

Alderney's West Coast and Burhou Islands

Ramsar Site and Other Sites

Annual Ramsar Review

2019

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Executive Summary

1. The 2019 *Alderney West Coast and Burhou Islands Ramsar Site and Other Sites* Ramsar Report is the 13th annual review since the Ramsar site's inception. It documents the work undertaken for the Ramsar Action Plan (AWT, 2019a) during the 3rd year of the 2017-2021 Five-Year Management Strategy (AWT, 2016). The year saw significant changes with the establishment of an independent Alderney Bird Observatory (ABO), and a move towards new oversight processes and legislation. To help support this transition a more detailed and transparent overview of the work undertaken is given including descriptions of the methods used, what was found and any recommendations for further work.
2. 2019 was a very productive year, with the majority of the programme completed successfully. This included the annual programme of seabird and marine mammal monitoring, green ormer monitoring, inter-tidal habitat mapping, baited remote underwater video surveillance and various educational events as well as some additional research on the threat of plastics in the marine environment, sea-cave surveys, ringed plover nest survival on our beaches and the use of a pan-tilt zoom camera to monitor puffin productivity. Further work was also undertaken on the role of the Ramsar Secretariat, a new legislative framework and States of Alderney (SoA) Scientific Advisory Group.
3. 2019 saw few changes in the numbers of seabirds breeding within the Ramsar site and the remainder of Alderney's coast. There was little change in productivity too and all the evidence suggests food was in good supply and the usual numbers of chicks fledged successfully. A notable exception was the loss of the common terns from Houmet de Pies. Unfortunately, no birds chose to nest there this year. This was despite the programme of rat control implemented to improve their nest survival. Nevertheless, sudden changes in nest site choice are not unusual in this ethereal species and it's very possible the site or islets close by will still be used next year.
4. The 2019 puffin season was assessed through a combination of productivity surveys, apparently occupied burrow counts and raft counts. An estimated 150 pairs bred, a marked increase from 2018 (140). Cameras were used to conduct productivity surveys, estimating between 60-88% of burrows successfully raised a chick. This is similar to previous estimates. 330 gannet nests were monitored on Les Etacs and 52% of these raised chicks to fledging, although true productivity was probably closer to 59% as some of the observed nests were not laid in. The latter figure also lies closer to productivity figures found in the UK gannetries. Thirty-one Fulmars bred and 49% raised a chick to fledging, which was more than in the previous couple of years. Round island census also revealed an increase in nesting shags (from 100 last year to 119 this year) but an on-going decline in Herring gulls since 2014 probably reflecting changes in refuse collection both here and in France since then. Four pairs of ringed plovers were found nesting on Platte Saline beach, Saye and Clonque bays but only those that nested in Clonque bay were successful. Successful seabird ringing trips by the ABO and CIBRS provided additional data on the gulls and storm petrels breeding on Burhou and gannets on Ortac.
5. The SoA and the Alderney Wildlife Trust (AWT) established evidence of rats on all the larger offshore islets except Burhou and Rousset and have put in place suitable rat control measures. Bracken growth on Burhou impacted on puffin productivity surveys this year too and may limit suitable nesting ground for puffins in the future.
6. The AWT undertook an ambitious programme of marine work. This included the successful completion of Phase 1 habitat mapping of Clonque Bay, the tagging of five green ormer and the recording of four invasive species. In addition, baited remote underwater video (BRUV) surveys provided data on fish populations. Grey seal studies found a small population and further developed the regional photo-ID catalogue. Strandline surveys across Alderney found mainly marine algae, but also plastic and, on one occasion palm oil which prompted a beach clean.
7. The AWT 2019 education programme brought the Ramsar site's natural history to a wide audience including the local community, tourists and various stakeholders. The Track A Gannet (T.A.G) project collected foraging data from 8 gannets, which provided the basis for a response to a cross-channel

planning enquiry. A geolocator was recovered, revealing new data on Alderney gannets' migratory behaviour. New research into the impact of man-made debris on Northern gannets produced results which may prove to be of international value and featured on BBC's Countryfile and ITV News.

8. Around 550 passengers took Ramsar boat tours on Sula of Braye, including free tours for students of St Anne's School. Free trips for Year 6 school students will continue in 2020. The Puffin Friendly Zone continued to yield results, however there were 10 boat intrusions recorded highlighting the need for continued work by the Harbour Office and stakeholders. Various community and public engagement events were held including beach cleans, rockpooling sessions, several surveys and provision of a marine outreach tank in VisitAlderney.
9. Some useful advisory and legislative work was undertaken but the review of the Five-Year Management Strategy was postponed to next year pending a new system for environmental research led by the SoA Chief Executive Officer for 2020. Support was given to the establishment of new wildlife legislation and the adoption of the Blue Island Charter. At least 26 publications/media coverage occasions relating to the Ramsar site were produced by organisations independent of the Activity Organisations in 2019, including a significant feature on the BBC Countryfile's Autumn Special episode. Support for the Channel Islands Ramsar Steering Committee continued, and work went on with the establishment of a Channel Islands Ramsar website, to be published in 2020.
10. Detailed recommendations for the 2020 Ramsar Action Plan, based on the site's Five-Year Management Strategy (AWT, 2016) and the outcomes of the 2019 programme, are summarised in Appendix 6.9. Key to delivering the 2020 programme will be the adoption of the new Terms of Reference, provided by the SoA to ensure that the programme continues to meet the objectives of the Five-Year Strategic Plan. The existing Alderney Ramsar Steering Group will continue in its role until the end of 2020 by which time the new structures will have been established. Crucial during this period is the collaborative working of all Activity Organisations.
11. This Ramsar report was developed and reviewed in consultation with the Alderney Ramsar Steering Group (ARSG). All comments from the ARSG on this report are included in Appendix 6.10.

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List of Acronyms

AAWS – Alderney Animal Welfare Society
ABO – Alderney Bird Observatory Limited
AOBs – Apparently Occupied Burrows
ARSG – Alderney Ramsar Steering Group
AWT – Alderney Wildlife Trust
BMLRD – British Marine Life Rescue Divers
BRUV – Baited Remote Underwater Video
BTO – British Trust for Ornithology
CEO – Chief Executive Officer
CIBRS – Channel Islands Bird Ringing Scheme
ES – Environmental Secretariat
GDPR – General Data Protection Regulation
GSC – General Services Committee
IEM – Inter-Islands Environmental Meeting
JNCC – Joint Nature Conservation Committee
PFZ – Puffin Friendly Zone
PTZ – Pan-Tilt-Zoom
RSPB – Royal Society for the Protection of Birds
SAG – Scientific Advisory Group
SoA – States of Alderney
T.A.G – Track A Gannet
ToR – Terms of Reference

1. Introduction

This document reviews the work objectives carried out in 2019, as detailed in the 2019 Ramsar Action Plan (AWT, 2019a), reviewed by the Alderney Ramsar Steering Group and approved by the States of Alderney General Services Committee.

2. Background

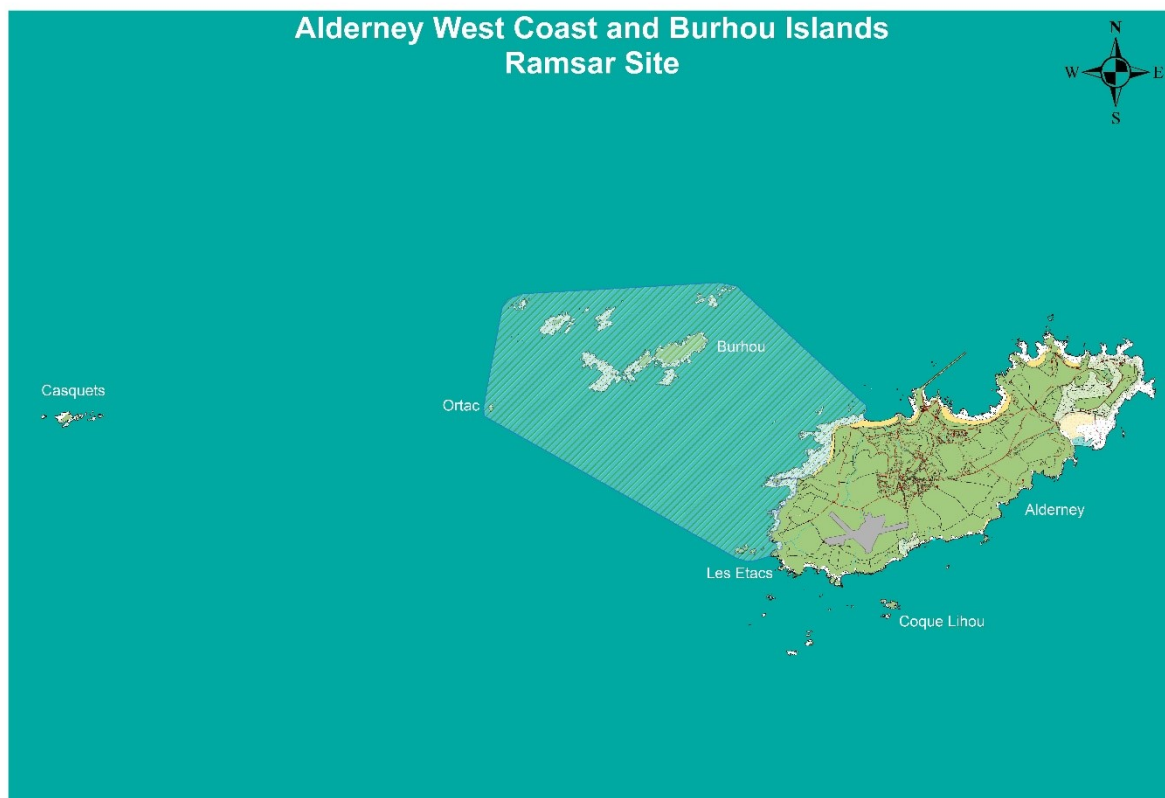


Figure 1 – Alderney West Coast and Burhou Islands Ramsar Site

On 25th August 2005, the Alderney West Coast and Burhou Islands Ramsar Site was designated and gained global recognition as a wetland of international importance under the Ramsar Convention.

The site covers 1,500 hectares of land and sea and was the first site to gain Ramsar designation within the Bailiwick of Guernsey.

In 2006, on behalf of the States of Alderney (SoA), the General Services Committee (GSC) requested the support of the Alderney Wildlife Trust (AWT) in the preparation of a management strategy, as required under the commitments of the Ramsar Convention, and registered the AWT as the Alderney Ramsar Secretariat with the International Ramsar Secretariat in Geneva. The Ramsar site strategy outlines the need to monitor seabird and marine population trends, threats to these and to continue the management of populations where necessary. The objectives of the strategy are assessed annually through various research projects and conservation management techniques.

Since 2007, the Ramsar site has been managed using Five-Year Management Strategies, with annual Action Plan and Review documents, prepared by the AWT on behalf of the SoA (all available online at AWT, 2019c).

All Ramsar reports are developed and reviewed in consultation with the Alderney Ramsar Steering Group (ARSG). The ARSG was established in 2006 to offer technical advice to the AWT and vet proposals before their presentation to the SoA, in the effort to create robust and vetted management strategies. The group is made up of experts (including individuals who work for the RSPB, BTO and States of Jersey). The ARSG are involved in reviewing all five-year management strategies, annual action plans and annual review reports, as well as meeting annually to discuss the work. All comments by the ARSG on this report are included in Appendix 6.10.

While the Ramsar site has a clearly defined boundary (see Figure 1), the site's five-year/annual management plans and review documents may include specific habitats and species which occur outside of this defined area. This has occurred to ensure that monitoring and conservation measures (often including projects and species which occur within the Ramsar site) are properly documented and reviewed. This ensures a wider view of species information (particularly important for those which are mobile and will travel into the Ramsar site) and conservation measures which protect species and habitats within the Ramsar site is taken. Locations are clearly detailed within the reports to ensure it is clear if a work item has occurred inside or outside of the defined Ramsar site. In April 2019, the GSC approved an updating of the current 2017-2021 Ramsar Management Strategy's title to include 'and other sites'.

In 2019, the Alderney West Coast and Burhou Islands Ramsar site entered the third year of the 2017-2021 Management Strategy (AWT, 2016).

3. Objectives

The objectives of the 2019 Ramsar Action Plan (AWT, 2019a), set to meet with the objectives of the 2017-2021 Ramsar Site Management Strategy (AWT, 2016) were as follows. Each objective number corresponds with the review paragraph number in section 4 (e.g. for objective number 3.1.1. the review can be found under heading number 4.1.1.). Please note, any links to heading numbers in the below objectives refer to the original document (AWT, 2019a).

3.1 Seabirds

- 3.1.1 Re-installation and maintenance of the puffin monitoring cameras and equipment on Burhou, for seabird monitoring and streaming online (March – August; see 4.1.1).
- 3.1.2 Continuation of all seabird monitoring on Alderney, Burhou and other islets (Puffins: February - August; Gannets: March - September; Fulmar: May/June - August; Common Terns: May – August, Ringed Plover: April – July; see 4.1.2).
- 3.1.3 Support academic research into the impact of human debris on gannets, providing data on entanglement and mortality rates (April - September; see 4.1.4). Attempt to secure funds and investigate working with Alderney Animal Welfare to further investigate gannet mortality by performing autopsies on birds washed up on the island. This will be undertaken specifically with a view to establishing the impact of anthropogenic debris.
- 3.1.4 Work with the Marine Management Forum to continue supporting a voluntary marine exclusion zone around rafting puffins during their breeding season, through liaison with stakeholders, building on success in 2018 (see appendix 6.1; exclusion zone in place March - August).
- 3.1.5 Review the possibility of creating a full marine exclusion zone around rafting puffins by issuing a notice to mariners, which would identify this zone on marine navigational charts. This will be dependent on resources and the support of the Alderney Harbour Office and local stakeholders.
- 3.1.6 Continuation of 'Track A Gannet' (T.A.G) programme (on Ortac in June/July; see 4.1.3).
- 3.1.7 Supporting the continuation of the traditional ringing effort undertaken on Burhou, Les Etacs, Ortac and other islets. Both 3.1.6 and 3.1.7 will be dependent on the issuing of suitable licences by the States of Alderney for work on the Ringed Plover: April-July; Gulls, Storm-Petrels and Shags on Burhou: June/July; Gannets on Les Etacs: June/July; Gannets on Ortac: July; seabirds on Coque Lihou: June/July; Common Terns: date to be confirmed; (see 4.1.2).
- 3.1.8 Population counts of Seabirds on Coque Lihou (resource dependent; see 4.1.4).
- 3.1.9 Monthly Wetland Bird Surveys (WeBS) conducted and submitted to the British Trust for Ornithology (BTO) and AWT Ramsar databases (every month; see 4.1.5).
- 3.1.10 Review the possibility of a collaborative project for ringed plover with French stakeholders and ornithologists for a focused monitoring effort helping to build a better picture of our population and build relationships. This work will be undertaken in support of twinning efforts underway via VisitAlderney (resource dependent).
- 3.1.11 Review contact with Groupe Ornithologique Normand (GONm) annually (resource dependent). This work will be undertaken in support of twinning efforts underway via VisitAlderney.
- 3.1.12 Annual review of seabird data (after data collection).
- 3.1.13 Annual review of T.A.G. data (after data collection).

3.2 Terrestrial

- 3.2.1 Last year, evidence of rats was found on the twin sisters, La Quoire and the Hanaine Bay islets, whilst active Rat control was undertaken on Houmet des Pies in Saye Bay. In 2019, it is proposed that monitoring stations are deployed on Burhou to determine presence (or absence) using chew sticks/wax blocks. In addition, active rat control will be undertaken on Twin Sisters, La Quoire, Hanaine Bay and again Houmet des Pies (February/March; see 4.2.1). This work will be undertaken in collaboration with the SoA Public Services Department and is resource dependant.
- 3.2.2 Review of small mammal monitoring effort to establish the long-term sustainability of control measures (winter).
- 3.2.3 Continued monitoring of the presence and extent of bracken and invasive species such as Hottentot Fig on Burhou, with subsequent management as needed in collaboration with SoA Public Services Department (after puffin breeding season in August).

3.3 Marine

- 3.3.1 Contact Capturing our Coast (Capturing our Coast, 2019) to request data to update intertidal species information for Alderney (February).
- 3.3.2 Habitat mapping of Clonque Bay (Davies *et al.*, 2001, p. 165-178, methodology, using JNCC habitat guidance/classification with supplementary European Nature Information System habitat descriptions for habitats difficult to classify under the JNCC classification; from April).
- 3.3.3 Green Ormer population assessment at Clonque Bay following Dr. Mel Broadhurst-Allen's methodology (April and October; see 4.3.1).
- 3.3.4 Invasive species assessment at Clonque Bay and Hanaine Bay (same time as ormer hunts in April and October, see 4.3.2).
- 3.3.5 Boat based surveys of marine mammals of the entire Ramsar site (following Sea Watch Foundation methodology, SWF, 2019; minimum 1 trip per month; April - October).
- 3.3.6 Conduct fish/shellfish surveys at selected areas within the Ramsar Site, following the success of this project last year (methodology in appendix 6.2; August - October).
- 3.3.7 Grey seal population dynamics study following JNCC grey seal survey methodology (JNCC., 2005) at offshore islets of known breeding locations (breeding season: August - October).
- 3.3.8 Grey seal photographic ID catalogue kept up to date following the guidance from the Cornwall Seal Group Research Trust. Members of the public will be invited to submit any good pictures (year-round).
- 3.3.9 Intertidal desk-based review of methods, results and activities (to be conducted by a MSc placement project from the University of York over the summer).
- 3.3.10 Strandline surveys at Clonque Bay, Hanaine Bay, Platte Saline Bay and Burhou to assess strandline presence, size and composition (dead, live and litter content; methodology in appendix 6.3).
- 3.3.11 Capturing our Coast citizen science project at Clonque Bay to promote marine life within the Ramsar Site. The citizen science project provides the public with training to conduct the intertidal surveys of species and invasive species. (spring/summer).
- 3.3.12 Intertidal habitat survey of selected caves and investigation of the coastline to establish the presence of any additional caves within the Ramsar site (timing to be confirmed, during summer; see 4.3.3).
- 3.3.13 Continue to liaise with and support Seasearch groups in conducting scuba diving marine ecological surveys in the Ramsar site (as required).
- 3.3.14 If our funding proposal is accepted by the Alderney Marine Forum/SoA monthly sea water quality testing of selected bays (see 4.3.4).
- 3.3.15 Marine mammal desk-based review of surveys conducted within the Ramsar Site (October - December).

- 3.3.16 Support the local British Marine Life Rescue Divers group on Alderney (as required).
- 3.3.17 Support marine management activities and the community led Marine Management Forum (as required).
- 3.3.18 Support and lead marine based academic projects within the Ramsar site (as required).
- 3.3.19 Annual review of contact with Agence des Aires Marines Protégées (AAMP; resource dependent).
- 3.3.20 Annual review of baseline marine data to ensure work steams are relevant and up to date (winter).

3.4 Events

- 3.4.1 Continuation of boat tours on Sula of Braye to increase public awareness of the Ramsar site while contributing to costs of boat operation by the AWT** (April - August).
- 3.4.2 Educational tours for students at St Anne's School to enhance local knowledge of the Ramsar site and key seabird species, including gannets and puffins (see 4.4.1).
- 3.4.3 Community engagement and public awareness of the Ramsar Site through events (year-round; see 4.4.2).

** The AWT maintains a 10m coded Cat 2 (MCA Coded) vessel to undertake all its works within the marine environment of the Ramsar site. This work is charged at base costs back to the Ramsar budget and the AWT must then charter or operate scheduled services to cover all other costs of operating the vessel in order to maintain it in operation.

3.5 Advisory and Legislative

- 3.5.1 Review and update the 5-Year Ramsar Strategy and following reports, to include altering the title to "Alderney West Coast and Burhou Islands Ramsar Site and Other Sites Strategy" to better define the scope of work carried out, following recommendations from the 2018 Ramsar Review (AWT, 2018a). The 5-Year Ramsar Strategy will also be updated to include correct methodologies and justifications for any acts that are invasive, such as ringing and small mammal trapping (to be completed as soon as possible).
- 3.5.2 Installation of a sign displayed inside the Burhou hut detailing sensitive areas on the islet where seabirds nest on the ground or in burrows, requesting visitors to avoid such areas (March).
- 3.5.3 Signpost placement, production of a publication and press releases detailing where the puffin exclusion zone will be (April - August).
- 3.5.4 Review and signpost placement alerting the public to breeding waders and exclusion zones on Alderney's beaches (March).
- 3.5.5 Production of publicised materials to educate the general public on the Ramsar site, seabirds and the work of SoA/AWT, including puffin cameras, information boards about the Ramsar site, a Ramsar information leaflet and radio interviews (year-round; see 4.5.1).
- 3.5.6 Maintain communication links and collaboration with Channel Islands Ramsar Steering Committee (year-round).
- 3.5.7 Twin Alderney's Ramsar Site with Iles de Chausey in Normandy (by 2020).
- 3.5.8 Review Bird Protection Law (BPL) – liaise with bird experts and the States of Alderney to include legal implications for disturbance to breeding sites (not a priority for this year – for consideration at the end of the year).
- 3.5.9 Support the SoA in the development of appropriate legislation in regards to the monitoring and protection of wildlife within the Ramsar site to enable the Ramsar Strategy programme.
- 3.5.10 Support the Channel Island Ramsar website for pan channel island Ramsar co-operation.

4. Review

4.1 Seabirds

4.1.1 Puffin Cameras

4.1.1.1 Installation and Maintenance

Installation of the puffin cameras in 2019 was delayed due to awaiting approval of the 2019 Ramsar Action Plan by the SoA. Three puffin cameras (two static bullet cameras, named close up and main cam and one Pan-Tilt-Zoom (PTZ) camera, named colony cam), two solar panels and associated cable and transmission equipment was installed on Burhou by four people with an overnight stay on the 19th to 20th March. Replacement puffin burrow numbered pegs were also installed on this trip.

A short trip to Burhou was required on the 29th April 2019 to replace the inverter and adjust the static cameras to a more suitable position with improved views of the burrows and positioned to avoid weather on the lenses.

A maintenance trip to Burhou on the 20th June was required after the PTZ stopped working on the 15th. Repairs were undertaken by two people on island for a short time. Possible rabbit gnawing though the cables and/or an inverter problem are thought to have caused the problem.

The total time on island to support the camera work during the breeding season (excluding the initial set up) was approx. two hours, a significant reduction in the time required on island to conduct surveys in person in previous years.

Signs were placed on Burhou during the season to alert anyone on the island to the cameras' presence and use.

The cameras were taken down on Friday, 2nd August 2019, with 4 people visiting Burhou for around three hours.

A review of the puffin cameras and their use in 2019 is provided in 4.1.2.1.7.

4.1.1.2 Streaming Online

The cameras were streamed online between 15th April and 2nd August 2019. The AWT worked to promote the cameras throughout the season.

The cameras were very successful this year. As outlined below, the number of users and views on the LIVE: Teaching Through Nature website were significantly higher than in 2018 (percentage increase depicted in green). In addition, the cameras were also available for the first time directly through the VisitAlderney.com website (user figures below in red):

12,394 users **↑72%** / **30,705** (users)
116,915 views **↑108%** / **105,462** (total page views)
82,642 unique views **↑90%** / **39,208** (unique page views)
Main webcam received 43,275 unique views **↑158%**
Close up camera received 16,793 unique views **↑187%**
Colony cam received 16,679 unique views **↑1,172%**

Positive feedback was received from members of the public, including the below quotes:

“Just a thank you, I love watching them, fascinating”

“We watched last night and got a great show of the puffins coming back to their burrows!”

“I’ve loved checking in on the cameras (especially when I made my first visit to Alderney in June and felt I was literally on their doorstep!!) and thank you for your informative blogs”

“It has been really amazing watching the wonderful Puffins every day. Going to miss them they are so entertaining.”

“I watch this every year, just amazing”

The LIVE: Teaching Through Nature website has been updated ready for 2020 and is intended to deliver all three camera feeds through the main page, aiming to reduce the filtering effect created by the main camera being the first feed available when visiting the site (an introduced bias observable in the viewer figures above). This should in turn allow the more actively manageable PTZ camera to be used, in conjunction with Visit Alderney, to increase the viewing audience and better support the VisitAlderney website.

Recommendations:

In 2020 and beyond it is recommended the cameras are installed earlier, ideally in February, to allow time for setting up and troubleshooting before the puffins arrive on land. As always, ensure the cameras are properly armoured all the way along their length (especially where the cables plug into the camera) to prevent problems from rabbit gnawing. Ensure the solar panels are secured with rocks or similar available materials to prevent them falling over during the season.

4.1.2 Seabird Monitoring

4.1.2.1 Atlantic Puffin Monitoring

4.1.2.1.1 Key Dates:

Atlantic puffins (*Fratercula arctica*, hereafter ‘puffins’) were first thought to be observed by a member of the public on the 17th March 2019. The AWT confirmed their presence on the 20th March 2019 (observing 140 rafting during the trip to set up the puffin cameras).

A puffin was first observed on Burhou at 9:44am on the 6th April 2019.

A pair of puffins was observed mating in the water on the afternoon of the 29th April 2019.

The first fish within a puffin’s bill was observed on the 17th May 2019, both via the cameras during the productivity survey and during an AWT boat trip that afternoon.

The day a puffin lays can be estimated indirectly by calculating back from the first fish observation, assuming a fixed incubation period of 41 days (which in reality may vary by several days; Harris and Wanless, 2012, p. 82). Accepting this assumption, a laying date of the 6th April 2019 is estimated as the assumed earliest breeding individuals.

One puffin was observed fledging at 1:47am on the 29th July 2019, recorded using the PTZ camera. This date was 35 days after the first fish return was observed for this burrow during a productivity survey, relatively late in the season on the 24th June 2019. The normal fledging period for a puffin is between 38 and 44 days (Harris and Wanless, 2012, p. 89). This burrow was also observed in use on the 3rd June with one entry and one exit and with two additional fish returns observed on the 11th July and 20th July.

4.1.2.1.2 Puffin Productivity Surveys

Survey Methodology:

The method for puffin productivity in 2019 continued and expanded upon the methodology first introduced in the 2018 season (AWT, 2019e), utilising the puffin cameras for surveys. The aim this year was to test using the cameras as a method for estimating productivity.

Surveys were recorded using the PTZ puffin camera, with the start and end time of each survey view and weather conditions noted. Two surveys per week aimed to be completed, however it should be noted that some surveys were missed or not undertaken due to poor camera quality (caused by fogging or water on the lens) or problems with the camera (see 4.1.1.1). The colony was initially split into three sections (named View 1, View 2 and View 3), with each section recorded for 30 minutes. These survey views were sufficient to identify burrow activity, however during May it was noted that it was difficult to observe if puffins were carrying fish using these views. The survey views were therefore changed from the 27th May, splitting the three survey sections into six further zoomed-in views (named Test 1, Test 2, Test 3 e.t.c.), which were recorded for 20 minutes each. This change of methodology was approved by the ARSG.

Survey views were set by saving these on the PTZ camera controls, enabling a button to be pressed to move the camera to the specified camera view and thus enabling standardised views to be observed. However, it was noted upon review that all the set survey views slowly started shifting to the left towards the end of the season, from the 29th June. It is unknown why this occurred.

Each recorded survey was reviewed, noting burrow activity (time in or out), if fish were carried, and whether harassment by gulls was observed, thus following the same survey forms and basic methodology as historically used for on island surveys. Utilising the cameras was advantageous as the survey video could be reviewed at slower or faster speeds, paused, rewound, zoomed into e.t.c, which greatly aided burrow identification and whether fish were being carried in the bill. Surveys were never reviewed at speeds greater than x1.5 as this was perceived the maximum speed to ensure puffin observations were not missed. The puffin burrows were numbered, with a screenshot of the burrow taken as reference and allowing comparison. Burrow locations were also marked on photographs of the survey views.

In total in 2019, 25 surveys were undertaken between the 16th April and 26th July, equating to 2,595 minutes or 43 hours and 15 minutes. It should be noted that the time taken to review the footage took significantly longer than the survey time, due to recording, pausing the reviewing the survey. This was particularly true for surveys where there was a large amount of activity and when multiple puffins entered or exited burrows at the same time/within a few seconds of each other.

After completing all the surveys, footage of burrow numbers within close proximity of each other was checked and compared, confirming if these were different or the same burrows and amending numbers as necessary.

Appendix 6.2 contains data relating to the puffin productivity surveys. Figure 20, within this appendix shows the various survey views and the observed burrows (all of those recorded, whether determined active or not), while Figure 21 depicts the extent of the bracken (discussed below). *Table 21* summarises the data from the surveys.

Productivity Estimate:

Productivity was calculated from these surveys following the JNCC productivity monitoring, method three formula (below; Walsh *et al.*, 1995, p. Puffin 8).

$$\text{Productivity} = \frac{\text{Number of successful burrows} \\ \text{(burrows observed with fish taken down them late in the season)}}{\text{Number of burrows observed occupied early in the season, during incubation} \\ \text{(burrow entered by a puffin on two separate dates)}}$$

Using the above formula, 13 burrows were identified as occupied early in the season (up to and including 14th May), 8 of which were observed with fish returns later in the season, thus giving a productivity value of 0.62.

It was noted that many burrows were observed with fish returns which were excluded from the sample following the above formula. This arose as they were not observed until later in the season. In order to provide an estimate of error, productivity was therefore also calculated including all burrows with recorded fish returns (adding the burrow to both the occupied and successful totals). Three fish returns were impossible to assign to a burrow as the puffins disappeared into bracken and there were multiple burrows nearby which could have been entered. In order to include this in the estimate, one occupied and one successful burrow was included as a minimum for these three returns. This gives a total of 36 occupied burrows, 31 of which were thought to be successful, thus yielding a productivity value of 0.86.

Unfortunately, bracken growth during the season obstructed the view of several burrows, mainly covering burrows within the 'Test 1' and 'Test 2' survey views (see Figure 21 in Appendix 6.2). At its peak height, this obstructed the view of 19 burrow entrances. Calculating productivity excluding obstructed burrows, using the above formula (including burrows observed up to and including 14th May), gives 10 occupied burrows, 6 of which were observed with fish returns, giving a productivity value of 0.60.

If once again productivity is calculated including all burrows with recorded fish returns (including 5 fish returns to burrows covered by bracken which were either identified before the bracken obstructed the view or due to the lack of any other burrows nearby) but excluding those burrows covered by bracken previously included as occupied but with no fish returns, yields 34 occupied burrows, of which 30 were considered successful. This thus, gives a productivity value of 0.88.

The above productivity range from 0.60 to 0.88, therefore highlights the significant error if following the JNCC methodology and due to bracken growth. Interestingly, a productivity figure of 0.60 is similar to previous productivity estimates at Burhou (Table 1). An estimate of 0.88 seems abnormally high, likely due to the bias of including burrows with fish returns. Less puffin observations were recorded during surveys before fish returns started, which is to be expected due to the behaviour of adult puffins incubating.

Table 1 - Historic Puffin Productivity Estimates – estimates calculated following a different methodology from that used in 2019, please see the annual Ramsar Review Reports for the specific methodology used. Note, the productivity estimate from 2018 has not been included in this table due to the authors concerns regarding the error of the result.

	Year							
	2005	2006	2007	2008	2010	2011	2014	2015
Puffin Productivity	0.64	0.61	0.63	0.65	0.66	0.66	0.36 - 0.60	0.71

It should be noted that the above productivity estimate does not include all the puffin burrows on Burhou but represents a sample, bias towards those within the survey views observable from the camera. Puffins were also observed via the cameras on the slope towards the sea, with at least two fish returns recorded to this area. Due to the inability to observe burrows in this area, these were not included in the productivity estimate. During boat tours, puffins were also observed on the south-east end of Burhou (the other side of the ridge to the cameras). Evidence of puffins here was also identified during the end of season Apparently Occupied Burrow survey (4.1.2.1.5).

Recommendations:

Please see 4.1.2.1.7.

4.1.2.1.3 Evidence of Connectivity/Burrow Sharing

Evidence of connectivity was observed throughout the season as outlined in Table 2. Indication of puffins, rabbits and storm petrels using the same burrow entrance was recorded again this year. Three puffins emerging from one burrow together (e.g. burrow number 26) may indicate the burrow entrance leads to multiple burrows which share the same entrance. This is thought to occur due to the puffins occupying rabbit warrens, which are much deeper and more connected than burrows dug by puffins.

Table 2 - Evidence of Connectivity/Burrow Sharing Observed in 2019; see Figure 20 for numbered burrow locations.

Date	Observation
1 st May	Puffin out of burrow 13 went into burrow 1
1 st May	Rabbit came out of puffin burrow 4
10 th May	Puffin out of burrow 31 went into burrow 26
17 th May	Puffin out of burrow 40 went into burrow 4.5
17 th May	Puffin out of burrow 10 into burrow 8 and then out of 8 into burrow 10
21 st May	3 puffins observed emerging from and returning into burrow 26
22 nd May	Puffin out of burrow 68 went into burrow 19
27 th May	Puffin out of burrow 26 went into burrow 44
27 th May	Rabbit went in and out of burrow 26 (was inside for just under one minute)
29 th May	Puffin out of burrow 73 into burrow 3
24 th June	One individual puffin came out of burrow 53 and went into burrow 26, this was followed by another individual for burrow 53 going into burrow 26 (presumably observing and following). It is thought one of these individuals, identified due to mud on the individual's chest exited burrow 26 3 minutes after the original entry. Another individual emerged from burrow 26 shortly afterwards.
29 th June	Puffin out of burrow 53 went into burrow 26
29 th June	Puffin out of burrow 64 went into 65 – or possibly just behind the rock/in a ditch in the topography
2 nd July	Puffin out of burrow 17 went into burrow 65 and then puffin out of 65 went into burrow 17
11 th July	Puffin out of burrow 35 went into 31
11 th July	Puffin out of burrow 26 went into burrow 31
29 th July	Storm petrel observed entering and exiting puffin burrow 53 (Figure 19)
29 th July	Rabbit observed entering puffin burrow 53/ storm petrel burrow number 1 (Figure 19)
29 th July	Storm petrel observed exiting a burrow which is possibly the same as puffin burrow 83 (Figure 19)

It is interesting to note that many instances of puffins using more than one burrow entrance occurred between burrows with a fair distance between them. It is impossible to tell whether these burrows are connected or if the individual was simply curious about the other burrow. At times a puffin would exit the burrow and run back to the previous burrow in a rush, as if chased out by another puffin, although this was not observed within the view of the cameras.

Recommendations:

Continue recording evidence of connectivity in 2020 and beyond, using the same burrow numbers. A review of all the evidence gathered in a few years, aiming to determine which burrows are connected/contain more than one pair, would be valuable.

4.1.2.1.4 Gull and Puffin Interactions

Gull species are widely known to predate or steal fish from puffins (kleptoparasitism), often catching puffins as they enter and exit burrows, especially if the vegetation is sufficiently dense to hinder their progress. Detailed observations have been carried out, often showing that although individual puffins are affected by kleptoparasitism, population level effects are relatively minor (Harris and Wanless, 2012, p. 139; Soanes *et al.*, 2010). It should be remembered that this is a natural process and that the gull species involved are also of conservation importance. For example, great black-backed gulls (*Larus marinus*) are amber listed on the British Birds of Conservation Concern (Eaton *et al.*, 2015). The pair of peregrine falcons on Burhou are also highly likely to predate puffins.

An estimated 6 great black-backed gull apparently occupied nests (representative of pairs) were recorded on Burhou this year (4.1.2.6.3), while the island remains a key breeding area for lesser black-backed gull and herring gull populations.

17 instances of gulls harassing puffins were observed during productivity surveys this year, at least 6 of which definitively occurred towards puffins carrying fish. This number only includes those observed within the section being viewed during a survey and does not include puffins appearing as though they were being chased in the air. All observations of interactions occurred after the first puffin was observed returning with fish on the 17th May (between the 22nd May and the 20th July 2019).

While most interactions occurred between puffins and great black-backed gulls, on the 14th June both great black-backed gulls and a herring gull (*Larus argentatus*) were observed actively chasing puffins in flight (not included in the above number). On the 8th July 2019, a herring gull, a great black-backed gull and a crow species all appeared to chase an individual puffin carrying fish back to the burrow.

Great black-backed gulls were observed clearly waiting within the puffin burrow area actively looking upwards for puffins approaching and darting for these when the opportunity arose. They were also observed walking around burrows, peering in and occasionally scavenging food from the entrances.

Lesser black-backed (*Larus fuscus*) and great black-backed gulls were observed loafing near or within the puffin burrows within the survey views throughout the season. Territorial behaviours between gulls or simply gulls walking though/landing in the area are thought to have indirectly affected the puffins with observations of individuals dashing into burrows when these events occurred.

The puffins changed their behaviour in response to the gulls, both wheeling and returning to land in groups. Both strategies are well known responses to gulls, aiming to reduce individuals' chances of being targeted (Harris and Wanless, 2012). These behaviours were particularly obvious on the 22nd May, when 9 gull harassment instances were recorded. A pair of great black-backed gulls were also observed attempting to mate within the puffin burrow area on this date.

Observations of harassment outside of productivity surveys were also opportunistically recorded; On the 20th May 2019 a pair of great black-backed gulls were recorded (via the PTZ camera) eating a puffin; On the 31st May a great black-backed gull was observed taking a puffin; On the 15th June, a great black-backed gull was also observed darting and grabbing a puffin at its burrow entrance before the puffin escaped. Additional reports were made by members of the public viewing behaviours via the puffin cameras; On the 9th June 2019 a gull (unknown species) was described picking up a puffin, shaking it for about 20 seconds before the puffin escaped and flew off; On the 18th June a great black-backed gull appeared to be devouring a chick or adult puffin; On the 8th July 2019 a viewer reported that a great black-backed gull got hold of a puffin in its beak and shook it. The puffin managed to flap free and flew off.

Observations of kleptoparasitism and a few instances of predation are normal on Burhou. While it is thought that individual gulls (particularly great black-backed gulls) may have specialised in kleptoparasitism/predation of puffins this year, the population effects are unlikely to be significant.

Guernsey's landfill site closed this year, which historically provided a food source for many gulls (Veron, pers. obs., 2019). In addition, myxomatosis largely impacted the rabbit population on Alderney through the winter of 2018/19 (Gauvain, pers. obs., 2019), potentially reducing available food sources by the spring and summer of 2019. Both instances are likely to have impacted the food availability for gulls, which may have driven them to alternative sources such as the puffin population on Burhou.

Although unconfirmed, it is also thought that some gull eggs may have been taken from Burhou earlier in the season, suggested due to social media posts online. It should be noted that this was not an official activity and to the AWT's knowledge has not occurred on Burhou for the last 10 years; however, historically this was a common activity, licensed by the SoA. Kleptoparasitism may be concentrated when the individual undertaking the activity is raising chicks (as identified in yellow-legged gulls; Oro and Martines-Vilalta, 1994). Therefore, the removal of eggs may have influenced species interactions this year due to second laying and chick rearing as a result of these activities.

While interactions should be monitored, it must be remembered that these are natural processes and the gull species involved are of conservation importance.

Recommendations:

Continue to monitor species interactions in 2020.

4.1.2.1.5 Apparently Occupied Burrow Survey

The end of season Apparently Occupied Burrow (AOB) survey aims to count the total number of burrows on Burhou which appear occupied by puffins, giving an estimation of the total number of puffin pairs (assuming one occupied burrow equates to one puffin pair). Observations from boat trips near Burhou (including monthly around island surveys) and other trips to Burhou during the

season (including ringing trips if possible) are used to determine potential burrow locations which are investigated in the AOB survey, undertaken once chick fledging is believed to have taken place.

The survey is conducted by walking across the ground and placing a pasta shell in each burrow that appears to have been occupied, to prevent double counting. A burrow is determined as occupied if it has a puffin smell (a strong, musky but sweet smell) / small white puffin chest feathers / small guano (not gull guano) / eggshells / fish inside or very close to the entrance. It's essential to define these criteria to help standardise the methodology when different surveyors are used. To reduce human error, counters are used to tally the total number of AOBs determined by each surveying individual.

In 2019, a team of five visited Burhou on 29th July (after the puffins had left the island) for around 2.5 hours to conduct the end AOB survey. The team included the AWT's Ramsar Officer, Avian Ecologist, Conservation Officer and placement volunteer, in addition to a seabird expert from Jersey National Trust. Due to limited resources and to minimise time on island, the team focused on four areas of Burhou (below Burhou Hut where the cameras observe, the south-eastern end of Burhou, the far east end of Burhou and the far west end of Burhou), historically known as sites with active puffin burrows.

Figure 2 outlines the areas surveyed and the number of AOBs determined in each area. A total of 182 AOBs were determined within the 4 survey areas, the majority of these (132) recorded at the south-east end of the island. However, it was noted that there were lots of burrows perfect for storm-petrels in this area and it was very difficult to distinguish between these and puffin burrows. 4 burrows recorded at the west end of the island were noted as possible puffin burrows, as again there was some uncertainty as they could have been storm petrel burrows.

A large amount of this uncertainty is thought to occur as there was very little guano, feathers, fish or egg evidence remaining at the burrows, therefore AOBs were determined largely on smell. As a puffin's scent is very similar to a storm petrel's this made determining if a burrow was occupied by a puffin as opposed to a storm petrel or a rabbit difficult. Unfortunately, there were two periods of heavy rainfall prior to the AOB survey (when puffins were thought to still be occupying burrows) which seem to have washed away much of the evidence. Due to this lack of evidence it is also possible the pufflings had fledged prior to these storms, however the one puffling observed fledging via the PTZ camera did so early in the morning on the 29th July (the same day as the AOB survey).

46 AOBs were counted within the area the puffin cameras view. This is higher than the highest number of successful burrows estimated from productivity surveys (31 successful burrows; 4.1.2.1.2). This is thought to have occurred as the AOB survey included burrows which were not observed by the cameras (down the slope, behind rocks or outside the survey views e.t.c.).

An AOB count of 182 is significantly higher than AOB surveys in previous years (Figure 3). This highlights the uncertainty associated with this survey.

During the AOB survey it was noted that there were a lot of storm petrel burrows at the east end of the island (evident by size and smell). Three deceased puffins were observed on the island during this trip with the cause of death unknown.



Figure 2 – Puffin Apparently Occupies Burrow Survey Areas and Numbers of Burrows Determined Occupied

Recommendations:

Due to a lack of resources and the abnormally large amount of puffincam footage this year it was difficult to review the recorded night videos within a timely manner. It is recommended that night-time recording of the burrows starts at the beginning of July. The footage must be reviewed every morning to pinpoint exactly when the puffins are fledging and ensure the AOB survey occurs at the earliest date possible, thus hopefully ensuring evidence of puffin occupation remains. Volunteers may help assist with this workload.

The trip to Burhou to ring storm petrels in mid-late July should be used to support puffin observations, with at least one suitably qualified surveyor present and the ringers supporting. Combining this activity with the ringing trip would reduce disturbance of carrying out the activity separately. This survey would help identify areas to assess with the post-season AOB survey.

4.1.2.1.6 Raft Counts

Early season raft counts (end of April to May) are thought to provide an estimate of the population of the breeding birds. A single rafting bird represents a breeding pair, as one individual from the pair will be incubating the egg within the burrow. Raft counts later in the season are important as indicators of potential recruitment as at this time non-breeders will have arrived to try and claim a burrow for the following breeding season. Some breeding pairs will also have failed by this time, causing both adults to raft on the water instead of just one. The end of season raft count (end of June to early July) is therefore a good indicator of the population health for the current year and future years.

Mid-April raft counts tend to be the most useful as they can be compared to previous years.

In 2019, raft counts were completed between the 20th March and the 29th July, either using the PTZ camera or opportunistically during boat tours and work on Burhou. The PTZ camera recorded rafts by panning across the puffin bay area, where most of the birds raft. The area of water immediately adjacent to Burhou was not observable using the camera, so puffins within this area will not have been counted. This method was advantageous as surveys could be completed more frequently. The recorded video footage could be reviewed at slower speeds, paused and re-wound and a hand counter could be used. In order to obtain accurate results, the footage was also able to be reviewed multiple times and an average count taken. It should be remembered that due to the sea conditions and puffins disappearing between waves, raft counts are more of an estimation than an exact figure.

The highest early season raft count this year was 150, recorded on the 18th April 2019. Thus, representing 150 breeding pairs or 300 breeding individuals. This represents an increase from 2018's highest early season raft count of 140 (Figure 3). The highest late season raft count was 191, recorded on the 11th July 2019. A raft count of 190 was recorded from the boat on the 5th July 2019, backing up this figure (see Appendix 6.3). This late season raft count is lower than 2018, when 203 rafting birds were recorded.

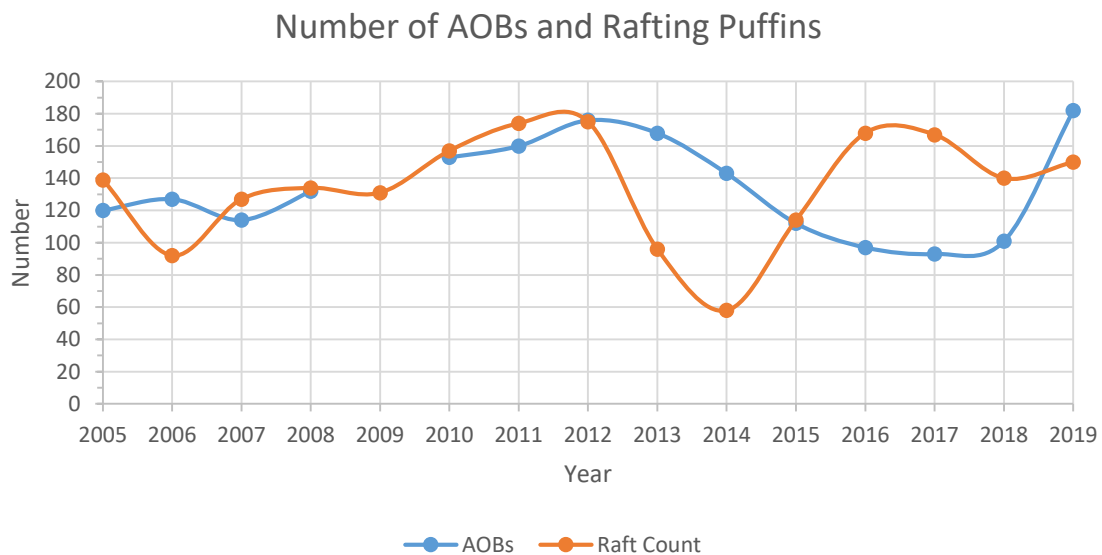


Figure 3 – Puffin Apparently Occupied Burrows (AOBs; 4.1.2.1.5) and Highest Early Season Raft Counts 2005-2019.

Recommendations:

The PTZ camera was an effective and easy method to record raft counts and should be utilised in 2020 and beyond, combined with counts from the boat and land.

4.1.2.1.7 Review of the Puffin Cameras and Their Use in 2019

As previously described, an aim of this year was to evaluate the use of the puffin cameras. While a principal objective of this was to determine if the cameras could be utilised for puffin productivity surveys, the below evaluation assesses the use of the cameras as a whole. In 2019, the cameras were used for puffin raft counts (see 4.1.2.1.6), puffin productivity surveys (see 4.1.2.1.2), opportunistic gull observations (see 4.1.2.1.4), opportunistic colour ring observations (see 4.6.1), opportunistic storm petrel observations (see 0) and opportunistic monitoring of the Puffin Friendly Zone (see 4.1.4).

Advantages:

A large advantage of the puffin cameras is the ability to record and review footage. Videos can be reviewed multiple times, at slower or faster speeds, paused, rewind, and even zoomed in using VLC software tools (VideoLan, 2019). This can make observations, particularly for puffin productivity, more accurate than on island observations. It also makes it much easier to follow individual puffins activity (as the footage can be reviewed multiple times focusing on an individual) and thus pick up connectivity (as shown in 4.1.2.1.3). The footage can also be used to extract key data, for example in 2019 pictures of every single burrow observed in use were obtained allowing comparison and easy reference. This also enabled a figure to be made depicting every burrow observed throughout the season (Figure 20). If the camera methodology and same burrow numbers are used in the future this would enable the productivity of individual burrows to be compared between years.

Utilising the cameras means that surveys do not cause any disturbance from human presence on island, which is a great advantage due to the presence of breeding shags, puffins, gulls and storm petrels. The island can also be observed 24/7, during any weather conditions (providing the camera quality is adequate). TeamViewer software (TeamViewer, 2019) enables the cameras to be viewed and controlled from anywhere with a sufficient internet connection. This enables more frequent observations/surveys and monitoring of the island. This was advantageous for observing species interactions on Burhou this year (see 4.1.2.1.4).

The ability to use the cameras at night, with the infra-red lights enables opportunistic storm petrel observations and the identification of a few burrows (see 0). It also enables the monitoring of select puffin burrows at night around the time of fledging. This enabled one puffling fledging to be recorded this year; however, with increased resources it is thought that this ability could be used more in the future.

The fantastic panning and zoom ability of the PTZ camera this year enabled a significant amount of lesser black-backed gull colour rings to be observed, contributing valuable data to the Guernsey Gulls (2019) database. This was a great unexpected ability of the camera. The PTZ ability was also very effective for carrying out raft counts within the puffin bay, by recording video footage zooming in and panning across the area. The review ability, as mentioned above, was greatly advantageous for this.

The PTZ ability was also fantastic for public engagement. Streaming and controlling the PTZ camera live in the AWT information centre, allowing visitors to move the camera/moving the camera in order to show and explain things to them was great for engaging and educating people about Alderney, the Ramsar site and the wildlife within it. The PTZ camera was also set up to give a virtual tour at 4pm every day helping to increase views (viewer statistics in 4.1.1.2).

The PTZ camera also enabled monitoring of marine users' compliance with the Puffin Friendly Zone (see 4.1.4). Individual boats could be identified enabling the Alderney Harbour Office to monitor compliance and subsequently discuss the zone with non-compliant users which came into Braye Harbour. While observations were opportunistic in 2019, this could be improved in 2020 by setting up the PTZ camera to automatically record any boats which cross the PFZ line.

Organising the footage, naming every file according to its contents and adding every file to a master catalogue (excel sheet) was advantageous for organisation as the database could be searched, files which would be good for social media/public engagement could be highlighted and gull rings could easily be recorded.

Disadvantages:

A main disadvantage of using the PTZ camera for puffin productivity surveys was the fact the surveyor is observing a two-dimensional (2D) image. This makes the area look very different on camera vs in real life (especially due to the topography and angle of the camera). Unlike on island observations, it is impossible to change position to make observations at different angles/view behind rocks/down slopes e.t.c. Due to the position of the PTZ camera at a higher level, looking down towards the puffin burrows (positioned so to reduce potential problems and damage to the camera from sea spray) observations of puffins entering or exiting burrows are recorded if a puffin simply disappears. The actual entrance of the burrow is not observable. This makes it difficult to ascertain if a puffin is entering a burrow, is simply out of view in a topographical dip or remains hiding out of view just within/at the entrance of the burrow. However, if observations on land also occur from a higher elevation than the puffin burrows this problem would remain.

The depth of field is also difficult to determine due to the 2D image (note, moving the puffin pegs to form lines from the camera may help with this in the future). While photos of the area and observations of puffins, rabbits and gulls walking across the area can help to determine to topography and depth, this remains a difficulty of using the cameras, especially due to changes in vegetation and new burrows being dug.

Another large disadvantage of the 2019 system is the inability to observe outside of the camera view. This was particularly noticeable when completing puffin productivity surveys. For example, at times the puffins suddenly all darted into burrows; however, unless it occurred within the camera view it was impossible to determine what caused this action. This also meant that individuals which emerged from a burrow and walked out of the camera view could not be followed.

The camera set up currently does not include a microphone. This would be very useful for several reasons. Firstly, this would allow the surveyor to listen to activities on the island, including those originating from outside of the camera. This may help to determine events outside of the camera view, for example the reasons why puffins may all suddenly dart into burrows. Secondly, this would enable storm petrels calling within burrows to be heard which would greatly aid night observations of this species (see 0). Finally, Burhou is an extremely audio rich environment. Adding sound to the pictures would be a great addition for public engagement and education, helping to increase puffincam views and promotion of Alderney as a wildlife haven. 2019 puffincam viewers have highlighted that sound would be a great addition to the cameras. This would also enable Alderney to keep up with several competitive bird webcams which include sound.

The main problem with conducting puffin productivity solely using the cameras is that the sample is biased towards those burrows which can be observed by the camera. Several burrows were identified outside of the camera view and on other areas of the island (see 4.1.2.1.5). Unless multiple cameras can be set up to cover the whole of Burhou, it is impossible to monitor the whole puffin population with this methodology. While sampling techniques can be used so every burrow on the island doesn't need to be surveyed, as a minimum each different puffin area (see 4.1.2.1.5) needs to be included. In 2019, on island puffin productivity surveys were planned to be completed alongside the camera surveys to enable an estimated productivity of burrows outside of the camera view and compare results from the puffincam and on-island observations. These surveys were intended to be completed during ringing trips to the island, thus reducing the amount of visits and disturbance on Burhou. Unfortunately, this was not possible in 2019, however, it is highly recommended that this becomes a requirement in 2020.

When recording the puffin burrows at night, only a select number of burrows within the camera view can be monitored at a time, therefore without multiple cameras it's impossible to monitor every burrow. Viewing a select number of burrows does however gain some data and may give a suggested fledging time.

The final disadvantage of using the puffin cameras was the large amount of footage this created. In 2019, due to significant other events which took up a large amount of the AWT's Ramsar Officer's time, it was impossible to review puffin survey footage on the day it was recorded. While recording and reviewing the footage has great advantages, this takes significantly longer than on island observations. The recorded footage does also require storage (around 150GB in 2019); however, this author believes the large amount of information gained and use of the footage for public engagement largely outweighs this disadvantage. However, it does take time to review the footage, label it according to the contents and input it into the catalogue, for easy management/searching. To counter this a competent resident surveyor willing to dedicate several hours per day to reviewing and standardising this form of survey should be secured for 2020 to make the camera survey method viable.

Recommendations:

It is recommended a microphone is added to the cameras set up and the puffincam GDPR policy is updated to include sound.

Due to the time taken and difficulties monitoring puffin productivity solely using the PTZ camera, it is recommended a return to on island observations in 2020, with surveys wherever possible run during other visits to Burhou, including during the gull and petrel ringing trips, to minimise disturbance. Burrows should be numbered the same as in 2019 to enable comparisons between years and accumulative evidence of connectivity e.t.c.

The cameras were a very valuable asset for completing raft counts, puffling fledging, gull and storm petrel observations and should be continued for this use in 2020. The recruitment of volunteers to help review night footage and record fledging puffins in a timely manner is recommended. This would then supplement the surveys and help ensure the AOB survey is completed on the optimal date.

The puffincam footage master catalogue should be maintained in 2020 and beyond.

4.1.2.2 Northern Gannet Monitoring and Productivity

On 3rd February about 100 northern gannets (*Morus bassanus*, hereafter 'gannets') were seen gathered on the water in the Swinge between Les Etacs and Ortac. This observation marked the initial return of the birds to the two colonies. More birds arrived in the following days and by 9th February +1000 Gannets were circling Les Etacs with a smaller number over Ortac. On 10th February the first had settled on the rocks and the breeding season had begun.

Productivity was assessed following the methods outlined in previous Ramsar reports (available at AWT, 2019c). A sample of nests on Les Etacs were selected for observation from an observation point at the western end of Alderney. These were then watched throughout the breeding season (observations from 3rd February to 2nd November, with photo surveys starting on 11th April) to assess their outcome and the overall breeding success (no. of chicks fledged). Observations were undertaken at regular intervals (between 5-10 days) and data recorded either in situ using a telescope or via photographs taken using a camera with a long telephoto lens. Overall productivity was calculated as the number of nests that successfully fledged a chick divided by the number of

nests under observation. This value was then used as a likely proxy for the productivity of the whole colony.

Three hundred and thirty nests were sampled from various points around the colony (Figure 4 and Figure 5). Of these 173 successfully fledged a chick giving a productivity of 0.52. This value sits within the range recorded since 2013 (Figure 6). However, it's likely all these values are underestimates of the actual productivity. This is because true productivity equals the number of fledged chicks per nest divided by the number of eggs laid, not the number of nests observed, and an unknown proportion of gannets do not lay in each year. In any given year the proportion of non-layers can be as high as 20% (Nelson, 2002). Consequently, our assessment of productivity so far has likely been an underestimate of the real value.

To better assess productivity this year we attempted to establish the number of non-layers in our sample of observed nests. We did this by starting our observations earlier in the year so that we could monitor nest attendance behaviour more closely during incubation. Birds were deemed non-layers if they did not show consistent presence at the nest or brooding behaviour over the six-week period required for incubation. Using this method, we deduced that 36 of our sampled nests were likely not laid in. Assuming all the other nests in the sample had eggs the adjusted productivity improves to become 0.59 and may better match the real value (Table 3).

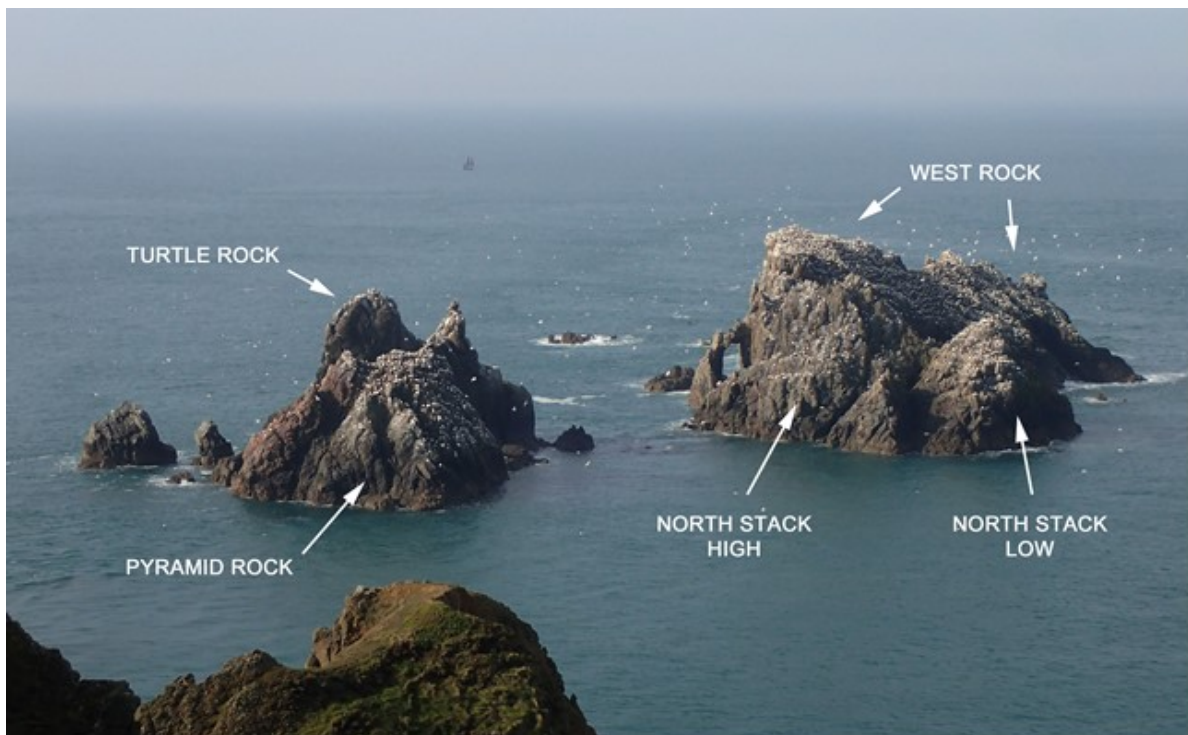


Figure 4 – The nomenclature used to describe the four stacks that comprise Les Etacs gannet colony.

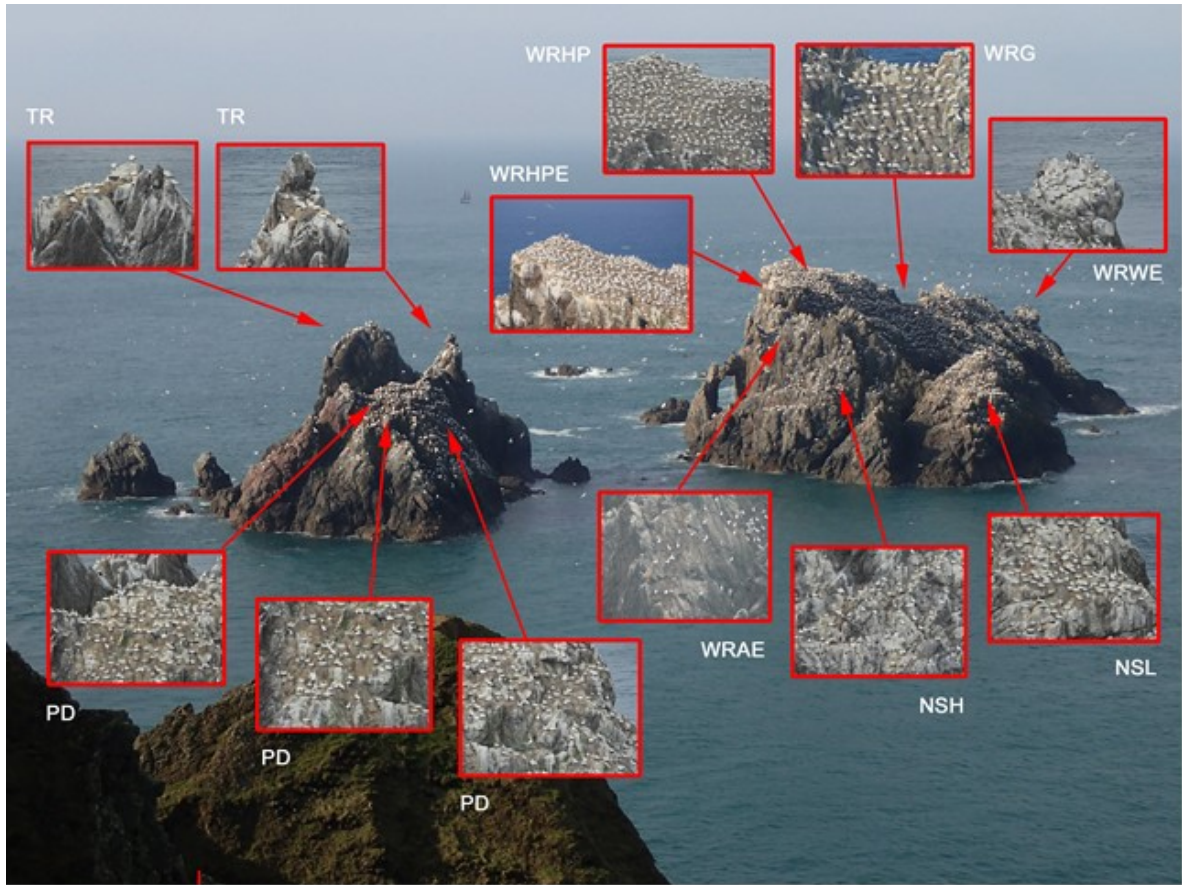


Figure 5 – The sample points from where productivity was assessed on Les Etacs; PD = Pyramid Rock; TR = Turtle Rock; NSH = North Stack High; NSL = North Stack Low; WRAE = West Rock Arch End; WRWE = West Rock West End; WRG = West Rock Gully; WRHP = West Rock High Plateau; WRHPE = West Rock High Plateau Edge.

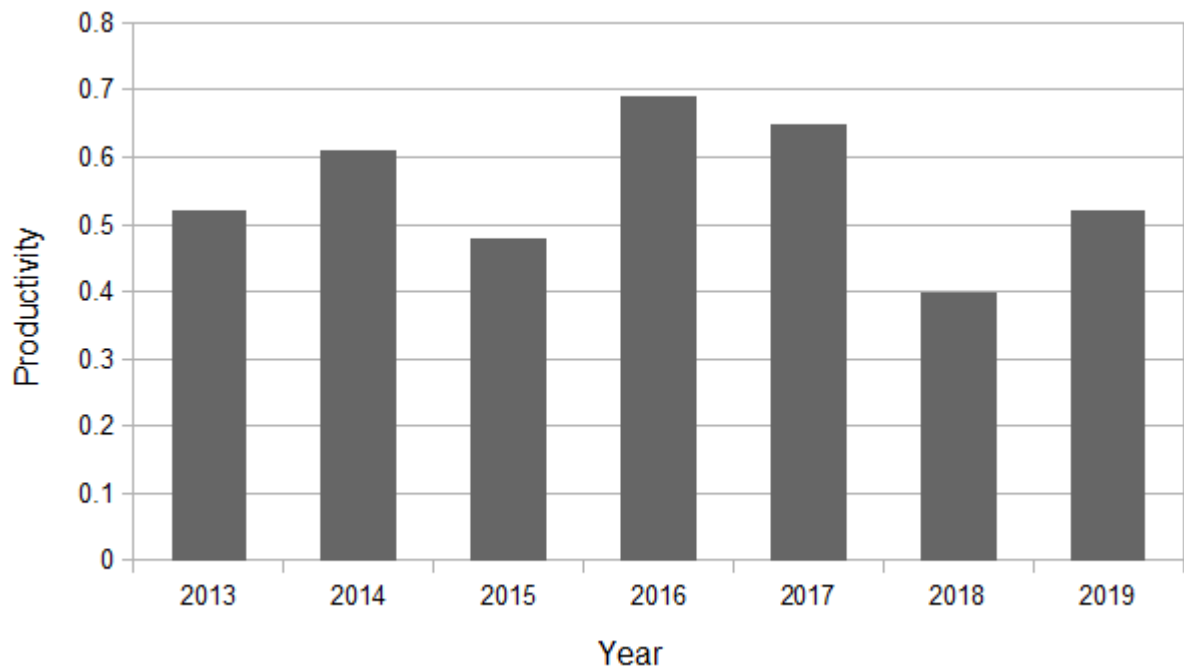


Figure 6 – Gannet Productivity Since 2013.

A recently hatched chick is only rarely seen if an adult stands up over it, changes place with its partner or feeds it. The remainder of the time it is closely brooded and not visible. Only in their 3rd week do chicks become too large to be fully covered by a brooding adult (Nelson, 2002) and therefore more easily seen from afar. From this age on it was possible to count them and so more confidently monitor growth and survival. Furthermore, as gannet chicks grow they undergo rapid changes in size and plumage. The rate of these changes occurs fairly homogeneously such that it's very possible to age a chick to the nearest week by its appearance alone. The appearances of the chick at each week after hatching are described by Nelson (2002) up to +11 weeks old by which time most have acquired their 1st year juvenile plumage. Using Nelson's description as a guide we followed the progress of each chick until they fledged (usually in their 13th week at around 90 days old) or were lost.

Of the 121 nests that likely laid but did not fledge, just 27 lost a chick between its 3rd and final week before fledging (Table 3). The significant remainder (n=130) were either unable to hatch their eggs or lost them or their recently hatched chicks for unknown reasons. Ravens, crows and sometimes larger gulls were occasionally seen patrolling the colony and may have predated some. Others eggs or small chicks may have been lost through starvation or parental incompetence. First time and inexperienced breeders sometimes inadvertently crush their own young as it hatches (Nelson, 2002).

Of the 27 chicks lost from their 3rd week 17 died for unknown reasons but one died because it became entangled in orange filament netting (used as nesting material) and was unable to be fed (the impact of plastic and marine debris on the birds is examined further in 4.1.3). The other nine perished following periods of stormy weather (with winds between beaufort 6-7). All these chicks were around 5-6 weeks old when they are near maximum weight but also becoming more mobile and exercising their wings with greater vigour. At this age their size and ungainliness makes them especially vulnerable to high winds particularly if their nest is close to a ledge. In fact, the earliest hatched chick from our sample perished in this way following a storm in June. In cool, wet and windy weather large chicks are also vulnerable to chilling as their down is not waterproof and they cannot be brooded effectively (Nelson, 2002).

Productivity varied across the colony ranging from 0.41-0.75 (adjusted for non-layers) between the sampled locations (Table 3). Nest location likely affects productivity as older and more experienced breeders tend to cluster in the centre of nest aggregations (Nelson, 2002). However, the comparatively low productivity found at the centre and top of Les Etacs (0.51), on the high plateau of West Rock (c.f Table 3 and Figure 5) was unexpected. How nest location affects breeding success on Les Etacs warrants further investigation. If differences in productivity are consistently different between nest locations, they could be better elucidated if the nests watched this year were monitored again over several years.

At monitored colonies around the U.K. productivity has changed little since the mid-1980s and generally varies between 0.6-0.9 chicks per breeding pair (JNCC, 2019c). Since 2013 productivity at Les Etacs lies at the lower end or just below these figures, c.f. Figure 6. Nevertheless, the numbers of gannets nesting on Les Etacs and throughout the UK has increased over the same period (JNCC, 2019c). Its therefore likely current reported levels of productivity can maintain the population although immigration from birds bred elsewhere maybe also be important.

Table 3 – Variation in gannet productivity between the sampled sub-populations on Les Etacs in 2019 (c.f. Figure 4 and Figure 5) showing productivity = fledged chicks/sample (as reported in previous years) and the adjusted productivity that takes into account probably non-layers; * = refers to the number of nests where no egg was probably laid based on the gannets nest attendance behaviour.

Site	Sample (n)	No. Fledged	Proportion fledged	No lays*	Adjusted proportion
Turtle Rock	20	12	0.6	1	0.63
The Pyramid	86	51	0.59	9	0.66
North Stack High	26	10	0.38	6	0.5
North Stack Low	30	18	0.6	6	0.75
West Rock - west end	10	5	0.5	1	0.56
West Rock - the gully	34	19	0.56	3	0.61
West Rock - high plateau centre	70	32	0.46	7	0.51
West Rock - high plateau edge	30	12	0.4	1	0.41
West Rock - arch end	24	14	0.58	2	0.64
Totals	330	173	0.52	36	0.59

Nest location may affect productivity on Les Etacs in a different manner to other larger less precipitous gannet colonies. This is because the four stacks comprising the colony provide little space for large aggregations of nests on level terrain. Many nests lie adjacent to ledges or steep drop offs and these nests may be more vulnerable to predation and extreme weather. Indeed, the proximity of nests to ledges or topographical drop offs appeared to reduce the chance of breeding success. If the sampled nests are divided between those located at an 'edge' from those separated from an 'edge' by at least one other nest we find an effect on productivity. Nests located at an edge lost more chicks and were less successful, X^2 (d.f. = 2, n = 294) = 7.14, $p=0.03$ (Table 4).

Table 4 - The breeding success at nests next to ledges or topographical drip offs (edges) and those inset from them and/or on less steep ground; * = Observed chick losses, typically from 3rd week or older; ** = Failed nests that likely had eggs that did not hatch or lost chicks soon after hatching.

Nest loci	sample (n)	Fledged	Chick fail*	Other fail**	No lay
Edge	144	68	18	41	17
Non-edge	186	105	9	53	19

Peak fledging occurred in early September with corresponding peak laying and hatching occurring in late April and mid-June, respectively (assuming a mean fledging period of 90 days and mean period of 44 days incubation, see Robinson, 2005; Figure 7). The earliest chicks seen were laid on the Pyramid Rock (c.f. Figure 4 and Figure 5) and would have likely hatched in the 1st week of May having been laid in the 3rd week March but these perished following some stormy weather in June.

The main departure from the colony occurred on 14th October but this did not quite mark the end of the breeding season as 20 chicks were left behind. These were not abandoned by their parents although they were attended much less. Interestingly none of these late nesting parents showed normal attendance behaviour by taking it in turns to defend their chicks or nest site. All returned to sea soon after feeding their chicks and did not to linger at the colony (pers. obs. Justin Hart). Despite their predicament all the late chicks eventually fledged except one that died entangled in netting. The last two chicks fledged on 31st October.

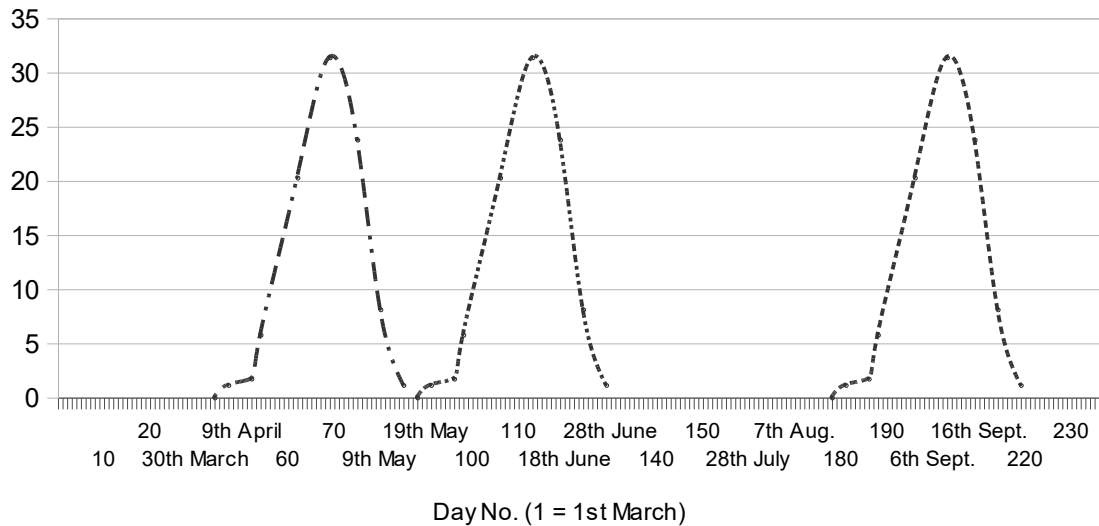


Figure 7 – Peak laying, hatching and fledging periods of all sampled nests that fledged chicks on Les Etacs in 2019; 3 dashes and 2 dotted line = proportion of nests laid; 3 dashes and 3 dotted line = the proportion of nests hatched; single dotted line = the proportion of nests with fledged chick.

The numbers of gannets nesting on Les Etacs and Ortac were not counted this year. A census of both gannet colonies occurs only once every five years in accordance with the Ramsar strategy and the next is scheduled for 2020.

Recommendations:

Early season observations should continue to help elucidate if behavioural clues can be used to identify non-laying pairs and therefore assess true productivity with improved accuracy.

It is recommended the results from 2019 are used to select samples from the 4 stacks (selecting a similar number of nests from each stack c.f. Figure 4 and Figure 5) and these selected nests are followed through the next 5-year Ramsar Strategy. This improved survey design would enable more robust data and statistical analyses to be carried out. Within year comparisons between locations could be compared in a contingency table using a simple chi squared test and multi-variate statistics could be applied to the data at the end of the next 5-Year Strategy. This would help elucidate the effects of location, pairs, year, laying date etc. on breeding success.

The ability to monitor productivity on Ortac has been largely discussed this year. It is thought that this could be achieved using photographic techniques. Photographs taken from a boat combined with drone photography (to view the top of the colony) would enable an estimation of productivity. Entangled individuals should be recorded along with such productivity surveys (see 4.1.3.2). This would be largely beneficial to help inform the timing of tagging and ringing trips to the colony based on the development stage of the chicks. A comparison between Les Etacs and Ortac would also be valuable, especially as historical observations have identified differences in the arrival and departure times of the two colonies.

4.1.2.3 Northern Fulmar Monitoring

Alderney's Northern fulmars (*Fulmarus glacialis*, hereafter 'fulmar') occupy sites on the sea cliffs at the western end of the island, the south-west coast and on Coque Lihou. Birds have also been seen prospecting the coastline between Corblet's point and Cat's bay at the north-east end of the island. To establish the number breeding we undertook shore based counts from the cliff-tops and two round-island boat surveys carried out on 17th May and 19th June.

Most, if not all the breeding birds, occupied the cliffs between Hanaine bay and the bay of Trois Vaux and it was from here that productivity was assessed using the same method employed in previous years. Productivity was calculated as the number of fledged chicks divided by the number of apparently occupied sites (AOS). Site occupancy was recorded either in situ using a telescope or from photographs taken with a telephoto lens. Sites were monitored through the season by undertaking repeat observations to record their contents and outcome.

As observations were made from afar and Fulmars often sit for prolonged periods at preferred 'perch points' on the cliffs it is difficult to determine whether a sitting bird is incubating an egg or not. To determine which sites were being used as nest sites we therefore made four repeat counts between 25th May and 14th June when all the nesting birds would have laid. Sites that had birds consistently present and sitting from within this period were deemed to be nesting and were designated as an AOS. Thereafter observations were made every 10 days until the last chicks had fledged.

Fifty-one 'perch points' were regularly used by Fulmars on the cliffs between Hanaine bay and Trois Vaux. Of these 31 were identified as nest sites (AOS). Sixteen sites failed to hatch their eggs or lost a chick soon after hatching i.e. before they became visible from afar and could be counted. One site lost its chick in mid-August when it was in its 3rd or 4th week, probably in strong winds or through predation. The last fulmar chick to fledge went to sea between 2nd and 9th September.

During the first boat based counts an additional four likely AOS were also seen. Two of these were on the south cliffs of the mainland and two on Coque Lihou. However, on the second boat survey no signs of presence were found so their outcome was uncertain. If we assume these sites were not used to nest then the total breeding population was 31 AOS with a productivity of 0.45. We can also deduce that the number of fulmars breeding on Alderney has remained stable and the level of productivity was an improvement on the last two years although it lay below that seen prior to 2014 (Figure 8).

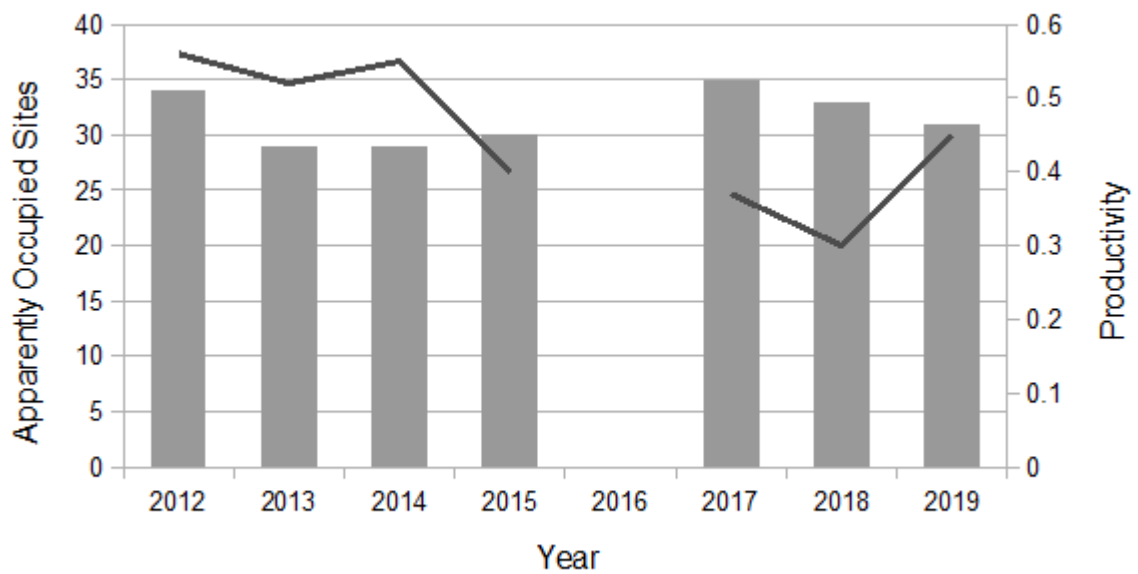


Figure 8 - Fulmar breeding population size and productivity since 2012. The grey bars indicate the no. of apparently occupied sites (AOS) and the dark grey line links annual productivity between years. Data obtained in 2016 were not comparable and are not shown here.

In an international context, Alderney's fulmars are doing well. The UK population of Fulmars has been in a slow decline over the last 20 years. This is attributed to a change in food availability and probably reflects a decline in available offal or fishery discards over the same period. Productivity declined too. Nevertheless, the number of Fulmars nesting around Alderney has remained stable and productivity this year was higher than the UK mean of 0.39 chicks per nest (derived from data 1986-2008; JNCC, 2019a).

Recommendations:

Continue monitoring in 2020 and beyond.

4.1.2.4 Common Terns

A small colony of common terns (*Sterna hirundo*; 20-30 pairs) has nested on Houmet de Pies, a rocky promontory on the west side of Saye Bay on the north coast of Alderney, for several years (at least since the Ramsar designation). However, this year the site was abandoned and, although 20 birds were seen prospecting the site on 6th June none settled to nest. Instead five pairs relocated to the rocky promontory on the east side of Saye bay and at least one pair was sitting on eggs there on 21st June. Unfortunately, this was predated soon after and no birds were present on 23rd June or seen thereafter. However, over the same period another lone pair had also settled on the rocky headland north of Fort Corblets and was found sitting on three eggs on 19th June. Two of these later hatched around 30th June and, despite their isolation, both chicks successfully fledged on 21st July.

The abandonment of Houmet de Pies this year was a disappointment given the successful implementation of rat control imposed last year (see AWT, 2019e) and continuation of this programme this year (see 4.2.1). Nevertheless, it's not entirely unexpected given the ethereal nature of this species' nest site selection behaviour.

As mentioned in 4.2.3, rat control on both Houmet de Pies and the new site on the east side of Saye Bay should continue as it's still very possible either or both sites could be used to nest next year.

Recommendations:

Continue monitoring and associated rat control in 2020 and beyond.

4.1.2.5 Ringed Plover

This year four pairs of ringed plover (*Charadrius hiaticula*) bred around Alderney's northern coastline. All nesting attempts occurred on beaches and promontories traditionally used in previous years including Saye Bay, Clonque Bay and Platte Saline. Nesting began in mid-April on Platte Saline and finished at the end of July in Clonque Bay when the latest brood of chicks were last seen.

One pair made two nesting attempts on the beach at the western end of Platte Saline before moving into Clonque Bay to try a third. Their first clutch was found with 4 eggs on 19th April but lost an egg to predation (probably rats or hedgehog) and was abandoned by 26th April. Their second attempt, a clutch of 3 eggs, was then relaid around mid-May. This survived until 6th June when another egg was lost from the clutch (probably due to rat or hedgehog predation) and it too was abandoned. The pair then re-located to Clonque bay (no further nesting attempts were made on Platte Saline) and laid a 3rd clutch of 4 eggs in the first week of June. These all hatched on 22nd July and were ringed (by Justin Hart on behalf of the ABO) the following day. All four chicks fledged successfully in the 3rd week of July.

Another pair nested on the edge of the rocky promontory on the north-eastern side of Saye Bay and made two nesting attempts. Their first clutch of 4 eggs was laid at the beginning of May. Three chicks hatched on 22nd May and two of these were caught and ringed on 23rd (by the ABO). All the chicks survived until at least 6th June but did not fledge. One chick was likely lost by 11th June when only two were seen but none were found thereafter. Although close to fledging, it's likely these chicks were predated (probably by crows/gulls). Nevertheless, the parents quickly relaid and were incubating a replacement clutch of 4 eggs on 23rd June. Although this clutch also survived to hatch (on 15th July) the chicks were predated soon after. By 17th July the chicks had gone and the parents abandoned the site soon after.

Initially two pairs of ringed plover attempted to nest in Clonque Bay but these were later joined by a third pair that had previously nested on Platte Saline with no success (see above). Of the two initial pairs one chose to nest on the beach near the Fort Tourgis or eastern end of the bay, the other pair closer to the Fort Clonque or the western end of the bay. The third pair settled in the bay in between.

The 'Fort Tourgis' pair made two nesting attempts. They began to breed late and laid their first clutch of 3 eggs in mid-May. This clutch did not hatch and was abandoned in early June probably following some disturbance by recreational fishermen. Their replacement clutch of 4 eggs was laid in late June and these hatched on 17th or 18th July. Three of the four chicks were ringed (by Justin Hart on behalf of the ABO) on 19th July. At least two of these chicks survived until 31st July but none could be seen on 4th August and all were likely predated (probably by crows/gulls or birds of prey).

The 'Fort Clonque' pair of ringed plovers were not detected until late in the season when they had two chicks more than two weeks old on 31st July. These were in a difficult part of the bay to observe

but were assumed to have fledged as volant juveniles were seen in their vicinity in early August. It is not known if this pair had made any nesting attempts in the same location earlier in the year.

Ringed plover productivity can be quoted in several ways, either as the number of chicks fledged per pair, per nesting attempt or per egg laid, Table 5. Productivity expressed as the number of chicks fledged per nesting attempt or per egg was higher than in the previous two years but productivity per nesting pair was the same as last year and only a little higher than 2016 (Table 5). Clutch survival (or the likelihood a clutch will hatch) was much higher this year and this was probably because most pairs eventually nested in Clonque Bay where clutch survival is much higher than in Saye Bay or Platte Saline (Table 6).

Due to recent population declines ringed plovers are a red-listed species in the UK and of conservation concern (Robinson, 2005). The species naturally suffers low productivity due to the risky nature of its ground nesting behaviour (Cramp and Simmons, 1983). Although the productivity we recorded is often typical for the species it would be beneficial to improve nest survival and productivity to help the regional population recover.

*Table 5 – Ringed Plover Nest Survival Probability and Productivity 2017 – 2019; No. = number * = Probability that a clutch would survive to hatch based on Mayfield (1975).*

Year	No. of Pairs	No. of Nests	No. of Eggs Laid	Chicks Fledged	Productivity			Nest Survival*
					Chicks per Pair	Chicks Per Nest	Chicks per Egg	
2019	4	8	30	6	1.5	0.75	0.20	62%
2018	4	9	33	6	1.5	0.66	0.18	30%
2017	5	9	36	4	1.25	0.44	0.11	29%

*Table 6 – Ringed Plover Survival at Each Breeding Site (data pooled between years 2017 – 2019); n = number; * = Probability that a clutch would survive to hatch based on Mayfield (1975).*

Site	Sample (n)	Nest survival*
Clonque Bay	10	71%
Platte Saline	8	6%
Saye Bay	5	57%
Crabby Bay	1	0%

Recommendations:

Improved protection of ringed plovers during the nesting season would be beneficial to attempt to improve productivity and thus the regional species population. The birds have had the most success in Clonque Bay, therefore, initially targeting Clonque restricting dog walkers and fishing activities on this beach between April and July would be beneficial. In order to be successful, this would require action by the States of Alderney (designation of specific protection measures) supported by stakeholders and the public. An engagement and education programme before implementing such a change, giving people the opportunity to voice concerns and opinions would be beneficial. The local community should feel empowered to make positive changes to protect species, rather than isolated and ignored by trying to force changes.

Further investigation of why there is such low breeding success would also be beneficial. It is recommended dog walking is monitored using fixed/timed observations on all breeding beaches (Platte Saline, Clonque (if the above recommendation is implemented this would also monitor compliance) and Saye), with the aim to determine how many dogs are walked on the beach per hour and calculate risk. Monitoring all breaches would allow a comparison of disturbance and/or risk of trampling to be determined. Camera traps should also be set up at night to determine if rats/hedgehog predation is a problem.

4.1.2.6 Seabird Census Boat Surveys / Other Seabirds

Two round-island boat surveys were carried out on 17th May and 19th June to estimate the breeding numbers of other seabirds (including cormorant, shag, gull species and auk species) nesting on Alderney's south coast cliffs and islets, Burhou, Little Burhou and the outer islets of Renonquet and the Nannels. Additional counts were also made from the south cliffs on the mainland. These primarily comprised counts of auks that were nesting on Coque Lihou, the Twin Sisters stacks and Les Etacs. Productivity of these species was not measurable.

4.1.2.6.1 Shag

Shags (*Phalacrocorax aristotelis*) nest throughout the archipelago except along the northern coastline of the mainland. The highest count was obtained during the June boat trip when 119 Apparently Occupied Nests (AON) were counted around Alderney's south coast cliffs and islets (Table 7). An additional 20 AON were counted on Burhou and Little Burhou, Table 8. The highest concentrations of nests occurred around the south-western end of the mainland between Hanaine bay and Telegraph bay and on Coque Lihou (Table 7). Too few data are available from previous years to determine any trends in numbers but this year's counts compare favourably with last year's round-island survey count of 100 Shag AONs.

4.1.2.6.2 Cormorant

Between 5-10 cormorant (*Phalacrocorax carbo*) pairs normally nest in a small colony on Little Burhou each year. Cormorants nest early in the spring and an accurate assessment of the breeding population is usually made in late April during an expedition to ring the chicks. Cormorants are a green listed species and therefore the need to closely monitor this population was thought to be low when considered against the need to reduce disturbance on the breeding bird colonies. In 2019, the cormorant population was assessed during the second boat trip in June, which is after the cormorants would have fledged their young. 12 birds were seen on Little Burhou (Table 8).

4.1.2.6.3 Great Black-Backed Gull

This large gull breeds in small numbers throughout the archipelago. Eleven AON were found around Alderney and the south coast islets, six were on Burhou (Table 7 and Table 8). Nests were well spaced around the islands but 2-3 pairs nested in close proximity on Fort Les Hoummeaux Florains and Houmet de Pies. Since 2005 the numbers of great black-backed gulls reported breeding each year has varied markedly ranging from one in 2013 to 23 in 2010 and 2011.

4.1.2.6.4 Lesser Black-Backed Gull

The majority of Alderney's lesser black-backed gulls nest within the Ramsar site in a large colony on Burhou but 34 AON were also found around Alderney's coastline and offshore islets (Table 7). The number of likely pairs nesting on Burhou was unable to be assessed during a chick ringing this year.

4.1.2.6.5 Herring Gull

Nesting herring gulls are widespread around the coast of mainland Alderney with smaller numbers also occupying the south coast islets and the lesser black-backed gull colony on Burhou. Most are fairly widely dispersed around the island but higher concentrations of nests occur on the sea cliffs at Hanaine Bay and in Godfreys Bay (Table 7). A total of 81 AONs were counted around Alderney and the south islets. This figure was substantially lower than the previous counts of 285 and 315 AON reported in 2000 and 2014, respectively. Although the decline has been rapid over the last five years the drop in numbers reflects the on-going decline of this species' coastal populations (JNCC, 2019b) and may reflect changes in refuse management locally and in France.

4.1.2.6.6 Guillemot

This species nests primarily on Coque Lihou but some also breed among the gannets on Les Etacs and perhaps with Razorbills on the Twin Sister stacks. Guillemots (*Uria aalge*) nesting on Coque Lihou and the Twin Sisters are hard to census. The nest locations are largely hidden from view on the southern side of the islets and/or within deep crevices and overhangs. Therefore, counts of the number of birds rafting on the water near these sites were used to estimate their numbers. In contrast, most of the nest locations on Les Etacs occur on North Stack High (see Figure 4) and can be observed from the mainland in situ using a telescope or from photos taken through a long telephoto lens. These birds' nesting status could be observed and counted directly.

Peak counts were obtained from observations made from shore in April. On 17th April 138 guillemots were seen rafting around Coque Lihou (Table 9). The highest number of guillemots seen around the Twin Sister stacks was three on 19th June (Table 7). The high counts in April occurred in the pre-laying period before many birds would have laid eggs and settled at their nest sites. The April counts therefore probably represent good estimates of the total population and the number of breeding pairs is probably more or less equal to half the number seen during these counts.

On Les Etacs the highest count of guillemots was 69 seen on 12th April, Table 9. Although 50-60 guillemots were regularly counted on the rocks between May and early June observations suggested only 20-30 birds had laid or hatched chicks and only one chick was observed, seen close to fledging on 29th June.

Breeding success on Les Etacs was probably low as few chicks were seen. More frequent observations through the chick rearing period would help elucidate productivity there in the future. Predation may have had significant impact as crows, gulls and ravens were often seen prospecting the site and predated Guillemot eggs were found on the adjacent mainland.

4.1.2.6.7 Razorbill

Razorbills (*Alca torda*) were hard to census for the same reasons as guillemots. Most bred among rock crevices on the Twin Sister stacks but smaller numbers occur on Coque Lihou, and Les Etacs. Two were also seen rafting close to L'Etac de la Quoire during the boat survey on 17th May. The highest counts were made from shore on 17th April when 73 Razorbills were seen rafting around the Twin Sister stacks and 19 around Coque Lihou, Table 9. As for the guillemots (see 4.1.2.6.6 above) these numbers probably represent estimates of the total population (not breeding pairs or the number of nests).

On Les Etacs, the highest number of razorbills seen was three on North Stack High (Figure 4) on both 10th May and 4th June (Table 9). At least one pair were seen allo-preening and probably nested there.

Recommendations:

Seabird boat surveys are a rotational objective of the five-year management plan (AWT, 2016). However, if resources are available the data obtained from surveys is very valuable, especially if this can be done every year. Linking seabird boat surveys with required marine mammal surveys (as done in 2019) vastly reduces the base boat cost of this work item.

As stated above, more frequent observations of guillemots on Les Etacs throughout the chick rearing period is recommended.

Table 7 – Boat-Based Round Island Breeding Seabird Surveys Conducted in 2019 around Alderney and the South Coast Islets; * = Counts represent either AOS = Apparently Occupies Sites, AON = Apparently Occupies Nests or IND = individuals; # = to obtain the complete estimate of the breeding population refer to the individual species in this document; LBBG = Lesser Black Backed Gull; GBBG = Great Black Backed Gull.

		Alderney and South Coast Islets (not including Les Etacs).											
		Alderney - mainland		Twin sisters		L'Etac de la Quoire		Coque Lihou		Rousset		Totals	
Species	Count*	17/05/2019	19/06/2019	17/05/2019	19/06/2019	17/05/2019	19/06/2019	17/05/2019	19/06/2019	17/05/2019	19/06/2019	17/05/2019	19/06/2019
Seabirds													
Fulmar#	AOS	15	30	0	0	0	0	2	2	0	0	17	32
Cormorant	IND	0	0	0	0	0	0	0	0	0	0	0	0
Shag	AON	55	72	8	6	7	11	29	28	1	2	99	119
Herring gull	AON	70	68	2	2	7	10	1	1	0	0	80	81
LBBG	AON	11	13	1	5	1	4	5	11	3	1	18	34
GBBG	AON	7	8	0	2	0	0	0	0	1	1	7	11
Common Tern#	AON	0	1	0	0	0	0	0	0	0	0	0	1
Guillemot#	IND	0	0	0	3	0	0	59	21	0	0	59	24
Razorbill#	IND	0	0	21	31	2	4	43	4	0	0	66	39
Puffin#	IND	0	0	0	0	0	0	0	0	0	0	0	0
Other species													
Peregrine	AOS	0	1	0	0	0	0	0	0	0	0	1	0
Grey seal#	IND	0	1	0	0	0	0	0	0	0	0	0	1

Table 8 – Boat-Based Round Island Breeding Seabird Surveys Conducted in 2019 Around Burhou and Other Islets; nc = no count; P = Present; * = Counts represent either AOS = Apparently Occupies Sites, AON = Apparently Occupies Nests or IND = individuals; # = to obtain the complete estimate of the breeding population refer to the individual species in this document.

			Burhou and the outer islands (not including Ortac).					
			Burhou (Little Burhou)		Renonquet and Nannels		Totals	
Species	Count*		17/05/2019	19/06/2019	17/05/2019	19/06/2019	17/05/2019	19/06/2019
Seabirds								
	Fulmar#	AOS	nc	0	nc	0	nc	0
	Cormorant	IND	nc	12(12)	nc	0	nc	12
	Shag	AON	nc	20(6)	nc	0	nc	20
	Herring gull	AON	nc	P	nc	P	nc	-
	Lesser black-backed gull	AON	nc	P	nc	P	nc	-
	Great black-backed gull	AON	nc	6(3)	nc	0	nc	6
	Common Tern#	AON	nc	0	nc	0	nc	0
	Guillemot#	IND	nc	0	nc	0	nc	0
	Razorbill#	IND	nc	0	nc	0	nc	0
	Puffin#	IND	nc	68	nc	0	nc	68
Other species								
	Peregrine	AOS	nc	1	nc	0	nc	1
	Grey seal#	IND	nc	2(2)	nc	3	nc	5

Table 9 – Land Based Counts of Guillemots and Razorbills in 2019 (observed from mainland Alderney cliff tops); Peak counts in **bold**; inc. = including; Est. = Estimated

Site	Date	Guillemot (GU)	Razorbill (RZ)	Notes
Coque Lihou	07/04/2019	125	0	Rafting
	17/04/2019	138	19	Rafting (including 4 GU seen on rocks).
Twin Sisters	07/04/2019	0	42	Rafting
	17/04/2019	1	73	Rafting
	29/04/2019	1	37	Rafting
Les Etacs (North Stack High)	12/04/2019	69	0	Occupying rockface.
	14/04/2019	43	0	On rockface.
	18/04/2019	62	0	On rock face.
	30/04/2019	50	0	On rock face.
	10/05/2019	63	3	On rock face. Est. 28 likely on eggs. All RZ rafting.
	13/05/2019	61	2	On rock face (inc. RZ). Est. 25-30 on eggs.
	27/05/2019	51	0	On rock face. Est. 25-30 brooding or guarding chicks
	31/05/2019	59	0	On rock face. Est. 25-30 brooding or guarding chicks
	04/06/2019	62	3	All on rock face. Est. 25-30 brooding or guarding chicks
	14/06/2019	57	0	On rock face. 19 guarding chicks
	24/06/2019	32	0	On rock face. 10 guarding chicks
	29/06/2019	25	0	On rock face. 1 chick seen ready to fledge, <10 guarding.
	04/07/2019	17	0	No chicks seen.
11/07/2019	0	0	No auks present.	

4.1.3 Researching the Impact of Human Debris on Gannets

Pollution of the marine environment with anthropogenic materials (including plastics) is a global issue that threatens marine species (IPBES, 2019). It is now well known that gannets incorporate anthropogenic materials into their nests, with the majority originating from fisheries (Bond *et al.*, 2012; O'Hanlon *et al.*, 2019).

On Les Etacs, virtually all nests that persist year on year are composed of some plastic debris. The quantity of nests affected likely makes the colony one of the worst afflicted within the species range (O'Hanlon *et al.*, 2019). Only a small proportion of nests, probably <10% appear plastic free and these seem to occur where the colony is swept clear by wave action each winter and new nests must be built each spring (Hart, pers. obs.).

Among the world's gannetries, Les Etacs' unusual location close to mainland Alderney (around 250m away) offers a rare opportunity to observe nesting gannets without the encumbrance and expense of travelling far offshore to do so.

Studies in 2019 were undertaken to investigate the incorporation and impact of marine debris on Alderney's gannet colonies. These included observations of material returns to the nest site (4.1.3.1) and entanglement and mortality (4.1.3.2), the performance of necropsies and ingestion studies (4.1.3.3) and post-season nest inspections (4.1.3.4).

4.1.3.1 Observations of Material Returns to the Nest Site

To investigate the extent of human debris incorporation into nests, in 2019 observations of material returns to Les Etacs were observed from adjacent mainland Alderney. Material returns were observed using a telescope or binoculars, counted and categorised into natural vs anthropogenic and major material types (as outlined in Table 10). A total of 15hrs and 10 minutes of observations were undertaken between the 29th April and 14th May 2019.

4 observations (0.21% of the total observations) of netting being carried to the colony were recorded, with no rope or other anthropogenic materials observed. 1864 observations (99.73%) recorded gannets returning with seaweed, gannets' natural nesting material (Table 10).

It should be noted that these results are likely to be influenced by the relative abundance of natural and synthetic material on the sea surface (Bond *et al.*, 2012). Studies at Grassholm, UK, have suggested positive selection of long, filamentous nest material due to its similarity to marine algae and suitability as a nesting material (Votier *et al.*, 2011).

The very small proportion of anthropogenic materials being returned to the colony is initially surprising considering the large amount of plastic materials observed. However, these observations indicate the addition of small amounts of marine debris each year which will accumulate at the colony and increase over time. This occurs as breeding gannets build their new nest on top of the previous year's nest site, creating pedestal nest structures. Unlike seaweed, manmade materials do not degrade and (unless washed away by rain or sea action) will remain on the colony for decades incorporated into nest structures. It is therefore the addition of nest materials every year, and the accumulation of these over decades which results in the large amount of anthropogenic materials observed on the colony today.

Table 10 – Observations of material collected and brought to the nest sit by gannets; * = cuttlefish bone; ** = strands of orange netting with seaweed; Netting often orange nylon from fishing activities while rope is often blue synthetic material.

Date	Watch		Natural		Anthropogenic		
	Start	End	Seaweed	Other	Netting	Rope	Other
29/03/2019	09:20	10:00	2	0	2	0	0
30/03/2019	08:00	09:00	59	0	1	0	0
31/03/2019	09:10	10:10	112	0	0	0	0
01/04/2019	08:15	09:15	263	1*	0	0	0
03/04/2019	09:15	10:15	136	0	0	0	0
08/04/2019	09:40	10:40	39	0	0	0	0
11/04/2019	09:25	10:25	131	0	0	0	0
12/04/2019	09:10	10:10	209	0	0	0	0
14/04/2019	09:15	10:15	55	0	0	0	0
15/04/2019	10:33	11:03	4	0	0	0	0
18/04/2019	09:25	10:25	194	0	0	0	0
30/04/2019	09:10	10:10	260	0	0	0	0
02/05/2019	08:55	09:55	148	0	1**	0	0
10/05/2019	08:10	09:10	89	0	0	0	0
13/05/2019	08:05	09:05	99	0	0	0	0
14/05/2019	08:30	09:30	64	0	0	0	0
Totals			1864	1	4	0	0

Recommendations:

Continued studies over the next few years would ascertain if these results can be replicated and enable the identification of trends.

4.1.3.2 Entanglement and Mortality

The extent of entanglement and resulting mortality at gannet colonies is little researched, with numbers of entanglement rarely reported (Votier *et al.*, 2011; O’Hanlon *et al.*, 2019). As previously mentioned, the ability to observe and monitor Les Etacs from mainland Alderney provides a unique opportunity to monitor entanglement at a gannet colony, following individual cases throughout the breeding season.

In 2019, observations of entanglement on Les Etacs were completed along with productivity surveys undertaken throughout the season (4.1.2.2). Entanglement instances were recorded, noting the date of the first observation, mortality status (dead vs alive), site (using the same nomenclature as outlined in Figure 4 and Figure 5), outcome (dead, escaped or unknown, noting the date if previously observed alive) and estimated age of the individual (adult vs estimated chick age). Photographs of every entanglement incident were taken.

Table 11 outlines recorded entanglement observations on Les Etacs in 2019. A total of 26 entanglement instances were recorded, involving 24 adults and 2 chicks (estimated 8-9 and 10-11 weeks old). Of these, 21 (19 adults and 2 chicks) undoubtedly resulted in mortality, 2 (adults) became disentangled and the remaining 3 (adults) entanglement outcomes are unknown.

While it is difficult to identify the material involved, estimations from pictures suggest 12 and 3 entanglements involved fishing line and synthetic rope respectively, with the remaining 11 cases unidentifiable. Identifying the body part that became entangled is equally difficult. However, estimations identified 14, 4 and 1 cases of entanglement around the neck, tarsi and breast and wings respectively, with the remaining 7 cases unidentifiable.

As observations were not undertaken every day, the exact number of days each individual was entangled for and days until death cannot be closely assessed. However, some birds were observed entangled alive for at least up to five days.

This total number of entanglements at the colony is likely to be an underestimate. From land it is impossible to view the whole colony, thus entanglement instances may have occurred in locations which could not be observed. Opportunistic observations of the colony while on the AWT boat were undertaken, however no new entanglement instances were identified using this method, likely due to the limited time available and pace of the boat.

It is interesting to note that most entanglement instances recorded involved adults, while records from Ortac (below) and other gannetries (Votier, *et al.*, 2011; supplementary material O'Hanlon *et al.*, 2019) suggest that many more chicks become entangled. It is thought that cases of chick entanglement are more difficult to observe from afar and thus all instances were not identified.

The last census of Les Etacs was undertaken in 2015, identifying 5,960 apparently occupied sites (Copping *et al.*, 2018), thus representing 5,960 breeding pairs or 11,920 individuals. Using this count, 21 deceased adults from entanglement in 2019 represents approximately 0.18% of the breeding adult population. The Les Etacs population annually increased by 2.3% between 2005 and 2015 (Copping *et al.*, 2018), thus it is unlikely that the current level of mortality from entanglement will have population-level consequences. However, it is worth noting this percentage of increase is not expected to persist much into the future as the colony is thought to be reaching its carrying capacity (Copping *et al.*, 2018). The results of the 2020 census will therefore be interesting to combine with entanglement records.

It is interesting to compare Les Etacs to Grassholm where the highest adult mortality between 1996 and 2010 recorded 20 deceased adults as a result of entanglement (in 1996), representing approximately 0.04% of the adult population (Votier, *et al.*, 2011). Similar to Alderney, 100% of nests at Grassholm are estimated to contain marine debris (O'Hanlon *et al.*, 2019); however, the smaller population of Les Etacs results in the population-level impact of entanglement being greater.

As the reported entanglements are believed to greatly underestimate chick mortality, estimating the percentage of the chick population which die from entanglement is not possible.

The Ortac gannetry is situated further out to sea (about 5km) from Alderney, consequently it is harder to undertake regular observations than Les Etacs. However, opportunistic records can be used to estimate entanglement at this colony.

Table 12 outlines reported cases of gannet entanglements on Ortac in 2019. In total, assuming the ABO and AWT reported different deceased individuals, 24 entanglement instances were

opportunistically recorded, involving 21 chicks and 3 adults. 10 individuals were found deceased, while the remaining 14 were cut free. It can be assumed these birds would have died if intervention had not occurred.

The material and body part entangled could be identified with more confidence than Les Etacs due to observations being made on the colony within close proximity of the individuals. Of these instances, 21, 1, 1 and 1 involved fishing line, rope, cotton thread and multistrand twine, respectively. All 7 cases where the body part entangled was recorded occurred around the tarsus.

As productivity has not been estimated for Ortac in 2019, it is impossible to determine the percentage of the juvenile population, however this would be of interest in the future should productivity estimates occur.

Both the Les Etacs and Ortac studies only record observations at the colonies during the breeding season. Individuals which escaped or whose outcome is unknown may have suffered injuries and died elsewhere. Entanglement has also been reported at non-breeding areas (Rodríguez *et al.*, 2013), which is not reflected here.

It is interesting to note that the plastic component of nests at Grassholm is dominated by rope and this was noted as being involved in a significant number of entanglements (although not systematically recorded; Votier, *et al.*, 2011). The majority of entanglement cases recorded on the Alderney gannetries in 2019 involved fishing line. The author wonders if this could be due to the different fishing practices in the surrounding waters.

While it may be unlikely the recorded mortality from entanglement will have population-level consequences, entanglement related mortalities will be additive to other causes of adult and chick mortality. Since plastic is persistent, entanglement is likely to occur every year, causing additive mortality which is a cause for concern (Votier, *et al.*, 2011).

Combining entanglement observations and necropsy results (4.1.3.3) indicates that entangled individuals suffer slow deaths, with starvation, injuries from entanglement and for some, from territorial defence, raising serious concerns for animal welfare.

Table 11 – Gannet Entanglement and Mortality Observations on Les Etacs in 2019. Site - PD = Pyramid Rock; TR = Turtle Rock; NSH = North Stack High; NSL = North Stack Low; WRAE = West Rock Arch End; WRWE = West Rock West End; WRG = West Rock Gully; WRHP = West Rock High Plateau; WRHPE = West Rock High Plateau Edge (c.f. Figure 4 and Figure 5).

Number	Site	Estimated Age	First Observation Date	Status When Found	Final Outcome	Notes
1	PD	Adult	30/03/2019	Dead	Dead	
2	NSH	Adult	30/03/2019	Dead	Dead	
3	PD	Adult	12/04/2019	Dead	Dead	
4	WRAE	Adult	14/04/2019	Dead	Dead	
5	WRAE	Adult	14/04/2019	Dead	Dead	
6	WRTR	Adult	18/04/2019	Dead	Dead	
7	WRTR	Adult	18/04/2019	Dead	Dead	
8	WRHP	Adult	18/04/2019	Dead	Dead	
9	PD	Adult	20/04/2019	Dead	Dead	
10	NSL	Adult	29/04/2019	Alive	Unknown	
11	WRAE	Adult	02/05/2019	Alive	Dead	Observed dead on 10th May.
12	PD	Adult	05/05/2019	Alive	Dead	Observed alive on 10th May. Observed dead on 13 th May.
13	WRTR	Adult	14/05/2019	Dead	Dead	
14	WRNS	Adult	25/05/2019	Dead	Dead	
15	WRTR	Adult	04/06/2019	Alive	Unknown	Bird not seen again thereafter.
16	WRHP	Adult	04/06/2019	Dead	Dead	
17	WRG	Adult	04/06/2019	Dead	Dead	
18	WRAE	Adult	24/06/2019	Dead	Dead	
19	NSH	Adult	11/07/2019	Dead	Dead	Possibly an adult from nests 5 or 6 on NSH.
20	WRAE	8-9 weeks	21/07/2019	Alive	Dead	Observed alive on 25 th July. Observed dead on 1 st August.
21	PD	Adult	15/08/2019	Alive	Dead	Observed dead on 18 th August
22	WRTR	Adult	23/08/2019	Alive	Unknown	Bird not seen thereafter.
23	NSH	Adult	25/08/2019	Alive	Disentangled	Disentangled by 31 st August.
24	WRAE	Adult	20/09/2019	Dead	Dead	A recent death.
25	NSH	Adult	05/10/2019	Alive	Disentangled	Disentangled by 10 th October.
26	NSH	10-11 weeks	20/10/2019	Alive	Dead	Observed dead on 22 nd October.

Table 12 - Gannet Entanglement and Mortality Observations on Ortac in 2019; Observations occurred during trips to Ortac by the Alderney Wildlife Trust (AWT) on 6th July for T.A.G deployment (0) and 23rd October for nest inspections (4.1.3.4) and the Alderney Bird Observatory Limited (ABO) on 15th July for gannet ringing (4.1.7.8.2); * = This individual was collected and a necropsy performed on (see 4.1.3.3);

Number	Estimated Age	Observation Date	Status When Found	Final Outcome	Entanglement Material	Body Part Entangled	Observation By
1	4 weeks	06/07/2019	Alive	Cut free	Rope	Tarsus (right)	AWT
2	4 weeks	06/07/2019	Alive	Cut free	Cotton thread	Tarsus (right and left)	AWT
3 *	Adult	06/07/2019	Dead		Multistrand twine	Tarsus (left)	AWT
4	Chick (unknown age)	15/07/2019	Alive	Cut free	Fishing line	Unknown	ABO
5	Chick (unknown age)	15/07/2019	Alive	Cut free	Fishing line	Unknown	ABO
6	Chick (unknown age)	15/07/2019	Alive	Cut free	Fishing line	Unknown	ABO
7	Chick (unknown age)	15/07/2019	Alive	Cut free	Fishing line	Unknown	ABO
8	Chick (unknown age)	15/07/2019	Alive	Cut free	Fishing line	Unknown	ABO
9	Chick (unknown age)	15/07/2019	Alive	Cut free	Fishing line	Unknown	ABO
10	Chick (unknown age)	15/07/2019	Alive	Cut free	Fishing line	Unknown	ABO
11	Chick (unknown age)	15/07/2019	Alive	Cut free	Fishing line	Unknown	ABO
12	Chick (unknown age)	15/07/2019	Alive	Cut free	Fishing line	Unknown	ABO
13	Chick (unknown age)	15/07/2019	Alive	Cut free	Fishing line	Unknown	ABO
14	Chick (unknown age)	15/07/2019	Alive	Cut free	Fishing line	Unknown	ABO
15	Chick (unknown age)	15/07/2019	Alive	Cut free	Fishing line	Unknown	ABO
16	Chick (unknown age)	15/07/2019	Dead		Fishing line	Unknown	ABO
17	Chick (unknown age)	15/07/2019	Dead		Fishing line	Unknown	ABO
18	Chick (unknown age)	15/07/2019	Dead		Fishing line	Unknown	ABO
19	Chick (unknown age)	15/07/2019	Dead		Fishing line	Unknown	ABO
20	Chick (unknown age)	15/07/2019	Dead		Fishing line	Unknown	ABO
21	11+ weeks	23/10/2019	Dead		Fishing line (orange)	Tarsus (left)	AWT
22	Adult	23/10/2019	Dead		Fishing line (orange)	Tarsus	AWT
23	Adult	23/10/2019	Dead		Fishing line (blue)	Tarsus (right and left)	AWT
24	11+ weeks	23/10/2019	Dead		Fishing line (blue)	Tarsus (right)	AWT

4.1.3.2.1 Mitigation Measures

While reducing the amount of anthropogenic materials entering the marine environment is desirable, the persistence of nest material and indication of gannets selectively collecting materials with a high entanglement risk means this problem is unlikely to disappear in the near future. The amount of anthropogenic material on the colonies combined with the difficulty of access would make it logistically very challenging to remove. Removal would also take away the pedestal nests which have been constructed over years of occupation. This may have a deleterious impact on the structure and functioning of the colony. The freeing of individuals therefore currently remains the most viable method to reduce mortality; however, this needs to be balanced with the disturbance caused by entering the colonies (Votier *et al.*, 2011).

Recommendations:

It is recommended that efforts to free individuals occur during ringing and T.A.G visits to the colonies continue (as they have for decades). Visits to the colonies sufficiently late in the breeding season to avoid disturbance to breeding birds but sufficiently early to avoid mortality of entangled birds by starvation (as has occurred at Grassholm, UK for years; Votier *et al.*, 2011) may be possible, if balanced with disturbance concerns. It should be noted that Alderney's colonies are much smaller than Grassholm, meaning that disturbance events have a greater impact due to the distance to the colony edge being vastly less, thus increasing the risk of causing chicks to immaturely fledge when trying to avoid human disturbance.

4.1.3.3 Seabird Necropsies and Gastrointestinal Tract Content Studies

While entanglement represents an obvious physical threat from marine debris there are many other impacts which are less visible. It is estimated that 99% of all seabird species will have ingested plastic by 2050 (Wilcox *et al.*, 2015). Ingested plastic can cause physical damage, obstruct the digestive tract (Pierce *et al.*, 2004), compete with food for space in the stomach and add mass to the seabird affecting the bird's ability to reduce wing-loading for flight and diving (Provencher *et al.*, 2017). Plastics also absorb pollutants (e.g persistent organic pollutants; Colabuono *et al.*, 2010; and trace metals; Lavers and Bond, 2016) and thus when ingested can act like 'toxic pills', facilitating the transfer of pollutants to seabirds. While plastics are currently receiving a lot of attention, the ingestion of other anthropogenic materials in seabirds has also been reported (Roman *et al.*, 2016).

Ingestion of anthropogenic material by gannets has been very little studied with only a few published reports of plastic within the gastrointestinal tract (Parslow *et al.*, 1973; Pierce *et al.*, 2004). Therefore, in order to investigate the accumulation of anthropogenic materials ingested by gannets in Alderney the below research was initiated in 2019. Other seabirds were also opportunistically included in the study.

Four deceased gannets were opportunistically collected during the AWT's T.A.G deployment visit to Ortac (4.1.6). A further 11+ week old gannet and herring gull were obtained for the study after being admitted to Alderney Animal Welfare Society (AAWS) and euthanised. All birds were frozen until necropsies could be undertaken, defrosting the birds for >24 hours prior to the procedure.

Necropsies were performed on the birds with collaboration between the AAWS and the AWT (necropsy recording form in Appendix 6.4, including definition of condition indices quoted below). The gastrointestinal tract was removed (from as high up the oesophagus as possible to the end of the intestines), any contents were collected and cleaned in a 0.5mm sieve, in order to collect materials >0.5mm. These contents were sorted and analysed, examining items under a microscope

if there was any uncertainty if they were natural (e.g. bones) or anthropogenic (e.g. plastic). The number of anthropogenic materials found were counted and categorised as industrial plastic pellets (nurdles), user plastics, subcategorised into sheet plastics (e.g. plastic bags), threadlike plastics (e.g. rope or netting), foamed synthetics (e.g. polystyrene), hard fragments and miscellaneous (for uncommon items such as cigarette filters, pieces of balloon rubber e.t.c, with specific details reported), other material categories included metal, rubber, foams, paper and wood. Reporting the presence and absence of these is important (Provencher *et al.*, 2017). Further categorisation of the size and colour of materials were also planned.

Please note, this study does not measure anthropogenic material ingestion itself, but the accumulation of ingested materials within the gastrointestinal tract as some materials are likely to be excreted or regurgitated, especially during chick rearing (Provencher *et al.*, 2017). This methodology was largely based on the advice of Provencher *et al.* (2017), Camphuysen *et al.* (2007) and van Franeker (2004).

Summary findings for each bird are outlined below. The data will continue to be analysed in 2020.

GAN001 was a male, adult gannet collected from Ortac. The proximate cause of death for this individual was determined as trauma and internal bleeding, with an overall condition score of two indicating the individual was also critically emaciated. Adequate gastrointestinal contents were obtained from this individual, with a large amount of natural materials within the sample. Two items were discovered, which are thought to be plastic microbeads (measuring 2mm and 0.5mm across; Figure 9). Experts will be contacted in 2020 to verify the material. No metal, rubber, foams, paper or wood items were found.

GAN002 was a male, adult gannet collected from Ortac with multistrand twine entangled around the left tarsus. The proximate cause of death for this individual was determined as starvation, with no subcutaneous fat (condition score of 0) and emaciated pectoral muscles (condition score of 1) and, possible liver disease. Absolutely no gastrointestinal tract contents were within this individual.

GAN003 was a male, 3 week old gannet chick collected from Ortac. A pebble was found in the pylorus (next to the exit to the stomach) of this individual which is thought to have caused death by obstruction and starvation, with the signs of severe emaciation (overall condition score of 0). No anthropogenic materials were found within the gastrointestinal tract contents of this individual, although natural materials were present.

GAN004 was a male, 0-1 week old gannet chick collected from Ortac. The proximate cause of death for this individual is unknown. No anthropogenic materials were found within the gastrointestinal tract contents of this individual, although natural materials were present.

GAN005 was a male, 11+ week old gannet collected from Arch beach and taken to AAWS by a member of the public after being observed struggling with only one leg. The AAWS had to euthanise this individual. It is unknown which colony this gannet originated from. The left leg had an incised wound, suspected from fishing line due to the clean cut (Figure 10). It is unknown when this occurred, although it was noted that this wound had started to heal. The gastrointestinal tract was completely empty, indicating the individual had been unable to feed for a few hours. However, the bird was in good condition (overall condition score of 8), suspected due to feeding by the parents before fledging.

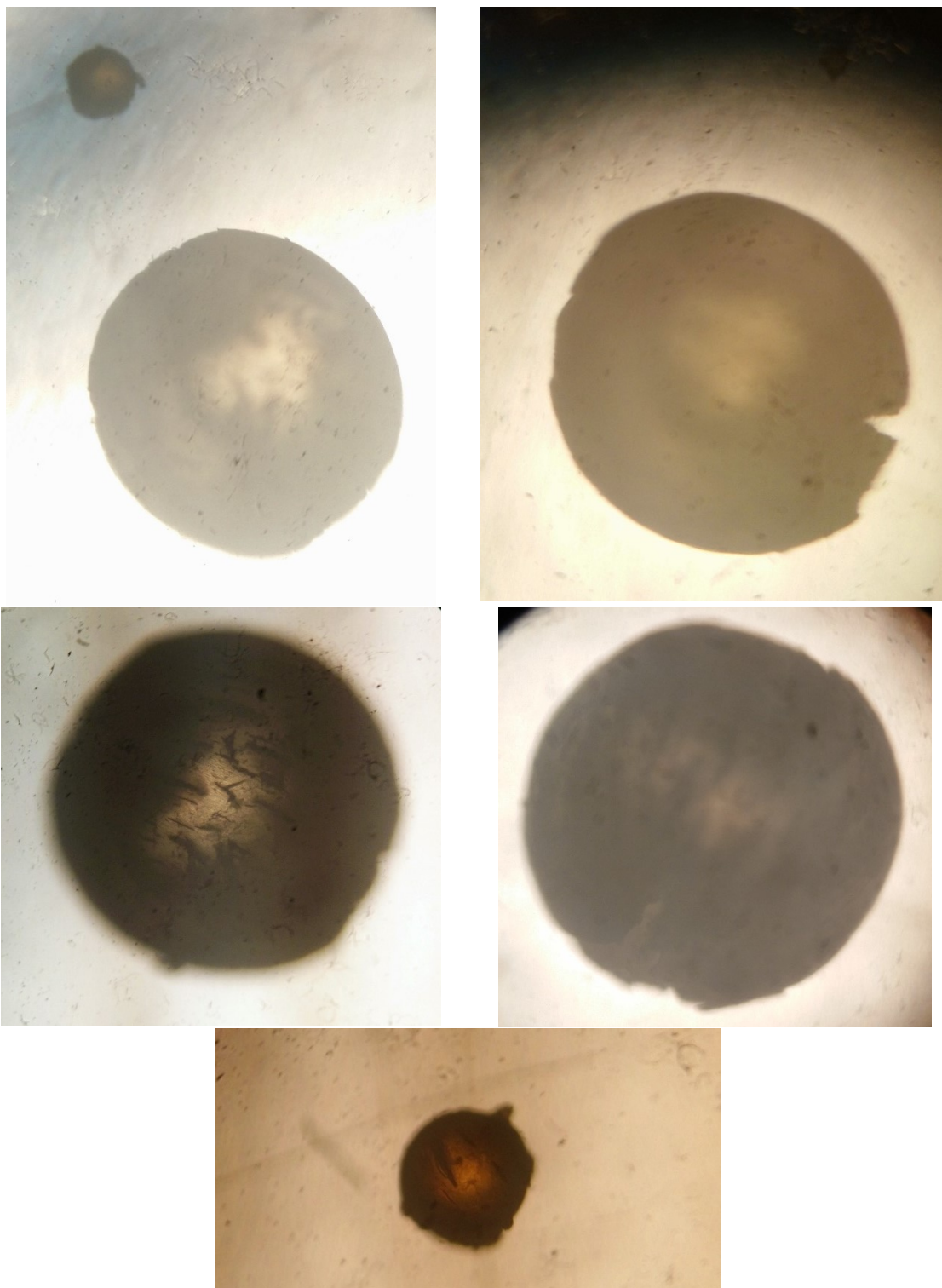


Figure 9 – Suspected Plastic Microbeads from GAN001 Gastrointestinal Tract Contents, Viewed under a Microscope; Top left = microbead 1 and microbead 2; Top right and middle row = microbead 1; Bottom image = microbead 2.



Figure 10 – GAN005 Wound Suspected from Fishing Line.

HGL001 was an immature, male herring gull with a fishing hook caught in its neck. This individual was submitted to AAWS after an experienced ringer attempted to care for the individual for three days. The AAWS had to euthanise the bird after medication and attempts to remove the hook were not possible, the hook had caused too much damage to the back of the neck and a suspected fungal infection had infected the mouth (likely to have been thrush (moniliasis)) and possibly spread to the heart. Natural materials and one small piece of metal of anthropogenic origin (measuring 3.5 x 2.5 x <0.5 mm; Figure 11) were found within the gastrointestinal contents of this individual. No other anthropogenic materials were found.

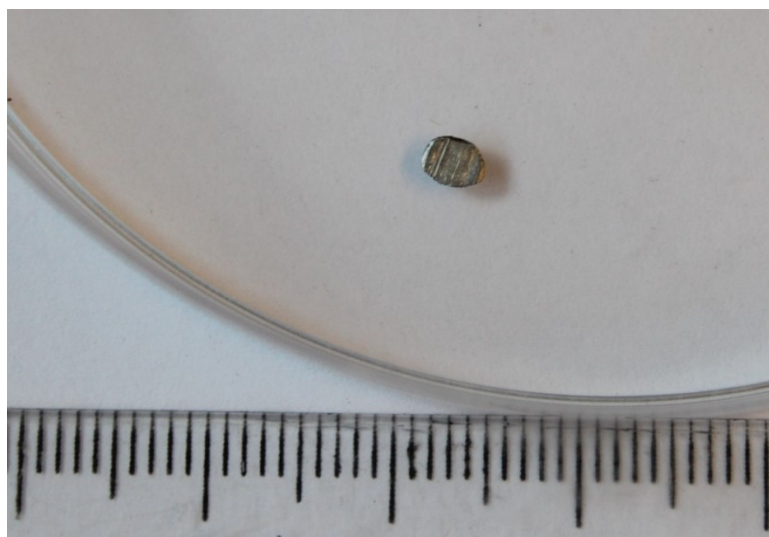


Figure 11 – Metal from HG001 Gastrointestinal Tract Contents; Ruler scale in cm.

It was noted during analysis that anthropogenic fibres would have been very difficult to determine from natural feathers and thus may have been missed. Analysis of stomach contents using Fourier Transform Infrared spectroscopy (FT-IR) or Raman Spectroscopy to identify polymer type (Provencher *et al.*, 2017) may help to overcome this, however spectrometry facilities are currently not available on Alderney. This would be particularly interesting from a biological perspective due to relationships of contaminants associated with plastic (Provencher *et al.*, 2017).

The above six cases highlight the vast amount of information that can be obtained from necropsies and gastrointestinal tract content analysis, of which only a summary is provided above. Cases where the individuals were thought to be entangled in plastic (GAN002 and GAN005) elucidate the associated suffering entailed, raising serious concerns for animal welfare.

While the above cases found three items of probable anthropogenic origin (verification to be undertaken in 2020) the very small sample size (limited by the number of gannets possible to obtain this year) means it is impossible to draw any statistical conclusions (e.g. on the frequency of incidents). Unfortunately all deceased individuals observed during the post-season visit to Ortac (4.1.3.4) were too decomposed/with no stomachs to enable additional individuals to be collected for the study. Continuation of the project over subsequent years will increase the sample size and thus enable assessment of the accumulation of anthropogenic materials within seabirds in Alderney.

Recommendations:

Continue analysis and determination of materials within GAN001 in 2020.

Continue this study, increasing the sample size until sufficient data is obtained to assess the accumulation of anthropogenic materials within seabirds in Alderney.

4.1.3.4 Post-Season Nest Inspections

A post-season visit to Ortac was undertaken on the 23rd October 2019 in order to photograph gannet nests for analysis of anthropogenic contents. Photographs will be analysed in 2020.

Recommendations:

Analyse 2019 photos and repeat this work in 2020.

4.1.3.5 Observations of Other Seabirds Utilising Anthropogenic Materials

On the 16th April 2019, a puffin was photographed carrying green plastic line (Figure 12), presumed for use within the puffin burrow. This is the first known documentation of puffins utilising plastic in Alderney. Unfortunately, as the Alderney puffin population utilise rabbit burrows which form complex systems the examination of burrows for plastic would be difficult. Past attempts utilising endoscopes proved unsuccessful.



Figure 12 – Puffin Photographed with Plastic Line, Burhou, 16th April 2019. Photographed by Justin Hart.

Recommendations for All Seabird and Anthropogenic Material Research:

Despite the observed consequences of marine debris on seabirds, few studies have researched changes in use, entanglement and ingestion over time (Bond *et al.*, 2012). Continuing the above research, monitoring the impact, gaining increased data, which may also be used to study changes with time would be valuable for monitoring Alderney’s gannet population and contributing to global research. Furthermore, the frequency of seabird interactions with marine debris has been suggested to provide indices of this marine pollution (van Franeker *et al.*, 2011), however selectivity for certain plastics may introduce bias (Votier *et al.*, 2011).

4.1.4 Puffin Friendly Zone – Marine Exclusion Zone

Following observations of a decline in Burhou’s puffin population and concerns of disturbance impacting breeding success, the AWT, in collaboration with the SoA, the Alderney Marine Management Forum, Alderney Harbour Office and local fishermen, designated a “Puffin Friendly Zone” (PFZ) and an associated code of conduct in 2018. This zone, annually in place during the puffin breeding season, aims to provide puffins with a safe area to rest undisturbed by visiting or passing boats. Puffins are easily disturbed when rafting on the water, leading them to take flight which uses up vital energy reserves and interrupts feeding and parenting habits. This sort of disturbance can have a significant negative impact on breeding success.

In 2019, significant resources went into raising awareness of the PFZ. A stakeholder meeting was organised by AWT’s Ramsar Officer and Alderney Harbour Office on the 22nd March 2019, in order to present information about the PFZ/Burhou’s puffins, discuss the zone and the possibility of issuing a notice to mariners to make it a full marine exclusion zone. The meeting also provided an opportunity to answer stakeholder questions. Attendees included commercial boat skippers, commercial fisherman, the SoA appointed Burhou Warden and attendees from Alderney Sailing Club and Visit Alderney. The meeting was positive, with support for the PFZ and no issues raised.

Posters and publications were also made to raise awareness of the PFZ (see 4.5.3)

The PFZ was opportunistically monitored using the PTZ puffin camera, recording and reporting entries into the zone to the Alderney Harbour Office. Table 13 outlines the 10 recorded entries

this year. It should be noted that the zone was not monitored 24/7 therefore additional entries may have occurred.

All recorded media of identifiable boats/marine users within the PFZ is handled strictly in accordance with GDPR requirements (AWT., 2019d). Evidence from this year (as outlined below) proves the camera system delivers the desired benefits and is necessary for monitoring of the PFZ.

It is thought most of the entries into the PFZ were due to a lack of knowledge of the zone's designation. Adding the PFZ to navigational charts would help address this issue (see 4.1.5). The exception to this was a local Alderney commercial boat skipper who is aware of the PFZ but has a history of entering the zone. In 2019, despite attending the stakeholder meeting with no comments or objections, this individual continued to enter the PFZ a minimum of 3 times and was seen very close to the zone boundary many times throughout the season. The individual was asked to adhere to the PFZ again this year but did not comply.

Recommendations:

Continue the PFZ in 2020 and beyond, continuing to publicise and raise public awareness. Issuing a notice to mariners would be largely beneficial (see 4.1.5).

It is recommended that a meeting is held with the local commercial boat operator who repeatedly enters the zone in order to understand his reasons for doing so and raise awareness of the potentially damaging effects of such disturbance. Unfortunately, however, making the PFZ a legal exclusion zone with penalties attached may be the only way to stop incursions in the future; this is a matter for the SoA GSC to consider in 2020 with the Alderney Harbour Office.

Table 13 – Puffin Friendly Zone Recorded Entries in 2019

Date	Entry and Exit Time	Entry By	Activity	Details
28 th March 2019	Unknown	Unknown	Fishing	Lobster pot buoy observed in the PFZ on this date.
Unknown	Unknown	Unknown	Fishing	Presumed entry for lobster pot pick up within the PFZ.
10 th May 2019	11:57 – 12:03	French RIB	Fishing	Upon entry to Alderney Harbour the Harbour Office informed the gentlemen of the PFZ. They were unaware and very apologetic. They said that they would help raise awareness by telling their friends back home in France.
24 th May 2019	Unknown	Alderney Motorboat Commercial Operator*	Tourism	
1 st June 2019	First spotted very close to Burhou at 10:15 - 10:19	Sailing Yatch, under motor (with tender in tow)	Tourism, photographing puffins	
1 st June 2019	First spotted very close to Burhou at 14:09 – 14:15	Alderney Motorboat Commercial Operator*	Tourism	
9 th July 2019	First spotted at 8:19 – 8:26	Alderney Motorboat Commercial Operator*	Transport – dropping ABO ringers onto Burhou	Drove in wide circles in the PFZ.
9 th July 2019	First spotted at 8:19 – 8:21 8:24 – 8:26	RIB with Alderney Motorboat Commercial Operator	Transport – dropping ABO ringers onto Burhou	
22 nd July 2019	First spotted 13:26 – 14:14	Small open motorboat	Fishing	At anchor. Not a local boat. Thought to possibly been French.
29 th July 2019	11:48 – 11:49	RIB	Unknown	
* = This tour operator is aware of the PFZ from previous years and attended this year’s stakeholder meeting in 2019 (with no comments or objections) but has a history of entering the PFZ.				

4.1.5 Review Creating a Full Marine Exclusion Zone Around Puffins Issuing a Notice to Mariners

Making the PFZ a full marine exclusion zone, issuing a notice to mariners to ensure the zone is on navigational charts, would be greatly beneficial as this would ensure that skippers are aware of the zone. Many of the historic entries are thought to have been by individuals visiting Alderney (many from France) who are simply unaware of the zone. This would, therefore, help to prevent a lot of the entries into the PFZ during the crucial puffin breeding season.

Issuing a notice to mariners was discussed with Alderney Harbour Office's Harbour Master and with local stakeholders during the meeting on 22nd March 2019 (see 4.1.4). The Harbour Master was supportive and has plotted the zone on the Harbour Office radar so they can accurately observe when a boat is entering the zone. There was no objection to making the zone a full legal marine exclusion zone from any of the stakeholders in attendance.

The Harbour Master left the position shortly after this meeting, with a replacement not starting until December 2019. Issuing a notice to mariners was therefore discussed with the Deputy Harbour Master; however, the individual was not eager and stated that the Harbour Office does not have the resources to monitor and enforce the PFZ. Placing the nature reserve symbol on navigational charts was discussed to ensure that people are at least aware of wildlife in the area.

Due to the staff change and period without a Harbour Master a notice to mariners / addition of the PFZ to navigational charts was therefore not possible in 2019.

Recommendations:

It is recommended the AWT Ramsar Officer meets with the new Harbour Master as early as possible in 2020 to educate the new individual about the zone and discuss issuing a notice to mariners and adding the PFZ to navigational charts.

Making the PFZ a legally designated marine exclusion zone with penalties for entering the area, may also help to prevent multiple disturbance events caused by a local commercial boat operator (see 4.1.4).

4.1.6 Track A Gannet (T.A.G)

4.1.6.1 Background

The T.A.G project uses GPS tagging to provide short-term data (up to 6 weeks) on the flight routes and foraging areas of Alderney's gannets during the main chick rearing period of the breeding season. It also uses geolocators to provide data on their larger scale migratory behaviours throughout the year. Since 2011, between 10-30 gannets have been tracked each year (except in 2018, see AWT., 2019e) using the GPS tags. In 2017 ten geolocators were deployed too. Data from the project has contributed to the publication of scientific papers (e.g. Warwick-Evans *et al.*, 2015, 2016a, 2016b, 2016c, 2018 and Soanes *et al.*, 2013) and in response to developments (particularly renewable energy and interconnectors). Continuing this project establishes a long-term dataset which is vital in understanding how the birds react to changing conditions (environmental or anthropogenic). For example, in years when food is less easy to obtain, birds may change their behaviour and forage further than normal.

The AWT raises significant funds for this project.

4.1.6.2 Permissions

The SoA confirmed the approval of the T.A.G. project on the 26th April 2019, providing full ethical and practice review and the subsequent issuing of individual SoA ringing licences. Contact was made between the SoA Chief Vet, the SoA CEO, and the AWT, in order to ethically review the project. Permission was gained and the appropriate licences from the SoA were applied for and issued.

Unfortunately, the AWT were unable to deploy geolocators in 2019.

4.1.6.3 The T.A.G Deployment Trip

The T.A.G deployment trip was completed on the 6th July. The trip had five aims, listed below:

1. Attach tags to 10 individual gannets.
2. Locate and recover as many of the 10 geolocator devices deployed in 2017 as possible.
3. Record colour and metal ring re-sightings to gain population data.
4. Record videos/photos for analysis of the incorporation of anthropogenic material in gannets nests (see 4.1.3.4).
5. Collect deceased gannets for necropsies and gastrointestinal tract content analysis (see 4.1.3.3).

The weather conditions on the day were deemed appropriate, being fair, between 18-20°C with a light breeze between 6 and 20km/hour. The trip was covered by a risk assessment and the appropriate insurance.

Four individuals were landed on Ortac for three hours to undertake the work. The AWT's Avian Ecologist led the team, caught, and held gannets for tag deployment. Dr Jude Lane (a post-doctoral researcher from the University of Leeds, specialising in telemetry research of gannets on Bass Rock) was responsible for attaching the tags. The AWT's Ramsar Officer acted as a scribe, and with assistance from the AWT's Conservation Officer, looked for rings/geolocators, monitored gannet behaviour and collected deceased gannets for necropsies. All individuals were responsible for monitoring gannet behaviour and care was taken not to remain within one area for too long, in order to minimise disturbance. The work was recorded by observers on a boat stationed off Ortac to ensure a clear record was maintained of the level of disturbance to help inform practice in the future.

Eight tags were deployed, with the decision not to attach the remaining two as they were bulkier in design and thus would not fit well against the tail feather. All tags were attached to birds already fitted with CIBRS metal rings. One geolocator was recovered while an additional three were observed. In total, 21 metal or colour rings were read (see Appendix 6.4).

4.1.6.4 T.A.G Data Obtained

Figure 13 displays the summary map of telemetry data from GPS tags deployed in 2019. Data from 2019 was similar to previous years (available at AWT, 2019f), depicting gannet foraging throughout the English Channel, with the Bay off Cherbourg being a particular 'hotspot'.

The nature of individuals can also be observed, with some specialising in particular areas while others forage more widely in the English Channel.

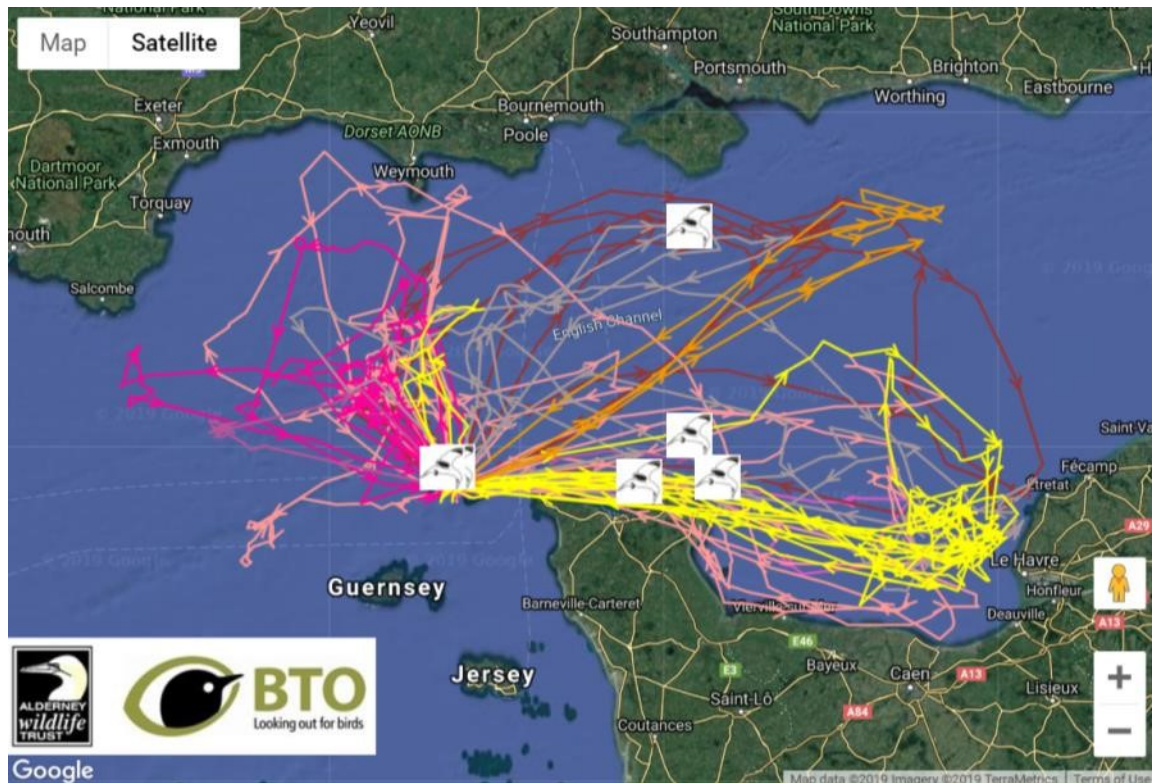


Figure 13 – T.A.G. Map 2019 – data from 8 GPS tags attached to adult gannets on the 6th July 2019; Each colour represents an individual gannet/GPS tag.

Figure 14 outlines the data from the recovered geolocator, after the data was analysed and mapped by experts at the University of Liverpool. The recovery of more geolocators are required in order to assess if this data represent the normal pattern of migration.

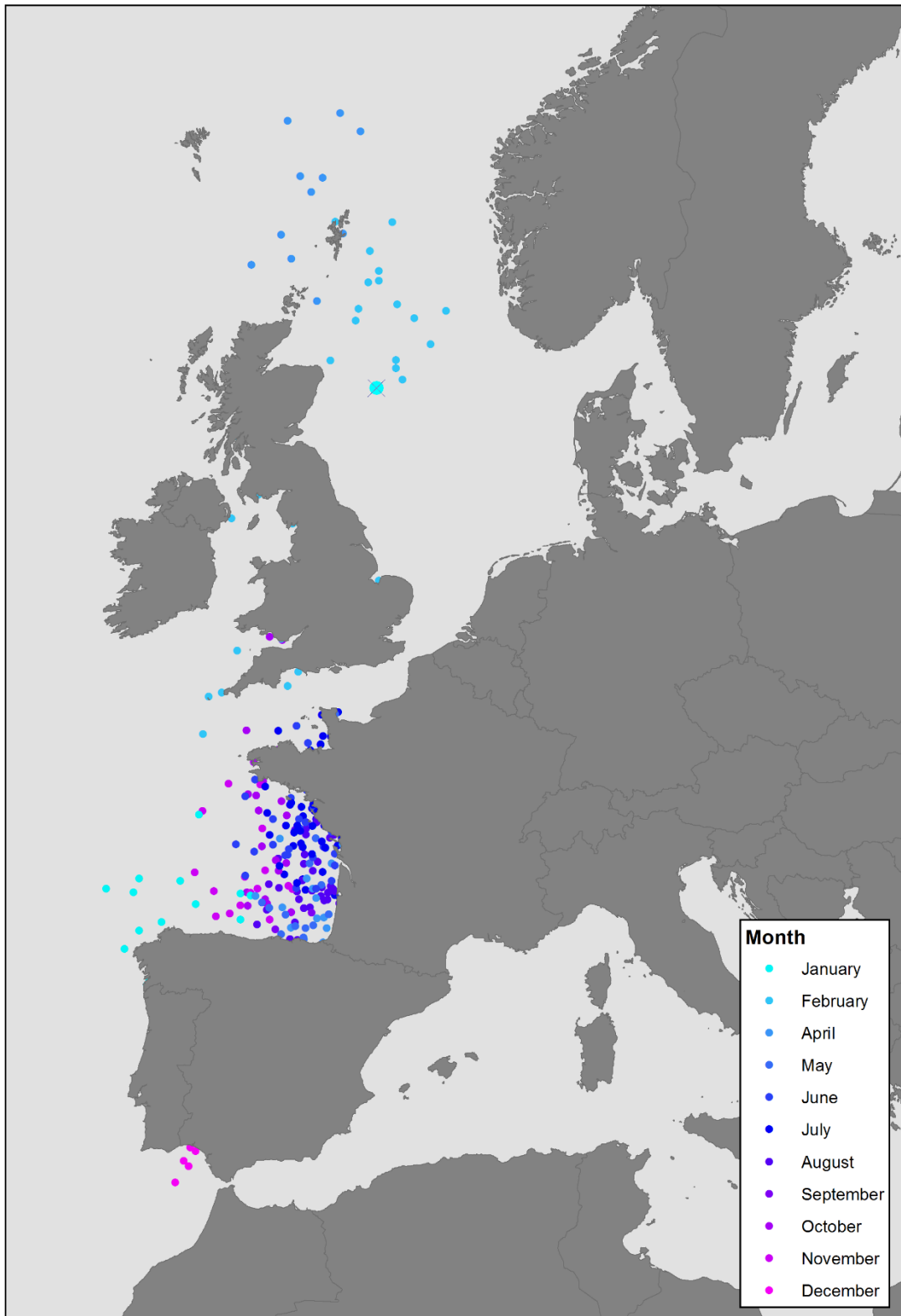


Figure 14 – T.A.G. Geolocator Map; data from one geolocator deployed on an adult gannet in 2017..

4.1.6.5 T.A.G Data Use in 2019

4.1.6.5.1 Research and Applications

In October 2019, T.A.G. data from 2019 and previous years was used in response to a request for comment on a Habitat Regulations Assessment Report for a proposed interconnector within the English Channel. The interconnector is a proposed High Voltage Direct Current (HVDC) marine and underground electric power transmission link between the south of England and Normandy in France. This therefore placed the development within the foraging range of gannets from Alderney's colonies.

The T.A.G data from 2019 and previous years is also being used in research by the University of Liverpool.

4.1.6.5.2 Public Education

'Adopt a Gannet', where members of the public/organisations can sponsor a tagged gannet, was popular in 2019, possibly due to increased marketing by the AWT. Posts about T.A.G were also extremely popular, clearly reflecting an appetite for tracking data and information about where Alderney's wildlife goes.

The Live: Teaching Through Nature T.A.G page received 636 total page views between 1st July and 15th August 2019.

Recommendations:

It is recommended the T.A.G project is continued in 2020, due to the use of the data in research and impact assessments for renewable energy/interconnectors, of which there are several proposed developments. A masters project to review the data (e.g. to determine if more data on the foraging ranges of Alderney's gannets would be valuable) would be beneficial.

Recovery of the nine remaining geolocators deployed in 2017 and deployment of the ten purchased geolocators should be a priority to gain further information on the migratory trends of Alderney's gannets. This would establish if Alderney's gannets' movements are any different to other colonies where tagging research has been undertaken. It would also be valuable to identify if there are any differences between the Les Etacs and Ortac colonies by deploying geolocators on both the colonies.

While the current T.A.G project focuses on adult gannets, research on the movements of juvenile/fledging gannets would be valuable and would offer the potential of collaboration with other research sites currently engaged in this work, such as Bass Rock.

4.1.7 Ringing

Seabird ringing this year was undertaken by the Alderney Bird Observatory Limited (ABO), a newly formed company in 2019 and Justin Hart (AWT Avian Ecologist) under the Memorandum of Understanding between the AWT and ABO. The data below (compiled and formatted into tables by the Ramsar Officer) was provided by the ABO. The AWT has added no additional reports or interpretation to what was provided to ensure accuracy of reporting.

The ABO states “The type of rings used are those supplied by the CIBRS and are of metal alloy composition. The larger plastic rings used for the lesser-black backed Gulls were donated to the ABO by Mr Paul Veron. The ring sizes used are A,D,E,F,J, P & X.”

4.1.7.1 Ringed Plover

Table 14 – Ringed Plover Ringing Data (provided by the ABO); N/A = Not Applicable.

Species	Ringed Plover (<i>Charadrius hiaticula</i>)
Date:	23 rd June 2019
Location:	Clonque Bay
Number of people involved in ringing:	1 (Justin Hart)
Time on island:	N/A
Time spent ringing:	13:00
Capture method:	By hand
Number of nets (if applicable):	N/A
Length of nets (if applicable):	N/A
Net Locations (if applicable):	N/A
Number of birds caught/ringed:	4 chicks
Number of controls:	0
Number of retraps:	0
Number of casualties/injured birds:	0
Additional information:	2 days old, 4 of 4 eggs hatched
Date:	26 th May 2019
Location:	Saye Bay
Number of people involved in ringing:	2 (John Horton and Joe England)
Time on island:	N/A
Time spent ringing:	10:20 – 10:25
Capture method:	By hand
Number of nets (if applicable):	N/A
Length of nets (if applicable):	N/A
Net Locations (if applicable):	N/A
Number of birds caught/ringed:	2 of 3 chicks present
Number of controls:	N/A
Number of retraps:	N/A
Number of casualties/injured birds:	0
Additional information:	Comment from the ABO: <i>“We noted that whilst the chicks were still very young a number of AWT canoes were dragged up the beach very close to the plover nest site. The chicks had to break cover and move onto the open sandy beach, they were not subsequently seen or recorded to our knowledge. We would advise that this activity be avoided in future if possible.”</i> ¹
¹ The Ramsar Officer queried the above comment with the AWT, who provided the below response (p.t.o):	

“During a standard kayaking session, the AWT were forced to land the group on Saye on the 29th May because of changing weather conditions. To ensure that this did not cause disturbance of the nesting plover 3 members of the AWT team were asked to attend the beach before landing to establish the presence/location of the plovers and monitor their status prior to, during and after the 10 minute clearance operation took place. The AWT has continued the established monitoring programme, which will be reported in full in the 2019 Ramsar Review. However, the AWT are pleased to report all three chicks survived past the AWT kayak removal and provide the following summary. All three of the chicks the ABO ringed were seen again in the same area on the 30th May and the 6th June. The AWT also notes a sightings record from a member of the public on the 30th May. On the 11th June 2 chicks were seen. On the 17th June, the adults were present but all the chicks had gone, presumed predated.

Please note that whilst the AWT does not use Saye during the breeding season this is an unrestricted public beach with regular kayak users, moored yachts and bird watchers on the beach, to name a few activities. The Ramsar education effort has established awareness notices and other public information in an effort to try and reduce impact.”

Date:	19 th July 2019
Location:	Clonque Bay
Number of people involved in ringing:	1 (Justin Hart)
Time on island:	N/A
Time spent ringing:	10:00
Capture method:	By hand
Number of nets (if applicable):	N/A
Length of nets (if applicable):	N/A
Net Locations (if applicable):	N/A
Number of birds caught/ringed:	3 chicks
Number of controls:	0
Number of retraps:	0
Number of casualties/injured birds:	0
Additional information:	3 of 4 eggs hatched

Recommendations:

None provided.

4.1.7.2 Lesser Black-Backed Gulls

Table 15 – Lesser Black-Backed Gull Ringing Data (provided by the ABO); N/A = Not Applicable.

Species	Lesser Black-Backed Gull (<i>Larus fuscus</i>)
Date:	9 th July 2019
Location:	Burhou
Number of people involved in ringing:	5
Time on island:	08:30 – 14:00
Time spent ringing:	08:40 – 13:30
Capture method:	By hand
Number of nets (if applicable):	N/A
Length of nets (if applicable):	N/A
Net Locations (if applicable):	N/A
Number of birds caught/ringed:	144 chicks
Number of controls:	3 adult birds
Number of retraps:	N/A
Number of casualties/injured birds:	0
Additional information:	“3 dead emaciated chicks discovered amongst the colony. 7 eggs from 3 nests were recorded likely addled and unattended given the advanced stage of growth of the chicks ringed and out finding.”
Date:	27 th July 2019
Location:	Burhou
Number of people involved in ringing:	5
Time on island:	26 th July 17:00 – 27 th July 17:45
Time spent ringing:	16:00 – 17:30
Capture method:	By hand
Number of nets (if applicable):	N/A
Length of nets (if applicable):	N/A
Net Locations (if applicable):	N/A
Number of birds caught/ringed:	20 chicks
Number of controls:	0
Number of retraps:	N/A
Number of casualties/injured birds:	0
Additional information:	Comment from the ABO: “The traditional 2 nd sweep of the LBBG colony during the petrel weekend confirmed that the timing of the initial trip was optimal. The majority of this year’s chicks were fledged and the few birds encountered were probably those overlooked in the dense bracken cover 9 th July.”

Recommendations:

None provided.

4.1.7.3 Greater Black-Backed Gulls

Table 16- Great Black-Backed Gull Ringing Data (provided by the ABO) ; N/A = Not Applicable.

Species	Great Black-Backed Gull (<i>Larus Marinus</i>)
Date:	27 th July 2019
Location:	Burhou
Number of people involved in ringing:	Data not provided.
Time on island:	26 th July 17:00 – 27 th July 17:45
Time spent ringing:	Data not provided.
Capture method:	By hand
Number of nets (if applicable):	N/A
Length of nets (if applicable):	N/A
Net Locations (if applicable):	N/A
Number of birds caught/ringed:	2 chicks
Number of controls:	Data not provided.
Number of retraps:	Data not provided.
Number of casualties/injured birds:	Data not provided.
Additional information:	None provided.

Recommendations:

None provided.

4.1.7.4 Herring Gulls

Table 17 – Herring Gull Ringing Data (provided by the ABO); N/A = Not Applicable.

Species:	Herring Gull (<i>Larus argentatus</i>)
Date:	27 th July 2019
Location:	Burhou
Number of people involved in ringing:	Data not provided.
Time on island:	26 th July 17:00 – 27 th July 17:45
Time spent ringing:	Data not provided.
Capture method:	By hand.
Number of nets (if applicable):	N/A
Length of nets (if applicable):	N/A
Net Locations (if applicable):	N/A
Number of birds caught/ringed:	1 chick
Number of controls:	Data not provided.
Number of retraps:	Data not provided.
Number of casualties/injured birds:	Data not provided.
Additional information:	None provided.

Recommendations:

None provided.

4.1.7.5 Storm Petrels

Table 18- Storm Petrel Ringing Data (provided by the ABO); N/A = Not Applicable.

Species:	Storm Petrel (<i>Hydrobates pelagicus</i>)
Date:	26 th July – 27 th July
Location:	Burhou
Number of people involved in ringing:	5
Time on island:	26 th July 17:00 – 27 th July 17:45
Time spent ringing:	21:50 – 04:00
Capture method:	Mist netting
Number of nets (if applicable):	2
Length of nets (if applicable):	18m x2
Net Locations (if applicable):	49° 43' 54'' N 2° 14' 54'' W 49° 43' 53'' N 2° 14' 53'' W
Number of birds caught/ringed:	324 non pullus
Number of controls:	8
Number of retraps:	28
Number of casualties/injured birds:	0
Additional information:	Comment from the ABO: “This trip was scheduled for two overnight dedicated Petrel sessions. The weather on the 2 nd evening (27 th) was assessed by the lead ringer as outside acceptable conditions for mist netting and the ringing team was extracted back to mainland Alderney.” Note, one rock pipit was also opportunistically ringed (see 4.1.7.6 below).

Recommendations:

None provided.

4.1.7.6 Rock Pipits

Table 19 – Rock Pipit Ringing Data (provided by the ABO) ; N/A = Not Applicable.

Species:	Rock Pipit (<i>Anthus petrosus</i>)
Date:	26 th July – 27 th July
Location:	Burhou
Number of people involved in ringing:	5
Time on island:	26 th July 17:00 – 27 th July 17:45
Time spent ringing:	21:50 – 04:00
Capture method:	Mist netting
Number of nets:	2
Length of nets:	18m x2
Net Locations:	49° 43' 54'' N 2° 14' 54'' W 49° 43' 53'' N 2° 14' 53'' W
Number of birds caught/ringed:	1 adult
Number of controls:	Data not provided.
Number of retraps:	Data not provided.
Number of casualties/injured birds:	Data not provided.
Additional information:	Comment from the ABO: “mist netted 21:40, 26 th July opportunistic in petrel net”

Recommendations:

None provided.

4.1.7.7 Shags (Opportunistically)

Comment from the ABO:

“No shags were ringed.”

Recommendations:

None provided.

4.1.7.8 Gannets

4.1.7.8.1 Les Etacs

Comment from the ABO:

“The ABO heeded the advice of experienced CIBRS seabird ringers who last visited the rock in 2017. The advice given is that the density of the Gannet colony on Les Etacs in terms of the close proximity of the bird’s nests, has reached a stage whereby it is unsafe to move around on the rock. The health and safety of the researchers taking part must take precedence. A health and safety review is necessary in order to determine the potential of future visits to this rock.”

Recommendations:

Please see the above comment from the ABO.

Comment from the AWT: In response to the ABO’s comment the AWT is liaising with the Alderney Harbour Office and with managers of other similar sites to establish a new risk assessment for all the offshore islets, developed from the currently accepted one. The ABO and CIBRS will be involved in this process as stakeholders in the Ramsar work.

4.1.7.8.2 Ortac

Table 20 – Ortac Gannets Ringing Data (provided by the ABO); N/A = Not Applicable.

Species:	Northern Gannet (<i>Morus bassanus</i>)
Date:	15 th July 2019
Location:	Ortac
Number of people involved in ringing:	2
Time on island:	08:30 – 11:45
Time spent ringing:	08:30 – 11:45
Capture method:	By hand
Number of nets (if applicable):	N/A
Length of nets (if applicable):	N/A
Net Locations (if applicable):	N/A
Number of birds caught/ringed:	336 chicks
Number of controls:	0
Number of retraps:	N/A
Number of casualties/injured birds:	0
Additional information:	<p>Comments from the ABO:</p> <p>“Some 12 chicks that were trapped in fishing line were located and successfully set free. 8 perished chicks were noted – at least 5 of these were caught in fishing line.”</p> <p>“In terms of disturbance to the colony the ABO feels that small teams of 3 or 4 ringers only are required to complete this task.”</p>

Recommendations:

None provided.

4.1.7.9 Seabirds on Coque Lihou

Comment from the ABO:

“The weather and sea conditions were such that this year’s visit was not possible during the desired window of opportunity.”

Recommendations:

None provided.

4.1.7.10 Common Terns

Comment from the ABO:

“No birds were ringed. The ABO considered that disturbance to this erratic and fragile colony did not warrant the disturbance any ringing may entail. NB: The Tern colony location does not fall within the current designated and mapped RAMSAR area.”

Recommendations:

None provided.

4.1.8 Population Counts of Seabirds on Coque Lihou

This work stream was not undertaken as it aimed to be completed with the ringing trips to Coque Lihou which did not occur. However, observations of Coque Lihou are reported within 4.1.2.6.

Recommendations:

This objective should be completed in 2020.

4.1.9 Wetlands Bird Surveys (WeBs)

The Wetland Bird Survey (WeBS) is the British Trust for Ornithology's scheme to monitor non-breeding wetland birds in the UK. The principal aims of WeBS are to identify population sizes, determine trends in numbers and distribution, and identify important sites for wetland birds. WeBS core counts are carried out on a regular monthly basis at the same sites on a priority date. This degree of consistency over many years distinguishes WeBS counts from casual counts, and ultimately allows the monitoring of changes in wetland birds numbers and distribution with the added confidence of knowing that these reflect true changes rather than simply different areas being counted.

In the Ramsar site WeBS counts were carried out in Clonque Bay and Platte Saline in 2019. The data has been submitted to WeBS.

Recommendations:

This is a continual project. WeBS counts should be carried out monthly in 2020 and beyond.

4.1.10 Reviewing the Possibility of a Collaborative Ringed Plover Project

This objective was planned to be completed alongside twinning efforts (see 4.5.7), but due to the delay in twinning and limited resources this objective was not undertaken in 2019.

Recommendations:

Undertake this objective with twinning efforts in 2020 (see 4.5.7).

4.1.11 Review of Contact with Groupe Ornithologique Normand (GONm)

Contact has been reviewed, with GONm visiting Alderney at the beginning of 2019.

Recommendations:

Continue to remain in contact with GONm in 2020.

4.1.12 Annual Review of Seabird Data

An annual review of all seabird data is currently being undertaken, to be completed in January 2020.

Recommendations:

Complete in January 2020.

4.1.13 Annual Review of T.A.G. Data

Please see 4.1.6.

Recommendations:

Review T.A.G data annually.

4.2 Terrestrial

4.2.1

4.2.2 Rat Control

Building and expanding on successful work carried out in 2018 (see AWT, 2019e), the AWT and SoA Public Works Department expanded rat control in 2019. The aim of this project is to reduce rat presence and thus predation of seabirds on and adjacent to key breeding sites around Alderney.

Bait station sites in 2019 (Figure 15 and Figure 16) included Houmet de Pies, L'Etac de la Quoire, the Twin Sisters stacks and Hanaine Bay stacks. Bait stations were placed on the stacks themselves and on the adjacent mainland of Alderney to prevent rats accessing the islets. Bait stations were also placed on Burhou to confirm there was no rat presence on the island this year. East Saye Promontory was added to the project in June following observations of common terns using this area for breeding (instead of Houmet de Pies) and significant evidence of rats on the site (see 4.1.2.4).

While it is recognised that many of the sites are outside of the Ramsar site, they are included here to represent and report the project as a whole. Breeding sites which occur outside the Ramsar site boundary are also likely to be important for seabirds which will travel to and use the local Ramsar site.

It is noted that rat bait box checks after June of 2018 were not included in the 2018 Ramsar Review (AWT, 2019e). The Houmet de Pies bait boxes (HP01, HP02 and HP03) were checked on the 4th and 14th of July 2018, with no change in bait take since the boxes were previously checked on the 22nd June 2018. The boxes were next checked on the 9th March 2019 with clear evidence of rats using the islet since the July 2018. All 3 bait boxes were replaced with fresh bait blocks on this date.

Table 23 in Appendix 6.6 details the rat control work in 2019. In summary, following deployment in March onshore bait stations were checked every month and rebaited as necessary (with the exception of September and Houmet de Pies in July and August due to breeding bird presence). Pictures were taken to allow comparison of bait take between checks. At least one of the stations onshore showed evidence of rat take on every check at Hanaine Bay, Twin Sisters, L'Etac de la Quoire. Houmet de Pies showed no further take between the 9th March and 7th June 2019, however bait was taken and clear evidence of rat presence was observed when next checked on the 24th October and 13th November. 2 East Saye Promontory bait stations were deployed on the 18th June 2019, with clear evidence of rats observed on the 24th October 2019 and 13th November 2019 checks. Due to significant rat presence and breeding common terns utilising the area, a further 2 stations were deployed on the 24th October 2019. Evidence of mice was observed upon checking one of these in November, the second box unfortunately blew away in strong winds.

Bait stations were placed on Hanaine Bay stack, Twin Sisters, L'Etac de la Quoire on the 20th March 2019 (utilising Sula of Braye (the AWT's boat) to access islets). These stations cannot be checked during the breeding season due to the presence of breeding seabirds vulnerable to disturbance. Unfortunately, Autumn checks of these sites were not possible due to unsuitable weather. These sites will be checked and re-baited early in 2020, prior to the breeding season.

Bait stations were placed on Burhou on the 19th March (whilst setting up the puffin cameras), these were checked again on the 7th September. No evidence of rats was observed; however, snails had completely consumed the bait.

Due to the timing of bait placement coinciding with observations of shags just settling to nest at the base of hanging rock, monitoring of Rousset was abandoned early in the year. Shags are especially vulnerable to disturbance at this stage with females easily deserting sites in the pre-laying period or during early incubation. Monitoring of this site is planned for winter/early 2020.

Recommendations:

This is a long-term project, which must be continued. See 4.2.3 for recommendations.

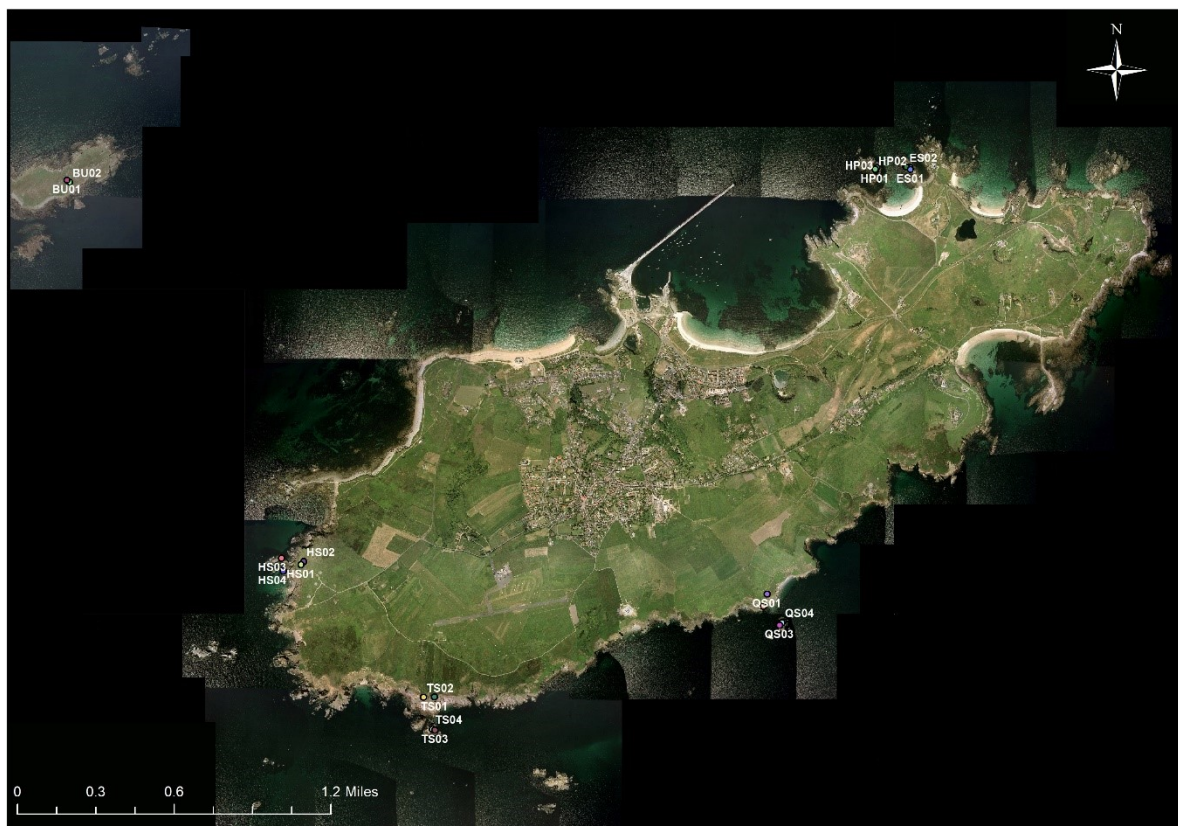


Figure 15 – Rat Bait Box Locations



Figure 16 – Rat Bait Box Locations; Top Left – Houmet de Pies (HP) and East Saye Promontony (ES); Top Right – Le Quoire (QS); Middle Left – Twin Sisters (TS); Middle Right – Hanaine (HS); Bottom – Burhou (BU)

4.2.3 Review of Rat Monitoring and Control

Rat monitoring in 2019 showed evidence of rats using all the targeted sites (except Burhou). These areas are important for breeding seabirds around Alderney, many of which will use the Ramsar site. In order to reduce rat presence on these sites and assess the impact of rat control on breeding seabird species this project needs to continue. Although common terns did not use Houmet de Pies this year (see 4.1.2.4), rat control on both Houmet de Pies and the new site on the east side of Saye Bay should continue as it's still very possible either site could be used next year.

Monitoring of Burhou is essential to determine if rats are present on the island which would require immediate rat control. This monitoring is essential due to the internationally important breeding seabird populations on the islet.

Recommendations:

Continue rat monitoring and control at all sites (including Rousset) in 2020 and beyond. It is recommended that work is completed earlier next year, with a monitoring programme in the first months of 2020 in order to assess rat presence before baiting with poison.

4.2.4 Monitoring of Bracken and Invasive Species on Burhou

This year, the bracken on Burhou was seen to extend into the area of the puffin's burrows below and south-east of Burhou Hut. Bracken obstructed the view of puffin burrow entrances thus impacting the puffin productivity surveys (see 4.1.2.1 and Appendix 6.2). Bracken may also limit suitable nesting ground for puffins in the future.

No evidence of rats on Burhou was found in 2019 (see 4.2.1).

Recommendations:

It is recommended bracken on Burhou is managed in 2020, cutting it back further away from the puffin burrows. This should be completed in collaboration with the States of Alderney Public Works department.

Rat presence should continue to be monitored in 2020 and beyond, with immediate and appropriate action taken should any evidence of rats be discovered.

4.3 Marine

All marine works within the Ramsar Site fall under the AWT Alderney Living Seas Programme (2019). As such, the majority of these surveys are completed across other sites on Alderney, with the data retained by the AWT.

4.3.1 Requesting Data from Capturing our Coast

Please see 4.3.11.

4.3.2 Habitat Mapping of Clonque Bay

A marine (intertidal) habitat survey of Clonque Bay was undertaken in 2019. At present, all field-work has been completed. Data entry, GIS mapping applications, assessment and summary report writing to be completed by the end of January 2020.

Recommendations:

Some areas have proven difficult to survey due to the aerial photograph maps not corresponding with the current topography/substrate of the bay (i.e. some areas now showing sedimentation/additional boulders present/scour from recent storm events). For 2020, it is recommended to source more recent maps from Digimap and/or consider photographing certain areas with a drone.

Following the completion of the habitat map survey summary report results, a phase II survey within identified important habitats/features is recommended to be undertaken.

4.3.3 Green Ormer Population Assessment

During 2019, four survey sessions with the public were held to assess green ormer population. A total number of five green ormers (*Haliotis tuberculata*) have been recorded and also tagged in Clonque Bay. No previously tagged individuals were found.

Recommendations:

To continue this assessment in 2020 and also pass on past green ormer information to La Societe Jersiaise for comparative Channel Islands review.

4.3.4 Invasive Species Assessment

The presence and location of intertidal invasive species were recorded during the green ormer population assessment (see 4.3.3) and public marine outreach events, such as rockpooling and the Inter Islands Environment Meeting (IIEEM; see 4.6.3) bioblitz.

For 2019, four invasive species were recorded within the Ramsar Site, specifically Clonque Bay. This included: Asian shore crab (*Hemigrapsus sanguineus*), Harpoon weed (*Asparagopsis armata*), Wireweed (*Sargassum muticum*) and orange-tipped sea squirt (*Corella eumyota*).

Recommendations:

Undertake intertidal invasive species surveys in 2020. This may include recording species through The Wildlife Trust's new recording programme, *Shoresearch*, in addition to the green ormer assessment and public outreach events.

4.3.5 Marine Mammal Surveys

At present, sources of marine mammal information from external groups (i.e. Sea Watch Foundation) are being sought. A full summary review of all marine mammal surveys and activities within and outside of the Ramsar Site will be completed by the end of February 2020.

Recommendations:

None at this present state unless stated in the final summary review, to be completed by the end of February 2020.

4.3.6 Fish/Shellfish Surveys – BRUVs

Six marine flora and fauna surveys were carried out this year, using Baited Remote Underwater Video (BRUV) techniques (see AWT., 2019a). Four surveys were undertaken within the Ramsar site, with a further two elsewhere around the island (Figure 17). Due to a lack of resources, some video footage remains to be analysed. A highlight from this year was the recording of two nursehound sharks (*Scyliorhinus stellaris*). While contributing valuable data, these videos also provided captivating footage to engage the public and raise awareness of the marine life and work within the Ramsar site. The footage was shown on the Alderney Wildlife Trust’s social media, in the wildlife information centre and gained media attention (see 4.5.5).

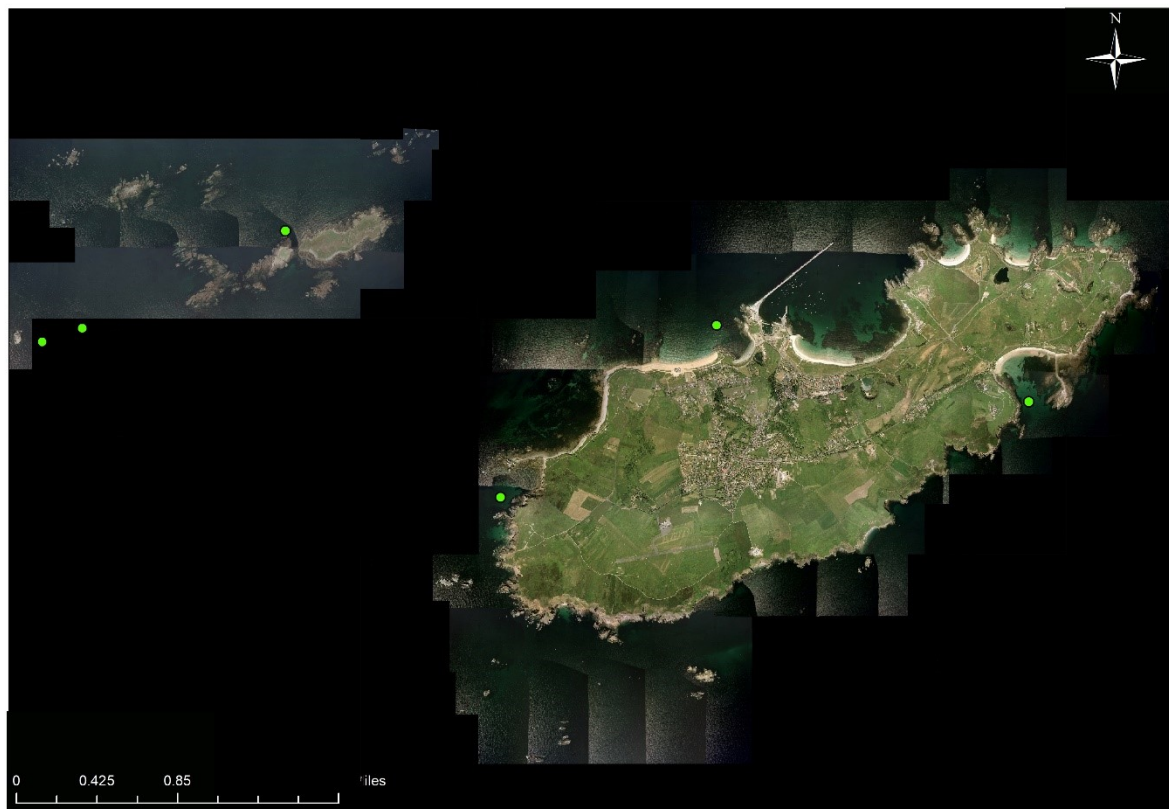


Figure 17 – BRUV drop locations in 2019.

Recommendations:

It is recommended in 2020 that a master’s student undertakes a BRUV project as part of an AWT placement. This will enable a competent student to undertake a research project involving reviewing the methodologies available, formulating the study design and undertaking data

collection and analysis. This will ensure more resource and focus is available to the BRUV project. Guidance notes have been drawn up for this purpose and are available from the Alderney Wildlife Trust.

4.3.7 Grey Seal Population Dynamics Study

For 2019, three boat surveys were successfully completed, which aimed to assess the grey seal population behind Burhou during their breeding season (October – November). A total number of 52 grey seal sightings were recorded, with an average of 17 sightings per trip. Most were seen hauled out on offshore rocks (mainly around Renonquet). Approximately 30% of the seal sightings comprised juveniles, with one very small weaner (photographs verified by independent UK seal experts). This potentially shows the population is a small healthy group.

Recommendations:

To continue grey seal population dynamics survey in 2020.

4.3.8 Grey Seal Photographic ID Catalogue

The grey seal photographic ID catalogue involves collating photographs of grey seals across the Channel Islands and identifying individuals based on their fur patterns/distinguishing features.

For 2019, photographs were provided by AWT staff members and the public. At present 43 grey seal individuals have been identified across the Channel Islands.

None of Alderney's grey seal photographic ID catalogue seals matched with Cornwall Seal Group's catalogue of UK seals (checked in December 2019).

Recommendations:

To continue support of the grey seal photographic ID catalogue.

4.3.9 Intertidal Review of Methods, Results and Activities

This objective was planned to be completed as a summer placement project by a student from the University of York. However, unfortunately the project was not chosen by any students. This workstream has therefore been postponed until 2020.

In the interim, a short review has been carried out as outlined below:

For 2019, intertidal methods comprised assessing marine intertidal habitats (see 4.3.2, 4.3.10 and 4.3.12) and species of interest (see sections 4.3.3 and 4.3.4).

In addition, general sightings of species were recorded through The Wildlife Trust's Shoresearch citizen science programme and a Bioblitz during the IEM, specifically within Clonque Bay. These helped provide under-recorded/new species presence within the Ramsar Site, such as spotted cowries (*Trivia monacha*), brittlestars and crabs.

In combination, these surveys and species sightings provide a valuable baseline of the intertidal environments within the Ramsar Site.

Recommendations:

It is recommended the project is re-advertised with the University of York for 2020.

4.3.10 Strandline Surveys

Strandline surveys were undertaken at Clonque Bay, Hanaine Bay and Platte Saline Bay during the summer. These assess strandline presence, size, and composition (dead, live, and litter content).

For this year, results show that the strandlines within these three bays predominately comprised marine algae, *Fucus* species. Numerous pieces of plastic and palm oil litter were recorded, which prompted a beach clean at Clonque Bay.

Recommendations:

Strandline surveys have been undertaken across Alderney since 2016 and have provided insight into their composition. These surveys have also acted as a useful training activity for visiting students, work placements and DoE volunteers. It is now, however, recommended that strandline surveys are used solely for training purposes for interested volunteers/students and/or in combination with a public beach clean event. A large amount of strandline data for each bay across Alderney has now been obtained meaning additional data is of limited value.

4.3.11 Capturing our Coast

At the end of 2018, the UK citizen science project Capturing our Coast (CoCoast) ended. CoCoast aimed to gather information on the range and distribution of intertidal species around the UK through training the public. Approximately 2,500 volunteers were trained, who sampled 240,000 data points in 1,800 locations from 2015 - 2018. On Alderney, the AWT helped train approximately 15 volunteers.

Co-Coast data is currently being used by CoCoast scientists to identify invasive species and climate change trends across the UK and Channel Islands. In 2018 and 2019, the AWT requested information regarding Alderney (particularly within the Ramsar Site), but have still not received a response from the CoCoast coordinators.

Recommendations:

A 'CoCoast 2' project is to potentially start in 2020/2021. It is recommended that past data from Alderney is requested again, once this new project becomes 'live' in 2020.

4.3.12 Cave Surveys

For 2019, only two caves were investigated due to poor weather and tide conditions during the end of summer/autumn. The two caves were located on the west coast of Alderney, outside of the Ramsar Site. The caves comprised two different cave habitat types, common intertidal species (such as sea anemones), anthropogenic items and the presence of an unidentified bat (AWT., 2019g).

Recommendations:

It is recommended that cave surveys continue in 2020.

4.3.13 Seasearch

This year, continued support was given to Seasearch, which train recreational divers and snorkellers to record marine habitats and species. During July, a number of AWT staff were given Seasearch training by Seasearch's national coordinator, Charlotte Bolton. This enabled the AWT (through the AWT Seasearch Snorkel Group) to conduct numerous Seasearch surveys across Alderney, including within the Ramsar Site. At present, all AWT Seasearch Snorkel Group data has been submitted to Seasearch, which will be independently verified and then added to the UK

National Biodiversity Network. Seasearch aim to write an annual Channel Islands report, which will describe all Alderney based data and will be made available to the AWT in due course.

Recommendations:

Support Seasearch activities (including AWT Seasearch Snorkel Group) within Alderney waters, to enable further marine habitat and species data collection. Consider funding further Seasearch training for AWT staff, for 2020 (i.e. transport and course costs).

4.3.14 Sea Water Testing

This work stream was subject to a funding proposal which unfortunately was not successful.

Recommendations:

Consider seawater testing within the Ramsar site for 2020.

4.3.15 Marine Mammal Review of Surveys

Please see 4.3.5.

4.3.16 Support the British Marine Life Rescue Divers Group on Alderney

For 2019, the AWT continued its support for the British Marine Life Rescue Divers (BMLRD). The BMLRD help rescue stranded marine mammals (live and dead). On Alderney trained BMLRD include Dr Mel Broadhurst (Living Seas Coordinator) and the staff at the Alderney Animal Welfare Society. The States of Alderney public works assist with removal of carcasses and signage. Live and dead marine mammal stranding policies have been written by the AWT, AAWS and SoA.

This year, only one dead Common Dolphin was recorded stranded, which was found near Houmet Herbe (outside the Ramsar Site).

Recommendations:

Continue supporting the BDMLR on Alderney, such as recording stranding incidents and providing additional support if required during a stranding (i.e. keeping the public away).

4.3.17 Support Marine Management Activities and the Marine Management Forum

Alderney's Marine Forum has been supported this year with a representative from the AWT present at all meetings. This year the forum helped provide funds for the AWT outreach marine tank. The forum also gave its on-going support for the voluntary "Puffin Friendly Zone".

Recommendations:

To continue supporting the Alderney Management Forum.

4.3.18 Support Marine Academic Projects

For 2019, no students completed marine academic projects within the Ramsar Site (see section 4.3.9).

Recommendations:

It is recommended a student placement/project is offered with the University of York for 2020 (see section 4.3.9).

4.3.19 Review Contact with Agence des Aires Marines Protégées (AAMP)

This organisation has changed its name to Agence de la Biodiversité. Contact has been reviewed, with representatives of the organisation attending the IEM, held in Alderney this year (see 4.6.3).

Recommendations:

Continue to remain in contact with Agence de la Biodiversité and review contact annually.

4.3.20 Review of Baseline Marine Data

This workstream was planned to be undertaken in winter and completed by the end of spring 2020.

Recommendations:

Complete in 2020.

4.4 Events

4.4.1 Boat Tours on Sula of Braye

The Alderney Wildlife Trust's boat, Sula of Braye (hereafter "Sula") returned to the water on the 18th March 2019, following annual winter maintenance work.

In total, 72 boat trips were undertaken this year, (including educational tours for students, see 4.4.2), 18 of which involved work within the Ramsar site and 1 involved filming for BBC Countryfile. A total of just under 550 passengers were engaged.

Boat tours on Sula educated members of the public about the Ramsar site and species within it, while also contributing to the costs of boat use for seabird and marine monitoring.

Sula was taken out of the water on the 14th November 2019 to undertake annual winter maintenance.

Recommendations:

Boat tours should continue in 2020 in order to raise awareness of the Ramsar site, wildlife and conservation in addition to contributing to the costs of vital seabird and marine work.

4.4.2 Educational Tours for Students of St Anne's School

AWT obtained funding to offer educational boat tours to all the upper school students of Alderney's St Anne's School this year. A total of 32 students/teachers attended tours. Each tour focused on educating local children about the Ramsar site, local wildlife ecology, conservation projects/issues and what they can do to help.

Recommendations:

This project will continue into the future, with one or two educational tours offered annually to Year 6 students of St Anne's School (funds for 2020 have been obtained).

4.4.3 Community Engagement and Public Awareness

Ramsar community and public engagement events held by the AWT in 2019 included; ormer/invasive species hunts (23rd March and 30th October), beach cleans (11th April and 24th October), rockpooling (28th May, 16th June and 31st July) and seaweed search and foraging (31st May) all at Clonque Bay. Regular boat tours (see 4.4.1; including a tour to Casquets on 31st May and involving BRUV deployment (see 4.3.6) on 7th and 16th September) and a marine mammal land based watch (28th July, for Sea Watch Foundation National Whale and Dolphin Watch) were also undertaken.

A marine tank was set up in VisitAlderney between July and September, with information and weekly talk sessions to educate the public about species found within the Ramsar site.

The public was also educated about the Ramsar site via many publications and conversations throughout the year, including raising awareness of the Puffin Friendly Zone (see 4.1.4).

A bioblitz was also held at Clonque Bay for attendees of the IIIEM (on 26th September 2019).

Recommendations:

Continue events and public engagement in 2020 and beyond.

4.5 Advisory and Legislative

4.5.1 Review and Update 5-Year Ramsar Strategy and Ramsar Reports

This objective was postponed to next year pending a new system for environmental research led by the SoA Chief Executive Officer for 2020 (see 4.5.9).

Recommendations:

This work objective should be undertaken in 2020.

4.5.2 Signage on Burhou

A poster outlining sensitive areas to avoid on Burhou (Appendix 6.1) was created and placed in Burhou Hut on the 29th April 2019. It is hoped this poster will help prevent the trampling of storm-petrel and puffin burrows.

Recommendations:

Check this poster has not been removed or damaged and replace if necessary.

4.5.3 Signage and Publication of the Puffin Friendly Zone – Marine Exclusion Zone

Posters of the PFZ were distributed around Alderney including at Alderney Harbour (at the top of the pontoon, in the Harbour Office, the harbour information point and Braye Beach hotel), in all supermarkets on the island, Visit Alderney, the Town Hall and local pubs, restaurants and shops.

A press release was also prepared gaining media coverage from Quay FM (Alderney's local radio station), ITV channel news website (ITV, 2019d) and social media pages, The Guernsey Press (2019d) and The Journal (published 3rd May 2019). The AWT Ramsar Officer also participated in radio interviews with BBC Guernsey and Island FM to raise awareness of the zone. HarbourGuides.com was also contacted and helped by adding information about the PFZ to the Alderney pilot note page of the website (Harbour Guides., 2019).

Visit Alderney included the PFZ on several pages of their website (Visit Alderney, 2019). The AWT continued to promote the PFZ throughout the year, posting about the zone on social media, the AWT and Live:Teaching Through Nature websites, educating the public during boat tours and discussions in the AWT shop/information centre. The AWT Ramsar Officer held a stakeholder meeting on the 22nd March 2019 (see 4.1.4 for further details).

Flyers were produced for the Harbour Office to distribute to visiting boats as recommended by the Harbour Master so that they could be distributed with welcome packs. These included information on the PFZ and the Ramsar site.

In order to target French marine users who often visit Alderney's waters, a French press release and poster was emailed to Dielette Harbour, Cherbourg Harbour, France Basse Normandie, Paris Normandie, Groupe Ornithologique Normand Cross Jobough, Cross Corcen, Ouest France, Normandie Fraicheur Mer (a Normandy fishermen organisation) and a local radio station. A news notice and the poster were published on the Cherbourg Harbour website (Port de Cherbourg, 2019).

The PFZ has been included in the 2020 tourism brochure for Alderney, produced by Visit Alderney.

Recommendations:

It is recommended the PFZ is promoted as much as possible in 2020 and beyond. Increased awareness and compliance will strengthen the effectivity of the zone. Further promotion in France would be particularly beneficial.

4.5.4 Signpost Placement for Breeding Waders

Signs alerting the public to breeding waders were placed around suitable beaches on the 6th May 2019. The public was also reminded about sensitive ground nesting wader presence via posts on the AWT's social media pages and on the Alderney Bass Comps facebook page.

The effectivity of signs this year was considered, noting that many people didn't notice the signs due to their small size and position near ground level.

Recommendations:

Replace all breeding wader signs before the 2020 season with a more prominent design and height to help gain attention.

4.5.5 Publications Relating to the Ramsar Site

At least 26 media publications (including TV, print and online articles) relating to the Ramsar site were produced by organisations independent to the AWT in 2019.

Publications relating to research on gannets and plastics (see 4.1.3) received significant attention from the media, with the AWT being interviewed by ITV Channel TV News on two occasions (aired 9th April and 7th November and published online at ITV, 2019a and 2019b) and BBC Countryfile, featuring conservation projects in Alderney on their 'Autumn Special' episode (aired 3rd November, available online at 'Autumn Special', 2019). Articles were also published by The Telegraph, both in print (Bodkin, 2019a) and online (Bodkin, 2019b), the BBC (2019), The Guernsey Press (two separate articles; 2019a and 2019b), the Bailiwick Express in Guernsey (Bailiwick Express, 2019a) and Jersey (Bailiwick Express, 2019b), BirdGuides (2019) and plasticgeneration.com (Askew, 2019).

The AWT also participated in interviews to promote the puffin cameras (including on ITV Channel TV News live on 19th April) and the Puffin Friendly Zone (see 4.5.3 for further details and articles).

The publication of Alderney's 2015 gannet census (Copping *et al.*, 2019) received media attention in The Guernsey Press (2019c).

The Track A Gannet (T.A.G) project (see 4.1.6) was featured by The Guernsey Press (Kenneally, 2019; with subsequent public engagement with a member of the public's letter and the AWT's response published) and ITV Channel News (ITV, 2019c).

The BRUV project (see 4.3.6) was featured by Country Life (Passino, 2019), following the recording of nursehound sharks.

In addition to the above, the AWT also produced many publications relating to the Ramsar site. These included regular articles in the local Press and AWT magazine, social media content and a Ramsar leaflet (to be published in 2020).

The puffin cameras were available to the public on the LIVE: Teaching Through Nature website (www.teachingthroughnature.co.uk) this year. The cameras were also publicly screened in the AWT information centre/shop.

The AWT also worked with the Guernsey Post to produce a series of stamps and associated publications depicting wildlife with the Ramsar site. These are due to be published on the 21st January 2020.

Due to limited resources, updated Ramsar information boards were unable to be produced in 2019. This should be a priority for 2020.

Recommendations:

Continue to contribute to publications for the Ramsar site in 2020.

Review the current and install additional Ramsar information boards in 2020 (see AWT, 2019a; 4.5.1 for further details).

4.5.6 Channel Islands Ramsar Steering Committee

Communication links were maintained throughout the year, with several videocall meetings.

Alderney also hosted the IEM and Wilder Islands Conference between the 26th and 28th September 2019 (see 0 and AWT, 2019b), with many Channel Island Ramsar site representatives attending. These events included a Ramsar meeting to specifically discuss Ramsar collaboration and issues, presentations by visiting organisations and many conversations between attendees, enhancing communication, relationships, the sharing of ideas and collaboration.

The Alderney Wildlife Trust has contributed to the creation of a Channel Islands Ramsar Site Code of Conduct document and undertook responsibility for the creation of the Channel Islands Ramsar website this year (see 4.5.10).

Recommendations:

Maintain communication links with the Channel Islands Ramsar Steering Committee and publish the Channel Islands Ramsar website in 2020.

4.5.7 Twin Alderney's Ramsar Site with Iles de Chausey

The possibility of twinning the Ramsar site has been raised with Maison de la Normandie (the permanent representative office of the County Council of La Manche and the Regional Council of Normandy in the Channel Islands). The AWT are currently awaiting a response.

Recommendations:

Continue this work objective in 2020.

4.5.8 Review Bird Protection Law

The States of Alderney were supported in improving bird protection laws in 2019, with a significant number of meetings regarding this topic. It is hoped positive changes will be made in 2020.

Recommendations:

Continue to support the SoA in 2020.

4.5.9 Support the SoA in the Development of Appropriate Legislation

A significant amount of resource went into the development of a new system for environmental research administration for Alderney, led by the SoA CEO. The draft proposal for this was approved by the General Services Committee on the 12th November 2019 (SoA, 2019).

This system will see the replacement of the existing ARSG with a Scientific Advisory Group (SAG), which will review environmental work in Alderney and provide advice to the SoA. An Environmental Secretariat (ES) will be created/contracted to coordinate processes between Activity Organisations (anyone undertaking environmental work as defined within the Terms of Reference), the SAG and the SoA. This process will eventually cover the majority of environmental work in Alderney, including Ramsar.

In collaboration with stakeholders, a draft Terms of Reference (ToR) has been prepared. The new policy will be further developed in 2020 with a shadow ES and SAG and the policy established no later than October 2020. While the new system is being developed, it has been agreed that the current Ramsar processes will continue to be used throughout 2020, with the end of year reporting by Activity Organisations being submitted before the end of the year to the new SAG, under the ToR.

It should be highlighted that the SoA CEO's Office has advised that the Ramsar Secretariat and then the ES will be responsible for maintaining overarching risk assessments for Ramsar and other SoA environmental practice. All Activity Organisations will be responsible for completing operational risk assessments and taking out insurance for their activities. The SoA will require Activity Organisations to provide evidence to this effect to the secretariats for documentation and for the SoA Harbour Master. Activity Organisations will work with the ES/SoA to implement appropriate health and safety measures, where necessary.

A wildlife act is also being developed by the SoA following the successful Blue Islands Charter (see 4.6.3).

Recommendations:

Continue to support the SoA in 2020 and beyond.

4.5.10 Support the Channel Islands Ramsar Website

The creation of a Channel Islands Ramsar website is a project to help publicise the Channel Islands Ramsar sites, promote and raise awareness of visitation and use, publishing code of practices and relevant information for the sites as a whole and individually.

Support was given to the creation of a Channel Islands Ramsar website, with responsibility for building the site being taken on by AWT in 2019. The website is planned to be published in 2020.

Recommendations:

Continue to support the Channel Islands Ramsar website, aiming to publish the site in 2020.

4.6 Additional Items

4.6.1 Gull Observations via Puffin Cameras

Unexpectedly, the PTZ puffin camera enabled many gull observations this year, including the recording of colour rings on Burhou.

Lesser black-backed gulls were observed mating on the 30th April (not thought to have been successful), in the foreground of puffin survey View 1 on the 22nd May and in survey view Test 6 (behind the rocks behind peg 91) on the 12th June. Lesser black-backed gull chicks were observed upon these rocks from the 24th June.

Great black-backed gulls were observed mating on the 27th April and within the puffin burrow area (survey view 2) on the 22nd May.

34 lesser black-backed gull colour ring sightings (21 individual gulls) were recorded using the PTZ puffin camera this year (see in Table 24 in Appendix 6.7), contributing valuable data to the Guernsey Gulls (2019) database. Most of the recorded individuals were initially ringed on Burhou, with the exceptions of one individual initially ringed as a pulli in Sark and three individuals initially ringed in Guernsey. One individual had not been recorded since it was initially ringed over 5 years and 9 months (2103 days) prior to the sighting. 2, 5, 10 and 16 records were recorded for individuals which had not been sighted for 2-3 years, 1-2 years, 130-290 days and <85 days respectively.



Figure 18 – Example Lesser Black Backed Gull Colour Ring Records using the PTZ Puffin Camera

These opportunistic sightings were possible by panning the camera around, zooming in on gulls and taking a picture or video of the ring, gaining a record (including with a time and date stamp) which could be checked and validated (e.g. see Figure 18). Sightings were opportunistic this year, with the AWT's Ramsar Officer looking for rings when time allowed (often before or after the puffin productivity surveys and in the Officer's spare time). It is noted that additional rings were observed which were unable to be read due to being just out of the zoom ability of the camera/poor camera quality/the camera shaking too much in the wind on full zoom.

Recommendations:

Continue using the PTZ puffin camera to identify as many colour rings as possible in 2020 and beyond, contributing valuable data to Guernsey Gulls (2019).

4.6.2 Storm Petrel Observations via Puffin Cameras

Another unexpected ability of the PTZ puffin camera was the ability to view storm petrel activity at night (using infra-red lights on the cameras). Storm petrels were frequently observed flying at night throughout the season. As the 2019 camera set-up did not include a microphone to transmit sound, unfortunately it was impossible to determine if storm petrels were flying over burrows with an individual calling inside or not. 4 burrows were opportunistically identified in 2019 (Figure 19). Burrows 1 and 4 were also identified as puffin borrows, with storm petrel burrow 1/puffin burrow 53 observed with fish returns indicating a puffling was inside. A rabbit was also observed using this burrow. This may indicate the burrow entrance leads to multiple chambers.

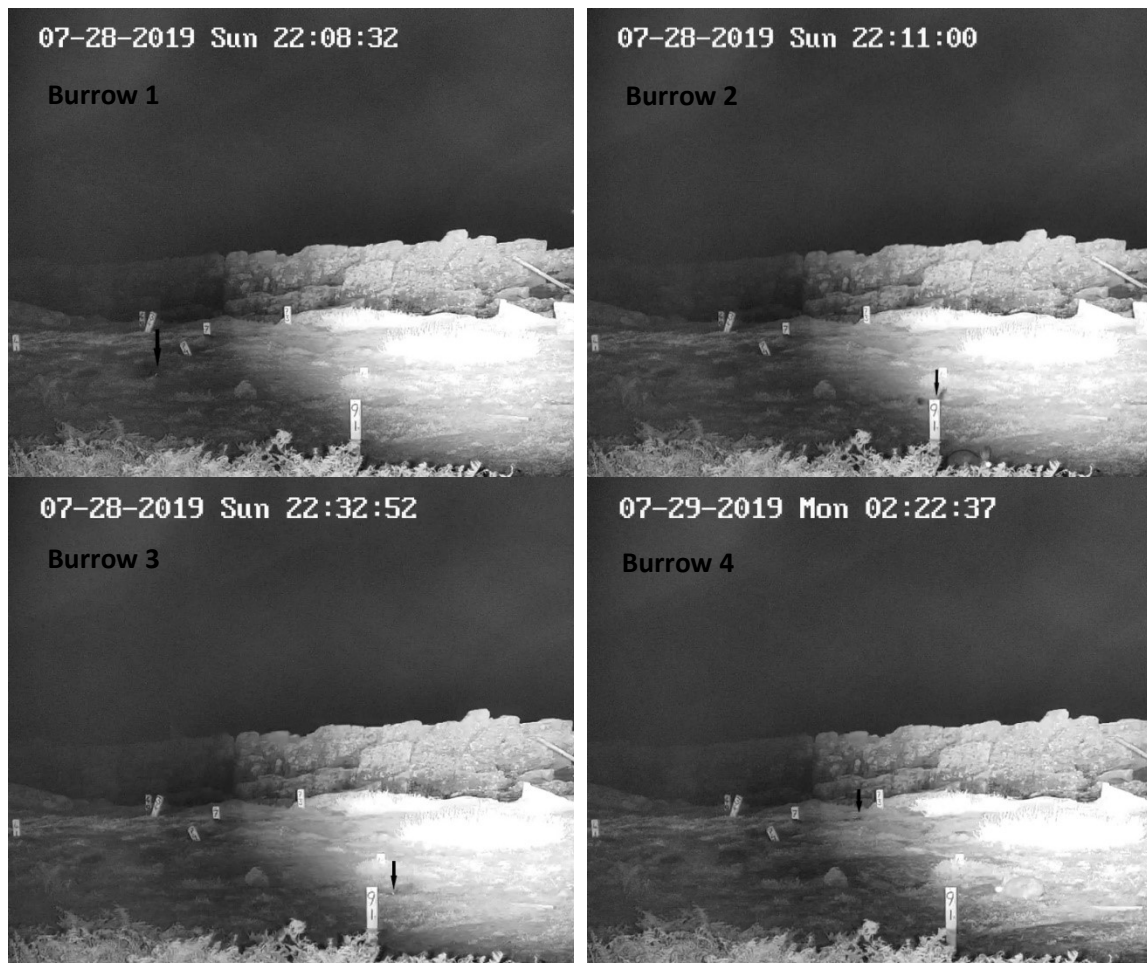


Figure 19 – Storm petrel burrows identified in 2019 opportunistically using the PTZ puffin camera. Burrows are indicated by black arrows pointing towards the entrance.

It is thought that additional burrows could be identified if more resources were available to review night footage.

Recommendations:

Add a microphone to the puffin camera set-up and explore using the PTZ puffin camera to monitor storm-petrel activity in 2020.

4.6.3 Inter-Islands Environment Meeting and Wilder Islands Conference

Alderney hosted the Inter-Islands Environment Meeting (IIEM) in 2019 – an annual event which has been running since 2000, bringing together conservationists from the Crown Dependencies, Overseas Territories, and the British Isles. This year the IIEM was combined with the Wilder Islands Conference, organised by the AWT – an additional day of talks and discussions with representatives from the British Isles and its Overseas Territories and the wider scientific community, aiming to bring scientists, conservationists and policy makers together to focus on steps these communities can do to make a Wilder Future for their islands.

Minsters and representatives of islands from UK Crown Dependencies, UK Overseas Territories and the British Isles agreed to sign the Blue Islands Charter during the Wilder Islands Conference. The Charter (Appendix 6.8) provides a statement of principle on several environmental initiatives which signees intend to pursue.

The various territories are also actively exploring the possibility of creating a joint biodiversity fund to support inter-island work. This fund would also be open to contributions from other parties, including governmental, corporate and private sources.

Representatives from other Ramsar sites within the Channel were present (some of whom gave presentations) and a Ramsar workshop was held to discuss collaboration opportunities, issues and ideas. A bioblitz of Clonque bay was also undertaken, gaining valuable data for the Ramsar site.

Please see AWT., (2019b) for further details.

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6. Appendices

Appendix 6.1. Poster Detailing Sensitive Areas to Avoid on Burhou

Notice to Visitors: Help Protect Burhou's Wildlife



Sensitive Areas to Avoid
Please protect our seabirds by avoiding sensitive breeding areas on Burhou.

Burhou Puffin Friendly Zone
Between March and August, please avoid crossing the white line as indicated, to prevent disturbance of rafting puffins.

Burhou Cottage

Thank you for your cooperation.

Alderney

0 55 110 220 Meters


Please avoid walking in the areas highlighted in orange above.

Burhou is home to many important seabirds, including Atlantic puffins, gulls, shags and storm petrels. These birds breed on/in the ground, stone walls and rocks around the island. The storm petrel breeding season extends well into October, so it is very important not to trample on burrows which may have chicks and adults inside. In order to protect these sensitive areas from trampling and disturbance, which has been shown to significantly reduce breeding success, visitors are kindly asked to avoid walking in sensitive areas. Please access the foreshore by walking along the rocky coastline.

Burhou's Puffin Friendly Zone, is an area which marine users are requested not to enter between March and August, coinciding with Burhou's closed season during the puffin breeding season. Mariners are also kindly asked to adhere to the agreed code of conduct below:

- **DO NOT** cross the white line
- **KEEP** your **speed under 10 knots** when coming close to the island.
- **TRY** drifting by in the tide, keeping noise to a minimum and the birds will come out to visit you.
- **DO NOT** force the birds to fly.

Everyone can help protect nature by raising awareness of the above.



Appendix 6.2. Puffin Productivity Survey Summary Data

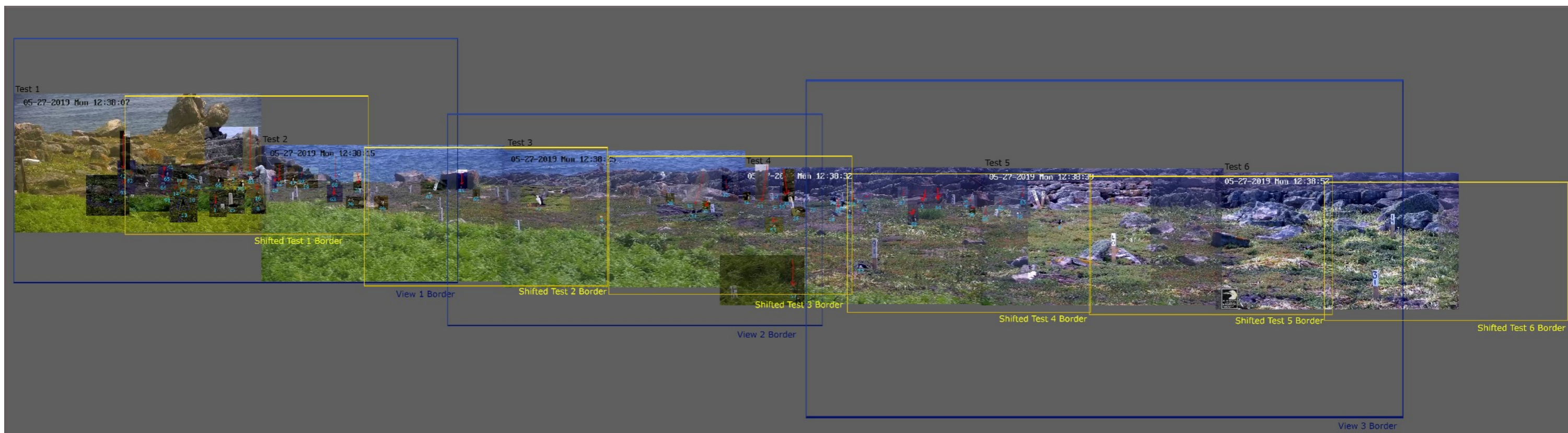


Figure 20—Puffin Productivity Observed Burrows and Survey Views

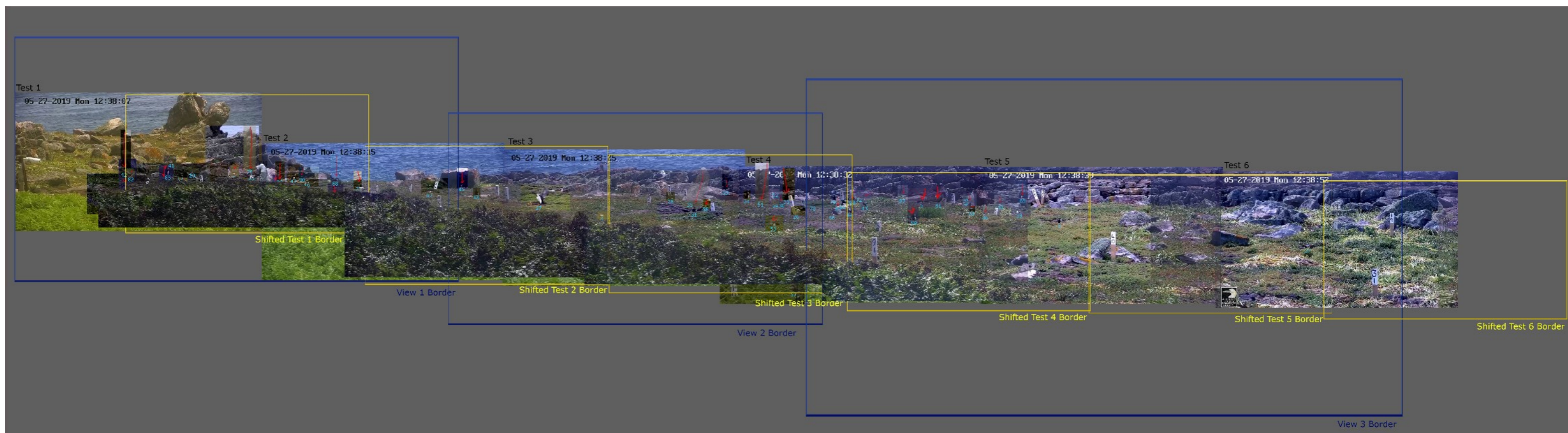


Figure 21—Puffin Productivity Observed Burrows and Survey Views with Bracken Overlay

Table 21 – Puffin Productivity Summary Data

Legend

• = burrow in use—entries/exits (number not included, but often multiple)

F = Fish return

Burrow Number	16 th April	18 th April	23 rd April	1 st May	7 th May	10 th May	14 th May	17 th May	22 nd May	27 th May	29 th May	3 rd June	6 th June	12 th June	14 th June	24 th June	29 th June	2 nd July	8 th July	11 th July	16 th July	20 th July	23 rd July	26 th July
1	•			•		•		•																
2		•		•		•		•																
3		•		•		•		•							F	•								
4			•	•		•		•				F			F	•			•			•		
45		•		•		•		•											•			•		
5		•		•		•		•											•			•		
6		•		•		•		•							F	•			•			•		
7			•	•		•		•						•					•					
8	•			•		•		F	•	F	•			•										
10				•		•		•						•										
11				•		•		•						•										
13				•		•		•						•										
14				•		•		•						•								•		
15				•		•		•						•										
16				•		•		•						•										
17				•		•		•						•										
18				•		•		•						•										
19				•		•		•						•								•		
20				•		•		•						•										
21				•		•		•						•										
22				•		•		•		F			F	•			F	F						
23				•		•		•		•				•			F	F						
25				•		•		•						•										
26				•		•		•		•				•										
27				•		•		•		F	F			F	•		•	•	•	F	•			
28				•		•		•		F	F	F			F						•			
29				•		•		•						•							•			
30				•		•		•						•							•			
31				•		•		•		•				•							•			
32				•		•		•		F	F			•				F			•			
33				•		•		•		F				•				F			•			
34				•		•		•		F				•				F			•		F	
35				•		•		•						•							•			
37				•		•		•						•							•			
38				•		•		•						•							•			
39				•		•		•						•							•			
40				•		•		•					F								•			
41				•		•		•						•							•			
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43				•		•		•						•							•			
44				•		•		•		•				•							•			
45				•		•		•		•				•							•			
46				•		•		•					F	•							•			
47				•		•		•						•							•			
48				•		•		•						•							•			
49				•		•		•						•							•			
50				•		•		•					F	•							•			
51				•		•		•						•							•			
52				•		•		•		F				•							•			
53				•		•		•						•							•			
54				•		•		•						•							•			
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66				•		•		•						•							•			
67				•		•		•						•							•			
68				•		•		•						•							•			
69				•		•		•						•							•			
70				•		•		•		F				•							•			
72				•		•		•		Fx2				•							•			
73				•		•		•			F	F		•							•			
74				•		•		•						•							•			
75				•		•		•			F			•							•			
76				•		•		•						•							•			
77				•		•		•						•			F				•		F	
78				•		•		•						•							•			
79				•		•		•					Fx2	•							•			
80				•		•		•						•							•			
81				•		•		•						•							•			
82				•		•		•						•							•			
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88				•		•		•						•							•			
90				•		•		•						•							•			
91				•		•		•						•							•			
93				•		•		•						•							•			

Appendix 6.3. Puffin Raft Counts

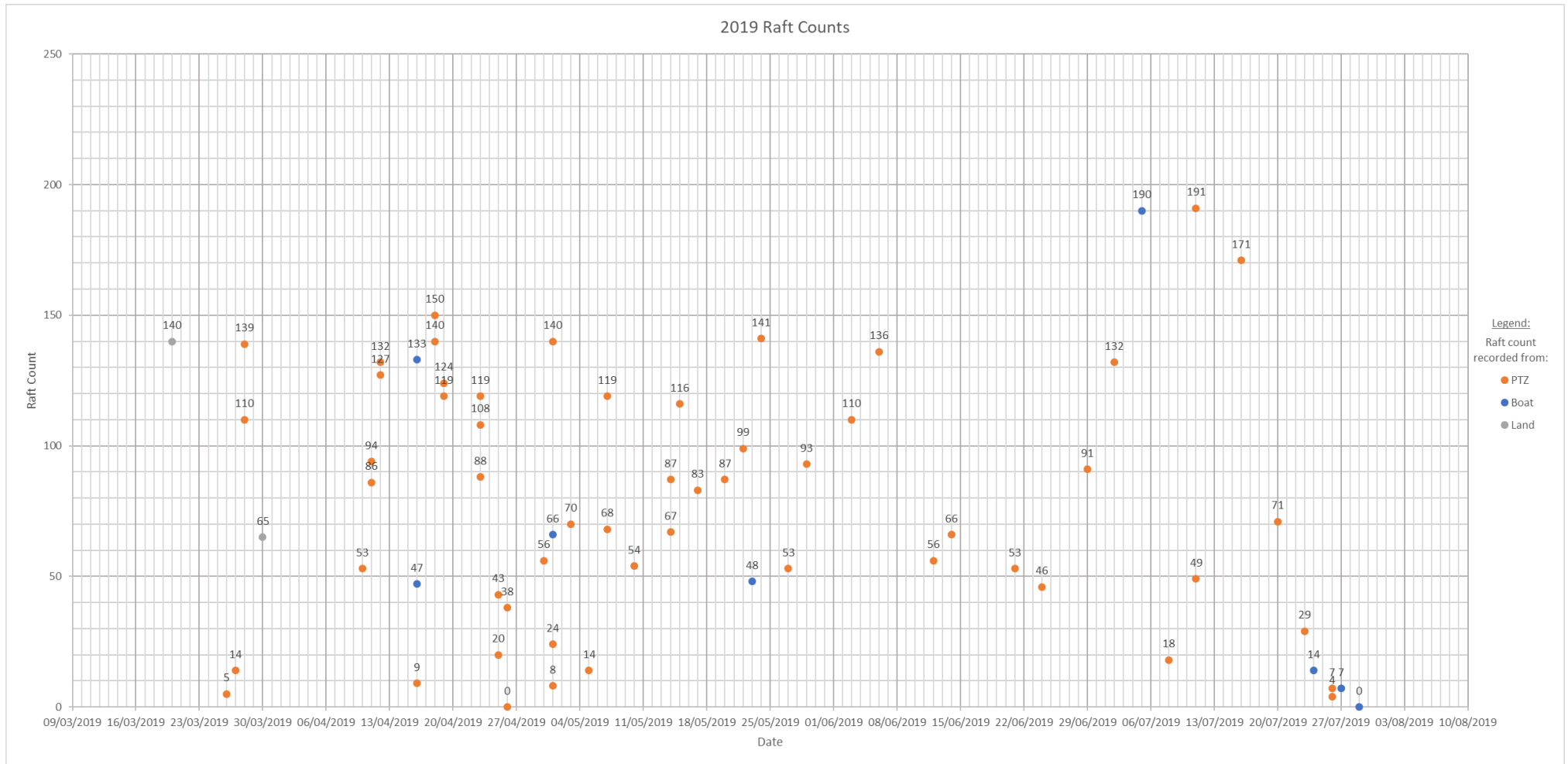


Figure 22 – 2019 Puffin Raft Counts

Appendix 6.4. Necropsy Recording Form

Unique ID: _____

Created by Daniele Clifford, AWT Ramsar Officer,
Seabird Necropsy Form

Species:		Unique ID:							
Collected From:		Collection Date:							
Frozen Date:		Necropsy Date:							
Necropsy Performed By:									
Additional Collection Notes:									

Rings Present:	Y / N				Ring Notes (colour e.t.c.):				
Metal Ring Number:					Colour Ring Number:				

Corpse Condition:		
Corpse Freshness: Categories of freshness - <i>(circle middle column)</i>		
Very fresh	FFF	Eyes bright & shiny
Fresh	FF	Eyes dull & bit shrunken, but tissue e.g. in mouth looks fresh
Rather fresh	F	Shrunken eyes, tissue in mouth starts discolouring
Rather old	O	Shrunken eyes, discoloured tissues, feathers becoming loose
Old	OO	Feathers easily pulled out
Very old	OOO	Mummified or strongly decaying e.g. bill-cornea easily falls off
Corpse Completeness: Categories of completeness - <i>(circle middle column)</i>		
Complete	CC	Body & plumage fully intact, no scavenger marks
Near complete	C	Lightly damaged or scavenged, but all major feather areas present
Incomplete	I	Seriously damaged or scavenged, with feather areas incomplete
Parts only	II	Whole body parts missing e.g. only wings and breastbone
Oil / External Fouling:	Y / N	% : <i>(don't estimate for incomplete corpses)</i>
Fractures / Wounds Visible:	Y / N	<i>(don't include those expected to be secondary - e.g. occurred during transport)</i>
Notes (e.g. external fouling substance / description of injury):		

Plumage: <i>(circle middle column)</i>		
Plumage Type (1 st year – adult): <i>(See appendix 1)</i>	1	Immature first year, dark head, whitish underparts
	2	Immature second year, white head, whitish forewing only, back mostly dark brown
	3	Immature third year, white or yellowish head, progressively more white on back and wings, most secondaries blackish
	4	Immature fourth year, secondaries “as piano keys” increasingly white, several blackish tail feathers
	5	Immature fifth year, few blackish secondaries, only central tail feathers black
	Adult	White secondaries and upper wing, white tail
Chick Plumage: (Nelson, 2002):	0-1 week	Black skin with white down plumes becoming noticeable by the end of the week.
	2 weeks	White scrubby down over the body, head and neck often bare, and the radio-ulna and hand still blackish. Chick looks considerably larger than then parents webs.
	3 weeks	Fully covered in white down (including head and wings) but lacking luxuriantly fluffy appearance of a 4 week old chick. Chick too big to be fully covered by the parent during brooding.
	4 weeks	Down notably long and fluffy by the end of the 4 th week. Chick now large and fat (2kg) about 2/3 of adult size.
	5 weeks	Some wing and tail feathers erupting – beginning to show black through the down. Chick near adult size.
	6 weeks	Long white down with black feathers of scapulars, wing and tail feathers becoming conspicuous. Chick looks bigger than parents.

	7 weeks	Mixed black feathers and white down on back. Long white down on the head, neck and belly. Black on wing, back and tail expanding.
	8 weeks	Advanced chicks losing white down from feathered forehead, back and tail. Mainly black above.
	9 weeks	White down thinning on ventral surface but still thick on flanks, belly and neck. Looks raggedest.
	10 weeks	Small amounts of white down remain on nape, flanks and back.
	11 weeks	Advanced chicks retain only wisps of down on nape and flanks and may be clear by the end of the week; but slow growers may not reach this stage until 93 days (13.28 weeks).
	11+ weeks old	Entirely juvenile plumage – no white down.
Description of Plumage:		
Pictures of plumage taken with unique ID in photos:		<input type="checkbox"/> Done

Biometrics: (See appendix 2)		Accuracy of Measurement: (e.g. mm)
Body Mass:	(total)- (container) = (bird mass)	
Bill Length:	(first feather-base to tip)	
Bill Depth:	(at base)	
Skull Length:	(first feather-base to back of skull)	
Total Head Length:	(front of bill to back of skull)	
Outer primary wing feather fully grown?	Y / N (Right)	Y / N (Left)
Wing Length:	(Right) (Left) (wrist to wing tip)	
Tarsus Length:	(Right) (Left)	

Internal Examination: (See appendix 3). Judge as if the corpse was fresh.						
Subcutaneous Fat:	0	1	2	3	Notes:	(fat stores should be examined at shoulder and back)
Breast/Pectoral Muscle Condition:	0	1	2	3	Notes:	
Intestinal Deposited Fat:	0	1	2	3	Notes:	
Lungs Condition:	0	1	2	3	Colour & Notes:	
Kidneys Condition:	0	1	2	3	Colour & Notes:	
Liver Condition:	0	1	2	3	Colour & Notes:	
Guts Condition:	0	1	2	3	Colour & Notes:	
Sexing & Aging (see appendix 4):						
Sexual Organs Visible:	Y / N	If yes... Organs Visible:		<input type="checkbox"/> Testis	<input type="checkbox"/> Oviduct	
Testis -						
Testis Colour:						
Testis Length x Width:	Left	Right	Right	Left	mm	
Testis Description:	(long thin, long thick, short round e.t.c.)					

Unique ID: _____

Oviduct -		
Ovary Visible:	Y / N = not structured	
Oviduct Development Score:	1	Thin and straight
	2	Thicker, straight
	3	Thicker still, slightly twisted
	4	Swollen and twisted <i>(adult breeding females, oviduct strongly enlarges and tissue becomes fleshy)</i>
Ovary – Maximum Diameter of Largest Follicle in the Ovary:	mm OR <input type="checkbox"/> not structured	
Bursa Fabricii:		
Bursa Fabricii Visible:	Y / N / Did not look for	
Bursa Fabricii description:	<i>(large, moderate, small e.t.c.)</i>	
Bursa Fabricii Length X Width:	X mm	
Stomach:		
Gizzard Colour:		
Proventriculus Colour:		
Worms:	Y / N	
<i>Extract gastrointestinal tract (including proventriculus, gizzard and intestines).</i>		
Total Mass of Gastrointestinal Tract (with contents inside):	Accuracy of measurement: <i>(e.g. 0.001g)</i>	
<i>Extract contents of gastrointestinal tract and separate out anthropogenic materials by flushing out with cold water over a 0.5mm sieve.</i>		
Total Mass of Gastrointestinal Tract Lining (without contents inside):		
Stomach contents notes:		
Additional Notes:		
Proximate Cause of Death:		
Gastrointestinal Tract Anthropogenic Material Contents Sterilised and Bagged, Labelled with Bird's Unique ID:	<input type="checkbox"/> Done	
Corpse Bagged and Labelled with Unique ID for Re-Freezing:	<input type="checkbox"/> Done	

Appendix 1:
Plumage Types

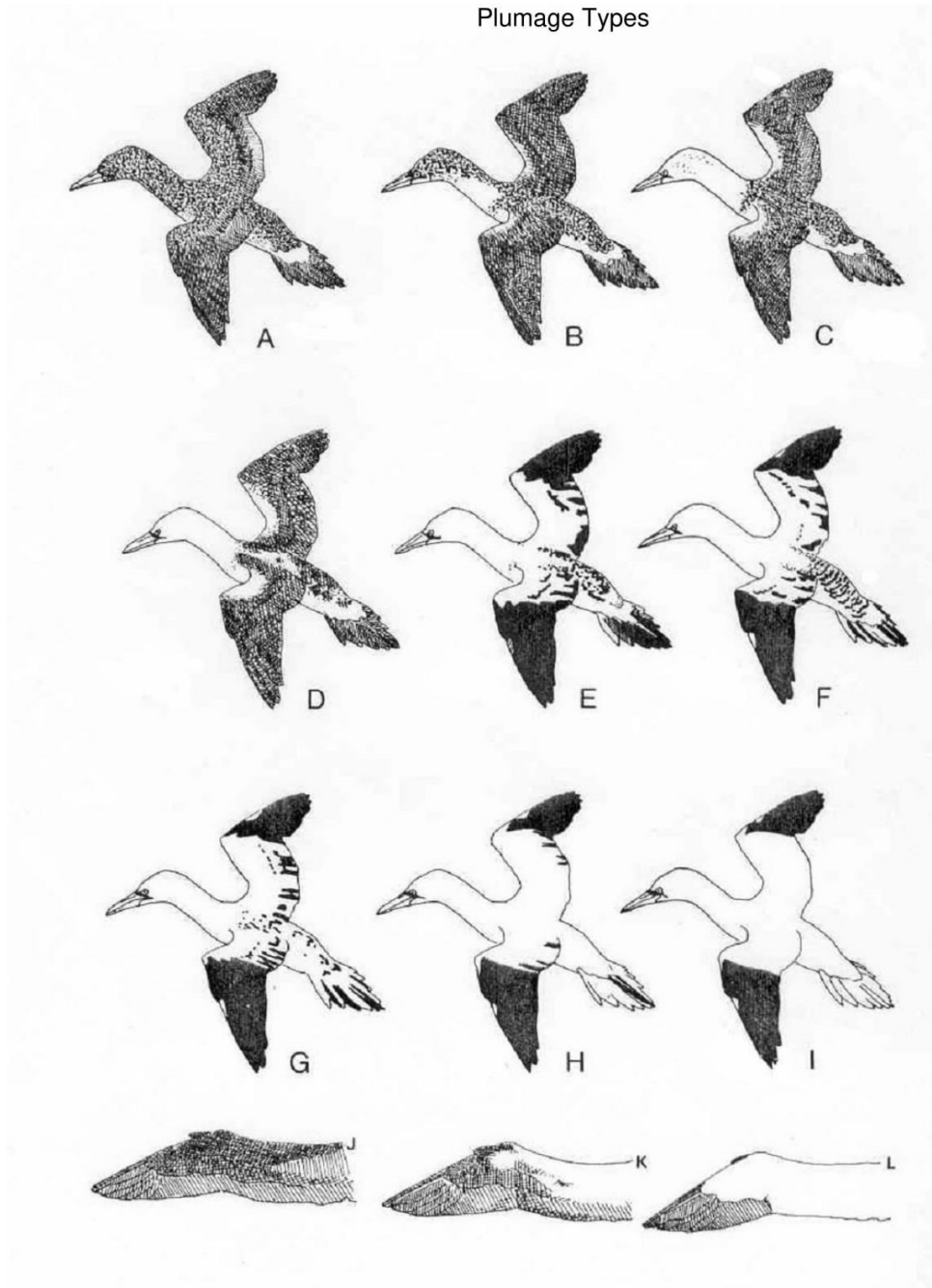


Figure 3 Gannet plumage types with age (from Nelson 1978b, modified)

- Type 1 (A) Juvenile plumage, dark brown sprinkled white, greyish underparts
- Type 1 (B) Immature first year, dark head, whitish underparts
- Type 2 (C-D) Immature second year, white head, whitish forewing only, back mostly dark brown
- Type 3 (E-F) Immature third year, white or yellowish head, progressively more white on back and wings, most secondaries blackish
- Type 4 (G) Immature fourth year, secondaries "as piano keys", several blackish tail feathers remaining
- Type 5 (H) Immature fifth year, one or two blackish secondaries, only central tail feathers blackish
- Adult (I) White secondaries and upper wing, white tail

(Camphuysen et al., 2007)

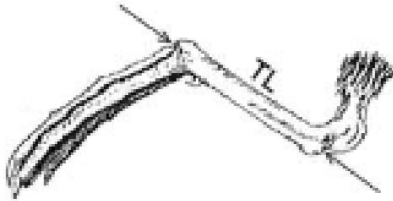
Appendix 2:

Biometrics

(*Camphuysen et al., 2007*)

Left and right measurements refer to the bird's left and right (i.e. if you've opened up the cavity with the bird laying on its back the left is on your right and the birds right is on your left).

Tarsus length:



Measure from the notch at the back of the intertarsal joint to the distal edge of the last large complete scale at the front of the foot, just before the toes diverge. The foot is gently bent down at right angles to the tarsus to expose the last large scale.

(*Image source: van Franeker., 2004*)

Appendix 3:

Internal Examination Matrices

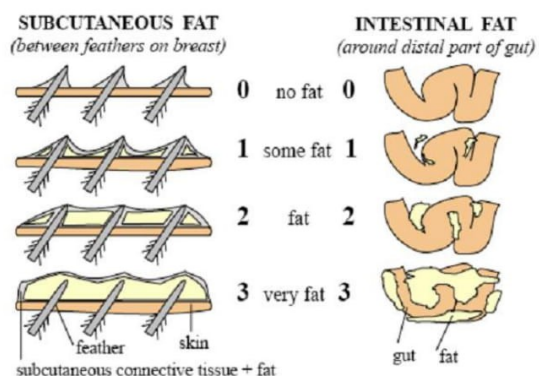


Figure 4. Fat deposit in stranded seabirds, scored according to a four-point scale (from Van Franeker 1983, 2004).

- 0 – no fat, feather quills clearly visible when the skin is opened during a standard autopsy (belly and breast skin are inspected), not a trace of fat between the intestines. See Fig. 2b for a clear example.
- 1 – some fat between the feather quills, scattered traces of fat in membranes between the intestines
- 2 – fat, feather quill tops just visible as little humps in the subcutaneous fat, intestines clearly visible but extensive fat stores between the loops
- 3 – very fat, feather quills invisible, intestines hidden in thick layers of fat. See Fig. 3b for a clear example.

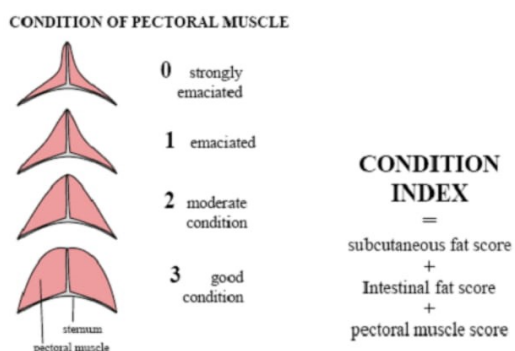


Figure 5. Breast muscle profiles and a suggested condition index based on fat score and pectoral muscle score (from Van Franeker 1983, 2004).

- 0 – breast muscle mostly gone. Sternum keel as a razor. See Fig. 3a for a clear example.
- 1 – breast muscle clearly concave
- 2 – breast muscle thick, but tip of sternum keel sticks out
- 3 – breast muscle very thick, sternum keel as a depression in the centre. See Fig. 3b for an example.

Fat score and condition index Birds in deteriorating body condition usually deplete their fat reserves first (subcutaneous and intestinal fat deposits disappear) and then start using proteins from muscles like the pectoral flight muscles (breast muscles). Figs. 4-5 illustrate how to score the various characters on a four-point scale (0-3) and how to calculate the overall condition index; examples of extreme cases are shown in Figs. 1-3. The condition index is based on the sum of scores of fat stores and breast muscles (0-9): score 0-1 = mortally emaciated; 2-3 critically emaciated; 4-6 moderate body condition; and 7-9 good body condition.

Table 1. Four-point scales of organ health (0-3, ranging from poor condition to pristine), for visual inspections

Intestines (Guts)

0	Heavily infected	nearly black, shriveled
1	Infected	dark green, loose, empty
2	Slightly or partly infected	(partly) greenish, loose
3	Pristine	nice pink with blood veins visible, neatly arranged, equally filled

Kidneys

0	Degenerated, crumbly	hard structures in the organ, colour variable
1	Heavily spotted	white, red, or dark spots
2	Slightly spotted	white, red, or dark spots
3	Pristine	uniform fleshy colour

Liver

0	Cancers or other hard parts	hard structures in the organ, colour variable
1	Heavily spotted	white, red, or dark spots
2	Slightly spotted	white, red, or dark spots
3	Pristine	uniform fleshy colour ¹

Lungs

0	Heavily infected, filled with blood or oil	black or dark red
1	Infected	completely bright red, watery
2	Slightly or partly infected	partly red or reddish, watery
3	Pristine	completely pink and "dry"

!! ¹Corpses that are not fresh have their organs coloured greenish or blackish, despite the fact that they may have been OK when the bird died. In particular the liver gets a blackish wash all over at an early stage in the degeneration of the corpse. In case of great stink: do not try to record condition of liver from visual observations only.

1

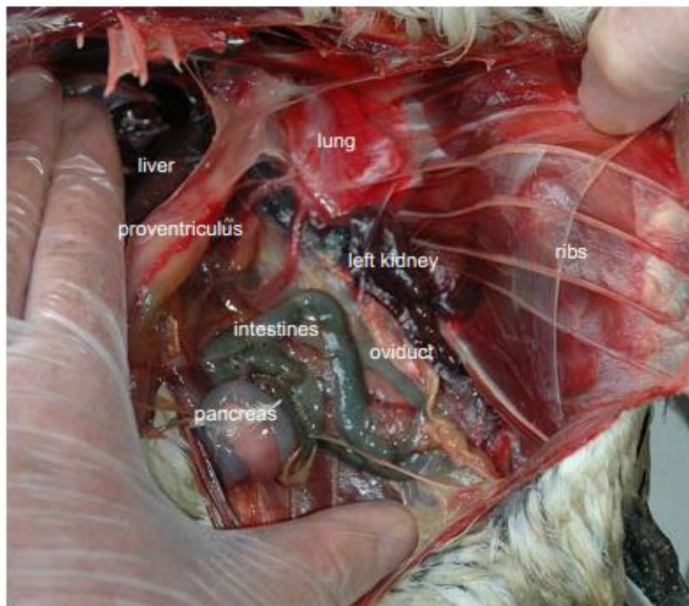


Fig. 6. Visual inspection of vital organs in the thoracic cavity by lifting the sternum (see methods of standard autopsy) and while pushing the stomach and liver to the left side.

- The pancreas should not be confused with deposited fat between the intestines.
- The illustrated intestines have a proper shape but are mal-arranged and greenish (inflammation).
- The illustrated lungs are reddish, suggesting some degree of pneumonia
- Kidney colour is fine, the organ is probably healthy
- Liver colour (barely visible) is fine, the organ is probably healthy

In this badly emaciated example, there is not a trace of fat deposited between the intestines.

(Camphuysen et al., 2007)

Appendix 4:

Sexing & Aging

Sexual organs are situated close to the kidneys and can thus only be found by pushing the overlying organs (mainly stomach and intestines) gently to the side. Initially look for the sexual organs at the bird's left side, because females develop sexual organs only at the left side of their body. Males have testes on both sides. (van Franeker, 2004)

(Camphuysen et al., 2007)

Sexing birds Male birds have paired testes within the abdominal cavity, anterior and ventral to the lobes of the kidneys (Fig. 1a), while the reproductive system in female birds is reduced to a left ovary and oviduct, just anterior and medial to the left kidney (Fig. 1b). For orientation, while looking into the abdominal cavity during a standard autopsy, the left testis is seen on the right side. Similarly, ovary and oviduct are seen on the right.

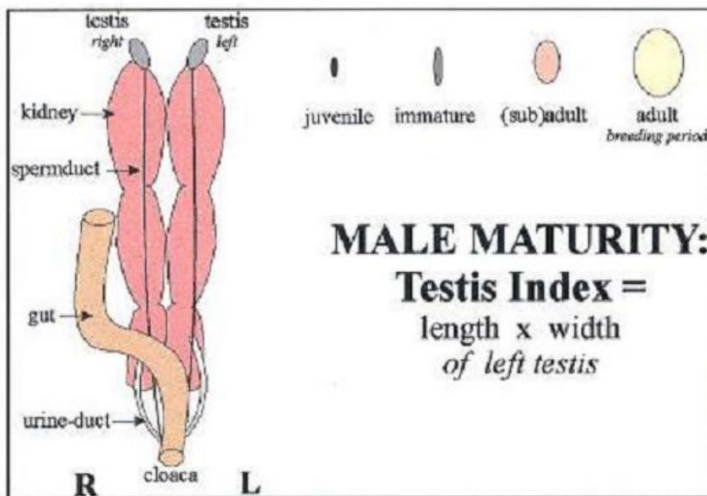


Figure 2. Testis index suggested by Van Franeker (2004) based on Northern Fulmar *Fulmarus glacialis* dissections.

Juveniles have an often dark, short and thin testis, mature birds have rounded testis, considerably swollen in the breeding season.

In other seabirds, testis shapes may be slightly different, but the general plan of development is the same as in the illustrated case. In guillemots, for example, juvenile testis are rather long and thin (often 12x0.5 mm or similar), often bicoloured, and sometimes with a clear nick in the top. As in fulmars, the adult male preparing for breeding will develop a white-bean type testis as illustrated.

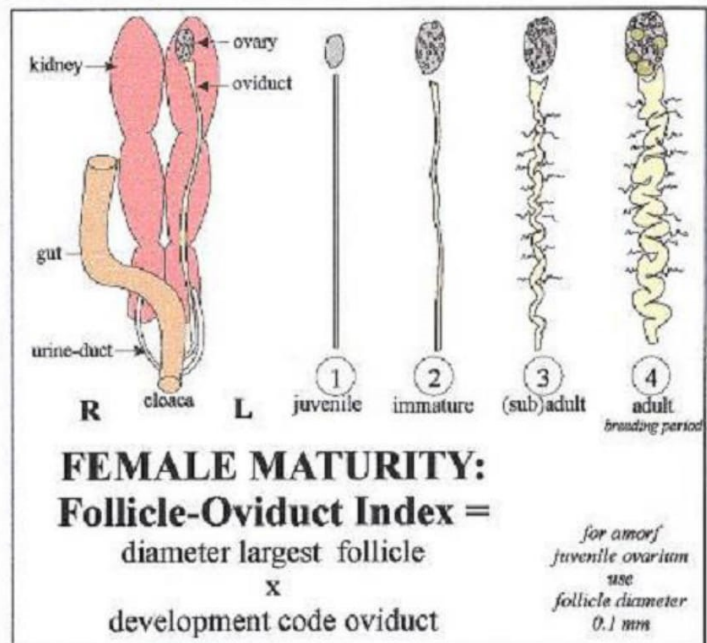


Figure 3. Follicle-Oviduct index suggested by Van Franeker (2004) based on Northern Fulmar dissections.

The ovary of juveniles has no structure (amorph). Small grains (tiny follicles) are visible in young immature birds, whereas older birds develop clearly visible follicles of different sizes. All the examples drawn here are outside the breeding season, or just prior to nesting. During egg-laying, some follicles will greatly increase in size (finally reaching the actual egg size), and the oviduct is greatly enlarged.

Oviduct development four-point scale:

1. thin and straight
2. thicker, straight
3. thicker still, slightly twisted
4. swollen and twisted

(p.t.o)

Bursa Fabricii While the gonadal development gives an idea of the age of the bird, more foothold can be obtained by assessing the presence or absence of the bursa Fabricii, one of the glands in the endocrine system of birds. The bursa Fabricii (or Bursa of Fabricius) is visible as a pouch on the outer wall of the cloaca, and it is only found in very young birds, while it atrophies in sub-adults and is absent in mature birds. From frequent comparisons of the presence/absence and the size of the bursa with known age (ringing results) of individual birds, we are certain that all juvenile seabirds have a large bursa, young immatures (2nd year) may have a much reduced bursa, while old immatures (>3rd year) and adults normally have not a trace of a bursa. Hence, the presence of a large bursa in combination with non-developed gonads is a fine indication that the bird in question is a juvenile.

The bursa is involved with forming and stimulating cells of the immune system and it is assumed to secrete hormones that stimulate the production of antibodies to infections and the production of lymphocytes (a type of white blood cell) (Proctor & Lynch 1993).

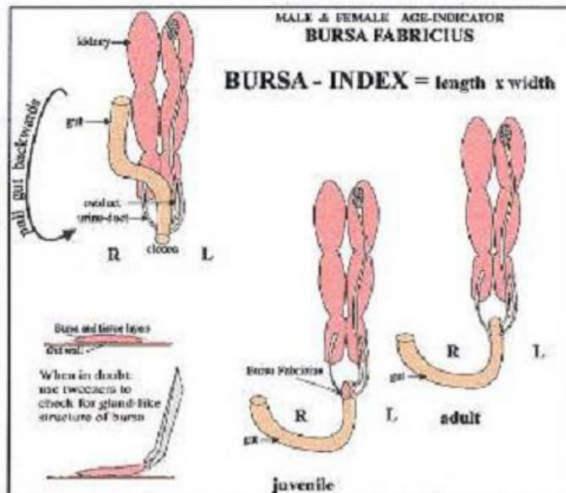


Figure 5. Bursa index suggested by Van Franeker (2004) based on Northern Fulmar *Fulmarus glacialis* dissections.

The bursa is most easily found when the large intestine (gut) is folded down during a standard autopsy, to inspect the region closest to the cloaca, and between the two ureters. In juvenile birds, the bursa is so large, that folding down the gut is not needed (Fig 6a), even although the presence will become more clear (Fig. 6b). To measure the size, however, the other organs should be moved 'out of the way'. In immature birds, small bursa's might be easily overlooked if the gut is not folded down.

Note that in some species the bursa does not stand out as a clear pouch, because a strong membrane holds it tight against the outer wall of the cloaca. There is usually a colour difference between bursa and intestine, and tweezers may have to be used in case of doubt.

Assessing the presence is easier than assessing the absence. Small bursa's may be hard to find and the large intestine must be manipulated such that the absence can be seen very clearly. **The absence of a bursa can only be properly checked by folding down the large intestine. Use tweezers to 'loosen' it along the edges to confirm it's a gland-like organ.**

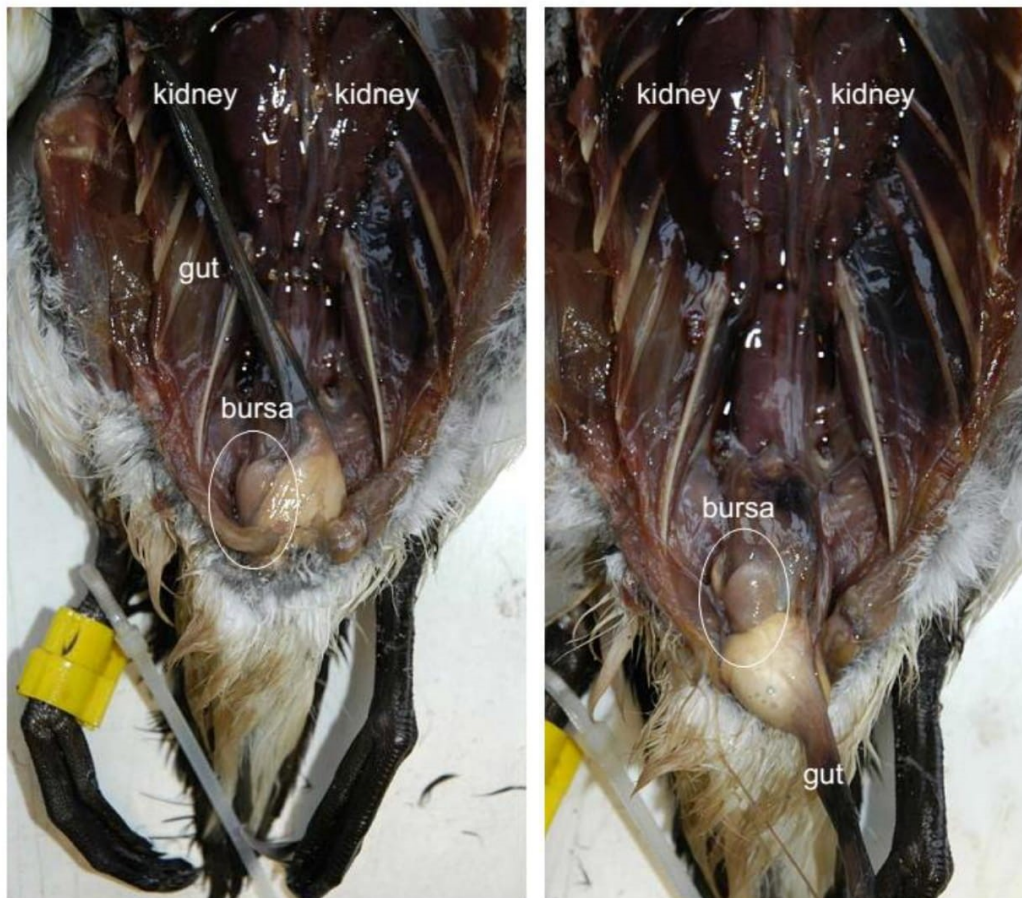


Figure 6. Urogenital system of juvenile female Razorbill *Alca torda* showing the position of the bursa Fabricii, (a) just visible slightly to the side of the cloacal exit of the large intestine, and (b) more clearly visible with the gut folded down. Note that the whitish, swollen appearance of the intestine is caused by excrements filling up the organ. This swelling should not be confused with a bursa (see also Fig. 7).

References:

Camphuysen, C.J., R. Bao, H. Nijkamp, and M. Heubeck, eds., (2007), *Handbook on Oil Spill Assessment*, Online edition, version 1.0. Available at: www.oiledwildlife.eu/publications/handbook-oil-impact-assessment-seabirds

Nelson, B., (2002), *The Atlantic Gannet, 2nd edn*, Fenix Books Ltd: Norfolk.

van Franeker, J.A., (2004), *Save the North Sea Fulmar-Litter-EcoQO Manual Part 1: Collection and Dissection Procedures*, Alterra, Alterra-rapport 672. Available at: <https://library.wur.nl/WebQuery/wurpubs/fulltext/40451>.

Appendix 6.5. T.A.G Ringing Data

Table 22 – Track A Gannet (T.A.G) Ringing Data; R= metal ring number read on the day; A = metal ring number identified afterwards from other data collected; * = TAGS attached on 6th July 2019; P = Pullus; Ringing data provided by the Channel Islands Bird Ringing Scheme (CIBRS).

Field Notes from T.A.G 06/07/2019						Ringing Data from initial CIBRS ringing							
Metal Rings	R or A	TAG Number*	Colour Rings Observed	Geolocator	Any Other Notes	Age	Ringing Date	Ringing locality	Coordinates	Status	Catching Method	Comments	Days Since Initial Ringing
F25664	R	213	-	-	-	P	19/06/2004	Ortac	49° 4323N, 002° 1725W	Bird not full grown	On nest		5495
F37677	R	206	-	-	-	P	22/06/2009	Ortac	49° 4323N, 002° 1725W	Bird not full grown	Unknown		3666
F37681	R	247	-	-	-	P	22/06/2009	Ortac	49° 4323N, 002° 1725W	Bird not full grown	Unknown		3666
F3452?	R	285	-	-	-							From a batch of rings used on Les Etacs on 24th June 2006	4760
F31343	R	214	-	-	-	P	23/06/2005	Ortac	49° 4323N, 002° 1725W	Bird not full grown	On nest		5126
F23677 (double ringed individual)	R	283	-	-	-	P	13/06/1999	Ortac	49° 4323N, 002° 1725W	Bird not full grown	Unknown	This bird was also ringed with F23564 on the same day	7328

F23564 (double ringed individual)	R					P	13/06/1999	Ortac	49° 4323N, 002° 1725W	Bird not full grown	Unknown	This bird was also ringed with F23677 on the same day	7328
F34405	R	255	-	-	-	P	24/06/2006	Ortac	49° 4323N, 002° 1725W	Bird not full grown	Unknown		4760
F28991	R	751 (the bulkier tag)	-			P	14/06/2003	Ortac	49° 4323N, 002° 1725W	Bird not full grown	On nest		5866
F40957	A	-	A155	RECOVERED	Breeder with an egg	4 cy+	13/07/2017	Ortac	49° 4323N, 002° 1725W	Unknown/unrecorded	Default unknown	GSM 808	723
F40953	A	-	A151	Geo observed	-	4 cy+	13/07/2017	Ortac	49° 4323N, 002° 1725W	Unknown/unrecorded	Default unknown	GSM 827	723
F40954	A	-	A154	Geo observed	-	4 cy+	13/07/2017	Ortac	49° 4323N, 002° 1725W	Unknown/unrecorded	Default unknown	GSM 524	723
F25968	A	-	A157	-	-	P	19/06/2004	Ortac	49° 4323N, 002° 1725W	Bird not full grown	On nest		5495
F39427	A	-	A051	-	-	5 cy+	25/06/2016	Ortac	49° 4323N, 002° 1725W	Unknown/unrecorded	By hand (with or without hook, noose e.t.c)	Tag number 057	1106
F15436	A	-	A061	-	-	P	12/06/1992	Ortac	49° 4323N, 002° 1725W	Bird not full grown	By hand (with or without hook,	Details here for initial metal	9885

											noose e.t.c)	ringing. No details regarding colour ringing.	
F28730	A	-	A059	-	-	P	14/06/2003	Ortac	49° 4323N, 002° 1725W	Bird not full grown	On nest	Details here for initial metal ringing. No details regarding colour ringing.	5866
F19956	R	-	-	-	-	P	15/06/1997	Ortac	49° 4323N, 002° 1725W	Bird not full grown	Unknown		8056
F38147	R	-	-	-	-	P	22/06/2009	Ortac	49° 4323N, 002° 1725W	Bird not full grown	Unknown		3666
F34439	R	-	-	-	-	P	24/06/2006	Ortac	49° 4323N, 002° 1725W	Bird not full grown	Unknown		4760
F32108	R					P	20/06/2005	Les Etacs	49° 4216N, 002° 1425W	Bird not full grown	On nest		5129
F40073	A		A098			5 cy+	25/06/2016	Ortac	49° 4323N, 002° 1725W	Unknown/unrecorded	By hand (with or without hook, noose e.t.c)		1106

Appendix 6.6. Rat Control Work in 2019

Table 23 – Rat Control Work in 2019; latitude and longitude in decimal degrees; ⁿ = rat nest inside

Bait station	Site	Latitude	Longitude	Deploy date	Check 1			Check 2		
					Date	Take	Action	Date	Take	Action
HP01	Houmet de Pies	49.73117	-2.18247	09/03/2019	03/04/2019	No	not rebaited	01/05/2019	No	not rebaited
HP02	Houmet de Pies	49.7311	-2.1824	09/03/2019	03/04/2019	No	not rebaited	01/05/2019	No	not rebaited
HP03	Houmet de Pies	49.73126	-2.18232	09/03/2019	03/04/2019	No	not rebaited	01/05/2019	No	not rebaited
HS01	Hanaine Bay Stack – onshore	49.70936	-2.23159	15/03/2019	03/04/2019	Yes – incomplete	not rebaited	01/05/2019	Yes – complete	rebaited
HS02	Hanaine Bay Stack – onshore	49.70953	-2.23137	15/03/2019	03/04/2019	Yes – incomplete	not rebaited	01/05/2019	Yes – complete	rebaited
HS03	Hanaine Bay Stack	49.70973	-2.23328	20/03/2019						
HS04	Hanaine Bay Stack	49.70902	-2.23313	20/03/2019						
TS01	Twins Sister – onshore	49.70201	-2.22025	15/03/2019	03/04/2019	Yes – incomplete	not rebaited	01/05/2019	Yes – incomplete	rebaited
TS02	Twins Sister – onshore	49.702	-2.22117	15/03/2019	03/04/2019	No	not rebaited	01/05/2019	Yes – incomplete	rebaited
TS03	Twin Sister – Fourquie	49.70019	-2.22023	20/03/2019						
TS04	Twin Sister – Fourquie	49.70023	-2.22042	20/03/2019						
QS01	L'Etac de la Quoire – onshore	49.70766	-2.1918	15/03/2019	03/04/2019	Yes – complete	rebaited x2	01/05/2019	Yes – incomplete	not rebaited
QS02	L'Etac de la Quoire – onshore	49.70697	-2.19214	15/03/2019	03/04/2019	Yes – complete	rebaited x2	01/05/2019	Yes – complete	rebaited x2
QS03	L'Etac de la Quoire	49.70595	-2.19075	20/03/2019						
QS04	L'Etac de la Quoire	49.70608	-2.19052	20/03/2019						
ES01	East Saye Promontory	49.731151	-2.179433	18/06/2019						
ES02	East Saye Promontory	49.731276	-2.179771	18/06/2019						
ES03	East Saye Promontory	49.731284	-2.179514	24/10/2019						
ES04	East Saye Promontory	49.731295	-2.179858	24/10/2019						
BU01	Burhou Hut	49.730689	-2.251279	19/03/2019						
BU02	Burhou Hut	49.730568	-2.251279	19/03/2019						

Continued on next page...

Table 23 – Rat Control Work in 2019 continued

Bait station	Check 3			Check 4			Check 5			Check 6		
	Date	Take	Action	Date	Take	Action	Date	Take	Action	Date	Take	Action
HP01	07/06/2019											
HP02	07/06/2019											
HP03	07/06/2019											
HS01	07/06/2019	Yes – complete	rebaited	17/07/2019	Yes – incomplete	rebaited x2	22/08/2019	Yes – incomplete	rebaited x1			
HS02	07/06/2019	Yes – incomplete	not rebaited	17/07/2019	Yes – complete	rebaited x2	22/08/2019	Yes – complete	rebaited x2			
HS03												
HS04												
TS01	07/06/2019	Yes – incomplete	not rebaited	17/07/2019	Yes – incomplete	rebaited x2	22/08/2019	Yes – incomplete ⁿ	not rebaited			
TS02	07/06/2019	Yes – incomplete	not rebaited	17/07/2019	Yes – incomplete	not rebaited	22/08/2019	Yes – incomplete	rebaited x1			
TS03												
TS04												
QS01	07/06/2019	Yes – incomplete	rebaited	17/07/2019	Yes – incomplete	not rebaited	22/08/2019	Yes – complete	rebaited x1			
QS02	07/06/2019	No	not rebaited	17/07/2019	Yes – incomplete	not rebaited	22/08/2019	Yes – incomplete	rebaited x2			
QS03												
QS04												
ES01												
ES02												
ES03												
ES04												
BU01										07/09/2019	Not by rats (complete take by snails)	not rebaited
BU02										07/09/2019	Not by rats (complete take by snails)	not rebaited

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Table 23 – Rat Control Work in 2019 continued

Bait station	Check 7			Check 8		
	Date	Take	Action	Date	Take	Action
HP01	24/10/2019	No	rebaited x2	13/11/2019	No	not rebaited
HP02	24/10/2019	Yes – incomplete	rebaited x2	13/11/2019	Yes – incomplete	not rebaited
HP03	24/10/2019	Yes – complete	rebaited x2	13/11/2019	No – station blown over	not rebaited
HS01	23/10/2019	Yes – complete	rebaited x2 ⁿ	13/11/2019	Yes – complete	rebaited x2
HS02	23/10/2019	Yes – complete	rebaited x2	13/11/2019	Yes – complete	rebaited x2
HS03						
HS04						
TS01	23/10/2019	Yes – complete	rebaited x2	13/11/2019	Yes – complete	rebaited x2
TS02	23/10/2019	Yes – complete	rebaited x2	13/11/2019	Yes – complete	rebaited x2
TS03						
TS04						
QS01	23/10/2019	Yes – complete	rebaited x2	13/11/2019	Yes – complete	rebaited x2
QS02	23/10/2019	Yes – complete	rebaited x2	13/11/2019	Yes – complete	rebaited x3
QS03						
QS04						
ES01	24/10/2019	Yes – complete	rebaited x2	13/11/2019	Yes – incomplete	not rebaited
ES02	24/10/2019	Yes – complete	rebaited x2	13/11/2019	Yes – incomplete	not rebaited
ES03				13/11/2019	Not by rats some evidence of mice take	not rebaited
ES04				13/11/2019	N/A – station blown away in wind	N/A
BU01						
BU02						

Appendix 6.7. Lesser Black Backed Gull Colour Ring Sightings Via PTZ Puffin Camera

Table 24 – Lesser Black Backed Gull (*Larus fuscus*) colour ring sightings on Burhou, Alderney (49.73058, -2.252712) recorded by the PTZ puffin camera and associated ringing data supplied by Guernsey Gulls (2019); ¹ Initially colour ringed with W3AX1, re ringed on 26/05/2012 with B4AM6; ² First re-sighting of this individual

Number	Colour Ring	Sighting Date	Metal Ring	Observer	Days Since Last Record	Initial Ringing Date	Initial Ringing Location	Initial Ringing Country	Age at Ringing	Sex
1	B0AC2	03/07/2019	D5871	Alderney Wildlife Trust	7	13/06/2011	Burhou	ALDERNEY	Hatched four or more calendar years ago	Male
2	B0AC5	26/07/2019	D5874	Alderney Wildlife Trust	207	13/06/2011	Burhou	ALDERNEY	Hatched four or more calendar years ago	Unknown
3	B1CC6	24/03/2019	D7959	Alderney Wildlife Trust	411	29/06/2013	Brecqhou	SARK	Pullus	Unknown
4	B2AP5	12/05/2019	D7098	Alderney Wildlife Trust	290	14/07/2012	Burhou	ALDERNEY	Pullus	Unknown
5	B2AP5	26/07/2019	D7098	Alderney Wildlife Trust	75	14/07/2012	Burhou	ALDERNEY	Pullus	Unknown
6	B2CF3	20/07/2019	D8068	Alderney Wildlife Trust	154	19/05/2014	Chouet Landfill	GUERNSEY	Hatched three or more calendar years ago	Male
7	B4AM6 ¹	26/03/2019	E17428	Alderney Wildlife Trust	138	28/05/2010	Chouet Landfill	GUERNSEY	2nd year bird, hatched last calendar year	Male
8	B5CN7	16/07/2019	D8597	Alderney Wildlife Trust	23	12/07/2014	Burhou	ALDERNEY	Pullus	Unknown
9	B5CN8	02/07/2019	D8598	Alderney Wildlife Trust	144	12/07/2014	Burhou	ALDERNEY	Pullus	Unknown
10	B5FJ6	02/05/2019	D9565	Alderney Wildlife Trust	233	09/07/2016	Burhou	ALDERNEY	Pullus	Unknown
11	B5FJ6	13/07/2019	D9565	Alderney Wildlife Trust	72	09/07/2016	Burhou	ALDERNEY	Pullus	Unknown
12	B5FJ6	18/07/2019	D9565	Alderney Wildlife Trust	5	09/07/2016	Burhou	ALDERNEY	Pullus	Unknown
13	B5FJ6	20/07/2019	D9565	Alderney Wildlife Trust	2	09/07/2016	Burhou	ALDERNEY	Pullus	Unknown
14	B5FJ6	23/07/2019	D9565	Alderney Wildlife Trust	3	09/07/2016	Burhou	ALDERNEY	Pullus	Unknown
15	B6CK1	15/07/2019	D8401	Alderney Wildlife Trust	427	08/06/2014	Ty Coed, Vale Marais	GUERNSEY	Hatched four or more calendar years ago	Female
16	B6FF9	23/04/2019	D9443	Alderney Wildlife Trust	17	11/07/2015	Burhou	ALDERNEY	Pullus	Unknown
17	B6FJ6	13/07/2019	D9591	Alderney Wildlife Trust	1053	09/07/2016	Burhou	ALDERNEY	Pullus	Unknown
18	B8AM4	09/07/2019	D6958	Alderney Wildlife Trust	365	14/06/2012	Burhou	ALDERNEY	Hatched four or more calendar years ago	Male
19	B8AM4	13/07/2019	D6958	Alderney Wildlife Trust	4	14/06/2012	Burhou	ALDERNEY	Hatched four or more calendar years ago	Male


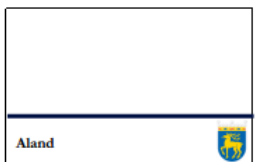
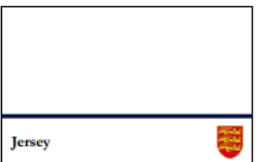
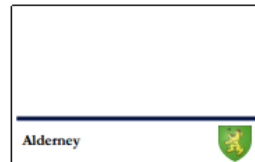
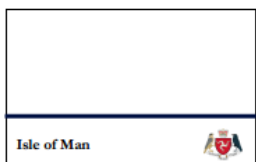
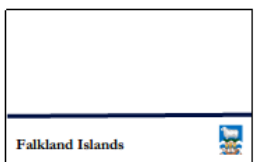
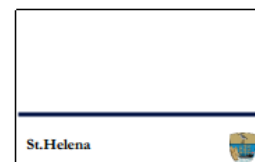
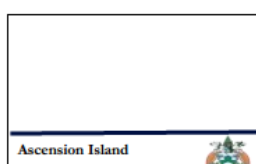
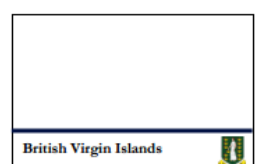
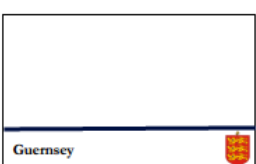
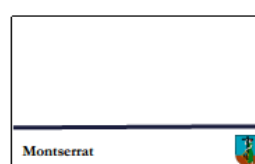
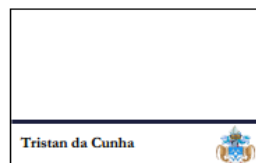
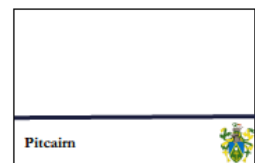
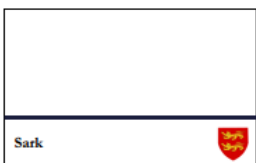
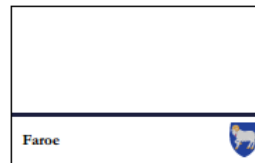
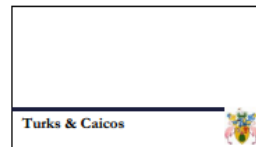
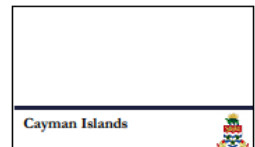
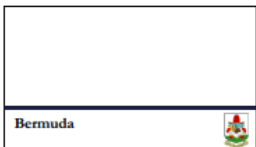
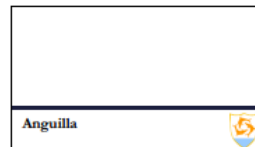
20	B8AM9	18/05/2019	D6962	Alderney Wildlife Trust	646	14/06/2012	Burhou	ALDERNEY	Hatched four or more calendar years ago	Male
21	B8CC8 ²	16/04/2019	D8032	Alderney Wildlife Trust	2103	13/07/2013	Burhou	ALDERNEY	Pullus	Unknown
22	B8FK9	23/05/2019	D9698	Alderney Wildlife Trust	269	09/07/2016	Burhou	ALDERNEY	Pullus	Unknown
23	B8FK9	30/05/2019	D9698	Alderney Wildlife Trust	7	09/07/2016	Burhou	ALDERNEY	Pullus	Unknown
24	B9CK8	22/05/2019	D8418	Alderney Wildlife Trust	483	19/07/2014	Burhou	ALDERNEY	Pullus	Unknown
25	B9CK8	18/07/2019	D8418	Alderney Wildlife Trust	57	19/07/2014	Burhou	ALDERNEY	Pullus	Unknown
26	B9CN7	30/05/2019	D8637	Alderney Wildlife Trust	276	13/07/2014	Burhou	ALDERNEY	Pullus	Unknown
27	B9CN7	13/06/2019	D8637	Alderney Wildlife Trust	9	13/07/2014	Burhou	ALDERNEY	Pullus	Unknown
28	B9FJ6	10/05/2019	D9632	Alderney Wildlife Trust	192	09/07/2016	Burhou	ALDERNEY	Pullus	Unknown
29	B9FJ8	10/05/2019	D9634	Alderney Wildlife Trust	1014	09/07/2016	Burhou	ALDERNEY	Pullus	Unknown
30	B9FJ8	20/05/2019	D9634	Alderney Wildlife Trust	10	09/07/2016	Burhou	ALDERNEY	Pullus	Unknown
31	W8U7	20/03/2019	D4581	Alderney Wildlife Trust	263	12/06/2009	Burhou	ALDERNEY	Hatched four or more calendar years ago	Male
32	W8U7	15/04/2019	D4581	Alderney Wildlife Trust	26	12/06/2009	Burhou	ALDERNEY	Hatched four or more calendar years ago	Male
33	W8U7	09/07/2019	D4581	Alderney Wildlife Trust	85	12/06/2009	Burhou	ALDERNEY	Hatched four or more calendar years ago	Male
34	W8U7	23/07/2019	D4581	Alderney Wildlife Trust	14	12/06/2009	Burhou	ALDERNEY	Hatched four or more calendar years ago	Male

Appendix 6.8. The Blue Islands Charter

BLUE ISLANDS ENVIRONMENT CHARTER
GUIDING PRINCIPLES
FOR THE PROTECTION OF ISLAND COMMUNITIES

The threat to the ocean is intrinsically linked to human activity in Island Nations. This Charter proposes that all Islands commit to the following principles:

- 1. To control and reduce the negative impacts of the Island's activities on the environment*
- 2. To control the risks associated with activities on the Island*
- 3. To promote a rationale of continuous environmental improvement*
- 4. To factor the environment into every day practices*
- 5. To move towards a complete ban on single-use plastic entering the Island and in particular the marine environment.*
- 6. To increase knowledge in order to improve and communicate*
- 7. To contribute to the development of scientific knowledge with regards to Island Marine Environments*
- 8. To support other Islands through open communication and education*
- 9. To protect native, terrestrial and marine species and habitats and enhance biodiversity*
- 10. To enhance terrestrial and marine natural environments*

Appendix 6.9. Recommendations

Table 25 - Recommendations for Future Ramsar Work (collated from the 2019 Review Report).

Objective Number	Objective Title	Recommendations
3.1 Seabirds		
3.1.1	Puffin Cameras	<p>Streaming Online</p> <p>In 2020 and beyond it is recommended the cameras are installed earlier, ideally in February, to allow time for setting up and troubleshooting before the puffins arrive on land. As always, ensure the cameras are properly armoured all the way along their length (especially where the cables plug into the camera) to prevent problems from rabbit gnawing. Ensure the solar panels are secured with rocks or similar available materials to prevent them falling over during the season.</p>
3.1.2	Seabird Monitoring	<p>Puffins</p> <p>Continue recording evidence of connectivity in 2020 and beyond, using the same burrow numbers. A review of all the evidence gathered in a few years, aiming to determine which burrows are connected/contain more than one pair would be valuable.</p> <p>Continue to monitor species interactions in 2020.</p> <p>Due to a lack of resources and the abnormally large amount of puffincam footage this year it was difficult to review the recorded night videos within a timely manner. It is recommended that night- time recording of the burrows starts at the beginning of July. The footage must be reviewed every morning to pinpoint exactly when the puffins are fledging and ensure the AOB survey occurs at the earliest date possible, thus hopefully ensuring evidence of puffin occupation remains. Volunteers may help assist with this workload.</p> <p>The trip to Burhou to ring storm petrels in mid-late July should be used to support puffin observations, with at least 1 suitably qualified surveyor present and the ringers supporting. Combining this activity with the ringing trip would reduce disturbance of carrying out the activity separately. This survey would help identify areas to assess with the post-season AOB survey.</p> <p>The PTZ camera was an effective and easy method to record raft counts and should be utilised in 2020 and beyond, combined with counts from the boat and land.</p> <p>It is recommended a microphone is added to the cameras set up and the puffincam GDPR policy is updated to include sound.</p>

Due to the time taken and difficulties monitoring puffin productivity solely using the PTZ camera, it is recommended a return to on island observations in 2020, with surveys wherever possible run during other visits to to Burhou, including during the gull and petrel ringing trips, to minimise disturbance. Burrows should be numbered the same as in 2019 to enable comparisons between years and accumulative evidence of connectivity e.t.c.

The cameras were a very valuable asset for completing raft counts, puffling fledging, gull and storm petrel observations and should be continued for this use in 2020. The recruitment of volunteers to help review night footage and record fledging puffins in a timely manner is recommended. This would then supplement the surveys and help ensure the AOB survey is completed on the optimal date.

The puffincam footage master catalogue should be maintained in 2020 and beyond.

Northern Gannets

Early season observations should continue to help elucidate if behavioural clues can be used to identify non-laying pairs and therefore assess true productivity with improved accuracy.

It is recommended the results from 2019 are used to select samples from the 4 stacks (selecting a similar number of nests from each stack c.f. Figure 4 and Figure 5) and these selected nests are followed through the next 5-year Ramsar Strategy. This improved survey design would enable more robust data and statistical analyses to be carried out. Within year comparisons between locations could be compared in a contingency table using a simple chi squared test and multi-variate statistics could be applied to the data at the end of the next 5-Year Strategy. This would help elucidate the effects of location, pairs, year, laying date etc. on breeding success.

The ability to monitor productivity on Ortac has been largely discussed this year. It is thought that this could be achieved using photographic techniques. Photographs taken from a boat combined with drone photography (to view the top of the colony) would enable an estimation of productivity. Entangled individuals should be recorded along with such productivity surveys (see 4.1.3.2). This would be largely beneficial to help inform the timing of tagging and ringing trips to the colony based on the development stage of the chicks. A comparison between Les Etacs and Ortac would also be valuable, especially as historical observations have identified differences in the arrival and departure times of the two colonies.

Northern Fulmars

Continue monitoring in 2020 and beyond.

Common Terns

		<p>Continue monitoring and associated rat control in 2020 and beyond.</p> <p>Ringed Plover</p> <p>Improved protection of ringed plovers during the nesting season would be beneficial to attempt to improve productivity and thus the regional species population. The birds have had the most success in Clonque Bay, therefore, initially targeting Clonque restricting dog walkers and fishing activities on this beach between April and July would be beneficial. In order to be successful, this would require action by the States of Alderney (designation of specific protection measures) supported by stakeholders and the public. An engagement and education programme before implementing such a change, giving people the opportunity to voice concerns and opinions would be beneficial. The local community should feel empowered to make positive changes to protect species, rather than isolated and ignored by trying to force changes.</p> <p>Further investigation of why there is such low breeding success would also be beneficial. It is recommended dog walking is monitored using fixed/timed observations on all breeding beaches (Platte Saline, Clonque (if the above recommendation is implemented this would also monitor compliance) and Saye), with the aim to determine how many dogs are walked on the beach per hour and calculate risk. Monitoring all breaches would allow a comparison of disturbance and/or risk of trampling to be determined. Camera traps should also be set up at night to determine if rats/hedgehog predation is a problem.</p> <p>Seabird Census Boat Surveys / Other Seabirds</p> <p>Seabird boat surveys are a rotational objective of the five-year management plan (AWT, 2016). However, if resources are available the data obtained from surveys is very valuable, especially if this can be done every year. Linking seabird boat surveys with required marine mammal surveys (as done in 2019) vastly reduces the base boat cost of this work item.</p> <p>As stated above, more frequent observations of guillemots on Les Etacs throughout the chick rearing period is recommended.</p>
3.1.3	Researching the Impact of Human Debris on Gannets	<p>Observations of Material Returns to the Nest Site</p> <p>Continued studies over the next few years would ascertain if these results can be replicated and enable the identification of trends.</p> <p>Mitigation Measures</p> <p>It is recommended that efforts to free individuals occur during ringing and T.A.G visits to the colonies continue (as they have for decades). Visits to the colonies sufficiently late in the breeding season to avoid disturbance to breeding birds but sufficiently early to avoid mortality of entangled birds by starvation (as has occurred at Grassholm, UK for years; Votier <i>et</i></p>

		<p><i>al.</i>, 2011) may be possible, if balanced with disturbance concerns. It should be noted that Alderney's colonies are much smaller than Grassholm, meaning that disturbance events have a greater impact due to the distance to the colony edge being vastly less, thus increasing the risk of causing chicks to immaturely fledge when trying to avoid human disturbance.</p> <p>Seabird Necropsies and Gastrointestinal Trace Content Studies</p> <p>Continue analysis and determination of materials within GAN001 in 2020.</p> <p>Continue this study, increasing the sample size until sufficient data is obtained to assess the accumulation of anthropogenic materials within seabirds in Alderney.</p> <p>Post-Season Nest Inspections</p> <p>Analyse 2019 photos and repeat this work in 2020.</p> <p>Observations of Other Seabirds Utilising Anthropogenic Materials</p> <p>Despite the observed consequences of marine debris on seabirds, few studies have researched changes in use, entanglement and ingestion over time (Bond <i>et al.</i>, 2012). Continuing the above research, monitoring the impact, gaining increased data, which may also be used to study changes with time would be valuable for monitoring Alderney's gannet population and contributing to global research. Furthermore, the frequency of seabird interactions with marine debris has been suggested to provide indices of this marine pollution (van Franeker <i>et al.</i>, 2011), however selectivity for certain plastics may introduce bias (Votier <i>et al.</i>, 2011).</p>
3.1.4	Puffin Friendly Zone – Marine Exclusion Zone	<p>Continue the PFZ in 2020 and beyond, continuing to publicise and raise public awareness. Issuing a notice to mariners would be largely beneficial (see 4.1.5).</p> <p>It is recommended that a meeting is held with the local commercial boat operator who repeatedly enters the zone in order to understand his reasons for doing so and raise awareness of the potentially damaging effects of such disturbance. Unfortunately, however, making the PFZ a legal exclusion zone with penalties attached may be the only way to stop incursions in the future; this is a matter for the SoA GSC to consider in 2020 with the Alderney Harbour Office.</p>
3.1.5	Review Creating a Full Marine Exclusion Zone Around Puffins Including Issuing a Notice to Mariners	<p>It is recommended the AWT Ramsar Officer meets with the new Harbour Master as early as possible in 2020 to educate the new individual about the zone and discuss issuing a notice to mariners and adding the PFZ to navigational charts.</p>

		Making the PFZ a legally designated marine exclusion zone with penalties for entering the area, may also help to prevent multiple disturbance events caused by a local commercial boat operator (see 4.1.4).
3.1.6	Track A Gannet (T.A.G)	<p>It is recommended the T.A.G project is continued in 2020, due to the use of the data in research and impact assessments for renewable energy/interconnectors, of which there are several proposed developments. A masters project to review the data (e.g. to determine if more data on the foraging ranges of Alderney's gannets would be valuable?) would be beneficial.</p> <p>Recovery of the 9 remaining geolocators deployed in 2017 and deployment of the 10 purchased geolocators should be a priority to gain further information on the migratory trends of Alderney's gannets. This would establish if Alderney's gannets' movements are any different to other colonies where tagging research has been undertaken. It would also be valuable to identify if there are any differences between the Les Etacs and Ortac colonies by deploying geolocators on both the colonies.</p> <p>While the current T.A.G project focuses on adult gannets, research on the movements of juvenile/fledging gannets would be valuable and would offer the potential of collaboration with other research sites currently engaged in this work, such as Bass Rock.</p>
3.1.7	Ringing	<p>Gannets - Les Etacs</p> <p>AWT – in response to the ABO's comment [4.1.7.8.1] the AWT is liaising with the Alderney Harbour Office and with managers of other similar sites to establish a new risk assessment for all the offshore islets, developed from the currently accepted one. The ABO and CIBRS will be involved in this process as stakeholders in the Ramsar work.</p>
3.1.8	Population Counts of Seabirds on Coque Lihou	This objective should be completed in 2020.
3.1.9	Wetlands Bird Surveys (WeBs)	This is a continual project. WeBS counts should be carried out monthly in 2020 and beyond.
3.1.10	Reviewing the Possibility of Collaborative Ringed Plover Project	Undertake this objective with twinning efforts in 2020 (see 4.5.7).
3.1.11	Review of Contact with Groupe Ornithologique Normand (GONm)	Continue to remain in contact with GONm in 2020.
3.1.12	Annual Review of Seabird Data	Complete in January 2020

3.1.13	Annual Review of T.A.G. Data	Review T.A.G Data annually
3.2 Terrestrial		
3.2.1	Rat Control	This is a long-term project, which must be continued. See 3.2.2 for recommendations.
3.2.2	Review of Rat Monitoring and Control	Continue rat monitoring and control at all sites (including Rousset) in 2020 and beyond. It is recommended that work is completed earlier next year, with a monitoring programme in the first months of 2020 in order to assess rat presence before baiting with poison.
3.2.3	Monitoring of Bracken and Invasive Species on Burhou	It is recommended bracken on Burhou is managed in 2020, cutting it back further away from the puffin burrows. This should be completed in collaboration with the States of Alderney Public Works department. Rat presence should continue to be monitored in 2020 and beyond, with immediate and appropriate action taken should any evidence of rats be discovered.
3.3 Marine		
3.3.1	Requesting Data from Capturing our Coast	None.
3.3.2	Habitat Mapping of Cloque Bay	Some areas have proven difficult to survey due to the aerial photograph maps not corresponding with the current topography/substrate of the bay (i.e. some areas now showing sedimentation/additional boulders present/scour from recent storm events). For 2020, it is recommended to source more recent maps from Digimap and/or consider photographing certain areas with a drone. Following the completion of the habitat map survey summary report results, a phase II survey within identified important habitats/features is recommended to be undertaken.
3.3.3	Green Ormer Population Assessment	To continue this assessment in 2020 and also pass on past green ormer information to La Societe Jersiaise for comparative Channel Islands review.
3.3.4	Invasive Species Assessment	Undertake intertidal invasive species surveys in 2020. This may include recording species through The Wildlife Trust's new recording programme, <i>Shoresearch</i> , in addition to the green ormer assessment and public outreach events.
3.3.5	Marine Mammal Surveys	None at this present state unless stated in the final summary review, to be completed by the end of February 2020.

3.3.6	Fish/ Shellfish Surveys – BRUVs	It is recommended in 2020 that a master’s student undertakes a BRUV project as part of an AWT placement. This will enable a competent student to undertake a research project involving reviewing the methodologies available, formulating the study design and undertaking data collection and analysis. This will ensure more resource and focus is available to the BRUV project. Guidance notes have been drawn up for this purpose and are available from the Alderney Wildlife Trust.
3.3.7	Grey Seal Population Dynamics Study	To continue grey seal population dynamics survey in 2020.
3.3.8	Grey Seal Photographic ID Catalogue	To continue support of the grey seal photographic ID catalogue.
3.3.9	Intertidal Review of Methods, Results and Activities	It is recommended the project is re-advertised with the University of York for 2020.
4.3.10	Strandline Surveys	Strandline surveys have been undertaken across Alderney since 2016 and have provided insight into their composition. These surveys have also acted as a useful training activity for visiting students, work placements and DoE volunteers. It is now, however, recommended that strandline surveys are used solely for training purposes for interested volunteers/students and/or in combination with a public beach clean event. A large amount of strandline data for each bay across Alderney has now been obtained meaning additional data is of limited value.
3.3.11	Capturing our Coast	A ‘CoCoast 2’ project is to potentially start in 2020/2021. It is recommended that past data from Alderney is requested again, once this new project becomes ‘live’ in 2020.
3.3.13	Cave Surveys	It is recommended that cave surveys continue in 2020.
3.3.14	Sea Water Testing	Consider seawater testing within the Ramsar site for 2020.
3.3.16	Support the British Marine Life Rescue Divers Group on Alderney	Continue supporting the BDMLR on Alderney, such as recording stranding incidents and providing additional support if required during a stranding (i.e. keeping the public away).
3.3.17	Support Marine Management Activities and Marine Management Forum	To continue supporting the Alderney Management Forum.

3.3.18	Support Marine Academic Projects	It is recommended a student placement/project is offered with the University of York for 2020 (see section 4.3.9).
3.3.19	Review Contact with Agence des Aires Marines Protégées (AAMP)	Continue to remain in contact with Agence de la Biodiversité and review contact annually.
3.3.20	Review of Baseline Marine Data	Complete in 2020
3.4 Events		
3.4.1	Boat Tours on Sula of Braye	Boat tours should continue in 2020 in order to raise awareness of the Ramsar site, wildlife and conservation in addition to contributing to the costs of vital seabird and marine work.
3.4.2	Education Tours for Students of St Anne's School	This project will continue into the future, with one or two educational tours offered annually to Year 6 students of St Anne's School (funds for 2020 have been obtained).
3.4.3	Community Engagement and Public Awareness	Continue events and public engagement in 2020 and beyond.
3.5 Advisory and Legislative		
3.5.1	Review and Update 5-Year Ramsar Strategy and Ramsar Reports	This work objective should be undertaken in 2020.
3.5.2	Signage on Burh ou	Check this poster has not been removed or damaged and replace if necessary.
3.5.3	Signage and Publication of the Puffin Friendly Zone – Marine Exclusion Zone	It is recommended the PFZ is promoted as much as possible in 2020 and beyond. Increased awareness and compliance will strengthen the effectivity of the zone. Further promotion in France would be particularly beneficial.
3.5.4	Signpost Placement for Breeding Waders	Replace all breeding wader signs before the 2020 season with a more prominent design and height to help gain attention.

3.5.5	Publications Relating to the Ramsar site	Continue to contribute to publications for the Ramsar site in 2020. Review the current and install additional Ramsar information boards in 2020 (see AWT, 2019a; 4.5.1 for further details).
3.5.6	Channel Islands Ramsar Steering Committee	Maintain communication links with the Channel Islands Ramsar Steering Committee and publish the Channel Islands Ramsar website in 2020.
3.5.7	Twin Alderney's Ramsar Site with Iles de Chausey	Continue this work objective in 2020.
3.5.8	Review Bird Protection Law	Continue to support the SoA in 2020.
3.5.9	Support the SoA in the Development of Appropriate Legislation	Continue to support the SoA in 2020 and beyond.
3.5.10	Support the Channel Island Ramsar Website	Continue to support the Channel Island Ramsar website, aiming to publish the site in 2020.
3.6 Additional Items		
3.6.1	Gull Observations via Puffin Cameras	Continue using the PTZ puffin camera to identify as many colour rings as possible in 2020 and beyond, contributing valuable data to Guernsey Gulls (2019).
3.6.2	Storm Petrel Observations via Puffin Cameras	Add a microphone to the puffin camera set-up and explore using the PTZ puffin camera to monitor storm-petrel activity in 2020.

Appendix 6.10. Comments from Members of the ARSG.

This section has been removed to comply with GDPR guidance. Should you have any questions, please contact ramsar@alderneywildlife.org

Appendix 6.11. Comments from Activity Organisations

This section of the report has been removed to comply with GDPR guidance. Should you have any questions, please contact ramsar@alderneywildlife.org