Larix decidua*) and beech (*Fagus sylvatica*). Nestling diet is predominantly oak-roller moth (*Tortrix viridana*) and winter moth (*Operophtera brumata*). Species of Coleoptera, Hemiptera, Annelida, Gastropoda and Araneae have also been observed to be taken during the summer. Winter diet of Hawfinch include, cherry, hornbeam and beech, but also includes damson (*Prunus institia*), dog rose (*Rosa canina*) and Wych elm. Exploring dietary components of differing Hawfinch populations within the UK in more detail is vital into shedding light on their decline, and therefore is the focus of this work.

From March – June 2019 thanks to funds from the Welsh Ornithological Society I was able to visit six population stronghold sites, three near Dolgellau, two within the Wye Valley area and one in north Cardiff. Thanks to the funds donated, I could visit the field sites multiple times during the field season, allowing me to collect more samples and greatly increase my data set. Work in these areas was conducted with the kind help of BTO licenced ringers Jerry Lewis, Tony Cross and Richard Facey who have been ringing Hawfinch across Wales for many years as part of a long term monitoring scheme. The field sites consisted of mature broadleaved woodland, mainly of beech, hornbeam, ash and oak.

Hawfinch were caught using mist and woosh nets and ringed according to the BTO manual. Despite being a well established site, we were victims of unusually low numbers of Hawfinch trapped during April, especially in the Wye Valley. It was hypothesised that this may have been of a result of the birds utilising a more preferred food source in the canopy. Despite the difficulties, we still managed to collect morphometric data for 134 birds, as well as faecal samples which will be used in the diet analysis. In Cardiff, DNA will be extracted from the faecal samples and analysed for dietary components of individual Hawfinch from different populations. The faecal samples will be tested for both plant and invertebrate DNA. This work will allow us to construct a detailed species list of key dietary elements within the Hawfinch diet and, working in conjunction with the RSPB can be used to put forward a conservation management plan.

I would like to thank the Welsh Ornithological Society for funding which made the trips to sample these stunning birds possible. I would also like to thank my supervisors Dr Pablo Orozco-terWengel, Professor William Symondson, Dr France Gerard, Dr Ian Vaughan and Mr Paul Bellamy and his colleagues at the RSPB for their ongoing support. I also express immense gratitude to the team working on the Hawfinch project, particularly Mr Will Kirby, Mr Jerry Lewis, Mr Tony Cross and Mr Richard Facey for their assistance carrying out the fieldwork within Wales.



Hawfinch in the hand after being processed