S. 37

File With _____

## SECTION 131 FORM

Appeal NO: ABP 314485

Defer Re O/H ☐

TO:SEO

Having considered the contents of the submission ~~dated~~/ received 23/12/24 from

Sabrina Joyce Keegan I recommend that section 131 of the Planning and Development Act, 2000 ~~be~~/not be invoked at this stage for the following reason(s):. no response

E.O.: _____ Date: 9/1/25

To EO: _____

Section 131 not to be invoked at this stage. ☐

Section 131 to be invoked – allow 2/4 weeks for reply. ☐

S.E.O.: _____ Date: _____

S.A.O: _____ Date: _____

M _____

Please prepare BP _____ - Section 131 notice enclosing a copy of the attached submission

to: _____

Allow 2/3/4weeks – BP _____

EO: _____ Date: _____

AA: _____ Date: _____

S. 37

File With _____

## CORRESPONDENCE FORM

**Appeal No: ABP**_____

**M** _____

**Please treat correspondence received on** _____ **as follows:**

**1. Update database withnew agent for Applicant/Appell ant** _____

**2. Acknowledge with BP** _____

3. Keep copy of Board's Letter ☐

**1. RETURN TO SENDER with BP**_____

2. KeepEnvelope: ☐

3. Keep Copy of Board's letter ☐

**Amendments/Comments**

**4. Attach to file**

(a) R/S ☐ (d) Screening ☐

(b) GIS Processing ☐ (e) Inspectorate ☐

(c) Processing ☐

**RETURN TO EO** ☐

| | |
|---|---|
| | Plans Date Stamped ☐<br>Date Stamped Filled in ☐ |
| **EO:** | **AA:** |
| **Date:** | **Date:** |

# Lodgement Cover Sheet - LDG-077165-25

An Bord Pleanála

## Details

| | |
|---|---|
| Lodgement Date | 23/12/2024 |
| Customer | Sabrina Joyce-Kemper |
| Lodgement Channel | Email |
| Lodgement by Agent | No |
| Agent Name | |
| Correspondence Primarily Sent to | |
| Registered Post Reference | |

| | |
|---|---|
| Lodgement ID | LDG-077165-25 |
| Map ID | |
| Created By | Cathy Carleton |
| Physical Items included | No |
| Generate Acknowledgement Letter | |
| Customer Ref. No. | |
| PA Reg Ref | F20A/0668 |

## Categorisation

| | |
|---|---|
| Lodgement Type | Observation / Submission |
| Section | Processing |

| | |
|---|---|
| PA Name | Fingal County Council |
| Case Type (3rd Level Category) | Normal Planning Appeal PDA2000 |

## Fee and Payments

| | |
|---|---|
| Specified Body | No |
| Oral Hearing | No |
| Fee Calculation Method | System |
| Currency | Euro |
| Fee Paid | 0.00 |
| Refund Amount | |

| | |
|---|---|
| Observation/Objection Allowed? | Yes |
| Payment | |
| Related Payment Details Record | |

## Observation

| | |
|---|---|
| | A proposed development comprising the taking of a 'relevant action' only within the meaning of Section 34C of the Planning and Development Act 2000, as amended, at Dublin Airport, |

Run at: 09/01/2025 10:14

Run by: Cathy Carleton

**James Sweeney**

**From:** Appeals2
**Sent:** Tuesday 24 December 2024 12:09
**To:** James Sweeney
**Subject:** FW: Submission to 314485 DRaft Decision Relevant Action Dublin Airport.
**Attachments:** SJK Sub Draft Decision 314485 plus appendices.pdf

**Follow Up Flag:** Follow up
**Flag Status:** Completed

**From:** Sabrina Joyce <sabrina.joyce@gmail.com>
**Sent:** Monday, December 23, 2024 11:41 PM
**To:** Appeals2 <appeals@pleanala.ie>
**Subject:** Submission to 314485 DRaft Decision Relevant Action Dublin Airport.



Please see my submission attached,
I am an aobserver on this casefile and have already paid my fee with previous submissions.

Best Regards
Sabrina Joyce-Kemper

# Planning Observation

## An Bord Pleanála
## Planning ref: 314485
## Relevant Action
## Dublin Airport


Photo by Ameya Khandekar on Unsplash

**Submission by;**

Sabrina Joyce-Kemper
23 Portmarnock Crescent
Portmarnock
Co Dublin

**Date of Observation:** 23rd December 2024

**Planning application reference:** F20A/0668 / ABP 314485

# Table of Contents



Please note this report is formatted having regard to the Dyslexia association of Ireland's guidelines to inclusive communications on the font styles, font size and text alignment.

# Introduction

**1. Introduction**

1.1 Sabrina Joyce-Kemper makes this submission on The Boards Draft Decision in relation to ABP planning appeal 314485. Ms Joyce-Kemper has an advanced diploma in Planning and Environmental law from the Honourable Society of Kings Inn. This submission is in objection to the planning application to amend the conditions imposed by the Bord with decision in case no 217429.

1.2 I the past in relation to this case I have provided appendices/ sections to the submission provided by the St. Margaret's and the Ward residents group. I wish to adopt all SMTW submissions on this case file, band all submissions without prejudice to whether they support my arguments or not.

1.3 The development is described as follows on the ABP case file planning portal:

*A proposed development comprising the taking of a relevant action only within the meaning of Section 34C of the Planning and Development Act 2000, as amended, which relates to the night-time use of the runway system at Dublin Airport.*

1.4 I wish to object to the Draft Decision made by The Board. The majority of relevant issues I raised in my submissions have not been addressed or engaged with. In many cases the \Inspector and the Board by way of adopting the inspectors report, did not apply the Habitats, Birds, EIA and Water Framework Directives (WFD) as required by law. An Board Pleanála as a competent planning authority also failed to comply with Section 34(12) of the Planning and Development Act (as Amended), for the reasons and considerations laid out in the remainder of this document.

1.5 Many of the point particularly in relation to Section 34(12) obligations were raised at the earliest stage in this planning process. It is extremely frustrating that the issue was not engaged with and correctly complied with in 2020 by Fingal County Council, and ANCA and by An Bord Pleanála upon receipt of my First submission to appeal 314485. Section 34(12) obligations should have been complied with 4 years ago so that the proper avenue for consent, where unauthorised elements of a plan / project or development exists, could be taken. By not doing so the lawful development of our National Airport has been delayed by 4 years which will undoubtedly have a knock on effect on other airport developments with cumulative impacts.

1.6 I have made my arguments again in the document in as cogent a manner I can, and ask that the Inspector and the Board fulfil their obligations as prescribed by National and EU legislation. It should not fall to a member of the public to ensure compliance with the law in planning matters, nor should this matter need to be settled in the Planning and

Environment Court when the legislation is clear, an admission of unauthorised development in relation to the mppa CAP has been made by the applicant, and in relation to breach of 65 movement limit endorsed via enforcement procedures by Fingal County Council.

## 2. Unauthorised Development

2.1 In both submissions made in my name (appendix 1 and 2) I go into great detail in identifying unauthorised development in relation to this planning application. The inspectors lists many of the issues I had raised in section 9.7.7 but not all.

**2.12** **Flight paths:** I detailed the links between flight paths and land use planning in the development plan and the need for planning consent and appropriate assessments of same. I pointed out that the ONLY consented flight paths were those submitted in the 2007 North Runway application which was extended in 2017. The flight paths were ONLY subject to EIA assessment no Appropriate assessment. I gave clear evidence how the current Fingal development plan is based on the 2007 consented flight paths which are integrated into the Development Plan via the Public Safety Zones.

2.13 I provided copies of those maps and the reports on how and why the Public safety zones were assessed and arrived at. The new noise contours noise monitoring information and flight operations that this relevant action seeks to regularise are based on unconsented therefore unauthorised flight paths that have never been subject to an AA or an EIA as required by law. By every legal planning and environmental definition they are unauthorised. This whole planning application seeks to amend the original permission ABP reference 217429 and certain condition attached t it. No other planning consent is referenced because there is none. This is the only planning consent for Dublin airport that exists in relation to authorising flight paths.

2.14 This planning permission 314485 seeks to submit different flight paths and associated noise contour modelling and EIA assessment. It was lodged in 2020 before the runway opened. Despite the fact that the new flight paths were never consented under any planning application since 2017 and despite the fact that this application was live and appealed, the daa proceeded to use new flight paths that had NEVER been subject to an EIA (screening or assessment) or an AA (screening or assessment) which is legally required for any plan or programme that is likely to have a significant effect on the environment under the EIA Directive regime or the Habitats and Birds Directive regime.

2.15 The principle that THIS relevant action actually required a new EIA screening and assessment and AA screening and the content of same, in itself proves that flight paths and airspace operations are plans, projects or programmes that require EIA and AA screening and assessment which can only be carried out through a consenting regime under the control of a competent authority prescribed by law to carry out such

screening/ assessments and consenting. Fingal County Council have themselves initiated enforcement proceeding on the flight paths issue.

2.16 In Ireland the only prescribed competent authorities for changes to planning consents and the elements of plans, projects or programmes contained therein are An Bord Pleanála and/ or Planning Authorities for each functional area. Any changes to the plans and particulars lodged with the original consent must be made via amendment to the original permission BEFORE the amended development is progressed or changed. In the UK in terms of changes to airspace operations, legislation prescribed that the Civil Aviation Authority are the competent authority to assess flight path changes. In the CCA Guidelines[1] on environmental assessment on airspace change proposals state the following:

At section 2.9: *Part 6, Chapter 1 of the Conservation of Habitats and Species Regulations 2017 (UK transcription of the Birds and Habitats Directive- my note) requires that* ***airspace change proposals which are likely to have a significant effect - either alone or in combination with other plans or projects - on European sites must be subject to an appropriate assessment*** *of their potential adverse effects on the integrity of those sites. This is known as a habitats regulations assessment which also includes consideration of any mitigation measures to reduce adverse effects.* (emphasis added)

At Section 2.10 : *The CAA is the competent authority under the Conservation of Habitats and Species Regulations 2017. This means that the CAA may* ***only approve an airspace change proposal if satisfied that it will not adversely affect the integrity of one or more European sites****, unless there are no alternative solutions, and the proposal must nevertheless be approved for imperative reasons of overriding public interest. However, in such cases, change sponsors must satisfy the CAA that sufficient compensatory measures will be implemented to ensure the overall coherence of the national site network of European sites.* (emphasis added) based on this guidance by an aviation regulatory authority in the UK, It is clear that EIA and AA to any changes in flight paths is required under European law.

2.17 The IAA have already stated that they do not have nor ever had the power under the IAA functions to amend or revoke planning consents or conditions (see yellow sections of Appendix 3 – IAA media announcement Oct 2024). When certain functions of the IAA were transferred to the AirNav Ireland in May 2023 under the Air Navigation and Transport Act 2022 and its vesting order[2], no new functions under section 15 of that act were granted in terms of powers to amend or revoke planning consents. The only

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1 UK Civil Aviation Authority - Environmental Assessment Requirements and Guidance for Airspace Change Proposals CAP 1616i – November 2023/ effective January 2024

2 S.I. No. 218/2023 - Air Navigation and Transport Act 2022 (Vesting Day) Order 2023

powers to do so are vested in either ABP or a local planning authority. Neither ABP or Fingal County Council have consented the new flight paths, nor have they carried out EIA or AA screening on new flight paths outside of this planning application. The new flight paths were not included in this application until ABP upon a de novo appeal, requested further information on the operational flight paths that differed from the consented ones. At this point in time the unconsented flight paths were already operational without being subject to an EIA or AA (Screening/ full assessment) and therefore were already unauthorised development.

2.18 The inspector makes numerous references to the fact that the daa has materially changed the flight paths to match current operational flight paths (that differ to those consented originally), and that further information needed to be requested to properly asses the impact the new flight paths are causing. The fact that ABP requested this information as it needed it to inform the EIA and AA for the planning application based on the new Flight Paths in operation since 2022 should have been a red flag to the Board and the Inspector. An applicant cannot apply for permission to consent any plan/ programme or project which by law requires and EIA or AA, that has already been initiated or carried out in an unauthorised manner. ABP and FCC and ANCA are all precluded from considering any application that seeks to carry out an EIA or AA assessment AFTER the elements contained in the application have already been operational without legally required assessments.

2.18 Below are some statements made by the inspector in the inspectors report, that clearly identifies the inspector was aware of the flight paths that were the subject of this consent 314485, already being operational. Emphasis added on all statements and my comments follow each statement.

*1.6.2 The applicant's submission noted* ***the initial application included predicted flight patterns although since the NR had subsequentially became operational, the actual flight paths could now be included in the noise modelling****, and as such, amended the findings in the EIAR.* (an AA and EIA calls for precise and definitive findings, predictions are associated with outline permissions which 217429 was not. This statement is irrational).

*1.11.3. The mode of operation has been referenced in a significant number of submissions,* ***mainly in relation to the new flight paths for departures from the NR. The supplementary information includes information on these new flight paths*** *which will divert north, off the north runway, earlier than previously indicated in the EIS with the original NR application. This is referred to as a 15-degree divergence throughout my report. The applicant has stated that this new turn north, is an airspace safety*

*requirement and is reflected in the noise contour areas. My planning assessment and EIAR* ***details the implication of this divergence and concludes that this does not reflect an alteration to the mode of operation of the runway.*** (This statement is irrational as it absolutely contradicts the inspectors comments in 12.3.14), Why was new information required and requested by the Board to inform the EIA if the new flight paths were not an alteration to the mode of operation of the runway? The new information / data could only be provided, as the new flight paths and monitoring stations for same were already in operation without planning consent).

1.13.2. ...Having regard to **the amendments in the flight paths in the supplementary information to the Board**, the Board requested the applicant to submit amended Eligibility Contour Maps. These were circulated to observers for comments. (these amendments were already operational.)

*12.2.3. In general, the applicant's amended information* ***included new flight paths*** *and fleet mix, not previously considered during the RD or RA.* ***New flight patterns include the divergence of departing aircraft off the NR, in a more north westerly pattern earlier than previously considered in the original application.*** *Alterations to fleet mix and forecasting scheduling at the airport include, inter alia, the scheduling of cargo flights during the nighttime hours.* ***These alterations, and new noise modelling, indicate new flight paths over a population previously not flown over, north of the North Runway.*** *The main change to the RD, issued by ANCA, from the applicant's supplementary information, would be the assessment of the eligibility of the noise insulation scheme* ***and those newly impacted by new flight paths at night****. To further assess this impact, an additional suite of maps was requested by the Board in the second request for additional information. All the additional information submitted to the Board* ***has importance in the assessment*** *of the RD.* (more indications of the unconsented flight paths being operational yet not identified as unauthorised despite numerous submissions identifying this issue.)

*12.3.13. The assessment of these flight paths and use of the runway is assessed in detail throughout my report. In general, the Board will note that the grounds of appeal were concerned with* ***the flight paths not operating in compliance with those conditions*** *included in the original NR permission.* (clear acknowledgement by Inspector of uncompliant and unconsented operations without calling it unauthorised development).

12.3.14. On foot of the Boards first additional information request the applicant **submitted amended flight paths to reflect the actual operation of the NR rather than those initially predicted and included in the RD and RA. These alterations change the mode of operation of the runways from mixed mode** (previously proposed in revised submission in 2021) i.e., the parallel use of both the NR and the SR for departures

between 06:00 to 08:00 to single mode (original proposed in the RA in 2020) i.e., only the NR will be used for departures during 06:00 to 08:00. ***The flight patterns from the NR have also been amended, i.e. the applicant's supplementary information submission to the Board, to consider the requirements of the Irish Aviation Authority and divert north, northwest, earlier from the NR than originally proposed***. (directly contradicts statement in 1.11.3, the inspector should have complied with section 34(12) of the Planning and development act 2000 as amended and had regard to my detailed comments on same in my submissions rather than disregarding them completely.)

2.19 Limit on nightly Aircraft movements: The arguments raised in relation to flight paths can equally be applied to the consistent and continuous breach of the number of night time aircraft movements. This application sought to replace the 65 movement per night for North and South Runways combined with a noise quote system, as such it directly involved the 65 night limit condition. However this condition had already been breached and unauthorised movements had taken place. The planning authority agreed and initiated an enforcement notice (see appendix 4 and 5) The enforcement notice was challenged brought to judicial review and a stay on the proceedings was made until the Board made a decision on this action, as I believe the Court held it could not make a determination while the case was live with the Board and influence these proceedings.

2.20 The inspectors report states the following in relation to the night movements enforcement issue.

*12.4.8. The applicant's response to the Board FI notes differing views on this enforcement. The applicant considered that the North Runway only became operational in August 2022, more than halfway through the 92-day period referred to in Condition No 5 and accordingly Condition No.5 did not become applicable in 2022. I note the scheduling of flights during the night is a matter for Daa and subject to continuous change. This aside, I have no evidence before me to suggest the proposal for the RA is to address any unauthorised action. A response to the supplementary information was received by both ANCA and the PA and no issues relating to unauthorised development have been raised. Any non-compliance with the original NR permission and enforcement issues are a matter for the PA.*

2.21 The Board should note that the 92-day temporal period was chosen as a metric, as its in in the summer, a period when aircraft movements are at their highest. The period was chosen to ensure the planning authorities and daa did not underestimate the no of movements per night in quieter times of the year by calculating it in the in the busiest

period of the year and applying to less busy times of the 365 night year. The Civil Aviation authority in the UK explain this in their modelling guidelines[3] stating:

At section 2.3: *All modelling of aircraft noise is based on assessing the noise on the ground generated by each aircraft type using the airport (or airspace), then combining these in the proportions of the various different aircraft types that fly along the various different flight paths that are observed or expected, usually for an average summer* day or night.* Corresponding footnote states: **Summer is often used, since, in the UK, airports are likely to be busier in the summer season than in the winter season, and because residents are more likely to be outside or with windows open in the summer than in the winter, and so will be more affected by any aviation noise. Summer is defined here as the 92- day period between 16 June and 15 September inclusive.*

2.22 The condition only related to the modelling metric, a system or standard of measurement, used to identify a movement per night limit to apply from the first night that the Airport Runway comes into operation. It is not a condition that requires summer to come around each year before it is applicable. That would be absurd.

2.23 The inspector states that no evidence was before ABP in relation unauthorised development and movements per night. I believe I had listed the enforcement cases that were in train relating to Dublin airport planning developments but in any case I have included the evidence at appendix 4 and 5. While the inspector is correct in stating that it is the Planning Authorities role to process enforcement complaints, Section 34(12) of the planning and development acts as amendment place a mandatory obligation on An Bord Pleanála to refuse to consider a planning application that seeks to regularise unauthorised development that would require EIA or AA assessment (as an increase in night time movements does as this application confirms).This is such a case as the operations of the airport have exceeded the 65 movements per night limit frequently, resulting in the FCC enforcement.

**2.24 Breach of passenger CAP of 32mppa:** The daa have openly admitted that they have breached the passenger Cap of 32mppa in the years 2019, 2023 and 2024. This planning application bases operations and assessment on the authorised figure of 32 mppa, however this has now been breached and so the excess passengers, flights, and associated environmental impacts that have not been assessed under EIA and AA constitute unauthorised development. I have dealt with this issue in detail in my submissions.

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[3] CAA Policy on Minimum Standards for Noise Modelling CAP 2091 – Jan 2021- https://www.caa.co.uk/publication/download/18321

2.25 The inspector relies on the consented 32mppa figure in section 13.3.1 to conclude that the proposed development was the optimum scenario among the alternatives considered. In the section the inspectors report states:

*These scenarios were also considered in ANCA's assessment that led to the issuing of the Regulatory Decision and are based on the preferential use of the runway during additional hours and operational activities. The passenger cap of 32 mppa remained constant throughout all the alternatives. In all scenarios the environmental assessment, and interactions, concluded that there would be an adverse impact on population and human health, a potential for significant adverse effects on air and ground noise and vibration and an imperceptible impact on all other areas.*

2.26 The applicants alternatives and the Inspectors/ Boards reliance on them cannot be considered legally robust in light of the fact that the 32 mppa was breached a number a times since 2019. Incidently the daa sought to raise the cap in 2019 to 35mppa in 2019 but withdrew the application in 2020. It also means that the EIA assessment and AA screening are not based on the actual figures and do not consider the excess/ unauthorised flights, passengers and associated emissions to air, wastewater and pollution impacts (sewage overflows, de-icing, pfas, surface water contamination to water bodies). The EIA and AA conclusions therefore cannot be relied upon.

2.27 The North and South Runway combined construction and operations have NEVER been appropriately assessed. The applicant nor An Bord Pleanála have acknowledged this important point. The AA screening should have identified this and assessed as a cumulative impact which would certainly have led to a stage 2 AA. Also there has NEVER been a comprehensive cumulative impact assessment of all Dublin Airport Campus developments (see appendix 6) nor of the unauthorised development that consisted of the unconsented excavation of toxic PFAS contaminated soil during the North Runway Construction and illegal reburial of contaminated soil just off the newly constructed runway. There is evidence that the toxic material is draining to local watercourses and groundwater and needs to be assessed as a cumulative impact. The Board should review the live case file on appeal 320815 (F23A/0636). I have attached my recent submission to this unauthorised development associated with the North Runway at appendix 7.

2.28 In the event that a planning authority failed in their obligations under Section 34(12), The Board are obliged in law to overturn and grant of permission and refuse to grant such an application due to the unauthorised development. Such consent can only be granted via a strict substitute consent process. Such example of ABP 34(12) refusals include ABP-300140-17, ABP-304352-19. The relevant legislation as inserted and amended by Planning and Development, Maritime and Valuation (Amendment) Act 2022 is as follows:

(8) The modification is that the reference in section 34(12) to the planning authority shall be construed as a reference to the Board.

(9) Where the Board refuses under section 34(12), as applied by subsection (7), to consider an application on appeal—

(a) it shall give the reasons for the refusal to the person who made the appeal,

(b) the application on appeal shall be deemed to have been withdrawn by the applicant for permission, and

(c) the refusal shall operate to annul the decision of the planning authority as from the time when that decision was given.".

2.29 Some relevant case law in relation to the application of section 34(12) is laid out below.

**Mount Juliet Estates Residents Group- [2020] IEHC 128** paragraphs;
36. This prohibition is intended to give effect to a judgment of the Court of Justice of the European Union ("the CJEU") in infringement proceedings taken against Ireland. In Case C-215/06, Commission v. Ireland, the blanket provision then made for retention planning permission under domestic law was condemned by the CJEU as being contrary to the EIA Directive. The PDA 2000 was subsequently amended by the Planning and Development (Amendment) Act 2010 to greatly restrict the circumstances in which retention planning permission may be obtained. The 2010 Act also introduced a special form of retrospective development consent, known as "substitute consent".

37. As appears from the wording of section 34(12) of the PDA 2000 (above), the prohibition on applying for retention planning permission is contingent on there having been a breach of the requirements of one or both of the EU Directives. It may assist the reader in understanding the extent of the prohibition to pause briefly, and to explain the following feature of the EU Directives. Both the EIA Directive and the Habitats Directive provide for the making of what is described informally as a "screening determination". This is a preliminary decision as to whether or not a particular development project must be subject to a "full" assessment. If the screening determination indicates that the development is likely to have a significant effect on the environment or on a European Site, then it is necessary to carry out a "full" assessment.

38. The making of a screening determination is, generally, done as part of the consideration of a planning application. (The carrying out of EIA is mandatory in the

case of projects which exceed certain prescribed thresholds, but this is not immediately relevant to the issues to be addressed in this judgment). Almost by definition, development which has been carried out without a prior grant of planning permission will not have been subject to a screening determination.

39. An understanding of the concept of a screening determination is essential to a proper understanding of the extent of the prohibition under section 34(12) of the PDA 2000. This is because one of the circumstances in which the prohibition will bite is where the failure to apply for planning permission prior to the commencement of development had the consequence that the developer avoided a screening determination.

40. An application for retention planning permission will, by definition, be made subsequent to the commencement of development. The precise purpose of a retention application is to regularise unauthorised development. In order to decide whether the prohibition under section 34(12) bites, a planning authority in receipt of an application for retention planning permission must perform the following hypothetical exercise. The authority must extrapolate as to what would have happened had the developer applied for planning permission prior to the commencement of development. (On the facts of the present case, Kilkenny County Council, having received the retention application in March 2019, would have had to consider whether screening for EIA would have been required in 2016 had an application been made then).

41. To elaborate: the planning authority must consider whether, in the event that a hypothetical planning application had been made in advance of the commencement of development works, it would have required a determination as to whether an environmental impact assessment is required, i.e. a screening determination. If it did, then the developer cannot apply for retention planning permission. The developer would have to seek "substitute consent" instead. Crucially, this is so even if the (hypothetical) screening determination would have been negative, i.e. a full assessment would not have been required. It is enough to trigger the prohibition under section 34(12) that the developer avoided having to submit to a screening exercise, irrespective of what the outcome of that exercise would have been. Put otherwise, the procedural misstep of avoiding a screening exercise precludes the making of a retention planning permission.

A judgment made on the 18th of December 2024 [2024] IECA 300] in the Court of appeal stated;

147.The EIA Directive and the Habitats Directive are structured so that the requisite environmental assessments must precede the grant of development consent, which in

turn must precede the carrying out of any development. This gives legal structure to the precautionary principle under which development should not proceed unless the decision maker is satisfied in advance of granting consent that the development will not be environmentally damaging. As a matter of EU law, environmental pollution encompasses the risk of environmental pollution even where such pollution has not actually occurred. Further, under the Habitats Directive the decision maker must be satisfied that there will not be an adverse effect on any site designated for ecological protection. The level of proof required in an AA is high, namely the decision maker must be satisfied as to the absence of such risk beyond a reasonable scientific doubt. As a result, a court should be slow to exercise its discretion to permit an unauthorised development –particularly one requiring AA –to proceed on the basis that the Irish civil standard of proof has been metas to the absence of environmental risk. This is particularly so where the claim that it is met is based on the absence of contrary expert evidence being adduced by the appellant for relief.

**3. Appropriate Assessment.**

3.1 The addendum report to the inspector by the Inspectorate Ecologist cannot be considered in accordance with Planning and Environmental Law and Fair Procedure. It relies on surveys data that is out of date by CIEEM guidance standards - ADVICE NOTE ON THE LIFESPAN OF ECOLOGICAL REPORTS & SURVEYS APRIL 2019 (see appendix 8). The advise note states any surveys over 18 months must be reviewed for relevancy and any data of 3 years old at the time of making a decision cannot be relied upon. Some of teh data used to inform the AA screening and EIA assessment dates back to 2017/2018 and predates COVID restrictions on travel which may have lead to biodiversity expansion in relevant areas. It cannot be robust.

3.2 Ms Flynn only reviews the data submitted by the applicant and has not reviewed submissions by observers or experts. It is also signed December 2023 before further information was put out for further public consultation under Aarhus and EIA directive, with more submissions coming in March /April 2024.

3.3 The AA relies on the noise contours (based on human metrics) to assess impacts on Birds. This is an average modelling method. So the assumptions made in relation to disturbance to Avian receptors based on the contours is not applicable. The information for AA screening MUST ba based on precise, definitive and scientific information, Therefore Lmax decibel readings must be used to identify impacts. Averaged modelling do not identify actual impacts as required by Habitats and Birds Directives. The conclusions on no impact reached by the applicant and endorsed by the ABP Ecologist and inspector are not reliable.

3.4 In my previous submission I had raised the issue of bird strikes. The daa submitted bird strike figures that were well below the figures they had declared in safety reporting to Aviation authorities. The AA screening and EIA assessment relies on the wildlife

management plan to avoid impacts and conclude that a stage 2 AA is not required. It is not legally permissible to rely on mitigation measures to screen out impacts on Annex species or Qualifying Interests a=or Special Conservation Interests of Natura 2000 sites. The reliance on mitigation measures in this case is contrary to the Birds and Habitats Directives. The applicant must give full details including species of all avian mortalities both at the airport campus and in airspace over flight paths on approach or take-off to runways particularly in Natura 2000 site airspace.

3.5 The AA screen has no assessment of the masking of avian vocalisations by Aircraft noise both diurnally or nocturnally. No assessment of how it could affect, breeding (mating), roosting (predation) etc. This is still a lacunae in the assessments.

3.6 The AA screening fails entirely to consider ex situ feeding sites for Birds and the birds that feed there under flight paths, which are more stringently protected under Article 4 of the Birds directive. Such site would include the Bird Quiet Zone at Maynetown designated in Fingal Development plan, Kingfisher Green in Portmarnock and the Sluice River Marsh in Portmarnock. There is no no assessment of migratory routes or flight paths of species such as Brent geese and gulls and they fly between functionally connected SPAs in the Natura 2000 network.

3.7 The AA screening does not identify the individual species at the relevant Natura 2000 sites in the zone of influence. Nor doe sit identify that many of the sites have Qualifying species and or Special conservation interests in decline. See appendix 8/9/10 trend reports of Birdwatch Ireland for Baldoyle Bay SPA, Rogerstown SPA, Broadmeadow/ Malahide Spa and Dublin Bay SPA. The numbers are not stable and increasing and so the conservation objectives of these sites where they are available and legally compiled, are not being met. This should be reflected in any assessments.

3.8 No Assessment of operational impacts from increased night flights such as de-icing pollution to watercourses, light pollution from Aircraft lighting at night, increased contrails from night flights. None of these issued that i have raised have been addressed.

**Conclusion:**

I respectfully request that the Board refuse this application due the level of unauthorised development that this application effectively seeks to retain and regularise, due to the failure to carry out an AA screening assessment in accordance with the law or any stage 2 appropriate assessment at all (even when ANCA deemed one necessary), including cumulative impacts, due to lacunae in the EIA and AA inputs and assessments that still have not been acknowledged or addressed by the Board, Due to the conflict of interest issue involving Ethna Felton and finally due to a material contravention of the Fingal Development plan in relation to the Unauthorised flight paths which are contrary to the land use planning, integrated into the Plan based on the authorised flight paths.

Yours Sincerely
Sabrina Joyce-Kemper

# Submission on FI Relevant Action

## ABP ref: 314485

Photo by Ross Parmly on Unsplash

**Submission by:**
**Sabrina Joyce-Kemper**
**23 Portmarnock Crescent**
**Portmarnock**
**Co Dublin.**

**Date of Submission : 2nd April 2024**

# Submission

**1. Introduction**

1.1 Sabrina Joyce-Kemper has been a resident of Portmarnock for over twenty years and has actively made submissions on planning permissions, plans, policy and programs in relation to Dublin Airport. She makes this submission for a number of members of her local community and for herself and her family. Ms Joyce-Kemper has an advanced diploma on Planning and Environmental Law from the Honorable Kings Inn.

1.2 The development is described as follows:

A proposed development comprising the taking of a relevant action only within the meaning of Section 34C of the Planning and Development Act 2000, as amended, which relates to the night-time use of the runway system at Dublin Airport

1.3 This submission is in response to further information submitted by the daa after a section 132 request by the Board.

**2. Relevant Action seeks to regularise unauthorised development.**

2.1 The relevant action can be summarized as follows;

The proposed relevant action, if permitted, relates to the night time use of the runway system at Dublin Airport. It involves the amendment of the operating restriction set out in condition no. 3(d) and the replacement of the operating restriction in condition no. 5 of the North Runway Planning Permission Fingal County Council Reg. Ref. No. F04A/1755; ABP Ref. No. PL06F.217429 (Parent Permission) as amended by Fingal County Council F19A/0023, ABP Ref. No. ABP-305289-19), in addition to proposing new noise mitigation measures.

Conditions no. 3(d) and 5 have now come into effect are operational although Fingal County Council current have a live enforcement action for breach of Condition 5.

2.2 The proposed relevant action, if permitted, would be to remove the numerical cap on the number of flights (which the daa have effectively already put into operation before this application received planning consent), permitted between the hours of 23:00 and 07:00 daily that came into effect in accordance with the North Runway Planning Permission and to replace it with an annual night time noise quota between the hours of 23:30 and 06:00 and also to allow flights to take off from and/or land on the North Runway (Runway 10L 28R) for an additional 2 hours i.e. 23:00 to 24:00 and 06:00 to 07:00. Overall, this would allow for an increase in the umber of flights taking off and/or landing at Dublin Airport between 23:00 and 07:00 over and above the number stipulated in condition no. 5 of the North Runway Planning Permission, in accordance with the annual night time noise quota. (again FFC have live enforcement action for breach of the number of flights).

2.3 The relevant action pursuant to Section 34C (1) (a), seeks:

To amend condition no. 3(d) of the North Runway Planning Permission (Fingal County Council Reg. Ref. No. F04A/1755; ABP Ref. No.: PL06F.217429 as amended by Fingal County Council F19A/0023, ABP Ref. No. ABP-305289-19). Condition 3(d) and the exceptions at the end of Condition 3 state the following:

'3(d). Runway 10L-28R shall not be used for take-off or landing between 2300 hours and 0700 hours except in cases of safety, maintenance considerations, exceptional air traffic conditions, adverse weather, technical faults in air traffic control systems or declared emergencies at other airports.'

2.4 Permission is being sought to amend the above condition so that it reads:

'Runway 10L-28R shall not be used for take-off or landing between 0000 hours and 0559 hours except in cases of safety, maintenance considerations, exceptional air traffic conditions, adverse weather, technical faults in air traffic control systems or declared emergencies at other airports or where Runway 10L-28R length is required for a specific aircraft type.'

The net effect of the proposed change, if permitted, would change the normal operating hours of the North Runway from the 07:00 to 23:00 to 06:00 to 00:00.

2.5 The daa also seeks to replace condition no. 5 of the North Runway Planning Permission (Fingal County Council Reg. Ref. No. F04A/1755; ABP Ref. No.: PL06F.217429 as amended by Fingal County Council F19A/0023, ABP Ref. No. ABP-305289-19) which provides as follows:

5. 'On completion of construction of the runway hereby permitted, the average number of night time aircraft movements at the airport shall not exceed 65/night (between 2300 hours and 0700 hours) when measured over the 92-day modelling period as set out in the reply to the further information request received by An Bord Pleanála on the 5th day of March, 2007.'

Reason: To control the frequency of night flights at the airport so as to protect residential amenity having regard to the information submitted concerning future night time use of the existing parallel runway'.

2.6 With the following:

'A noise quota system is proposed for night time noise at the airport. The airport shall be subject to an annual noise quota of 7990 between the hours of 2330hrs and 0600hrs'. In addition to the proposed night time noise quota, the relevant action also proposes the following noise mitigation measures:

- A noise insulation grant scheme for eligible dwellings within specific night noise contours

- A detailed Noise Monitoring Framework to monitor the noise performance with results to be reported annually to the Aircraft Noise Competent Authority (ANCA), in compliance with the Aircraft Noise (Dublin Airport) Regulation Act 2019.

2.7 The competent authority for planning compliance in Fingal is Fingal County Council they have a number of live planning enforcement for failure to comply with the planning permission that this relevant action seeks to amend including conditions 3(d) and 5 which are the subject of this planning permission. The following is a list of live enforcement cases related to the parent permission and the conditions that the daa seek to amend in this application.

**ENF22/166B** Warning Letter issued on 21st September 2022 for non compliance with planning permission Register Ref. F04A/1755 / ABP Ref: PL 06F.217429 as extended under FCC Reg. Ref: F04A/1755/E1 and amended under FCC Reg. Ref: F19A/0023 / ABP Ref: ABP-305298- The Planning Authority, following the issue of above referenced Warning letter in Case ENF 22/166B pursuant to the provisions of section 153(1) of the Planning and Development Act 2000 (as amended), i*ssued an Enforcement Notice on 28/07/23* pursuant to the provisions of section 154 of the Planning and Development Act 2000 (as amended).

**ENF23/042B** Warning Letter issued on 1st March 2023 for non compliance of Condition 3 (d) with planning permission Register Ref. F04A/1755 / ABP Ref: PL 06F.217429 as extended under FCC Reg. Ref: F04A/1755/E1 and amended under FCC Reg. Ref: F19A/0023 / ABP Ref: ABP-305298-19.

**ENF23/043B** Warning Letter issued on 1st March 2023 for non Compliance of Condition 10 with planning permission Register Ref. F04A/1755 / ABP Ref: PL 06F.217429 as extended under FCC Reg. Ref: F04A/1755/E1 and amended under FCC Reg. Ref: F19A/0023 / ABP Ref: ABP-305298-19.

**ENF23/100B** Warning Letter issued on 25th April 2023 for non compliance with Condition 5 with planning permission Register Ref. F04A/1755 / ABP Ref: PL 06F.217429 as extended under FCC Reg. Ref: F04A/1755/E1 and amended under FCC Reg. Ref: F19A/0023 / ABP Ref: ABP-305298-19. Follwoing an invesitigation an Enforcement Notice (CE Order Ref. PENF/0134/2023), dated 28th July 2023 was issued to the daa.

2.8 The daa have failed to advise ABP of these enforcement proceedings which are pertinent to this. The applicant has issued High Court proceeding to challenge the enforcement but the presiding judge, Humphreys J., has suspended those proceeding pending the outcome of this application. Thus the legal position at this moment in time is that the enforcement notice regarding unauthorised development, due to non conformity with Condition 5, stands.

2.9 The condition 5 limited the number of flights movements at night for both runways to 65. daa have breached this and FCC have legally stated that unauthorised development took place. As this instant permission is attempting to remove the 65 movement limit, but now that limit has already been breached, a grant of permission in this case would effectively regularise unauthorised development. I have already pointed out other issues relation to unauthorised development in my submissions, but now there is evidence before the board that it is fact.

2.10 Any movements over and above the 65 movement limit would be subject to an Appropriate assessment screening and Environmental Impact Assessment Screening due to the following:

-the flight paths are through Baldoyle bay SAC and Baldoyle Bay SPA and the noise contours have been extended into it (see Fig 1.). The SPA is functionally linked to a number of other SPA's and the qualifying Interests utilise other NATURA2000 sites for feeding and roosting.

-in 2022 IAA stated in their annual safety performance review[1] for Dublin Airport:

*"Birdstrike moved from the 4th most common occurrence pre-covid to 2nd both during the pandemic and post-Covid, it was one of the emerging risks identified in the COVID-19 Safety Risk Portfolio, "increased presence of wildlife on aerodromes." It is also the most common event type for 2022 as outlined in Figure B.3 which provides more granularity with the top event types reported to the IAA from the CAT aeroplane sector for 2022. The 2nd most common event type reported in 2022 was 'difficult/unruly passengers' which is one of the topics mentioned in the EASA SIB 2023-05: "Possible Risks Emerging During Summer 2023" and also forms part of the focus of EASA's 2023 Ready to Fly Campaign. "*

-more flights at night will cause more visual, vibration and noise disturbance and birdstrikes to Special Conservation Interests in Baldoyle SPA. This must be screened/ assessed.

-increase in night flights will impact nocturnally active bird species.

-Increases in flights in the colder nighttime will lead to increases in use of deicing chemicals that wash into surface water and Sluice , Cuckoo and Mayne Rivers which feed into Baldoyle Bay SAC.

-Increase in emissions due to more impactful contrails at night.

2.11 I have conclusively shown that daa have been deemed to have carried out unauthorised development by the competent authority under sections 152/ 153 and 154 of the Planning and development acts. The applicant deemed that this application would require a full EIA and stage 2 Appropriate assessment to include an increase in night flights with mitigation measures, therefore by extension the additional flight movement the subject of the enforcement notice would also have required development, operational and site specific EIA and AA screening and assessment.

2.12 Therefore under Section 34(12) of the planning and development act 2000 to present the board must refuse this application, as the applicant carried out the unauthorised development without consent and without AA and EIA screening followed by assessment by a competent authority and the identification of mitigation measures. ABP have indeed refused to consent a number of developments on this basis, case nos. 306153 and 304352 would be such examples of Section 34(12) refusals by the board.

1 https://www.iaa.ie/docs/default-source/publications/corporate-publications/performance/annual-safety-performance-review-2022.pdf?sfvrsn=31a6eef3_7

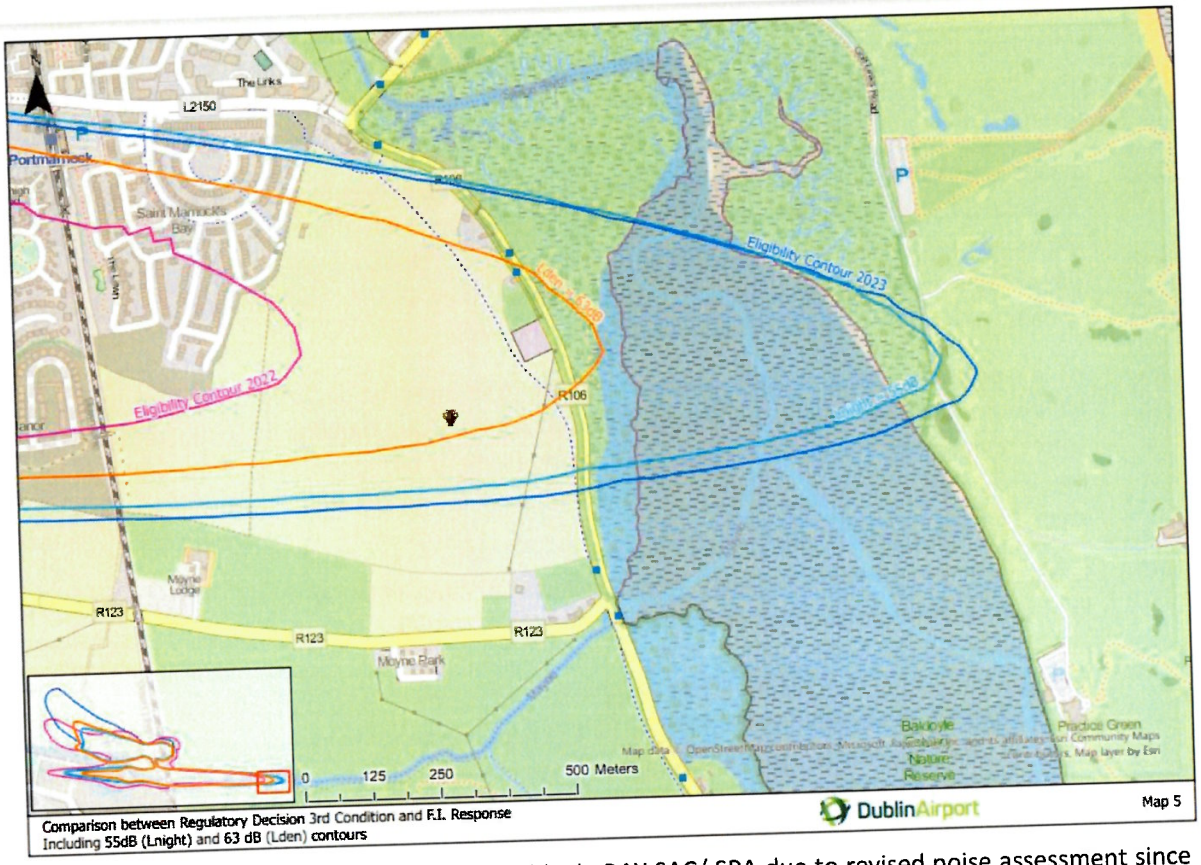


Fig 1. Eligibility contours extending out to Baldoyle BAY SAC/ SPA due to revised noise assessment since opening of North Runway.

## 3. Competition Law and State Aid Issues.

3.1 As a member state of the EU, Ireland and its competent authorities required to comply with EU law particularly in relation to the single market. In order to ensure a level playing field, the legislation on State aid (Article 107 and 108 of the Treaty on the Functioning of the European Union (TFEU)) and competition (Articles 101 to 109 TFEU — mergers, alliances, price-fixing, etc.) applies to the air transport sector.

3.2 EU rules ensure that all carriers, European and non-European, are granted the same rights and same opportunities to access air-transport-related services. This may not, however, be the case in some third countries where discriminatory practices and subsidies may give unfair competitive advantages to air carriers from those third countries. Competition law is in place in order to regulate anti competitive conduct within the single market.

3.3 If the ABP fails to implement the Habitats Directive and EIA Directive as transcribed into National Law by Section 34(12) of the P&D acts 2000 to present, it may be seen to be breaching EU internal market competition law. Other airports in EU member states must comply with regulations and the terms of their planning permission and operating licenses. In relation to this

application for Dublin Airport by refusing to apply the same rules that other Airports in EU member states must adhere to they could be gaining an unfair advantage in enticing airlines to use Dublin Airport. For this reason the decision must comply with the planning conditions and Environmental Directives., as implemented under EU planning and environmental law.

3.4 DAA are a semi state company (albeit commercial), but have recently received substantial state aid and subsidies from the state particularly during and after the covid restrictions had an economic impact on the airport. Recent judgments from the European Courts in Luxembourg have confirmed that the construction and operation of an airport may constitute an economic activity , which are subject to the TFEU rules on State aid.

3.5 As a semi-state body if ABP make a decision that may be in breach of Planning and Environmental law and may be in breach of competition law, allowing the DAA (another semi state body) and the airlines to benefit economically from non compliance with an EU regulatory regime, could this be seen as giving state aid to the airport? And is the form of state aid illegal under the TFEU?

3.6 We know that the airport was given tens of millions in State aid under the COVID 19 Temporary Framework and may have benefited from state aid via the adoption of co-ordination slots that may have breached planning and environmental law. But there are conditional provisions placed on State aid by the EU. While the focus of State aid control is the protection of the internal market against distortions of competition, as a general matter of coherence within the EU legal order, the Commission must also ensure that State aid is not contrary to other provisions of EU law, including EU environmental law. In a nutshell to receive State aid the DAA must be in compliance with EU legislation/ regulations.

3.7 The DAA operations at Dublin Airport have been deemed to be in breach of the Environmental and Planning regulations that govern the planning conditions of the parent permission and indeed that the daa seek to amend in this application, since the opening of the North Runway in 2022. The scheduling of more flight movements at night then consented for under condition 5 appears to have been intentional, this therefore may trigger a claw back on previous subsides or a ban on any future state aid or subsidies while the Airport is in non compliance with its planning conditions, under EU State Aid rules. Something the Board need to consider.

**4. (RSIGS) – Initial Eligibility Contour Area issues**

4.1 I am very concerned to learn that daa have proposed major changes to the 'Residential Sound Insulation Grant Scheme (RSIGS) – Initial Eligibility Contour Area and that the General public, (most especially those who may be impacted by the extension/ retraction of the contour area) have no say on the efficacy or fairness of the changes being proposed.

4.2 There is absolutely no provision for Residential residents in Portmarnock/ Kinsealy/ Baskin that are impacted by take offs and landing on Runway 28R. (see green outline figure 2)The contours 10L/ 10R/ 28L do not appear to be in line with the consented flight paths, nor are they reflective of the lived experience of noise for residents impacted by both the North and South Runways.

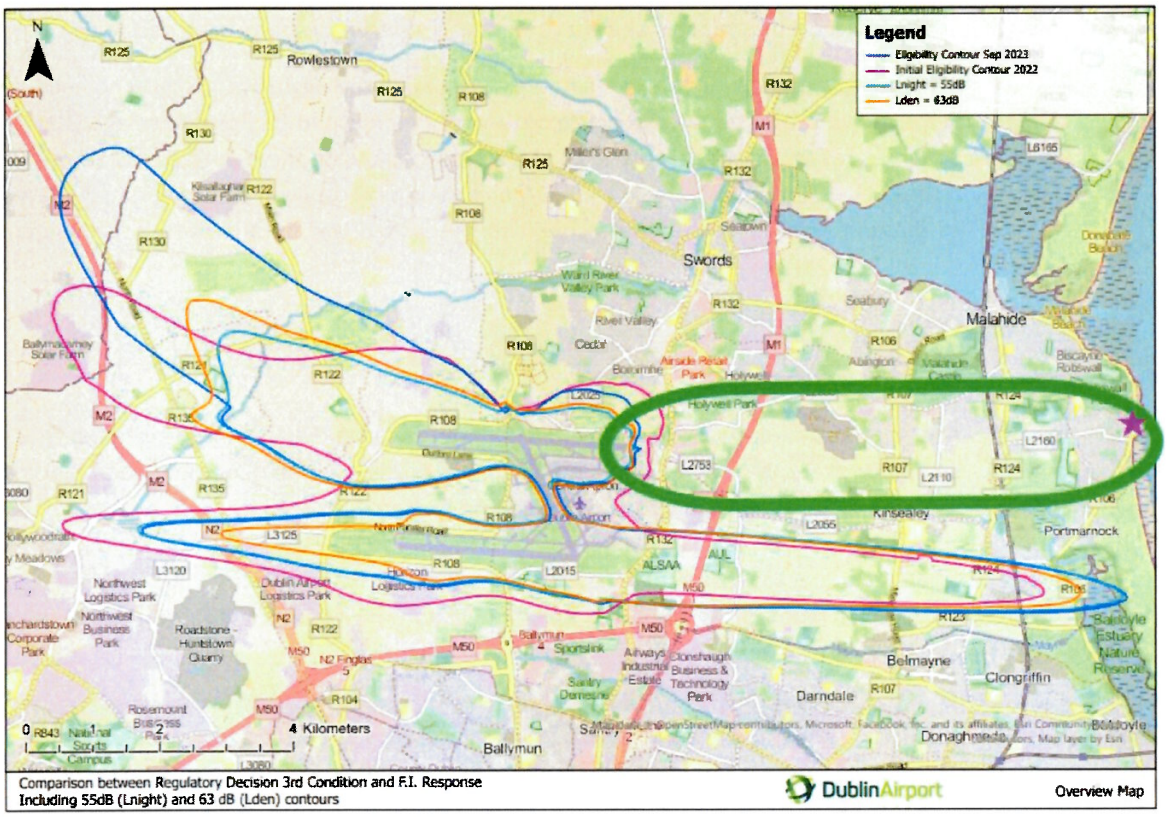


Figure 2. Missing eligibility contour in green and my home approx with purple star.

4.3 I live at 23 Portmarnock Crescent (Purple star) and I am regularly awoken at night by planes both on South and now North runway approach for arrivals and departures. I am also regularly subject to flights during the night on the North Runway when the "essential maintenance" clause of condition 3(d). These works occur for 4-5 nights in a row and are regular as the daa have confirmed below in an email to be about their frequency:

*"Essential maintenance works at the airport can consist of a variety of works such as rubber removal, painting of day markings, grass cutting around critical runway and taxiway areas (to mitigate risk of bird strikes in particular), pavement repair, replacement of visual aids and other lighting systems etc. Dublin Airport, like all airports across Europe, must comply with prescriptive requirements of infrastructure standards as outlined under EU Regulations. Therefore, regularly scheduled maintenance works on our runway system are a vital part of airport operations which work to maintain the safety of the thousands of passengers and staff using Dublin Airport every single day. When these works are being conducted, it does require the closure of the runway in question to allow works to be completed safely."*

4.4 There is no reason residents within the green area (approx) should be excluded from the eligibility scheme other than to save the applicant money. Those residents are subject to the same disturbance and health impacts and there is no basis in law for them to be excluded.

4.5 The daa appeared to expanded and at the same time reduced the eligibility contours to such an extent that they have protected themselves from a major increase in further financial outlay to meet the scheme. There is a massive conflict of interest in allowing the daa to be the one who decides on these contours. They cannot be a judge in their own cause under the first principles of law. The identification of eligible areas need to be carried out by an independent body/ expert.

**Conclusion.**

In the first instance this application MUST be refused under section 34(12) of the Planning and Dveloepment Acts 2000 to present. FCC have concluded that unauthorised development took place in relation to both Conditions 3(d) and 5 but with condition 5 being proved in law by way of an Enforcement notice. An AA and EIA would be required on the additional night flight movements, such assessments and mitigation specific to the quantifiable unauthorised development in cumulation with other developments has not taken place therefore this application must be refused and the applicant directed to apply for leave for substitute consent.

Also in light of the serious issues of compliance with EU and National legislation and taking into consideration fiduciary duty of ABP members to the public in terms of complying with those same laws. I also ask that the Board be cognisant of the associated offenses under the Planning and Development act of breaching planning conditions, and the intentional manner in which it was carried out by the daa. The daa also failed to inform the Board of the enforcement notice which directly pertains to this application.

In the second instance (which should not be required due to the obligation on the Board to refuse) the daa have failed to identify legal noise and eligibility contours, they are severely conflicted in doing so as the larger the contours the more financially exposed they are. As such an independent expert should be commissioned by the Board to identify correct contours.

In essence I and the communities I represent are asking the An Bord Pleanála to comply with the law.

Yours sincerely

Sabrina Joyce-Kemper

# Planning Observation
# ABP-314485
# FCC F20A/0668
# daa plc
# Relevant Action


Photo: Baldoyle Bay SAC & SPA by Philip Swan

**Submission by:**
**Sabrina Joyce-Kemper &**
**Sabrina Joyce-Kemper on behalf of Wild Irish Defence CLG**
**C/O 23 Portmarnock Crescent**
**Portmarnock**
**Co Dublin.**

**Date of submission: 14th December 2023**

# Submission

**1. Introduction**

1.1 Sabrina Joyce-Kemper as an individual and Sabrina Joyce-Kemper as a member of Wild Irish Defence CLG wish to make a submission on additional information in relation to ABP planning appeal 314485. Ms Joyce-Kemper has an advanced diploma in Planning and Environmental law from the Honorable Kings Inn. This submission is in objection to the planning application to amend the conditions imposed by the Bord with decision in case no 217429.

1.2 I provided an appendix to the submission provided by the St. Margaret's and the Ward residents group. I wish to adopt that part of the SMTW submission, but in order to avoid repetition and to facilitate the inspector and the Board with any references to that submission, I have attached the SMTW section as Appendix 1 of this submission. We also adopt all other submission without prejudice to whether they support our arguments or not.

1.3 Due to a number of planning applications and planning appeals live on Dublin airport developments, we have not had time to give this application a full rundown of the issues with this development. We believe we had identified a number of issues in relation to detail of the planning application and some deficiencies in the application report, documentation and Environmental assessments which, need to be updated in order to constitute a complete application (in accordance with the law), which is capable of being properly assessed by ABP. We have raised the procedural/ administration issues and deficiencies in the below submission which we believe should require the application to be deemed invalid and require a new application or without prejudice to that argument require substantial additional information.

1.4 We (SJK and WID) believe that in the first instance the initial F20A/0668 application and subsequent submissions of further information should never have been accepted by the Local Authority once it was pointed out that the lack of AA on the parent permission and extension permission meant that the application should be refused under section 34(12) pf the Planning and development act 2000 o present. ABP have not attempted to have a full AA on the parent permission carried out or included on this application which we believe to be contrary in law. The inspector and Board should refer this file to their internal legal team to risk assess this aspect of the appeal. We believe that the Board should refuse to grant permission and overturn the decision of FCC and ANCA to approve this amendment as it was incorrect in law from the outset. And the entirety of the Parent permission that the instant application seeks to amend constitutes unauthorised development. We refer the board to SJK prevoius detailed arguments to FCC and ANCA in this regard, which to date have remained unaddressed by FCC, ANCA or the applicant.

1.5 We object to the planning application which is described as follows;

The relevant action pursuant to Section 34C (1) (a) is:

- To amend condition no. 3(d) of the North Runway Planning Permission (Fingal County Council Reg. Ref. No. F04A/1755; ABP Ref. No.: PL06F.217429 as amended by Fingal County Council F19A/0023, ABP Ref. No. ABP-305289-19). Condition 3(d) and the exceptions at the end of Condition 3 state the following:

*-3(d). Runway 10L-28R shall not be used for take-off or landing between 2300 hours and 0700 hours except in cases of safety, maintenance considerations, exceptional air traffic conditions, adverse weather, technical faults in air traffic control systems or declared emergencies at other airports.' Permission is being sought to amend the above condition so that it reads: 'Runway 10L-28R shall not be used for take-off or landing between 0000 hours and 0559 hours except in cases of safety, maintenance considerations, exceptional air traffic conditions, adverse weather, technical faults in air traffic control systems or declared emergencies at other airports or where Runway 10L-28R length is required for a specific aircraft type.'*

- The net effect of the proposed change, if permitted, would change the normal operating hours of the North Runway from the 0700hrs to 2300 hrs to 0600 hrs to 0000 hrs.

The relevant action also is: To replace condition no. 5 of the North Runway Planning Permission (Fingal County Council Reg. Ref. No. F04A/1755; ABP Ref. No.: PL06F.217429 as amended by Fingal County Council F19A/0023, ABP Ref. No. ABP-305289-19) which provides as follows:

*5. On completion of construction of the runway hereby permitted, the average number of night time aircraft movements at the airport shall not exceed 65/night (between 2300 hours and 0700 hours) when measured over the 92 day modelling period as set out in the reply to the further information request received by An Bord Pleanála on the 5th day of March, 2007. Reason: To control the frequency of night flights at the airport so as to protect residential amenity having regard to the information submitted concerning future night time use of the existing parallel runway'.*

With the following: A noise quota system is proposed for night time noise at the airport. The airport shall be subject to an annual noise quota of 7990 between the hours of 2330hrs and 0600hrs. In addition to the proposed night time noise quota, the relevant action also proposes the following noise mitigation measures:

- A noise insulation grant scheme for eligible dwellings within specific night noise contours;

- A detailed Noise Monitoring Framework to monitor the noise performance with results to be reported annually to the Aircraft Noise Competent Authority (ANCA), in compliance with the Aircraft Noise (Dublin Airport) Regulation Act 2019.

The proposed relevant action does not seek any amendment of conditions of the North Runway Planning Permission governing the general operation of the runway system (i.e., conditions which are not specific to night-time use, namely conditions no. 3 (a), 3(b), 3(c) and 4 of the North Runway Planning Permission) or any amendment of permitted annual passenger capacity

of the Terminals at Dublin Airport . Condition no. 3 of the Terminal 2 Planning Permission (Fingal County Council Reg. Ref. No. F04A/1755; ABP Ref. No. PL06F.220670) and condition no. 2 of the Terminal 1 Extension Planning Permission (Fingal County Council Reg. Ref. No. F06A/1843; ABP Ref. No. PL06F.223469) provide that the combined capacity of Terminal 1 and Terminal 2 together shall not exceed 32 million passengers per annum . The planning applic ationwill be subject to an assessment by the Aircraft Noise Competent Authority in accordance with the Aircraft Noise (Dublin Airport) Regulations Act 2019 and Regulation (EU) No 598/2014. The planning application is acco mpanied by information provided for the purposes of such assessment. An Environmental Impact Assessment Report will be submitted with the planning application. The planning application and Environmental Impact Assessment Report may be inspected or purchased at a fee not exceeding the reasonable cost of maki ng a copy, at the offices of the Planning Authority du ring its publ ic opening hours of 9.30 - 16.30 (Monday – Frida y) at Fingal County Council, Fingal County Hall, Main Street, Swords, Fingal, Co. Dublin.

**2. Unauthorised Development.**

2.1 The applicant breached the 32 mppa condition in 2019 (32.9 mppa) this means that the excess capacity was unauthorised development and no EIA or AA of the 32.9 capacity was ever carried out. Therefore as per required by the Habitats and Birds Directives a remedial EIA and AA must be completed. As this application is quoting the 32mmpa figure and had not referenced the excess unauthorised operational development, this application cannot be in accordance with the law.

2.2 The flight paths on commencement of the parent permission for the North Runway were not in accordance with the permission granted. This application deals with land use planning which is intrinsically link and inseparable from the flight paths that have informed the guidance on the Fingal development plan since 2006. The development plan has based its noise zones and its public safety (**see fig 1.**) zones on the permitted flight paths as assessed in the original EIS. To change the permitted flight paths that have shaped how Fingal has developed since the grant of planning for the North Runway is to materially contravene the current and past Fingal Development plans and maps. Houses and estates were built on the basis of the land planning assessment tied to the original "straight out" flight paths. The IAA may decide that a change is required but any changes they recommend must be put forward for planning consent to inlcude EIA and AA assessment of the changes as they directly influence the sustainable and proper planning on Fingal.

2.3 The originally permitted paths have been breached since Aug 2022 when the permission conditions and permission came into operation. In an attempt to rectify the situation daa tried to bring the as operated flight paths closer to those originally permitted but this does not change the fact that the Airport development has not been in compliance with the plans and application consented in 2006 and 2017. The whole development is unauthorised development due to the use of incorrect flight paths. Remedial EIA and AA must be carried out to identify compensation measures for unauthorised impacts of the development. New flight paths will

need a variation of the Fingal development plan and all associated public consultations and assessments (SEA, AA, EIA) As such this application cannot be approved in law.

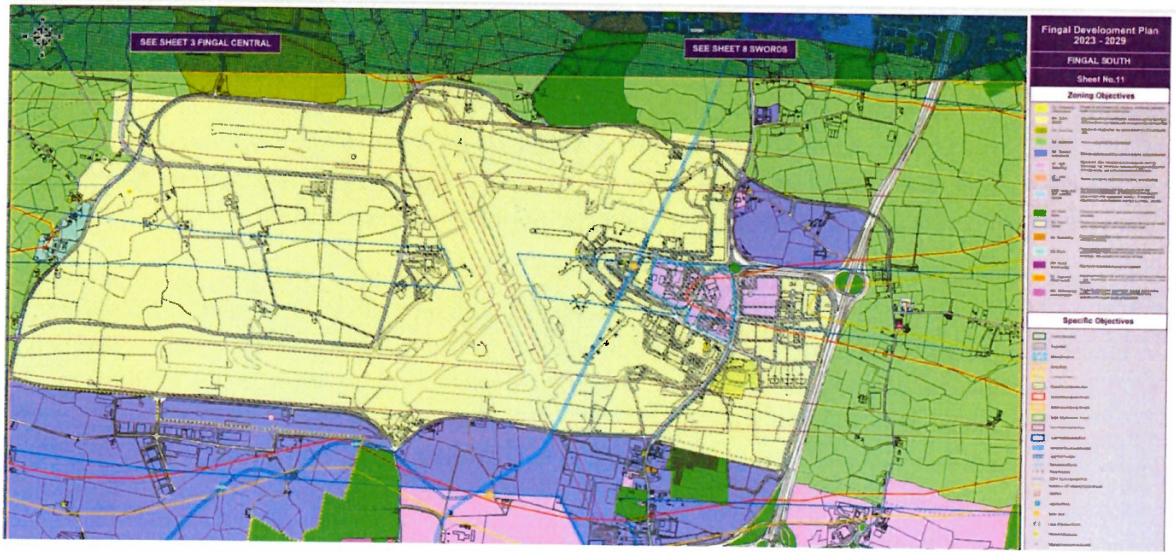


**Figure 1: Map 8 for swords Fingal development plan inner PSZ in red and outer PSZ in blue.**

2.3 The inner and outer public safety zones (PSZ) which stringently inform the land use planning for Fingal and are included on all development plan maps, are based on the originally permitted flight paths. This zone identifies the risk to the public and infrastructure of potential aviation accidents and provides for lower densities and restricted development in these areas in order to minimize mortality and damage rates in the event of an accident. I have attached the PSZ report for Dublin airports and the PSZ maps based on the permitted flight paths in Appendices 5 and 6 of this report. No changes can happen to permitted flight paths without planning consent and variations to the current Fingal Development plan and SEA for the development plan.

2.4 Figures 2 and 3 on the following pages show the new developments that have been built since the original permission was granted. These developments were restricted by the flight paths land use planning in the development plans. Some would have had density restrictions on estates and no schools or hospitals could be build or were restricted within inner and outer zones. On the other side of the coin if we were to suspend the planninga nd environmental acts for a minute and presume that flight path changes were allowed without consent, the how are we to stop high density building or educational facilities being built in the most dangerous zones under new paths. How do we asses the impact on annex species flight paths and habitats that may not have prevviously been impacted? How do we mitigate for Human impacts (noise and health) that have shifted to communities under the new paths, if we haven't assessed the impacts? The answer is we cant and that is why new flight paths are legally intertwined with land planning and require planning consent and EIA / AA assessment.

2.5 Unfortunately for the applicant the current planning laws do not allow for substitute consent on unauthorised development that would have required EIA and AA screening if it had been applied for planning consent correctly. Therefore in the present legislative landscape at this point in time, these flight paths or indeed the parent permission cannot be regularised in law to bring them into legal compliance. Therefore this planning application must be refused.

2.6 Below are some of the planning policies and objectives from Fingal Development Plan that tie the flight paths and land use planning together in a legally binding manner.

**3.5.15.6** Housing within the Airport Noise Zones The development of new housing for those who are not involved in farming will be actively resisted within the area delineated by Noise Zone A for Dublin Airport. However, consideration will be given to the development of new housing for those not involved in farming but who have family homes within Noise Zone A, in locations on suitable sites outside Noise Zone A but within five kilometres from that noise zone. To ensure that the need to live as close as possible to the existing family is met and to avoid undue pressure on certain areas of the Greenbelt, the M1 will provide an east-west boundary, with those living to the east being considered for housing on suitable sites to the east, and those living to the west being considered for housing on suitable sites to the west. Site selection should ensure that the rural character of the area is maintained and that multiple sites on single landholdings are avoided.

**Objective SPQHO82** – Rural Settlement Strategy and Airport Noise Zone A Apply the provisions of the Rural Settlement Strategy, only with regard to 'New Housing for Farming Families' as set out within this Chapter, within the Airport Noise Zone A, and subject to the following restrictions: ¨ Under no circumstances shall any dwelling be permitted within the predicted 69dB LAeq 16 hours noise contour. ¨ Comprehensive noise insulation shall be required for any house permitted under this objective. ¨ Any planning application shall be accompanied by a noise assessment report produced by an independent specialist in noise assessment which shall specify all proposed noise mitigation measures together with a declaration of acceptance of the applicant with regard to the result of the noise acceptance report.

**Policy DAP4** – Transitioning to a Low Carbon Economy Ensure that all developments comply with the Climate Action Objectives and the Circular Economy and Waste Management Objectives in the Dublin Airport Local Area Plan 2020, or any subsequent LAP or extension of same.

**National Policy Objective 65** set out in the Department of Housing Planning and Local Government (DHPLG) National Planning Framework 2040, February 2018, to: "Promote the pro-active management of noise where it is likely to have significant adverse impacts on health and quality of life and support the aims of the Environmental Noise Regulations through national planning guidance and Noise Action Plans."

**Policy DAP6 –** Health of Residents and Aviation Noise Protect the health of residents affected by aviation noise, particularly night-time noise.

**Objective DAO14** – Aircraft Movements and Development Restrict development which would give rise to conflicts with aircraft movements on environmental or safety grounds on lands in the vicinity of the Airport and on the main flight paths serving the Airport, and in particular restrict residential development in areas likely to be affected by levels of noise inappropriate to residential use. Objective DAO15 – Ongoing Review of Operation of Noise Zones Review the operation of the Noise Zones on an ongoing basis in line with the most up to date legislative frameworks in the area, the ongoing programme of noise monitoring in the vicinity of the Airport flight paths, and the availability of improved noise forecasts.

**Objective DAO18 –** Safety Promote appropriate land use patterns in the vicinity of the flight paths serving the Airport, having regard to the precautionary principle, based on existing and anticipated environmental and safety impacts of aircraft movements. Objective DAO19 – Review of Public Safety Zones Support the review of Public Safety Zones associated with Dublin Airport and implement the policies to be determined by the Government in relation to these Public Safety Zones.

**Policy DAP8** – Community Engagement Support the ongoing and continued engagement with neighbouring airport communities to ensure that the environmental impacts associated with the development proposals are carefully managed and mitigated through land use planning and environmental monitoring and review processes. Policy DAP9 – Support for the Local Community Support the local community impacted by the expansion of Dublin Airport in efforts to prevent the fragmentation of their community.

**Objective DAO24 –** Housing Development and Dublin Airport Noise Zones Restrict housing development in order to minimise the potential for future conflict between Airport operations and the environmental conditions for residents, in accordance with the Dublin Airport Noise Zones 2019.

2.7 We believe that the points 2.2-2.5 above should be read with the conclusion of the original ABP inspector for the parent permission (whom the Board overruled) as we feel it is pertinent to the importance of legal and robust assessments of actual impacts on human and non human communities.

ABP 217429 Inspectors report page 101:

*"The matter of noise is particularly problematic and despite the extent of information provided on the subject and the opportunities provided to the applicant to address certain issues I consider that the information before the Board remains materially deficient, namely with regard to the 'significant effects' in terms of night time noise and, in the light of increasing evidence of the correlation of aircraft noise and cognitive skills of children, the ability of schools to be insulated so as to provide the necessary indoor noise levels of 45dBA above which significant effects would occur.*

*In view of the importance of these issues and their potential material negative impacts on the affected communities and schools, in my opinion it is incumbent on the applicant to provide the necessary information in a format which is easily interpreted without recourse to conjecture or inference so as to allow the Board to make a proper assessment. The repeated failure by the applicant to provide this information has to be considered fatal at this stage and I do not consider it possible that a reasonable expectation in terms of the extent of the impacts in terms of noise can be made on which the Board can realistically make an informed decision.*

*As I have acknowledged above the proposal accords with national, regional and local policy and its strategic importance is accepted. I would suggest, however, that the advancement of the scheme would effectively require a section of the population to accept the impacts and inconvenience arising for the benefit of the wider community. In the interests of fairness and transparency I would suggest that a positive decision in this instance, should it be predicated on such reasons, should only be countenanced where the full facts as to nature and extent of the potential impacts are available and detailed so that the Board and all persons who are thus affected are cognisant of the potential ramifications. This is not the case in this instance and I do not consider that the material deficiencies which remain could be addressed, in any manner, by way of condition. I therefore recommend that permission for the above described development be refused for the following reasons and consideration*

*REASONS AND CONSIDERATIONS 1. It is considered that the proposed northern parallel runway, taken in conjunction with the existing southern runway 10R/28L and cross-wind runway 16/34, would result in a material extension in the geographical area and population that would be affected by Dublin Airport in terms of noise and public health and safety risk. These impacts are considered material. The impacts relating to noise would be only partially offset by the proposed mitigation measures in terms of the insulation and buy-out schemes. It is therefore considered that the altered noise environment and increase in aircraft noise both during the day and at night which would arise as a consequence of the proposed development, coupled with the increased risk in terms of public health and safety would, seriously injure the amenities of property and community facilities within the affected areas and would be contrary to the proper planning and sustainable development of the area. 2. Having regard to the correlation between aircraft noise and the development of childrens' cognitive skills the Board is not satisfied on the basis of the submissions made in connection with the planning application and the appeal that the proposed mitigation measures in terms of insulation of schools which would be affected by the proposal would be adequate to ensure a maximum internal classroom noise level of 45dBA LAeq. In the absence of this information it is considered that the proposal would endanger the health and safety of persons attending the said schools and would be contrary to the proper planning and sustainable development of the area. 3. Having regard to the proposed increase in night time flights on the existing southern parallel runway which would be facilitated by the proposed northern parallel runway the Board is not satisfied, on the basis of the submissions made in connection with the planning application and appeal, that either the full nature and extent of the increase in night time noise, the significant effects which may arise from same or the extent of the areas and populations which would be affected by same have been*

*satisfactorily identified and quantified. It is considered measures proposed reinforced by conditions and monitoring can ensure that a suitable noise environment can be maintained within classrooms and school buildings generally. In coming to the above decision, the Board noted that, in addition to planning controls, Dublin Airport would in the future be subject to the new noise control regime introduced under the EU Environmental Noise Directive 2002/49/EC and the Environmental Noise Regulations, 2006.*

*Note: The Board considered both this application and the application for Terminal 2 together and took account of the cumulative impacts of the proposed developments. The Board considered that the EIS and the EIS Addendum supplemented by the further information submitted to the planning authority and the Board, including at the oral hearing, together with the Inspector's report provided for an appropriate Environmental Impact Assessment of the likely significant impacts of the proposed development.*

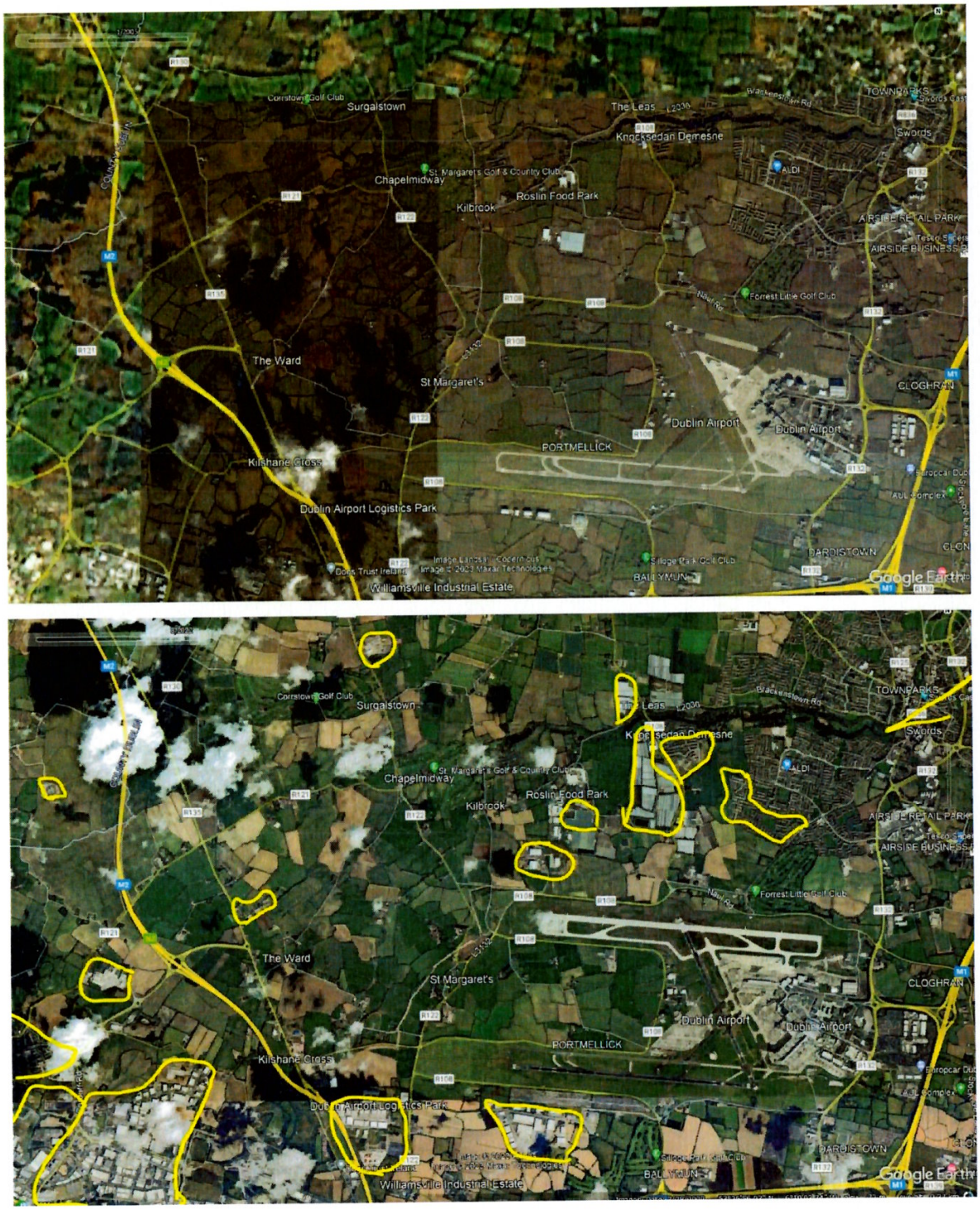


**Figure 2 – development before and after comparison west runway lands upper 2006, lower 2023**


Fig 3. **development before and after comparison East of runway lands upper 2023, lower 2006**

## 3. Appropreate Assesment

**3.1** Aecoms AA screening was not robust. The assessment of impacts generally attempted to tie impacts of aircraft to specific noise levels. Very few scientific papers assess disturbance on specific decibel levels bar the outlier Aecom referred to. Most will asses based on chronic noise both high and low level and on visual stimuli disturbance, vibration etc. so the very basis for excluding other disturbance methods is manifestly wrong.

3.2 although we were happy that the applicants own consultant highlighted the need for AA screening of new flight paths in section 3.9 of the Screening document where They state: *This is in line with a similar AA carried out for Edinburgh Airport in the UK, and reported in HiDef Aerial Surveying Ltd. (2017), where a change in flight paths was proposed, taking aircraft over multiple SPAs in the Firth of Forth. No consideration was given in the test of likely significant effects for this project to the potential impacts of fuel dumping.*

3.3 The screening report concerning states at 3.10 that *"It is impossible to know the location of every area of functionally-linked habitat (i.e. habitat outside of the boundary of a European site but which may be used by QI / SCI species) which may be overflown by aircraft using Dublin Airport. Therefore, for the same reasoning as set out in relation to fuel dumping, it is unreasonable to attempt to assess the potential impacts and effects from the proposed Relevant Action on species when using functionally-linked habitat."* The habitats directive specifically calls for the precautionary principle if there is difficulty producing evidence of no impact and some attempt at fuel dumping along the approach routes and nominated circling roues taken to reduce fuel load before landing should have been made. The reason and considerations produced here were not sufficient.

3.4 In 3.11 Aecom Screenin report states; *The AA Screening Report prepared on behalf of ANCA to inform their own assessment of the Noise Abatement Objective (NAO) states that air emissions from aircraft become negligible, in terms of their ground-level air quality effects, once aircraft are more than approximately 350-650 feet above ground on take-off, or more than approximately 160-350 feet above the ground on landing (Logika Consultants Ltd., 2021). According to the same report, this height will be reached by aircraft using Dublin Airport within 2 km or less of the airport. The nearest European site to North Runway is Malahide Estuary SAC, approximately 4 km north-east, well beyond this distance.*

*3.12 Consequently, the only possible impacts from the proposed Relevant Action on the QI / SCI of European sites can be from direct noise and/or visual disturbance caused by over-flying aircraft, or from collision mortality ('bird strike'). Therefore, any SACs which are designated only for habitats, and have no animal species as QI which could be subject to disturbance, are outside of the ZoI of the proposed Relevant Action.*

3.5 ANCA and the applicant forget that increased night flights leads to more emissions from contrails (see appendix 7) which absolutely should be assessed in terms of carbon impacts and warming impacts on non animal SACs for example Baldoyle Bay SAC which has protected Annex

Salt meadows and is a source of eel grass for Brent Geese and SCI of the sister SPA. Increases in sea level due to global warming could eradicate these important species.

3.6 The aecom screening and ANCA NIS failed to assess SCI of Wetlands and waterbirds A999 Baldoyle AC . All bird species listed on the IE Natura2000 annual reports to EU for this SCI must be assessed.

3.7 The screeining report states that at 4.21 *"A total of 252 hours of survey were conducted during the survey period, covering a range of weather conditions, tidal states and times of day. During the VP watches, surveyors recorded all disturbance events, noting the time, source of disturbance, species affected and the number of birds involved. The response of waterbirds was recorded on a scale of 0 – 3: 0 – no behavioural change; 1 – behavioural change (e.g. vigilance or alarm call) but no flight; 2 – flew but soon returned to the site; and, 3 – flew and abandoned the site. 4.22 There was an "almost continuous stream of air traffic overhead" during the surveys. AECOM 27 Document Classification: Class 1 - General 4.23 In summary, a total of 184 disturbance events were identified during the surveys, with 89 at Rogerstown Estuary and 95 at Baldoyle Bay. These were caused by a variety of disturbance sources, primarily walkers and/or dogs, but also including aquaculture activities, ground-based transport and predators. A single disturbance event was noted in response to a low-flying Coastguard helicopter. 4.24 During the 21 months of survey, comprising 252 hours of VP watch, no disturbance events caused by aircraft passing overhead on established flight paths to or from Dublin Airport were recorded.* Absolutely no evidence of this was put before the board for the inspector or public to assesss Who were the experts? Where is the raw data? Can it be considered good date post COVID when many species repopulated areas that were less impacted by anytropgenic impacts and disturbance. Not precise or definative.

3.8 The birdstrike data was discussed at 5.16 *"Bird strike incidences at Dublin Airport are recorded by the Applicant. The data recorded between 2010 and 2019, inclusive, are shown in Table 12 (although data are available for 2020, they are not included here because, due to significantly reduced numbers of flights as a result of the Covid-19 pandemic, the bird strike figures are not representative of a typical year). 'External' bird strikes are those which take place outside of the boundary fence of Dublin Airport and can occur anywhere outside of this area. The most important information is therefore the number of 'Confirmed' bird strikes, which occur between birds and aircraft taking-off or landing.* The protected species that may be Ex Situ for foraging, breeding, migrating species must be assessed outside of the boundary fence and also along permitted flight paths and the Natura2000 sites impacted by them This limited assessment is not full definitive or scientific. Full raw data, and wildlife management plans atc should be provided.

3.9 We attach at appendices 2, 3 & 4 scientific reports on aircraft impacts on bird species which identify the limitations of the applicants and Anca screening and AA assessments. In any case ANCA should not have commission their own NIS and been judge in their own cause, so this document may be invalidated and not applicable.

3.10 No impacts of CECs, Nitrogen, PFAS(Deicing/ firefighting foam) pollution runoff into SACs hydro-logically linked to the airport via the Mayne, Sluice, Ward and Cuckoo rivers was assessed. This is a glaring omission and must be rectified, particularly in light of the large amount of PFAS contaminated soil that the airport has removed for remediation, again without development consent or EIA. AA assessment which is another Unauthorised development issue as indication are that the North runway and environ lands were involved and may actually still contain contaminated soil.

**4. Other issues:**

4.1 The EIA assessment of noise impacts on health only assess under the noise legislation and limited metrics/ parameters that the legislation details. HOWEVER the overarching legislation the EIA Directive and equally the Habitats Directive, which supersede the aircraft and environmental noise legislation, requires that " a WORST CASE SENARIO" must be assessed when it comes to EIA assessment of impacts. This means that the Lmax impacts must also be assessed in actuality and in tandems with the other metrics. The full health impacts at Who recommended levels must also be modeled and assessed in tandem with the noise legislation so that a full worst case scenario can be assessed from the EIA and AA point of view. There is no way around this.

4.2 Last nigh a report from "We Are The Ditch" identified that Ethna Felten the Head of ANCA is also the deputy Chairperson of Fingal County Council. A quick search of Fingal events confirms this. It is an extraordinary breach of article 3(2) and clause 13 of 594/2014 in relation to the functional separation of ANCA and FCC. This in addition the fact that the Chairperson of ANCA receives rent from FCC her employer is a clear and serious conflict of interest which we believe invalidates all of the work undertaken by ANCA in relation to this relevant action. An investigation must be launched immediately. The courts have overturned planning consents for less. ABP must request a response on this issue from both FCC and ANCA.

For the reasons and considerations above, please refuse permission for 314485.

Yours Sincerely

Sabrina Joyce-Kemper, Max Kemper, Lucas Kemper, Amelia Kemper and Ben Kemper.

and

Wild Irish Defence CLG

**Appendix 1**

# Environmental Assessment Chapter

## 1. Introduction

1.1 This chapter has been prepared by Sabrina Joyce-Kemper as an individual member of the public affected by aircraft noise and on behalf of St. Margaret's and The Ward / FORUM submission. Ms Joyce-Kemper has an advanced diploma in Planning and Environmental law from the Honorable Kings Inn and is local to Portmarnock and involved with environmental matters in her locality.

1.2 We believe that the amendment application does not provide sufficient information for the Board to carry out an Environmental Impact Assessment and Appropriate Assessment that is in accordance with the law. We also believe that the amended application and the most recent additional information, if accepted will constitute an amendment to the original development application outside of the" relevant action" in respect of aircraft noise which would require a dual application for consent under section 34 of the Planning and Development Act of 2000. We also believe that the application materially contravenes the Fingal Development Plan 2023-2029.

1.3 We wish at this stage to adopt all third-party submissions made in relation to F20A/0668 / 314485 without prejudice to the arguments that those submissions make, whether they are in conflict with our own arguments or in support of them. This includes Ms Joyce-Kempers other submission in her personal capacity.

1.4 The instant planning application is described as follows:

*A proposed development comprising the taking of a relevant action only within the meaning of Section 34C of the Planning and Development Act 2000, as amended, which relates to the night-time use of the runway system at Dublin Airport*

1.5 Below we lay out the reasons and considerations for our objection to this planning application.

## 2. Administrative / Procedural issues:

2.1 **Incorrect application procedure.** There are aspects of this application that are not governed by Section 34B and 34C of the Planning and Development Act and do not therefore fall under 'operating restrictions' or 'noise mitigation measures', they are in fact changes to the originally granted flight paths that intensify and expand the noise impacts on communities. These changes also impact on land use planning in public safety zones which fall outside of noise mitigation and therefore materially contravenes the Fingal Development plan 2023 -2029.

2.2 These non-relevant action amendments need to be identified and separated from noise mitigation measures and operating restrictions and applied for in a dual planning application under Section 34 of the P&D Act of 2000 to present with associated EIAR and NIS covering all current and historical cumulative impacts.

2.3 **Development in multiple functional areas.** As the Development impacts on more than one local authority functional area and therefore communities in multiple counties and municipalities. As such there should be statutory consultation with Dublin City Council, Meath County Council, and any other council whose functional area may be impacted by the changes in the relevant action elements of the planning application. Despite the airport being removed from the 7th Schedule on relation to Strategic Infrastructural Development (SID), the fact that the flight paths intensify noise and impact on multiple local authorities may have triggered a dual assessment as an SID or at the very least an SID like statutory consultation and engagement with councilors in the public interest.

2.4 We refer the inspector/ board to Section 37E(4) of the Planning and Development (Strategic Infrastructure) Act 2006 which states:

*(4) The planning authority for the area (or, as the case may be, each planning authority for the areas) in which the proposed development would be situated shall, within 10 weeks from the making of the application to the Board under this section (or such longer period as may be specified by the Board), prepare and submit to the Board a report setting out the views of the authority on the effects of the proposed development on the environment and the proper planning and sustainable development of the area of the authority, having regard in particular to the matters specified in section 34(2).*

2.5 **Invalid NIS and ulta vires decision.** The issue of ANCA producing their own NIS for the relevant action and then being the decision maker on the NIS they commissioned raises issues of irrationality, acting ultra vires of their remit in producing an NIS (rather than the applicant) and being a judge in their own cause. St Margret's and the Ward did attempt to appeal the ANCA decision for this and other reasons, but we were informed by the Board that this was not possible. We again put it to the bord that the NIS prepared by ANCA is inadmissible and its decision invalid in law.

2.6 **Breaches of planning conditions:** It must be noted that the applicant has breached planning conditions in relation to number of night movements in excess of that permitted under condition 5 and in relation to the permitted flight paths/ tracks that were assessed in the original EIS and informed the making of multiple development plans in relation to spatial planning and the identification of public safety zones and policy on public safety zones which are also adopted in the current Fingal Development plan.

2.7 In fact the applicant as voting members of the Dublin Airport slot co-ordination committee have knowingly and willfully and with full knowledge of their legal obligations, decided to potentially breach planning and environmental regulations in relation to the operating conditions included in this application, which are attached to the grant of the parent planning permission for the North Runway. They have done so after full discussions and risk assessments, when deciding co-

ordination parameters for Summer 2023/Winter 2023 and Summer 2024 slots some months in advance of the slot periods. The slot decisions are attached at Appendix A, B and C.

These conditions that the slot decisions assessed and decided to contravene are:

1.3 **3(d) of the North Runway Planning Permission** (Fingal County Council Reg. Ref. No. F04A/1755; ABP Ref. No.: PL06F.217429 as amended by Fingal County Council F19A/0023, ABP Ref. No. ABP-305289-19). Condition 3(d) and the exceptions at the end of Condition 3 state the following:

*3(d). Runway 10L-28R shall not be used for take-off or landing between 2300 hours and 0700 hours except in cases of safety, maintenance considerations, exceptional air traffic conditions, adverse weather, technical faults in air traffic control systems or declared emergencies at other airports.'*

2.8 **Condition no. 5 of the North Runway Planning Permission** (Fingal County Council Reg. Ref. No. F04A/1755; ABP Ref. No.: PL06F.217429 as amended by Fingal County Council F19A/0023, ABP Ref. No. ABP-305289-19) which provides as follows:

*On completion of construction of the runway hereby permitted, the average number of night time aircraft movements at the airport shall not exceed 65/night (between 2300 hours and 0700 hours) when measured over the 92-day modelling period as set out in the reply to the further information request received by An Bord Pleanála on the 5th day of March, 2007. Reason: To control the frequency of night flights at the airport so as to protect residential amenity having regard to the information submitted concerning future night time use of the existing parallel runway'*

2.8 The net effect of the slots' decisions, is, if and when they were implemented, constituted a potential intentional breach of the planning permission operating conditions. This fact, that the committee including the applicant may have acted with intent to breach Planning conditions, will not sit well with the Courts when the current JR of FCC enforcement, case is at hearing stage. The Courts expect parties to have "clean hands" / not to have partaken in unfair conduct. Actively assessing the risk of adhering to planning conditions 3(b) and 5, when deciding the slot S23 parameters and voting to potentially breach them anyway in favour of economic market concerns, then carrying those decisions through to W23 and this decision S23 raises the legal violation of "the clean hands doctrine". An Bord Pleanála as a quasi-judicial body must also comply with legislation under section 34(12) of the planning act in relation to unauthorised development and whether the breach was carried out in a deliberate manner, which we could be supported by the slot co-ordination decisions.

2.9 We wish to point out to the Inspector that currently active Winter 2023 slots and the future Summer 2024 slot decisions are relevant evidence that must be considered by the inspector to be proof of the committees (including applicant) intention to continue breaching the

operating conditions and restrictions of the parent permission some of which make up this application. Section 6.2.2. of the Worldwide Airport Slot Guidelines (WASG)[1] states:

6.2.2 The coordination parameters represent the maximum capacity available for allocation considering the **functional limitations** at the airport such as runway, apron, terminal, airspace, and ***environmental restrictions*** (emphasis added)

In the document the co-ordination parameters are described as follows:

Coordination Parameters: the maximum capacity available for allocation at an airport considering the functional limitations at the airport such as runway, apron, terminal, airspace, and environmental restrictions declared by the airport or ***other competent body.*** *(emphasis in bold added)*

2.9 The industry guidelines therefore state that the parameters considered must be within the constraints to capacity and include limitations and restrictions declared by any other competent body, in this case the local authority and an Bord Pleanála. As the IAA and the slot co-ordination committee have failed to comply with the sustainable planning conditions put in place by ABP in 2007, it falls to the Board to find that the applicant cannot benefit from a breach of planning consent and that the current application should be refused on the basis that no AA was ever carried out on the parent permission in contravention of the Habitats and Birds Directives. In previous submissions we have made detailed case for the invocation of section 34(12) to refuse to accept this planning application as under the current laws it cannot be regularised.

2.10 **Competition Law.** As a member state of the EU, Ireland and its competent authorities required to comply with EU law particularly in relation to the single market. In order to ensure a level playing field, the legislation on State aid (Article 107 and 108 of the Treaty on the Functioning of the European Union (TFEU)) and competition (Articles 101 to 109 TFEU — mergers, alliances, price-fixing, etc.) applies to the air transport sector.

2.11 EU rules ensure that all carriers, European and non-European, are granted the same rights and same opportunities to access air-transport-related services. This may not, however, be the case in some third countries where discriminatory practices and subsidies may give unfair competitive advantages to air carriers from those third countries. Competition law is in place in order to regulate anti-competitive conduct within the single market.

2.12 The applicant as part of the co-ordination slot committee by taking part in a process to potentially breach planning and environmental regulations that apply to all member states equally, the committee and by extension the IAA if they adopt the decision, may be seen to be breaching EU internal market competition law. Other airports in EU member states must comply with regulations and the terms of their planning permission and operating licenses. daa by potentially seeking to dis-apply apply the same rules that other Airports in EU member states must adhere to in relation to EIA, AA and compliance with planning consents, could be gaining an unfair advantage in enticing airlines to use Dublin Airport.

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1 https://www.iata.org/contentassets/4ede2aabfcc14a55919e468054d714fe/wasg-edition-2-english-version.pdf

2.13 To be lawful at the point of application for amendment, the previous operational application of the parent consent that this application seeks to amend must have complied with the planning conditions, as implemented under EU planning and environmental law. If it did not, section 34(12) is a legitimate remedy the Board can utilise to nullify the unlawful consequences of a breach of EU law. Namely habitats directive, EIA directive and competition law.

2.14 **State Aid Issues.** DAA are a semi state company (albeit commercial) but have recently received substantial state aid and subsidies from the state particularly during and after the covid restrictions had an economic impact on the airport. Recent judgments from the European Courts in Luxembourg have confirmed that the construction and operation of an airport may constitute an economic activity, which are subject to the TFEU rules on State aid.

2.15 As a semi-state body if An Bord Pleanála;

a) allow or facilitate the applicant to benefit from amending a planning consent in breach of Planning and Environmental law, and

b) allow them to regularise a potential breach of competition law by making a decision to grant this application

- are they aiding and rewarding the DAA (another semi state body) and the airlines to benefit economically from non-compliance with an EU regulatory regime? Could this be seen as giving state aid to the airport? And is the form of state aid illegal under the TFEU?

2.16 We know that the airport was given tens of millions in State aid under the COVID 19 Temporary framework and may have benefited from state aid via the adoption of co-ordination slots that may have breached planning and environmental law. But there are conditional provisions placed on State aid by the EU. While the focus of State aid control is the protection of the internal market against distortions of competition, as a general matter of coherence within the EU legal order, the Commission must also ensure that State aid is not contrary to other provisions of EU law, including EU environmental law. In a nutshell to receive State aid the DAA must be in compliance with EU legislation/ regulations. The inspector and the Board need to be cognisant of this.

2.17 Insufficient time was given by the Board for members of the public concerned to review highly technical documents. Just the minimum requirement in law of 5 weeks was granted. This was in spite of numerous members of the public contacting the Board and requesting more time due to overlapping planning applications by daa.

2.18 When the applicant first lodged this application the North Runway had not been commissioned. In fact, this is first opportunity for people to give evidence on the failure of the current mitigation measures to prevent awakenings and severe sleep disturbance. Therefore, we ask the board to revisit holding an oral hearing, in the interests of justice.

**3. Appropriate Assessment:**

3.1 In previous submissions in relation to this application we have gone into great detail on the issue of our National Airport never being subject to an appropriate assessment of the cumulative impacts of the Airport development and infrastructure. This situation of significant and consequential lack of implementation of the Birds and Habitats Directive cannot be allowed to continue. The Board have a statutory duty to ensure that EU law is applied in its fullest iteration, in its decision-making process. On some planning consents the applicant has carried out screening, submitted an NIS but only for piecemeal development and never has it even attempted to carry out a robust EIA and AA of the entire Airport campus.

3.2 This position is no longer tenable and must be corrected. The cumulative impacts of the Dublin Airport Campus on our NATURA2000 Network must be assessed. This can also be applied to a master EIAR. Legal precedent would be case C-392/96 which states:

*"The purpose of the EIA Directive cannot be circumvented by the splitting of projects and the failure to take account of the cumulative effect of several projects must not mean in practice that they all escape the obligation to carry out an assessment when, taken together, they are likely to have significant effects on the environment within the meaning of Article 2(1) of the EIA Directive."*(C-392/96, Commission v. Ireland, paragraphs, 76, 82; C-142/07, Ecologists en AcciónCODA, paragraph 44 ; C-205/08, Umweltanwalt von Kärnten, paragraph 53; Abraham and Others, paragraph 27; C-275/09, Brussels Hoofdstedelijk Gewest and Others, paragraph 36)

3.3 The problem that is frequently encountered in planning applications is that of carrying out an AA on a development and having a finding of no significant effect. Then incorrectly carrying out a cumulative impact assessment by concluding because each development in isolation had a finding of no significant effect then cumulatively there could be no significant effects. This method is manifestly wrong. All effects identified within each development no matter how significant must be assessed in a cumulative matrix. Below at Figures 1 and 2 we give a visual representation via info-graphic of the correct and incorrect methods of cumulative assessment to be used in AA and EIA assessments.

3.4 Taking the correct methodology into consideration we can safely conclude that as previous AA and EIAR did not apply the correct methodology a robust AA and EIA is now required. Based on an initial examination of airport planning consents it is clear that AA and EIA assessments were not always carried out on new development applications. In order to try and rectify this we have compiled a list of planning applications relating to the Dublin Airport campus in Appendix D, since the implementation of the Habitats Directive in the EU. While some applications are for international modifications there may be capacity, waste and water, traffic components that need to be assessed. DAC certificates and Fire Certificates may or may not require assessments but should still be included in the matrices for cumulative impact.

3.5 The southern runway was built in advance of the implementation of the habitats directive as was the old airport building but their current uses and impact on NATURA2000 sites should be included in cumulative impact assessments.

3.6 In addition to the compliance issues identified earlier, the daa is not in compliance with condition 10 of the parent permission as FCC have deemed their compliance submission unacceptable and not as per the requirements of the condition. This condition directly impacts on the ability of ABP to assess this amendment application in relation to aircraft noise, mitigation and compliance with the NAO.

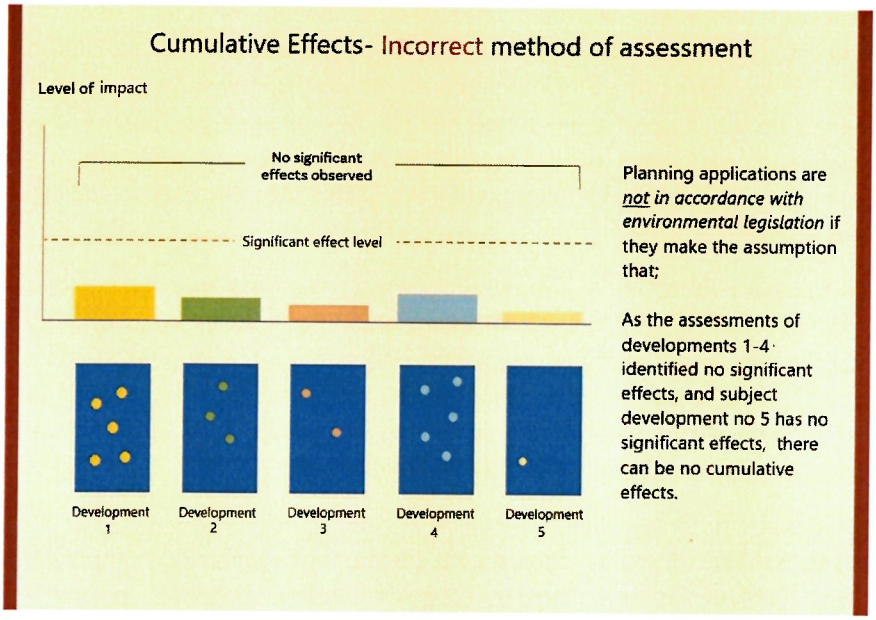


**Figure 1: Incorrect method of cumulative assessment.**

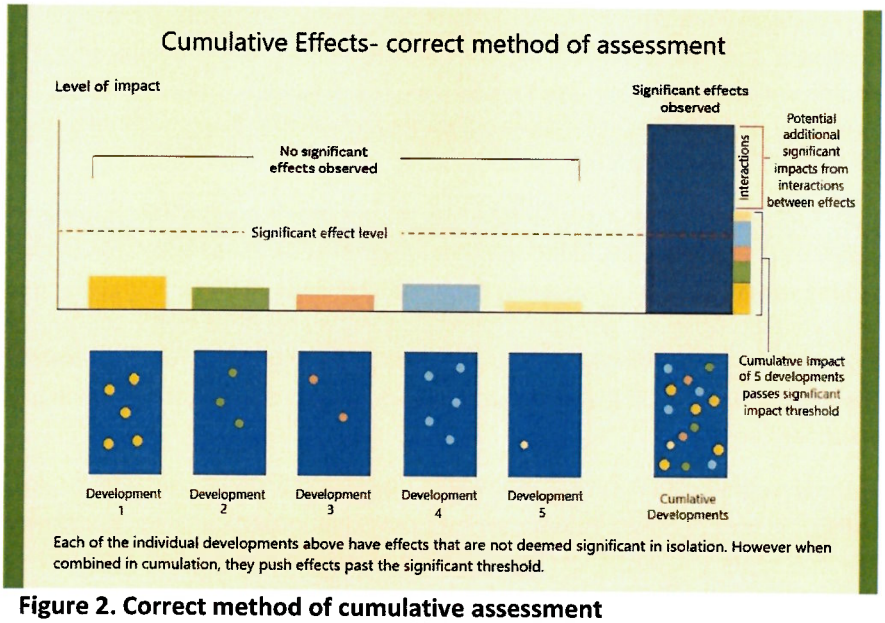


**Figure 2. Correct method of cumulative assessment**

3.7 Very Recent concerns have been raised about PFAS contamination of soils and water information has come to light of 150 tonnes of contaminated soil that may or may not relate to the North Runway consent being removed and sent to the Netherlands for remediation treatment. The PFAS contamination can come from firefighting foams and de-icing agents used during the historical operations and operations of the North Runway.

3.8 We tried to locate the water (and Air) emissions monitoring data that may contain this information, but it appears that the DAA is also in breach of conditions 21 and 22 of the parent commission in that it is not putting the water and air monitoring raw data online on its website as per the terms of the original grant of permission. It appears that Fingal County Council incorrectly confirmed compliance with these conditions which have not been met, and now are proving a barricade to effective public participation in making this submission. The conditions in question are as follows.

*21. A monitoring regime for the monitoring of surface water discharged to streams and the public sewer shall be agreed in writing with the planning authority and shall be fully operational prior to the completion of construction of the runway. Monitoring results shall be submitted to the planning authority on a quarterly basis* ***and shall be made available for public inspection on the Dublin Airport Authority's website****. Reason: In the interest of public health and to ensure continuous monitoring of surface water discharges from the site.*

*22. The Dublin Airport Authority shall monitor air pollutant concentrations within the environs of Dublin Airport at locations to be agreed with the planning authority. The pollutants to be measured shall include nitrogen dioxide, sulphur dioxide, benzene, carbon monoxide, particulates PM10 and ozone. The measurements shall be undertaken so that concentrations can be compared with compliance of the appropriate National Air Quality Standards. The monitoring network shall include both continuous sampling equipment and passive sampling methods for monitoring the air pollutant parameters. Results obtained from the air quality monitoring network shall be submitted to the planning authority on a quarterly basis,* ***and displayed on the Dublin Airport Authority website.*** *The frequency and pollutant parameters shall be reviewed on a yearly basis to ensure adequate monitoring. Reason: To ensure adequate monitoring of emissions and air quality.*

3.9 The impact of PFAS contamination via surface runoff and ground water filtration needs to be assessed as part of this application. All monitoring data must be made available in compliance with the planning conditions. The increase in night flights will mean more planes will need to be de-iced in the colder nocturnal periods. This means an increase in PFAS contamination to surface waters. The Board cannot seek to make a decision without a full assessment via EIA and AA of the impact on SAC/ SPA and the water body catchments that re receiving waters of the Airports surface runoff.

3.10 The applicant has failed to put definitive evidence before the board on bird air strikes and impacts on SPAs. There are no up to date surveys provided in particular for the new Western Irish Sea SPA. The applicants AA screening found no need for a stage two with absolutely no evidence to base this outcome on. In response to frequency of bird strikes the applicants response is vastly different to the information the IAA have in their 2022 safety review report

(appendix E) which indicated that bird strikes are a major safety issue for the airport and if it impacts on protected habitats and species needs to be assessed. Th IAA report gives the exact numbers of bird strikes in 2022 and previous years. The applicant's previous response is insufficient, and a detailed and evidential assessment and report must be completed.

3.11 In summary the compliance issues which constitute unauthorised development, and the EIA and AA assessment deficiencies need to be addressed. We hold the position in the first instance that section 34(12) applies and as such the Board should invalidate/ refuse the decision to grant this planning amendment via relevant action.

ENGLISH NATURE

# Birds Network
**INFORMATION NOTE**

## Disturbance effects of aircraft on birds

### Introduction

The purpose of this note is to examine the evidence of impacts on bird populations resulting from disturbance caused by aircraft. This includes an assessment of the effects of different aircraft types and their proximity, altitude and frequency of flight. Other important factors discussed are differences in sensitivity shown by different species and flock sizes and behavioural responses such as habituation and facilitation. The evidence for harmful disturbance caused by aircraft is then presented under a number of categories of impacts including: increased energy expenditure, reduced foraging rates, reduced breeding success and increased predation. Finally, a number of measures that may reduce disturbance impacts are described, including changes to flight altitudes and the use of no-fly zones.

Before discussing the impact of disturbance caused by aircraft, it is important to define the meaning of disturbance in this context. Disturbance can be defined as 'any situation in which a bird behaves differently from its preferred behaviour' or 'any situation in which human activities cause a bird to behave differently from the behaviour it would exhibit without the presence of that activity'. Here we are concerned mainly with the latter definition, although natural causes of disturbance (weather, predators) will always play an important role and may result in even greater impacts when combined with disturbance caused by human activities.

A gradient or hierarchy of behavioural responses to disturbance shown by birds is described by much of the work presented below. For example, the lowest detectable response is for a bird to briefly look in the direction of the source of disturbance before resuming its previous activity. The other extreme would be for a flock of birds to fly away from an area and to not return for several hours, or even days. Such high levels of disturbance resulting in flushing or escape behaviour are quite likely to have an effect, for example, by increasing the energy expenditure of wintering birds. The more difficult question to answer is at what point along the lower end of the gradient does the disturbance result in an impact on a population. For example, repeated exposure to lower levels of disturbance may result in increased stress which, in turn, may cause lower breeding success.

Useful introductions to bird disturbance and further information on the above issues can be found in Davidson & Rothwell (1993) and Hill *et al* (1997).

### Disturbance caused by aircraft

The degree of disturbance caused by aircraft relative to other sources of disturbance varies greatly. For example, Grubb & Bowerman (1997) cite results from research on the human disturbance of Bald Eagles where aircraft caused the lowest frequency of behavioural

response of the five disturbance groups evaluated (vehicle, pedestrian, aquatic, noise, aircraft). By contrast, small aircraft and pedestrians were the most important sources of disturbance in a study of waders at a high-tide roost on Terschelling, the Netherlands, summarised by Smit & Visser (1993). Bélanger & Bédard (1989) also concluded that the time spent in flight and the time taken to resume feeding by staging Snow Geese in the Montmagny bird sanctuary, Québec, were greater after disturbance by aircraft than after any other type of disturbance encountered in their study.

**Disturbance caused by different types of aircraft**

Differences in response to different types of aircraft have also been identified. The work on Bald Eagles by Grubb & Bowerman (1997) established that the eagles in their study showed a much greater response to helicopters (47% of all potential disturbance events) than to jets (31%) and light planes (26%). This is consistent with Platt (1977) who recorded that helicopter flights at 160 m altitude or less disturbed all adult Gyrfalcons being tested. Visser (1986) also compared the effects of jets and helicopters on roosting waders on Terschelling and found that helicopters disturbed birds more frequently and over longer distances than jets, even though the activities from jets were accompanied by weapon testing and high sound levels. Similar results were found in a study of small aircraft flying over wader roosts in the German Wadden Sea (Heinen 1986). In this study helicopters disturbed most often (in 100% of all potentially disturbing situations), followed by jets (84%), small civil aircraft (56%) and motor-gliders (50%). These data confirm the widely accepted view that helicopters are the most disturbing type of aircraft (Watson 1993).

The effects of ultra light aircraft are briefly described by Smit & Visser (1993). Although very little research on the effects of ultra lights has been carried out so far, there is evidence that they can cause significant disturbance, probably because of the low altitude at which they operate and the noise they produce. For example, the numbers of roosting and foraging Bewick's Swans close to an ultra light air strip in the Delta area of the Netherlands dropped from 1,400-4,300 in 1986-88 to only a few birds in 1989, after the strip has been used for one year (Smit & Visser 1989). However, this must be compared with the results of a study on the effects of microlights on wintering Pink-footed Geese near the Ribble Estuary (Evans 1994). Although only based on six observations during January to March, this study concluded that birds rapidly habituated to the presence of microlights landing and taking off from an air-strip only 250 m from their feeding areas.

**Effects of proximity and frequency of aircraft flights**

The altitude and lateral distance of aircraft have been shown to be important factors affecting bird disturbance. In a model of helicopter disturbance of moulting Black Brant geese it was shown that altitude strongly influenced the results, as measured by the number of birds disturbed and by weight loss. At an altitude of 1220-1830 m (depending on helicopter size) there was no predicted weight loss. However, helicopters at 915-1065 m disturbed most birds along all the flight routes. The greatest weight loss was predicted to occur with helicopters at 305-460 m (Miller 1994). Work carried out by Ward *et al* (1994) also confirms an effect of aircraft altitude for staging Black Brant on the Izembeck Lagoon, Alaska. It was found that large planes flying above 610 m had little effect, causing only brief responses by relatively few birds. Fixed-wing aircraft caused the greatest flight response when passing at less than 610 m and less than 0.8 km lateral distance to the flock. Similarly, Owens (1977) reported that wintering Black Brant showed a greater response to fixed-wing aircraft at less than 500

m altitude and less than 1.5 km lateral distance. Aircraft disturbed Black Brant at greater distance than other disturbance types and affected more geese over a larger area than other stimuli. Again, helicopters caused the greatest response duration of all aircraft types. Jensen (1990) found that helicopters had to fly at over 1070 m to avoid disturbing moulting Black Brant. Mosbech & Glahder (1991) suggest that *distant* helicopters are less disturbing when at low altitudes as they are likely to transmit less noise than helicopters at a higher flying level.

Observations of cliff-nesting seabirds on the coast of Aberdeenshire by Dunnet (1977) showed that helicopters and fixed-wing aircraft flying at 150 m above sea level and 100 m above the cliff top caused no detectable effect on the attendance of breeding Kittiwakes and Guillemots at their nests during egg-laying and hatching. However, it was noted that the cliffs are on the normal route of air traffic and thus the birds may have become habituated. No observations were made of aircraft at less than 100 m above the cliff top. Very different responses by seabirds, presumably not habituated, have been recorded on Ailsa Craig in the Firth of Clyde. During one incident a Hercules transport aircraft made successive flights about 200 m above the summit of the island. This caused an entire gannet colony to scatter for about an hour, leaving eggs and small chicks exposed to predation (Zonfrillo 1992).

Smit & Visser (1993) cite further information on the effects of small civil aircraft on roosting shorebirds at different altitudes:

- Aircraft at an altitude of more than 300 m at various sites in the German Wadden Sea disturbed birds in 8% of all potentially disturbing situations, with those flying at 150-300 m in 66% of the cases and those flying at less than 150 m in 70% (Heinen 1986).

- Disturbance in another study was always registered at 150 m altitude and, at a height of 300 m, there was still disturbance within a radius of 1,000 m (Baptist & Meininger 1984). It has been estimated that an aircraft passing over at 150 m creates a disturbed area of more than 15,000 ha (Meer 1985).

- Disturbance can still be detected when aircraft pass at 1000 m altitude (Werkgroep Waddenzee 1975).

- In addition to altitude, the behaviour of aircraft also influences disturbance levels. Flying high in a straight line leads to smaller effects than flying low or with unpredictable curves (Boer *et al* 1970).

Experimental studies of the effects of microlights on Pink-footed Geese (Evans 1994) indicated that they caused no detectable disturbance of geese, Lapwing, Curlew or Golden Plover when over 1000 ft. Signs of disturbance were first noted at around 500 ft.

Turning to the effect of lateral distance of aircraft, a study of the effects of low level jets on nesting Osprey in Labrador, Canada, could not identify any significant disturbance to birds from over-flights as close as 0.75 nautical miles (Trimper *et al* 1998). However, the Ospreys in this study may have habituated to aircraft during exposures in previous years. Visser (1986) detected the disturbance of roosting waders on Terschelling by jets flying up to 1000 m away. Brent Geese on the Essex coast were put to flight by any aircraft up to 1.5 km away when at altitudes below 500 m (Owens 1977).

Research has also been carried out to assess the effect of the frequency of aircraft flights on birds. For example, a study of staging Snow Geese in the Montmagny bird sanctuary, Québec, found that a rate of greater than two disturbances per hour during a single day could reduce the numbers of geese present on the site the following day (Bélanger & Bédard, 1989). Simulations of the effects of over-flights on moulting Black Brant also showed that increasing flight frequency usually caused greater impact on the birds through increased weight loss (Miller 1994). Similarly, experiments on feeding waders on tidal flats on Terschelling showed that 10 minutes after a single disturbance by a small plane at 360 m altitude bird numbers had returned to the same level as prior to disturbance. However, a plane passing twice, at 450 and 360 m respectively, caused a stronger effect, with only 67% of original number of Oystercatcher and 87% of the Curlew returning after 45 minutes (Glimmerveen & Went 1984).

**Effect of noise**

There has been little work on the effects of aircraft noise on birds. Busnel (1978) states that some species, such as gulls on airfields, breed close to extremely loud man-made noises without ill effects. Birds are assumed to habituate to the frequent loud noises of landing and departing aircraft, and only unusually loud noises are known to cause a reaction of alarm in these circumstances. Similarly, during the study by Owens (1977), Brent Geese quickly became habituated to most sounds, including extremely loud but regular bangs made during weapon testing. In another study of the effects of pre-recorded aircraft noise on nesting seabirds on Australia's Great Barrier Reef it was found that Crested Terns showed the maximum response of preparing to fly or flying off at exposures of greater than 85 dB(A). However, a scanning behaviour involving head-turning was observed in nearly all birds at all levels of exposure down to 65 dB(A), a level only just above that of the background noise (Brown 1990). It is not known what effect repeated exposure to lower noise levels can have on birds, although Fletcher (1988) found that low level jet and helicopter over-flights can cause physiological changes in domestic animals that may represent symptoms of stress.

Work by Mosbech & Glahder (1991) found that moulting geese in north-eastern Greenland showed signs of disturbance before helicopters were visible and that, typically, the noise stimuli alone disturbed the geese. Trimper *et al* (1998) found that nesting Osprey exhibited a similar response, staring at an approaching aircraft before it was audible to observers. There is also circumstantial evidence associating a near total hatching failure of Sooty Terns nesting on the Dry Tortugas Islands with sonic booms produced by low-flying military jets (reviewed in Bell 1972). However, Schreiber & Schreiber (1980) investigated sonic boom effects on colonial nesting gulls and cormorants and concluded that, compared to a human walking into a colony, a sonic boom had a minimal effect. Further work is needed to examine the combined effects of visual and acoustical stimuli. For example, trial balloon flights during a study by Brown (1990) indicated additional or interactive effects from the visual stimulus. In situations where background noise from natural sources is continually high the visual stimulus may have a greater effect.

**Sensitivity of different species and effect of flock size**

Significant variations in the sensitivity of different species have been observed during studies of the effects of aircraft on birds. For example, during observations of roosting waders on Terschelling, the Netherlands, it was found that Oystercatchers were rather tolerant of aircraft disturbance and Bar-tailed Godwits and Curlews were less so (Visser 1986). Different

responses were also found during a study of coastal waterfowl in the German Wadden Sea. Brent Geese were amongst the most strongly reacting species (being disturbed in 64-92% of all potentially disturbing situations), together with Curlew (42-86%) and Redshank (70%), with Shelduck (42%) and Bar-tailed Godwit (38%) reacting less often (Heinen 1986). However, identifying consistent trends within species is difficult, as shown by another study of waders on Terschelling by Glimmerveen & Went (1984) where the recovery time following disturbance caused by a small air plane was greater for Oystercatcher (30 minutes before feeding resumed) than Curlew (7 minutes).

The relationship between flock size and disturbance was noted by Bélanger & Bédard (1989) when disturbance rates for staging Snow Geese were higher when more birds were present. Similarly, Owen (1977) observed that larger flocks of Black Brant geese took flight at a greater distance than did smaller flocks when approached by people, and Madsen (1985) observed the same reaction in staging Pink-footed Geese in Denmark. Disturbance behaviour of flocks is largely determined by the behaviour of the most nervous members of the group. Take-off of only a few birds may cause the entire flock to take flight, and the larger the flock the more chance of it containing a higher number of especially susceptible individuals. Thus, species that form large flocks may be more vulnerable to disturbance from aircraft.

**Habituation and facilitation**

The absence of any visible response of some species to aircraft suggests that, under certain circumstances, habituation may take place. The process of 'learning' that a particular stimulus is not associated with risk is probably encouraged by a more or less constant and predictable exposure to that stimulus. This may be the reason for the presence of Lapwings, gulls and Starlings at airfields where the movements and sound levels of planes are very predictable (Burger 1981). Similarly the habituation of nesting Ospreys to human activity has been shown to vary depending on the frequency and type of disturbance (Daele & Daele 1982). Ospreys nesting near humans, highways and the approach corridors for aircraft habituated to those activities, whereas others nesting farther from humans were less tolerant (Mullen 1985).

The importance of 'predictable' stimuli is illustrated in a study of feeding and roosting waders at Texel, the Netherlands, where it was found that a high degree of habituation had occurred to helicopters passing over at a frequency of 2-3 per hour at 100-300 m altitude. However, 'unusual' types of plane, which show up at low frequencies, still had strong effects (Smit & Visser 1993). This study suggests that birds are able to distinguish between types of plane as they do between aerial predators. Koolhaas *et al* (1993) note that habituation is only likely to develop in those individuals that are persistent in using an area throughout the season. Furthermore it is likely that birds never habituate to some types of disturbance. For example, studies of the effects of shooting ranges on roosting waders on Vlieland, the Netherlands, suggest that certain species could not habituate and, as a result, moved to alternative sites (Tanis 1962). Similarly, in a study of wintering Dark-bellied Brent Geese it was noted that, although birds quickly became habituated to most sounds, they never habituated to small, low-flying aircraft (Owens 1977). Jensen (1990) also found that moulting Black Brant geese did not habituate to over-flights.

The opposite to habituation, referred to as facilitation, may also occur when a combination of disturbing stimuli leads to an impact that far exceeds the effect that each activity alone would have had. For example, a study by Smit & Visser (1993) at Texel showed that, following

exposure to an unusual aircraft type, otherwise habituated birds became more vulnerable to other forms of disturbance. Thus, an over-flying Grey Heron could cause a panic reaction much greater than would occur under normal conditions. A similar effect was found by Küsters & Raden (1986) on Sylt, Germany, where over-flying jets appeared to have greater effects when wind surfers had previously been in the area. Thus, the effect of facilitation is that birds become much more sensitive to relatively low levels of disturbance.

**Impacts of aircraft disturbance on bird populations**

As described above, the response of birds to disturbing events depends on a wide range of factors. These include the level of disturbance, reactions of other birds nearby, flock size and knowledge from earlier experiences (habituation and facilitation). Additional factors determine either their willingness to remain in the same place (scarcity of food, adverse weather, physiological condition of individual birds) or their motivation to leave for another place (daily and annual patterns of movement related to time of year and tidal level, or the presence of alternative sites). For this reason it is difficult to accurately predict the response of birds to different sources of disturbance. However there is evidence that, under certain circumstances, disturbance can have serious consequences for bird populations. The evidence of disturbance-related effects on bird populations is presented under the following categories of impacts.

*Reduced food intake rates*

There is general evidence that disturbance can significantly reduce food intake rates. For example, Beliën & Brummen (1985) found that birds forced out from preferred feeding areas may often simply wait until the source of disturbance has disappeared before resuming feeding. This was shown by the experimental disturbance of a single Oystercatcher. The bird was forced out from its preferred feeding site to another area where, despite the presence of other feeding birds, its intake rate dropped to almost zero. These results are confirmed by Hooijmeijer (1991) during similar work on Oystercatcher at Texel, the Netherlands. This showed that resting and walking during disturbance become the more dominant behaviour than feeding. Also, the food intake rate during the recovery period following disturbance was much higher than normal, presumably a result of birds trying to compensate for the loss of feeding time. Similarly, in response to frequent helicopter disturbance, the amount of time spent grazing by Pink-footed Geese in Northeast Greenland was decreased (Mosbech & Glahder 1991). Instead, the geese spent more time on the water and resting on ice floes. It was concluded that helicopter disturbance had a drastic impact on the time budget of Pink-footed Geese in this area.

Obviously, the impact of reduced intake rates will depend on other factors, including the physiological condition of the disturbed birds and their ability to compensate, for example, by feeding at night. This is illustrated by a simulation of the impact of helicopter flights on staging Black Brant geese which indicated that disturbance could result in significant weight loss (Miller 1994). Taylor (1993) found that Black Brant nearing the completion of wing moult are 'nutritionally emaciated' and that, for birds already in such poor condition, the additional loss of weight resulting from disturbance could result in abnormal or incomplete moult, if not decreased survival. Concerning compensation for reduced intake rates, Jensen (1990) suggested that gut capacity and passage rates and forage digestibility might limit the ability of Black Brant to compensate for lost feeding.

*Increased energy expenditure*

A potentially serious consequence of the extra flights needed to escape sources of disturbance is that energy expenditure will increase. The energetic costs of man-induced disturbance to staging Snow Geese in the Montmagny bird sanctuary, Québec, have been estimated by Bélanger & Bédard (1989). Human activities here accounted for over 80% of all disturbances recorded, with hunting and over-flying aircraft ranked highest. Two responses of birds to disturbance were considered: birds fly away but promptly resume feeding; and birds interrupt feeding altogether. The average rate of disturbance (1.46/hr) for the first response was estimated to result in a 5.3% increase in hourly energy expenditure combined with a 1.6% reduction of energy intake. The disturbance for the second, more prolonged, response was estimated to result in a 3.4% increase in hourly energy expenditure and a 2.9% reduction of energy intake. A conclusion from this study is that high levels of disturbance may have harmful energetic consequences for Snow Geese in Québec. More than two disturbances per hour may cause an energy deficit that no behavioural compensatory mechanism (such as night feeding) can counterbalance. Davis & Wiseley (1974) carried out similar work and claimed that an average seasonal disturbance rate of one event every two hours would cause a reduction of 20.4% in the energy reserves of staging Snow Geese. White-Robinson (1982) noted that wintering Black Brant geese increased their energy expenditure by 15% because of flights in response to disturbance.

*Decreased breeding productivity*

Disturbance caused by aircraft can have a range of impacts on breeding birds. Harmful effects include interference with courtship and initial nesting activities, the loss of eggs and chicks as a result of predation or exposure to adverse weather, and greater chick mortality due to starvation or premature fledging. However, the linkage between disturbance and decreased breeding productivity is not always clear and often it is not possible to conclusively show adverse effect. For example, the study by Dumnet (1977) of cliff-nesting seabirds found no evidence that aircraft affected incubating and brooding Kittiwakes, though habituation may have influenced the results. Some of the most dramatic evidence comes from 'catastrophic' incidents of the type described at Ailsa Craig (Zonfrillo 1992) where a low over-flight by a Hercules transport aircraft resulted in the estimated loss of 2000 Gannet eggs or chicks to gull predation. Another incident at the same location caused young auks, mostly Guillemots, to panic and fall from their ledges, resulting in the death of at least 123 birds. A similar panic response has been recorded for species of heron where, because of flimsy nest construction and vulnerable locations, rapid flights from the nest can result in the loss of eggs or young (reviewed in Bell 1972).

More subtle effects were suggested by Burger (1981) in a study of Herring Gulls nesting near Kennedy International Airport. These birds had a lower mean clutch size than expected and it was proposed that this was an indirect result of aircraft disturbance. Significantly more gulls flew up and engaged in more fights when aircraft flew overhead than under normal conditions and it was observed that eggs were broken during these fights. Under normal conditions fights between gulls do not occur because adults return to their nests at different times. However, the aircraft disturbance synchronized the landings of close nesting pairs thus increasing the likelihood of territorial disputes. Chick mortality as a result of aircraft disturbance is also cited by Grubb & Bowerman (1997) where the death of a nestling Bald Eagle was attributed to frequent helicopter flights less than 30 m from the nest which significantly reduced prey deliveries by the adults.

Birds are particularly sensitive to disturbance early in the breeding season. For example, Palmer (1976) and Myerriecks (1960) discuss the sensitivity of Great Blue Herons to startle effects during the early stages of courtship and nesting. Similarly, in a review by Vana-Miller (1987), sporadic activity following the initiation of nesting has been found to have severe effects on Osprey reproduction.

*Physiological changes*

There has been much experimental work on the effect of noise on the physiology of animals, both wild and domestic (Bell 1972, Fletcher 1988). For example, research on heart-beat rates of breeding Adélie Penguins has shown that rates increase as helicopters fly in the vicinity of their colonies, even when birds remained on their nest and showed no other signs of stress (Culik 1990). This work suggests that unusually loud noises can result in physiological changes that can be equated with increased stress. It has been speculated that continual exposure to disturbance of this nature, although having little visible effect, may reduce reproductive success. A similar effect has been suggested for Black Brant geese in Alaska where stress from aircraft over-flights might inhibit their ability to complete their moult while maintaining or acquiring the body condition necessary for migration (Taylor 1993).

*Habitat loss*

Frequent and high levels of disturbance can effectively result in habitat loss. This may be in the form of decreased carrying capacity where an area becomes less used by birds or, at its most extreme, it can occur when birds move away from a disturbed site permanently. An example of the latter is cited by Grubb & Bowerman (1997) where aircraft disturbance caused Bald Eagles to depart an area entirely. Consequently, displaced birds may have to feed at higher densities elsewhere, which may effect food intake due to increased competitive interactions between birds.

**Mitigation of aircraft disturbance**

Any attempt to reduce the effects of aircraft disturbance, for example by setting tolerance distances or disturbance-free zones, is complicated by the large variation in vulnerability to disturbance. This variability occurs across species and within species, across habitat types and between sites, and where exposure to disturbance causes varying amounts of habituation or facilitation. However, there are certain general principles which may help reduce disturbance in most circumstances. Also, a small number of case histories exist that may provide useful examples of effective mitigation measures under certain circumstances.

*Timing*

The potentially damaging effects of disturbance are greater for birds at particular times of the year. For example, disturbance is most likely to result in greater mortality of wintering birds in conditions of severe weather when food intake rates are reduced and fat and energy reserves are low. As illustrated above, birds are also very vulnerable to disturbance during the breeding season. Thus if aircraft disturbance can be removed or reduced at these critical times then overall impacts may be greatly reduced. Birds are also more vulnerable to 'unusual' disturbance events, for example unfamiliar aircraft types or unpredictable flight behaviour, and these should be avoided at critical times of the year.

*Aircraft type*

Certain types of aircraft create more disturbance than others. The existing research suggests that the use of helicopters in particular should be avoided in areas of importance for birds. There is also some evidence that ultra-lights are especially disturbing.

*Flight distance, altitude and frequency*

In some circumstances the use of zones around sensitive bird areas to restrict aircraft movements may be appropriate. Both lateral and altitudinal restrictions may be beneficial, although distances will vary with species and site. For example management plans for Bald Eagles in North America typically include restrictive buffer zones limiting human activity around nest sites and other key habitat areas such as foraging sites. Grubb & Bowerman (1997) suggest that aircraft would best be excluded from within 600 m of nest sites and key habitat areas during the breeding season. Work by Visser (1986) suggests that an exclusion zone of 1000 m may be required to prevent disturbance of roosting waders and Owens (1977) reports disturbance of Brent Geese up to 1.5 km distance. Turning to altitudinal restrictions, the results of the studies of Snow Geese in Québec and Brent Geese in Essex suggested that flights below 500 m over sanctuaries should be prohibited (Bélanger & Bedard 1990, Owens 1977). The work on Black Brant geese by Ward *et al* (1994) indicates that a flying altitude of at least 610 m is necessary to minimise disturbance. The simulation of helicopter disturbance of Black Brant geese by Miller (1994) predicted that the impact of helicopters could be greatly reduced by flying over 1065 m, minimizing flight frequency and by avoiding the use of larger (and thus noisier) helicopter. Similarly, in relation to flight frequency, Bélanger & Bedard (1990) recommended that human disturbance, particularly aircraft over-flights, should be reduced to less than one event per hour.

*No-fly zones*

There are two mechanisms for identifying such no-fly zones in the UK. The Civil Aviation Authority (CAA) publishes information on 'Bird Sanctuaries' and the MoD identifies national 'Avoidance Areas'. Both rely on map-based information to warn pilots of the location of large numbers of birds in order to reduce the risk of bird strike. The CAA defines a Bird Sanctuary as an *airspace of defined dimensions within which large colonies of birds are known to breed.* The location of these sanctuaries are listed in the UK Aeronautical Information Publication (AIP), an important reference for all civil pilots, giving details of location, avoidance distances (up to 3 nm) and heights (up to 4000 ft). Pilots are requested to avoid the Bird Sanctuaries during a particular period or during the breeding season. They are also advised to avoid flying at less than 1500 ft above surface level over areas where birds are likely to concentrate, such as offshore islands, headlands, cliffs, inland waters and shallow estuaries. The AIP recognizes that, apart from the danger to flying aircraft, the practice of flying close to breeding birds should be avoided for conservation reasons. However, these warning are only advisory for civil pilots.

The MoD can designate permanent and seasonal Low Flying Avoidance Areas to restrict the use of low-flying military aircraft. These are part of the UK Low Flying System (UKFLS) which aims to spread low-flying activity as widely as possible in order to reduce the burden of disturbance in any one area. Military aircraft are deemed to be low-flying when, in the case of fixed wing aircraft, they are less than 2000 ft above the surface, and for propeller-driven

light aircraft and helicopters, when they are less than 500 ft. Avoidance areas include civil airspace around airports, airfields and glider sites, industrial sites, major built-up areas, stud farms and hospitals. Some bird reserves and sanctuaries are also included, although the list is far from comprehensive and requires a review.

*Reducing other sources of disturbance*

Finally, in circumstances where it is not possible to reduce or eliminate aircraft disturbance, it may be beneficial to reduce other sources of disturbance present on the site. This requires an integrated approach to controlling disturbing activities such as wildfowling, sailing and public access through temporal and spatial zoning. For example, the designation of refuges from wildfowling disturbance may help reduce the effects of facilitation and thus lessen the impacts of aircraft activity.

**Conclusion**

As with all forms of disturbance, it is often difficult to identify the effects of aircraft on birds, especially at the lower levels of potentially disturbing activities. Detecting effects is further complicated by the great variation in response of birds to aircraft, depending on a whole range of factors including aircraft type, proximity and frequency of flights and noise levels. Add to this variation the additional factors of flock size, habituation and facilitation, and it quickly becomes apparent that simple generalisations regarding the effects of aircraft cannot be made. This is especially so when consideration is given to the host of other variables that influence bird populations, including food availability, habitat change, competition, predation and weather. However, from the current information on aircraft disturbance the following general points can be made:

- Low-flying helicopters and ultra-lights cause the greatest level of disturbance.
- Low flight altitudes cause most disturbance; flights over sensitive bird areas should be at least 500 m above surface levels, and preferably over 1000 m (especially for helicopters).
- Unpredictable, curving flight lines are more disturbing than predictable, straight flight lines; birds can often habituate to regular and predictable events.
- The impact of aircraft disturbance may be increased if other sources of disturbance effect the same area.
- Cliff-nesting and other colonial seabirds during the breeding season and flocks of waterfowl during the winter are most vulnerable, especially during severe weather conditions.
- No-fly zones should be sought if serious disturbance is apparent.

Any future studies of the effects of aircraft disturbance, as with all forms of potentially disturbing activity, should take into account a range of factors: the intensity, duration and frequency of disturbance; proximity of source; seasonal variation in sensitivity of affected species; whether birds move away and return after disturbance ceases; whether there are alternative habitats nearby; and whether there are additional forms of disturbance. Ideally

work on disturbance effects should include before-and-after studies and experimental controls. However, the flexibility for before-and-after studies rarely exists and often the disturbance is established and on-going. In these circumstances several sites should be studied and as many variables as possible should be measured in order to identify reliable correlations between bird activity and disturbance.

Once an effect has been identified, it is rarely possible to establish an impact on population dynamics and survival without extensive research into the behavioural responses of indivi dual birds. As research of this nature requires significant time and resources it is not always practicable. Where time or resources are constraining it will be necessary to rely on existing research results as presented here to indicate *potential* impacts. Thus, for examples of higher levels of disturbance where an effect has been established, the existing research literature that identifies impacts on populations should be used to reinforce the precautionary approach. However, the evidence for impacts at the lower levels of disturbance is less strong and this requires further research.

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# WHAT EFFECT DO AIRPLANES HAVE ON BIRDS? – A SUMMARY

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No one will expect this short question to produce an equally short and simple answer. The diversity of animal species and individual situations results in a wealth of barely classifiable and predictable responses. Outside in wild a lot of individual events can be observed that often appear contradictory. And opinions on the implications of a conflict between protection of birds and air traffic are correspondingly divergent. Representatives of authorities and associations nevertheless frequently expect a decision that is brief and unequivocal as possible. Attempts are often made to quantify and predict the effects of air traffic on birds in expert appraisals. The plethora of local individual situations and the different approaches to studies lead to results that are barely comparable with each other or generally capable of extrapolation.

Against this background, the results widely scattered in publications and the "grey literature" (appraisals, dissertations etc.) have been compiled and their variability and identifiable universally applicable correlations have been presented. In this article, an earlier publication (Kempf & Hüppop 1998) has been partly updated and summarized on the basis of new developments and findings.

## Why do birds react at all to flying objects?

Almost all species of bird have to live with the threat of dangerous predators swooping on them out of the sky. The fastest possible escape flight as soon as a predator appears is the only sensible reaction in many cases. In the process, mistakes may also occur, so that birds respond to the sudden approach of animals that are essentially harmless by suddenly flying off.

Airplanes can also prompt birds to take flight, even though the aircraft do not appear as predators. In experiments on birds with different dummies, it was found that escape flight reactions are the natural response to all flying objects. Fear of dummies used many times quickly subsided, but not their attentiveness towards them. Individual features of the flying object, such as shape, size, angular speed etc., are of differing significance as trigger mechanisms. But since wild animals react to enemies according to a complex system, virtually no useful rules can be derived from this for air traffic.

## What kinds of reaction occur?

When an airplane appears, all possible levels of excitation are described in birds, from outwardly non-visible physiological reactions to protection, ducking, increased calling activity, restless pacing back and forth, running away, flying off and returning to the same place or a place close by, flying off and leaving the area, right through to panic-like flight reactions.

In addition, during the breeding period, various predatory species of bird repeatedly carry out **pseudo-attacks** and also genuine attacks on gliders, hang-gliders and paragliders. Curlews sometimes launch vicious attacks on model aeroplanes that fly over their breeding

grounds, which can also lead to accidents.

Waterfowl which take to the air because of an airplane usually stay in the air for one to three minutes, but sometimes also considerably longer. After this, it takes some time before the birds calm down again and resume their previous activity.

Using modern electronic instruments, it is possible to measure the heart rate of brooding birds. Measurements show that these birds often react to the appearance of airplanes with a marked **increase in heart rate**, in other words they become nervous, even if no outward reaction is visible.

It thus becomes clear that the loss of time immediately associated with taking flight is not the only effect of an airplane on birds which has to be taken into account.

**What are the effects of these reactions?**

A crucial question that needs to be answered is the extent to which effects can be anticipated on individual life expectancy, reproduction rate and ultimately on population size.

- First of all, any reaction leads to **changes in energy conversion.** In species which fly a lot (e.g. swallows) the energy conversion during flight increases only to three times the base energy conversion, in poor flyers or at high speeds (e.g. in ducks) it sometimes increases to more than 20 times the base figure. In the case of escape and attack flights of e.g. waders of wet meadows, it has to be assumed that the energy consumption corresponds to twelve times the base energy conversion. Even when there is no outwardly visible excitation, the heart rate may show a fifteen-fold increase and energy consumption may at least treble even without physical activity.
- In resting snow geese, it has been found that the **time of food intake during** the day may be reduced by up to 51 % if they are disturbed. Brent geese which are frightened every 30 minutes by aircraft or people must spend 30 % more time feeding compared with birds of the same species in less intensely disturbed areas. When the period of daylight and other resources are limited, it is not always possible to compensate for such loss of time.

Disturbances can thus influence the time and energy budget of birds and hence, for example, the ability to lay down fat reserves for migration and breeding. In many species there is documentary evidence to indicate that breeding success depends on the available energy reserves at the start of the breeding periods. Birds try to make up for the energy deficits that come from constant disturbances by feeding at different times of the day, by feeding at the expense of other activities, e.g. preening, by increased feeding rates or by increased risk taking. Even if it is hardly possible to provide any direct evidence in methodological terms, it becomes clear that individual life expectancy and reproductive capacity may be impaired.

Disturbances can also lead directly to expulsion and thus loss of territory for certain species of bird. In geese, a rate of more than two disturbances an hour can lead to a decrease in the bird population in the area concerned. Breeding birds may for example be driven to the edge of their territory or out of their territory altogether by aircraft, which has obvious consequences for feeding and breeding success. In some cases, breeding areas are

abandoned altogether for this reason. Many bird species in Central Europe have been reduced to small scattered populations as the result of a deterioration and decrease in habitat. Thus even the slightest additional damage can lead to further decreases.

**Which birds react to airplanes?**

- Most reports on disturbances by aircraft concern ducks and waders (plovers). Geese are particularly sensitive to airplanes. Aircraft disturbances are especially striking in those places where the birds gather in **large *swarms***, in our case especially in the area of the Wadden Sea.
- In the literature, negative effects of aircraft **at breeding time** are documented in particular for meadow-breeding waders (including curlews, godwits and lapwings) in relation to model aircraft. Flight reactions of breeding lapwings to powered airplanes have also been documented. In the case of breeding waders (Limicolae), however, air traffic with powered airplanes – in contrast to model aircraft – and low-flying ultralight aircraft (up to 1994, see UL article) – lead more rarely to visible reactions.

The fact that the interests of meadow birds and air sports in particular often come into conflict is explained by their matching "habitat preferences": expansive, open and as far as possible unwooded areas that are remote from residential districts and are or can be extensively used.

Apart from ducks and waders, disturbed reactions to flight activities have been reported for other waterfowl, great bustards, black grouse, various predatory birds and crows. Particular sensitivity to aircraft is shown by breeding colonies, especially those of larger bird species. For colonies of terns, gannets, guillemots and pelicans, almost complete breeding failure has been documented following just a few aircraft fly-overs.

The group of smaller song-birds has hardly been studied. Apart from in two reports on a military jet exercise and an air display, where some small birds reacted with panic-like flight movements, we did not find any reports in the literature about corresponding behavioral impairments. However, the reactions of small birds are difficult to observe. We know from our own observations that starlings at least frequently take flight in response to airplanes. In wine-growing regions, airplanes are used to drive away starlings.

**How do birds respond to different types of aircraft?**

Most studies on the effects of **model aircraft** are primarily concerned with meadow-breeding waders during the breeding season.

- In an area that has already been used by model aircraft enthusiasts for 17 years, lapwings reacted in two-thirds of fly-overs with protection-seeking behavior (in 50 % of cases as a result of powered airplanes), and sometimes also with escape reactions. A strong reaction was found when several sources of disturbance occurred in combination.
- A newly arrived female lapwing showed substantially greater anxiety than the well-established birds. Even if the meadow birds in this study region appeared to have grown accustomed to the model aircraft to a certain extent, the flying of model aircraft still frequently led to disturbances, especially in combination with people and dogs running

around.

- One author measured escape distances from model aircraft of 150 - 250 m for meadow-breeding waders in the breeding area, and 300 - 450 m for resting birds. On three occasions he observed that breeding lapwings were driven from their nests by model aircraft. The escape distances were in the range 130-200 m. As long as the aircraft flying continued, the birds did not return to their nests.
- In studies on curlews in Southern Germany, losses of egg clutches were detected on several occasions as a result of flying model aircraft. The birds evacuated the areas completely or partly during model aircraft flying and often did not return for the whole day. Young curlews hatched more frequently in areas with no aircraft flying activity than in those where model aircraft were flown.
- After a model aircraft site was set up, the curlew population in Isarmoos fell from a maximum of 15 to 3 - 4 pairs of birds. The short-eared owl, Montagu's harrier, snipe and corncrake all migrated away from the area. Since the habitat was progressively worsening at the same time, however, it is not possible to identify the factor that was ultimately responsible for this migration.
- In almost every large curlew breeding area in the southern region of the Upper Rhine there is at least one site used for flying model aircraft. The illustrates the potentially grave consequences of this type of aerial sports.
- One author studied the propensity of model aircraft for perpetually frightening off birds. Remote-controlled model aircraft resulted in a marked frightening effect on almost all groups of birds. Geese reacted most strongly. It was observed that the main advantage of this frightening technique was that no acclimatization effects occurred. Other authors also assume that acclimatization to model aircraft is hardly possible.

It is worth noting that **hang-gliders and paragliders** can induce greater anxiety in chamois goats and ibexes than other aircraft, including helicopters. In some cases, these animals respond with panic-like flight reactions and no longer appear in the same area again for the rest of the day. A corresponding effect in birds has only once been documented, and this was in black grouse. In the aerial sports regions of Oberallgäu, no decline was observed in any members of the grouse family. In the few direct encounters that were observed, black grouse did not flee.

Larger predatory birds may feel disturbed in their area by hang-gliders and paragliders , and pilots even have to expect attacks. The abandonment of breeding grounds or breeding losses appear to be occurring from time to time by golden eagles as a result of disturbances by aerial sports enthusiasts, although it is difficult to provide any direct evidence of a link.

Reports on the marked negative effects of **ultralight aircraft** are essentially attributable to the low-flying practices (at a maximum height of 150 m) that were required by law until 1994.

- There is evidence to show that, on the landing area of Reichelsheim, Hessen, a small brood of black-tailed godwits (over half the population in Hessen) and curlews died out in the 80s as a result of ultralight aircraft activities. On active flying weekends, the district hunting system of the birds broke up. The many years of air traffic with other aircraft apparently had no negative impact.
- The numbers of resting and foraging Bewick's swans in an area of the Dutch delta region declined from 1400 - 4300 in the period from 1986 to 88 to a few individual

birds in 1989 after a take-off and landing strip for ultralight aircraft was installed nearby and had been in operation for a year.

With the flying laws that have also been in place for ultralight aircraft since 1994 (e.g. minimum flying altitude of 600 m above the ground on cross country flights) and in view of the type of construction of modern ultralight aircraft, their effect on wild birds today can probably be regarded as similar to that of powered airplanes.

With normal **glider** operations, disturbing effects on birds are hardly to be expected: Except at take-off and landing, the thermal-dependent gliders mostly fly at a great height. In the literature there are few specific data on the reactions of birds to gliders/motor gliders.

- The flight pattern of gliders with large wing-spans and a slowly gliding flight movement at what is usually a great height does however seem to fit the generalized pattern of an airborne enemy. In a study on breeding and resting birds in the Wadden Sea, the disturbing effect of motor gliders was considerably greater than that of powered airplanes.
- The scarcity of gliders would also seem to play a role here: the only registered motor glider on the Wangeraage during the period of the study triggered the strongest and longest-lasting reaction of all. As soon as the motor glider came into view, all the birds resting on the salt flats – even the usually unruffled gulls and oyster catchers – took to the air, making calling sounds as they circled the area for a long time.
- In the case of black grouse in an aviary used to reintroduce birds into the wild, panic-like flight reactions were observed with the direct approach flight and fly-over of gliders and motor gliders – much more often than in the case of fly-overs by fighter jets.
- Flight reactions of goats to gliders have been reported from the Alps.

The effects of **powered airplanes** on birds have been reported in particular from the Wadden Sea.

- On various East Frisian islands, resting birds showed a reaction to direct aircraft fly-overs in 50 – 90 % of cases. Resting birds reacted more by taking to the air (57 % of reactions) than breeding birds (22 %) (see "What other parameters influence the reaction?"). While there no marked differences were seen in the effects of aircraft flying at low and medium altitude, there was overall a discernible tendency for higher-flying aircraft to cause less of a disturbance than lower-flying aircraft. In a study on the impact of human disturbance on Brent geese, aircraft or helicopters were the cause of geese taking to the air in 26 % of all cases. While helicopters had the greatest impact, the reactions to airplanes were only slightly weaker. No clear difference was discernible between the impact of aircraft fly-overs at altitudes above or below 150 m.
- In a study on the factors disturbing birds at a high-tide sanctuary in the Dutch Wadden Sea, airplanes and walkers were found to be by far the most importance causes of reactions.
- According to a literature review on the disturbing effects on waders in the Dutch Wadden Sea, airplanes were among the most disruptive factors in the Wadden Sea. The authors presented a model which can be used to calculate the area affected by a disruptive object. This model is based on data relating to escape flight distance, the distance within which birds interrupt their search for food, and the time it takes for the

various disturbing effects to disappear again. In the case of oyster catchers, the affected area for a mud-flats hiker walking at a speed of 3.6 km/h is 20 ha and for an airplane flying at an altitude of 150 m over the mud-flats 15,000 ha. This large area is produced with a 1000 m breadth of impact to the right and left, a speed of 150 km/h and a duration of 30 minutes.

- A group of authors observed the flight of breeding meadow birds from powered airplanes in many cases – both at low altitudes (50 - 100 m) and also at very high altitudes (in some cases then very long protection-seeking behaviour). Powered airplanes induced protection-seeking behaviour in half of cases, and model aircraft in about two-thirds of cases.

In terms of the intensity of the impact which they have on birds, powered airplanes lie between helicopters and jet fighters which are used comparatively little, if at all, in air sports. The disturbing effect of military jet fighters on birds is often less than one would expect in view of their rather unpleasant effects for humans. By contrast, almost all authors come to the conclusion that, of all aircraft, helicopters most frequently lead to reactions in birds and at the same time to the strongest disturbance reactions.

Systematic studies on the effect of **free balloons** on animals do not appear to have been carried out to date. In 1996, the Society of Wildlife Biology in Munich (*Wildbiologische Gesellschaft München*) carried out an extensive survey of experiences on this subject among balloonists, hunters, farmers, nature lovers, biologists and others. In many respects, the evaluation suggests a situation similar to that with other flying devices: most balloon rides are carried out without any discernibly negative consequences for animals. To some degree, many different species of bird and mammal show reactions of fear towards free balloons (flying at low altitude). Through a combination with the burner, which may ignite precisely when the animal is already in a state of nervous tension, panic flight reactions are possible with dramatic consequences for the individuals concerned. However, the effects of silent gas balloons is no less marked.

The latest example of an unfortunate incident: a pair of sea eagles which had nested in the Segeberg district for the first time in 2000 suffered enormous disturbance from a landing hot-air balloon, whereupon they abandoned their brood.

**What other parameters influence the reaction?**

Since the visual faculties of birds tend to be essentially far better developed than their auditory faculties, they respond less to noise than is generally assumed. Silent flying objects can induce reactions similar in intensity to those induced by noisy aircraft. However, visually comparable loud airplanes on average induce more and stronger reactions in birds than quiet ones.

- In breeding bald-headed eagles in North America, the parameter of noise (in contrast to distance or duration of visibility) played no role in disturbances caused by aircraft.
- In a study on a colony of terns, it was not until jet noise reached 90 and 95 dB (A) that two and four percent, respectively, of the birds took to the air, and a further four percent showed a fright reaction.
- With motorized model aeroplanes, it is above all the irregular changes of volume and frequency that play an important part in the disturbance effect.

There are more conclusive findings on the influence of **flight altitude** than there are on the influence of noise volume, but these findings are rarely based on measured altitude data.

- In one expert appraisal on military air traffic, the altitude of helicopters was calculated from distance with reference to land markings and from the angle. The frequency of bird reactions was clearly dependent on the altitude of the helicopters (at 50 – 80 m there was a reaction in 83 % of cases, at 120 - 150 m in 56 % and at 200 - 300 m in 27 %). But strong reactions were still induced even at greater altitudes. This is confirmed by various other authors.
- Brent geese in Alaska reacted in 68 % of cases to airplanes flying at altitudes lower than 610 m and in 33 % to higher flying aircraft (altitude calculation via land markings, experimental fly-overs and listing into radio communications).
- In two literature reviews for the Wadden Sea, it is concluded in the summary that effects on birds are very marked at altitudes below 500 m (1700 ft) and decrease substantially above this altitude.

The disruptive effect of an airplane depends on the **lateral distance** of the fly-over.

- In various studies, the frequency and intensity of the reaction decreased in inverse proportion to the lateral distance. From 700 to 1000 m upwards, no birds took to the air.
- Geese, however, flew off up to a lateral distance of 1.5 km. The first unrest at the approach of an aircraft occurred on average at a distance of 2.6 km.

In general, it can be said that an airplane travelling at high speed in a straight trajectory has less impact on birds than a slow airplane flying in a curved trajectory.

A stronger reaction is often observed in combination with several sources of disturbance **(stimulus summation)**. Such a situation frequently occurs precisely in those places where air sports attract spectators: flying model aircraft, flying sites for hang-gliders and paragliders and also in areas around airfields, day-tripping activities, people walking and dogs off the leash can cause additional disturbances. The stress caused by people seeking relaxation produces stronger and longer-lasting reactions to airplanes in birds than are seen at times when there are no such leisure activities. Conversely, air traffic, even if it does not cause birds to take to the air, can lead to a substantial increase in the distance of the animals' escape flight from humans.

Some **stimulus-independent factors** also affect the reaction of a bird. For example, breeding birds are inhibited from leaving the nest and for this reason alone react differently to disturbances. The willingness of parent birds to take risks may increase in the course of the day or with advancing incubation and rearing of chicks. Weather and season can also play a role. During the wing moulting period, when they are incapable of flight, ducks show substantially greater sensitivity in their reactions to airplanes than at other times. Birds in relatively large swarms tend more towards escape flight reactions than groups of a few individuals. In mixed groups, species may influence each other in their reactions. In the Wadden Sea, the birds are substantially more sensitive before high tide than after high tide.

**Do birds become accustomed to air traffic?**

Almost all authors report on habituation effects. It would seem that the frequency and above all the regularity with which an airplane flies past have a decisive influence on the reactions of birds. This is especially striking during military exercises or in the vicinity of airfields, where bird species that are regarded as sensitive can also be found.

- The same bird species which developed a certain tolerance to air traffic on Wadden Sea islands that have an airfield showed considerable flight reactions to comparable fly-overs on Mellum, where there is no airfield in the vicinity.
- Rare types of aircraft in a certain area also produce conspicuously strong reactions.

These correlations provide an explanation for the different results, e.g. with regard to critical flight altitudes, in the various studies or for unusual observations that contradict the results of most other studies.

But there are limits to the capacity for habituation. The uneven and unpredictable movements of model airplanes and to a certain degree also of gliders, hang gliders and low-flying trikes do not generally allow any habituation. In sensitive species (e.g. resting curlews or Brent geese) even regular air traffic does not lead to a greater degree of tolerance. At least some bird species or individuals react to heavy air traffic by leaving the area, and no habituation takes place. If only insensitive birds are then observed, there is a tendency for this to be confused with habituation.

**Demands of nature conservation**

- Many authors recommend **maximum possible flight altitudes** for airplanes to avoid disturbances of birds or mammals. The minimum altitude figures here range between 150 and 750 m. Most experts recommend a flight altitude of at least 500 m.
- In various projects, there was also seen to be a need for an **adequate lateral distance.** Depending on the sensitivity of the animals studied, this minimum distance ranges from one to eight kilometres (for helicopters).
- In several studies, authors demand that air traffic keep to routes and certain areas. A separation into **areas with regular traffic and areas free of air traffic** on the one hand facilitate habituation and on the other effective protect the rest of the landscape.
- In addition to this proposal not to fly over areas with especially sensitive and threatened species, **seasonal or day-time restrictions of air traffic** are recommended where there are specific or local problems. Examples of this are to set flight shows on a date in late summer or not to fly over ice-free places of refuge for waterfowl during periods of frost.

The original article Kempf, N. & O. Hüppop (1998): "Wie wirken Flugzeuge auf Vögel? - Eine bewertende Übersicht" in *Naturschutz und Landschaftsplanung* 30, (l), pp.17 - 28, is based on a review of 161 publications and expert reports. These also list the citations of these studies, which are not given in this short summary.

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# Long-term effects of noise pollution on the avian dawn chorus: a natural experiment facilitated by the closure of an international airport

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The impacts of noise pollution on birdsong have been extensively investigated but potential long-term effects are neglected. Near airports, where noise levels are particularly high, birds start singing earlier in the morning, probably to gain more time of uninterrupted singing before air traffic sets in. In a previous study, we documented this phenomenon in the vicinity of Berlin Tegel airport. In 2020, Tegel airport closed down, giving us the opportunity to investigate potential long-term effects after noise removal and to gain insight into the mechanisms underlying the advancement of dawn singing. We found that several species at the airport shifted their song onset back after the closure and now had similar schedules to their conspecifics at a control site. Some species, however, still sang earlier near the closed airport. While the first suggests plastic adaptation, the latter suggests selection for early singing males in areas with long-lasting noise pollution. Our findings indicate that a uniform behavioural response to anthropogenic change in a community can be based on diverging evolutionary mechanisms. Overall, we show that noise pollution can have long-lasting effects on animal behaviour and noise removal may not lead to immediate recovery in some species.

## 1. Introduction

Anthropogenic noise is arguably one of the most pervasive and least controlled pollutants, with vehicle and aircraft noise being particularly widespread [1]. In the European Union, for instance, more than 100 million people are affected by hazardous traffic noise levels [2]. These hazards include sleep deprivation, hypertension and cardiovascular disease, metabolic dysregulation, psychological disorders, and reduced cognitive performance [3]. For these reasons, the World Health Organization classified traffic noise as a major threat to public health [1]. Noise is not only detrimental to humans, it also affects many non-human animals, including arthropods, fish, amphibians, birds and mammals [4]. Typically, noise impacts animals on different biological system levels, from physiology to behaviour and ecological processes [5,6]. Hence, it is of major importance to understand how noise pollution affects wildlife [7,8].

Generally, noise can have two types of effect on animals: auditory effects (i.e. impairments of hearing and masking of acoustic signals or cues, and non-auditory effects, such as stress, noise-induced diseases, and changes in predator or prey abundance). Anthropogenic noise has auditory effects in animals that use sound to communicate or to find their prey [9]. For instance, noise from traffic and industry infrastructure interferes with the detection of alarm calls by birds [10,11], which is likely to increase the predation risk in noise-polluted areas. Traffic noise also disrupts the detection of acoustic cues used

by greater mouse-eared bats (*Myotis myotis*) to find their insect prey, which leads to a reduced hunting efficiency close to motorways [12]. As for non-auditory effects of anthropogenic noise, a growing body of evidence from different taxa has identified effects on stress physiology and the immune system [13,14], as well as on behaviour, including acoustic signalling [15,16], space use [17,18] and learning [19,20]. Other non-auditory effects include reduced pairing and breeding success [21,22]. Ultimately, noise pollution can affect whole communities [23–26] and alter ecological services [27]. Two recent studies found that the abundance of different bird species and their reproductive success varies with noise pollution levels across a continental scale [28,29].

In the context of noise pollution, studying animal behaviour is of special interest for two reasons. First, behaviour is the interface between the physiological changes in an animal and the environment; second, behaviour can be markedly plastic, allowing rapid adaptations to changing environments. One particular behaviour that has been widely studied in relation to anthropogenic noise is bird song [30,31]. Noise effects on bird song have strong implications for the evolution of signals as well as for conservation [32], and for almost 20 years, researchers have been investigating whether and how birds adjust their songs to anthropogenic noise. It emerges that the most basic mechanism is the regulation of vocal amplitude (the Lombard effect), which is probably present in all birds [33]. In addition, some species also adjust the timing and frequency of their songs in response to anthropogenic noise [30]. Counteracting acoustic masking is crucial for birds because their songs carry vital information. Specifically, birds use their songs in territory defence and mate attraction [34]. Therefore, differences in the efficiency of signal transmission due to noise likely have major fitness consequences.

A particularly severe case of noise pollution is that from aircraft [1]. Noise measurements in bird territories close to airport runways have registered peak levels as high as 87–118 dB(A) SPL [35,36], which is above the limit that birds can compensate through the Lombard effect [37]. Shifts in song frequency are of no help either, as aircraft noise is typically very broadband, covering the entire frequency range of bird songs [38]. On top of this, major airports often operate almost continuously throughout the day, with airplane take-offs every one to two minutes [39]. The resulting extreme noise pollution poses an unusual challenge to birds, most likely surpassing all natural noise sources they have encountered in their evolutionary past. Therefore, noise pollution from airports is not only a special concern for conservation but also an eminent case for research into the mechanisms of song adaptation.

It appears that birds in the vicinity of airports adjust their song timing in relation to the airplane noise. For instance, chaffinches (*Fringilla coelebs*) fell silent during fly-overs from starting airplanes when the noise exceeded 78 dB(A) SPL [35]. In addition to such short-term plasticity in response to single noise events, many bird species in noise-polluted areas begin singing earlier in the morning [35,40,41]. This phenomenon leads to an advancement of the so-called 'dawn chorus' (i.e. the marked peak of singing activity around dawn in the breeding season) by 4–45 min, depending on the species and the airport location [35,40,42]. The dawn chorus in Europe usually starts before airports begin their daily operations, and it is thought that birds at airports advance their dawn song onsets to gain more time of unimpaired singing before the onset of air traffic [35]. This shift seems crucial since singing around dawn is optimal to attract mates and defend territories [43]. It remains unknown, however, how the advancement in song onset in noise-polluted areas arises. Two hypotheses have been put forward to explain the emergence of this phenomenon: (i) population-wide, microevolutionary changes (e.g. through selection for earlier chronotypes), and (ii) behavioural plasticity (i.e. individual short-term changes in song onset in response to changes in the environment) [35,40].

The closure of the Berlin Tegel international airport in November 2020 afforded us the opportunity to test these hypotheses in a natural experiment. Tegel airport opened in 1948 as a military airport and civil aviation with regular flights started operating in 1960 [44]. Thus, the forest bordering the airport was exposed to frequent high-level noise pollution for at least 60 years, which might have led, over the course of many generations, to microevolutionary changes in the local bird populations. In a previous study, while the airport was still operating, we recorded the onset of the dawn song for all species of the bird community in a forest close to the airport and at control sites together with the environmental noise levels, and we then quantified the noise-related shift in the dawn chorus [35]. Now we intend gaining insight into the mechanisms underlying the noise-related advancement of dawn singing. To this end, we repeated the previous study during the first breeding season after the airport closure in the same areas as in the previous study. The selection hypothesis (H1) predicts that birds near the airport still sing earlier than in the control areas. The behavioural-plasticity hypothesis (H2), in contrast, predicts that birds shift back to normal dawn song schedules so that no difference in song onsets times between airport and control locations can be detected.

## 2. Methods

### (a) Field recordings

We recorded the bird dawn chorus at two forested sites, referred to as 'airport' and 'control', on 2, 3 and 4 May 2021. These sites were the same as in a previous study by Dominoni *et al.* [35]. The control forest was chosen because it was close to the airport site (the sites were roughly 4 km apart; electronic supplementary material, figure S1), and it had a similar age and vegetation structure (mixed deciduous and pine forests with little undergrowth). Within each site, recordings were made at 21 locations. To this end, we used 14 AudioMoth audio recorders (v. 1.2.0) [45], seven of which were deployed at each site at the same time, and then swapped between locations the next day. The audio recorders were packed in resealable plastic bags to protect them from humidity and then attached to trees. The locations were chosen so that the surface area of both sites was well covered but the recorded areas did not overlap (based on previous tests, we estimated the recording distance of each unit to be around 100 m). Each recording (sample rate 32 kHz, gain 'medium') started at 03.40 and lasted until 06.30, resulting in 170 files with a duration of 55 s, separated by a 5 s pause (we chose to split up the recording into short files because they are easier to handle, the 5 s pause was necessary to allow the system to save the data on the SD card without overloading the memory).

All recordings were analysed with Avisoft-SASLab Pro software (v. 5.2.08, Avisoft Bioacoustics, Berlin, Germany) by the

same observer (LdF). For every recording session (one recording unit, 1 day), the spectrograms (FFT window 256, gain 30) were visually screened until the first bird vocalization was detected and then all following files were listened to. Species songs (or drumming in case of the great spotted woodpecker) were identified and the onset time (minute at which the first bird of each species was heard) was noted. This scoring was done blindly (i.e. the observer was not informed about the site of the recording when identifying the species). To verify that the scoring in the present study was comparable with that of Dominoni *et al.* [35], one recording session was also analysed by one of the observers involved in the previous study (HB). Both observers detected the same 21 species, for 18 of which they had an inter-observer reliability for the dawn chorus onset of 100%, for two species the detected onset time differed by 1 min, and for one species it differed by 2 min.

In addition to the onset of the dawn chorus, we also used the Audiomoth recordings to measure the ambient noise levels. For this purpose, one 55 s file per location was chosen between 06.15 and 06.30. We selected this time period because it is the noise levels after 06.00 that were crucial for the advancement of the dawn chorus at Tegel airport [35]. For the noise level measurements, we selected recordings with no wind and no birds singing close to the recorder. We bandpass filtered the recordings in the range of bird hearing (0.1–10.0 kHz), then corrected them for the frequency response of the microphone and finally applied an A weighting (see 'Recorder calibration' below). Similarly to Dominoni *et al.* [35], we define ambient levels as the sound level (dB(A) RMS re 20 µPa) of the 100 ms window with the highest value in the selected 55 s file.

### (b) Recorder calibration

To obtain accurate sound level measurements, it is necessary to correct the recordings for the frequency response of the recording system because microphones do not record all frequencies with the same amplitude. Therefore, we measured the frequency response and the sensitivity of each recorder in the range of bird hearing. All sound generation and analyses for the calibration were performed in R (v. 4.0.4, R Foundation for Statistical Computing) with the package *seewave* (v. 2.1.6) [46]. The calibration was done separately for each audio recorder.

We generated a pulse train (100 Hz–10 kHz in 100 Hz steps, pulse duration 0.2 s including a 0.05 s linear fade-in and 0.05 s linear fade-out) and a 10 s 1 kHz tone. This playback was broadcasted through a Pioneer A-109 amplifier and a JBP Pro III loudspeaker and then recorded with an AudioMoth recorder and at the same time with a Behringer ECM 8000 measuring microphone (connected to a Marantz PMD 660 recorder). The source level of the 1 kHz tone was measured with a Casella CEL-240 SPL meter. The AudioMoth recorder, the measuring microphone, and the SPL meter were mounted 1 m in front of the loudspeaker in an anechoic room, the floor and walls of which were covered with sound-absorbing foam. The frequency response of the loudspeaker was first calculated using the recordings made with the measuring microphone. The central section of each pulse (0.08 s excluding the fade-in and the fade-out) was extracted from the recordings and then bandpass filtered ±200 Hz around the pulse frequency. Thereafter, we calculated the amplitude of each pulse (dB RMS FS). In a next step, we subtracted the amplitude of the 1 kHz pulse from the amplitude values obtained for all other frequencies, such that the amplitude of all pulses is expressed in dB relative to the amplitude of the 1 kHz signal. This procedure was applied to each audio recorder used in this study. We then subtracted the frequency profile of the loudspeaker (measured with the measuring microphone) from the frequency profile obtained for the audio recorders, to obtain the frequency response of each individual recorder. We padded zeros before 100 Hz and after 10 kHz and performed a linear interpolation on the frequency response to obtain 256 values, equally spaced between 0 and 16 kHz, and added the A-weighting factor to the frequency response. We used A-weighting because it is a good proxy for the frequency-dependant sensitivity of bird hearing [47]. The frequency response was then used as an impulse-response filter. The received level of the 1 kHz tone (dB RMS FS) was used to determine the sensitivity of each recording unit. Based on the sensitivity and frequency response curves, we could then obtain the true ambient sound levels from the recordings.

### (c) Statistical analysis

Statistical analyses were conducted in R (v. 4.0.4), using the package *lme4* (v. 1.1-26) and *arm* (v. 1.11-2). In line with our previous study [35], we included in the analysis all species that were detected at least at ten different locations at each site. To compare the effect of the site (airport or control) on the onset of dawn chorus before the airport closure [35] with the situation after the closure (present study), we performed a similar analysis as described in [35]. We fitted a multiple linear regression with the onset time (in minutes after civil twilight) as the response variable for all species together (global model). The peak ambient level measured from the recordings, and the site (airport versus control) were included as fixed predictors. The date (3 May, 4 May and 5 May) was also included as a fixed predictor to account for potential day-to-day variability in singing activity independent of noise levels and site (due, e.g. to differences in the weather). The species was included as a random factor to account for species-specific variability in the singing behaviour. The recorder ID was used as a random factor to account for potential differences in recording quality. We checked model fit by visual inspection of the diagnostic plots [48] (i.e. we made sure that residuals and random effects were normally distributed, residuals plotted against fitted values did not show any signs of heteroscedasticity or any obvious trend, and that there were no autocorrelations in the residuals). Credible intervals of estimates were obtained by simulating the posterior distribution of the model 1000 times and calculating the 2.5% and 97.5% percentiles of the simulated estimates [49]. In addition to the global model, we also analysed the effect of the site for each species separately because previous studies have found species-specific effects of the ambient noise on dawn chorus onset times [35,40,50]. For this purpose, we fitted 15 sub-models (one per species) with the date, ambient noise level and the site as predictors of the onset of dawn chorus, and with the recorder ID as a random effect. We used the same procedure as described for the global model to check model fit and to calculate credible intervals for each of the 15 species-specific models. Altogether, we constructed 16 different models that investigated the long-term effect of noise pollution on the onset of the avian dawn chorus: one global model, across all species, and 15 species-specific models. Because our aim was to compare the onset of the dawn chorus before and after the closure of the airport, we refitted the species-specific models with the data from [35] to obtain the respective estimates and credible intervals.

## 3. Results

After the closure of the airport, the median peak level of environmental noise at the airport site was 46.2 dB(A), which is a drop by more than 28 dB(A) compared to the noise levels when the airport was operating (two sample *t*-test: 95% confidence interval = −33.69, −28.34; $p < 0.001$). Still, the airport locations were on average somewhat noisier than the control locations (two sample *t*-test: 95% confidence

**Table 1.** Estimates, credible intervals and s.e. of the general linear mixed model explaining the dawn chorus onset time across all species (global model). The intercept represents the average onset time on 2 May at the control site. The 'site' variable shows the effect of the airport site relative to the control site. Statistically significant variables are shown in italics.

| | estimate (95% CRI) | s.e. | *t*-value |
|---|---|---|---|
| (intercept) | 26.62 (13.51, 39.01) | 6.53 | 4.11 |
| *site* | *−3.83 (−6.71, −0.96)* | *1.46* | *−2.66* |
| peak ambient level | −0.11 (−0.36, 0.14) | 0.12 | −0.85 |
| date 3 May | −0.75 (−3.87, 2.24) | 1.58 | −0.49 |
| date 4 May | 1.28 (−2.01, 4.31) | 1.65 | 0.76 |

interval = 1.41, 9.02; $p = 0.008$), but this difference was as little as 3.9 dB(A) (electronic supplementary material, figure S2).

In total, we recorded 46 species in the dawn chorus recordings, 45 at the airport site and 33 at the control site (electronic supplementary material, table S1). Of these, 15 species were detected more than 10 times at both sites, including all of the 10 species analysed in the previous study when the airport was still operating. The order in which the different species started singing around dawn was similar across all recording locations (electronic supplementary material, figure S3).

The global model indicated that birds near the airport started the dawn chorus on average 3.83 min earlier compared to birds in the control forest (table 1). However, unlike in the previous study, the onset of the dawn chorus did not vary with ambient noise levels (table 1). The day of the recordings had also no significant effect on chorus onset times (table 1).

While the global model points to a persisting effect of the airport site on the onset of the dawn chorus after the airport was closed (table 1), our species-specific analyses show that the birds' reactions to the closure of the airport differed between species. The bird species that we considered in our analyses fall into three categories: the species that started the dawn chorus significantly earlier at the airport site when the airport was operating (seven species, figure 1*a*), the species that did not sing significantly earlier at the airport when it was operating (three species; figure 1*b*), and the species that were not analysed in the previous study because they occurred at less than ten locations per site but have now passed this threshold after the closure of the airport (five species; figure 1*c*).

Of the seven species in the first category that commenced the dawn chorus earlier at the airport site while it was operating (figure 1*a*), five shifted the chorus onset to later times after the airport was closed down, namely robins, great tits, blue tits, chaffinches and great spotted woodpeckers. The effect sizes in the two tit species were larger (greater than 2 min) than in the other three species (less than 2 min, credible intervals centred on zero) and they fell in-between zero and the values measured while the airport was operating. Blackbirds and nuthatches still sang considerably earlier at the airport site compared to the control site (effect size greater than 5 min, credible interval not overlapping with 0), just as they did when the airport was in operation (figure 1*a*, table 2*a*).

The species in the second category (those that did not sing significantly earlier in the presence of noise) shifted their dawn song onsets in different directions after the noise removal (figure 1*b*): song thrushes and woodpigeons started singing considerably earlier at the airport (on average 4.6 and 21.1 min, respectively; table 2*b*), whereas wrens started singing later at the airport compared to the control area (on average 7.7 min).

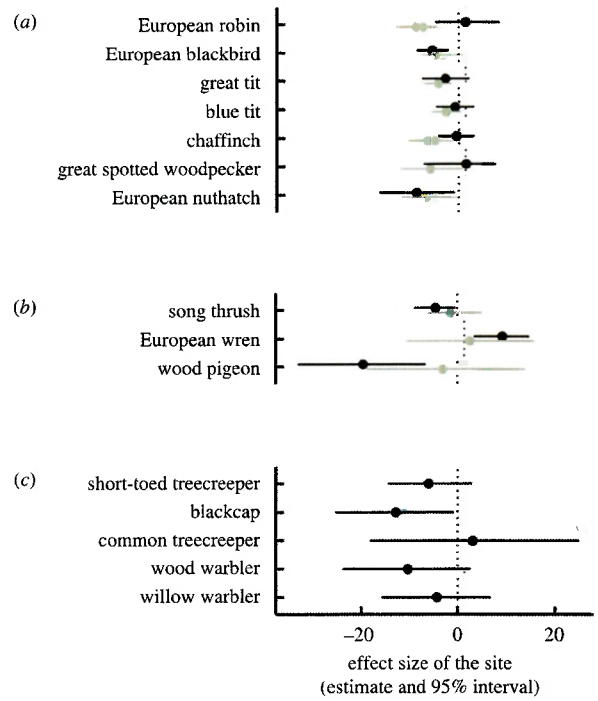


**Figure 1.** Effect sizes (average and 95% credible interval) of the difference in the onset of dawn song between the airport site and the control site. The dotted line indicates no effect of the site, i.e. birds start singing at the same time in both forests. Negative values indicate earlier song onsets at the airport than in the control forest and positive values indicate later song onsets at the airport than in the control forest. Grey: airport operating (spring 2013 and 2014); black: airport closed (spring 2021). Species are organized in three categories based on their behaviour when the airport was operating [35]: (*a*) bird species that sang significantly earlier at the airport, (*b*) bird species that did not sing significantly earlier at the airport and (*c*) bird species that were not investigated when the airport was operating.

Finally, in the third category (figure 1*c*), four of the five species that were not included in the previous study [35] tended to sing earlier at the airport compared to the control site although the noise pollution had been removed for almost six months (mean effect size between 4 and 12 min; table 2*c*). It is important to note that the sample sizes in this group of species was smaller than in the other two categories (electronic supplementary material, table S1) and probably because of this the variation in the data resulted in wide credible intervals (that overlapped zero in the short-toed treecreeper, the wood warbler and the willow warbler), calling for a careful interpretation of the results.

## 4. Discussion

Evidence for the impact of anthropogenic noise on animals is growing [6,28,51] but only few studies have examined potential long-term effects. Birds advance the onset of their diel singing activity in areas that are heavily noise polluted during the day [40–42], and we hypothesized that this is

**Table 2.** Estimates, credible intervals and s.e. of the species-specific linear mixed models explaining the dawn chorus onset time as a function of the site. The intercept represents the average onset time on 2 May at the control site. The 'site' variable shows the effect of the airport relative to the control. Species are organized in three categories based on their behaviour when the airport was operating [35]: (*a*) bird species that sang significantly earlier at the airport, (*b*) bird species that did not sing significantly earlier at the airport and (*c*) bird species that were not investigated when the airport was operating. Statistically significant variables are shown in italics.

| species | | estimate (95% CRI) | s.e. | *t*-value |
|---|---|---|---|---|
| (*a*) species that sang earlier at the airport while it was operating | | | | |
| European robin | (intercept) | −28.26 (−35.01; −21.87) | 3.71 | −7.59 |
| | site | 1.37 (−4.8; 8.3) | 3.82 | 0.4 |
| | *date 3 May* | *16.97 (9.56; 24.46)* | *4.5* | *3.71* |
| | date 4 May | 12.37 (4.24; 20.61) | 4.8 | 2.57 |
| European blackbird | (Intercept) | −0.47 (−3.9; 2.78) | 2 | −0.19 |
| | *site* | *−5.44 (−8.68; −2.1)* | *1.97* | *−2.77* |
| | date 3 May | 0.69 (−3.21; 4.59) | 2.36 | 0.25 |
| | date 4 May | 0.47 (−3.73; 4.85) | 2.45 | 0.12 |
| great tit | (intercept) | 11.24 (6.48; 16.05) | 2.89 | 3.94 |
| | site | −4.17 (−9.05; 0.78) | 2.93 | −1.43 |
| | date 3 May | −1.52 (−7.13; 4.24) | 3.47 | −0.49 |
| | date 4 May | 1.89 (−4.25; 7.9) | 3.68 | 0.43 |
| blue tit | (intercept) | 17.7 (13.99; 21.44) | 2.27 | 7.76 |
| | site | −2.18 (−6.16; 1.75) | 2.34 | −0.87 |
| | date 3 May | 2.29 (−2.23; 7.18) | 2.8 | 0.81 |
| | date 4 May | −3.09 (−8.08; 2) | 2.87 | −1.07 |
| chaffinch | (intercept) | 21.61 (17.89; 25.22) | 2.08 | 10.4 |
| | site | −0.43 (−4.17; 3.12) | 2.13 | −0.21 |
| | *date 3 May* | *−4.47 (−8.73; −0.41)* | *2.53* | *−1.78* |
| | date 4 May | −0.29 (−4.74; 3.95) | 2.64 | −0.15 |
| great spotted woodpecker | (intercept) | 38.67 (31.02; 46.59) | 4.61 | 8.37 |
| | site | 0.1 (−8.74; 7.6) | 4.75 | 0.09 |
| | date 3 May | 4.76 (−4.7; 14.07) | 5.67 | 0.82 |
| | date 4 May | 0.54 (−9.04; 9.98) | 5.81 | 0.07 |
| European nuthatch | (intercept) | 53.95 (45.65; 62.22) | 4.8 | 11.19 |
| | *site* | *−8.69 (−16.5; −0.8)* | *4.65* | *−1.87* |
| | date 3 May | 2.29 (−6.84; 12.27) | 5.65 | 0.49 |
| | date 4 May | −10.08 (−19.48; −0.62) | 5.77 | −1.75 |
| (*b*) species that did not sing earlier at the airport while it was operating | | | | |
| song thrush | (intercept) | −5.78 (−10.11; −1.24) | 2.49 | −2.37 |
| | *site* | *−4.58 (−8.96; −0.36)* | *2.54* | *−1.8* |
| | date 3 May | −4.34 (−9.41; 0.62) | 3.04 | −1.4 |
| | date 4 May | 0.48 (−4.98; 5.61) | 3.18 | 0.23 |
| European wren | (intercept) | 6.3 (0.41; 12.39) | 3.32 | 1.86 |
| | *site* | *7.72 (1.92; 13.28)* | *3.4* | *2.3* |
| | date 3 May | −5.88 (−12.95; 1.22) | 4.15 | −1.41 |
| | date 4 May | −0.67 (−7.55; 6.36) | 4.05 | −0.16 |
| wood pigeon | (intercept) | 49.5 (36.46; 61.88) | 7.41 | 6.67 |
| | *site* | *−21.03 (−34.71; −7.99)* | *7.69* | *−2.71* |
| | date 3 May | 8.48 (−5.75; 22.17) | 8.71 | 0.98 |
| | *date 4 May* | *18.72 (2.15; 35.84)* | *9.96* | *1.9* |
| (*c*) new species that were not analysed while the airport was operating | | | | |
| short-toed treecreeper | (intercept) | 25.99 (17.59; 34.72) | 5.18 | 5.01 |
| | site | −6.01 (−14.42; 2.92) | 5.34 | −1.17 |
| | date 3 May | 2.16 (−8.55; 13.06) | 6.42 | 0.39 |
| | date 4 May | −4.81 (−15.87; 6.22) | 6.45 | −0.72 |
| blackcap | (intercept) | 42.37 (28.27; 56.18) | 8.19 | 5.22 |
| | *site* | *−12.88 (−25.38; −0.71)* | *7.65* | *−1.71* |
| | date 3 May | −7.05 (−21.68; 8.44) | 9.03 | −0.8 |
| | date 4 May | 1.51 (−15.73; 18.42) | 9.86 | 0.15 |
| common treecreeper | (intercept) | 41.26 (21.75; 60.92) | 11.32 | 3.64 |
| | site | 3.11 (−18.07; 24.93) | 12.05 | 0.28 |
| | date 3 May | −8.53 (−34.61; 18.45) | 15.79 | −0.57 |
| | date 4 May | −0.3 (−22.34; 24.06) | 13.56 | 0 |
| wood warbler | (intercept) | 72.49 (59.67; 85.52) | 7.71 | 9.36 |
| | site | −10.38 (−23.79; 2.65) | 7.88 | −1.28 |
| | *date 3 May* | *−17.47 (−34.67; −0.45)* | *9.87* | *−1.79* |
| | date 4 May | −4.81 (−21.56; 12.26) | 9.51 | −0.47 |
| willow warbler | (intercept) | 69.22 (59.18 79) | 5.95 | 11.66 |
| | site | −4.34 (−15.71; 6.83) | 6.36 | −0.72 |
| | date 3 May | −8.47 (−21.58; 3.18) | 7.25 | −1.18 |
| | date 4 May | 1.69 (−11.8; 16.18) | 8.35 | 0.18 |

either the result of behavioural plasticity or the outcome of selection for earlier chronotypes [35]. Here, we used the opportunity of the closure of an international airport to test these hypotheses. We found that most species at the airport shifted their song onsets back after the closure and had now similar dawn song schedules as their conspecifics in a control forest. However, some species still started singing earlier in the vicinity of the airport and a general trend of earlier dawn song onsets at the airport could still be detected across the entire bird community (table 1).

Thus, we found support for both the selection (H1) and the behavioural-plasticity hypothesis (H2). In line with H1, blackbirds, nuthatches, song thrushes, wood pigeons and blackcaps still sang earlier at the airport after the closure (figure 1). There is ample evidence that environmental selection through noise may shape acoustic signals, resulting in population-wide changes in signal characteristics in many taxa (reviewed in [52–54]). For instance, grasshoppers from noisy road-side habitats produce mating songs with elevated frequencies that are less masked by the vehicle noise and this increased song frequency persist when the insects are transferred to a silent room [55]. Moreover, there is a cross-generational effect of the noise, as the offspring from road-side grasshoppers also produce higher-pitched songs, even when they are reared with no noise exposure [16]. Our study suggests that not only the signal itself but also when it is produced can be subjected to more permanent shifts in chronically noisy environments. Such a long-term shift may be based on selection for certain chronotypes [35]. Several studies have shown that the timing of song onset and other behaviours can be under sexual selection [56–58]. Likewise, the timing of dawn song could be under environmental selection, with the massive noise pollution from aircraft leading to the selection of males with earlier song onsets. Such a scenario would explain the patterns we observed in the species that still sang earlier at the airport although noise pollution had stopped (e.g. song thrush, blackbird and nuthatch; figure 1). If the observed persistence of the advanced song timing indeed reflects selection for earlier chronotypes, then we would expect that these species will return only slowly to later song onsets at the silent airport site, probably over the course of several generations.

By contrast, robins, great tits, blue tits and chaffinches had shifted back their song onsets at the airport (figure 1), suggesting noise-dependant plasticity of dawn song timing in these species. Likewise, great spotted woodpeckers started drumming later in the morning at the airport after it had been closed, resulting in similar daily routines as their conspecifics in the control forest. Thus, the onset of drumming in woodpeckers appears to be as plastic as the dawn song in some songbird species and, just as well, modulated by the level of noise masking later in the day. Noise-dependant song plasticity is well documented in birds (reviewed in [30]). Presumably all extant birds exhibit the Lombard effect (i.e. they increase their vocal amplitude when background noise levels rise) [33]. In addition, some species may also adjust song pitch [59] or song rate [60] in response to anthropogenic noise. Spotless starlings (*Sturnus unicolor*) and house sparrows (*Passer domesticus*) shifted their dawn chorus onset on a daily basis when they were experimentally exposed to traffic noise [61], which is in line with the behavioural-plasticity hypothesis. Similarly, most species in our study shifted the onset of their dawn chorus to later schedules after the noise pollution from the airport ceased, corroborating the notion of noise-related song plasticity. Sierro *et al.* [42] suggested that the advanced blackbird dawn chorus at airports is also a plastic adjustment, as the observed birds shifted song onsets only early in the season, when the dawn chorus overlapped with aircraft noise at their study site in Spain. However, the two studies conducted at Tegel airport indicate that the dawn chorus in blackbirds was affected by long-term effects of noise pollution. Blackbirds near the operating airport began the dawn chorus significantly earlier even though the song onset did not overlap with aircraft noise (which set in about 70 min later) [35], and they still sang earlier six months after the closure of the airport (present study). Taken together, these findings support the selection hypothesis rather than the behavioural-plasticity hypothesis for this species. Conflicting results from different locations may be accounted for by latitudinal differences in the onset of the dawn chorus and, related to this, in the resulting response to noise pollution, as suggested by Gil *et al.* [40]. Indeed, no consistent dawn chorus shift could be found in bird communities around tropical airports [50]. These differences between tropical and temperate birds suggest that biogeography can have substantial effects on how animals respond to anthropogenic change [41].

Although the exact mechanism underlying the observed behavioural plasticity in our study is not known, the results indicate that some bird species are able to anticipate the onset of noise masking later in the day and to flexibly adjust their song onset accordingly. In a classic experiment, Gwinner [62] demonstrated that social sound cues can function as zeitgeber for circadian rhythms in songbirds, in particular, he found that Eurasian siskins (*Spinus spinus*) and European serins (*Serinus serinus*) synchronize their daily activity patterns to the periodic broadcast of conspecific song. Our findings suggest that other periodic sound cues, such as anthropogenic noise, can have similar effects on the chronobiology of at least some bird species.

In addition to noise-induced microevolutionary shifts and song plasticity, the onset of dawn song may also be affected indirectly by the massive noise pollution, such as through changes in the predatory landscape. It is known that Passerines sing more and earlier when the perceived predation pressure is low [63]. Moreover, anthropogenic noise can disrupt both the distribution [23] and the hunting success [64] of predators. Therefore, heavy noise pollution might lead to reduced predation pressure on birds and, in turn, result in advanced song onset. On the other hand, anthropogenic noise can also mask the alarm calls of songbirds [10] which then increases predation risk. Without empirical data, however, it is impossible to tell what the outcome of these opposing factors is, and it remains to be shown whether the potential noise-induced changes in predation indeed affect the onset of the dawn chorus.

While there is increasing interest in the impacts of anthropogenic noise on wildlife [65], potential long-term effects have been neglected. One notable exception comes from the work by Clinton Francis and colleagues on the ecological impacts of noise from gas well compressors in New Mexico. These compressors emit continuous noise at high amplitudes, which has strong effects on the behaviour of birds and mammals, leading to large-scale modifications in plant communities through altered seed dispersal and pollination [27]. In some areas, the compressors had been switched off (after running for a decade or so) but the plant community did not recover within the first four years after the noise removal [66]. This long-term disruption is the outcome of cascading ecological effects, in which the negative impact of noise pollution may persist for longer periods than in our study that addressed behavioural responses of individual animals. However, our results indicate that noise pollution can also have long-lasting effects on individual behaviours in some species.

After Tegel airport was shut down, the noise levels in the adjacent forest dropped massively as expected. It must be noted, though, that even after the closure the ambient noise was slightly higher at the airport site than the control forest. However, the average ambient noise level at the airport locations was 46 dB(A) SPL, which is within the range of natural noise levels in a temperate forest [30,67]. Moreover, the mean difference in noise levels between the airport and the control site was lower than 4 dB, which is unlikely to affect the song timing. In previous studies, shifts in the dawn chorus were related to much larger noise differences, namely 8–30 dB [61], 20–25 dB [40] and 30 dB [35]. Indeed, our global model indicated no effect of the noise level on the onset of dawn chorus. Therefore, we are confident that the observed advances in dawn singing near the airport in our study were due to carry-over effects of the noise pollution from previous years rather than the current differences in ambient noise levels.

In conclusion, our study suggests that intense anthropogenic noise pollution can have long-term consequences for animal behaviour, even after noise emissions have ceased. Specifically, we still observed advanced dawn singing six months after an international airport stopped operating, which means that birds did not shift their behavioural routines back to normal times after the massive noise pollution from aircraft was removed. On the other hand, some species quickly shifted their song onset back to the typical schedule of undisturbed conditions, illustrating the complexity of noise pollution impacts on wildlife. Our study indicates that both phenotypic plasticity and population-wide long-term changes may lead to a noise-induced advance of dawn chorus onsets in different species. A better understanding of the long-term consequences of pollution on organisms and ecosystems is of major importance for conservation so that mitigation and avoidance measures can be implemented to minimize not only immediate but also long-term impacts.

Data accessibility. The data used in this study are available from the Open Research Data Repository of the Max Planck Society (https://doi.org/10.17617/3.EGLBLP) [68] and in the electronic supplementary material [69].

Authors' contributions. L.F.: data curation, formal analysis, investigation, methodology, writing—original draft and writing—review and editing; H.B.: conceptualization, funding acquisition, investigation, methodology, writing—original draft and writing—review and editing.

All authors gave final approval for publication and agreed to be held accountable for the work performed therein.

Conflict of interest declaration. We declare we have no competing interests.

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CONTENTS

# 1 INTRODUCTION

This report is a detailed account of an investigation into Public Safety Zones (PSZs) at Ireland's three principal airports; Cork, Dublin and Shannon.

The investigation was performed by ERM Environmental Resources Management Ireland Ltd on behalf of the Department of Transport (DT) and the Department of Environment, Heritage and Local Government (DoEHLG) between December 2000 and June 2003 (1) (2).

A technical report was issued for public comment on 23rd June 2003, and three 'public information' days were held in July 2003 at Cork, Dublin and Shannon airports.

Over 130 people attended the information days, and a total of 42 written submissions were received up until 28th August 2003.

In response to the public comments this revised technical report was issued on 30th September 2003.

## 1.1 STRUCTURE OF THIS REPORT

This report is set out as follows:

- this section, *Section 1*, provides a synopsis of the project team who performed the work and undertook the public consultation, and it also provides background to Public Safety Zones (PSZs);
- *Section 2* outlines the processes undertaken in defining and calculating the PSZs proposed for Cork, Dublin and Shannon airports;
- *Sections 3, 4* and *5* illustrate the calculated PSZs for Cork Airport, Dublin Airport and Shannon Airport, respectively;
- *Section 6* provides ERM's recommendations and conclusions for PSZs at Cork, Dublin and Shannon airports;
- *Annex A* provides a detailed and mathematical explanation of the calculation method;

(1) Environmental Resources Management. Contact: 22 Earlsfort Terrace, Dublin 2.

(2) Department of Transport (formerly the Department of Public Enterprise) and Department of the Environment and Local Government (2000). Terms of Reference for the preparation of Recommendations for Public Safety Zones in the Vicinity of Dublin Airport. Letter of 29th November 2000, from Martina Walsh, Secretary to the Public Safety Zones Working Group, Aviation Regulations & International Relations Branch.

- *Annex B* provides an overview of risk and land-use planning, expert opinions, and the development of criteria and policy for Cork, Dublin and Shannon airports;

- *Annexes C, D* and *E* detail the assumed aircraft movement data and provide an example risk calculation for Cork Airport, Dublin Airport and Shannon Airport, respectively;

- *Annex F* details ERM's response to the public comments received following issue of the technical report on 23rd June 2003 and the information days held in July 2003 at Cork, Dublin and Shannon airports.

## 1.2 PROJECT TEAM

***Davies, Paul.*** Dr Paul Davies is a Partner of ERM. He has an honours degree in Mechanical Engineering, a doctorate in Quantitative Risk Assessment, and over 15 years experience in the field. This experience has covered fire, explosion, toxic, and crash hazards in process operations, storage facilities, road, rail, air and pipeline transport, quarrying, offshore platforms, ports and power generation.

With regards to airports and aircraft, Paul has been the project director, manager and/or principal analyst for numerous studies. These include: the investigation of risks to persons 'on-the-ground' from potential aircraft crashes at Manchester Airport (this work was presented as evidence for Queens Council at the Public Inquiry into the Proposed Second Runway at Manchester Airport); a peer review of the assessment of risk to major hazard installations due to runway re-alignment at Liverpool Airport; the assessment of risks presented to aircraft from the blasting of rock during the development of Hong Kong's Chek Lap Kok Airport; methodology development for the investigation of third party risk (land-use planning issues) for the proposed location of a second Sydney Airport; and an assessment of the risks to persons 'on-the-ground' in the vicinity of Farnborough Aerodrome.

***O'Riordáin, Seán.*** Sean is the Managing Director of ERM's Dublin office. He joined ERM from the Institute of Public Administration, Dublin (IPA) in 2000. He continues to contribute to the planning and regional development elements of the IPAs MA Local Government programme. He is also a visiting lecturer in Planning at the University of Dublin, Trinity College.

Sean has widespread experience in liaising with public agencies, including the EU, and has been involved with research into public management issues in Ireland and the European Union generally. This includes undertaking evaluation and assessment of regional policy initiatives in Ireland and elsewhere in the European Union and Central and Eastern Europe. Since joining ERM he has been involved in work addressing the National Spatial Strategy and local and regional planning.

*Quinn, Daniel.* Daniel is a Senior Consultant with ERM. His principal areas of work include hazard identification, scenario quantification, risk evaluation and mathematical modelling of fire, gas and crash impacts. Projects include the risk assessment of gas compression stations, power stations, underground gas storage facilities, sulphur trioxide/oleum transport, petroleum transport, management factors in the prevention and cause of accidents associated with the transport of hazardous materials by road, rail and inland waterway; and risks profiling of flammable gas storage and delivery systems.

With regards to airports and aircraft, Daniel was the principal analyst for the assessment of risks to persons 'on-the-ground' from potential aircraft crashes in the vicinity of Farnborough Aerodrome.

***Williams, Kirsten.*** Kirsten is a Social Scientist/Social Planner with considerable experience in environmental impact assessment, social impact assessment and strategic planning components of large multi-disciplinary infrastructure projects. Ms Williams also designs, manages and conducts consultation and evaluation processes, is experienced in strategy and policy development, and is a highly experienced Project Manager.

Projects undertaken have covered a wide range of industries including transportation (roads, rail, ports and airports), construction, mining, housing, education, tourism, recreation, public utilities, water resources, forestry, agriculture, pipelines, and foreign aid. In addition to her extensive European and Australian experience, Ms Williams has been responsible for undertaking social and environmental resource assignments in China and Indonesia for a major international donor agency, and more recently for BP in Turkey. Areas of focus have included environmental and social impact assessment, poverty alleviation, community and stakeholder consultation, natural resource management, infrastructure development and institutional strengthening. More recently, Kirsten has been involved in the development Ireland's National Spatial Strategy, revision of Irelands Nuclear Emergency Plan, and a Strategic review of Ireland's rail network.

## 1.3 *BACKGROUND*

The risks to persons 'on the ground' from aircraft crashes have been appreciated for some time. As such, Ireland, as do many other countries, operates 'protection zones' at the end of runways where the risk is greatest.

In Ireland, these zones are currently referred to as 'red zones' and serve to aid safe navigation of aircraft and to protect the public on the ground (1). This is done by limiting the type and allowable height of buildings and structures within the zones.

(1) In Ireland, a number of terms have been used when referring to the 'red zones', for example safety zones, and even public safety zones. The reason for this, most probably, relates to the (existing) dual purpose of the 'red zones' (i.e. to aid safe navigation of aircraft, by providing an obstacle clearance surface, and to protect persons on the ground by controlling land-use (within the zones)). In this report, the existing zones are referred to as 'red zones' and those zones proposed to protect people 'on the ground' as public safety zones or PSZs.

Advances in modelling techniques have made it possible to quantify the risks to the public (on the ground) from aircraft crashes. These techniques have shown that the risk pattern 'on the ground' bears little relation to the extent and shape of the red zones. Therefore, a set of protection zones, termed Public Safety Zones (PSZs), have been recommended for Cork, Dublin and Shannon airports. If adopted, these PSZs will help protect the public, whilst the red zones will continue to aid safe navigation of aircraft.

Two 'individual risk values' have been assessed in determining appropriate PSZs at Cork, Dublin and Shannon airports. They are 1 in 100,000 per year and 1 in one million per year [1]. An inner and an outer PSZ, corresponding to these risk values, have been set for each runway.

These 'individual risk values' were selected because they are established in the setting of protection zones at airports, for example in the Netherlands and the UK (as discussed in *Section 1.3.1*); and because they are comparable with those used in setting protection zones around chemical installations in Ireland and internationally. Further details are provided in *Annex B*.

Furthermore, in calculating and setting the PSZs for Cork, Dublin and Shannon airports it was recognised that they may impact upon existing and proposed land-use in the vicinity of the airports. As such, the study scope was broadened to investigate the potential land-use implications of the proposed PSZs. It was found that there would be no changes to existing land-use around Cork, Dublin and Shannon airports, and only minor alterations to proposed development plans (i.e. either a reduction in housing density or a variation to a proposed location). Further details are provided in *Annex B*.

In summary, this study has led ERM to propose a two-zone PSZ system for Cork, Dublin and Shannon airports, i.e. an inner and an outer PSZ. The calculation and setting of these zones, and the proposed criteria/policy to apply in operating these zones are outlined in the following sections.

### 1.3.1 *The Experience of Setting PSZs in the Netherlands and the United Kingdom*

Studies performed in the Netherlands and the UK have drawn similar conclusions to the investigation of PSZs in Ireland. This has resulted in the setting of new/revised PSZs at the end of runways at Schiphol Airport and at all major UK airports [2] [3].

The extent of the Dutch and UK PSZs has been based on the individual risk of fatality. The Dutch government has adopted both an inner and outer PSZ set at an individual risk of 1 in 100,000 per year and 1 in one million per year,

(1) Individual risk of 1 in 100,000 per year; i.e. $10^{-5}$ or a 0.00001 chance of death per year for an individual exposed 24 hours per day, 365 days per year. Individual risk of 1 in one million per year; i.e. $10^{-6}$ or a 0.000001 chance of death per year for an individual exposed 24 hours per day, 365 days per year.

(2) Ale, B.J.M. and Piers, M. (2000). The Assessment and Management of Third Party Risk Around a Major Airport. Journal of Hazardous Materials, 71, 1-3, pp 1-16.

(3) UK Department of the Environment, Transport and the Regions (DETR). (1997). Third Party Risk Near Airports and Public Safety Zone Policy. R&D Report 9636. National Air Traffic Services, London.

respectively [1]. By comparison, the UK government has adopted only a single PSZ set at 1 in 100,000 per year.

Within the PSZs that are set at an individual risk of 1 in 100,000 per year, both the Dutch and UK governments prevent any further building. In addition, the Dutch government plan to remove all existing housing within this zone. This compares with the UK government's decision to allow all existing developments to remain within this zone.

In addition, within the Dutch government's outer PSZ (i.e. set at a risk of 1 in one million per year), no future development of housing, hospitals and/or schools is permitted. However, all existing development is permitted to remain. This compares with the UK's approach of allowing unrestricted development outside the 1 in 100,000 PSZ (in respect of the risk from aircraft).

*Annex B* provides further details on the zones, criteria and policy adopted in the Netherlands and the UK.

(1) Individual risk of 1 in 100,000 per year; i.e. $10^{-5}$ or a 0.00001 chance of death per year for an individual exposed 24 hours per day, 365 days per year. Individual risk of 1 in one million per year; i.e. $10^{-6}$ or a 0.000001 chance of death per year for an individual exposed 24 hours per day, 365 days per year.

# 2 DEFINING AND CALCULATING PUBLIC SAFETY ZONES

## 2.1 IDENTIFYING AN APPROPRIATE METHODOLOGY

In determining the most appropriate method to use in calculating Public Safety Zones (PSZs) for Cork, Dublin and Shannon airports, a review was undertaken of the methodologies used by the Dutch and UK governments in setting PSZs at their airports [1] [2].

Both governments' methods have been translated into computer models, with the results used to develop policy and set the size, shape and extent of PSZs in these countries [3] [4]. The approaches used have drawn upon the work of others during this period, and an overview of some of these methods is given in the UK government's report on third party risk around airports and in a recent paper on the approach adopted in the Netherlands [5] [6].

The principal difference between the two approaches is the adoption of different crash location models. In the Netherlands, the probability of crash location is related to individual flight paths (known as a curve-linear approach). By comparison, the UK method relates potential crash location to a runway's extended centreline.

Intuitively, a potential crash location is related to an aircraft's flight path, and so the Dutch approach appears to offer improved modelling accuracy. However, in many accident reports no details of an aircraft's intended route are given and hence, compared with the UK approach, fewer accidents are available to form the basis of the Dutch model. Considering the already 'small' set of accidents upon which the UK model is based, it can be argued that the Dutch approach has less statistical basis.

Further support for the UK approach is given by the fact that landing aircraft (half of all movements) tend to align with the extended runway centreline at considerable distances from the runway (e.g. 10 km or more) and that the crash rate for landings is approximately 2½ times that of departures. Hence, landing crashes (which are likely to be distributed about the extended runway centreline) have a greater influence on the overall distribution of crash locations.

With regards to accident consequences, both approaches use the extent of potential crash area to estimate fatal injuries, and relate this area to Maximum

(1) Ale, B.J.M. and Piers, M. (2000). The Assessment and Management of Third Party Risk Around a Major Airport. Journal of Hazardous Materials, 71, 1-3, pp 1-16.

(2) Cowell, P.G., et al. (2000). A Methodology for Calculating Individual Risk Due to Aircraft Accidents Near Airports. R&D Report 0007. National Air Traffic Services, London.

(3) Ministerie van Verkeer en Waterstaat, Den Haag. (19-Dec-99). The Future of the National Airport [Schiphol].

(4) UK Department for Transport. (10-Jul-02). Control of Development in Airport Public Safety Zones. Circular 1/2002.

(5) UK Department of the Environment, Transport and the Regions (DETR). (1997). Third Party Risk Near Airports and Public Safety Zone Policy. R&D Report 9636. National Air Traffic Services, London.

(6) Refer to footnote 1, page 6.

Aircraft Weights (MAW) [1]. Similarly, crash rates are based on established accident databases, and modified to reflect so called 'first-world' operations (i.e. eliminating accidents specific to countries where aircraft types and aircraft/airport operations are not comparable to Western Europe and the United States).

With the above in-mind, the model used to calculate PSZs for Cork, Dublin and Shannon airports is based upon the method employed on behalf of the UK government. The method is detailed in *Annex A*.

## 2.2 *IDENTIFYING APPROPRIATE GUIDANCE (RISK CRITERIA AND POLICY)*

As stated in *Section 1.3* a two-zone Public Safety Zone (PSZ) system is proposed for Cork, Dublin and Shannon airports; an inner PSZ representing an individual risk of 1 in 100,000 per year, and an outer PSZ representing 1 in one million per year [2].

Within the PSZs the following land-use policy is proposed:

- prevent further development within inner PSZs, but allow existing developments to remain; and
- allow existing developments to remain within outer PSZs, but prevent high density housing development, and the building of schools, hospitals and facilities attracting large numbers of people (for further detail refer to *Section 6*).

These 'individual risk values' (i.e. criteria) and the associated policy on land-use within the PSZs are based upon:

- a review of the established risk criteria used to protect the public from industrial hazards both in Ireland and internationally;
- a comparison of these 'industrial' criteria with those recently implemented at airports in the Netherlands and the UK; and
- a consideration of expert opinions.

The review, comparison and expert opinions are detailed in *Annex B*.

(1) The Dutch and UK approaches refer to Maximum Take-off Weight (MTOW) and Maximum Take-off Weight Authorised (MTWA), respectively. These terms are synonymous with the term used here, Maximum Aircraft Weight (i.e. the maximum weight allowed, to include full load and fuel).

(2) Individual risk of 1 in 100,000 per year; i.e. $10^{-5}$ or a 0.00001 chance of death per year for an individual exposed 24 hours per day, 365 days per year. Individual risk of 1 in one million per year; i.e. $10^{-6}$ or a 0.000001 chance of death per year for an individual exposed 24 hours per day, 365 days per year.

## 2.3 *CALCULATING RISKS*

The calculation of risks upon which to determine Public Safety Zones (PSZs) in Ireland involved the following stages:

1. identifying the number of annual movements (i.e. landings and take-offs) with respects to aircraft types/classes [1];

2. calculating an 'all classes' movement-weighted average crash rate (crashes per million movements). This is done by using crash rates for each aircraft class (crashes per million movements) and multiplying it by the proportion of movements for that class, and summing the individual products;

3. calculating average crash areas (within which persons 'on the ground' are assumed to be fatally injured) for 'large' aircraft and 'light' aircraft. These are calculated by determining the average Maximum Aircraft Weight (MAW) for each class, multiplying the average crash area by the proportion of annual crashes for that class, and summing the individual products;

4. calculating the probability that crashing aircraft impact a specified location. For 'large' aircraft, this is performed by integrating probability density functions over the calculated average crash area. A similar calculation is performed for 'light' aircraft;

5. calculating the annual frequency that crashing aircraft impact a specified location (i.e. the individual risk). This is performed by multiplying the annual probability of a crash for the specified location by the appropriate average crash rate and associated number of movements (landings and take-offs) for each runway end;

6. using the individual risk results to determine 'best fit' zones representing specified annual individual risks (e.g. 1 in 100,000 per year and 1 in one million per year for the proposed inner and outer PSZs). The shape of each contour (extending away from the runway end) is very similar to that of a triangle. Therefore, to provide a simple geometric area that can be readily defined and easily reproduced on maps and plans, the risk contours are represented by zones alongside and parallel to the runway and triangular zones extending away from the runway ends.

The principal purpose of the outer PSZ is to minimise the possibility of a multiple fatality accident. For example, to limit the possibility of an aircraft crashing into a school, hospital or other development where large numbers of people can be expected. In relation to the 'size', 'speed' and weight of aircraft,

(1) The extent of PSZs is related to the number of aircraft movements and aircraft types. To minimise the need to periodically revise zone extents the Steering Group agreed that the number of aircraft movements for each runway should be set as either (a) the runway's movement capacity, or (b) the expected maximum number of movements. Similarly, aircraft types have been categorised as either 'large' or 'light', and the proportion of both set to provide a good representation of the expected split.

it is judged that 'light' aircraft have a far lower likelihood of causing a multiple fatality accident than 'large' aircraft [1]. Therefore, the extent of the outer PSZs is based upon large aircraft crashes only.

A detailed explanation of the calculation procedure and input data is given in *Annex A, Annex C* (Cork Airport), *Annex D* (Dublin Airport) and *Annex E* (Shannon Airport).

(1) Light aircraft <4 tonnes MTWA, compared with a movement weighted average MTWA of 33 tonnes, 95 tonnes and 54 tonnes for Cork, Dublin and Shannon Airports, respectively. Maximum Take-off Weight Authorised (MTWA).

# 3 PUBLIC SAFETY ZONES: CORK AIRPORT

The dimensions of the Public Safety Zones (PSZs) proposed for the two runways at Cork Airport are described below and illustrated in *Figures 3.1* to *3.5*. The inner and outer PSZs relate to an individual risk of fatality of 1 in 100,000 per year and 1 in one million per year, respectively. Where calculated, the individual risk of fatality of 1 in 10,000 per year is also shown.

## 3.1 MAIN RUNWAY 17/35

### 3.1.1 *Towards the North – End 17*

*Inner PSZ*
An area with a maximum extent from the end of the runway, along the extended runway centreline, of 3065 m, and a maximum width at the end of the runway of 260 m.

*Outer PSZ*
An area with a maximum extent from the end of the runway, along the extended runway centreline, of 11290 m, and a maximum width at the end of the runway of 962 m.

### 3.1.2 *Towards the South – End 35*

*Inner PSZ*
An area with a maximum extent from the end of the runway, along the extended runway centreline, of 3055 m, and a maximum width at the end of the runway of 278 m.

*Outer PSZ*
An area with a maximum extent from the end of the runway, along the extended runway centreline, of 11015 m, and a maximum width at the end of the runway of 1056 m.

## 3.2 CROSS-RUNWAY 7/25

### 3.2.1 *Towards the West – End 7*

*Inner PSZ*
An area with a maximum extent from the end of the runway, along the extended runway centreline, of 625 m, and a maximum width at the end of the runway of 96 m.

*Outer PSZ*
An area with a maximum extent from the end of the runway, along the extended runway centreline, of 2615 m, and a maximum width at the end of the runway of 224 m.

### 3.2.2 *Towards the East – End 25*

*Inner PSZ*
An area with a maximum extent from the end of the runway, along the extended runway centreline, of 625 m, and a maximum width at the end of the runway of 96 m.

*Outer PSZ*
An area with a maximum extent from the end of the runway, along the extended runway centreline, of 2300 m, and a maximum width at the end of the runway of 170 m.

*Figure 3.1* *Cork Airport – Proposed Public Safety Zones*

*Figure 3.2* ***Cork Airport – Proposed Public Safety Zones, Main Runway 17/35 (North End 17)***

*Figure 3.3* ***Cork Airport – Proposed Public Safety Zones, Main Runway 17/35 (South End 35)***

*Figure 3.4* *Cork Airport – Proposed Public Safety Zones, Cross Runway 7/25 (West End 7)*

*Figure 3.5* ***Cork Airport – Proposed Public Safety Zones, Cross Runway 7/25 (East End 25)***

# 4 PUBLIC SAFETY ZONES: DUBLIN AIRPORT

The dimensions of the Public Safety Zones (PSZs) proposed for the three existing runways and the additional proposed runway at Dublin Airport are described below and illustrated in *Figures 4.1* to *4.11*. The inner and outer PSZs relate to an individual risk of fatality of 1 in 100,000 per year and 1 in one million per year, respectively. Where calculated, the individual risk of fatality of 1 in 10,000 per year is also shown.

## 4.1 MAIN (EXISTING) RUNWAY 10R/28L

### 4.1.1 *Towards the West – End 10R*

*Inner PSZ*
An area with a maximum extent from the end of the runway, along the extended runway centreline, of 3155 m, and a maximum width at the end of the runway of 370 m.

*Outer PSZ*
An area with a maximum extent from the end of the runway, along the extended runway centreline, of 11455 m, and a maximum width at the end of the runway of 1448 m.

### 4.1.2 *Towards the East – End 28L*

*Inner PSZ*
An area with a maximum extent from the end of the runway, along the extended runway centreline, of 4375 m, and a maximum width at the end of the runway of 352 m.

*Outer PSZ*
An area with a maximum extent from the end of the runway, along the extended runway centreline, of 15430 m, and a maximum width at the end of the runway of 1394 m.

## 4.2 PROPOSED RUNWAY 10L/28R

### 4.2.1 *Towards the West – End 10L*

*Inner PSZ*
An area with a maximum extent from the end of the runway, along the extended runway centreline, of 3050 m, and a maximum width at the end of the runway of 378 m.

*Outer PSZ*
An area with a maximum extent from the end of the runway, along the extended runway centreline, of 11330 m, and a maximum width at the end of the runway of 1462 m.

### 4.2.2 *Towards the East - End 28R*

*Inner PSZ*
An area with a maximum extent from the end of the runway, along the extended runway centreline, of 3970 m, and a maximum width at the end of the runway of 344 m.

*Outer PSZ*
An area with a maximum extent from the end of the runway, along the extended runway centreline, of 15010 m, and a maximum width at the end of the runway of 1383 m.

## 4.3 *CROSS-RUNWAY 16/34*

### 4.3.1 *Towards the North-west - End 16*

*Inner PSZ*
An area with a maximum extent from the end of the runway, along the extended runway centreline, of 1240 m, and a maximum width at the end of the runway of 138 m.

*Outer PSZ*
An area with a maximum extent from the end of the runway, along the extended runway centreline, of 5645 m, and a maximum width at the end of the runway of 462 m.

### 4.3.2 *Towards the South-east - End 34*

*Inner PSZ*
An area with a maximum extent from the end of the runway, along the extended runway centreline, of 1290 m, and a maximum width at the end of the runway of 146 m.

*Outer PSZ*
An area with a maximum extent from the end of the runway, along the extended runway centreline, of 4370 m, and a maximum width at the end of the runway of 454 m.

## 4.4 RUNWAY 11/29

### 4.4.1 *Towards the West – End 11*

*Inner PSZ*
An area with a maximum extent from the end of the runway, along the extended runway centreline, of 1655 m, and a maximum width at the end of the runway of 144 m.

*Outer PSZ*
An area with a maximum extent from the end of the runway, along the extended runway centreline, of 3970 m, and a maximum width at the end of the runway of 438 m.

### 4.4.2 *Towards the East – End 29*

*Inner PSZ*
An area with a maximum extent from the end of the runway, along the extended runway centreline, of 1230 m, and a maximum width at the end of the runway of 118 m.

*Outer PSZ*
An area with a maximum extent from the end of the runway, along the extended runway centreline, of 5215 m, and a maximum width at the end of the runway of 432 m.

*Figure 4.1* *Dublin Airport - Public Safety Zones, Existing Runways*

*Figure 4.2* *Dublin Airport - Public Safety Zones, Including Proposed Runway 10L/28R*

*Figure 4.3* *Dublin Airport - Public Safety Zones, Main Existing Runway 10R/28L (West End 10R)*

*Figure 4.4* ***Dublin Airport - Public Safety Zones, Main Existing Runway 10R/28L (East End 28L)***

*Figure 4.5* ***Dublin Airport - Public Safety Zones, Proposed Runway 10L/28R (West End 10L)***

*Figure 4.6* ***Dublin Airport - Public Safety Zones, Proposed Runway 10L/28R (East End 28R)***

*Figure 4.7* ***Dublin Airport - Public Safety Zones, Cross-Runway 16/34 (North-west End 16)***

*Figure 4.8* ***Dublin Airport - Public Safety Zones, Cross-Runway 16/34 (South-east End 34)***

*Figure 4.9* *Dublin Airport - Public Safety Zones, Runway 11/29 (West End 11)*

*Figure 4.10* *Dublin Airport - Public Safety Zones, Runway 11/29 (East End 29)*

# 5 PUBLIC SAFETY ZONES: SHANNON AIRPORT

The dimensions of the Public Safety Zones (PSZs) proposed for the two runways at Shannon Airport are described below and illustrated in *Figures 5.1* to *5.5*. The inner and outer PSZs relate to an individual risk of fatality of 1 in 100,000 per year and 1 in one million per year, respectively. Where calculated, the individual risk of fatality of 1 in 10,000 per year is also shown.

## 5.1 MAIN RUNWAY 6/24

### 5.1.1 *Towards the West -End 6*

*Inner PSZ*
An area with a maximum extent from the end of the runway, along the extended runway centreline, of 2505 m, and a maximum width at the end of the runway of 307 m.

*Outer PSZ*
An area with a maximum extent from the end of the runway, along the extended runway centreline, of 9805 m, and a maximum width at the end of the runway of 1161 m.

### 5.1.2 *Towards the East - End 24*

*Inner PSZ*
An area with a maximum extent from the end of the runway, along the extended runway centreline, of 3770 m, and a maximum width at the end of the runway of 295 m.

*Outer PSZ*
An area with a maximum extent from the end of the runway, along the extended runway centreline, of 13970 m, and a maximum width at the end of the runway of 1,149 m.

## 5.2 CROSS-RUNWAY 13/31

### 5.2.1 *Towards the North-west - End 13*

*Inner PSZ*
An area with a maximum extent from the end of the runway, along the extended runway centreline, of 600 m, and a maximum width at the end of the runway of 72 m.

*Outer PSZ*
An area with a maximum extent from the end of the runway, along the extended runway centreline, of 2315 m, and a maximum width at the end of the runway of 225 m.

### 5.2.2 *Towards the South-east – End 31*

*Inner PSZ*
An area with a maximum extent from the end of the runway, along the extended runway centreline, of 665 m, and a maximum width at the end of the runway of 91 m.

*Outer PSZ*
An area with a maximum extent from the end of the runway, along the extended runway centreline, of 2285 m, and a maximum width at the end of the runway of 199 m.

*Figure 5.1* *Shannon Airport - Public Safety Zones*

*Figure 5.2* *Shannon Airport - Public Safety Zones, Main Runway 6/24 (West End 6)*

*Figure 5.3* ***Shannon Airport - Public Safety Zones, Main Runway 6/24 (East End 24)***

*Figure 5.4* ***Shannon Airport - Public Safety Zones, Cross Runway 13/31 (North-west End 13)***

*Figure 5.5* ***Shannon Airport - Public Safety Zones, Cross Runway 13/31 (South-east End 31)***

# 6 RECOMMENDATIONS AND CONCLUSIONS

## 6.1 RECOMMENDATIONS FOR PUBLIC SAFETY ZONES

ERM Environmental Resources Management Ireland Ltd, proposes the following Public Safety Zones (PSZs) for Cork, Dublin and Shannon airports:

- *Inner PSZ (extent set at an individual risk of 1 in 100,000 per year)*
  - prevent further development within inner PSZs, but allow existing developments to remain; and

- *Outer PSZ (extent set at an individual risk of 1 in one million per year)*
  - allow existing developments to remain within the outer PSZs, but prevent high density housing development, and the building of schools, hospitals and facilities attracting large numbers of people.

The permitted developments proposed for these zones are detailed in *Table 6.1* and summarised in *Table 6.2* and *Table 6.3*. Further guidance is given in *Section 6.2* and *Annex B*.

It is important to note that the guidance given in *Table 6.1* is not recommended for retrospective use. This is because the risks to existing developments (within the PSZs) are not so high as to be judged intolerable. The sole purpose of the guidance is to ensure that the risks do not become intolerable/unacceptable by controlling future land-use within the PSZs.

The size, shape and extent of the PSZs for each airport and runway are detailed in *Sections 3, 4* and *5*.

## 6.2 GUIDANCE ON PERMITTED DEVELOPMENTS WITHIN THE PROPOSED PUBLIC SAFETY ZONES (TABLE 6.1)

*Table 6.1* is for guidance, and only applicable to 'safety risks' from aircraft. It should be used in conjunction with appropriate legislative and regulatory controls and guidance, and other guidance, official development plans and objectives.

In some cases, permitted developments are restricted to a maximum density of persons. This density is expressed as the number of persons per half hectare. A half hectare was chosen as this approximates the average maximum aircraft crash area. The maximum density should be applied to any single half hectare within which the proposed development is located.

The guidance for the inner PSZ and outer PSZ applies only to those parts of a development located within the respective zone. The guidance does not apply to parts of a development outside the PSZs.

### 6.2.1 *What Types of Developments Need to be Assessed Against the Guidance?*

It is not practical to list all development types that may or may not be permitted in the PSZs. However, in general terms, a development should be assessed where people can be expected to be present for all or part of the day.

It follows that developments that need not be considered are those where persons are not normally expected to be present (e.g. normally unoccupied buildings, such as a tool store) [1].

### 6.2.2 *Exceptions to Permitted Developments in the Inner PSZ*

The only exceptions for permitted developments in the inner PSZ are:

- developments where persons are not expected to be present;
- long stay car parks (i.e. greater than 24 hours), provided that persons are normally expected to park their car and then immediately leave the car park development. Buildings associated with car parks are subjected to the guidance given in *Table 6.1*; and
- roads and railways where vehicles and passenger trains/trams are not expected to be stationary. For example, road vehicles can be expected to be stationary at major road intersections, junctions and traffic lights. Therefore, major road intersections, junctions, traffic lights and similar should not be permitted in the inner PSZ.

### 6.2.3 *Exceptions to Permitted Developments in the Outer PSZ*

In most cases, the guidance given in *Table 6.1* will be sufficient to identify whether a proposed development should be permitted in the outer PSZ. However, there may be cases, in exceptional circumstances, where it is judged that a development's socio-economic benefits (etc.) outweigh the 'safety risk', and that it is impractical for such a development to be located elsewhere. An Airport Terminal, as described below, is a good example of such a development.

*Airport Terminals*

To ensure risks to people are as low as reasonably practicable, it is desirable to locate airport terminals outside PSZs. However, this may not be practicable and there are precedents to accept a greater, but tolerable risk, where persons gain a direct benefit from the activity presenting the risk.

In the case of an airport terminal, all those working and using the terminal would be receiving a direct benefit (i.e. related to employment or travel) and

(1) For chemical sites, it is understood that the UK Health & Safety Executive has judged a building to be unoccupied where the presence of people does not amount to more than 2 hours in one day. Gakhar, S.J. (2000). Assessing Risks to Occupants of Existing Buildings on Chemical Plants due to Hazards of Fire and Explosion. Hazards XV, The Process, its Safety, and the Environment, Getting it Right, pp 433-449. Manchester, 4-6 April.

therefore an annual individual risk greater than 1 in one million (i.e. corresponding to the extent of the outer PSZ) but less than 1 in 100,000 (i.e. corresponding to the extent of the inner PSZ) is considered tolerable. Hence, location of an airport terminal in the outer PSZ is judged tolerable.

*Extensions to Existing Developments*

Extensions to existing developments are permitted. This is provided the development is of a permitted development type, and the proposed extended development (i.e. original development plus extension) does not result in the density figures listed in *Table 6.1* being exceeded (i.e. the number of persons per half hectare should not be exceeded).

For example, a proposed extension to a house which would increase the occupancy to five would be appropriate, provided no half hectare (i.e. 5,000 $m^2$ or approximately 1.24 acres) encompassing the extended development exceeded 60 persons.

*Roads and Railways*

Roads and railways are permitted in the outer PSZs, including major road and rail intersections, junctions and traffic lights.

*Bus and Rail Terminals*

Bus and rail terminals are permitted in the outer PSZs provided the density does not exceed 110 persons per half hectare.

*Car Parks*

Car parks are permitted in the outer PSZs. This is provided that persons are normally expected to park their car and then leave the car park development. Buildings associated with car parks are subjected to the guidance given in *Table 6.1.*

## *Table 6.1 Permitted Developments (applicable to new applications for development)*

| Permitted Developments | Public Safety Zone (PSZ) | |
|---|---|---|
| | **Inner PSZ** | **Outer PSZ** |
| All developments | No further development (existing developments remain) | see below (existing developments remain) |

| | **Outer PSZ** |
|---|---|
| 1. Housing | ≤ 60 persons/half hectare |
| 2. Holiday Accommodation | ≤ 100 beds per development |
| 3. Retail/Leisure Facilities | ≤ 85 persons/half hectare |
| 4. Working Premises | ≤ 110 persons/half hectare |
| 5. Institutional Accommodation | No further development |
| 6. Sports Stadia | No further development |
| 7. Limited Use | ≤ 220 persons/half hectare |

**No restrictions on development beyond Outer PSZ**

**Notes**

1. Housing – i.e. residential accommodation, persons at home.
2. Holiday Accommodation – i.e. hotels, caravan parks.
3. Retail/Leisure Facilities – i.e. shopping centres, sports halls, sports grounds, swimming pools, bowling alleys, golf clubs.
4. Working Premises – i.e. factories, offices and facilities where persons are expected to congregate, such as railway stations.
5. Institutional Accommodation – i.e. hospitals, schools, nurseries, care homes, prisons.
6. Sports Stadia – i.e. football/rugby stadia.
7. Limited Use – use not exceeding (approximately) a maximum of 12 hours in one week. i.e. Sunday markets, car boot sales, day fairs.

## *Table 6.2 Proposed Developments – Summary of Permitted Developments (applicable to new applications for development)*

| | **Inner PSZ** | | | **Outer PSZ[1]** | | |
|---|---|---|---|---|---|---|
| | **Industry[2]** | **Housing** | **Vulnerable[3]** | **Industry[2]** | **Housing** | **Vulnerable[3]** |
| Ire land | NO | NO | NO | YES | YES | NO |
| Netherlands | NO | NO | NO | YES | NO | NO |
| UK | NO | NO | NO | YES | YES | YES |

NO – development not permitted YES– development permitted

1. For the UK, the Outer PSZ refers to land beyond the single PSZ.
2. Industry – includes offices.
3. Vulnerable – hospitals, schools and sports stadia, etc.

## *Table 6.3 Existing Developments – Summary of Permitted Developments (applicable to existing development)*

| | **Inner PSZ** | | | **Outer PSZ[1]** | | |
|---|---|---|---|---|---|---|
| | **Industry[2]** | **Housing** | **Vulnerable[3]** | **Industry[2]** | **Housing** | **Vulnerable[3]** |
| Ireland | Remain | Remain | Remain | Remain | Remain | Remain |
| Netherlands | Remain | Remove | Remove | Remain | Remain | Remain |
| UK | Remain | Remain | Remain | Remain | Remain | Remain |

Remove – developments to be removed Remain– developments to remain and current use can continue

1. For the UK, the Outer PSZ refers to land beyond the single PSZ.
2. Industry – includes offices.
3. Vulnerable – hospitals, schools and sports stadia, etc.

## 6.3 *CONCLUSIONS*

It is the Consultant's view that the proposed inner and outer PSZs provide appropriate consistency with established risk criteria and zoning practice around airports, and around chemical installations in Ireland (set by the Health and Safety Authority), whilst recognising the differences between hazards presented by chemical installations and aircraft approaching and departing airports.

Acknowledging that the proposed PSZs might impact upon existing and proposed land-use, the implications of the zones calculated for Cork, Dublin and Shannon airports have been investigated. It is concluded that adoption of the PSZs would not require any changes to existing land-use around the airports, and would only require minimal changes to proposed development plans.

CONTENTS

## Maps of proposed Public Safety Zones at Dublin Airport

The following maps can be viewed below.

Fig 4.1: Dublin Airport-Proposed PSZs, Existing Runways
Fig 4.2: Dublin Airport-Proposed PSZs, Including Proposed Runway 10L/28R
Fig 4.3: Dublin Airport-Proposed PSZs, Main Existing Runway 10R/28L (West End 10R)
Fig 4.4: Dublin Airport-Proposed PSZs, Main Existing Runway 10R/28L (East End 28L)
Fig 4.5: Dublin Airport-Proposed PSZs, Proposed Runway 10L/28R (West End 10L)
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Fig 4.7: Dublin Airport-Proposed PSZs, Cross Runway 16/34 (North West End 16)
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Fig 4.9: Dublin Airport-Proposed PSZs, Runway 11/29 (West End 11)
Fig 4.10: Dublin Airport-Proposed PSZs, Runway 11/29 (East End 29)

*Figure 2 Dublin Airport - Proposed Public Safety Zones, Existing Runways*

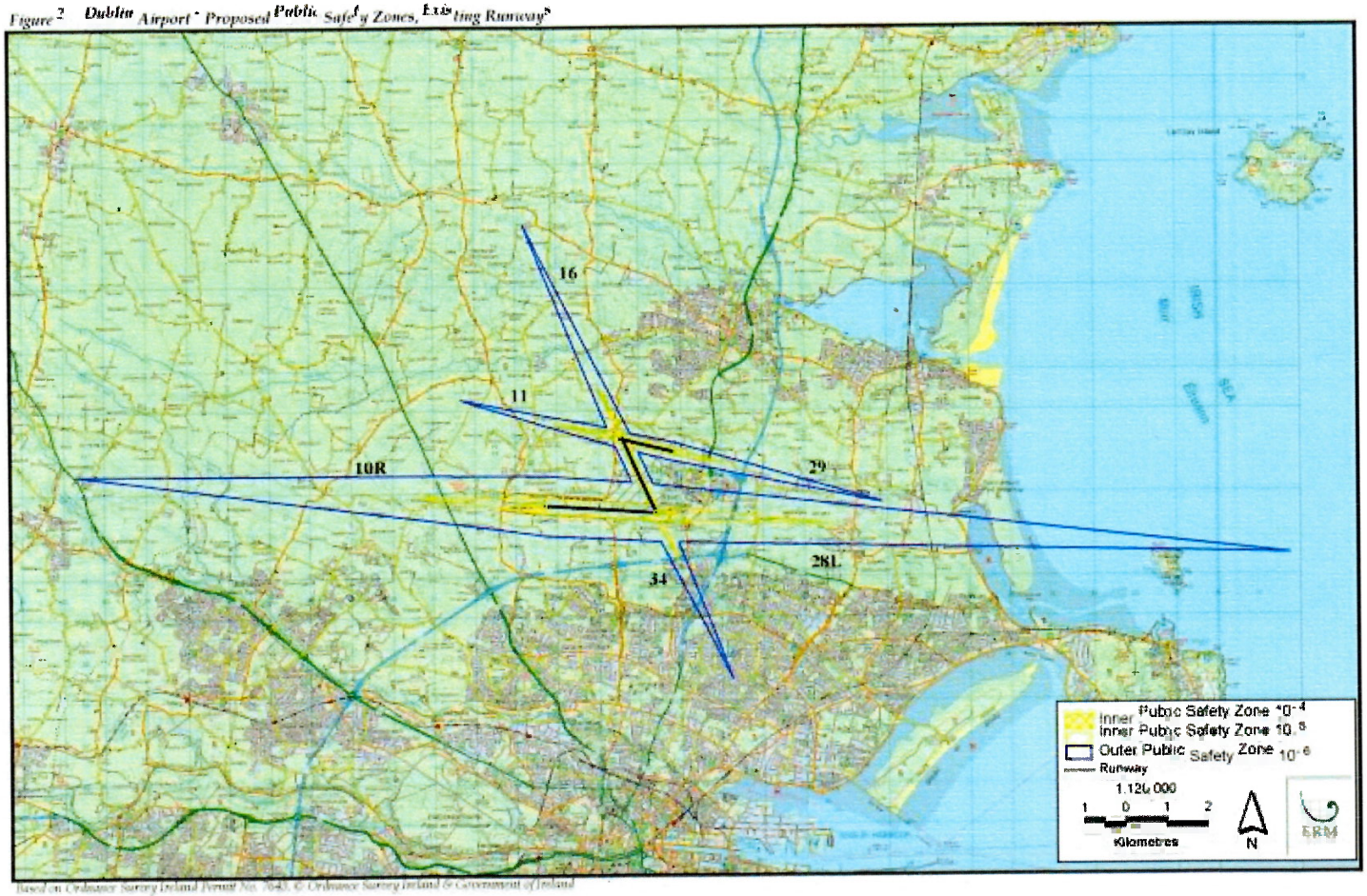


*Figure 3* ***Dublin Airport*** *- Proposed Public Safety Zones, Including Proposed Runway 10L/28R*

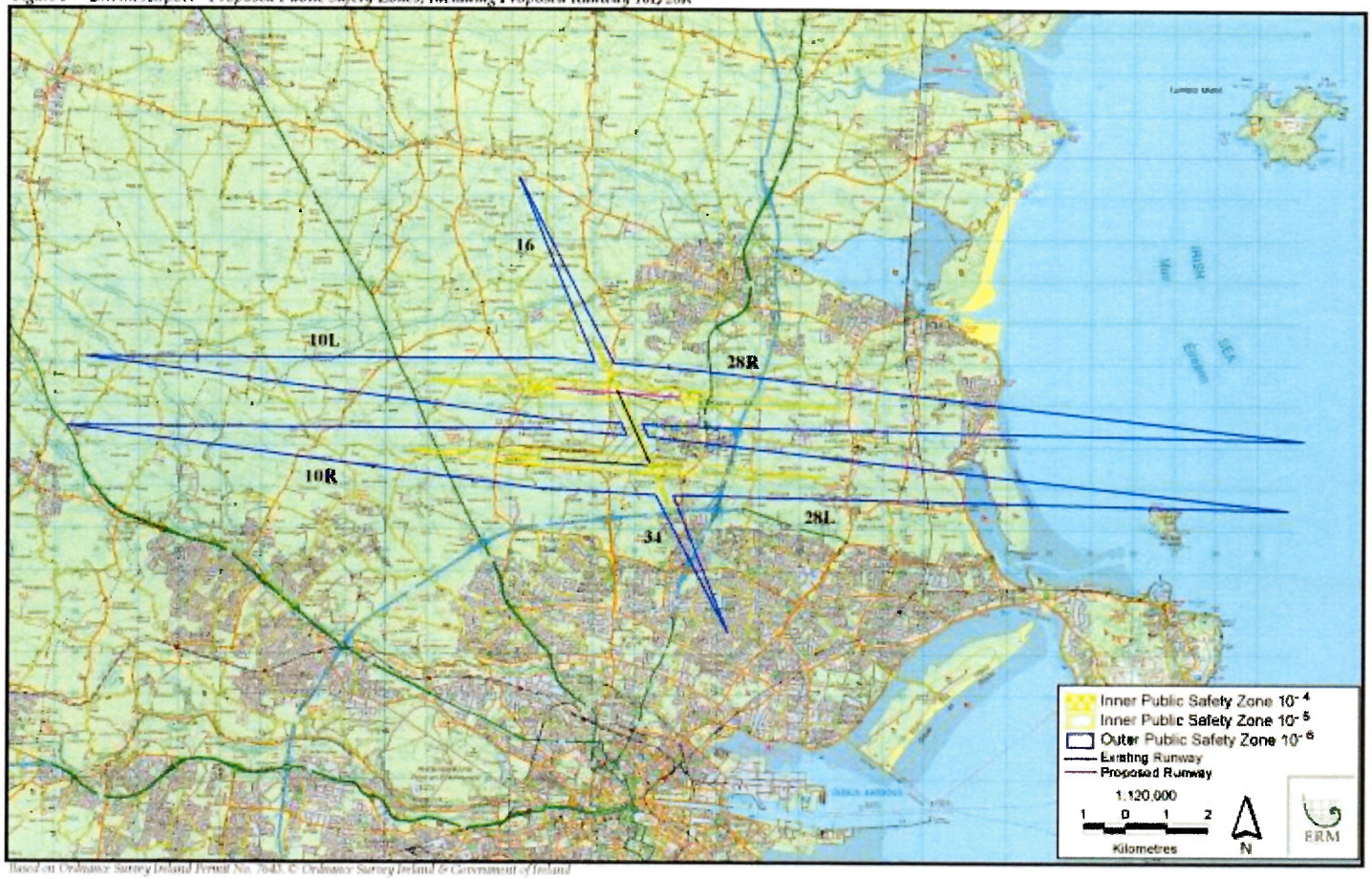


*Figure 4.3 Dublin Airport - Proposed Public Safety Zones, Main Existing Runway 10R/28L, (West End 10R)*

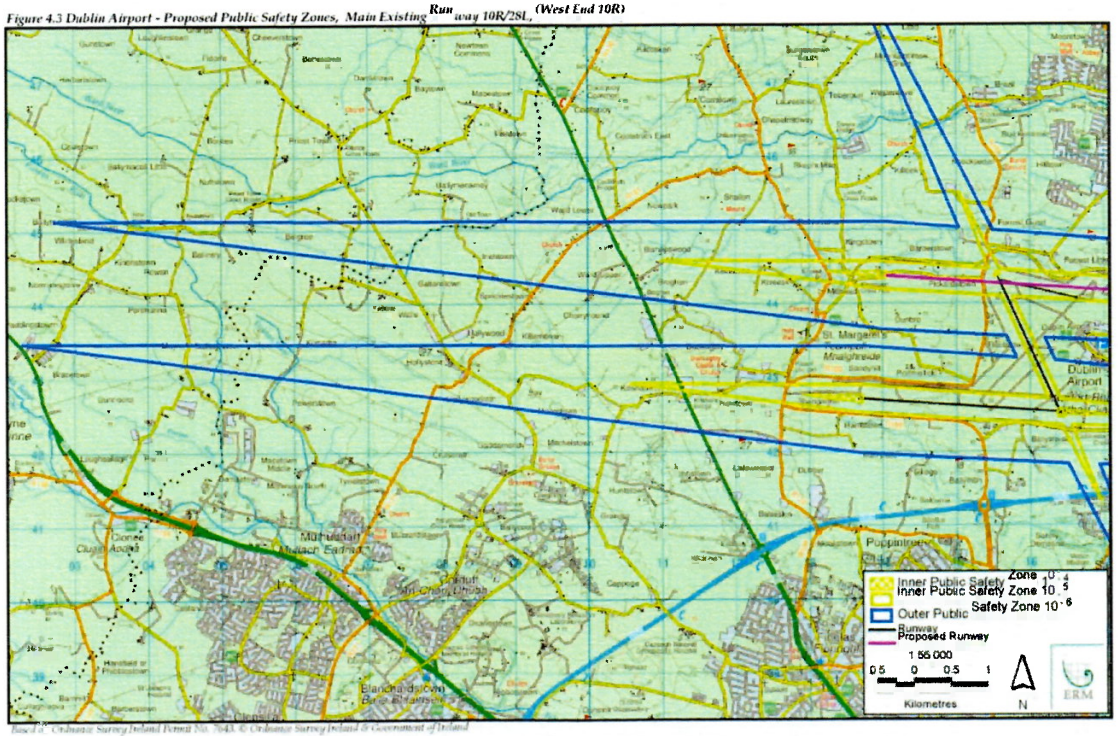


*Figure 4.4 Dublin Airport - Proposed Public Safety Zones, Main Existing Runway 10R/28L, (East End 28L)*

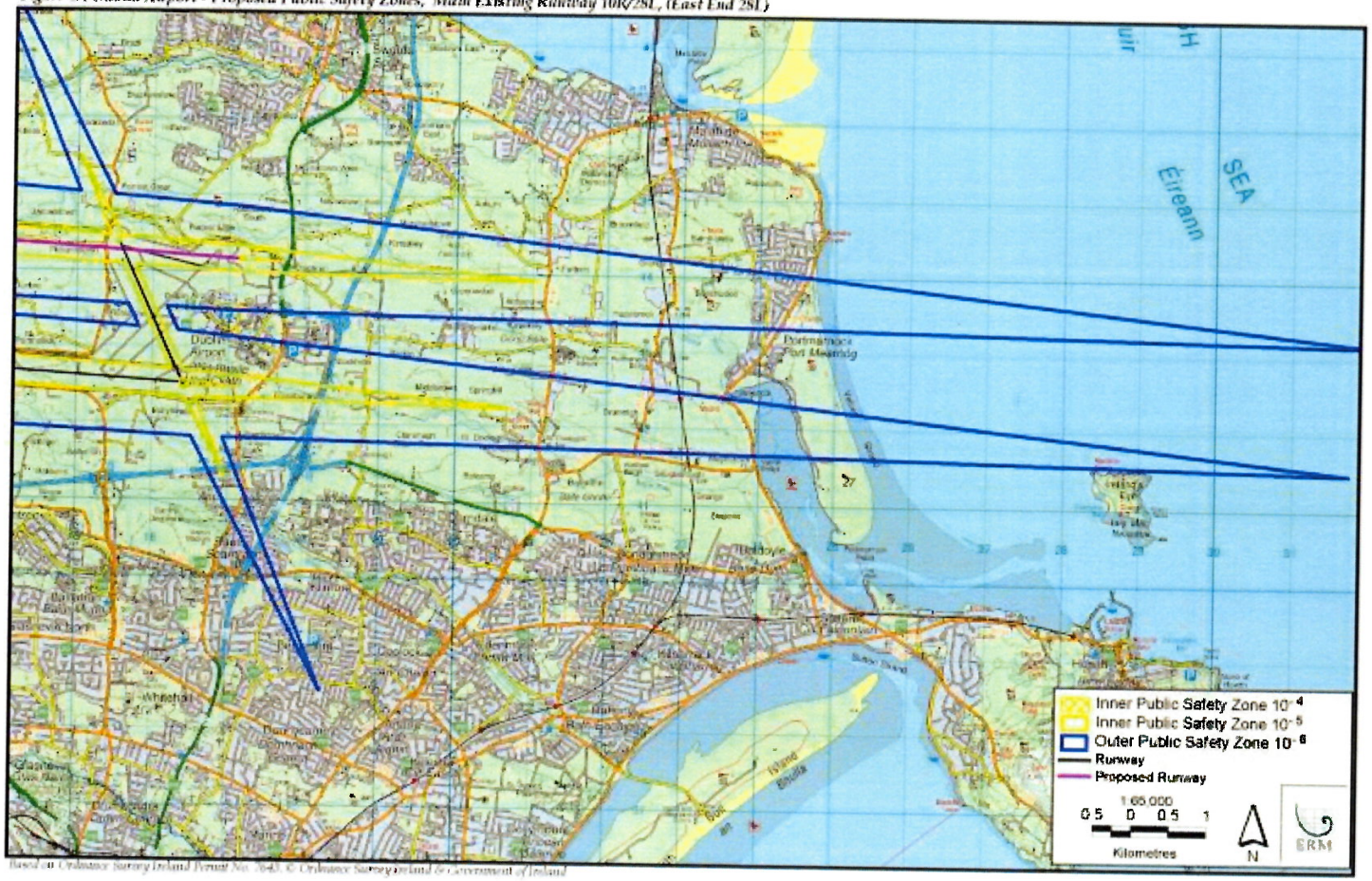


*Figure 4.5 Dublin Airport - Proposed Public Safety Zones, Proposed Runway 10L/28R, (West End 10L)*

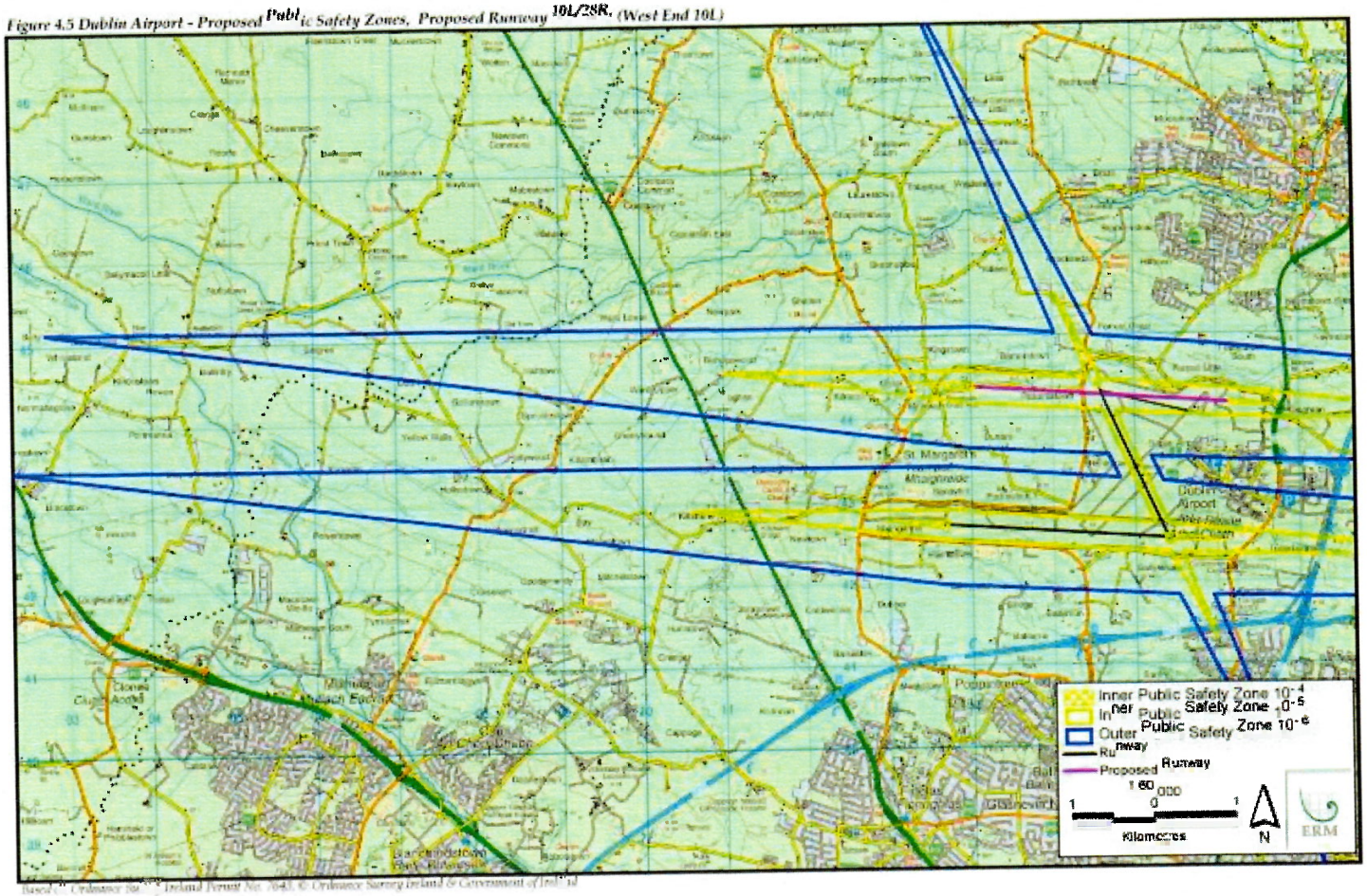


*Figure 4.6* ***Dublin*** *Airport - Proposed Public Safety Zones,* ***Proposed Runway 10L/28R*** *(East* ***End*** *28R)*

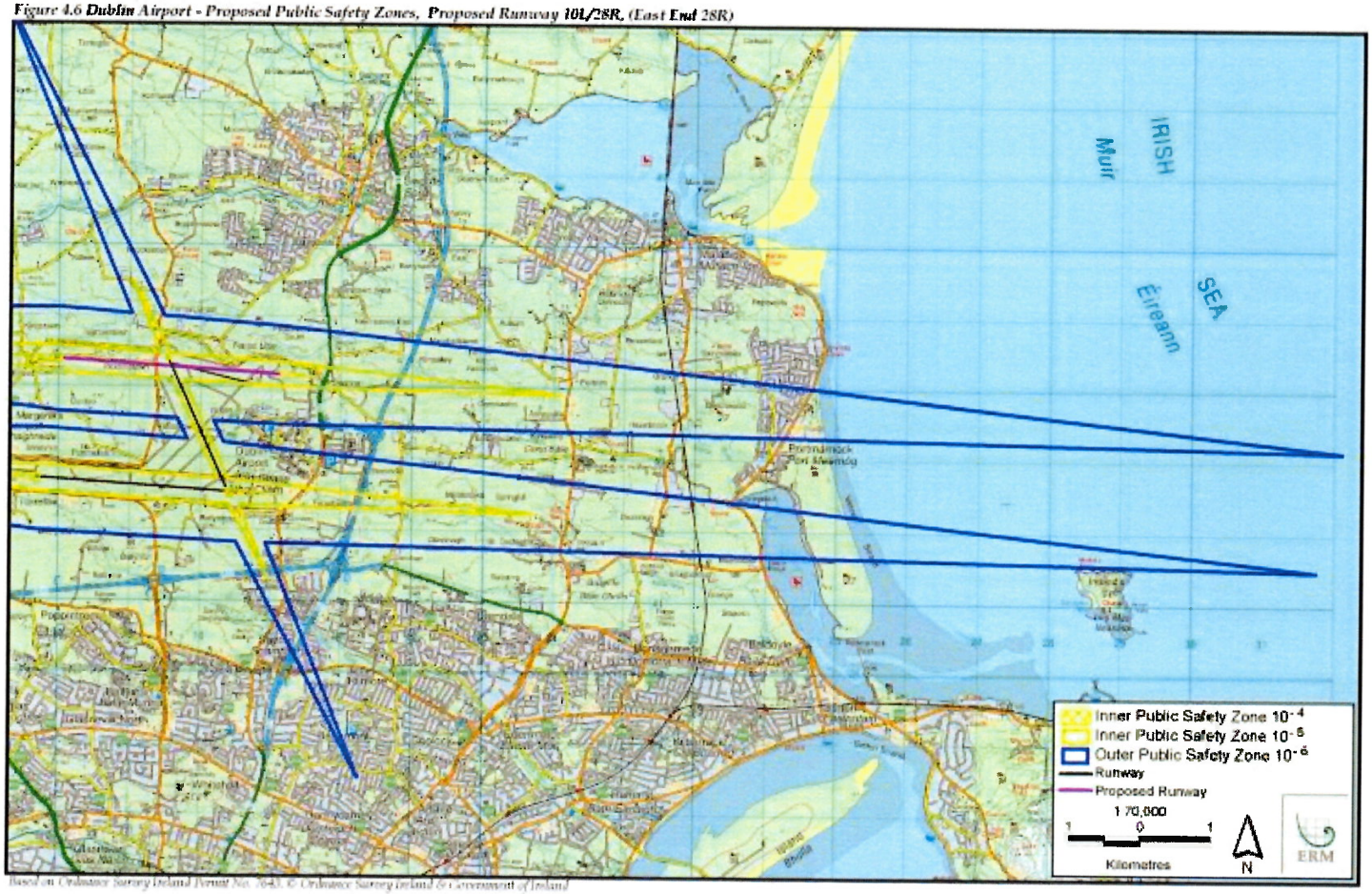


Figure 4.7 Dublin Airport - Proposed Public Safety Zones, Cross Runway 10/28 (North Pr... est End 16)

*Figure 4.8 Dublin Airport - Proposed Public Safety Zones, Cross Runway 16/34, (South-East End 34)*

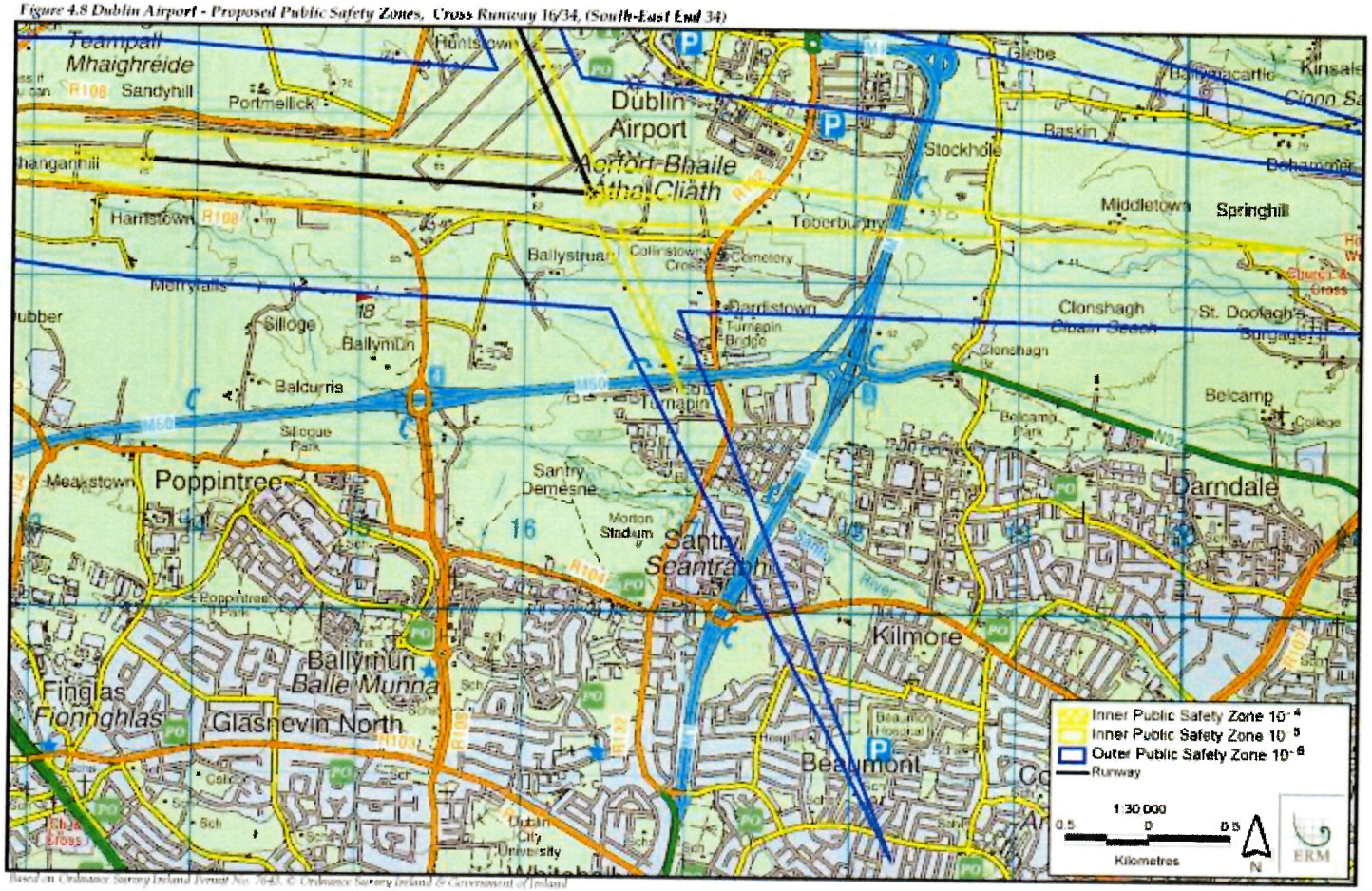


*Figure 4.9 Dublin Airport* Proposed Public Safety Zones, Runway 11/29, (West End 11)*

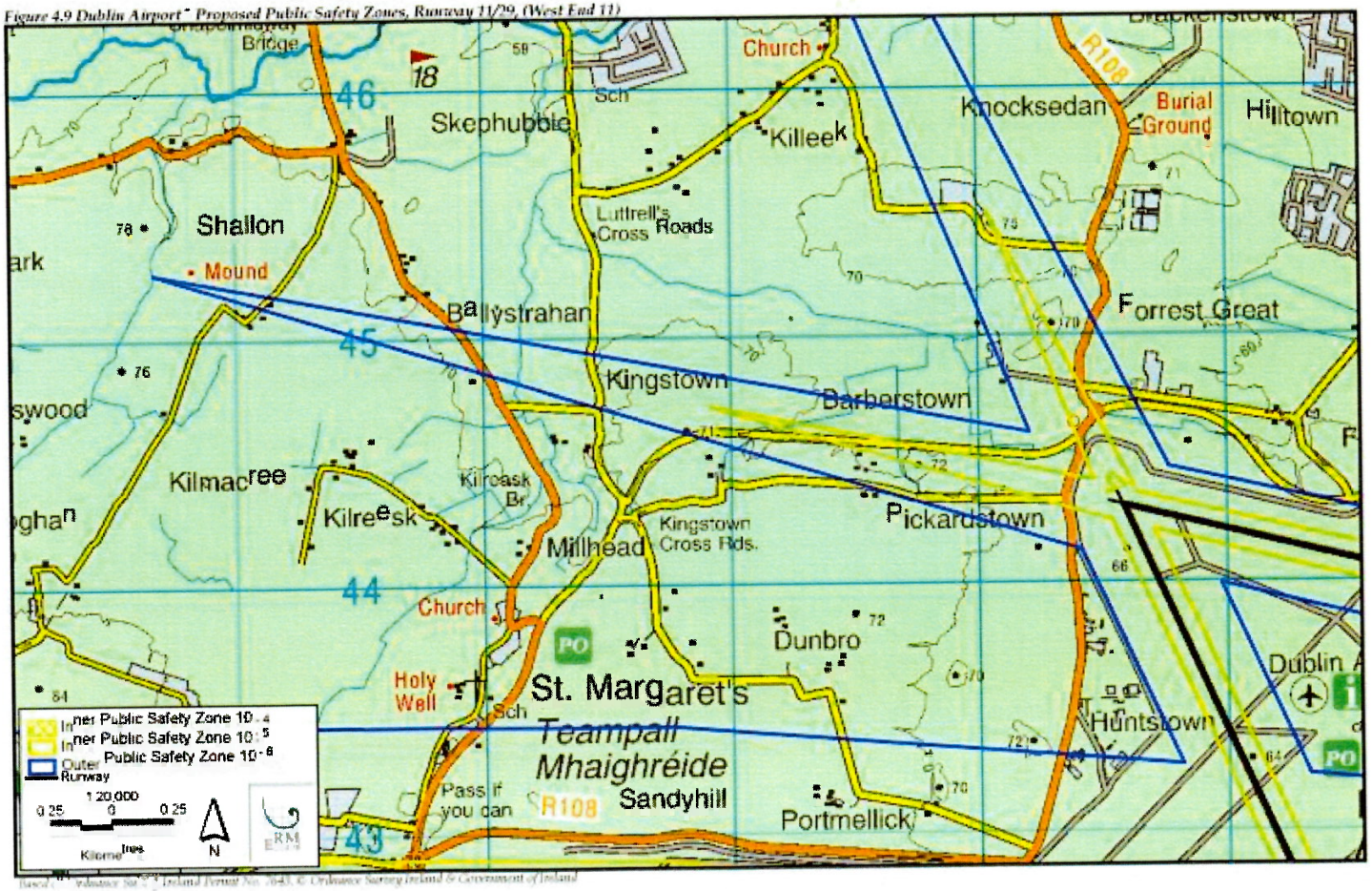
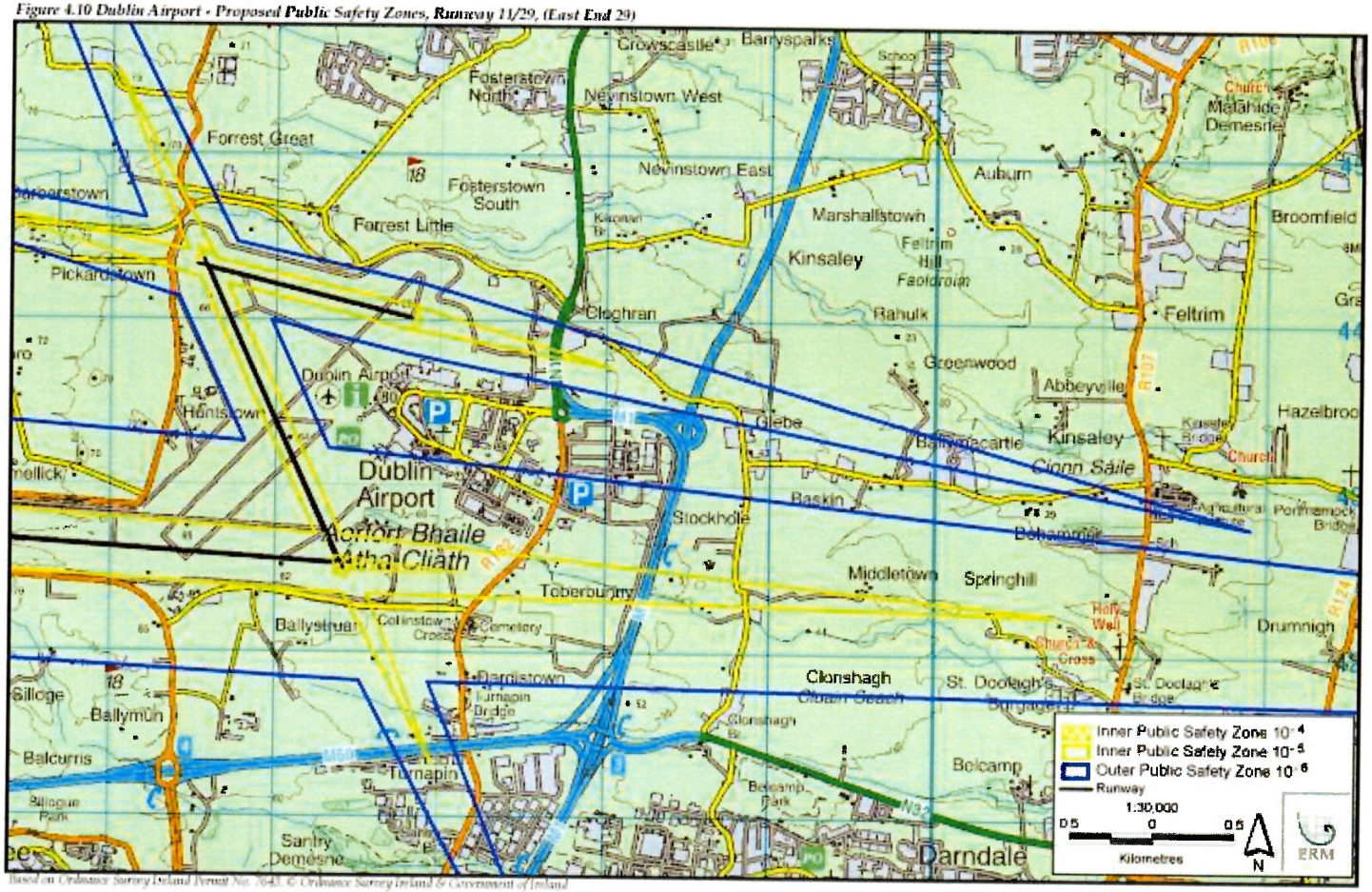


*Figure 4.10 Dublin Airport - Proposed Public Safety Zones, Runway 11/29, (East End 29)*



APPENDIX 7

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# Contrail minimization through altitude diversions: A feasibility study leveraging global data

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ABSTRACT

As global flight volume rises, the aviation industry is facing increasing climate challenges. One major factor is the impact of contrails, which trap outgoing terrestrial radiation and counteract emission reduction benefits from emission-optimized flight routes. Our study quantifies contrail-forming flights globally and assesses altitude adjustments necessary to avoid these regions. Using the Integrated Global Radiosonde Archive and global flight data from 2021-2022, we highlight several contrail-prone regions with high air traffic volumes and high potential for contrail-formation. We propose an operational strategy in altitude diversion, which can halve the amount of persistent contrails. Further, we analyse the additional carbon emissions caused by the altitude diversions and safety risks in terms of potential new conflicts. Our findings provide actionable strategies for policymakers to balance climate mitigation and operational challenges in aviation.

## 1. Introduction

Global aviation currently accounts for approximately 5% of net anthropogenic climate forcing (Lee, 2021), and this contribution is expected to increase as air traffic continues to rise worldwide. As a result, sustainability has become one of the most pressing challenges facing the aerospace industry. While alternative fuels and aerodynamic aircraft hold promise for reducing emissions, their implementation on a commercially relevant scale is still years away.

In addition to carbon dioxide, aircraft emissions also include nitrogen oxides, water vapour, sulphur oxides, and aerosols (Lee et al., 2010). However, the most significant individual contributor to aviation's total radiative forcing at shorter timescale is the formation of contrail cirrus, albeit with some uncertainties (Grewe et al., 2017). While carbon dioxide emitted today impacts global warming within 20–40 years, the warming effect of contrails is immediate (Avila et al., 2019).

This emphasizes the importance of minimizing contrails as a way to limit aviation's climate impact immediately as well as into the future. To address this challenge, the novel application of multidisciplinary fields beyond aviation, such as combining global aircraft surveillance data, atmospheric science, and satellite remote sensing, can help create a climate-optimized trajectory generator.

This paper aims to quantify the global extent of contrail-forming flights, their geographical location, as well as the typical altitude deviation necessary to avoid contrail-forming regions. Research done in Teoh et al. (2022), utilizes ERA5 reanalysis from ECMWF and an air traffic dataset from NATS (UK air navigation). Investigating the feasibility of incremental step-wise altitude diversion has been researched in Avila et al. (2019) in accordance with Domestic Reduced Vertical Separation Minimum (DRVSM) rules, using a year's worth of NOAA's Rapid Refresh Products (RAP) and a repeatedly using a single day of ADS-B data of mainland USA (24,095 flights).

This paper uses weather balloon data from the open-source Integrated Global Radiosonde Archive, as in Agarwal et al. (2022), where the radiosondes were used to validate reanalyses data like ECMWF and MERRA-2 to determine the estimation accuracy of contrail formation.

Additionally, the potential climate gain of these deviated flights will be computed in terms of radiative forcing (RF), applying the same net radiative forcing model as in Avila et al. (2019). Similar to the approach used in Rosenow and Fricke (2019), where the radiative forcing of individual condensation trails was calculated. Regarding the additional emissions caused by altitude changes, in previous research this was calculated using BADA, a database of Aircraft from EUROCONTROL (Teoh et al., 2022). This combination provides a sense of the overall true climate impact of altitude deviations to prevent contrails.

Furthermore, the potential safety impacts of contrail-mitigation are investigated. Through work has been done on this topic in Simorgh et al. (2023), which utilizes scenarios with around 1,000 flights during a 4-hour time frame in the Spanish and Portuguese airspace. Similarly, in Sausen et al. (2023), 212 aircraft were deviated vertically in MUAC airspace in order to avoid contrail formation.

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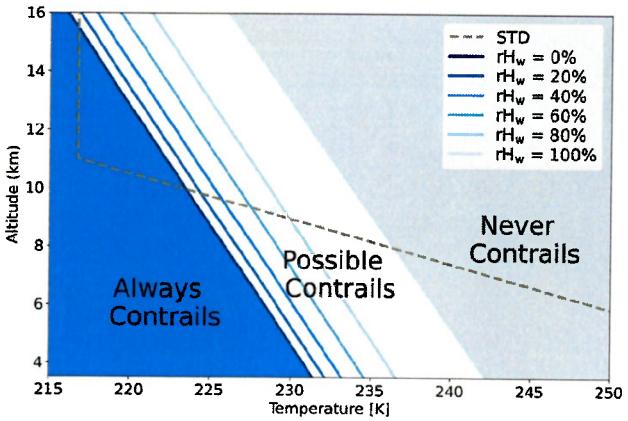



**Fig. 1.** A Schmidt-Appleman Diagram where the solid lines indicate the threshold temperatures at 0, 20, 40, 60, 80 and 100% relative humidity respectively, for kerosene fuel and an overall propulsion efficiency of 0.4. The international standard atmosphere temperature profile (STD) is plotted as well.

Our paper utilizes over 5.7 million flights, 2 years of real world data with global coverage, focusing on altitude changes rather than changing latitudinal or longitudinal positions. The assumption is that the flights are already horizontally and vertically separated according to safety protocols. We also solely consider the feasibility of altitude changes at the tactical short-term decisions, not possible strategical or pre-tactical decisions. Recent work regarding this has been done by Baneshi et al. (2023) and Simorgh et al. (2022).

By utilizing new data sets, this paper provides an alternate geographic coverage, as well as utilizing the high vertical resolution for the altitude deviation.

## 2. Contrails

### 2.1. Theories for contrail formation

Contrails, resembling clouds, can emerge in the wake of aircraft. To initiate contrail formation, certain atmospheric conditions must be met: the air temperature should be below −40 °C (233.15 K), and there should be a high relative humidity (Schumann, 1996). The formation of contrails is determined by the Schmidt–Appleman criterion (SAC) (Schumann et al., 2011), a thermodynamic theory developed by Schmidt and Appleman, which was later revised by Schumann (1996). The SAC states that the formation of contrails from condensing exhaust water depends on ambient pressure, humidity, and the ratio of water and heat released into the exhaust plume. When an aircraft flies through atmospheric conditions that satisfy the SAC, saturation with respect to liquid water occurs, resulting in contrail formation.

Fig. 1 shows the Schmidt-Appleman Diagram, which can be divided into three sections: always contrails, possible contrails, and never contrails. If the ambient temperature exceeds the line of relative humidity with respect to water ($RH_w$) at 100%, contrails are not expected to form (Service, 1981; Schumann, 2005). In conditions where the ambient temperature falls below the relative humidity line of 0%, contrails should always form. When the point lies between these two lines, in the *possible contrail* section of the graph, the formation of contrails depends on the relative humidity at that point, determining whether it falls on the left (always contrail) or right (never contrail) side of the corresponding $RH_w$ line.

### 2.2. Climate impact contrails

While many contrails disappear quickly, persistent contrails have lifetimes of more than five minutes, occurring when the condensing exhaust water does not evaporate in that given time frame (Ferris, 2007). Persistent contrails contribute to global warming by trapping outgoing terrestrial radiation (Schumann, 1996). This creates an imbalance between the incoming solar radiation and radiation from the Earth's atmosphere and surface, causing radiative forcing (RF) which leads to an alteration of temperature in the lower atmosphere (Karcher, 2018).

Whether a contrail is persistent is indicated by the presence of an ice-supersaturation region (ISSR), which forms when the ambient air is supersaturated with respect to ice (Schumann, 1996). Therefore, for persistent contrail formation, the aircraft must fly through a part of the atmosphere that satisfies both the SAC (indicating contrails can theoretically form) and is an ISSR (indicating their persistence).

Although contrails have a warming impact on global climate by trapping outgoing radiation, the impact of daytime contrails can be counteracted by their cooling impact, making their overall effect uncertain (Schumann et al., 2011). Nighttime contrails, however, always have a warming impact. Analysis from Stuber et al. (2006) showed that while night flights account for only 25 percent of air traffic, they account for 60 to 80 percent of the contrail climate forcing. Similarly, while winter flights are 22 percent of annual air traffic, they contribute to half of the annual mean forcing (Stuber et al., 2006). This paper includes a day and nighttime analysis, as well as seasonal variations, to more specifically understand the contribution of contrails to global climate change.

### 2.3. Contrail detection and avoidance

In practice, avoiding persistent contrail-forming atmospheric regions often involves either flying around the perimeter or changing altitude (Avila et al., 2019). The expansiveness of these regions typically makes re-routing less environmentally effective than varying altitude (Gao and Hansman, 2013; Sridhar et al., 2014). This implies that contrail avoidance would need to be incorporated into the flight planning process.

The deviations need to be in accordance with Domestic Reduced Vertical Separation Minimum (DRVSM) rules (Avila et al., 2019). Before such climate-optimized routing can be implemented, contrail formation needs to be adequately predicted, for re-routing but also for developing metrics to enforce compliance from airlines and industry.

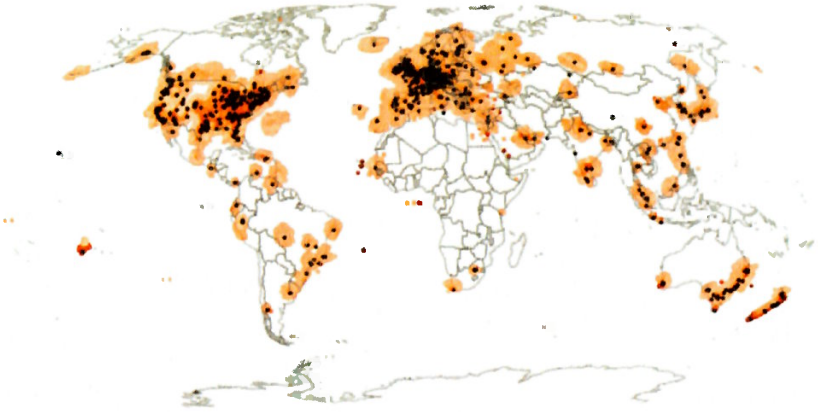
## 3. Data

The assessment of the number of flights that fall within a persistent contrail-forming atmospheric region and the required altitude change to leave the region, are based on remote sensing and flight data. This section explains these data sources and the steps taken before further processing.

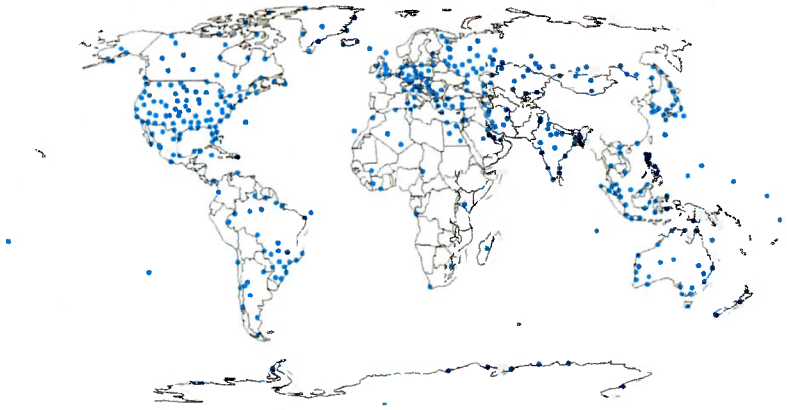
### 3.1. Integrated global radiosonde archive

The Integrated Global Radiosonde Archive (IGRA) consists of radiosonde observations collected and maintained by the US National Centers for Environmental Information (NCEI) of the US National Oceanic and Atmospheric Administration (NOAA) (Durre et al., 2018). Radiosondes are launched once or twice daily, usually at 0000 and 1200 UTC. During the 1 to 2-hour ascent, the radiosonde instruments collect measurements that are transmitted to ground stations (Durre et al., 2021).

At the ground station, the data is processed into pressure, geopotential height, temperature, and derived wind direction and speed based on the latitude and longitude of the balloon. In some cases, relative humidity with respect to water ($RH_w$) is also measured. For assessing persistent contrail formation, relative humidity with respect to ice is a crucial parameter, as any value of $RH_w$ exceeding 100% indicates the presence of an ISSR. While $RH_w > 100\%$ does not occur in the Earth's



(a) OpenSky receiver locations and coverage in 2022 (sourced from: Sun et al. (2022)).



(b) IGRA station locations used in this research

**Fig. 2.** Research Area: the OpenSky receiver locations and the IGRA stations that have an OpenSky receiver nearby.

atmosphere, relative humidity with respect to ice, $RH_i$, exceeding 100% is one of the criteria for persistent contrails and is common (Sonntag, 1994).

There are several ways of determining the $RH_i$ based on the $RH_w$. In this study, we use the formulas (Eqs. (1) and (2)) developed by Sonntag (1994). The equilibrium vapour pressure of water molecules ($e_w$) or ice ($e_i$) is temperature-dependent and can be used to determine the relative humidity with respect to water and ice (Buehler and Courcoux, 2003).

$$RH_w = \frac{e}{e_w} \tag{1}$$

$$RH_i = \frac{e}{e_i} \tag{2}$$

Previous research (Soden and Lanzante, 1996; Moradi et al, 2010) shows good agreement between IGRA relative humidity measurements and satellite data, with mean differences of 1 to 3%. The IGRA sensors (such as the Vaisala RS92) themselves have been shown to have an accuracy within ±1 K for temperature (Dirksen et al., 2014) and 10% for the relative humidity (Miloshevich et al., 2009).

### 3.2. Flight data: OpenSky and Spire

To ensure global coverage, two flight data sources were used in this research: OpenSky and Spire. The OpenSky Network, which has been collecting global air traffic surveillance data since 2013, provides unfiltered and raw data based on ADS-B, Mode S, TCAS, and FLARM messages that are open for use (Strohmeier et al., 2021). The spatial coverage is visualized in Fig. 2.a, with black dots representing station locations and red shading indicating the coverage of each station. The coverage is highest over Europe and North America, whereas due to the nature of terrestrial ADS-B, coverage over the oceans is minimal.

On the other hand, Spire uses satellite in addition to ground receivers, enabling ocean coverage. Since July 2018, a constellation of hundreds has been collecting ADS-B data globally. While OpenSky provides year-round temporal coverage, Spire data is available to us only for the month of April.

## 4. Method

In this section, we outline the methodology used to quantify the number of flights that fall within persistent contrail-forming atmospheric regions and the necessary altitude change required to leave these regions.

### 4.1. Contrail quantification

Unfortunately, only 304 of the 695 station locations measure the parameter of relative humidity over water vapour, which is necessary to determine the relative humidity over ice.

To identify flights that fall within ISSRs, we draw a 100 × 100 $km^2$ square around each IGRA station location. This area is deemed to be a representative area of influence for a single IGRA measurement, considering the lateral expansive nature of ISSR (Avila et al., 2019). We then overlay the locations of OpenSky receivers with these polygons.

If an OpenSky receiver is located within an IGRA polygon, we use the corresponding IGRA measurement location and OpenSky receiver data in our research. For cases where there is no OpenSky receiver

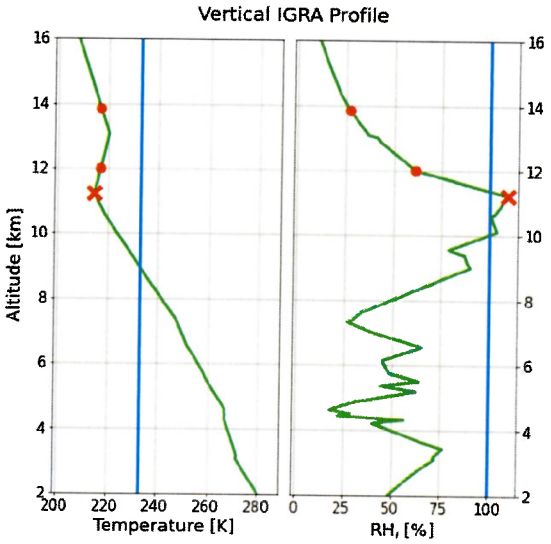



**Fig. 3.** An example of a vertical profile of temperature (left) and relative humidity (right) w.r.t. ice at the Camborne, a U.K. station on December 12, 2022 only. One of the aircraft is indicated in both plots by a cross (here at an altitude of 11.2 km) satisfies both SAC and the ISSR criterion, thus produces persistent contrails. The two aircraft at higher altitudes (indicated by dots) satisfy SAC but not the ISSR criterion, thus should produce non-persistent contrails.

within the IGRA polygon, we use Spire flight data. This data intersection results in coverage of 72 countries, the locations of the stations are shown as black dots in Fig. 10.

Only aircraft at cruise are considered, and the flight altitude closest to the weather balloon station (at the centre of each polygon) is used. Using this flight data, we then calculate the number of flights that pass through each polygon and identify those that fall within persistent contrail-forming atmospheric regions.

### 4.2. Flight level change

In Fig. 3, we present an example of a vertical profile of temperature and relative humidity with respect to ice for the Camborne station (UK) on December 12, 2022. The temperature profile on the left shows the vertical blue line indicating the −40 °C (233.15 K) SAC condition for contrail formation. On the right, the 100% $RH_i$ is shown as a blue line, representing the ice-supersaturation condition.

Moreover, the figure also includes the representation of aircraft at their respective flight levels along with the vertical relative humidity profile. A cross in both plots indicates one of the aircraft located at an altitude of 11.2 km satisfying both the SAC and ISSR criteria, thereby producing persistent contrails.

In Fig. 3, it is also demonstrated that a small increase in altitude, only a few hundred feet, could cause the aircraft indicated by a cross to descend below the 100% $RH_i$ line, thereby ceasing to satisfy the ISSR condition and stop producing persistent contrails.

Flight level changes that would exceed FL400 are not included in this analysis.

### 4.3. Net radiative forcing

As explained in Section 1, the foremost climate impact of contrails is through their trapped radiative forcing. Radiative forcing (RF) is a measure of the contribution of a greenhouse gas to the radiative energy budget of the climate system on Earth, which can disrupt the balance of incoming and outgoing energy in the atmosphere and alter the equilibrium state of the climate system (Ramaswamy et al., 2001). Measuring this impact can be done through net radiative forcing, which is the sum of incoming solar shortwave radiation ($RF_{SW}$) and outgoing longwave radiation ($RF_{LW}$).

Shortwave radiation from the sun is scattered or reflected by clouds and aerosols, or absorbed in the atmosphere (Trenberth et al., 2009; Sanz-Morère I. Eastham et al., 2021). On the other hand, longwave or terrestrial radiation refers to the infrared radiation emitted by the Earth, which is absorbed by clouds before being re-emitted. Contrails, similar to natural cirrus clouds, reflect incoming solar radiation during the daytime, resulting in a negative shortwave radiation effect. However, they also absorb terrestrial radiation and re-emit it at a higher altitude, leading to a positive longwave radiation effect during both day and night (Sanz-Morère I. Eastham et al., 2021).

To quantify the radiative effects of contrails, we will use the cloud radiative-transfer model (Corti and Peter, 2009). This model calculates the contrail-induced radiative imbalance in net warming of the Earth (Sanz-Morère I. Eastham et al., 2020). A positive $RF_{Net}$ would indicate an increase in the net energy of the Earth-atmosphere system.

### 4.4. Additional fuel burn

The additional fuel burn required for the altitude manoeuvres was determined using OpenAP (Sun et al., 2020), which is an open-source aircraft performance model capable of estimating fuel consumption and emissions based on flight data.

Based on the necessary altitude change, the additional fuel burn is determined, based on the aircraft type, altitude, vertical rate, and speed. A sensitivity analysis is performed on the initial mass parameter (0.70, 0.85, and 0.90% of the maximum take-off weight). The type code and engine parameters are based on the ICAO 24-bit transponder code, an aircraft identifier gathered from the ADS-B data. From this fuel flow analysis, the additional $CO_2$ emissions can be derived.

### 4.5. Risks to separation from altitude changes

Uncoordinated flight changes cannot always be safely performed. In Figs. 4, two scenarios illustrate the potential risks to separation caused by altitude changes to avoid contrail-forming areas. The sole criterion for an altitude diversion is that it is the shortest vertical way out, and the absolute change is less than 2000 ft.

Even though a loss of separation does not always imply an impending collision, it does signify aircraft being closer than safety regulations. A loss of separation occurs when aircraft within distance less than 5 nautical miles (9.26 km) and less than 1000 ft (300 m) altitude difference. A conflict is a predicted loss of separation, and uses the protected aircraft zone (Organization, 2016).

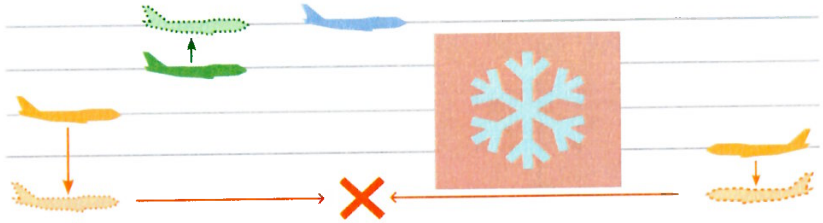
In this study, we determine nearby aircraft using a kd-tree algorithm. The *cKDTree* library from the *scipy* Python package is used as an efficient way to perform such calculations. We first search for 10 nearest aircraft for each individual aircraft, then the ones with distances below 5 nm are selected. Subsequently, these are also filtered with a maximum vertical distance of 1000 ft.

The loss of separation detection is first performed with the ADS-B data from OpenSky with the original altitude and then with the data including altitude diversions. This allows for the identification of intrusions similar to those sketched in Fig. 4.b.

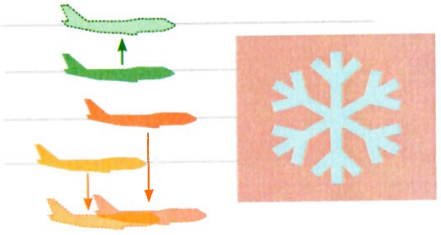
Besides this intermediate loss of separation, Fig. 4.a shows a future conflict. Based on the track and ground speed from the ADS-B data, an extrapolation was made for the trajectories for a look-ahead time of 10 min. It was investigated whether the extrapolated trajectories of the five nearest neighbours intersected. If so, this intersection was treated as a conflict.

## 5. Results

In this section, we evaluate the results and discussion, subdividing our analysis into several parts:

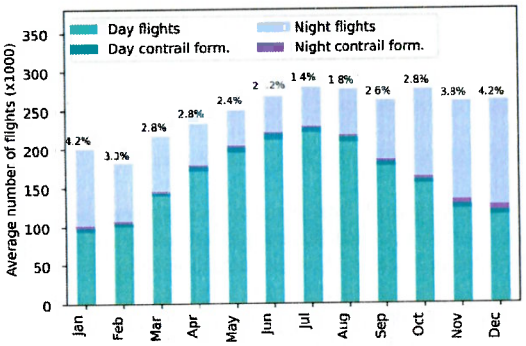


(a) Example of a conflict. The red box with a snowflake indicates a contrail-forming region that should be avoided. The blue aircraft does not have to change its altitude, and the green aircraft needs to increase its altitude. The orange aircraft both need to decrease their altitudes, and thus creating a conflict.

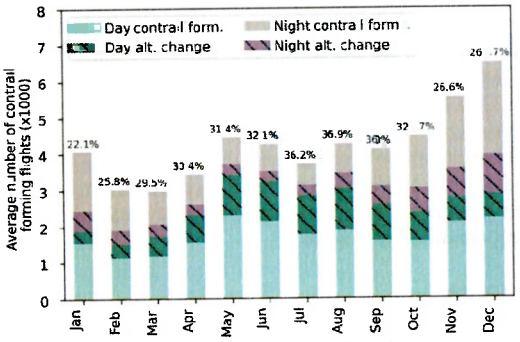


(b) Example of a potential loss of separation. The green aircraft increases its altitude to avoid the contrail-forming area without difficulties. The two orange aircraft are initially vertically separated, but because they both decrease their altitude, a loss of separation occurs.

**Fig. 4.** Two scenarios illustrating the potential risks to separation caused by altitude changes to avoid contrail-forming areas.




(a) Average number of flights per month in 2021 and 2022 in our dataset, with colours indicating day or nighttime flights, and whether they create contrails (indicated by the percentage above the bars).




(b) Average number of contrail-forming flights in 2021 and 2022 in our dataset and the subset of flights that are suitable for an altitude change of less than 2000 ft, indicated by hatching (indicated by the percentage above the bars).

**Fig. 5.** Temporal effects of contrail formation.

### 5.1. Quantifying contrails

Following the method described in Section 4, we analysed a total of 5,722,588 flights. Of these, 202,240 (3.5%) were identified as satisfying both the SAC and ISSR conditions, indicating the production of persistent contrails.

### 5.2. Temporal effects

As described in Section 1, seasonality has a large impact on contrail formation. In addition, the time of day when contrails form influences the climate impact. We consider these two temporal effects in this subsection.

In Fig. 5.a, we show the total number of flights per month, with colours indicating day and nighttime flights, as well as the percentage of total flights that create contrails (percentage above the bars). These values represent the monthly averages from 2021 and 2022. While air traffic peaks in the (Northern Hemisphere's) summer months, there is a higher occurrence of persistent contrails during winter, according to Avila et al. (201 9). In Fig. 5.a, we observe a similar result. Although the total number of flights is lowest during the winter months, the number of days with persistent contrail-forming atmospheric conditions and the percentage of contrail-producing flights per month peak during the winter months. Since the IGRA sounding data is global, with 87% of the stations located in the Northern Hemisphere (as seen in Fig. 2), we apply the Northern Hemisphere seasonal cycle to our analysis.

Fig. 5 b shows the number of contrail-forming flights, with colours indicating day or night, and hatching indicating the portion where an altitude change of less than 2000 ft would stop contrail formation.

### 5.3. Geographical effects

In addition to the temporal effects discussed in the previous section, contrail formation is also expected to vary based on geographical location. By utilizing the global nature of the OpenSky, Spire, and IGRA data, we examine the geographical effects in this subsection.

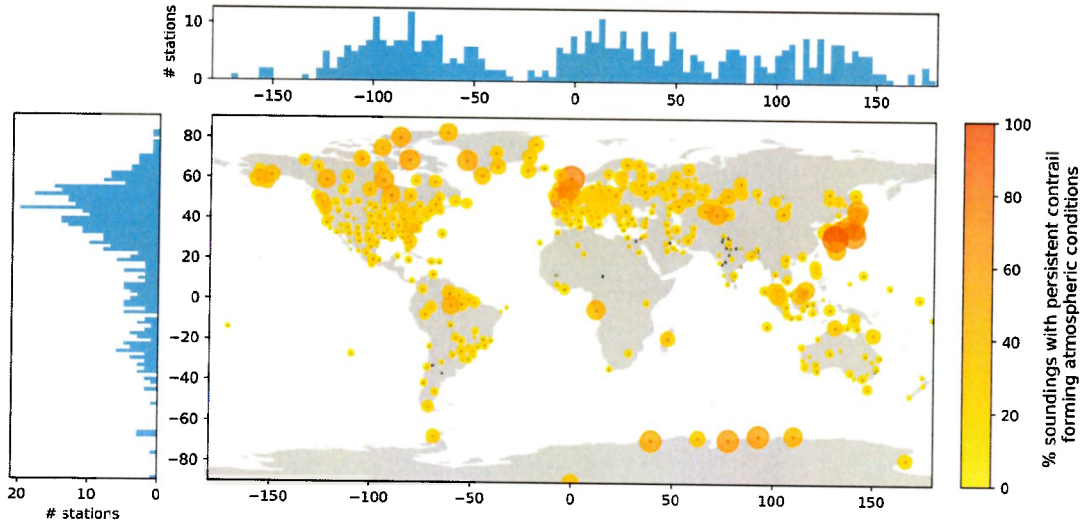



**Fig. 6.** Global distribution of persistent contrail-forming atmospheric conditions, with black dots indicating station locations, and shaded circles indicating the percent of soundings with atmospheric conditions satisfying persistent contrail formation. The vertical and horizontal histograms indicate the latitudinal and longitudinal distribution of IGRA stations.

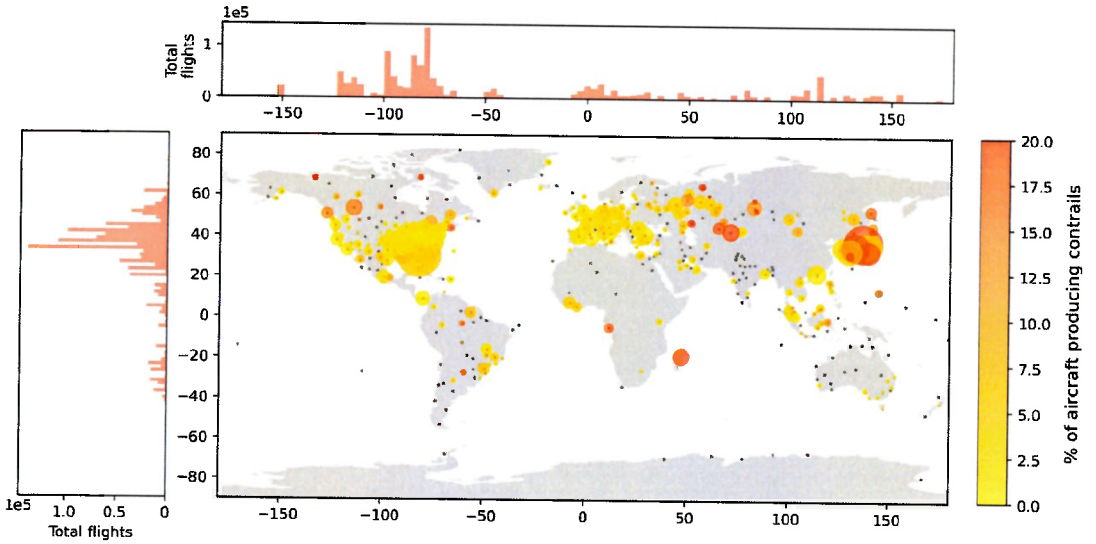



**Fig. 7.** Global distribution of aircraft producing persistent contrails, with black dots indicating station locations, and shaded circles indicating the percent of total aircraft and the size of the circle indicating the absolute number of aircraft. The vertical and horizontal histograms indicate the latitudinal and longitudinal distribution of total flights.

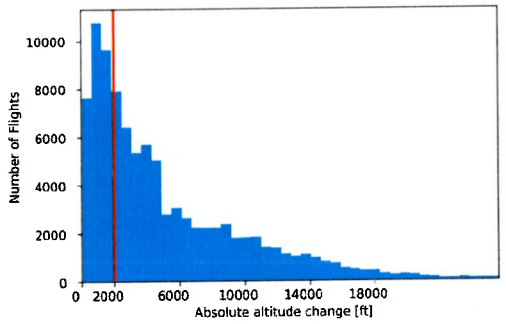
Fig. 6 shows a global yearly overview of the percent of weather balloon soundings that include persistent contrail-forming atmospheric conditions, namely instances of $RH_i$ exceeding 100% and temperature falling below −40° (233.15 K). The black dots indicate the locations of the stations, and the shade and size of the circles indicate the percentage of soundings when atmospheric conditions allow for the formation of persistent contrails. The vertical and horizontal histograms indicate the latitudinal and longitudinal distribution of IGRA stations.

Fig. 7 shows a similar graph, however here the colouring of the circles indicates the percentage of aircraft that fly through these atmospheric conditions that allow for persistent contrail formation. The sizes of the circles indicate the number of flights in absolute terms. The vertical and horizontal histograms display the latitudinal and longitudinal distribution of the total number of flights. Large and darker red circles mean that not only the percentage of contrail-forming flights is high, but also the absolute number of contrail-forming flights is high, as well.

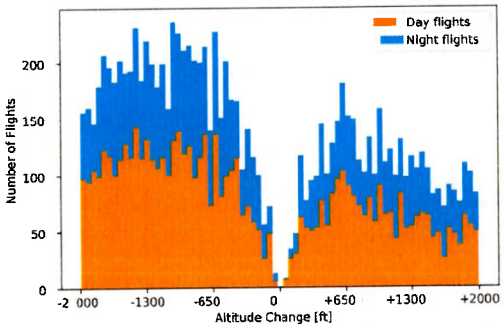
### 5.4. Flight level change

We previously illustrated the opportunity to change the flight level to stop contrail formation in Fig. 3. In Fig. 8.a, we show a histogram of the absolute nearest distance for a flight to *exit* a persistent contrail-forming atmospheric layer. From literature (Avila et al., 2019), we know that altitude changes of less than 2000 ft are feasible, and the histogram in Fig. 8.b shows that this accounts for a significant portion (31%) of the flights.

Filtering the histogram for deviations of less than 2000 ft, we show the absolute deviations in Fig. 8.b, with negative values indicating a decrease and positive values indicating an increase in the required altitude. A majority of 61% of the flights required an altitude decrease (an average of 1071 ft (326.44 m)), while the remaining 39% required an increase to exit the ISSR (an average of 996 ft (303.58 m)). We also indicate a distinction between day and night flights using colour in the histogram.




(a) Histogram of all flight level changes (absolute values), with the vertical red line at 2000 ft.




(b) Histogram of flight level changes, less than 2000 ft, with negative values indicating a decrease and positive values indicating an increase in altitude to avoid ISSRs.

**Fig. 8.** Flight level changes required to stop producing contrails.

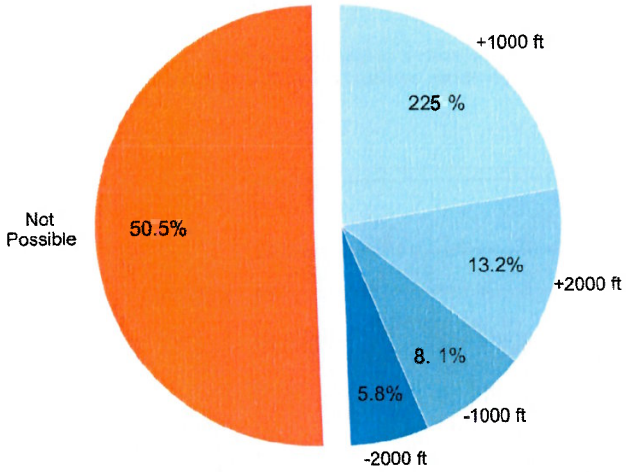



**Fig. 9.** Pie chart of flight level changes, where only discrete altitude options are available, among range the four steps of 1000 ft. If no alternative altitude can be found, the flight was categorized as *not possible*. A total of 64,288 were considered.

In the current airspace configuration, custom altitude changes (as shown in Fig. 8.b) are not always possible. Typically, only discrete steps are available when requesting an altitude change. These alternative altitudes are shown in Fig. 9. For each contrail-forming flight, we first checked whether an altitude change of +1000 ft would prevent persistent contrail formation. If it is insufficient, we then considered a higher increase of +2000 ft. Conversely, we also examined the possibility of reducing the altitude by −1000 ft and −2000 ft as alternatives. This order was chosen as altitude decreases are unfavourable when minimizing climate impact since they decrease fuel efficiency (Avila et al., 2019; Schumann et al., 2011). If none of these alternative altitudes are possible, we categorized it as *not possible* in Fig. 9 ,which occurs in 50.5% of cases.

In Fig. 10, we show the global distribution of the occurrences requiring a flight level change of less than 2000 ft to stop contrail production. The shading of the circles indicates the percentage of total flights that are suitable for such an altitude change, and the size of the circle indicates the number of these flights.

### 5.5. Additional $CO_2$ emissions

Since flight emission estimations can be heavily influenced by the aircraft mass, we performed a sensitivity analysis by varying the initial mass between 75% and 100% of the maximum take-off weight to study the additional $CO_2$ emissions caused by the altitude change. In Fig. 11, each line represents the additional emissions (in percent) in a month with different aircraft mass assumptions.

### 5.6. Climate impact

In this subsection, we demonstrate the true climate gains feasible through the altitude deviations described in Section 5.4. In Fig. 12, we show the top 25 stations where the largest climate gains can be made, with the smallest percentage of flights changing altitude. We limited the stations to those with a minimum of 10,000 yearly flights. Following the method described in Section 4.3, we determined the radiative forcing for all contrail-forming flights and then the radiative forcing for flights suitable for an altitude change of less than 2000 ft. The ratio between these two values, referred to as the percent of radiative forcing that can be prevented, is shown in Fig. 12.

### 5.7. Safety

We analyse the potential loss of separation and conflicts due to the change of flight altitude without any air traffic control coordination.

Table 1 shows the change in the number of actions required for intrusion prevention and for conflict solving, because of the change in altitude required to avoid contrail creation. The column *'change in number of intrusions'* refers to the scenario illustrated in Fig. 4b, and *'change in number of conflicts'* refers to the one in Fig. 4.a. The total number of flights and the number of flights with a changed altitude (and their percentage of the total) are also shown.

It is important to highlight that within controlled airspace, addressing these additional conflicts requires only a minimal additional effort for air traffic controllers. Therefore, the safety risks associated with flight altitude changes to prevent contrail formations are nearly negligible.

Table 1 shows that there is only a slight increase in the number of intrusions or conflicts when changing altitudes for contrail prevention. This result is somewhat expected based on the small percentage of flights that required an altitude change for contrail prevention, and the relative emptiness of the airspace in general, even considering the large number of flights analysed for the year 2021 (2.6 million).

## 6. Discussion

In this section, we adhere to the general structure of the results section for discussion.

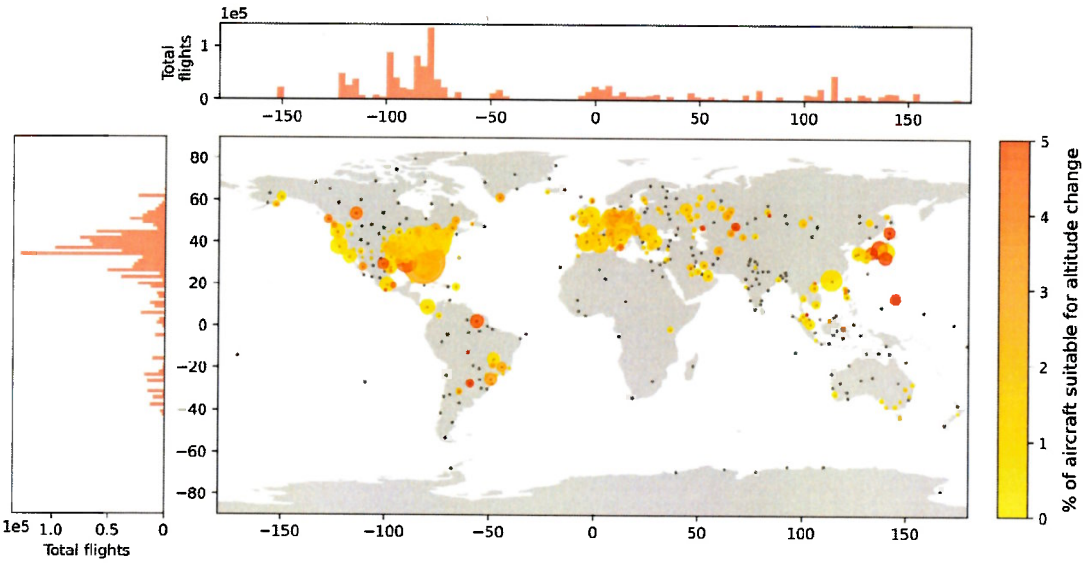



**Fig. 10.** Global distribution of the percent of aircraft where an altitude change of less than 2000 ft would prevent them from producing contrails. The size of the circles indicates the number of suitable flights. The vertical and horizontal histograms indicate the latitudinal and longitudinal distribution of all flights.

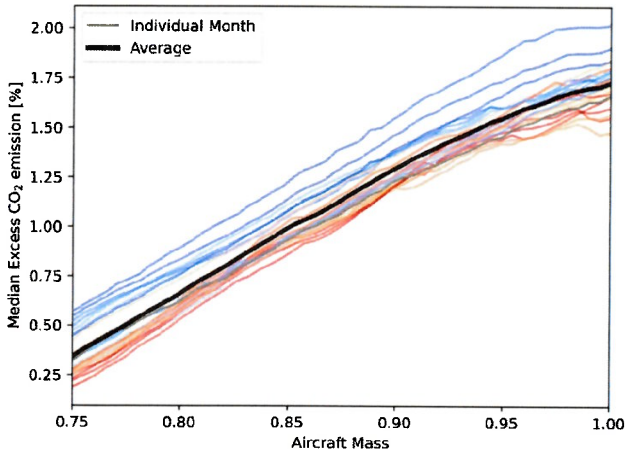



**Fig. 11.** Sensitivity analysis for additional $CO_2$ emissions, with varying initial mass. Each line represents a single month, and the black line shows the average of all 24 months. Seasonal dependency is also illustrated here, with colder winter months in blue colours and warmer summer months in red.

**Table 1**
Monthly actions for intrusion prevention and actions for conflict solving. The total number of flights and the number of flights with a changed altitude (and their percentage of the total) are also shown.

| | Actions for intrusion prevention | Actions for conflict solving | Total flights | Flights with changed altitude |
|---|---|---|---|---|
| January | 0 | +1 | 166,651 | 1154 (0.93%) |
| February | 0 | 0 | 149,998 | 1168 (0.78%) |
| March | 0 | 0 | 191,979 | 1338 (0.70%) |
| April | +1 | 0 | 200,296 | 1452 (0.72%) |
| May | 0 | 0 | 208,731 | 1604 (0.77%) |
| June | 0 | +1 | 220,712 | 1580 (0.71%) |
| July | 0 | 0 | 243,836 | 1492 (0.61%) |
| August | +1 | +2 | 238,265 | 1862 (0.78%) |
| September | 0 | 0 | 227,643 | 2,340 (1.02%) |
| October | 0 | 0 | 238,664 | 2,372 (0.99%) |
| November | +1 | 0 | 232,122 | 2,254 (0.97%) |
| December | +1 | 0 | 239,523 | 2,974 (1.24%) |

### 6.1. Quantifying contrails

Based on atmospheric data from the same source as (Roosenbrand et al., 2022; Avila et al., 2019) estimates that 15% of flights generate contrails in the United States, while our results show 4.6%. Avila and Sherry (2019) indicates a maximum of 34% of flights generate contrails on a given day, with the daily average percentage of flights at 15.1% with a median of 13.8%. However, these results encompass the mid-Atlantic, where ISSRs are very prevalent and has a high air traffic volume.

OpenSky and IGRA both have limitations regarding coverage over oceans, and so could not be included in this research. The limited data coverage over oceans likely contributes to the differences in overall contrail percentages. Further extensive analysis using satellite networks (Cappaert, 2020) for cross-Atlantic flights should confirm this hypothesis.

### 6.2. Temporal effects

Teoh et al. (2022) reveals that while air traffic peaks in summer, persistent contrails are more common in winter. Fig. 5 supports this finding.

Notably, Avila et al. (2019) indicates that summer flights exhibit roughly three times higher Net Radiative Forcing than other months. Therefore, though fewer flights produce contrails in summer, their climate impact per flight is higher, especially given the greater number of flights in that season.

Fig. 5.b displays a reduction in aircraft suitable for altitude changes during winter, likely due to increased ISSR vertical extent (Hoinka et al., 1993).

The dominance of Northern Hemisphere seasonal cycle in the IGRA data influences the estimate of night flights, with an increase during winter and a decrease in summer. Weather balloon data skewed to the Northern Hemisphere shows a higher proportion of night flights compared to earlier studies (Stuber et al., 2006) (33.2% compared to literature 25%). However, night flights contribute disproportionately to contrail forcing (Stuber et al., 2006), suggesting the potential of flight rescheduling for climate impact mitigation.

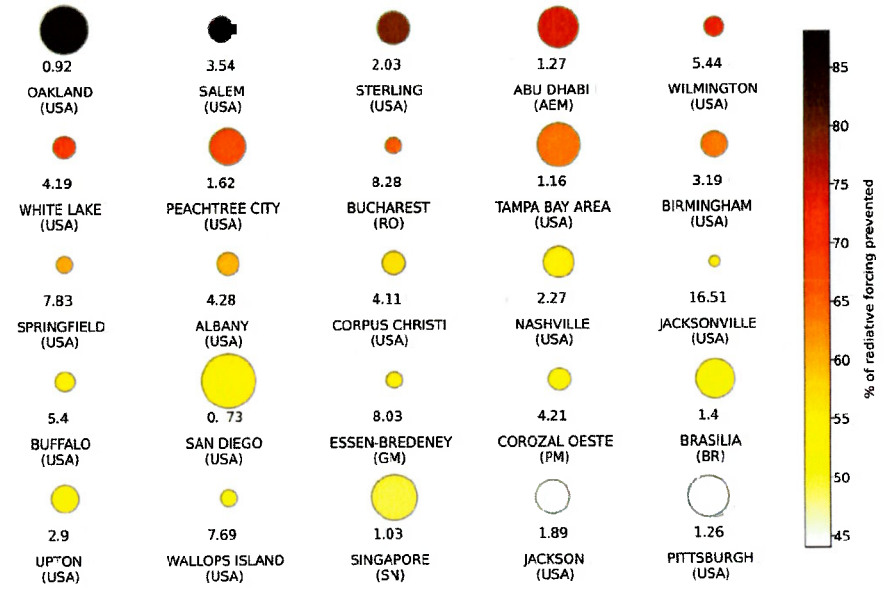



**Fig. 12.** Top 25 stations for minimizing contrail radiative forcing, with more than 10,000 yearly flights. The circle colour indicates the percent of contrails, which are prevented, and the size of the circle is correlated to the number of flights that need to be diverted (specifically the inverse). This percentage of flights is also shown below the circles. Thus, large circles in dark red indicate that with a few altitude diversions, a large percentage of contrails can be prevented.

### 6.3. Geographical effects

Avila et al. (2019) focuses on contrail generation in the contiguous United States and notes greater prevalence in the southeastern states. Our results (Fig. 7) align with this observation, but underestimate contrail formation in the Pacific region of the U.S.A. (Roosenbrand et al., 2022). These discrepancies may stem from contrail-forming regions mainly over the ocean, not covered by IGRA ground stations. Linking IGRA to ECMWF data in these oceanic regions may offer a solution.

Meyer et al. (2007) notes contrail prevalence in Southern and Eastern Asia, corroborated by our analysis (Fig. 6). With the region's increasing air traffic, contrail mitigation becomes increasingly relevant.

In Europe, a high volume of flights, rather than a high percentage of contrail-producing flights, drives contrail prevalence. However, atmospheric conditions allowing contrail formation are relatively frequent (Fig. 6). Further research is needed to understand altitude adjustments' impact on contrail formation.

### 6.4. Flight level change and its policy implications

Due to the discrete points used for the measurements and not using interpolation, the required altitude change could be overestimated, and might be even less in reality.

In our analysis, the aircraft has the option to either increase or decrease the altitude to *exit* the atmospheric layer. In Fig. 8, we see that in a majority (63%) of these flight alterations, the nearest option is reached by decreasing the altitude. Altitude decreases are generally unfavourable for minimizing climate impact due to decreased fuel efficiency (Avila et al., 2019; Schumann et al , 2011). Additional research on the trade-off between contrail climate effects and fuel burn is necessary.

A crucial result of this paper can be seen in Fig. 9: nearly 50% of contrail-forming flights can be mitigated through discrete altitude changes within the range of −2000 ft, −1000 ft, +1000 ft, and +2000 ft, already common in air traffic management.

Fig. 10 highlights regions where contrails could be minimized within current aircraft operations: mid-Western Europe, southeastern United States, and Southeast Asia.

### 6.5. Additional $CO_2$ emissions

Altitude diversions result in 0.25% to 2.0% additional carbon emissions, depending on aircraft mass assumptions. This range aligns with existing literature (<1% additional fuel burn - (Avila et al., 2019); 2.24% fuel - (Sridhar et al .,2010)).

The vertical extent of ISSRs in winter requires larger altitude deviations (Hoinka et al., 1993), resulting in higher $CO_2$ emissions, as depicted in Fig. 11 (bluish hues for winter and red for summer). Avila et al. (2019) points out that in the Summer months, more flights require an altitude *increase* to avoid ISSR's, which would also explain the lower fuel burn required we see.

With comparable results (Avila et al., 2019), concludes that the additional fuel burn caused by the altitude change from the original to the new flight level is *not* statistically significant. Mainly because the additional fuel burn was compensated by the advantage of cruising at higher altitudes with lower drag.

## 7. Conclusion

Global contrail formation was assessed using OpenSky, Spire, and weather balloon data from the years 2021 and 2022. Furthermore, the magnitude of altitude changes necessary to minimize contrail formation was quantified. The analysis of these persistent contrail flights shows that there are strong geographical and seasonal influences for identifying contrail-forming flights.

The key aspects examined in this study, namely safety, discrete altitude steps, and additional $CO_2$ emissions, are often cited as reasons that make altitude deviations for contrail prevention impractical. However, through a thorough analysis conducted within the scope of our research, we have effectively addressed and refuted these arguments. Of the required altitude changes to avoid contrails, 50.5% are possible within the discrete altitude step and a maximum of 2000 ft.

By carefully dissecting these concerns, we have demonstrated that the perceived obstacles surrounding safety, discrete altitude steps, and additional $CO_2$ emissions can be overcome. This research has successfully disarmed these commonly presented arguments against the feasibility of altitude deviations as a practical approach for contrail formation prevention, as well as illustrating the substantial climate gains possible through this approach.

## CRediT authorship contribution statement

**Esther Roosenbrand:** Conceptualization, Methodology, Writing – original draft, Data curation, Writing – review & editing, Visualization, Software. **Junzi Sun:** Conceptualization, Methodology, Writing – original draft, Writing – review & editing, Visualization, Software. **Jacco Hoekstra:** Conceptualization, Methodology, Writing – review & editing.

## Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

## Data availability

Open and public data are used for this paper.

## Acknowledgements

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## The IAA Sets Dublin Airport's Summer 2025 Capacity

07 Oct 2024

The Irish Aviation Authority (IAA) today published the coordination parameters which sets Dublin Airport's Summer 2025 Capacity. The parameters define how many aircraft may be scheduled to use Dublin airport at a particular time. These parameters will be used in the airport slot allocation process. The Summer 2025 scheduling season runs from 30 March to 25 October 2025. In making its decision, the IAA has taken account of the approximately 70 responses received in response to the consultation, which closed on 26 September.

The IAA is responsible for the implementation of the EU Airport Slot Regulation[1]. The Slot Regulation aims to ensure that, where airport capacity is scarce, the maximum available capacity is identified and distributed in a fair and transparent way by means of the allocation of take-off and landing slots by an independent coordinator, according to rules set out in the Slot Regulation, and based on the capacity identified for the airport concerned. Capacity is declared to the detailed level of up to 10 minute intervals.

The IAA's role includes identifying and determining the maximum available capacity at Dublin Airport and setting the consequent parameters for slot allocation. The IAA is required to take account of all relevant technical, operational and environmental constraints. Such constraints may include the capacity of runways, airspace capacity, availability of aircraft stands, various passenger

processes such as check-in and security screening, and planning constraints imposed on daa by the planning authorities in the form of planning conditions.

In 2007, An Bord Pleanála imposed a planning condition on daa's development of Terminal 2 at Dublin Airport, which limits the combined capacity of Terminal 1 and Terminal 2 at Dublin Airport to a maximum of 32 million passengers per annum. This planning condition remains in existence, and is limiting the available slot capacity below the capacity of the physical infrastructure.

To take account of the capacity constraint represented by the planning condition set by An Bord Pleanála, the IAA has set a seat capacity limit of 25.2 million seats for the Summer 2025 scheduling season. This is in line with what the IAA proposed in its Draft Decision and the proposal put forward by daa, the operator of Dublin Airport, during the deliberations of the coordination committee, in which daa also stated that the IAA should have regard to the condition. The members of the coordination committee include Dublin Airport and the air carriers using Dublin Airport. The committee is tasked by the Slot Regulation with advising the IAA in respect of the coordination parameters to be declared.

This decision makes Summer 2025 the second scheduling season to take account of the An Bord Pleanála 32m passengers per annum planning condition constraint. For Winter 2024 (26 October 2024 to 29 March 2025) the seat cap is 14.4m. The decision for Summer 2025 results in a total seat capacity of 39.6m across the two seasons. The seat cap is greater than the passenger cap as it takes account of expected load factors (how many passengers are expected on each flight relative to the total number of seats on the aircraft), and an adjustment for transfer passengers.

The IAA anticipates that the demand for slots for the Summer 2025 scheduling season will significantly exceed the 25.2m seat cap. In line with the Slot Regulation, air carriers who have operated series of slots (5 weeks or longer) in the Summer 2024 season will be given priority, on initial coordination, in relation to those series for Summer 2025. However, the IAA anticipates that not all slot series from Summer 2024 will be capable of being accommodated within the seat cap.

In addition, the IAA anticipates that, like Winter 2024, this decision will result in very little, if any, available capacity for new slot requests, or for ad hoc slot requests, for passenger flights using the capacity of Terminal 1 or Terminal 2 during the Summer 2025 scheduling season. Such an outcome, and its implications for airlines, Dublin Airport and the travelling public are a consequence of the An Bord Pleanála planning condition itself.

The role of the IAA does not encompass any powers to amend or revoke planning conditions or make any decision to enforce or not enforce conditions. These are all matters to be determined by the planning authorities, such as Fingal County Council. The IAA notes, that if the 32m planning condition was not a relevant constraint for Summer 2025, the IAA would be declaring a significantly higher terminal, and therefore airport, capacity. Accordingly, this would facilitate all Summer 2024 slot series, and anticipated growth and new entrants in the Season, including ad hoc slots.

The coordination parameters are available on the IAA's website: https://www.iaa.ie/commercial-aviation/economic-regulation/slot-allocation/documents---slots

The parameters are published today to confirm the IAA's decision for the next steps in the coordination process for Summer 2025.

The detailed decision document setting out the IAA's reasons in relation to this decision, and the consultation responses will be published in the coming days.

[1]EU COUNCIL REGULATION (EEC) No 95/93, on common rules for the allocation of slots at Community airports, as amended by Regulation (EC) No 793/2004.

For media queries please contact media@iaa.ie

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# COMHAIRLE CONTAE FHINE GALL

# FINGAL COUNTY COUNCIL

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| TO ISSUE |

## RECORD OF CHIEF EXECUTIVE'S ORDER

**IN THE MATTER OF THE LOCAL GOVERNMENT ACT 2001 (AS AMENDED)**

**AND IN THE MATTER OF THE PLANNING AND DEVELOPMENT ACT 2000 (AS AMENDED)**

**SECTION 153 OF THE PLANNING AND DEVELOPMENT ACT 2000 (AS AMENDED)**

Section 153 – Decision on Enforcement

**SUBJECT**
Whether to issue an Enforcement Notice

**Lands:** Dublin Airport, Co. Dublin

**Planning Permission:** Planning Authority Reg. Ref No: F04A/1755
ABP Ref. No: PL 06F.217429
North Runway Permission - Condition 5

**Enforcement Complaint:** Unauthorised development comprising development carried out in non-conformity with Condition 5 of the North Runway Permission (Planning Authority Reg. Ref No: F04A/1755 / ABP Ref. No: PL 06F.217429)

**WHEREAS** Dublin Airport Authority plc ("*daa*") obtained a grant of planning permission, following an appeal to An Bord Pleanála, for development comprising, *inter alia*, the development of the North Runway ("*the North Runway Permission*" - Planning Authority Reg. Ref No: F04A/1755 / ABP Ref. No: PL 06F.217429) – the said grant of permission was subject to 31 Conditions, including Condition 5 which provides:

> "On completion of construction of the runway hereby permitted, the average number of night time aircraft movements at the airport shall not exceed 65/night (between 2300 hours and 0700 hours) when measured over the 92 day modelling period as set out in the reply to the further information request received by An Bord Pleanála on the 5th day of March, 2007.
>
> **Reason:** To control the frequency of night flights at the airport so as to protect residential amenity having regard to the information submitted concerning future night time use of the existing parallel runway."

The application documentation, including the EIS and information provided by way of further information, the Inspector's Report and the Board Order provide the context to the imposition of Condition 5;

**AND WHEREAS** a complaint was received by Fingal County Council ("*the Council*"), on 24th March 2023, and subsequent complaints followed, in relation to alleged unauthorised development at the Lands – being non-compliance/non-conformity with Condition 5 of the North Runway Permission (Planning Authority Reg. Ref No: F04A/1755 / ABP Ref. No: PL 06F.217429) and including an alleged exceedance over the permitted number of night time aircraft movements;

**AND WHEREAS** pursuant to s.152(1)(a) of the Planning and Development Act 2000 (as amended) ("*the 2000 Act*"), having considered the said complaint, the Council issued a Warning Letter, dated 25th April 2023, to the daa in respect of the alleged unauthorised development – being alleged non-compliance/non-conformity with Condition 5 of the North Runway Permission (Planning Authority Reg. Ref No: F04A/1755 / ABP Ref. No: PL 06F.217429);

**AND FURTHER WHERE** the daa responded to the said Warning Letter, pursuant to s.152(4)(b) of the 2000 Act, setting out its response to the allegation of unauthorised development by way of correspondence, dated 23rd May 2023 – which included support documentation;

**AND WHERE,** as part of the Council's investigation into the matter, further information/clarification was sought from the daa by way of correspondence, dated 9th June 2023 and 15th June 2023, and the daa responded to same by way of correspondence, dated 14th June 2023 and 19th June 2023;

**HAVING CONSIDERED**, *inter alia*, the complaint received and the responses from the daa, including supporting documentation (including the aforesaid) and having considered the Council's Planning Report, dated 18th July 2023, together with the Appendices to same, prepared as part of the Council's investigation into the alleged unauthorised development and the recommendation therein;

**AND NOTING** that the Council's Planning Report, dated 18th July 2023, provides, *inter alia*: a summary of the relevant planning history to the Lands – including matters relevant to Condition 5; a summary of the complaint received per s.152; details on the Warning Letter issued pursuant to s.152; outlines and considers the various responses/arguments made by daa in response to the said Warning Letter; a response

to the said responses/arguments made by daa; outlines an interpretation of Condition 5 of the Planning Permission;

**AND HAVING NOTED AND CONSIDERED** the requirements of section 153 of the 2000 Act, including *inter alia* the following provisions which provide, *inter alia*:

> "(1) As soon as may be after the issue of a warning letter under section 152, the planning authority shall make such investigation as it considers necessary to enable it to make a decision on whether to issue an enforcement notice or make an application under section 160.
>
> ...
>
> (3) A planning authority, in deciding whether to issue an enforcement notice shall consider any representations made to it... and any other material considerations.
>
> ...
>
> (7) Where a planning authority establishes, following an investigation under this section that unauthorised development (other than development that is of a trivial or minor nature) has been or is being carried out and the person who has carried out or is carrying out the development has not proceeded to remedy the position, then the authority shall issue an enforcement notice under section 154 or make an application pursuant to section 160, or shall both issue such a notice and make such an application, unless there are compelling reasons for not doing so...";

**RECOMMENDATION of the SENIOR EXECUTIVE PLANNER:** Accordingly, in accordance with section 153(1) of the 2000 Act, having considered the proper planning and sustainable development of the administrative area of Fingal County Council including the preservation and improvement of the amenities thereof, and having carried out an investigation such as to enable it to make a decision in accordance with section 153(1) of the 2000 Act and having considered representations made to it under **section 152**(1)(a) and submissions or observations made under **section 152**(4)(b) and any other material considerations, I recommend that an enforcement notice issue pursuant to section 154 of the Planning and Development Act for the following reasons:

- The use of the airport for night-time aircraft movements was, for the reason of protecting residential amenity, limited by An Bord Pleanála in the consent of the North Runway. Night-time use of the airport was limited by Condition 5 to levels of activity submitted by the daa in the course of the application;

- Residential amenity is protected by Condition 5 by way of mitigation of an identified significant impact through the control of the frequency of that impact, to an intensity of use forecast by the daa at the time of the application to extend the airfield by construction of the North Runway. An Bord Pleanála confirmed and determined the magnitude of night-time flights acceptable in its consideration of proper planning and sustainable development. The night-time use was limited in this manner by An Bord Pleanála to address concerns regarding the cumulative impact of the proposal in combination with existing development;

- The North Runway has been constructed and became operational on the 24 August 2022. A scheduling and slot allocation process was undertaken and a summer 2023 operating schedule was determined and is currently in operation;

- The summer schedule which is being carried out is in breach of the limit applied in Condition 5;

- Taking account of the foregoing, it is therefore concluded that by virtue of the scheduled and actual operations reported, the frequency of night flights in Dublin Airport is not in conformity with Condition 5 of the North Runway permission and is for that reason unauthorised development. The 2000 Act, including s 154(5)(a)(ii) provides that the planning authority can issue an Enforcement notice to require the daa, to proceed with a development in conformity with Condition 5;

- Unauthorised development is occurring and will continue to occur in non-conformity with Condition 5 and that unauthorised development is occurring at the Lands and development is not being carried out in conformity with Condition 5 of the North Runway Permission (Planning Authority Reg. Ref No: F04A/1755 / ABP Ref. No: PL 06F.217429);

- The daa has not sought to remedy the said unauthorised development, there are no compelling reasons for not taking enforcement action, having regard to the nature of the unauthorised development at issue and the nature of Condition 5, including the reason/purpose of same;

- In circumstances where unauthorised development is occurring and will continue to occur at Dublin Airport, contrary to Condition 5 of the North Runway Permission (Planning Authority Reg. Ref No: F04A/1755 / ABP Ref. No: PL 06F.217429) comprising the continued and ongoing exceedance of the permitted average number of night-time (between 2300 hours and 0700 hours)

aircraft movements at the airport – being a permitted average of 65 aircraft movements per night when measured over the 92-day modelling period;

- Noting the nature of the unauthorised development and the evidence presented and matters discussed in the aforesaid Report dated 18th July 2023 and appendices thereto, it is considered that a period of 6 weeks for compliance with the terms of the Enforcement Notice is reasonable and appropriate in the circumstances.

**Recommender** Hugh O'Neill
P.P.
Senior Executive Planner

**ORDER:**

The report entitled *Informing a "decision on enforcement" under Section 153 of the Planning and Development Act 2000 (as amended)* from the Senior Executive Planner dated the 18th July 2023 and the appendices attached thereto have been considered. The findings and recommendations and the reasons set out therein **to issue** an enforcement notice pursuant to section 154 of the Planning and Development Act are hereby **ACCEPTED** and **ADOPTED** in this decision.

In accordance with section 153(1) of the 2000 Act, having considered the proper planning and sustainable development of the administrative area of Fingal County Council including the preservation and improvement of the amenities thereof, and having carried out an investigation such as to enable it to make a decision in accordance with section 153(1) of the 2000 Act and having considered representations made to it under **section 152**(1)(a) and submissions or observations made under **section 152**(4)(b) and any other material considerations the Planning Authority hereby **DECIDES** and **SO ORDERS** that an enforcement notice issue pursuant to section 154 of the Planning and Development Act for the following reasons:

- The use of the airport for night-time aircraft movements was, for the reason of protecting residential amenity, limited by An Bord Pleanála in the consent of the North Runway. Night-time use of the airport was limited by Condition 5 to levels of activity submitted by the daa in the course of the application;

- Residential amenity is protected by Condition 5 by way of mitigation of an identified significant impact through the control of the frequency of that impact, to an intensity of use forecast by the

daa at the time of the application to extend the airfield by construction of the North Runway. An Bord Pleanála confirmed and determined the magnitude of night-time flights acceptable in its consideration of proper planning and sustainable development. The night-time use was limited in this manner by An Bord Pleanála to address concerns regarding the cumulative impact of the proposal in combination with existing development;

- The North Runway has been constructed and became operational on the 24 August 2022. A scheduling and slot allocation process was undertaken and a summer 2023 operating schedule was determined and is currently in operation;

- The summer schedule which is being carried out is in breach of the limit applied in Condition 5;

- Taking account of the foregoing, itis therefore concluded that by virtue of the scheduled and actual operations reported, the frequency of night flights in Dublin Airport is not in conformity with Condition 5 of the North Runway permission and is for that reason unauthorised development. The 2000 Act, including s.154(5)(a)(ii) provides that the planning authority can issue an Enforcement notice to require the daa, to proceed with a development in conformity with Condition 5;

- Unauthorised development is occurring and will continue to occur in non-conformity with Condition 5 and that unauthorised development is occurring at the Lands and development is not being carried out in conformity with Condition 5 of the North Runway Permission (Planning Authority Reg. Ref No: F04A/1755 / ABP Ref. No: PL 06F.217429);

- The daa has not sought to remedy the said unauthorised development, there are no compelling reasons for not taking enforcement action, having regard to the nature of the unauthorised development at issue and the nature of Condition 5, including the reason/purpose of same;

- In circumstances where unauthorised development is occurring and will continue to occur at Dublin Airport, contrary to Condition 5 of the North Runway Permission (Planning Authority Reg. Ref No: F04A/1755 / ABP Ref. No: PL 06F.217429) comprising the continued and ongoing exceedance of the permitted average number of night-time (between 2300 hours and 0700 hours) aircraft movements at the airport – being a permitted average of 65 aircraft movements per night when measured over the 92-day modelling period;

- Noting the nature of the unauthorised development and the evidence presented and matters discussed in the aforesaid Report dated 18th July 2023 and appendices thereto, it is considered that a period of 6 weeks for compliance with the terms of the Enforcement Notice is reasonable and appropriate in the circumstances.

**Approver** Malachy Bradley

Senior Planner

28/07/2023 **Dated**

thereunto empowered by order of the Chief Executive, Fingal County Council C.E No **8539** delegating to me all powers, functions and duties in relation to the Council of the County of Fingal in respect of this matter.

Comhairle Contae Fhine Gall
Fingal County Council

An Roinn um Pleanáil agus
Infrastruchtúr Straitéseach
Planning and Strategic
Infrastructure Department

| | |
|---|---|
| **ENF No :** | 23/100B |
| **S.153 CE N o·** | PENF/0133/2023 |
| **S.154 CE No:** | PENF/0134 /2023 |

**COMHAIRLE CONTAE FHINE GALL**

**FINGAL COUNTY COUNCIL**

**IN THE MATTER OF THE LOCAL GOVERNMENT ACT 2001 (AS AMENDED)**

**AND IN THE MATTER OF THE PLANNING AND DEVELOPMENT ACT 2000 (AS AMENDED)**

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# ENFORCEMENT NOTICE
**Section 154 of the Planning and Develo pmentAct 2000 (as amended)**

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## DEVELOPMENT CARRIEDOUT IN NON-CONFORMITY WITH A GRANT OF PLANNING PERMISSION INCLUDING CONDITIONS

**To:** daa Public Limited Company,
Three, The Green,
Dublin Airport Central,
Dublin Airport,
Swords, Co. Dublin K67 X4X5

**Re:** **Lands at Dublin Airport, Co. Dublin ("*the Lands*").**
**Planning Permission for the North Runway - Planning Authority Reg. Ref No: F04A/1755 / ABP Ref. No: PL 06F.217429**
**Condition 5**

**WHEREAS** Fingal County Council ("*the Council*"), being the Planning Authority for the functional area in which the above mentioned Lands are located, having considered only the proper planning and sustainable development of the administrative area of Fingal County Council, including the preservation and improvement of the amenities thereof, any representations made to the Council under section 152(1)(a) of the Planning and Development Act 2000 (as amended), any

submissions or observations made under section 152(4)(b) of the Planning and Development Act 2000 (as amended) and any other material considerations, and having investigated the matter, has, in accordance with section 153 of the Planning and Development Act 2000 (as amended) decided to issue this Enforcement Notice.

**AND WHEREAS** subsequent to the 1st day of October 1964 and within seven years immediately preceding the date of this Notice, the following development is being carried out, and will continue to be carried out, in non-conformity with Condition 5 of the Planning Permission for the North Runway (Planning Authority Reg. Ref No: F04A/1755 / ABP Ref. No: PL 06F.217429) being the continued and ongoing exceedance of the permitted average number of night time aircraft movements at the airport being 65 aircraft movements per night namely between 2300 hours and 0700 hours (when measured over the 92 day modelling period as set out in the reply to the further information request received by An Bord Pleanála on the 5th day of March, 2007).

**AND WHEREAS** the reason for Condition 5 was to control the frequency of night flights at the airport so as to protect residential amenity having regard to the information submitted concerning future night time use of the existing parallel runway.

**YOU ARE HEREBY REQUIRED**, pursuant to section 154 of the Planning and Development Act 2000 (as amended) within **6 weeks** of the date of the service this Notice to proceed with the development in conformity with Condition 5 of the Planning Permission for the North Runway (Planning Authority Reg. Ref No: F04A/1755 / ABP Ref. No: PL 06F.217429) so that the average number of night-time (between 2300 hours and 0700 hours) aircraft movements at the airport is 65 aircraft movements per night or less - when measured over the 92-day modelling period;

**AND TAKE NOTICE** that you are further required to refund the Council the sum of €350.00 being the sum of costs and expenses reasonably incurred by it in relation to the investigation, detection and issue of this Enforcement Notice and any Warning Letter issued under s.152 of the Planning and Development Act 2000, as amended, including costs incurred in respect of the renumeration and other expenses of its employees, consultants and/or advisors pursuant to s.154(5)(d) of the Planning and Development Act 2000, as amended.

**AND TAKE NOTICE** that, if within the period specified above, or within such extended period (not being more than 6 months) as the Council may allow, the steps specified in this Notice to be taken are not taken, the Council may, insofar as same is relevant/applicable to the unauthorised development complained of herein, enter on

the land and take such steps, including the removal, demolition or alteration of any structure, and may recover any expenses reasonably incurred by them in that behalf.

**AND TAKE FURTHER NOTICE** that if, within the said period above, or within such extended period as may be allowed by the Council (not being more than six months), the steps in this Notice to be taken by you, have not been so taken, you may be guilty of an offence.

If the Council decides to prosecute you for non-compliance with this Notice and you are found guilty of an offence by the Courts, you may be liable on summary conviction to a fine not exceeding €5,000 and/or imprisonment for a term not exceeding 6 months or both or on conviction following trial on indictment to a fine not exceeding €12,697,381 and/or a term of imprisonment not exceeding 2 years or both.

You will further be liable on conviction for the costs and expenses of such prosecution.

**Dated:** The 28th day of July 2023

**Signed:** _____
**SENIOR PLANNER**

To whom the appropriate powers have been delegated by Order of CE 8539 of the Chief Executive, Fingal County Council.

**To be Served On:** daa Public Limited Company,
Three, The Green,
Dublin Airport Central,
Dublin Airport,
Swords, Co. Dublin K67 X4X5

**being the owner and person carrying out the unauthorised development.**

| Case No | Description: | Location: | Registration Date | Decision Date | Final Grant Date | Applicant |
|---|---|---|---|---|---|---|
| F24A/0965E | The provision of apron bus access facilities at Terminal 2, comprising the cons | In the townlands of Corballis, Terminal 2, Dublin Airport, Co. Dublin | 01/11/24 | | | DAA plc |
| F24A/0824E | DAA PLC intends to apply for Permission for development at this site (c. 0.19 Ha | Dublin Airport, Terminal 1 Arrivals, Terminal Complex, Collinstown, Swords, Co. Dublin | 12/09/24 | 06/11/24 | 10/12/24 | DAA PLC |
| F24A/0792E | DAA PLC intends to apply for Permission for development at this site (c. 0.19 Ha | Dublin Airport, Terminal 1 Arrivals, Terminal Complex, Collinstown, Swords, Co. Dublin | 04/09/24 | 09/09/24 | | DAA PLC |
| F20A/0553/C1/5 | Compliance with condition 5 of F20A/0553 | Terminal 1, Dublin Airport, Collinstown, Co. Dublin | 01/08/24 | 23/09/24 | | DAA plc |
| F24A/0650E | The demolition of an existing unoccupied dwelling and outbuildings, together wit | Toberbunny Lodge, Toberbunny, Swords Road, Cloghran, DUBLIN | 19/07/24 | 02/09/24 | 08/10/24 | Daa PLC |
| F23A/0636 | in the townlands of Pickardstown, Coultry, Huntsown, Forrest Green, Forrest | Dublin Airport, Swords, Co. Dublin | 27/06/24 | 21/08/24 | | DAA plc |
| FW24A/0253E | The proposed development will consist of: 1) the demolition of existing cattle p | a site of approximately 4.26ha, bounded by the South Parallel Road (R108) to th, Harristown Lane to the west, Horizon, In the townlands of Harristown | 14/06/24 | 08/08/24 | | Daa plc |
| F24A/0512E | The provision of an Aircraft Observation Facility on Old Airport Road (Collinsto | Airport Viewing Point, Old Airport Road (Collinstown Lane), Dublin Airport | 07/06/24 | | | DAA Plc |
| F23A/0121/C8/4iv | Condtion No 4ivv, Reg Ref F23A/0121. | Dublin Airport, Corballis, Co. Dublin | 21/05/24 | 25/06/24 | | DAA PLC |
| FW24A/0175E | The installation of an aircraft noise monitoring terminal on a standalone, tilta | Land within the car park of Ongar Community Centre, Ongar, Co. Dublin | 23/04/24 | 10/06/24 | 16/07/24 | daa PLC |
| F24A/0309E | We, daa plc, intend to apply for a temporary 7-year permission for a proposed de | 2no. landside sites, in the townlands of Collinstown, Co. Dublin Airport, Co. Dublin | 04/04/24 | 19/09/24 | 30/10/24 | daa plc |
| F24A/0160 | DAA proposes the installation of | Terminal 2 (Adjacent to), Dublin Airport, Corballis, Co. Dublin | 28/02/24 | 23/04/24 | 29/05/24 | DAA PLC |
| F23A/0781 | The proposed development relates to the entirety of the Airport | Dublin Airport Co. Dublin | 15/12/23 | | | DAA PLC |

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|---|---|---|---|---|---|---|
| F23A/0636 | in the townlands of Pickardstown, Coultry, Huntsown, Forrest Green, Forrest | Dublin Airport, Swords, Co. Dublin | 20/10/23 | | | DAA plc |
| F23A/0132 | The development will consist of | Land at and adjoining the North Apron at Dublin Airport,, Co. Dublin, in the townlands of Corballis and Cloghran | 13/10/23 | 07/12/23 | 20/02/24 | DAA PLC |
| F23A/0023 | The development will consist of: a 2-storey airside operations building | site between hanger 5 and M50 Garage, North Apron Airside Support, Dublin Airport, Castlemoate Road, Corballis, Swords, Co.Dublin | 27/07/23 | 03/10/23 | | Dublin Airport Authority (DAA) plc |
| F23A/0430 | For Plannning permisson for development on land within the grounds of Ballybough | Ballyboughal National School, Ballyboughal, Co. Dublin. | 14/07/23 | 07/09/23 | 17/10/23 | DAA PLC |
| F23A/0253 | The installation of an aircraft noise monitoring terminal on a standalone, | Ardgillan Community College, Castleland, Balbriggan, Co Dublin | 13/07/23 | 02/08/23 | 05/09/23 | DAA PLC |
| F23A/0414 | Planning permission for development on land within the grounds of St. Anne's | St. Anne's Church, Strand Road, Burrow, Portmarnock, Co. Dublin | 11/07/23 | 29/08/23 | 03/10/23 | daa plc. |
| F23A/0301 | The proposed development will consist of: (1) the reconfiguration and expansion | In the townlands of Corballis and Collinstown, Dublin Airport, Co. Dublin. | 31/05/23 | 24/07/23 | | daa plc |
| F23A/0258 | The development will consist of the installation of an aircraft | Donabate Community College, Portrane Road, Ballisk Common, Donabate, Co. Dublin | 16/05/23 | 06/07/23 | 15/08/23 | DAA PLC |
| F23A/0121 | The development is a modification to a previous permission for Airside | Dublin Airport, Corballis, Co. Dublin | 28/03/23 | 22/05/23 | 28/06/23 | DAA PLC |
| F23A/0104 | daa plc intend to seek planning permission for development | Terminal 1, Dublin Airport, Collinstown, Co.Dublin | 15/03/23 | 28/04/23 | 09/06/23 | daa plc |
| F23A/0039 | The proposed development subject of modification will consist of : i. Proposed | Dublin Airport, Corballis, Co. Dublin | 08/02/23 | 22/02/23 | | Daa plc |
| F22A/0460 | Intend to seek planning permission for development on 4no. sites | Townlands of Collinstown, Coultry, and Hunstown Co. Dublin, and in the townland of Pickardstown, Co. Dublin, and in the townland of Portmellick | 22/12/22 | 27/02/23 | | DAA PLC |

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| F21A/0518 | Planning permission for development which will consist of alterations to section | Departures routes to and from the Terminal 1 & Terminal 2 - Part of the central section of the Express Red Long-Term Car Park, Towlands of Corballis / Collinstown & Toberbunny, Dublin Airport, Dublin | 04/02/22 | 03/03/22 | 16/03/23 | DAA PLC |
| F21A/0673 | Development at site of c.5,889 square metres at Dublin Airport | In the Townland of Forrest Great at Dublin Airport, Co. Dublin | 10/12/21 | 10/02/22 | 24/03/22 | DAA PLC |
| F21A/0594 | Permission for the continuation of use of the existing site office structure | The Green, Dublin Airport Central, Dublin Airport, Swords, Co Dublin, K67 X4X5 | 02/11/21 | 04/01/22 | 08/02/22 | daa plc |
| F20A/0550 | For full planning permission to extend the North Apron in the Airfield at Dublin | Airfield in the townlands of, Cloghran, Corballis, Forrest Great, Forrest Little, Collinstown & Rock, Dublin Airport, Co Dublin | 14/10/21 | 08/12/21 | 13/07/22 | DAA PLC |
| F20A/0668 | A proposed development comprising the taking of a 'relevant action' only within | Dublin Airport, Co. Dublin. | 21/09/21 | 08/08/22 | | daa plc |
| F20A/0455 | Permission for alterations to sections of the existing internal road network and | Terminal 1 & Terminal 2 Forecourts, Townlands of Corballis and Collinstown, Dublin Airport, Co Dublin | 19/01/21 | 15/02/21 | | DAA plc |
| DAC/122/20 | Proposed construction of a new baggage handling/ancillary building | Terminal 1 Baggage Hall, Terminal 1, Dublin Airport, Collinstown, Co. Dublin. | 17/11/20 | 11/12/20 | | Dublin Airport Authority |
| F20A/0431 | Permission for alterations to sections of the existing internal road network and | Terminal 1 & Terminal 2 Forecourts, Townlands of Corballis and Collinstown, Dublin Airport, Co Dublin | 04/09/20 | 10/09/20 | | DAA PLC |
| F20A/0394 | 1) A glass and stainless-steel bus shelter, 2.50m high x 1.38m deep x 5.84m long | East of Terminal 1, Dublin Airport, Collinstown, Co. Dublin. | 12/08/20 | 30/09/20 | 06/11/20 | DAA plc |
| 20/4115 | The proposed works comprise of material alterations to the existing Pier 3 | Dublin Airport Authority, Head Office, Cloghran House, Dublin Airport, Co. Dublin | 06/07/20 | 26/11/20 | | Dublin Airport Authority |
| 20/4104 | It is proposed to remove the manual call point units in all areas | Dublin Airport, Terminal 1, Dublin Airport, Swords, Co. Dublin | 08/06/20 | 10/09/20 | | Dublin Airport Authority |
| 20/4080/7D | Proposed construction of a new baggage handling/ancillary building (to be known | Area C, Terminal 1, Dublin Airport, Fingal, Co. Dublin | 21/05/20 | 14/05/21 | | AMD Dublin Airport Authority |

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|---|---|---|---|---|---|---|
| 20/4048 | Proposed material alterations of an existing Bussing Lounge at | Pier 1, Terminal 1, Dublin Airport, Collinstown, Co. Dublin | 09/03/20 | 10/09/20 | | Dublin Airport Authority |
| 19/4274 | FSC application for a proposed construction of an animal welfare building | Dublin Airport, Swords Road, Collinstown Cross, Co. Dublin | 30/12/19 | 12/06/20 | | Dublin Airport Authority |
| 19/4275 | FSC application for a proposed construction of a single storey substation in | Dublin Airport, Swords Road, Collinstown Cross, Co. Dublin | 30/12/19 | 03/03/20 | | Dublin Airport Authority |
| 19/4200/Rev | Proposed material alteration of an existing store room at the roof top level of | Pier 2, Terminal 1, Dublin Airport, Collinstown, Co. Dublin | 05/09/19 | 28/11/19 | | Dublin Airport Authority |
| FS5/036/19 | Three questions in relation to the use by passengers of the airport in excess of | Dublin Airport, Co. Dublin | 03/09/19 | 17/09/19 | | daa |
| F19A/0023 | Amend the North Parallel Runway (North Runway)(permitted under FCC Reg. Ref | North Runway, Dublin Airport, Co. Dublin. | 19/07/19 | 09/08/19 | 18/03/20 | DAA |
| F19A/0302 | Minor alterations and retention of as built elements of the under construction D | Former western ancillary car park associated with the former Aer Lingus Head Office Building (HOB) & the former Annex building, Now known as Dublin Airport Central, Dublin Airport, Corballis, Swords, Co. Dublin. | 11/07/19 | 03/09/19 | 09/10/19 | DAA plc |
| DAC/082/19 | New 6 level multi storey car park building, 5 storeys + roof level, building A3 | Building A3, Dublin Airport Central, Dublin Airport, Co. Dublin | 06/06/19 | 19/08/19 | | DAA PLC |
| FS5/018/19 | Construction of a Security Gatepost (Security Gatepost 9A) and the demolition of | In the townland of Huntstown, Dublin Airport, Co. Dublin | 31/05/19 | 26/06/19 | | DAA |
| F19A/0049 | Development at a site at the Immigration Hall serving Pier 1 and Pier 2 and adjo | Terminal 1, Dublin Airport, Collinstown, Co. Dublin | 16/05/19 | 07/06/19 | 16/07/19 | DAA plc |
| DAC/065/19 | Proposed Material Alteration and Extension to the T1 Immigration Hall and Associ | T1 Immigration Hall, Link Building & Pier 1 Sky Bridge | 08/05/19 | 06/09/19 | | DAA PLC |
| DAC/050/19/Rev | Proposed 3rd floor subdivision into two office spaces of the previously approved | 3rd Floor, Building A1, Dublin Airport Central, Dublin Airport, Co. Dublin | 12/04/19 | 29/04/19 | | DAA PLC |

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| DAC/047/19 | New 7 storey office building. Building A2 of Dublin Airport Central, Cluster A, | Building A2, Dublin Airport Central, Dublin Airport, Co. Dublin | 11/04/19 | 03/05/19 | | DAA PLC |
| DAC/048/19 | New 7 storey office building. Building A5 of Dublin Airport Central, Cluster A, | Building A5, Dublin Airport Central, Dublin Airport, Co. Dublin | 11/04/19 | 03/05/19 | | DAA PLC |
| 19/4075/Rev | Proposed material alterations & extension to the previously approved FSC | T1 Immigration Hall, Link Building & Pier 1 Sky Bridge | 03/04/19 | 08/07/19 | | Dublin Airport Authority |
| 19/4056/Rev | Proposed 3rd floor subdivision into two office spaces of the previously | Building A1, 3rd Floor Dublin Airport Central, Dublin Airport, Co. Dublin | 13/03/19 | 06/06/19 | | DAA PLC |
| 19/4050 | The proposed building is a single storey bin storage building to be constructed | Building S3, Dublin Airport Central, Dublin Airport, Co. Dublin | 06/03/19 | 26/03/19 | | Brian Duffy (DAA PLC) |
| 19/4051 | The proposed building is a single storey bike storage building to be constructed | Building S4, Dublin Airport Central, Dublin Airport, Co. Dublin | 06/03/19 | 14/05/19 | | Brian Duffy (DAA PLC) |
| 19/4047 | The proposed building is a single storey cafe to be constructed adjacent to | Building A7, Dublin Airport Central, Dublin Airport, Co. Dublin | 04/03/19 | 24/07/19 | | Brian Duffy (DAA PLC) |
| 19/4042 | The proposed building is a multi storey car park building (5 levels plus roof | Building A3/A4, Dublin Airport Central, Dublin Airport, Co. Dublin | 27/02/19 | 23/09/19 | | Brian Duffy (DAA PLC) |
| 19/4043 | The proposed building is a 7 storey office building to be constructed adjacent | Building A5, Dublin Airport Central, Dublin Airport, Co. Dublin | 27/02/19 | 31/07/19 | | Brian Duffy (DAA PLC) |
| 19/4038 | The proposed building is a 7 storey office building to be constructed within the | Building A2, Dublin Airport Central, Dublin Airport, Co. Dublin | 22/02/19 | 09/07/19 | | Brian Duffy (DAA PLC) |
| CLASS32/001/19 | Notification in respect of proposed development in North Apron, Dublin Airport. | Dublin Airport, Co. Dublin. | 12/02/19 | | | DAA |
| DAC/012/19 | Proposed material alterations to create staff accommodation. | Bridge Link,, Terminal 1 To Former Pier C, Dublin Airport, Fingal, Co. Dublin | 05/02/19 | 26/02/19 | | Dublin Airport Authority |
| 18/4252 | Material alterations to Pier 2 as part of the Pier 2 Underpass Project at Dublin | Pier 2, Dublin Airport, Fingal, Co. Dublin | 19/12/18 | 21/05/19 | | David Devlin (DAA) |
| DAC/171/18 | Material alterations to pier 2 at part of the pier 2 underpass project at Dublin | Pier 2, Dublin Airport, Fingal, Co. Dublin | 19/12/18 | 15/02/19 | | Dublin Airport Authority (DAA) |
| DAC/126/18 | Installation of modular cabin consisting of an office and locker rooms. | Eastlands (Red) Longterm Carpark, Dublin Airport, Cloghran, Co. Dublin | 11/10/18 | 23/11/18 | | Dublin Airport Authority |
| 18/4141 | The proposed works include alterations to Unit R3001, R3017 & R3054 | Terminal 2, Dublin Airport, Co. Dublin | 20/07/18 | 17/12/18 | | John Blake, DAA |
| 18/4091/REV/7D | It is proposed to carry out material alterations to Pier 4 Transfers Extension a | Pier 4, Termial 2, Dublin Airport, Dublin, Fingal | 11/05/18 | 05/07/18 | | Dublin Airport Authority |

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| SID/01/18 | Permanent continuance of use of the existing 8,840 space long-term car park kno | Blue Car Park, South Parallel Road, Harristown, Sillogue and, Ballymun Townlands, Dublin Airport and, Express Red at Stockhole, Cloghran, Toberbunny Townlands, Dublin Airport, Co. Dublin | 18/04/18 | 08/10/18 | | daa plc |
| DAC/036/18 | A 3 Storey extension & internal alterations to Pier 4, dublin Airport to house a | Pier 4, Terminal 2, Dublin Airport, Co. Dublin | 22/03/18 | 25/04/18 | | Dublin Airport Authority (DAA) |
| DAC/188/17 | Construction of a one room steel dispatch cabin | Communications Hut, Stand 140L, Dublin Airport, Cloghran, Co. Dublin | 07/12/17 | 18/01/18 | | Dublin Airport Authority |
| DAC/181/17 | Construction of a one room steel dispatch cabin. | FedEx Communications Hut, West Apron, Dublin Airport, Cloghran, Co. Dublin | 28/11/17 | 17/01/18 | | Dublin Airport Authority |
| DAC/182/17 | Construction of a one room steel dispatch cabin | Ethiopian Airlines, Communications Hut, West Apron, Dublin Airport, Cloghran, Co. Dublin | 28/11/17 | 17/01/18 | | Dublin Airport Authority |
| DAC/171/17 | To construct a new communications room which will house IT equipment & make alte | Pier 2, Terminal 1, Dublin Airport, Co. Dublin | 14/11/17 | 15/12/17 | | Dublin Airport Authority (DAA AMD) |
| AC/133/17 | Proposed alteration in the existing ASU area including the fit-out of the fallow | ASU Area, Mezzanine Level, Terminal 1, Dublin Airport, Collinstown, Co. Dublin. | 19/09/17 | 10/11/17 | | Dublin Airport Authority |
| 17/4185/7D | Proposed Alterations in the existing ASU area including the fit-out of the | ASU Area, Mezzanine Level, Terminal 1, Dublin Airport, Collinstown, Co. Dublin. | 19/09/17 | 29/11/17 | | Dublin Airport Authority |
| DAC/097/17 | The development will consist of the erection of a single storey Pre-Boarding Zo | South Apron, Pre Boarding Zone Building, Dublin Airport, Co. Dublin | 19/07/17 | 07/09/17 | | AMD Dublin Airport Authority |
| DAC/041/17 | Airport Assembly - Pier 3 (Previously known as Pier B). Material Alteration to A | Pier 3 (Previously known as Pier B), Dublin Airport, Co. Dublin. | 28/03/17 | 12/05/17 | | Dublin Airport Authority |
| 17/4052/7D | Material Alterations to Pier 3 - Area C (Gates 302 & 303), at Apron Level | Pier 3 (Previously known as Pier B), Dublin Airport, Co. Dublin. | 24/03/17 | 12/06/17 | | David Devlin, DAA |

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| FS5/014/17 | Temporary site office | Land adjoining permitted Dublin Airport central development, adjacent to the former Aer Lingus Head office building, Corballis Drive, Dublin Airport | 23/03/17 | 11/04/17 | | Dublin Airport Authority |
| DAC/038/17 | Temporary material alteration within Pier 2 of Dublin Airport, this results in a | Pier 2, Terminal 1, Dublin Airport, Co. Dublin | 22/03/17 | 05/05/17 | | DAA |
| 17/4046 | Temporary material alteration within Pier 2 of Dublin Airport. Alteration will | Dublin Airport, Collinstown, Co. Dublin. | 13/03/17 | 05/05/17 | | Dublin Airport Authority |
| 17/4037 | Pier 4 is an existing airport pier which forms part of Terminal 2 in Dublin | Pier 4 Screens, Terminal 2, Dublin Airport, Co. Dublin. | 24/02/17 | 03/04/17 | | Stephen Byrne, DAA |
| DAC/014/17 | Proposed construction of a 6 storey office building, Building A1 of the Project | Building A1, Dublin Airport Central, Dublin Airport, Co. Dublin. | 03/02/17 | 23/03/17 | | DAA PLC |
| DAC/015/17 | Proposed construction of a 6 storey office building, Building A6 of the Project | Building A6, Dublin Airport Central, Dublin Airport, Co. Dublin. | 03/02/17 | 23/03/17 | | DAA PLC |
| DAC/016/17 | Proposed construction of a corridor link serving the existing car park and proje | Building A9, Dublin Airport Central, Dublin Airport, Co. Dublin. | 03/02/17 | 23/03/17 | | DAA PLC |
| FS5/007/17 | Erection of a roadside memorial | On realigned Naul Road (R108) | 26/01/17 | 20/02/17 | | Dublin Airport Authority |
| F04A/1755/E1 | To construct on airport lands, a runway, 3110m in length and 75m in width. The | Dublin Airport, Co. Dublin | 11/01/17 | 07/03/17 | | Dublin Airport Authority Plc,Head Office |
| 16/4242 | Proposed Construction of a 6 Storey Office Building, Building A1 of the Project | Building A1, Dublin Airport Central, Dublin Airport, Co. Dublin. | 22/12/16 | 31/05/17 | | Dublin Airport Authority |
| 16/4244 | Proposed Construction of a 6 Storey Office Building, Building A6 of the Project | Building A6, Dublin Airport Central, Dublin Airport, Co. Dublin. | 22/12/16 | 06/06/17 | | Dublin Airport Authority |
| 16/4245 | Proposed construction of an Ancillary Building, Building A10a of the development | Building A10a, Project Central, Cluster A, Dublin Airport. | 22/12/16 | 06/06/17 | | Dublin Airport Authority |
| 16/4246 | Proposed construction of an Ancillary building, Building A10b of the development | A10b, Project Central, Cluster A, Dublin Airport, Co. Dublin. | 22/12/16 | 06/06/17 | | Dublin Airport Authority |
| FS5/048/16 | Whether the decommissioning of petrol tanks | Former Texaco Garage, R132 Swords Road, Cloghran, Swords, County Dublin | 20/12/16 | 25/01/17 | | Dublin Airport Authority |

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| DAC/166/16 | Provision of Glazed Screens Across the Pier at Level 15(400C) to seperate Passen | AMD Deptarment, Dublin Airport Authority, 2nd. Floor, Cloghran House, Dublin Airport, Dublin, Co. dublin | 12/12/16 | 24/01/17 | | Dublin Airport Authority |
| 16/4221 | Construction of a c 2200 sq m pre-boarding building to the South Apron of | South Apron,, Dublin Airport,, Co. Dublin. | 29/11/16 | 26/01/17 | | DAA plc |
| FS5/037/16 | The installation of a temporary asphalt batching plant | Harristown Long Term Blue Car Park, R108, South Parallel Road, Sillogue, Dublin Airport | 20/09/16 | 13/10/16 | | Dublin Airport Authority |
| CLASS32/002/16 | Pedestrian security screening at Dublin Airport Fire Station | Dublin Airport | 05/08/16 | 30/08/16 | | DAA |
| CLASS32/001/16 | Temp security building | Dublin Airport | 12/07/16 | | | DAA |
| FS5/016/16 | Insertion of an additional area of glazing on the east elevation of Terminal 2 | Terminal 2, Dublin Airport, Co. Dublin. | 25/05/16 | 15/06/16 | | Dublin Airport Authority |
| DAC/049/16/Rev | The previously proposed ground floor sanitary facilities as per the previously a | DAA HOB, Dublin Airport, Co Dublin | 13/04/16 | 03/05/16 | | Dublin Airport Authority |
| DAC/002/16 | Existing 7 storey office development. | TASC Building,, Dublin Airport | 07/01/16 | 07/03/16 | | Dublin Airport Authority |
| 15/4239 | Proposed Material Alterations of the existing ground floor plant room | TASC, Dublin Airport, Co. Dublin. | 22/12/15 | 16/02/16 | | Dublin Airport Authority |
| 15/4221 | Reconfiguration and fit-out of the existing Mezzanine Restaurant area and | Terminal 1, Dublin Airport, Co. Dublin. | 04/12/15 | 31/05/16 | | Dublin Airport Authority |
| DAC/162/15 | Reconfiguration and fit-out of the existing Mezzanine Restaurant area | Terminal 1, Dublin Airport, Co. Dublin. | 04/12/15 | 23/08/16 | | Dublin Airport Authority |
| DAC/149/15 | The proposed works comprise of Material Alterations to the existing Pier 3 at | Pier 3, Dublin Airport, Co. Dublin. | 03/11/15 | 14/12/15 | | Dublin Airport Authority |
| 15/4203/7D | The proposed works comprise of Material Alterations to the existing Pier 3 at | Pier 3, Dublin Airport, Co. Dublin. | 28/10/15 | 15/02/16 | | Dublin Airport Authority |
| DAC/142/15 | Reconfiguration and fit-out of the existing evacuation area N (back of house are | Exacuation Area N, Pier 4 (Prev known as Pier E), Terminal 2, Dublin Airport, Co Dublin | 20/10/15 | 14/12/15 | | Dublin Airport Authority Group |
| FS5/041/15 | The provision of Terminal support facilities at Second Floor Mezzanine Level wit | Terminal 2 - Second Floor Mezzanine Level, Dublin Airport, Co. Dublin | 16/10/15 | 05/11/15 | | Dublin Airport Authority |
| FS5/028/15 | Airbridge equipment at Dublin Airport | Pier 4, Terminal 2, Dublin Airport, Co. Dublin | 31/07/15 | 25/08/15 | | Dublin Airport Authority |

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| FS5/029/15 | Alteration to southern facade of Pier 2 for provision of new glass doors | Dublin Airport Authority, Head Office, Cloghran House, Dublin Airport, Co. Dublin | 31/07/15 | 25/08/15 | | Dublin Airport Authority |
| FS5/026/15 | Modifications to Existing Facade at Terminal 1 Arrivals Hall to include replacem | Terminal 1 - Arrivals, Dublin Airport, Co. Dublin | 13/07/15 | 27/07/15 | | Dublin Airport Authority |
| FS5/025/15 | Extension of the existing concrete apron adjacent to the Ven Air Hanger | Dublin Airport, Co. Dublin | 07/07/15 | 27/07/15 | | Dublin Airport Authority |
| 15/4128 | Proposed material alterations of the previously approved Fire Safety Certificate | HOB Office, Dublin Airport. | 01/07/15 | 18/11/15 | | Dublin Airport Authority |
| DAC/024/15 | Disabled Access Certificate for the Construction of a Temporary Extension | Pier 1 (Previously known as Pier D), Dublin Airport, Co. Dublin. | 16/03/15 | 08/04/15 | | DAA/ P. Molloy & E. Kelly |
| 15/4029/7D | Fire Safety Certificate Application for the Construction of a Temporary | Pier 1 (Previously known as Pier D), Dublin Airport, Co. Dublin. | 02/03/15 | 22/04/15 | | P. Molloy & E. Kelly, DAA |
| 15/4014/7D | Provision of a new single storey security cabin extension (11 sq m) to the rear | Gate Post 1A, off Castlemoate Road, Dublin Airport. | 09/02/15 | 26/02/15 | | DAA |
| DAC/013/15 | Provision of a new single storey security cabin (11 sqm) that consists of a secu | Gate Post 1A, off Castlemoate Road, Dublin Airport. | 09/02/15 | 11/02/15 | | Dublin Airport Authority |
| 14DR/018 | Provision of single storey Security Gate Post 22 (Portacabin type building) to i | Security Post (Gate 22), Along perimeter boundary fence, at Junction of Swords Rd R132 and, Collinstown Lane (Old Airport Rd), Collinstown Cross, Dublin 9 | 22/12/14 | 06/01/15 | | Dublin Airport Authority |
| 14/4162 | Provision of single storey security gatepost (portacabin type building) to | Junction Swords Road (R132) & Collinstown Lane (Old Airport Road), Collinstown Cross, Co. Dublin. | 08/12/14 | 26/01/15 | | Dublin Airport Authority |
| DAC/115/14 | The proposed construction of a new Gate Post & security building | Security Post 4, Access Road, Dublin Airport. | 24/11/14 | 08/12/14 | | Dublin Airport Authority |
| DAC/102/14 | The existing six storey building is being reduced in size and subdivided into 2 | DAA HOB Office Building, Dublin Airport, Co. Dublin. | 30/10/14 | 04/12/14 | | Dublin Airport Authority |
| 14/4135 | The existing six storey building is to be reduced in size and sub-divided into 2 | DAA HOB Office Building, Dublin Airport, Co. Dublin. | 29/10/14 | 19/02/15 | | Dublin Airport Authority |
| F14A/0436 | Refurbishment works to the existing 6-storey office building (c.10,836 sq.m gfa) | The Former Aer Lingus Head Office Building (HOB), Corballis Drive, Dublin Airport, Co. Dublin. | 24/10/14 | 17/12/14 | 28/01/15 | Dublin Airport Authority Plc (daa) |

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| F14A/0260 | The temporary change of use for a maximum period of 5 no. years of the existing | Western Ancillary Car Park associated with the former Aer Lingus Head Office Building, Corballis Drive, Dublin Airport, Corballis, Co. Dublin. | 26/06/14 | 14/08/14 | 22/09/14 | Dublin Airport Authority plc (daa) |
| DAC/037/14 | Material alterations to the existing Airside Retail Street at Departures Level o | Terminal 1, Dublin Airport, Co. Dublin. | 08/05/14 | 10/06/14 | | Dublin Airport Authority |
| F14A/0149 | Erection of 1 no. backlit advertising sign to be affixed to the facade adjacent | Lobby 2, Terminal 1, Terminal 1 Arrivals Road, Dublin Airport, Co. Dublin. | 14/04/14 | 30/05/14 | 07/07/14 | Dublin Airport Authority plc (daa) |
| F13A/0352 | Placement of a cafe-van type structure | Coach Park, Dublin Airport, Atrium Exit Road, Corballis, Co. Dublin. | 06/03/14 | 01/04/14 | 06/05/14 | Dublin Airport Authority |
| 14/4035 | Material alterations to the existing Airside Retail Street at Departures Level | Terminal 1, Dublin Airport, Co. Dublin. | 06/03/14 | 09/09/14 | | Dublin Airport Authority |
| F14A/0004 | Partial change of use of a portion of the ground floor only (284.6sq.m.) from | Old Central Terminal Building (O.C.T.B.), Dublin Airport, Collinstown, Co. Dublin. | 06/01/14 | 27/02/14 | 07/04/14 | Dublin Airport Authority plc (DAA) |
| F13A/0341 | Placement of a caravan type structure. The total area of a van would be 11sq.m. | Coach Park, Dublin Airport, Atrium Exit Road, Corballis, Co. Dublin. | 12/09/13 | 16/09/13 | | Dublin Airport Authority plc (DAA) |
| DAC/092/13 | Extension and refurbishment of US CBP at ground floor. Additional floor area 486 | US CBP, Customs and Border Protection, Ground Floor, Pier 4, Terminal 2, Dublin Airport | 29/08/13 | 09/09/13 | | Dublin Airport Authority |
| 13/4106 | The development consists of the extension and refurbishment to US CBP | US CBP, Customs and Border Protection, Ground Floor, Pier 4, Terminal 2, Dublin Airport | 29/08/13 | 07/01/14 | | Dublin Airport Authority |
| 13/4057 | The proposal is for a prefabricated unit totalling 57.7 sq.m. in area and | Gate Post 22A, off Collinstown Lane, Dublin Airport, Co. Dublin. | 25/04/13 | 24/07/13 | | Dublin Airport Authority |
| DAC/053/13 | Prefabricated unit totalling 57.7 sqm in area and comprises a security screening | Gate Post 22A, off Collinstown Lane, Dublin Airport, Co Dublin | 25/04/13 | 08/05/13 | | Dublin Airport Authority |
| F13A/0094 | Permission for demolition and clearance at what is known as | Iona Hangar, R108 Regional Road, Huntstown, Dublin Airport, Co. Dublin | 20/03/13 | 08/05/13 | 11/06/13 | Dublin Airport Authority plc (DAA) |
| F13A/0094 | Permission for demolition and clearance at what is known as | Iona Hangar, R108 Regional Road, Huntstown, Dublin Airport, Co. Dublin | 20/03/13 | 08/05/13 | 11/06/13 | Dublin Airport Authority plc (DAA) |

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| DAC/128/12 | New Airside/Landside Security Screening Post | Gate Post 1A, off Castlemoate Road, Dublin Airport, Co Dublin | 07/11/12 | 17/12/12 | | Dublin Airport Authority |
| 12/4164 | The building is 14.95 x 11.7m internally and comprises a security screening area | Gate Pose 1A, off Castlemoate Road, Dublin Airport, Co. Dublin. | 07/11/12 | 19/12/12 | | Dublin Airport Authority |
| F12A/0216 | The replacement of 2 no. existing back-lit advertising signs with 2 no. new back | Corballis Road North, Dublin Airport, Co Dublin | 12/07/12 | 04/09/12 | 09/10/12 | Dublin Airport Authority (DAA) |
| 10/4089 | It is proposed to carry out a major upgrade to the fire strategy for the | Terminal 1, Dublin Airport, Co. Dublin. | 18/06/12 | 07/10/13 | | Dublin Airport Authority |
| 12/4022 | Material alteration of existing exit route and sanitary facilities to a defined | Level 10 Airside, Terminal 2, Dublin Airport | 01/03/12 | 13/07/12 | | Dublin Airport Authority |
| 12/4006/Rev | Modifications to the previously approved layouts including changes to escape | Terminal 2, Pier E And The Energy Centre, Dublin Airport, Fingal, Co. Dublin | 23/01/12 | 13/07/12 | | Dublin Airport Authority |
| F11A/0378 | Development comprising alterations to the external elevations of the existing st | Personnel & Catering Building (PCB), Corballis Park, Dublin Airport, Co. Dublin | 25/10/11 | 13/12/11 | 24/01/12 | Dublin Airport Authority plc (DAA) |
| F11A/0369 | The erection of a jet-blast screen on the airfield apron between Piers A and D a | Dublin Airport, Co. Dublin | 11/10/11 | 30/11/11 | 10/01/12 | Dublin Airport Authority plc (DAA) |
| F11A/0333 | The installation of 13 no. banner advertisement signs. The proposed banners are | Terminal 2 Forecourt And, Corballis Road South, Dublin Airport, Co Dublin | 07/09/11 | 27/10/11 | 07/12/11 | Dublin Airport Authority plc (DAA) |
| F11A/0238 | Permission for an increase in on-site storage of Potassium Acetate (de-icing flu | The Airfield Maintenance Base, Colinstown Lane, Dublin Airport, Co Dublin | 22/06/11 | 08/08/11 | 13/09/11 | Dublin Airport Authority Plc (DAA) |
| SID/01/11 | Long Term Car Park for 8840 spcaes | Harristown Long Term Blue Car Park, R108, South Parallel Road, Sillogue, Dublin Airport | 03/03/11 | | | Dublin Airport Authority |
| DAC/004/11 | The building is 4m high and 12mx27m in plan. The building is fabricated from 9 m | Gate 32, Dublin Airport, Co Dublin | 17/01/11 | 11/03/11 | | Dublin Airport Authority |
| 11/4006 | The building is 4m high and 12m x 27m in plan. The building is fabricated from 9 | Gate 32, Dublin Airport, Co Dublin | 17/01/11 | 11/04/11 | | Dublin Airport Authority |
| 10/4193 | Construction of a small single storey taxi kiosk facility for use by airport | Terminal 2 Check-In Building, Dublin Airport., (taxi Kiosk To Front). | 27/10/10 | 18/11/10 | | Dublin Airport Authority |
| 10/4134/REV | Reduction in the number of levels of carparking and omission of previously | DAA Multistorey Car Park, Dublin Airport, Co. Dublin. | 26/08/10 | 24/11/10 | | Dublin Airport Authority |

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| F10A/0289 | The installation of 7 low level advertising signs and structures within the pass | Terminal 2, Dublin Airport, Townland Of Corballis, Barony Of Coolock, Co Dublin | 20/07/10 | 09/09/10 | 21/10/10 | Dublin Airport Authority |
| F10A/0110 | Retention of the concrete hard area of 332.95sq.m. and planning permission also | Dublin Airport, Huntstown, In The Barony Of Nethercross, Co. Dublin | 13/07/10 | 06/08/10 | 14/09/10 | Dublin Airport Authority |
| 10/4101 | It is proposed to subdivide one unit into 5 smaller units. This Fire Safety Ce | Unit RT03, Units 1-5, Level 30, Terminal 2, Dublin Airport, Co. Dublin | 29/06/10 | 12/10/10 | | Eanan O'Doherty Dublin Airport Authority |
| DAC/069/10 | Life safety systems upgrade requiring minor material alterations to arrivals | Terminal 1, Dublin Airport, Collinstown, Co. Dublin | 29/06/10 | 14/07/10 | | Dublin Airport Authority plc |
| 10/4073 | Revised fire safety certificate application to address design modifications and | Terminal 2, Dublin Airport. | 25/05/10 | 03/08/10 | | Dublin Airport Authority |
| DAC/033/10 | Airside passenger corridor between existing Pier B and Pier C of Dublin Airport | Dublin Airport, Townland Of Collinstown Barony Of Coolock, Co. Dublin. | 22/03/10 | 06/05/10 | | Dublin Airport Authority |
| 10/4032 | Works comprise the provision of a new pedestrian link (Airside) between | Pier B Connectivity Unit, Dublin Airport, Co. Dublin. | 18/03/10 | 19/07/10 | | DAA (Dublin Airport Authority) |
| F10A/0089 | Retention of the concrete hard area of 332.95sq.m. and planning permission also | Dublin Airport, Huntstown, In The Barony Of Nethercross, Co. Dublin | 12/03/10 | 16/03/10 | | Dublin Airport Authority |
| DAC/010/10 | Terminal linked multi storey car park | Terminal 2, Multi Storey Car Park, Dublin Airport, Co Dublin | 16/02/10 | 25/03/10 | | Dublin Airport Authority |
| F09A/0626 | The development will consist of: an airside link corridor for transferring passe | Dublin Airport, Townland Of Collinstown, Barony Of Coolock, Co. Dublin | 08/12/09 | 09/02/10 | 18/03/10 | Dublin Airport Authority |
| F09A/0397 | Alteration to the previously approved planning application Ref. F08A/1261 and wi | Main Terminal Building 1, Dublin Airport, Collinstown, Co Dublin | 23/07/09 | 14/09/09 | 21/10/09 | Dublin Airport Authority Plc |
| F09A/0362 | The following advertising signage: 1) Replacement of two high level static signs | Dublin Airport, Collinstown & Barony Of Coolock, Co Dublin | 08/07/09 | 31/08/09 | | Dublin Airport Authority |
| 09/4112 | A two-storey extension to the north-west gable of the existing fire station. The | Dublin Airport Fire Station, Huntstown, Co. Dublin. | 02/07/09 | 20/11/09 | | Dublin Airport Authority |
| 09/4088 | Decommission and remove an escalator and stairs from use and infill the floor | Pier D - Hughes & Hughes Retail Unit, Pier D, Dublin Airport, Dublin | 25/05/09 | 15/04/10 | | Dublin Airport Authority |

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| F09A/0164 | Two-storey extension to the north-western gable end of the existing Fire Station | Dublin Airport Fire Station, Huntstown, Co. Dublin | 31/03/09 | 22/05/09 | 30/06/09 | Dublin Airport Authority PLC |
| 09/4052 | The building has two previously approved Fire Safety Certificates (Refs: | Terminal 1, Dublin Airport, Co. Dublin. | 30/03/09 | 14/04/09 | | Dublin Airport Authority |
| F09A/0159 | Retention permission for alterations to already approved planning application (R | Stockhole, Cloghran, Co Dublin | 27/03/09 | 18/05/09 | 24/06/09 | Dublin Airport Authority |
| 09/4048 | Single storey extension to G.N.I.B. and vertical circulation improvements for | Link Building And Pier D, Dublin Airport, Collinstown, Co. Dublin. | 24/03/09 | 11/05/09 | | Dublin Airport Authority |
| F09A/0092 | A single storey extension (58 sq.m.) to existing west end Substation located adj | Dublin Airport, Harristown, Co Dublin | 25/02/09 | 20/04/09 | 29/05/09 | Dublin Airport Authority |
| F09A/0055 | The development will consist of the retention of one generator and one oil stora | Southeast Of The Airport Roundabout, Adjacent To ESB Sublstation, Dublin Airport, Collinstown, Co. Dublin | 05/02/09 | 31/03/09 | 08/05/09 | Dublin Airport Authority |
| F09A/0010 | Retention of the existing single storey temporary passenger aircraft pier facili | Dublin Airport Collinstown, Co. Dublin. | 14/01/09 | 09/03/09 | 17/04/09 | Dublin Airport Authority |
| F08A/1441 | Retention and extension of duration of previously granted planning permission fo | Dublin Airport Collinstown, Co. Dublin. | 23/12/08 | 05/01/09 | | Dublin Airport Authority |
| 08/4419 | Renovation and extension of VIP facilities. | Ground Floor Pier A & Ground Floor Collinstown House, Dublin Airport, Collinstown, Co. Dublin. | 23/12/08 | 17/02/09 | | Dublin Airport Authority |
| 08/4421 | It is proposed to fit out Unit 501 at the new Terminal 1 extension at Dublin | Unit 501, Terminal 1, Dublin Airport, Co. Dublin. | 23/12/08 | 11/03/09 | | Dublin Airport Authority |
| 08/4422 | It is proposed to fit out Unit 502 at the new Terminal 1 extension at Dublin | Unit 502, Terminal 1, Dublin Airport, Co. Dublin. | 23/12/08 | 11/03/09 | | Dublin Airport Authority |
| 08/4423 | It is proposed to fit out Unit 504 at the new Terminal 1 extension at Dublin | Unit 504, Terminal 1, Dublin Airport, Co. Dublin. | 23/12/08 | 11/03/09 | | Dublin Airport Authority |
| 08/4424 | it is proposed to fit out Unit 505 at the new Terminal 1 extension at Dublin | Unit 505, Terminal 1, Dublin Airport, Co. Dublin. | 23/12/08 | 10/03/09 | | Dublin Airport Authority |
| 08/4425 | It is proposed to fit out Unit 506 at the new Terminal 1 extension at Dublin | Unit 506, Terminal 1, Dublin Airport, Co. Dublin. | 23/12/08 | 19/03/09 | | Dublin Airport Authority |
| 08/4426 | It is proposed to fit out Unit 507 at the new Terminal 1 extension at Dublin | Unit 507, Terminal 1, Dublin Airport, Co. Dublin. | 23/12/08 | 11/03/09 | | Dublin Airport Authority |
| 08/4427 | It is proposed to fit out Unit 508 at the new Terminal 1 extension at Dublin | Unit 508, Terminal 1, Dublin Airport, Co. Dublin. | 23/12/08 | 02/04/09 | | Dublin Airport Authority |

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| 08/4428 | It is proposed to fit out Unit 509 at the new Terminal 1 extension at Dublin | Unit 509, Terminal 1, Dublin Airport, Co. Dublin. | 23/12/08 | 17/04/09 | | Dublin Airport Authority |
| 08/4412 | Relocation of direct retail unit from current location in Pier A/D Link Building | Temporary Retail Unit, Pier A/D Link Corridor, Departures Level, Main Terminal Building, Dublin Airport. | 19/12/08 | 21/01/09 | | Dublin Airport Authority |
| F08A/1099 | Construction of a new storm water attenuation tank within the townland of Cloghr | Townland Of Cloghran In The Eastlands Car Park Area, Dublin Airport, Co. Dublin | 20/11/08 | 15/12/08 | 30/01/09 | Dublin Airport Authority |
| 08/4384 | Material alterations to ground floor and first floor of Pier D at Dublin | Pier D, Dublin Airport, Co. Dublin. | 18/11/08 | 28/01/09 | | DAA |
| 08/4376 | It is proposed to fill in a void in the floor adjacent to the restaurants at | Mezzanine Level, Main Terminal Building, Dublin Airport. | 17/11/08 | 29/01/09 | | Dublin Airport Authority |
| 08/4367 | The extension to the Terminal 1 building at Dublin Airport has a previously | Terminal 1, Dublin Airport, Co. Dublin. | 04/11/08 | 11/03/09 | | Dublin Airport Authority |
| F08A/1261 | The development will consist of the installation of new large scale wayfinding s | Main Terminal Building 1, Terminal 2 And Entrance To Airport Campus Adjacent To M1 Roundabout, Dublin Airport, Collinstown, Co. Dublin | 31/10/08 | 16/12/08 | 30/01/09 | Dublin Airport Authority |
| 08A/0782 | Alterations to a previously approved planning application for a development know | Dublin Airport, In The Townland Of Collinstown, Barony Of Coolock, Co. Dublin | 21/10/08 | 14/11/08 | 22/12/08 | Dublin Airport Authority |
| 08/4357 | Material alterations from Information Desk to a Kiosk, Level 1, Pier D, Dublin | Kiosk Unit, Level 1, (Departures Level), Pier D, Dublin Airport. | 17/10/08 | 15/12/08 | | Dublin Airport Authority |
| 08/4346 | Material alterations associated with fit-out of stores and office at Pier D | Pier D, Dublin Airport, Co. Dublin. | 03/10/08 | 18/12/08 | | Dublin Airport Authority |
| F08A/1084 | The development will consist of: the removal of backfilling of an existing under | Dublin Airport, In The Townland Of Collinstown, Barony Of Coolock, Co. Dublin | 04/09/08 | 28/10/08 | 03/12/08 | Dublin Airport Authority |
| F08A/1025 | Alterations to the alignment of the campus roads and coach park location, previo | Dublin Airport, In The Townland Of Collinstown, Barony Of Coolock, Co. Dublin | 19/08/08 | 10/10/08 | 20/11/08 | Dublin Airport Authority |
| F08A/1017 | A ground floor and first floor extension to the southwest end of the Pier D Link | Ground Floor And First Floor Pier D, Link Building, Dublin Airport, Collinstown, Co Dublin | 15/08/08 | 07/10/08 | 13/11/08 | Dublin Airport Authority plc |
| F08A/1018 | A single storey flat roof extension of the existing Garda National Immigration B | Ground Floor, Link Building, Dublin Airport, Collinstown, Co Dublin | 15/08/08 | 07/10/08 | 13/11/08 | Dublin Airport Authority plc |

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| F08A/0983 | The development will consist of: A ground floor and first floor extension to the | Ground Floor And First Floor Pier D Link Building, Dublin Airport, Collinstown, Co. Dublin | 08/08/08 | 12/08/08 | | Dublin Airport Authority Plc |
| F08A/0916 | The development will consist of: A single storey flat roof extension of the exi | Ground Floor, Link Building, Dublin Airport, Collinstown, Co Dublin | 22/07/08 | 29/07/08 | | Dublin Airport Authority Plc |
| 08/4217 | Material alterations associated with the conversion of existing car hire desk to | DAA Office, Arrivals Levels, Terminal 1, Dublin Airport | 13/06/08 | 12/08/08 | | Dublin Airport Authority |
| 8/4206 | Material alterations associated with fit out of airline accommodation at Pier D | Airline Accommodation Fit Out, Pier D, Dublin Airport. | 10/06/08 | 06/08/08 | | Dublin Airport Authority |
| 08/4202 | Water storage reservoir control building and pumping station. | Townland Of Cloghran Beside Castlemoate House Road, Dublin Airport, Proposed Airport Reservoir Control Building And Pumping Station. | 06/06/08 | 22/08/08 | | Dublin Airport Authority |
| F08A/0667 | Alterations to a previously approved planning application for a development know | Dublin Airport, In The Townland Of Collinstown, Barony Of Coolock, Co. Dublin | 28/05/08 | 05/06/08 | | Dublin Airport Authority |
| 08/4150 | Internal fit-out of existing office building and separation from adjacent | Old DHL Office Building, Corballis Park, Dublin Airport. | 16/04/08 | 04/07/08 | | Dublin Airport Authority |
| F08A/0426 | The installation of a two-storey system building on the northwestern gable end o | Fire Station, Dublin Airport, Huntstown, Co Dublin | 09/04/08 | 28/05/08 | 02/07/08 | Dublin Airport Authority Plc |
| F08A/0405 | The development will consist of: the renovation and expansion of the existing VI | Ground Floor Pier A & Ground Floor Collinstown House, Dublin Airport, Collinstown, Co. Dublin | 02/04/08 | 21/05/08 | 25/06/08 | Dublin Airport Authority |
| 08/4093 | Proposed car wash control kiosks. | "Block 2", Stockhole, Cloghran, Co. Dublin., (Airport Car Hire Facilities). | 14/03/08 | 04/06/08 | | Dublin Airport Authority |
| 08/4064 | Existing area previously used as circulation space with travellators providing | Pier A-D Shop, Link Building, Main Terminal, Dublin Airport. | 28/02/08 | 13/06/08 | | Dublin Airport Authority |
| F08A/0192 | The installation of a two-storey system building on the northwestern gable end o | Fire Station, Dublin Airport, Huntstown, Co Dublin | 20/02/08 | 26/02/08 | | Dublin Airport Authority Plc |
| 08/4048 | Existing retail unit proposed extension into adjacent concourse area. | Retail Unit, Multi Storey Car Park, Ground Floor Concourse, Dublin Airport. | 19/02/08 | 12/05/08 | | Dublin Airport Authority |
| F08A/0021 | Erection of signage to the Cityjet Hangar at Dublin Airport, consisting of four | Dublin Airport, Huntstown, Barony Of Nethercross, Co. Dublin. | 14/01/08 | 03/03/08 | 09/04/08 | Dublin Airport Authority |

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| F08A/0023 | Alterations to Pier E which was previously approved as part of the development k | Dublin Airport, In The Townland Of Collinstown, Barony Of Coolock, Co. Dublin | 14/01/08 | 03/03/08 | 09/04/08 | Dublin Airport Authority |
| 08/4002 | Development consists of : a two storey temporary office building subdivided into | Dublin Airport - South Apron, Terminal 2, South Of Cargo Buildings. | 08/01/08 | 14/03/08 | | Dublin Airport Authority |
| F07A/1696 | Erection of signage to the Cityjet Hangar at Dublin Airport, consisting of four | Dublin Airport, Huntstown, Barony Of Nethercross, Co. Dublin. | 21/12/07 | 04/01/08 | | Dublin Airport Authority |
| F07A/1526 | Alterations to a single storey over basement energy centre, previously approved | Pier C At Dublin Airport, In The Townland Of Collinstown, Barony Of Coolock, Co. Dublin | 22/11/07 | 23/01/08 | 29/02/08 | Dublin Airport Authority |
| F07A/1504 | Alterations to a previously approved development, known as Terminal 2 (Register | Termindal 2, Dublin Airport, Townland Of Collinstown, Barony Of Coolock, Co Dublin | 19/11/07 | 18/01/08 | 29/02/08 | Dublin Airport Authority |
| 07/4415 | Proposed single storey boiler house at Aer Lingus Head Office, Dublin Airport | Aer Lingus Head Office, Dublin Airport, Co. Dublin. | 24/10/07 | 11/01/08 | | Dublin Airport Authority |
| 07/4416 | Proposed single storey boiler house at TASC, Dublin Airport, Co. Dublin. | TASC, Dublin Airport, Co. Dublin. | 24/10/07 | 11/01/08 | | Dublin Airport Authority |
| F07A/1332 | Upgrade to existing boiler facility in the horseshoe area of Dublin Airport Camp | Dublin Airport | 18/10/07 | 07/12/07 | 25/01/08 | Dublin Airport Authority |
| F07A/1336 | Construction of a new potable water storage reservoir within the townland of Clo | Townland Of Cloghran Beside Castlemoate House Road, Dublin Airport, Co. Dublin | 18/10/07 | 11/12/07 | 25/01/08 | Dublin Airport Authority |
| 07/4405 | Material alterations to ground floor level Area C, Pier D, Dublin Airport. | Pier D, Dublin Airport, Co. Dublin. | 16/10/07 | 19/12/07 | | Dublin Airport Authority |
| F07A/1298 | Upgrade to existing boiler facility in the horseshoe area of Dublin Airport Camp | Dublin Airport | 12/10/07 | 19/10/07 | | Dublin Airport Authority |
| F07A/1164 | Temporary planning permission for 5 years. The development will consist of: a t | South Of The Cargo Buildings, Dublin Airport, Townland Of Collinstown, Barony Of Coolock, Co Dublin | 18/09/07 | 09/11/07 | 19/12/07 | Dublin Airport Authority |
| F07A/0754 | The erection of a Fire Simulation Rig, circa 1,200 metres squared, with associat | Dublin Airport Authority Fire Station, Townland Of Huntstown, Dublin Airport, Co Dublin | 11/09/07 | 05/10/07 | 13/11/07 | Dublin Airport Authority Plc |
| 07/4357 | The proposed extension to the airport comprises three levels and will be provide | Terminal 1, Dublin Airport, Co. Dublin. | 10/09/07 | 04/07/08 | | Dublin Airport Authority |

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| F07A/1117 | The construction of an alternative exit onto Corballis Road South to serve exist | Cloghran House, Dublin Airport, Corballis, Co. Dublin | 06/09/07 | 26/10/07 | 04/12/07 | Dublin Airport Authority |
| 07/4352 | Extension and material alterations to a mixed use building. | Block 2, Stockhole, Cloghran, Co. Dublin. | 04/09/07 | 12/10/07 | | Dublin Airport Authority |
| 07/4353 | Extension and material alterations to a mixed use building. | Block 3, Stockhole, Cloghran, Co. Dublin. | 04/09/07 | 12/10/07 | | Dublin Airport Authority |
| F07A/1064 | Temporary planning permission for 5 years for development to the south of the ca | Dublin Airport, In The Townland Of Collinstown, Barony Of Coolock, Co. Dublin | 23/08/07 | 11/09/07 | | Dublin Airport Authority |
| F07A/1049 | The construction of an alternative exit onto Corballis Road South to serve exist | Cloghran House, Dublin Airport, Corballis, Co. Dublin | 17/08/07 | 22/08/07 | | Dublin Airport Authority |
| 7A/0523 | The development is primarily of a new substation consisting of a new medium volt | North East & South East Of The Cuckoo Stream, Adjacent R132 Dublin Airport, Co Dublin | 07/08/07 | 28/08/07 | 04/10/07 | Dublin Airport Authority |
| F07A/0916 | The construction of an alternative exit onto Corballis Road South to serve exist | Cloghran House, Dublin Airport, Corballis, Co. Dublin | 20/07/07 | 10/08/07 | | Dublin Airport Authority |
| F06A/0795 | Temporary change of use to part of the second floor (Departures Floor) of Multi | Second Floor (Departures Level) Of Multi Storey Car Park, Block A Dublin Airport, Co. Dublin | 11/07/07 | 03/08/07 | 13/09/07 | Dublin Airport Authority |
| 07/4209 | Proposed HV sub station and ESB control room. | Dublin Airport, Co. Dublin. | 13/06/07 | 17/08/07 | | Dublin Airport Authority |
| 07/4210 | Proposed HV sub station and ESB control room. | Dublin Airport, Co. Dublin. | 13/06/07 | 17/08/07 | | Dublin Airport Authority |
| F07A/0473 | Alterations to already approved planning application (Reg. Ref. F06A/1624). The | Stockhole, Cloghran, Co. Dublin | 18/04/07 | 11/06/07 | 18/07/07 | Dublin Airport Authority |
| F07A/0423 | Erection and installation of 2 no. oil tanks | Dublin Airport, Huntstown, In The Barony Of Nethercross, Co. Dublin | 05/04/07 | 29/05/07 | 11/07/07 | Dublin Airport Authority |
| F07A/0093 | Development of an extension to the existing adjoining ground level long term car | South Lands Car Park, Harristown, Dublin Airport, Co. Dublin | 02/04/07 | 26/04/07 | 13/06/07 | Dublin Airport Authority |
| 07/4113 | A. Demolition of existing DAA and Airline Offices. B. Construction of | Pier A And D Centralized Immigration Area, Ground Floor, Pier A Link Building, Dublin Airport. | 28/03/07 | 21/09/07 | | Dublin Airport Authority |
| F06A/1843 | To construct an extension to the existing main terminal building at Dublin Airpo | Dublin Airport, Townland Of Collinstown, Barony Of Coolock, Co Dublin | 26/03/07 | 19/04/07 | | Dublin Airport Authority |

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| 07/4097 | To construct a new airside substation at Dublin Airport. | Substation A, Dublin Airport, Townland Of Collinstown, Barony Of Coolock, Co. Dublin. (south/east of Main Runway & North Of Collinstown Lane). | 21/03/07 | 15/05/07 | | Dublin Airport Authority plc |
| 07/4088 | The construction of a new aireside substation at Dublin Airport | ESB Substation B, Dublin Airport, Townland Of Collinstown, Barony Of Coolock, Dublin, (To East Of R108, 60 Metres, Southeast Of The Airport Fire, Station) | 13/03/07 | 17/05/07 | | Dublin Airport Authority plc |
| F06A/1809 | To construct a new airside substation B and an underground fuel tank. The airsi | Dublin Airport, Townland Of Collinstown, Co Dublin | 12/03/07 | 03/04/07 | 17/05/07 | Dublin Airport Authority Plc |
| 07/4082 | Temporary buildings assoicated with the provision of car hire facilities | Block 1, Type C, Stockhole, Cloghran, Co. Dublin. | 09/03/07 | 27/04/07 | | Dublin Airport Authority |
| 07/4083 | Temporary buildings associated with the provision of car hire facilities. | Block 2, Type E, Stockhole, Cloghran, Co. Dublin | 09/03/07 | 27/04/07 | | Dublin Airport Authority |
| 07/4084 | Temporary buildings assoicated with the provision of car hire facilities | Block 3, Type E, Stockhole, Cloghran, Co. Dublin | 09/03/07 | 27/04/07 | | Dublin Airport Authority |
| 07/4085 | Temporary buildings associated with the provision of car hire facilities. | Block 4, Type E, Stockhole, Cloghran, Co. Dublin. | 09/03/07 | 27/04/07 | | Dublin Airport Authority |
| F07A/0148 | An extension to the existing Airfield Maintenance Store for the storage of paint | Airfield Maintenance Base (Airside), Collinstown Lane, Co Dublin | 13/02/07 | 04/04/07 | 17/05/07 | Dublin Airport Authority Plc |
| F06A/1624 | The development will consist of the provision of 6 no. car rental facilities, co | Stockhole, Cloghran, Co. Dublin | 08/02/07 | 12/03/07 | 26/04/07 | Dublin Airport Authority |
| 07/4040 | Temporary buildings associated with the provision of car hire facilities. | Block 1, Units A, B, Stockhole, Cloghran, Co. Dublin. | 02/02/07 | 27/04/07 | | Dublin Airport Authority |
| 07/4041 | Temporary buildings associated with the provision of car hire facilites. | Block 1, Unit J, Stockhole, Cloghran, Co. Dublin. | 02/02/07 | 27/04/07 | | Dublin Airport Authority |
| 07/4042 | Temporary buildings associated with the provision of car hire facilities. | Block 1, Unit K, Stockhole, Cloghran, Co. Dublin. | 02/02/07 | 27/04/07 | | Dublin Airport Authority |
| 07/4043 | Temporary buildings associated with the provision of car hire facilites. | Block 2, Units A, B, Stockhole, Cloghran, Co. Dublin. | 02/02/07 | 27/04/07 | | Dublin Airport Authority |
| 07/4044 | Temporary buildings associated with the provision of car hire facilities. | Block 2, Unit D, Stockhole, Cloghran, Co. Dublin. | 02/02/07 | 27/04/07 | | Dublin Airport Authority |
| 07/4045 | Temporary buildings associated with the provision of car hire facilities. | Block 3, Units A, B, Stockhole, Cloghran, Co. Dublin. | 02/02/07 | 27/04/07 | | Dublin Airport Authority |

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| 07/4046 | Temporary buildings associated with the provision of car hire facilities. | Block 3, Unit D, Stockhole, Cloghran, Co. Dublin. | 02/02/07 | 27/04/07 | | Dublin Airport Authority |
| 07/4047 | Temporary buildings associated with the provision of car hire facilities. | Block 4, Units A, B, Stockhole, Cloghran, Co. Dublin. | 02/02/07 | 27/04/07 | | Dublin Airport Authority |
| 07/4048 | Temporary buildings associated with the provision of car hire facilities. | Block 4, Unit D, Stockhole, Cloghran, Co. Dublin. | 02/02/07 | 27/04/07 | | Dublin Airport Authority |
| 07/4049 | Temporary buildings associated with the provision of car hire facilities. | Block 5, Units G & H, Cloghran, Co. Dublin. | 02/02/07 | 27/04/07 | | Dublin Airport Authority |
| 07/4012 | 1. Extension at Arrivals, Departures & Mezzanine Level. 2. A new apron access | Extension of Main Terminal Building to north west towards Pier A, Dublin Airport. | 17/01/07 | 09/03/07 | | Dublin Airport Authority |
| F06A/1629 | New ground level extension to provide new walkway to southwest (airside) facade | Pier A Link, Dublin Airport, Collinstown, Co. Dublin | 12/01/07 | 06/02/07 | 08/03/07 | Dublin Airport Authority |
| F06A/1908 | The development will consist of the provision of temporary facilities for 4 no. | Stockhole, Cloghran, Co. Dublin | 22/12/06 | 22/02/07 | 12/04/07 | Dublin Airport Authority |
| F06A/1949 | Construction consolidation compound and associated works on lands with an area | Dublin Airport, Barony Of Coolock, Co. Dublin. | 22/12/06 | 22/02/07 | 12/04/07 | Dublin Airport Authority |
| 06/4565 | Steel framed industrial buildings for car hire use comprising a single storey | Block 1, Units A & B, Stockhole, Cloghran, Co. Dublin. | 21/12/06 | 19/02/07 | | Dublin Airport Authority |
| 06/4566 | Steel framed industrial buildings for car hire use comprising a single storey | Block 2, Units C & D, Stockhole, Cloghran, Co. Dublin. | 21/12/06 | 19/02/07 | | Dublin Airport Authority |
| 06/4567 | Steel framed industrial building for car hire use comprising a single storey | Block 3, Units E & F, Stockhole, Cloghran, Co. Dublin. | 21/12/06 | 19/02/07 | | Dublin Airport Authority |
| 06/4568 | Single storey blockwork substation and switch room building. | Adjacent To Block 1, Unit A, Stockhole, Cloghran, Co. Dublin. | 21/12/06 | 29/01/07 | | Dublin Airport Authority |
| F06A/1867 | The development will consist of the provision of temporary facilities for 4 no. | Stockhole, Cloghran, Co. Dublin | 19/12/06 | 21/12/06 | | Dublin Airport Authority |
| 06/4536 | Material alterations to previously approved design to Pier D. | Pier D, Dublin Airport, Co. Dublin. | 13/12/06 | 09/10/07 | | MSA for Dublin Airport Authority |
| F06A/1818 | A new ground level single storey flat roof, glazed pedestrian corridor and all a | Pier A Link, Dublin Airport, Collinstown, Co. Dublin | 11/12/06 | 08/02/07 | 27/03/07 | Dublin Airport Authority |
| 06A/1788 | To construct an extension to the existing main terminal building at Dublin Airpo | Dublin Airport, Townland Of Collinstown, Barony Of Coolock, Co Dublin | 07/12/06 | 13/12/06 | | Dublin Airport Authority |

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| 06/4522 | Dublin Airport Terminal 2 will be a large, open mixed use development located to | Dublin Airport, Co. Dublin. | 27/11/06 | 22/05/08 | | Dublin Airport Authority |
| F06A/1700 | An extension to the existing ground level staff car park for 174 spaces on a sit | Cloghran House, Dublin Airport, Corballis, Co Dublin | 22/11/06 | 12/01/07 | 01/03/07 | Dublin Airport Authority |
| F06A/1658 | To construct a new airside substation and an associated landside switchroom encl | Dublin Airport, Townland Of Collinstown, Co. Dublin. | 16/11/06 | 12/01/07 | 01/03/07 | Dublin Airport Authority Plc |
| F06A/1248 | A 10 year planning permission for development at Dublin Airport, east of the exi | Dublin Airport, Townlands Of Collinstown, Rock And Corballis, Barony Of Coolock, Co. Dublin | 31/08/06 | 25/10/06 | | Dublin Airport Authority |
| 06/4307 | Material alterations to temporary boarding gates (formally known as Temporary | Temporary Boarding Gates, OCTB, Dublin Airport, Co. Dublin. | 08/08/06 | 16/01/08 | | Dublin Airport Authority |
| F06A/1070 | The erection of a single storey extension circa 34.7m.sq. to the existing trolle | Arrivals Level, Main Terminal Building, Dublin Airport, Collinstown, Co. Dublin | 31/07/06 | 20/09/06 | 08/11/06 | Dublin Airport Authority Plc |
| F06A/1066 | The erection of an 11.514m high prefabricated Drill Tower with internal and ext | Dublin Airport Authority Plc, Fire Station, Airside, Dublin Airport, Cloghran, Co. Dublin | 28/07/06 | 13/09/06 | 26/10/06 | Dublin Airport Authority Plc |
| 06/4238 | Material alterations to Link between Pier A and Main Terminal Building involving | Link Between Pier A & Main Terminal Building, Dublin Airport, Co. Dublin. | 26/06/06 | 24/08/06 | | Dublin Airport Authority |
| F06A/0863 | The proposed works shall consist of the erection of a single s | North-western side of the main terminal building at arrivals level, Dublin Airport. | 21/06/06 | 21/07/06 | | Dublin Airport Authority plc |
| 06/4223 | Construction of a temporary structure on the second floor of the existing | Main Terminal Building, Dublin Airport, Co. Dublin., Block A. | 08/06/06 | 19/07/06 | | Dublin Airport Authority |
| 06/4218 | The development consists of the removal of an existing escalator and | Atrium Of Multi-Storey Car Park, Dublin Airport, Co. Dublin. | 06/06/06 | 25/08/06 | | Dublin Airport Authority |
| F06A/0088 | The continuance of use and maintenance for 10 years of the existing 9.8 hectare | South Parallel Road, Dublin Airport, Harristown, Co. Dublin | 10/04/06 | 18/05/06 | 27/06/06 | Dublin Airport Authority Plc |
| F05A/1750 | Modifications to a previously granted planning permission under planning registe | Dublin Airport, Huntstown, Barony Of Nethercross, Co. Dublin | 27/03/06 | 20/04/06 | 31/05/06 | Dublin Airport Authority |
| F06A/0379 | A new inclined moving walkway and car park control facility in the atrium of the | Atrium Of Multi-storey Car Park, Dublin Airport, Co. Dublin | 27/03/06 | 18/05/06 | 27/06/06 | Dublin Airport Authority |
| 06/4113 | Extension of existing landside restaurant at mezzanine level. | Mezzanine Level, Main Terminal, Dublin Airport. | 20/03/06 | 02/06/06 | | Dublin Airport Authority plc |

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| F06A/0308 | The construction of a new extension to the existing land-side restaurant present | The Aviator Restaurant, Mezzanine Level, Dublin Airport, Co. Dublin | 13/03/06 | 03/05/06 | 13/06/06 | Dublin Airport Authority |
| F04A/1755 | To construct on airport lands, a runway, 3110m in length and 75m in width. The | Dublin Airport, Co. Dublin | 03/03/06 | 12/04/06 | | Dublin Airport Authority Plc,Head Office |
| F06A/0232 | Revise and rationalise short-term car parking, car hire facilities and bus and c | Dublin Airport, Townlands Of Collinstown, Corballis And Rock, Co. Dublin | 24/02/06 | 19/04/06 | 31/05/06 | The Dublin Airport Authority |
| 06/4000 | Temporary Pier Facility. | Dublin Airport, Co. Dublin. | 05/01/06 | 22/02/06 | | Dublin Airport Authority |
| F05A/1894 | Change of use to part of lower ground floor level of the main terminal building | Lower Ground Floor, Main Terminal Building, Dublin Airport, Collinstown, Co. Dublin | 23/12/05 | 22/02/06 | 04/04/06 | Dublin Airport Authority |
| F05A/1767 | The development of a 3517 sq.m. gross floor area of single storey temporary airp | Dublin Airport, Townland Of Collinstown, Co. Dublin. | 13/12/05 | 13/02/06 | | Dublin Airport Authority Plc |
| F05A/1698 | The development of a 3517 sq.m. gross floor area of single storey temporary airp | Protected Structure Of The Old Central Terminal Building, Dublin Airport | 01/12/05 | 05/12/05 | | Dublin Airport Authority Plc |
| 05/4541 | Pier D Departures and Arrivals Building ( 2 storeys) and elevated covered | Pier D, Dublin Airport, Co. Dublin. | 29/11/05 | 08/06/06 | | Dublin Airport Authority (DAA) |
| 05/4501 | Material alterations associated with converting basement store to lower | Main Terminal Building, Dublin Airport. | 09/11/05 | 12/10/06 | | Dublin Airport Authority |
| F05A/1573 | Construct an alternative access route, from the main terminal building at Dublin | Dublin Airport, Collinstown, Co. Dublin | 04/11/05 | 28/03/06 | | Dublin Airport Authority plc |
| F05A/1520 | Construct an alternative access route, from the main terminal building at Dublin | Dublin Airport, Collinstown, Co. Dublin | 25/10/05 | 03/11/05 | | Dublin Airport Authority plc |
| 05/4380 | The proposed work comprises of the installation of a system building and require | Security Post North, North Apron, Dublin Airport | 13/09/05 | 02/11/05 | | Dublin Airport Authority |
| F05A/1226 | The demolition of existing two storey derelict dwelling including a single store | Swords Road, Cloghran, Co. Dublin | 29/08/05 | 13/10/05 | 24/11/05 | Dublin Airport Authority |
| F05A/1119 | The erection of a 34,000L capacity bunded polypropylene HDP storage tank for sto | Outdoor Cleaning Centre, Airside, Dublin Airport, Cloghran, Co Dublin | 09/08/05 | 30/09/05 | 08/11/05 | Dublin Airport Authority Plc. |
| 05/4338 | It is proposed to carry out material alterations to the Duty Free area of Pier B | Pier B, Terminal B, Dublin Airport. | 08/08/05 | 22/09/05 | | Dublin Airport Authority |

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| F05A/1099 | Development to consist of the construction of a new air-side restaurant at mezza | Dublin Airport, Townland Of Collinstown And, The Barony Of Coolock | 05/08/05 | 28/09/05 | 08/11/05 | Brendan Murphy, Dublin Airport Authority |
| 05/4285 | Material alterations and extension to Pier A at Dublin Airport. | Main Terminal Building, Dublin Airport, Co. Dublin. | 27/06/05 | 08/08/05 | | Dublin Airport Authority |
| 05/4251 | Material alterations associated with converting part of landside foodcourt to | Main Terminal Building, Dublin Airport. | 13/06/05 | 08/08/05 | | Dublin Airport Authority |
| 05/4168 | Alterations to security search area A. Provision of a parallel security | Security Search Area A, & Sky Music Outlet & Corridor From Street, To Pier A, Airside Departures Level, Main Terminal Building, Dublin Airport. | 28/04/05 | 29/04/05 | | Dublin Airport Authority |
| F04A/1854 | Continuance of use of existing ground level car park (approx. 3,600 parking spa | Southlands, Townlands Of Harristown, Silloge & Ballymun, Co. Dublin | 25/04/05 | 19/05/05 | 22/06/05 | Dublin Airport Authority plc. |
| 05/4098 | Removal of existing five offices and convert area into one large open plan | Lost Property Office, Baggage Reclaim Hall, Arrivals Floor, Main Terminal Building, Dublin Airport. | 04/03/05 | 26/04/05 | | Dublin Airport Authority |
| F05A/0218 | To construct circa 615 sq.m. extension comprising additional passenger seating a | Pier A, Ground Floor Level (north Side), Dublin Airport, Collinstown, Co. Dublin. | 24/02/05 | 18/04/05 | 25/05/05 | Dublin Airport Authority |
| F05A/0120 | Change of use to part of the ground floor of the Old Central Terminal Building ( | Old Central Terminal Building, Dublin Airport, Collinstown, Co. Dublin | 04/02/05 | 30/03/05 | 04/05/05 | Dublin Airport Authority |
| 05/4015 | Sub-division of existing single office into two separate offices. | Arrivals Level, Baggage Reclaim Hall, Main Terminal Building, Dublin Airport. | 18/01/05 | 09/03/05 | | Dublin Airport Authority |
| 05/4016 | Splitting existing trolley return into a new emergency exit corridor and | Trolley Return, Baggage Reclaim Hall, Arrivals Floor, Terminal Building, Dublin Airport. | 18/01/05 | 09/03/05 | | Dublin Airport Authority |
| 04/4513 | Construction of a partial frame building to accommodate baggage handling | Adjacent To Main Terminal Building, Dublin Airport. | 21/12/04 | 14/02/05 | | Dublin Airport Authority |
| 04/4509 | New single person office within existing open plan office area. | Level 5, Main Terminal Building, Dublin Airport. | 16/12/04 | 11/02/05 | | Dublin Airport Authority |
| 04/4445 | Alterations to existing reception area in the Airport Police station at Dublin | Airport Police Station, Arrivals Road, Dublin Airport. | 05/11/04 | 16/12/04 | | Dublin Airport Authority plc. |

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|---|---|---|---|---|---|---|
| 04/4422 | Mainly some new partitions and fitout works for the Anna Livia lounge | Main Terminal Building, Dublin Airport. | 22/10/04 | 19/09/06 | | Dublin Airport Authority |
| 04/4285 | Material alterations to areas within the terminal building (Terminal A, B & C) | Terminal Building, Dublin Airport. | 23/07/04 | 17/08/07 | | Aer Rianta |
| 04/4253 | Existing shop unit, mainly upgrading works for compartmentation walls. | Departures Level, Terminal Building, Dublin Airport. | 09/07/04 | 10/08/04 | | Aer Rianta, Airport Development Dept. |
| F03A/1353 | Installation of twenty flagpoles at two locations | Dublin Airport, Corballis Road North, Collinstown, Co. Dublin | 28/10/03 | 03/11/03 | | Aer Rianta cpt. |
| 02/4463 | Pier D Departures and Arrivals Building (2 storey's) | Pier D, Dublin Airport, Co. Dublin | 23/12/02 | 25/02/04 | | Aer Rianta |
| 02/4420 | Temporary Pier Building and Access Corridor | Site At The North Apron, Dublin Airport, (Collinstown Townland), Co. Dublin | 25/11/02 | 22/12/03 | | Aer Rianta cpt |
| F02A/1273 | Construct and operate a temporary passenger aircraft pier and associated service | Dublin Airport Collinstown,, Co. Dublin. | 11/10/02 | 04/12/02 | | Aer Rianta cpt. |
| F02A/1046 | Construct and operate an additional passenger aircraft Pier | Dublin Airport,, Co. Dublin. | 14/08/02 | 07/10/02 | | Aer Rianta CPT, |
| F02A/0333 | New security post and canopy. Work includes new fencing, | Cargo Area Post 4,, Corballis Park,, Dublin Airport,, Co. Dublin. | 02/04/02 | 17/04/02 | | Aer Rianta cpt |
| F02A/0142 | New boundary fence, barrier, gates CCTV, intercom and | Departure Level,, South end of the Terminal,, Dublin airport. | 15/02/02 | 14/05/02 | | Aer Rianta Cpt., |
| 02/4005 | Existing Airport Police Station, with temporary | Dublin Airport Police Station,, Arrivals Road, Dublin Airport. | 25/01/02 | 23/07/02 | | Aer Rianta CPT., |
| 01/4397 | Proposed new store at maintenance base at Dublin Airport. | Peoposed new store at maintenance base at Dublin A | 14/12/01 | 15/01/02 | | Aer Rianta CPT, |
| 01/4359 | 70m.sq. extension, single storey to the north side of | Dublin Airport,, Fire State, Westlands, Dublin Airport. | 01/11/01 | 04/12/01 | | Aer Rianta, |
| F01A/1257 | 3 no. advertising signage boards. | East Link & South Corballis Road,, adjacent to the pont at Dublin Airp | 19/10/01 | 10/12/01 | 17/01/02 | Aer Rianta Cpt., |
| 01/4335 | Installation of Porta Cabin for use as a classroom. | Creche, Dublin Airport. | 09/10/01 | 04/12/01 | | Aer Rianta CPT, |
| F01A/0882 | Commence phase 1 of new works (consisting of demolition of | Dublin Airport,, Collinstown,, Co. Dublin. | 29/08/01 | 25/10/01 | 05/12/01 | Aer Rianta Cpt., |
| F01A/0881 | Commence phase 2 of new works (consisting of a new two | Dublin Airport,, Collinstown,, Co. Dublin. | 29/08/01 | 25/10/01 | 05/12/01 | Aer Rianta Cpt., |

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|---|---|---|---|---|---|---|
| 01/4267 | Two storey ramp accommodation building consists of 8 | Rear of Pier C Building,, Dublin Airport, ( two storey ramp accommodation building) | 01/08/01 | 19/09/01 | | Aer Rianta CPT., |
| 01/4152 | Internal fit-out incl. stud partitions, suspended | GL35 - 37, ramp level, Pier C, Dublin Airport. | 23/04/01 | 20/06/01 | | Aer Rianta CPT, |
| F01A/0235 | Construction of maintenance stores of 37 sq.metres. | Corballis Cross,, Dublin Airport. | 07/03/01 | 03/05/01 | 12/06/01 | Aer Rianta cpt., |
| 00/4459 | Partial new mezzanine floor to be installed in the | An Post Warehouse, Corballis Cross,, Dublin Airport. | 30/11/00 | 09/01/01 | | Aer Rianta Dublin Airport, |
| F00A/0951 | Internal alterations and construction of an 70 sq.m. | Fire Station @, Westlands,, Dublin Airport,, Co. Dublin. | 28/11/00 | 25/01/01 | 08/03/01 | Aer Rianta |
| 00/4437 | Installation of portacabin (3m x 2.4m) for use | Pier A, Dublin Airport. | 21/11/00 | 14/12/00 | | Aer Rianta cpt., |
| 00/4436 | Installation of portacabin (3m x 2.4m) for use | Pier A, Dublin Airport. | 21/11/00 | 14/12/00 | | Aer Rianta cpt., |
| 00/4277 | 2 Storey extension to existing Air Traffic | Air Traffic Control Centre at Huntstown,, Dublin Airport (on the Old St. Margaret's, Road near Boot Inn). | 14/08/00 | 19/10/00 | | Aer Rianta cpt., |
| 00/4276 | New Energy Centre - plant rooms and electrical | Air Traffic Control Centre at, Huntstown, Dublin Airport, (on the Old t. Margaret's Road,, near Boot Inn). | 14/08/00 | 08/09/00 | | Aer Rianta cpt., |
| 00/4178 | Internal fit-out to provide office/storeroom | Ramp Level Pier C at Dublin Airport, (Gridlines 16-18). | 29/05/00 | 30/06/00 | | Aer Rianta, |
| 00/4154 | Six bay extension to existing main terminal | Dublin Airport, Collinstown Cross,, Co. Dublin. | 15/05/00 | 27/07/00 | | Aer Rianta CPT, |
| F99A/1519 | extension to the existing temporary Park & Ride car park. | temporary Park & Ride Car Park,, Dublin Airport,, Harristown Townland,, Co. Dublin, adjacent to the., South Parallel Road. | 10/01/00 | 08/03/00 | | Aer Rianta cpt |
| F00A/0009 | construction of new concrete apron pavement (Central | Central Apron,, Dublin Airport,, Townlands of Collinstown, Forest Gr | 06/01/00 | 25/02/00 | 05/04/00 | Aer Rianta cpt |
| 99A/0720 | Construction of a tensioned membrane hangar structure, | Gate 7,, Dublin Airport. | 31/08/99 | 27/10/99 | 08/12/99 | Aer Rianta Teoranta, |

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| 99/4281 | Part two level and part three level extension of | Multi-storey car parking complex - opposite, main terminal building - Dublin Airport. | 27/08/99 | 01/12/99 | | Aer Rianta cpt., |
| F99A/1032 | Re-construction of existing asphalt pavement to concrete | South Apron, Dublin Airport, Townland of Corballis. | 18/08/99 | 14/10/99 | 18/11/99 | Aer Rianta cpt |
| F99A/0934 | Extension to the existing Blocks A & B of the Multi- | Dublin Airport. | 27/07/99 | 23/09/99 | 01/11/99 | Aer Rianta CPT |
| 99/4235 | Internal fit-out, within existing building. | Aer Rianta ramp staff accommodation, apron level, Pier C, Dublin Airport. | 16/07/99 | 14/09/99 | | Aer Rianta Dublin, |
| F99A/0811 | Extension of an existing lobby on the landside elevation | Dublin Airport | 01/07/99 | 30/08/99 | 07/10/99 | Aer Rianta CPT |
| 99/4205 | Off site fabricated 2 storey cabin. | Car Park No.6,, Dublin Airport,, Co.Dublin. | 30/06/99 | 06/08/99 | | Aer Rianta Cpt., |
| 99/4204 | Off site fabricated 2 storey cabin. | Car Park No.4,, Dublin Airport,, Co.Dublin. | 30/06/99 | 06/08/99 | | Aer Rianta Cpt., |
| 99/4206 | Off site fabricated 2 storey cabin. | Car Park No.5., Old Airport/Swords Road,, Dublin Airport,, Co.Dublin. | 30/06/99 | 06/08/99 | | Aer Rianta Cpt., |
| 99/4179 | Temporary portacabin for C.I.E. and will be a single | Temporary Portacabin for C.I.E. on the arrivals, road at Dublin Airport. | 10/06/99 | 04/08/99 | | Aer Rianta CPT., |
| 99/4141 | Temporary pre-fab for office use. | Temporary pre-fabs for SIPTU at Taxi, carpark (near Great Southern Hotel), at Dublin Airport. | 12/05/99 | 20/08/99 | | Aer Rianta Property Department, |
| 99/4121 | New check in area of 6 No. new desks and 2 new | Multi-storey carpark (beside Atrium area, and opposite SPAR shop) at Dublin Airport. | 19/04/99 | 07/05/99 | | Aer Rianta Property Department, |
| F99A/0426 | construction of a temporary park and ride car park | Dublin Airport,, Harristown Townland,, Co. Dublin, adjacent to the South Parralel | 13/04/99 | 31/05/99 | 07/07/99 | Aer Rianta cpt. |
| F99A/0219 | Construction of a new aircraft hagar and associated offices | Westlands,, Huntstown,, Dublin Airport. | 05/03/99 | 30/04/99 | | Aer Rianta cpt |
| 98/4352 | A dispatch hut will be a single storey building | Reorganisation of car hire car park at Dublin, Airport. | 22/12/98 | 08/02/99 | | Aer Rianta cpt., |
| 98/4354 | A dispatch hut will be a single storey building | Reorganisation of car hire car park at, Dublin Airport. | 22/12/98 | 09/02/99 | | Aer Rianta cpt., |
| 98/4351 | A dispatch hut will be a single storey building | Reorganisation of car hire car park at, Dublin Airport. | 22/12/98 | 08/02/99 | | Aer Rianta cpt., |

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|---|---|---|---|---|---|---|
| 98/4353 | A dispatch hut will be a single storey building of | Reorganisation of car hire car park at, Dublin Airport. | 22/12/98 | 09/02/99 | | Aer Rianta cpt., |
| 98/4355 | A dispatch hut will be a single storey building of | Reorganisation of car hire car park at, Dublin Airport. | 22/12/98 | 09/02/99 | | Aer Rianta cpt., |
| F98A/1208 | The construction of an extension to Car Park | Car Park No. 3 at Dublin Airport,, Dardistown Townland,, Co. Dublin,, adjacent to the M1 Motorway | 24/11/98 | 21/01/99 | 03/03/99 | Aer Rianta cpt. |
| F98A/1073 | construction of a link road | between sections of Carpark 3 at Dublin Airport,, Cloghran Townland,, Co. Dublin, adjacent to the M1 Motorway | 22/10/98 | 20/04/99 | 17/09/99 | Aer Rianta cpt. |
| F98A/1077 | widening and upgrading of the South Corballis Road | Dublin Airport,, Co. Dublin | 22/10/98 | 17/12/98 | 26/01/99 | Aer Rianta cpt. |
| 98/4268 | Warehouse development, 2 adjoining warehouses with | Corballis Park,, Dublin Airport,, Co. Dublin. | 02/10/98 | 30/11/98 | | Aer Rianta Cpt, |
| F98A/0938 | proposed warehouse development of 2,369 sq. metres, to | Corballis Park,, Dublin Airport | 18/09/98 | 16/11/98 | 04/01/99 | Aer Rianta cpt. |
| 98/4198 | New office for SIPTU. | SIPTU Building,, Corballis Park,, Cargo Area,, Dublin Airport. | 20/07/98 | 02/09/98 | | Aer Rianta Cpt, |
| F98A/0596 | Single storey office building. | Corballis Park,, Cargo Area,, Dublin Airport. | 22/06/98 | 19/08/98 | 29/09/98 | Aer Rianta, cpt. |
| 98/4121 | 12 Gate Pier Building. Approximately 200m long | Pier D, Dublin Airport. | 01/05/98 | 17/06/98 | | Aer Rianta cpt., |
| F98A/0414 | for proposed development of Pier D comprising part single | Dublin Airport,, Co. Dublin | 01/05/98 | 29/06/98 | | Aer Rianta cpt |
| 98/4101 | Provision of new mezzanine floor to accommodate | Pier C, Dublin Airport, Co. Dublin. | 21/04/98 | 12/02/99 | | Aer Rianta, |
| 98/4040 | The development involves the relocation of the | A.T.O.S.,, Dublin Airport. | 16/02/98 | 12/03/98 | | Aer Rianta cpt., |
| 98A/0012 | construction of an external staircase in front of the | Dublin Airport,, Collinstown | 12/01/98 | 05/03/98 | 15/04/98 | Aer Rianta cpt |
| F97A/0959 | the erection of 1 spectacular advertising unit | Dublin Airport | 23/12/97 | 18/02/98 | | Aer Rianta, |
| F97A/1146 | a six-bay extension to the main terminal building. The | Dublin Airport,, Collinstown | 23/12/97 | 20/02/98 | 31/03/98 | Aer Rianta cpt |
| 97/4287 | Six bay extension to existing main Terminal Building | Dublin Airport, Collinstown Cross,, Co. Dublin. | 23/12/97 | 12/05/98 | | Aer Rianta cpt., |

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| 97/4257 | Provision of additional floor area to accommodate | Main Terminal Bld., Dublin Airport. | 14/11/97 | 22/01/98 | | Aer Rianta, |
| F97A/0846 | Reclad the six storey Technical Administration and | Corballis Road North,, Dublin Airport. | 31/10/97 | 19/12/97 | 28/01/98 | Aer Rianta cpt. |
| F97A/0938 | proposed (a) reorganisation of existing ground level Car | Dublin Airport | 31/10/97 | 19/12/97 | 28/01/98 | Aer Rianta cpt. |
| F97A/0626 | convert 300m sq. of existing car park into office space | Level 5,, Main Terminal Building,, Dublin Airport | 25/08/97 | 11/09/97 | 21/10/97 | Aer Rianta |
| 97/4177 | Upgrading of existing office area and construction | Landside of North Terminal, Dublin Airport. | 24/07/97 | 07/08/97 | | Aer Rianta cpt., |
| 97/4161 | Temporary offices for Aer Rianta Staff estimated | Car Park 4, Dublin Airport. | 07/07/97 | 14/07/97 | | Aer Rianta cpt., |
| F97A/0448 | Construct a single storey structure for use as a car hire | Car Park 3,, Dublin Airport. | 25/06/97 | 21/08/97 | 30/09/97 | Budget Rent-A-Car/Aer Rianta Cpt. |
| 97/4110 | Provision of ramp accommodation for workers on | Ramp Accommodation, South Apron, Dublin Airport. | 06/05/97 | 09/06/97 | | Aer Rianta cpt., |
| 97/4096 | Construction of new presidential suite containing | Presidential (Ceremonial) Suite, North Terminal,, Dublin Airport. | 21/04/97 | 20/05/97 | | Aer Rianta CPT, |
| F97A/0155 | New four storey office building with separate entrances to | Vacant site between A.T.O.S. Building and taxi holding area, at Dublin Airport. | 10/04/97 | 01/05/97 | 11/06/97 | Aer Rianta cpt. |
| F97A/0250 | Construction of a new two-storey building to accommodate | Dublin Airport. | 02/04/97 | 28/05/97 | 10/07/97 | Aer Rianta cpt. |
| 97/4077 | New 4 storey office building with credit union offices | Vacant Site between A.T.O.S. Building &, Taxi Holding Area, Dublin Airport. | 25/03/97 | 20/05/97 | | Aer Rianta, |
| 97/4069 | Construction of new presidential suite containing a | Presidential (Ceremonial) Suite, North Terminal,, Dublin Airport. | 14/03/97 | 09/04/97 | | Aer Rianta cpt., |
| F97A/0082 | Demolition of single story extension to the airside of the | Dublin Airport. | 11/02/97 | 19/03/97 | 01/05/97 | Aer Rianta cpt. |
| 97/4037 | Conversion of ground floor of the OCTB and construction | Old Central Terminal Building,, Dublin Airport. | 10/02/97 | 25/03/97 | | Aer Rianta cpt., |
| 97/4038 | New passenger waiting lounges and boarding gates. | Pier `A' at Dublin Airport, Co. Dublin. | 10/02/97 | 21/04/97 | | Aer Rianta cpt., |
| F96A/1002 | Change of use of the ground floor to passenger lounges, | Old Terminal Building,, Dublin Airport. | 20/12/96 | 18/02/97 | 14/04/97 | Aer Rianta. |

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| F96A/1000 | Construction of a new passenger lounge, boarding gates and | Pier A,, Dublin Airport. | 20/12/96 | 18/02/97 | 14/04/97 | Aer Rianta. |
| F96F/378 | Construction of Glazed Checkin area Below Departures | VIP Carpark, Below Departures Road,, Dublin Airport. | 12/12/96 | 10/02/97 | | Aer Rianta cpt., |
| F96A/0894 | New check-in facility and baggage hall. | Arrivals Road,, Dublin Airport. | 20/11/96 | 16/01/97 | 04/03/97 | Aer Rianta CPT. |
| F96F/353 | New single storey building located under departures | Energy Centre, Dublin Airport, adjacent, departures ramp. | 15/11/96 | 08/01/97 | | Aer Rianta, |
| F96F/348 | Glazed Lobby, to provide Kerb-Side Check-In Facilities | Beside Departures Lobby, Main Terminal Building,, Dublin Airport. | 07/11/96 | 17/12/96 | | Aer Rianta Cpt., |
| F96A/0824 | Build a Kerb-side check-in facility adjacent to the | Main Terminal Building,, Dublin Airport. | 29/10/96 | 11/12/96 | 22/01/97 | Aer Rianta cpt. |
| F96F/311 | New boiler house including chiller room and chp room. | East End Terminal Bldg., Adjacent Spiral Ramps,, Dublin Airport. | 23/09/96 | 19/11/96 | | Aer Rianta CPT, |
| F96F/291 | Change of use of existing single storey canteen to | T.A.S.C. Building,, Dublin Airport. | 09/09/96 | 30/10/96 | | Aer Rianta CPT., |
| F96F/283 | New maintenance building with offices and workshops. | Dublin Airport, Corballis Road, South adjacent to Taxi Rank. | 04/09/96 | 23/10/96 | | Aer Rianta cpt., |
| F96A/0563 | New boiler house transformer, chiller room and ancillary | East End of Terminal Building, Dublin Airport. | 01/08/96 | 26/09/96 | 05/11/96 | Aer Rianta cpt., |
| F96F/229 | Renovation of existing storage out building adjacent | Airport Police Dog Patrol Unit, Castlemoate House,, Dublin Airport. | 26/07/96 | 17/09/96 | | Aer Rianta Cpt., |
| F96A/0552 | Single and two-storey maintenance building, car parking, | Corballis Road South,, Dublin Airport,, Co. Dublin. | 26/07/96 | 24/09/96 | 05/11/96 | Aer Rianta |
| F96A/0524 | Conversion of an existing building to accommodation for the | Adjacent to Castlemoate House,, Dublin Airport. | 19/07/96 | 13/09/96 | 21/10/96 | Aer Rianta cpt |
| F96F/219 | Offices to be built on existing flat roof 'Commerically | Link Building, Dublin Airport. | 17/07/96 | 10/03/97 | | Aer Rianta CPT, |
| F96A/0516 | Change of use of offices and for new elevations to | TASC Building,, Dublin Airport | 11/07/96 | 09/09/96 | 21/10/96 | Aer Rianta cpt. |
| F96A/0455 | Build offices on the roof of the link building and also | Dublin Airport | 19/06/96 | 14/08/96 | 23/09/96 | Aer Rianta Cpt, |
| F96A/0290 | One 18ft. x 10 ft. Spectacular advertising unit | first roundabout,, exit road,, Dublin Airport | 26/04/96 | 24/06/96 | | Aer Rianta |
| F96F/045 | Steel columns and beams, reinforced concrete floor | Pier A, Dublin Airport. | 04/03/96 | 25/04/96 | | Aer Rianta cpt., |
| F96A/0122 | New shop and store at first floor level | Pier A,, Dublin Airport | 27/02/96 | 28/03/96 | 08/05/96 | Aer Rianta cpt. |

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| F95F/200 | Extensions to existing terminal building known as | Dublin Airport Collinstown, Co. Dublin. | 22/12/95 | 20/05/96 | | Aer Rianta, |
| F95F/157 | Conversion of existing parking bays to store rooms and | Garden Complex,, Dublin Airport,, Co. Dublin. | 26/10/95 | 03/04/96 | | Aer Rianta CPT., |
| F95F/142 | Conversion of existing car parking on level 5, | Level 5, Terminal Building, Dublin Airport. | 28/09/95 | 15/02/96 | | Aer Rianta cpt, |
| F95A/0681 | Conversion of existing tractor bays to offices | Garden Compound,, Dublin Airport | 20/09/95 | 16/11/95 | 03/01/96 | Aer Rianta cpt |
| F95A/0677 | Relocate offices within the proposed warehouse/office | Cargo Terminal No. 2,, Corballis Park,, Dublin Airport. | 19/09/95 | 16/11/95 | 24/02/96 | Aer Rianta cpt. |
| F95F/113 | Addition of retail units, associated store and staff | Multi Storey Carpark Concourse,, Dublin Airport,, Co. Dublin. | 23/08/95 | 28/09/95 | | Aer Rianta CPT., |
| F95F/112 | Construction of extension to existing warehouses and | DHL & Servisair,, Corballis Park,, Dublin Airport,, Co. Dublin. | 21/08/95 | 18/10/95 | | Aer Rianta CPT, |
| F95A/0577 | Conversion of existing car park to office accommodation and | Level 5,, Main Terminal Building,, Dublin Airport | 09/08/95 | 04/10/95 | 15/11/95 | Aer Rianta cpt., |
| F95F/096 | Alterations & extensions to Ground Floor of Pavilion | Pier 'B' Pavilion,, Terminal Building,, Dublin Airport. | 24/07/95 | 13/09/95 | | Aer Rianta Cpt., |
| F95A/0153 | Install signage and associated works on the road network, | Dublin Airport | 09/03/95 | 03/05/95 | 14/06/95 | Aer Rianta |
| F95F/012 | Maintenance facility with carpark, yard and ancillary work. | South Corballis Road,, Dublin Airport,, Co. Dublin. | 01/02/95 | 28/03/95 | | Aer Rianta, |
| F95A/0014 | Single and two storey Maintenance Building, car parking, | Corballis Road South,, Dublin Airport,, Co. Dublin | 11/01/95 | 09/03/95 | | Aer Rianta |
| F94F/0159 | Conversion of existing car park to office | Level 5 Main Terminal Building, Dublin Airport. | 07/12/94 | 20/01/95 | | Aer Rianta CPT, |
| F94A/0777 | Conversion of part of existing car park to office | Level 5 Main Terminal Building,, Dublin Airport | 16/11/94 | 11/01/95 | | Aer Rianta cpt. |
| F94A/0707 | Erection of a sign and external alterations | Old Central Terminal Building,, Dublin Airport. | 24/10/94 | 21/12/94 | 01/02/95 | Aer Rianta, cpt., |
| F94F/0117 | Office accommodation to lst floor workshop/store | Dublin Airport at the junction of old Naul Road, and Collinstown Road. | 09/08/94 | 21/09/94 | | Aer Rianta, |
| F94F/0112 | Staff building one of group of buildings - make | Gardening Complex,, Dublin Airport. | 02/08/94 | 21/09/94 | | Aer Rianta CPT., |
| F94A/0466 | Gardening complex at main entrance road | Dublin Airport | 30/06/94 | 24/08/94 | 09/03/95 | Aer Rianta Cpt. |

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| F94F/0082 | General Warehouse & Office Development - aviation | Cargo Area, Corballis Park, Dublin Airport. | 17/06/94 | 04/08/94 | | Aer Rianta, |
| F94F/0052 | New Lounge pavilion with link building which will | Extension to Pier A at Dublin Airport. | 21/04/94 | 24/05/94 | | Aer Rianta, |
| F94F/0035 | (a) Multi-storey car park (6 levels). | Dublin Airport. | 14/03/94 | 05/05/94 | | Company Secretary, Aer Rianta Teo., |
| 93F/0263 | Four unit warehouse. | Cargo Area, Corballis Park, Dublin Airport. | 29/07/93 | 15/09/93 | | Aer Rianta C.P.I., |
| 93F/0089 | Extension and internal alterations to Dublin Airport | Dublin Airport Worksplace Nursery, Dublin Airport. | 07/04/93 | 19/05/93 | | Aer Rianta, |
| 92F/0067 | Extension to an existing building which is used for | Airfield Maintenance Base Extension,, South Parallel Rd.,, Collinstown,, Dublin Airport. | 03/11/92 | 16/11/92 | | Aer Rianta, |
| 92F/0061 | Warehouse walls/roof, insulated metal decking, | Nippon/McDermott Warehouse, Cargo Area,, Dublin Airport,, Collinstown, Co. Dublin. | 27/10/92 | 17/12/92 | | Aer Rianta, |
| 92F/0056 | Changes to door locations, proposed new dining room and | Aer Rianta Training Centre,, Castlemoate House,, Dublin Airport. | 22/10/92 | 10/11/92 | | Aer Rianta cpt. |
| 92F/0033 | New Dining Room and Extension to Existing | Aer Rianta Training Centre, Castlemoate House,, Dublin Airport. | 15/09/92 | 08/10/92 | | Aer Rianta, |
| 92F/0028 | Enclosures of part of existing carpark 2 in main | Car Park 2 Level,, Main Terminal Building,, Dublin Airport. | 04/09/92 | 23/11/92 | | Aer Rianta. |

# Response to SAI F23A/0636 Dublin Airport Drainage Area Infrastructure

Photo: Baldoyle Bay SAC by Philip Swan

**Submission by:**
**Sabrina Joyce-Kemper**
**23 Portmarnock Crescent**
**Portmarnock**
**Co Dublin.**

**Date of submission: 30th July 2024**

# Submission

**1. Introduction**

1.1 Sabrina Joyce-Kemper makes this submission in response to Significant Additional Information (SAI) on planning reference F23A/0636. Ms Joyce-Kemper has an advanced diploma in Planning and Environmental law from the Honorable Kings Inn. The planning application F23A/0636 is described as follows;

*"in the townlands of Pickardstown, Coultry, Huntsown, Forrest Great, Forrest Little, and Collinstown; and to the east of the airfield in the townlands of Cloghran, Corballis, Commons, Toberbunny, Stockhole and Clonshagh.*

*The proposed development includes upgrades to existing drainage infrastructure and construction of additional drainage infrastructure to improve performance of the surface water management system at Dublin Airport and will consist of:*

*a. a contamination detection and response (CD&R) system comprising detection devices, network decision points (DPs), control kiosks, and ancillary infrastructure including local access roads, local drainage and communications and power ducts;*

*b. clean water supply pipelines consisting of large diameter trunk pipelines;*

*c. airfield contaminated pipelines consisting of large diameter trunk pipelines;*

*d. upgrades to the West Apron surface water collection network including reconfiguration of the existing network, construction of an underground attenuation tank, installation of a local CD&R system, network DPs and a control kiosks, construction of an underground pollution storage tank, a pumping station, and ancillary development including local ductwork, local access roads and local drainage;*

*e. upgrades to the existing surface water collection network in the vicinity of the South Apron including reconfiguration of the existing network, construction of network DPs, upgrade of the existing flow diversion structure (FDS) and reconfiguration of the existing Cuckoo supply channel;*

*f. a central pollution control facility (CPCF) consisting of underground pollution control storage tanks, a pumping station, a discharge pipeline to the Uisce Eireann network, mechanical and electrical equipment, a control building, an electrical substation, and ancillary development including a local access road, enhanced flood bund, local drainage and ducting;*

*g. a CPCF pipeline consisting of a large diameter trunk pipeline;*

*h. a central supervisory control and data acquisition (SCADA) system comprising kiosks and associated electrical power and signal connections;*

*i. repurposing of the central section of the existing Airfield Trunk Culvert (ATC) as a contaminated pipeline; and*

*j. ancillary and associated development including pipework, mechanical and electrical service connections and upgrades, temporary compounds and site works.*

*This planning application is accompanied by an Environmental Impact Assessment Report and NaturaImpact Statement.*

1.2 In my first submission to this application at section 2.8 of that submission I made the following observation:

*No mention of unauthorised development of PFAS contaminated soil that has already been excavated without AA or EIAR. Can this application be accepted in section 34.12 of the Planning and Development Act 2001 to present is triggered.*

1.3 The applicant has not assessed the confirmed and existing PFAS contamination in soils and groundwater on the Airport campus. The only comment I can see in the NIS is on page 14 a comment added with RFI which states:

**Page 14: Added** **Author** **06/06/2024 18:18:00**

Soils within the airport will require the excavation and there is a possibility that these soils have been contaminated by airport related activities in the past. . Mitigation measures will be required in relation to soils and soil movements within areas of excavation airside.

1.4 In the response memorandum document the applicant states the following in reply to RFI request 6:

**A. PFAS Contamination at daa**

**Response:**

The potential for encountering contaminated material is considered **Chapter 11 - Lands, Soils, Geology and Hydrogeology** of the EIAR. As described in **Section 11.6.1.1**, site investigation and laboratory analysis will be carried out to determine potential contamination of ground that will be excavated during the construction phase, including testing for PFAS. As described, if contaminated soil/water is encountered, it is proposed that it be removed by a licensed waste contractor for treatment or disposal at a suitably licensed facility in accordance with the Waste Management Act 1996 (as amended), the Waste Management (Collection Permit) Regulations 2007 (as amended) and the Waste Management (Facility Permit & Registration) Regulations 2007 (as amended). Where appropriate daa propose to use a structured approach in line with the Environmental Protection Agency's (EPA's) Guidance on the Management of Contaminated Land and Groundwater at EPA Licensed Sites, taking account of best international practice, evolving standards and emerging knowledge and experience in remediation technologies to determine the most appropriate environmental solution for its management. **Section 11.6.1.2** describes the potential for accidental contamination of surface water run-off during construction activity. **Section 11.7** lists mitigation measures to reduce this risk including development of the Construction and Environmental Management Plan (CEMP), measures to control soil excavation to ensure that exposed soils are stable and minimise erosion including ensuring works are carried out within the main excavation site as far as possible, application of pre-treatment and silt reduction measures, and careful management of storage areas. EIAR **Appendix 13.1 - Resource & Waste Management Plan** outlines how to manage contaminated soil should this be identified prior to starting works.

This reply is completely uninformed as I can only presume the planning consultant replied in this manner as daa have not provided their planning consultant with the 4 reports that detail confirmation of PFAS contamination in the soil, groundwater and migration to water bodies. The information coming through from the daa, EPA , Fingal County Council and these reports indicate that the PFAS contamination issue at Dublin Airport first came to light in approx 2016. The reports which are too large to append to this document can be downloaded and reviewed by the planning section at the following links. I request that they are considered as part of my submission.

https://www.dublinairport.com/docs/default-source/sustainability-reports/2021-2023-environmental-monitoring-report.pdf?sfvrsn=36299b4d_2

https://www.dublinairport.com/docs/default-source/sustainability-reports/2021-2023-environmental-monitoring-non-technical-summary.pdf?sfvrsn=cfae8fda_2

https://www.dublinairport.com/docs/default-source/corporate/material-management-design-report-for-the-management-of-impacted-soils-2020.pdf?sfvrsn=fc671644_2

https://www.dublinairport.com/docs/default-source/corporate/groundwater-and-surface-water-risk-assessment-and-remediation-options-appraisal-2021.pdf?sfvrsn=2e845f1a_0

1.5 The planning authority simply cannot carry out an EIA, AA and Water Framework assessment and Waste assessment without comprehensive report from the daa detailing the interaction of this development with existing PFAS contamination currently in soil, groundwater and water bodies. Remediation and decontamination measures capable of preventing PFAS contaminated runoff from impacting water resources, protected sites and from being discharged to sewer and then Ringsend (which has no technology to deal with PFAS contamination) MUST be assessed, mitigation identified, compensation identified for unauthorised reburial of contaminated soils and removal of contaminated soils.

1.6 the current from of application will not prevent the extreme risk to human health, sensitive habitats and the species that live thefre. ROBUST and definitive measure must be identified and implemented as a matter of urgency at full costs to the daa due to their inability to comply with Planning and environmental issues to date on this specific issue.

1.7 Multi party consultation with the EPA, Fingal CC, Health and Safety Authority and daa must commence immediately.

The planning authority have a responsibility under the Local Government Act of 2001 and the Ethics in Public office Act 1995 , in addition to environmental and planning legislation, to act in the public interest.

Yours Sincerely

Sabrina Joyce-Kemper

ADVICE NOTE

# ON THE LIFESPAN OF ECOLOGICAL REPORTS & SURVEYS

APRIL 2019

CIEEM

It is important that planning decisions are based on up-to-date ecological reports and survey data. However, it is difficult to set a specific timeframe over which reports or survey data should be considered valid, as this will vary in different circumstances. In some cases there will be specific guidance on this (such as for the age of data which may be used to support an EPS licence application). In circumstances where such advice does not already exist, CIEEM provides the general advice set out below.

For some projects the time taken between commencing the scoping or design and submitting a planning application can be several years, and this can result in the early ecology surveys becoming out-of-date (based on the advice set out below); this can lead to additional costs for developers associated with updating survey data. Nevertheless, there are considerable advantages associated with undertaking surveys early during the scoping or design phases of a project.

Ecological consultants should give careful consideration to which, if any, surveys need to be updated; design their data collection in a way which maximises the benefits of early surveys whilst minimising the costs to developers; and provide clarity on the likely lifespan of surveys in their reports.

| AGE OF DATA | REPORT / SURVEY VALIDITY |
|---|---|
| Less than 12 months | Likely to be valid in most cases. |
| 12-18 months | Likely to be valid in most cases with the following exceptions:<br>• Where a site may offer existing or new features which could be utilised by a mobile species within a short timeframe (see scenario 1 example);<br>• Where a mobile species is present on site or in the wider area, and can create new features of relevance to the assessment (see scenario 2 example);<br>• Where country-specific or species-specific guidance dictates otherwise.<br>Report authors should highlight where they consider it likely to be necessary to update surveys within a timeframe of less than 18 months. |
| 18 months to 3 years | A professional ecologist will need to undertake a site visit and may also need to update desk study information (effectively updating the Preliminary Ecological Appraisal) and then review the validity of the report, based on the factors listed below. Some or all of the other ecological surveys may need to be updated. The professional ecologist will need to issue a clear statement, with appropriate justification, on:<br>• The validity of the report;<br>• Which, if any, of the surveys need to be updated; and<br>• The appropriate scope, timing and methods for the update survey(s).<br>The likelihood of surveys needing to be updated increases with time, and is greater for mobile species or in circumstances where the habitat or its management has changed significantly since the surveys were undertaken. Factors to be considered include (but are not limited to):<br>• Whether the site supports, or may support, a mobile species which could have moved on to site, or changed its distribution within a site (see scenario 1&2 examples);<br>• Whether there have been significant changes to the habitats present (and/or the ecological conditions/functions/ecosystem functioning upon which they are dependent) since the surveys were undertaken, including through changes to site management (see scenario 3 example);<br>• Whether the local distribution of a species in the wider area around a site has changed (or knowledge of it increased), increasing the likelihood of its presence (see scenario 4 example). |
| More than 3 years | The report is unlikely to still be valid and most, if not all, of the surveys are likely to need to be updated (subject to an assessment by a professional ecologist, as described above). |

# EXAMPLE SCENARIOS

1

- Trees or buildings on site have been surveyed for evidence of bat roosts and none were found; new roosts may be present, and trees or buildings may have developed new features which were not previously present. An update bat roost survey is likely to be required.
- One or more potential otter resting sites have been identified, although there was no evidence of use at the time of the survey; such features may have been used by otters during the intervening period. An update otter survey is likely to be required.

2

- A badger survey confirmed the presence of badgers on site; new setts may have been excavated within the site. An update badger survey is likely to be required.

3

- An area of grassland was heavily grazed by cattle at the time of the original survey and was considered to be unsuitable for reptiles, although slow-worms were known to be present in the wider area; grazing has since ceased and the grassland has been cut once annually, which has encouraged the development of a tussocky sward which provides suitable habitat for slow-worms. A reptile survey is now likely to be required.

4

- A water vole survey confirmed their absence from the site but identified them as present in the wider area surrounding it; a recovery project is underway in the local area through a mink control programme, which is encouraging the spread of water voles.

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# I-WeBS Baldoyle Bay Trends Report

## I-WeBS Trends Report 1994/95 – 2019/20

First Published 2022-04-03, Updated 2023-08-17

# Introduction

This report presents site trends based on the data gathered by the Irish Wetland Bird Survey (I-WeBS). Only species with sufficient data at Baldoyle Bay (site code 0U403) are presented.

This report is part of the I-WeBS National and Site Trends Report 1994/95 – 2019/20 .

For guidance on how to interpret these trends, please see the I-WeBS Trends Report Guidance.

For details on the methods used to generate these trends, please see the I-WeBS Trends Report Methodology.

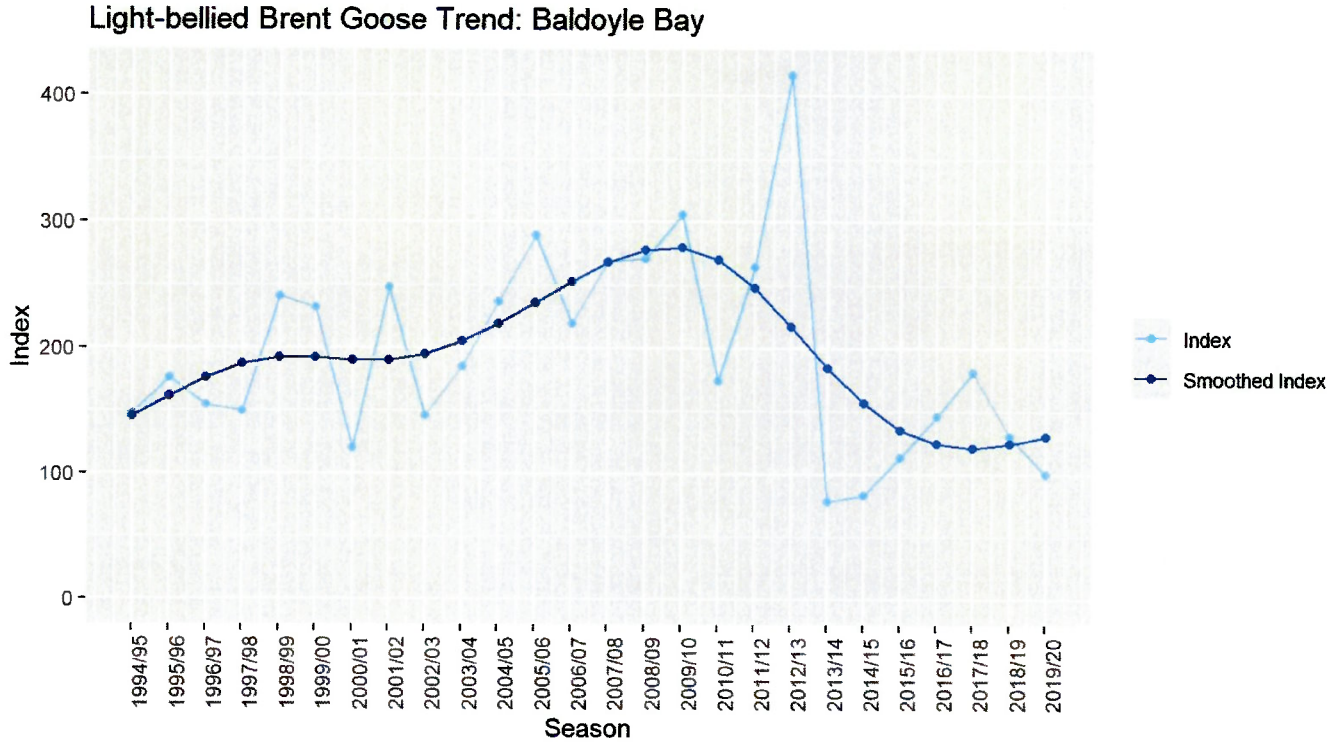
# Site Summary

| | Trend (%) | | | |
|---|---|---|---|---|
| **Species** | **Baldoyle Bay - 5 Year** | **Baldoyle Bay - 12 Year** | **Baldoyle Bay - 23 Year** | **Long Term Trend** |
| Grey Plover | -36.9 | -60.9 | -83.1 | Large Decline |
| Golden Plover | -77.6 | -67.1 | -80.1 | |
| Turnstone | -17.5 | -76.5 | -66.7 | |
| Bar-tailed Godwit | -55.4 | -44.7 | -66.5 | |
| Dunlin | -57.2 | -21.1 | -65.3 | |
| Lapwing | -9.8 | -38.3 | -62.3 | |
| Redshank | -4.2 | -62.7 | -38.7 | Moderate Decline |
| Light-bellied Brent Goose | -32.6 | -51.0 | -23.0 | Intermediate Decline |
| Curlew | 69.0 | -19.3 | 12.7 | Stable or Increasing |
| Teal | 1.2 | -24.1 | 24.2 | |
| Oystercatcher | -1.8 | -20.6 | 28.6 | |
| Shelduck | 81.6 | -43.7 | 32.8 | |
| Mallard | 38.7 | -52.9 | 33.6 | |

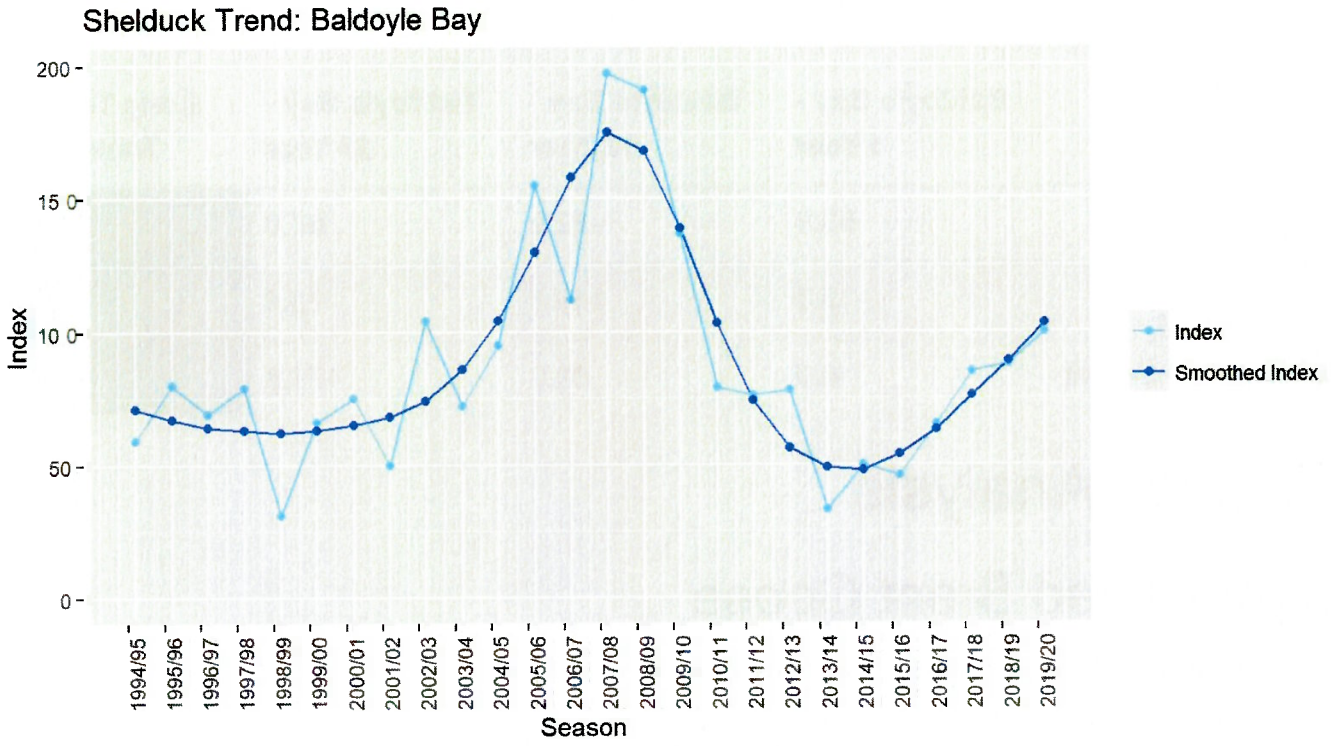
| Species | Trend (%) | | | |
|---|---|---|---|---|
| | Baldoyle Bay - 5 Year | Baldoyle Bay - 12 Year | Baldoyle Bay - 23 Year | Long Term Trend |
| Wigeon | 53.9 | -32.2 | 67.0 | |
| Knot | -15.3 | 146.7 | 73.4 | |
| Black-tailed Godwit | 6.0 | 86.0 | 171.8 | |

# Species Analysis

## Light-bellied Brent Goose




## Shelduck


Shelduck Trend: Baldoyle Bay
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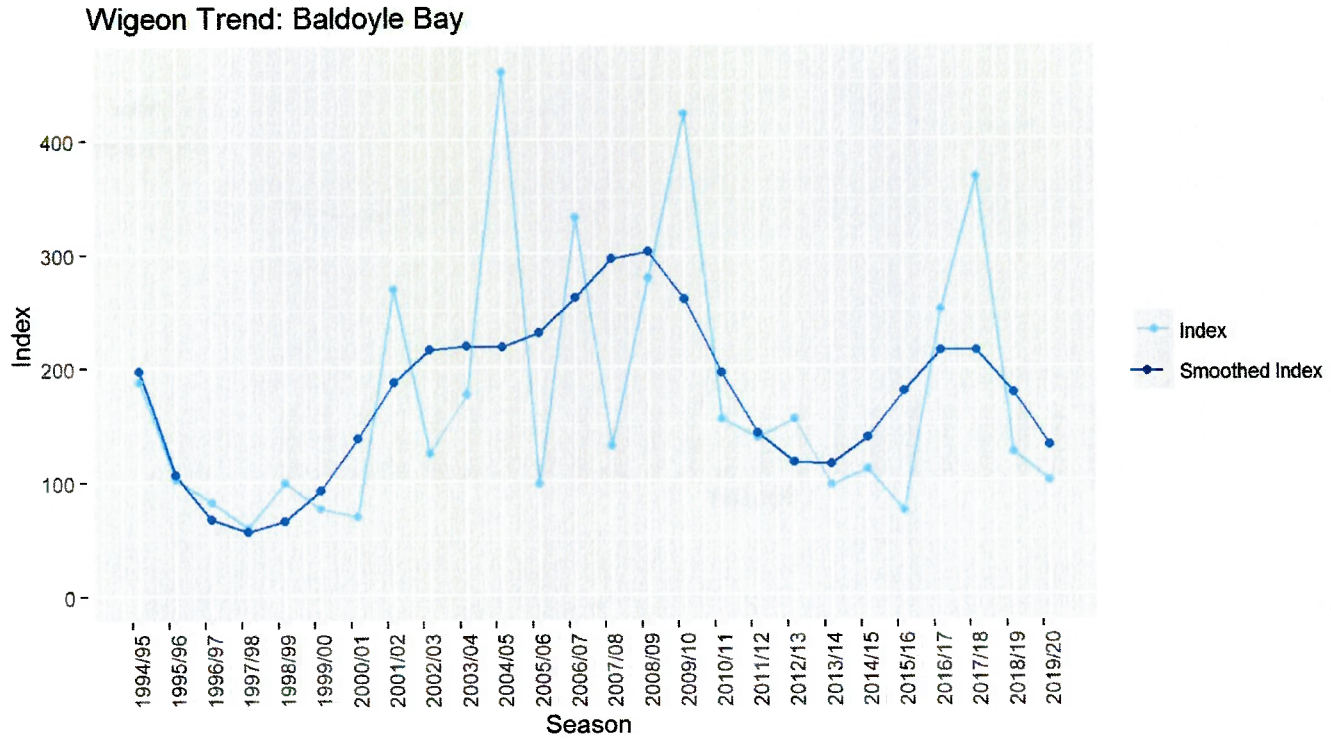
Season
Index
Smoothed Index

# Wigeon


Wigeon Trend: Baldoyle Bay
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Index
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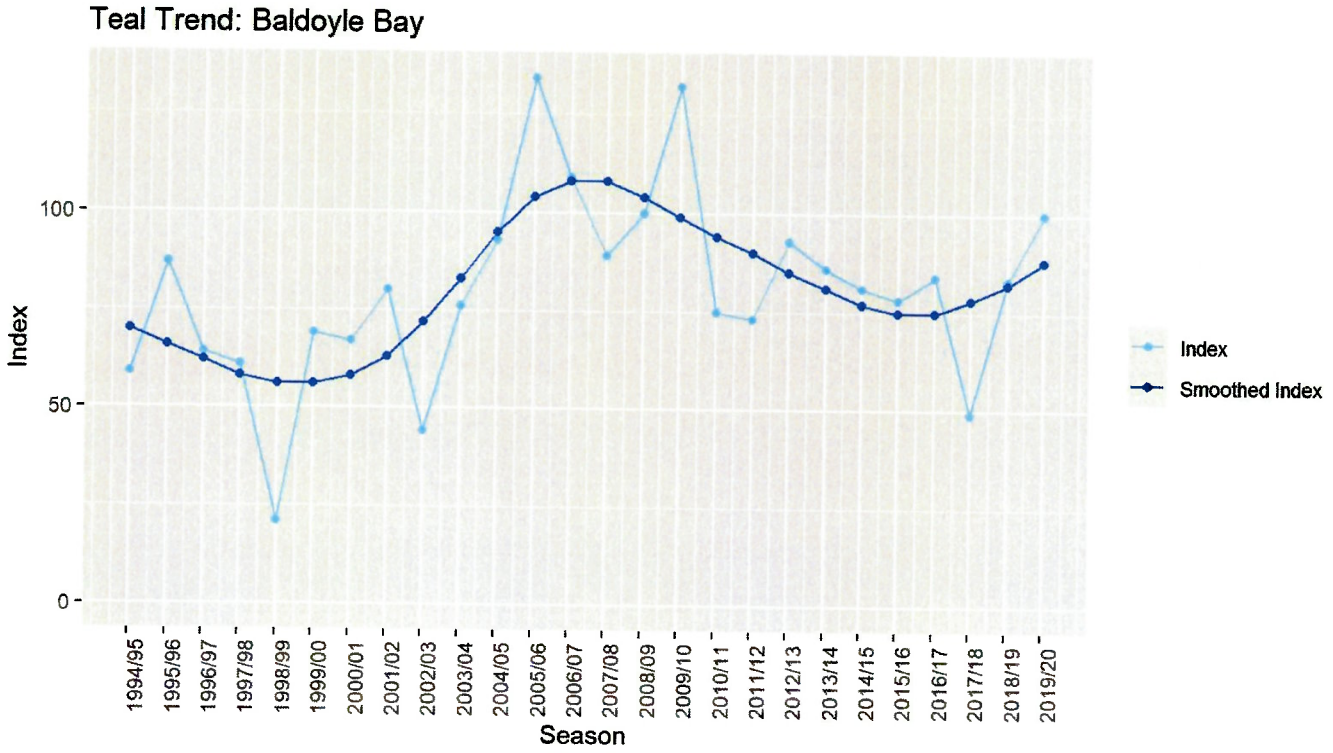
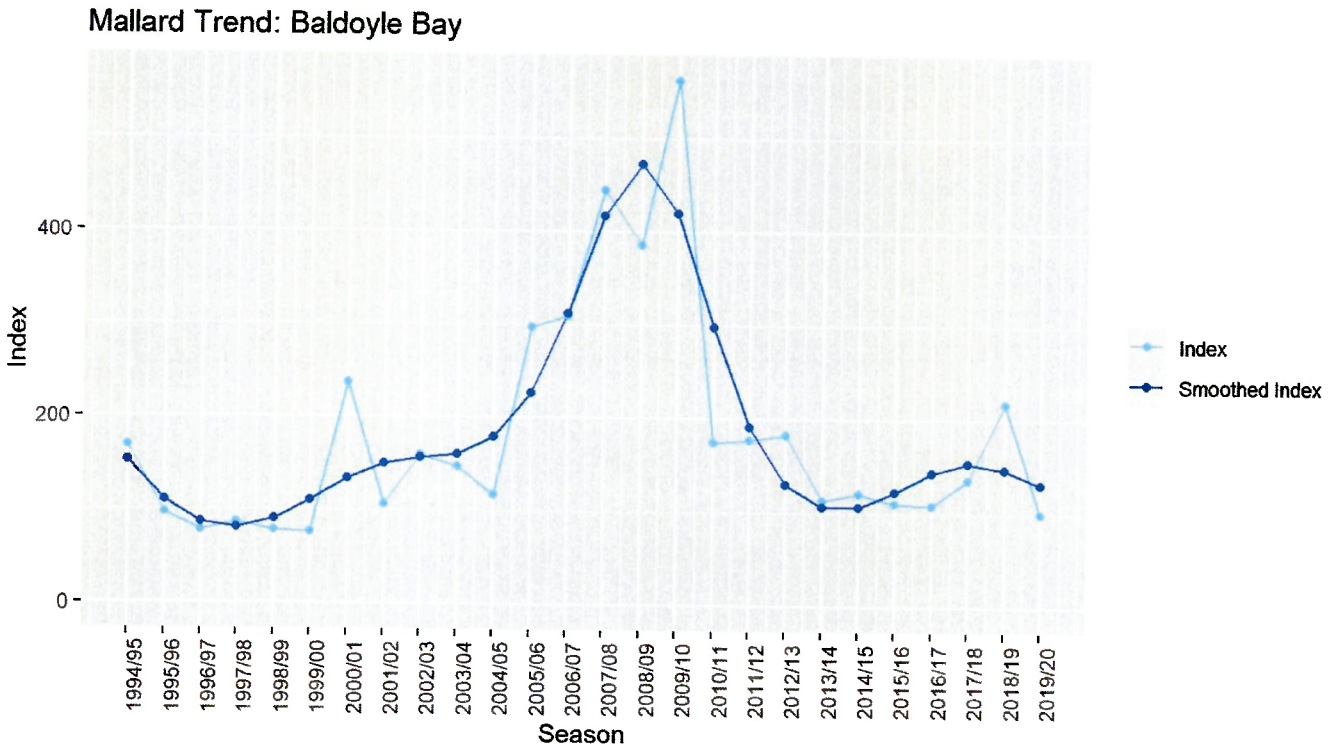
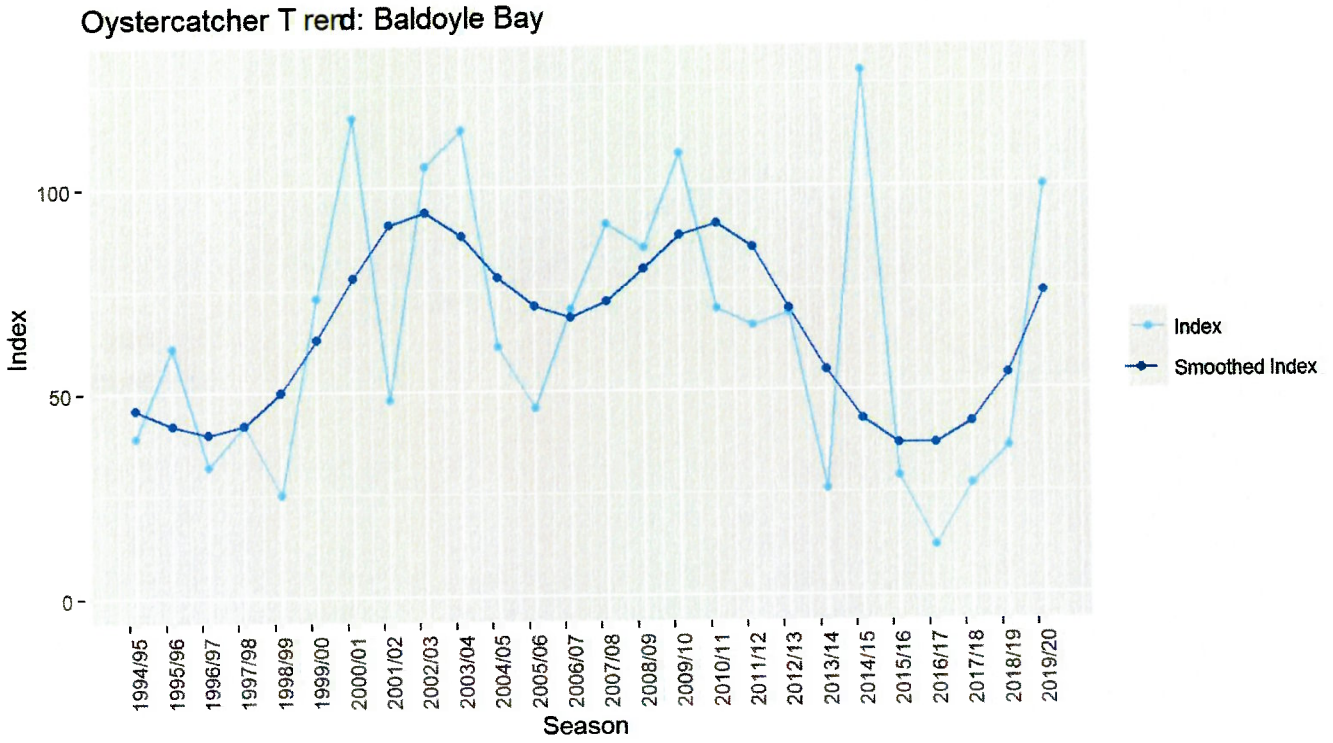
# Teal



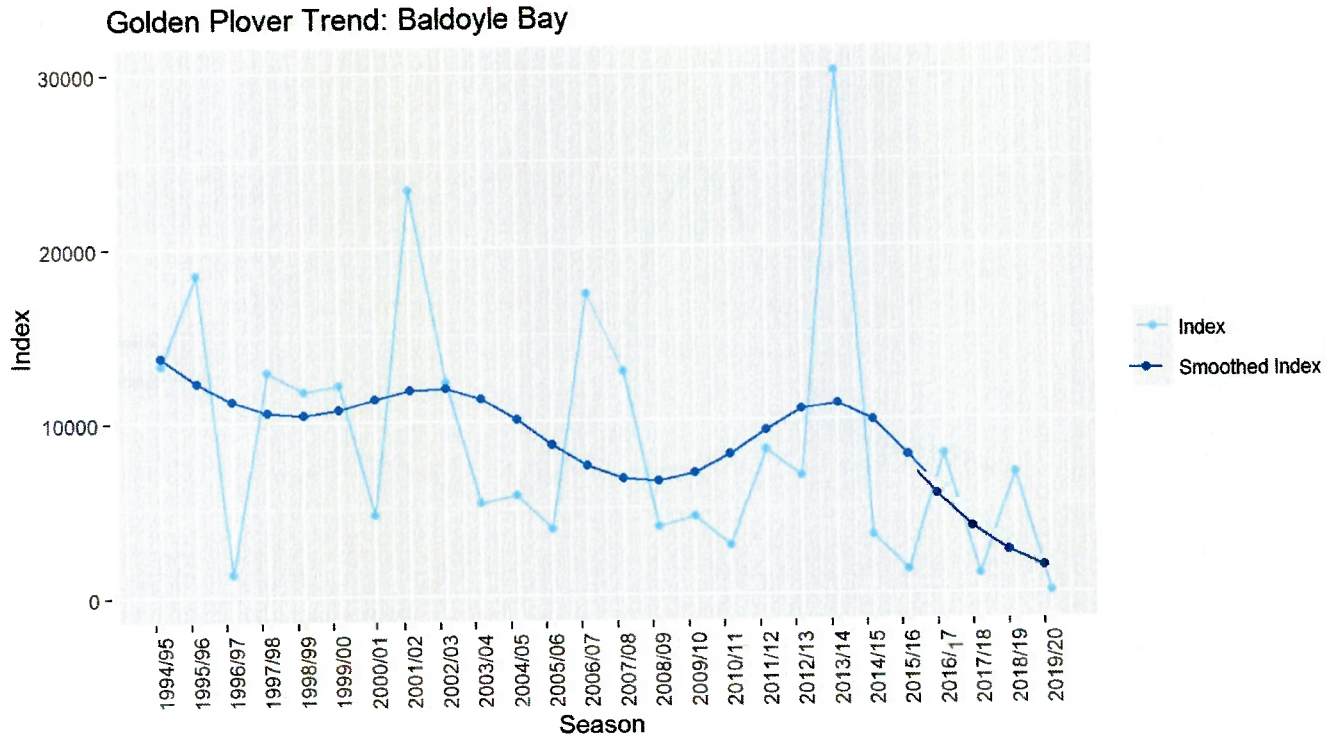

# Mallard



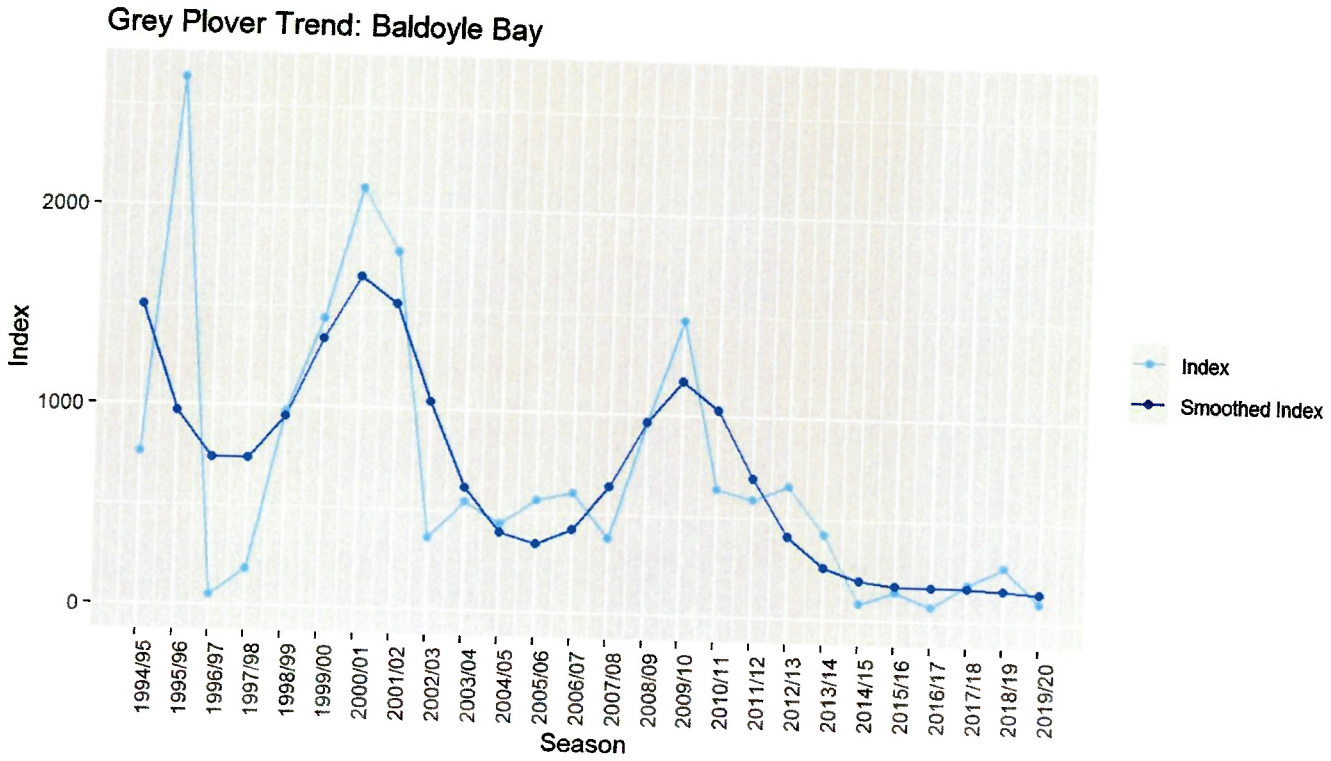

# Oystercatcher



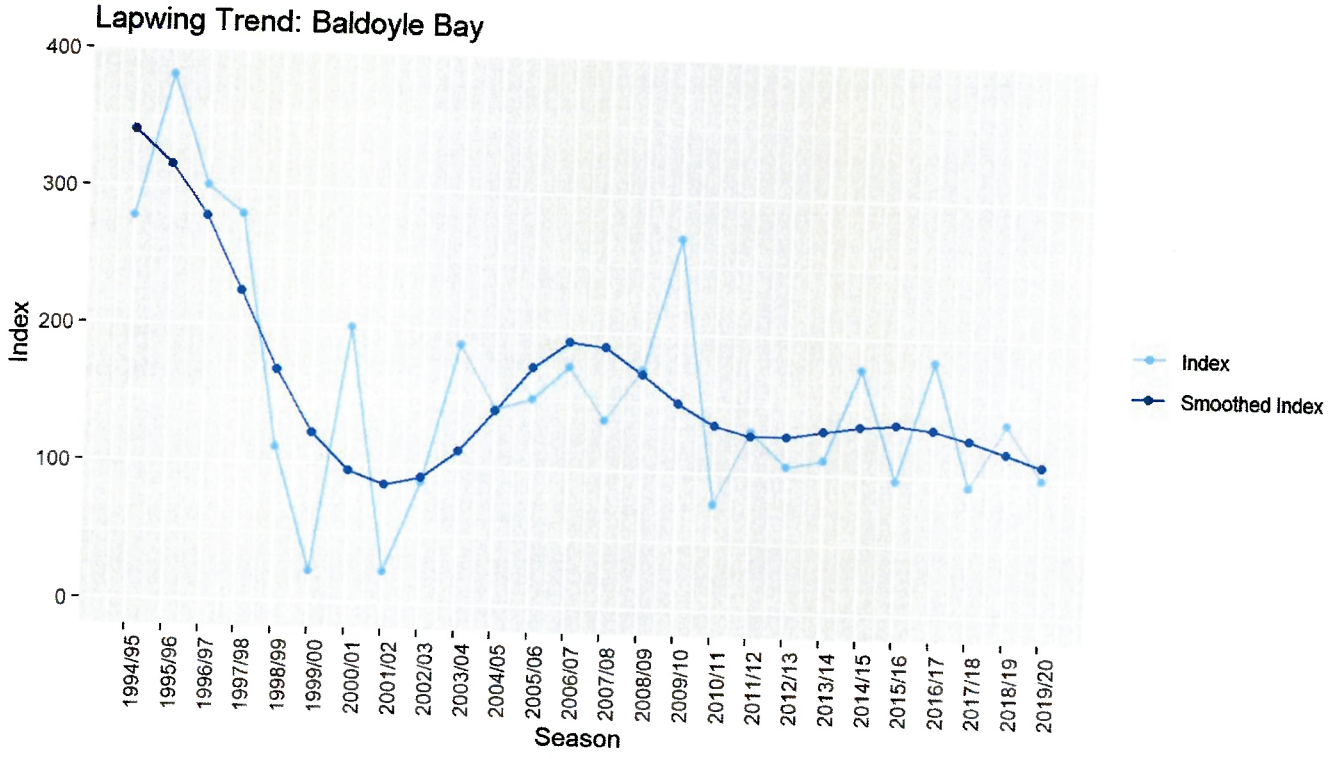

# Golden Plover



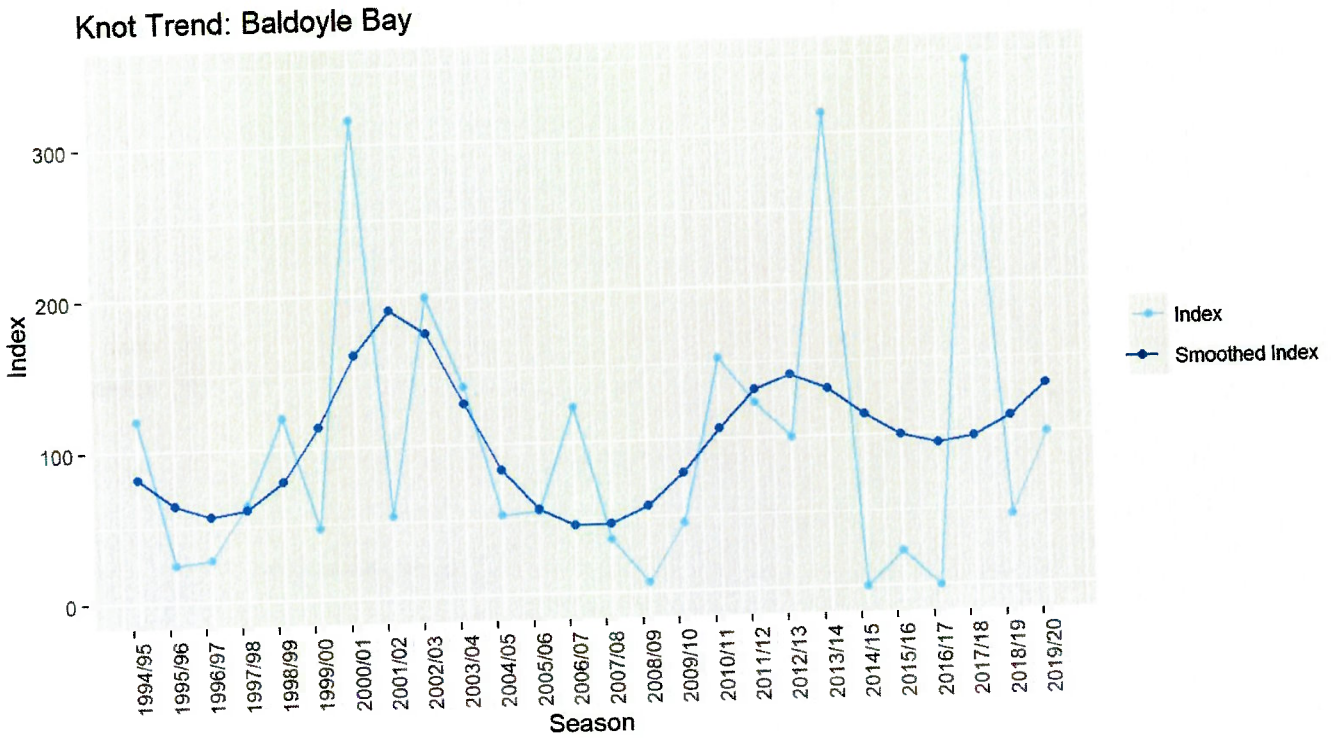

# Grey Plover



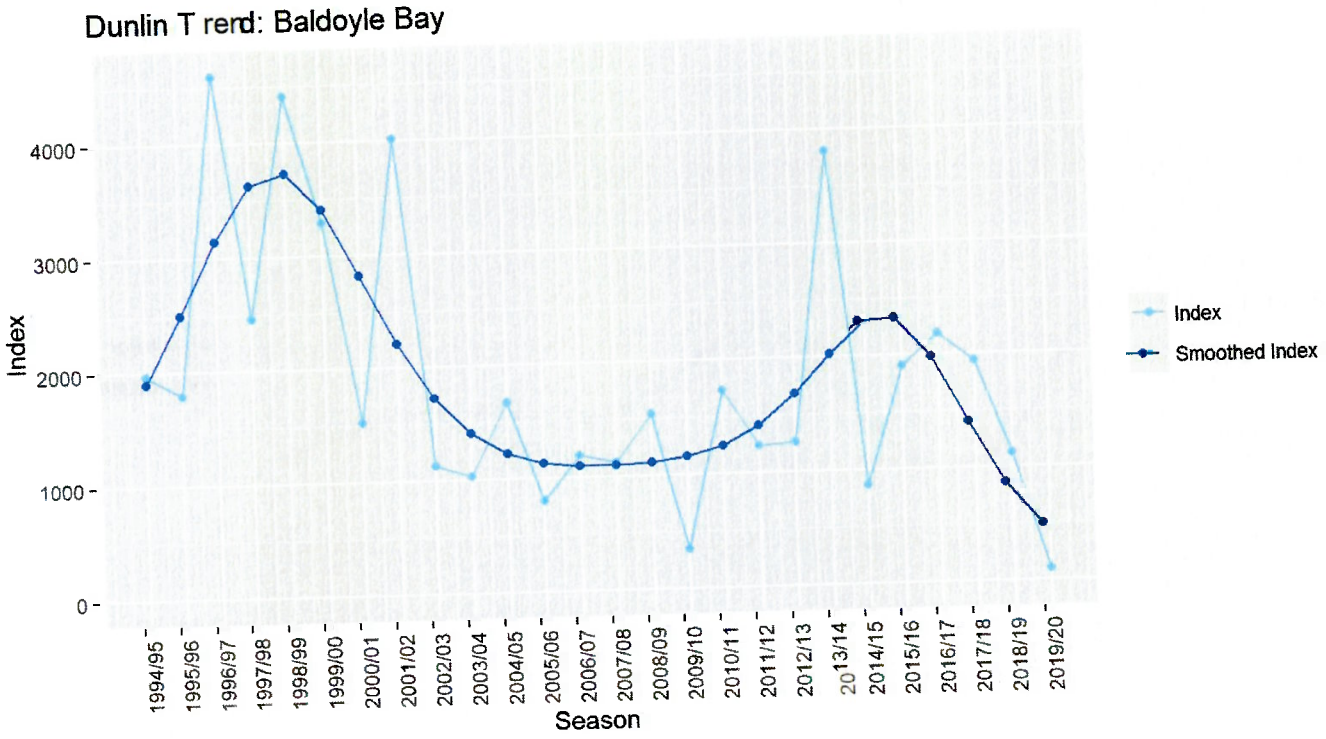

# Lapwing



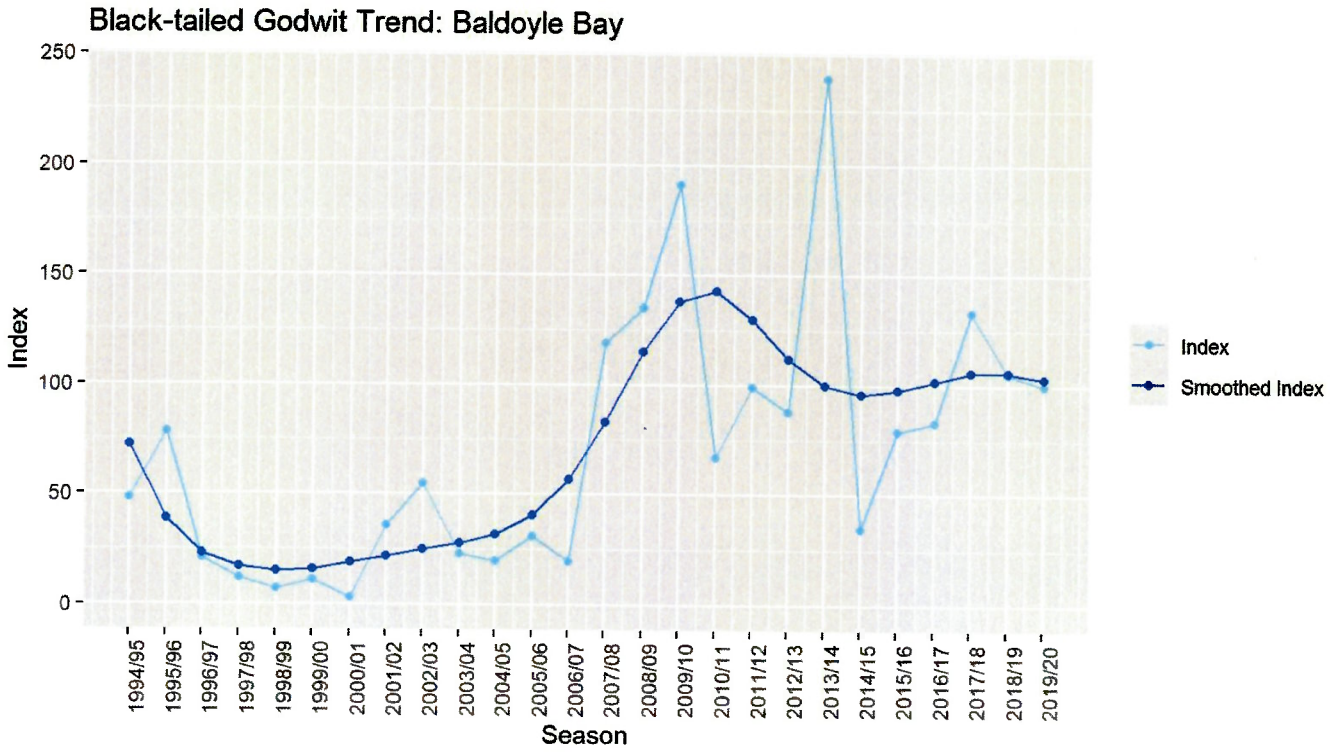

# Knot



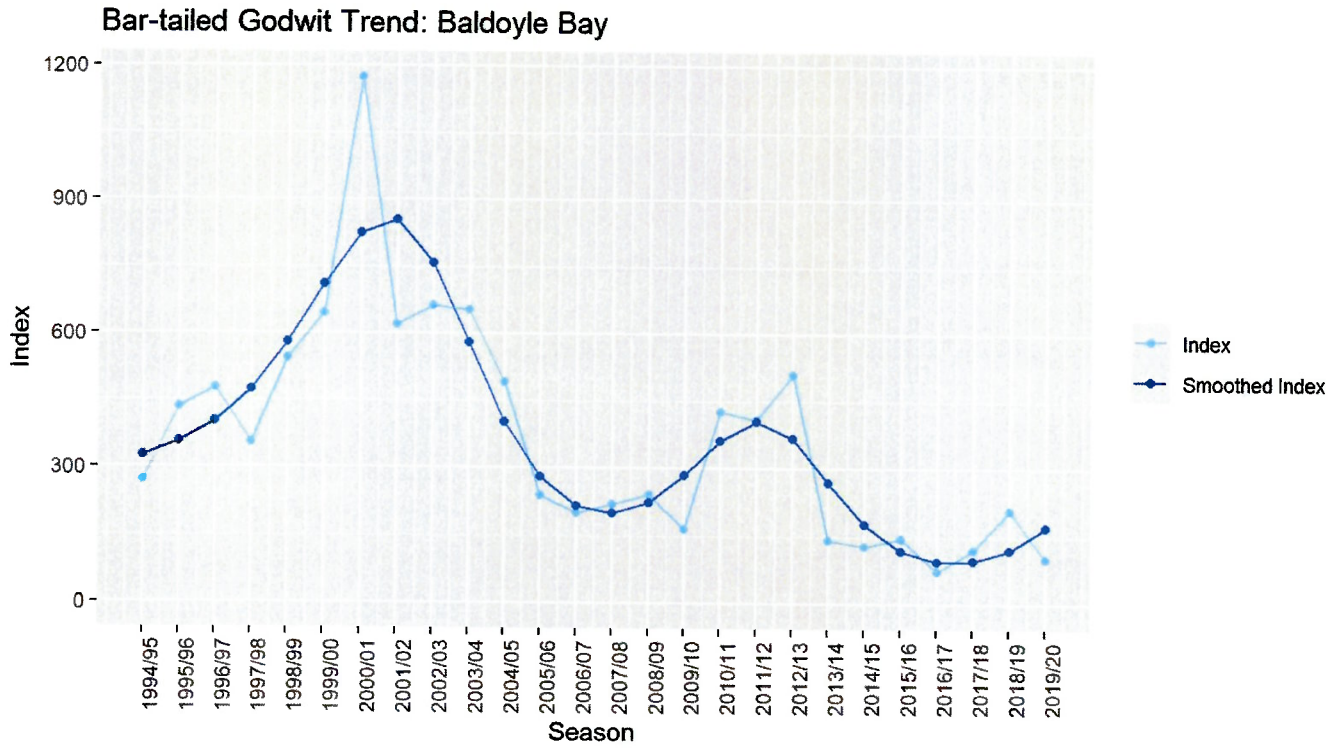

# Dunlin



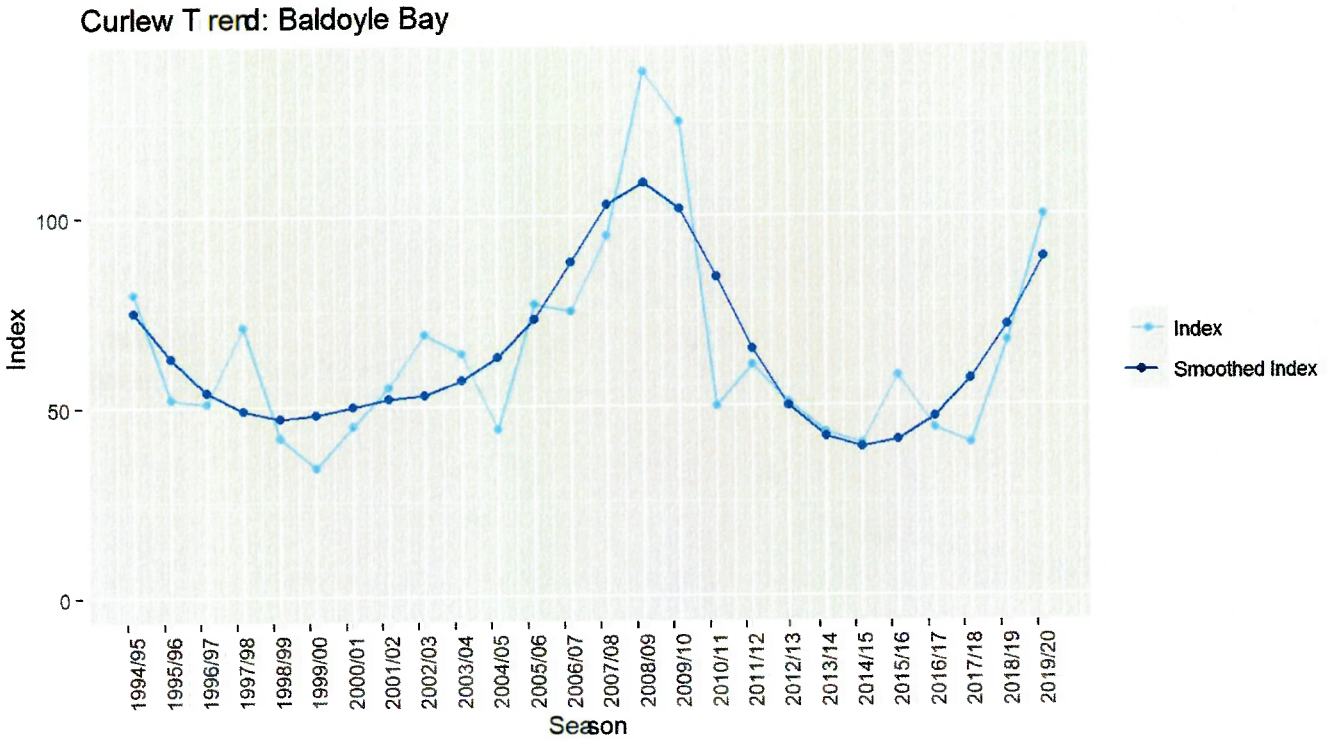

# Black-tailed Godwit



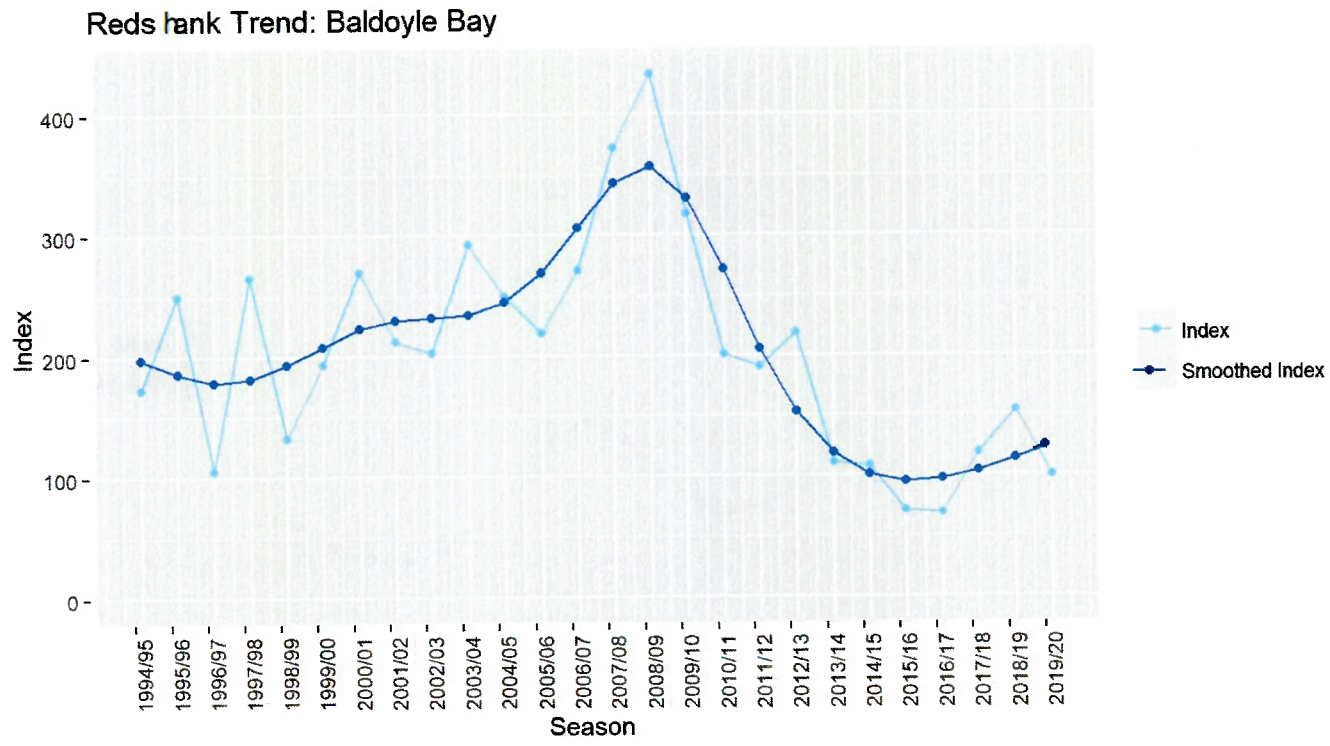

# Bar-tailed Godwit



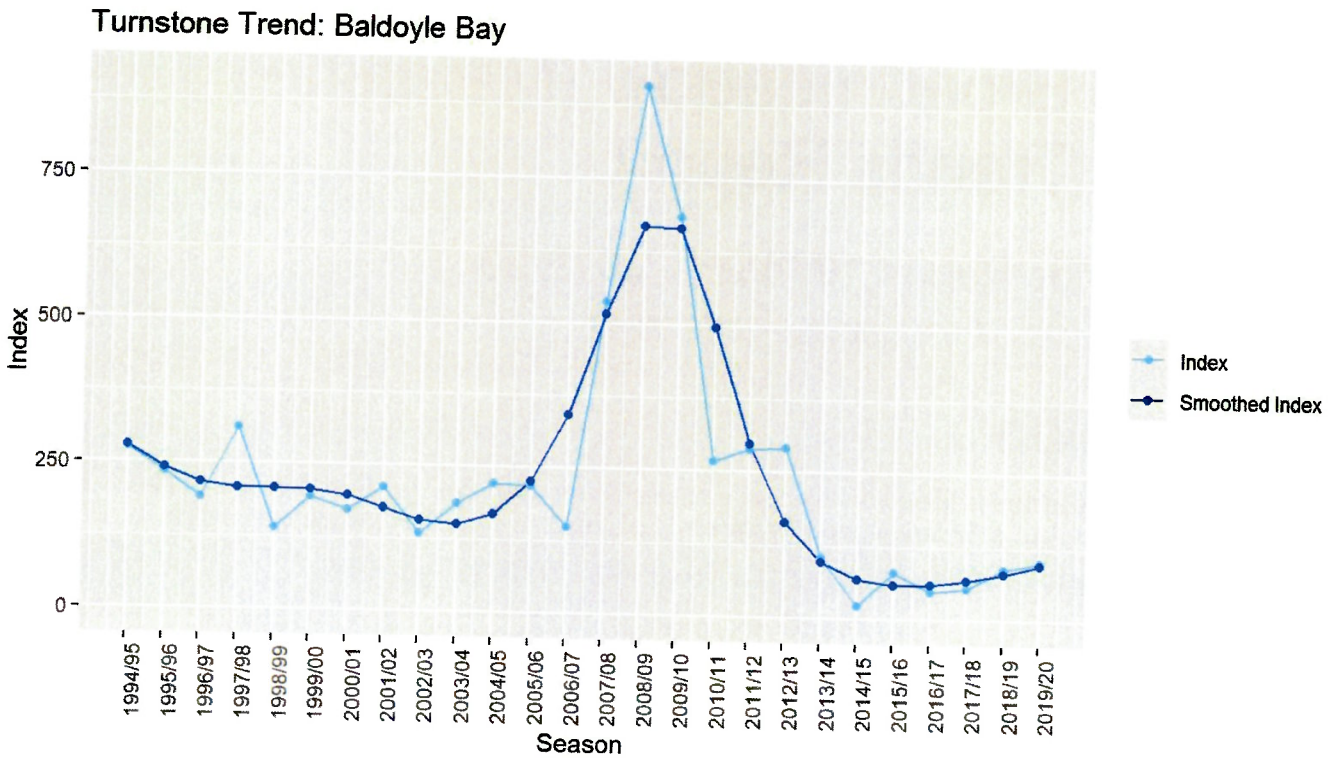

# Curlew




# Redshank




# Turnstone




# Citations

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*(https://birdwatchireland.ie/app/uploads/2023/08/iwebs_trends_report.html)*

# I-WeBS Broadmeadow (Malahide) Estuary Trends Report

## I-WeBS Trends Report 1994/95 – 2019/20

First Published 2022-04-03, Updated 2023-08-17

# Introduction

This report presents site trends based on the data gathered by the Irish Wetland Bird Survey (I-WeBS). Only species with sufficient data at Broadmeadow (Malahide) Estuary (site code 0U408) are presented.

This report is part of the I-WeBS National and Site Trends Report 1994/95 – 2019/20 .

For guidance on how to interpret these trends, please see the I-WeBS Trends Report Guidance.

For details on the methods used to generate these trends, please see the I-WeBS Trends Report Methodology.

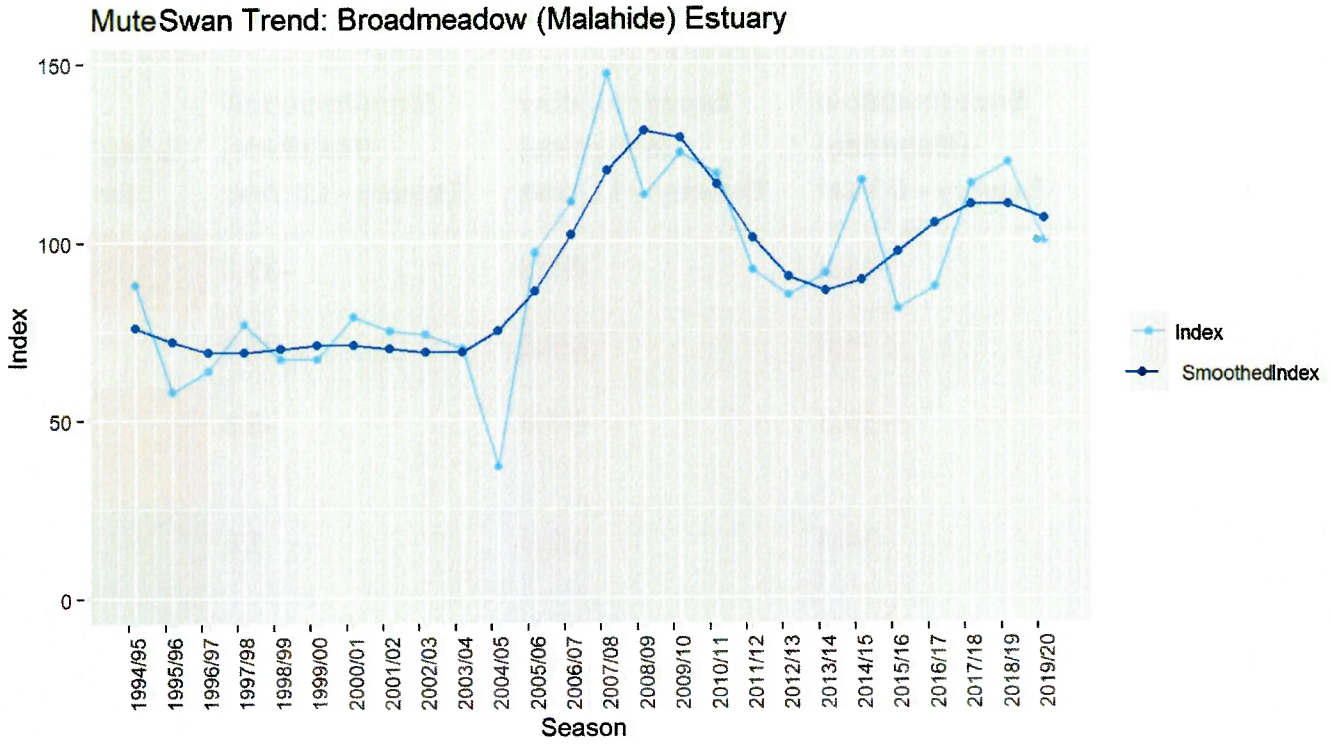
# Site Summary

| | Trend (%) | | | |
|---|---|---|---|---|
| **Species** | **Broadmeadow (Malahide) Estuary - 5 Year** | **Broadmeadow (Malahide) Estuary - 12 Year** | **Broadmeadow (Malahide) Estuary - 23 Year** | **Long Term Trend** |
| Golden Plover | -69.5 | -89.3 | -89.3 | Large Decline |
| Lapwing | -56.5 | -58.8 | -81.0 | |
| Goldeneye | -26.6 | -58.9 | -79.1 | |
| Grey Plover | -21.0 | -71.1 | -69.1 | |
| Dunlin | 2.9 | -32.0 | -63.1 | |
| Pintail | -16.2 | -70.7 | -57.9 | |
| Curlew | -9.4 | -45.1 | -56.4 | |
| Knot | 33.7 | 51.9 | -42.0 | Moderate Decline |
| Ringed Plover | 47.7 | -13.9 | -39.3 | |
| Red-breasted Merganser | -24.8 | -8.4 | -37.7 | |
| Turnstone | -37.6 | -73.7 | -36.3 | |

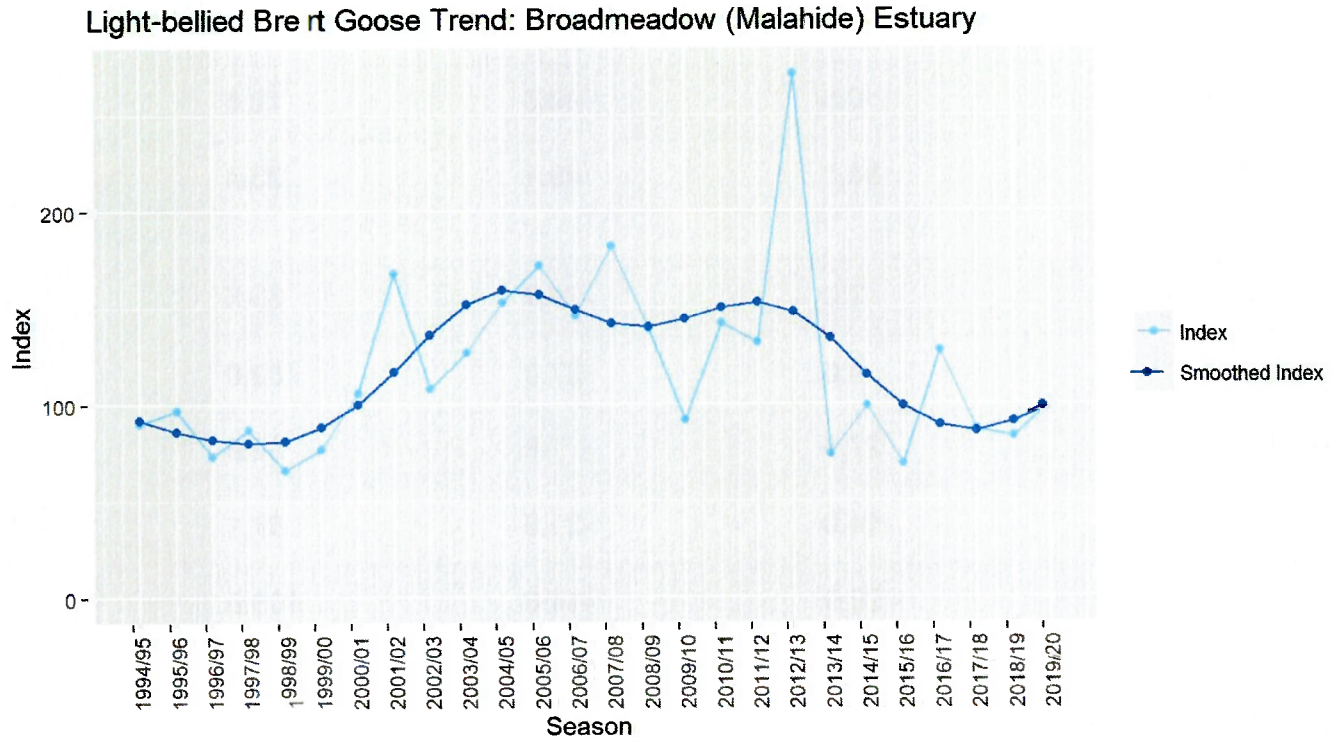
| Species | Trend (%) | | | Long Term Trend |
|---|---|---|---|---|
| | Broadmeadow (Malahide) Estuary - 5 Year | Broadmeadow (Malahide) Estuary - 12 Year | Broadmeadow (Malahide) Estuary - 23 Year | |
| Redshank | -11.8 | -55.6 | -33.3 | |
| Shelduck | -4.5 | -29.8 | -26.6 | |
| Oystercatcher | -15.2 | -17.6 | -9.3 | Intermediate Decline |
| Great Crested Grebe | -34.3 | -22.3 | 1.8 | Stable or Increasing |
| Light-bellied Brent Goose | -32.1 | -38.9 | 5.8 | |
| Wigeon | 18.5 | -59.6 | 6.2 | |
| Bar-tailed Godwit | -35.2 | -57.3 | 8.6 | |
| Greenshank | 0.8 | 40.0 | 12.5 | |
| Black-tailed Godwit | 88.1 | 49.1 | 23.4 | |
| Grey Heron | 2.0 | -29.9 | 33.8 | |
| Mallard | 4.6 | -27.8 | 52.0 | |
| Mute Swan | 27.9 | 7.8 | 52.8 | |
| Teal | 14.9 | -21.6 | 87.1 | |
| Cormorant | 28.9 | -14.0 | 108.5 | |

# Species Analysis

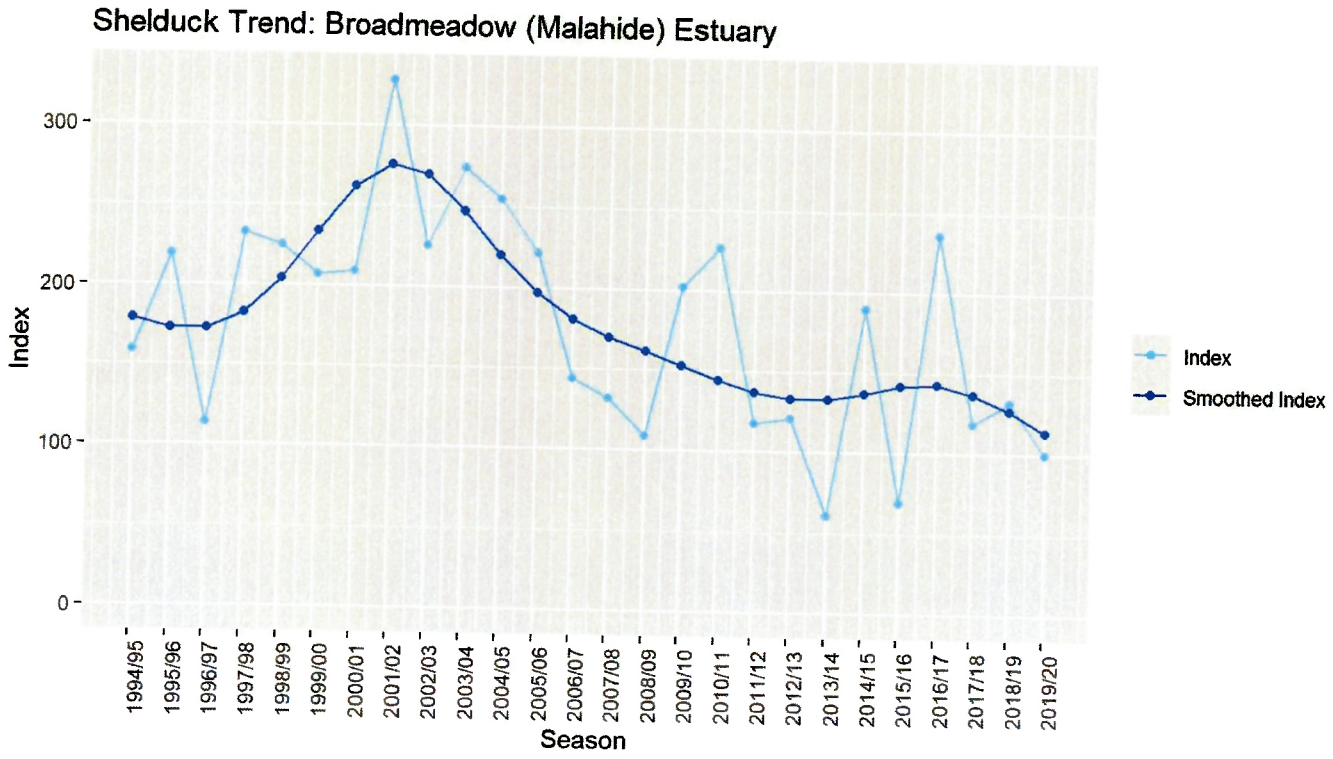
## Mute Swan




# Light-bellied Brent Goose




# Shelduck


Shelduck Trend: Broadmeadow (Malahide) Estuary
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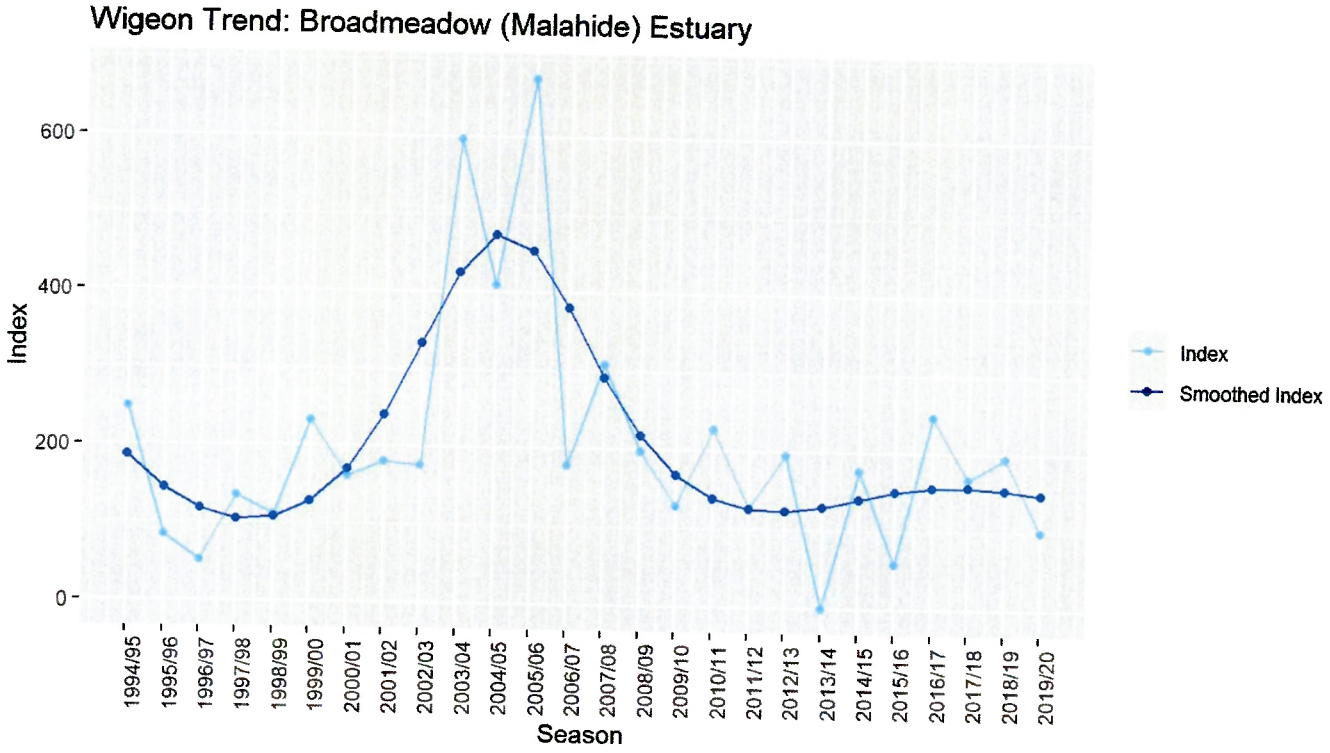
2019/20
Season
Index
Smoothed Index

# Wigeon


Wigeon Trend: Broadmeadow (Malahide) Estuary
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2010/11
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2017/18
2018/19
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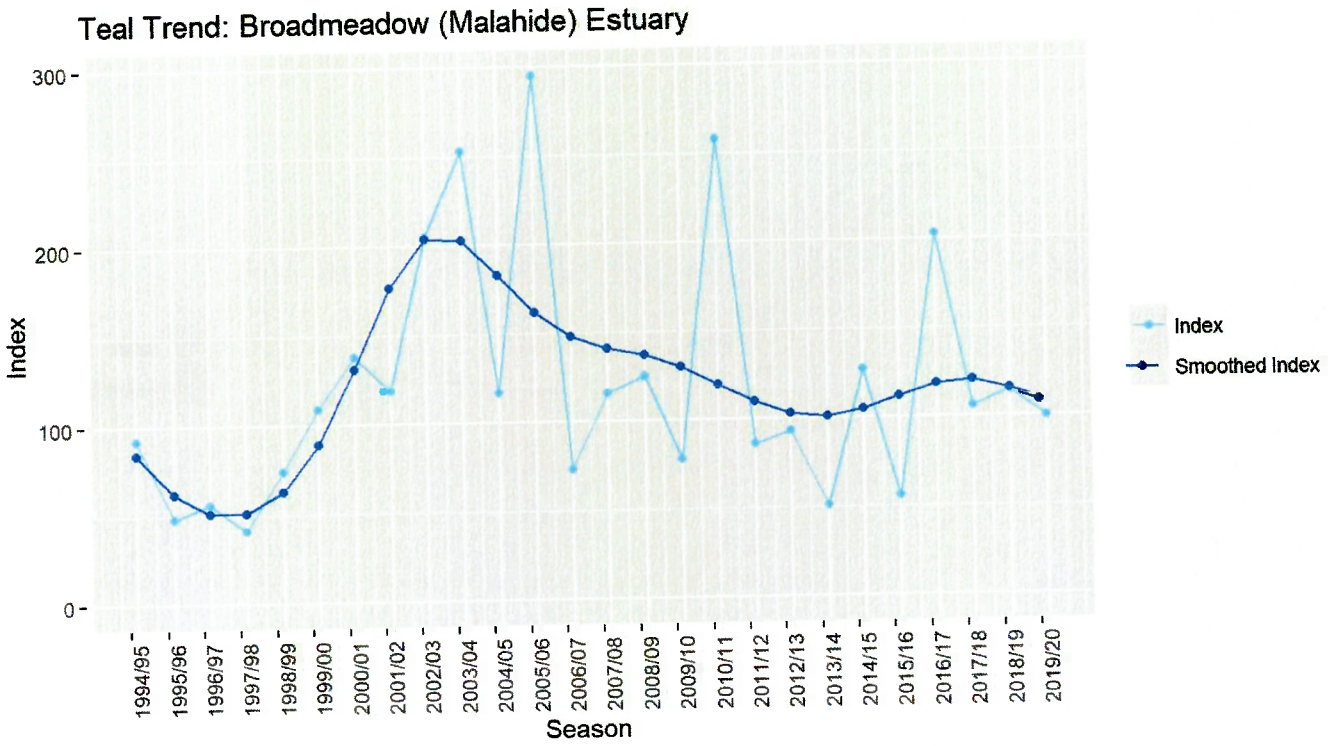
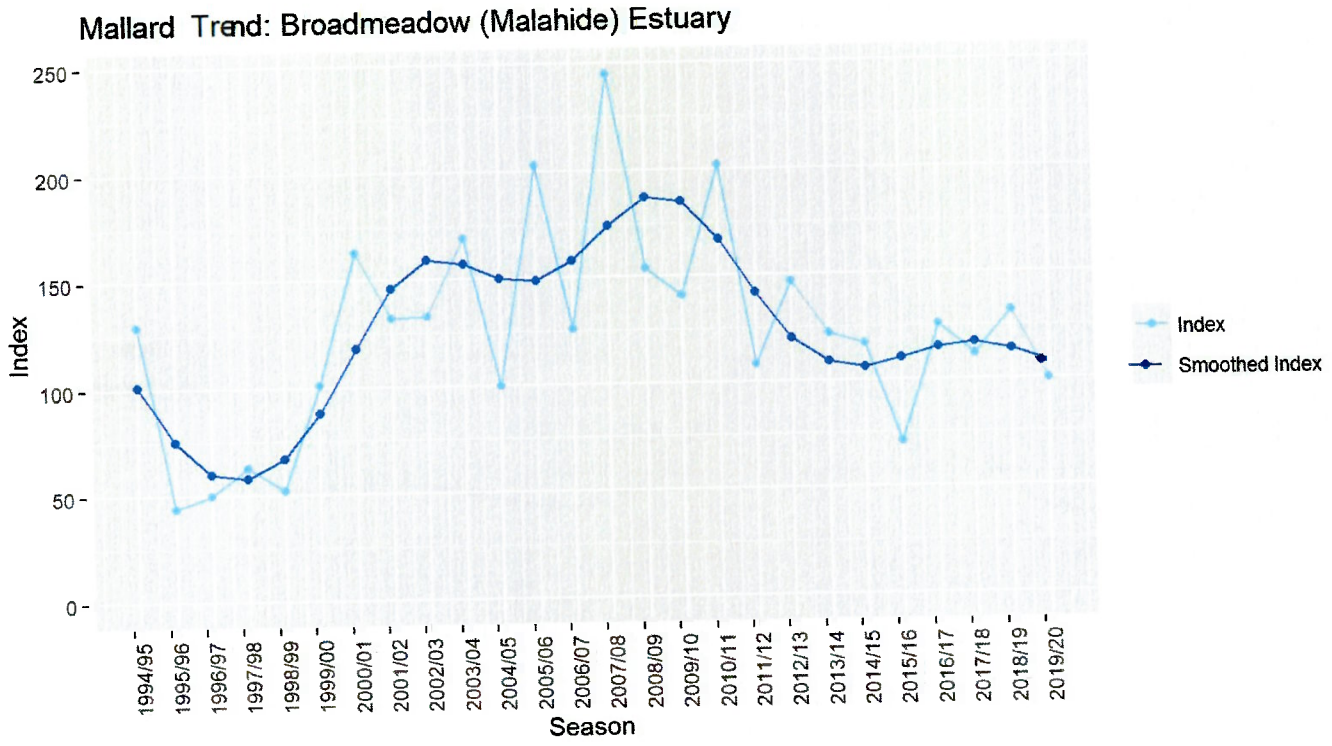
Season
Index
Smoothed Index

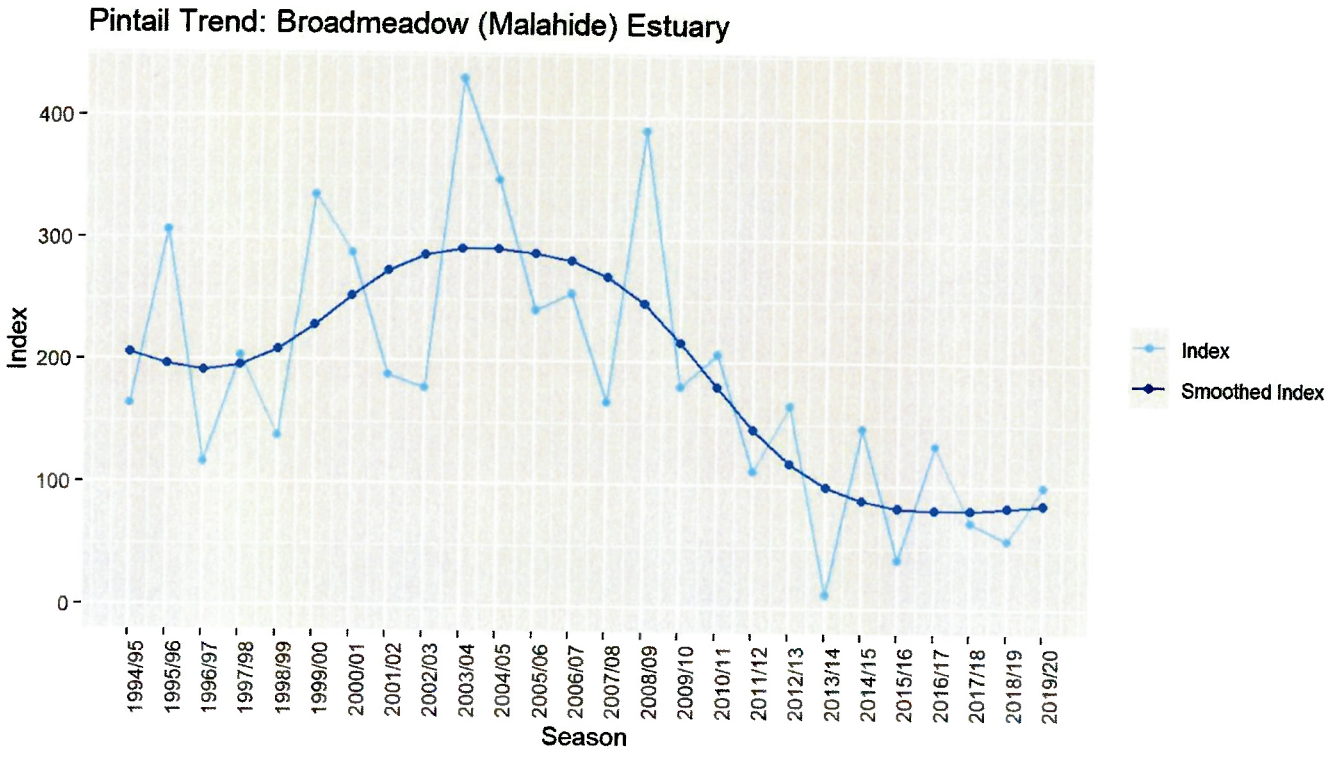
# Teal



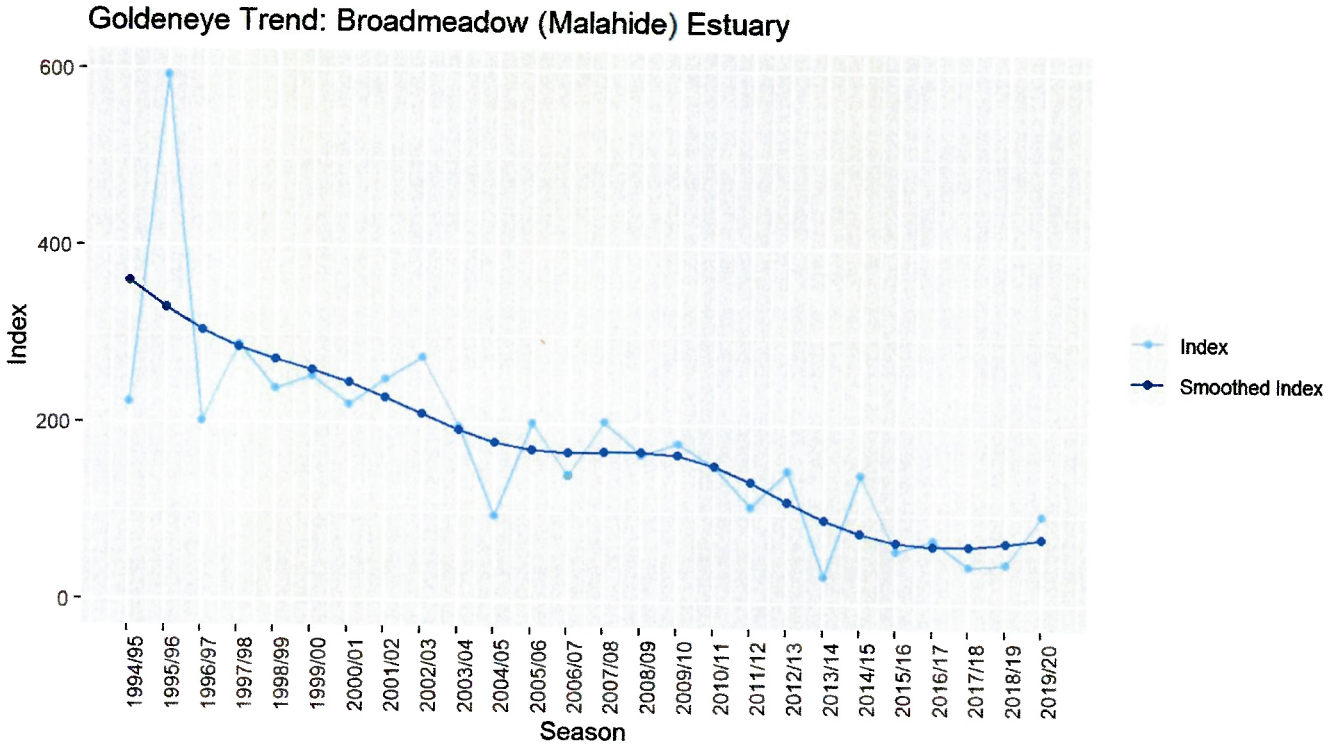

# Mallard



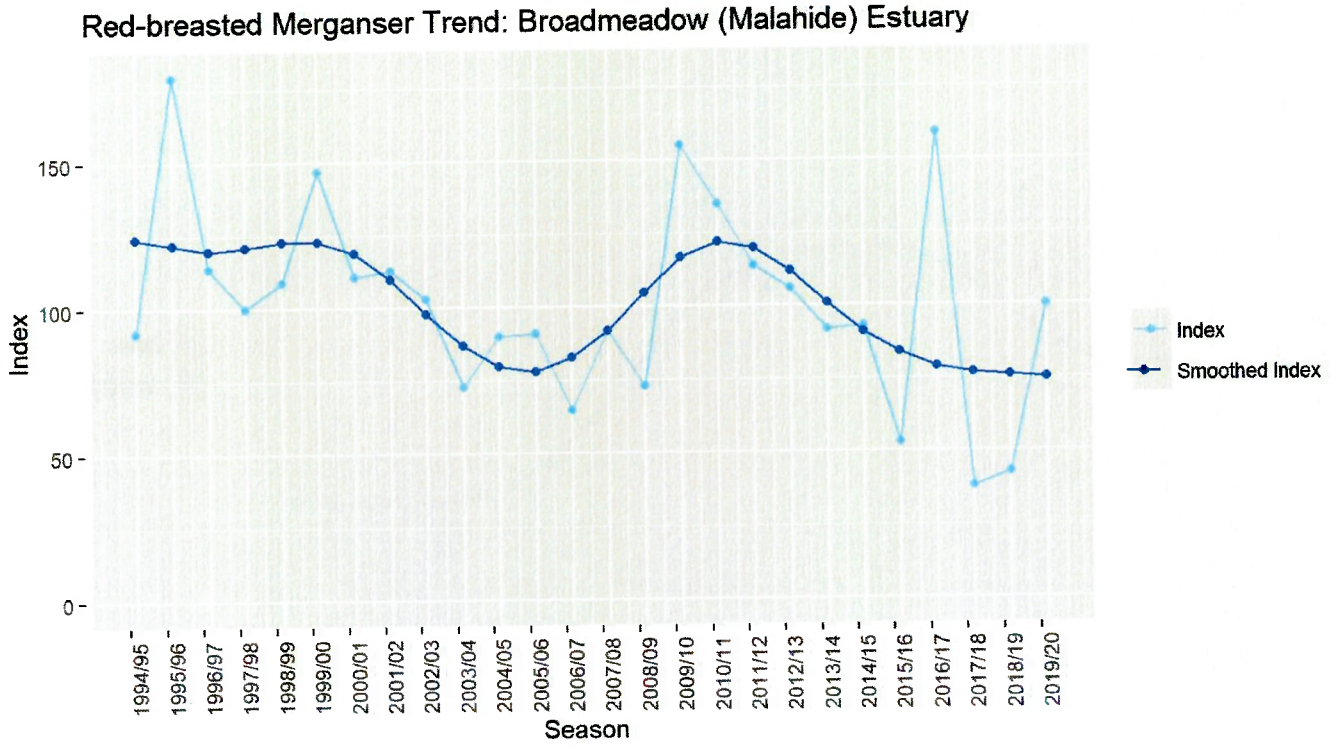

# Pintail



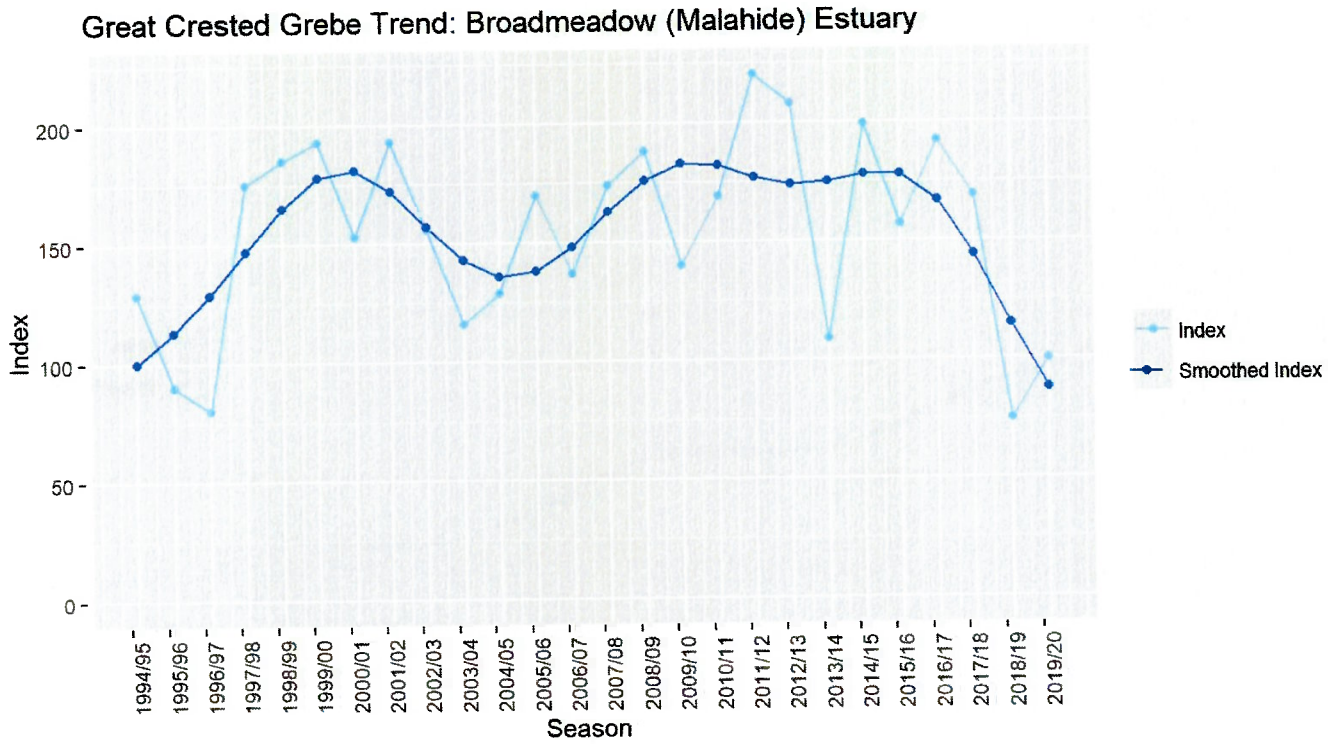

# Goldeneye



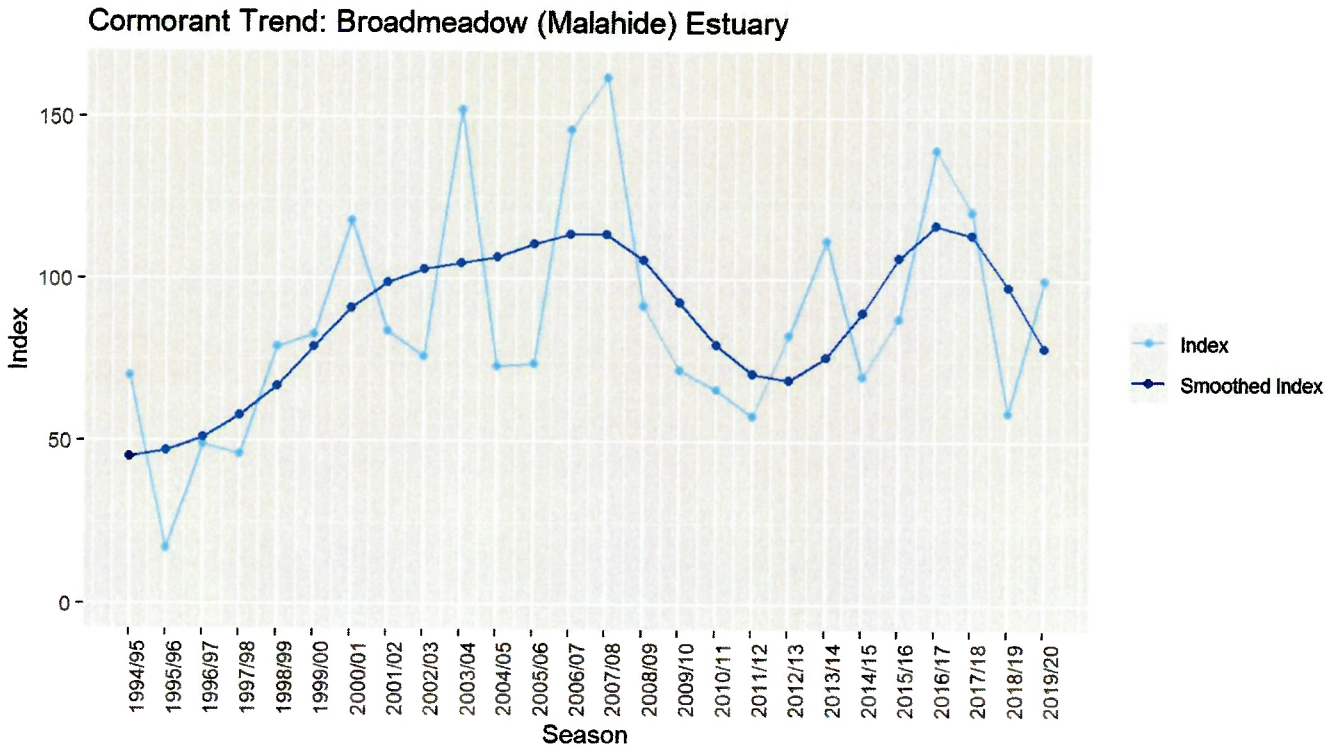

# Red-breasted Merganser



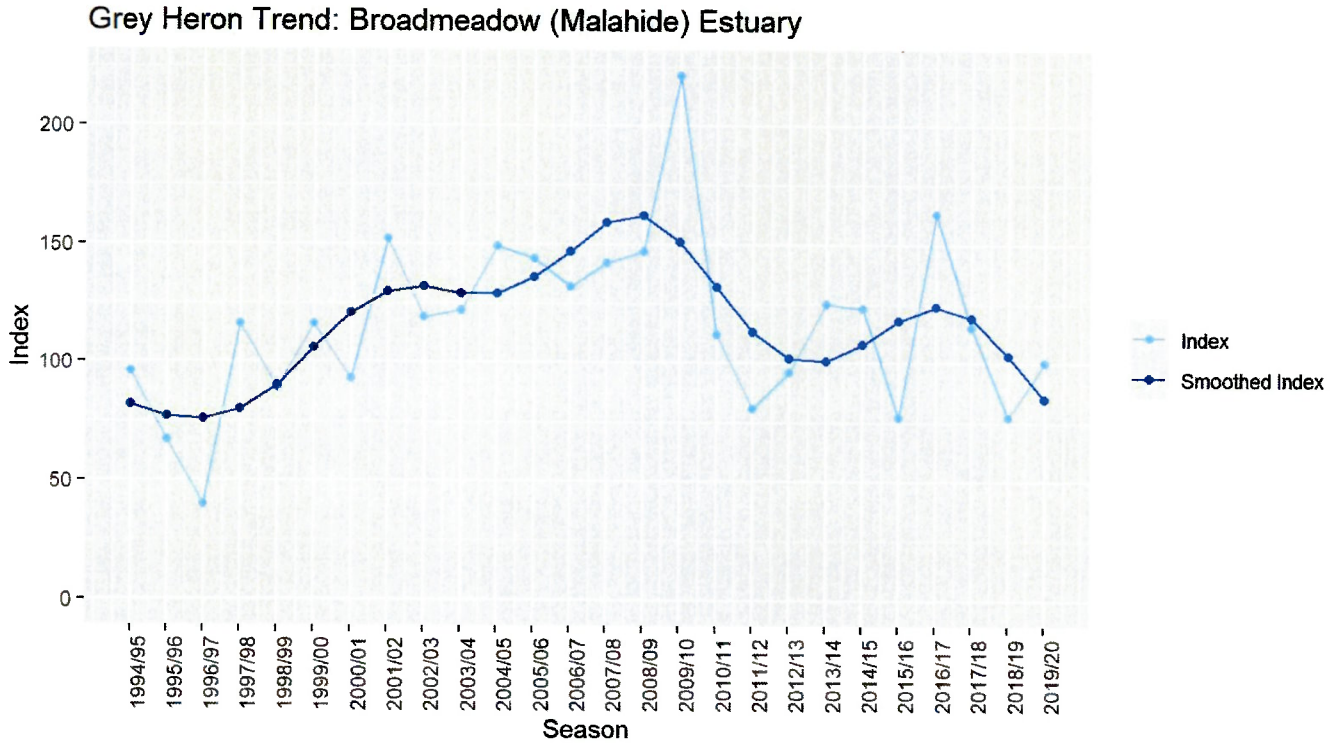

# Great Crested Grebe



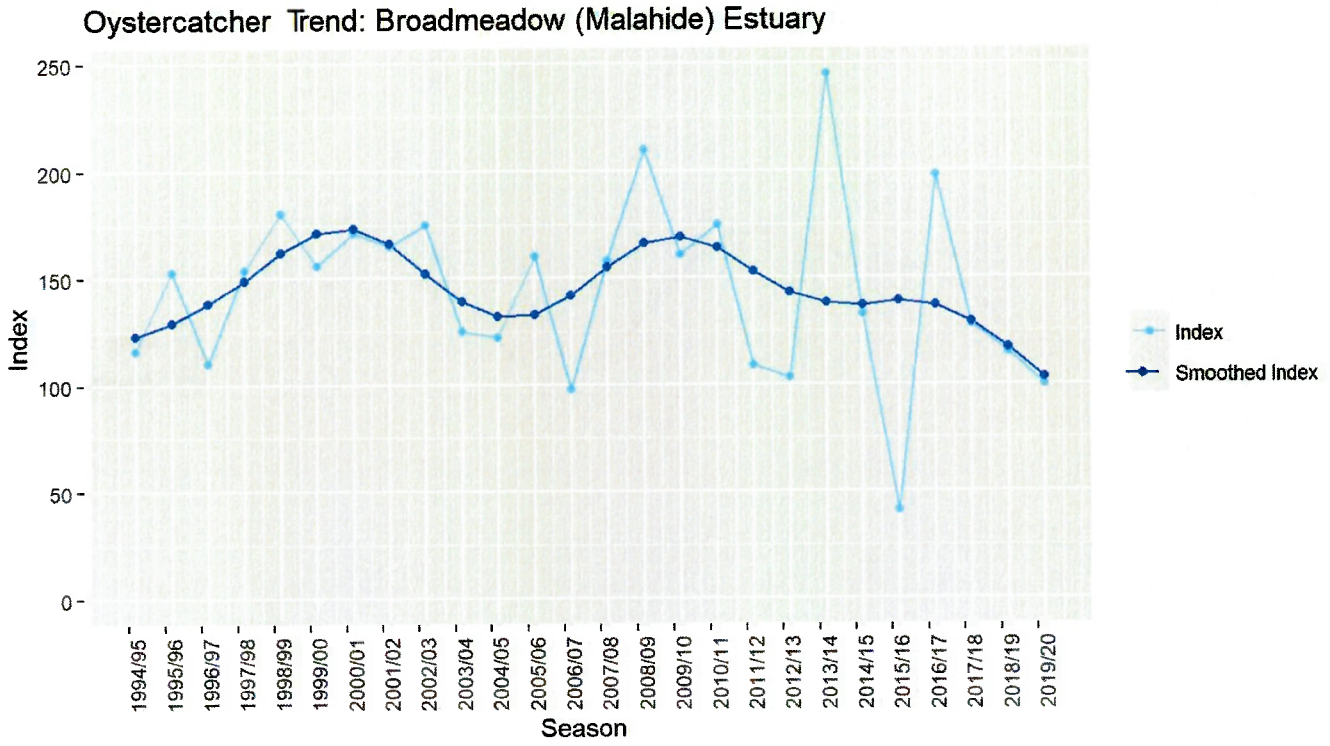

# Cormorant



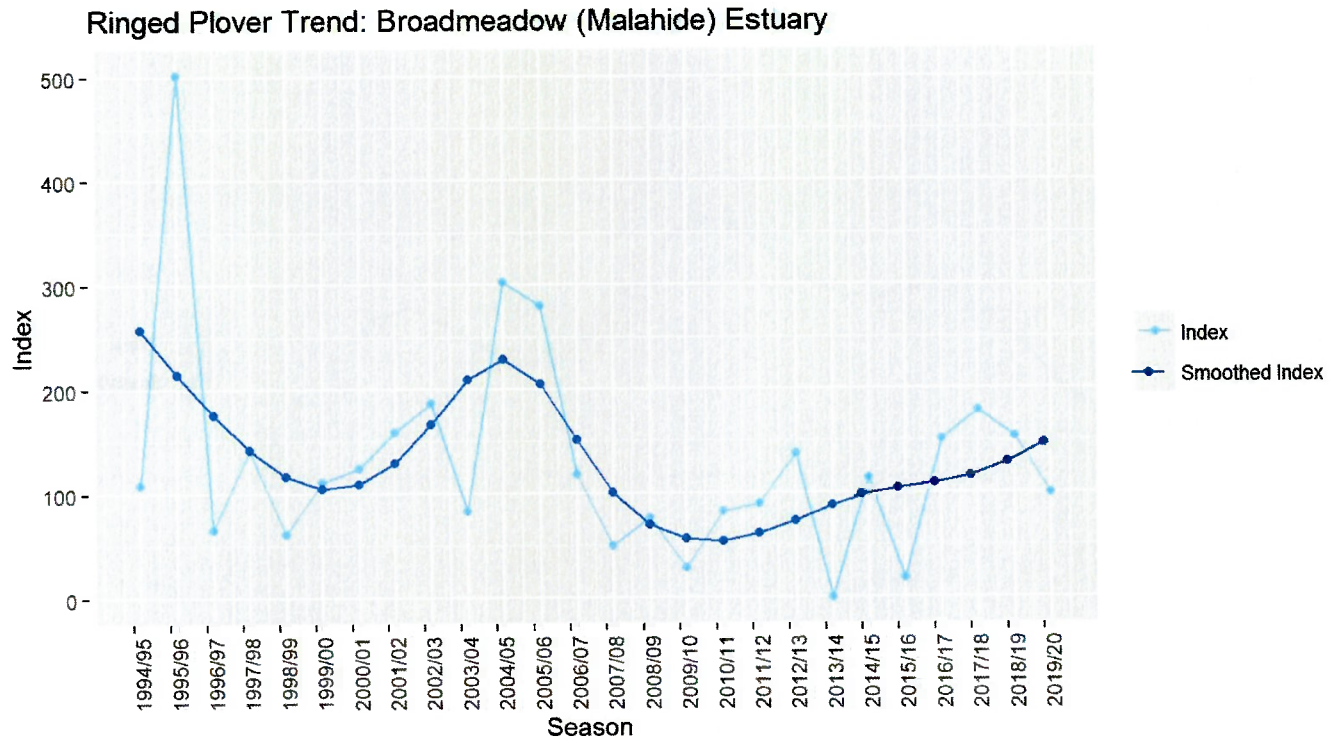

# Grey Heron



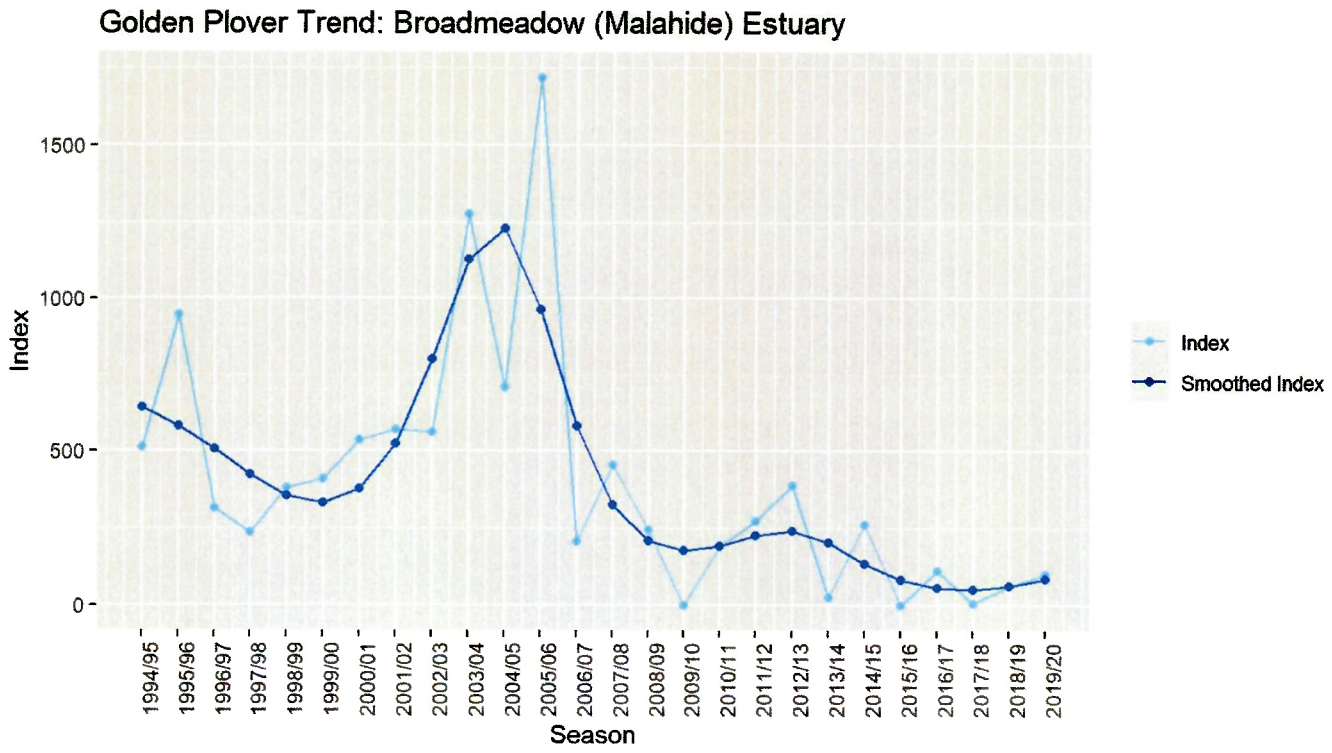

# Oystercatcher



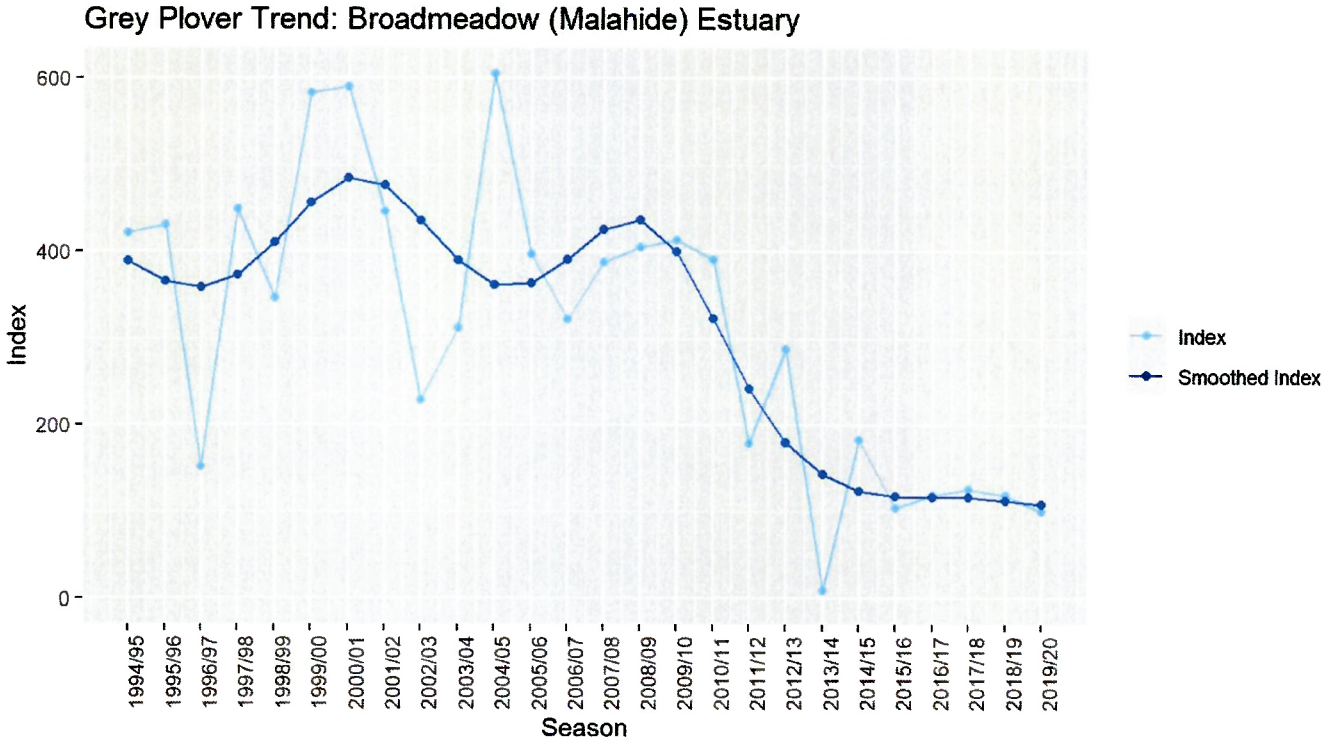

# Ringed Plover



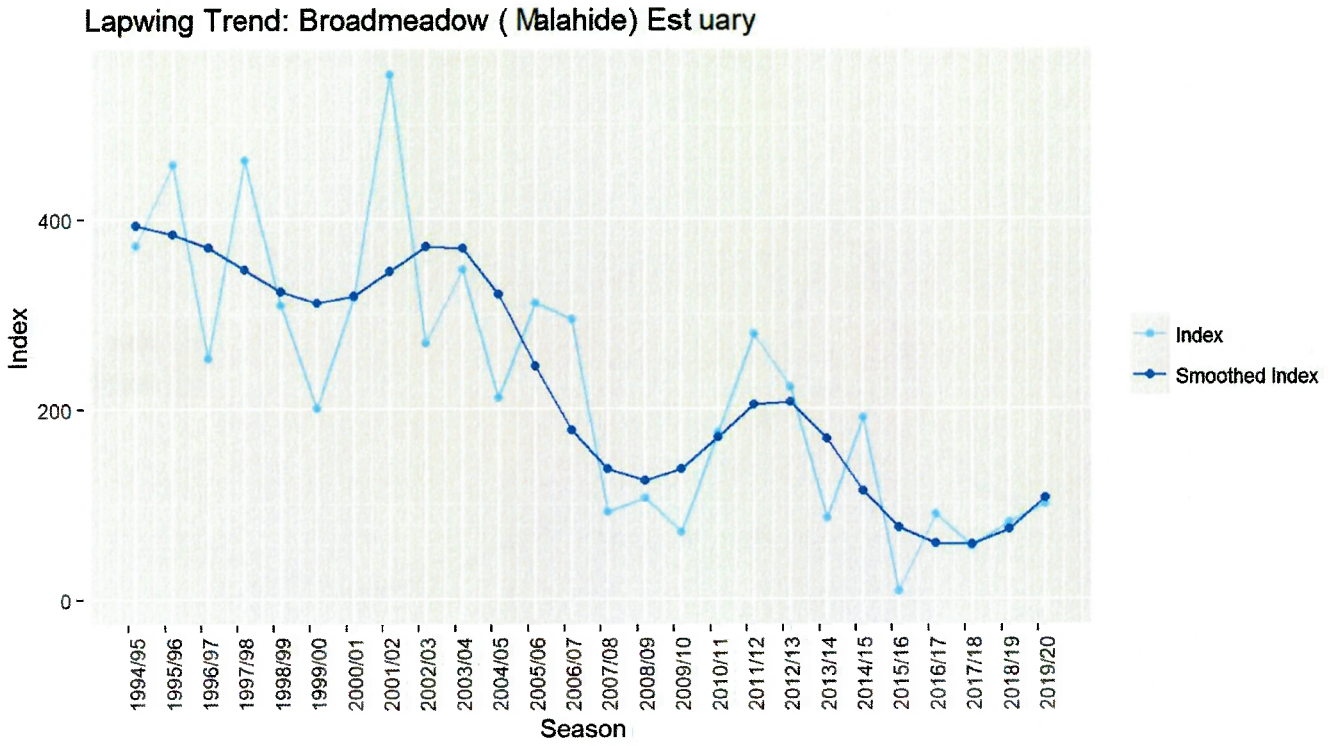

# Golden Plover




# Grey Plover




# Lapwing


Lapwing Trend: Broadmeadow ( Malahide) Est uary
Index
400
200
0
1994/95
1995/96
1996/97
1997/98
1998/99
1999/00
2000/01
2001/02
2002/03
2003/04
2004/05
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2010/11
2011/12
2012/13
2013/14
2014/15
2015/16
2016/17
2017/18
2018/19
2019/20
Season
Index
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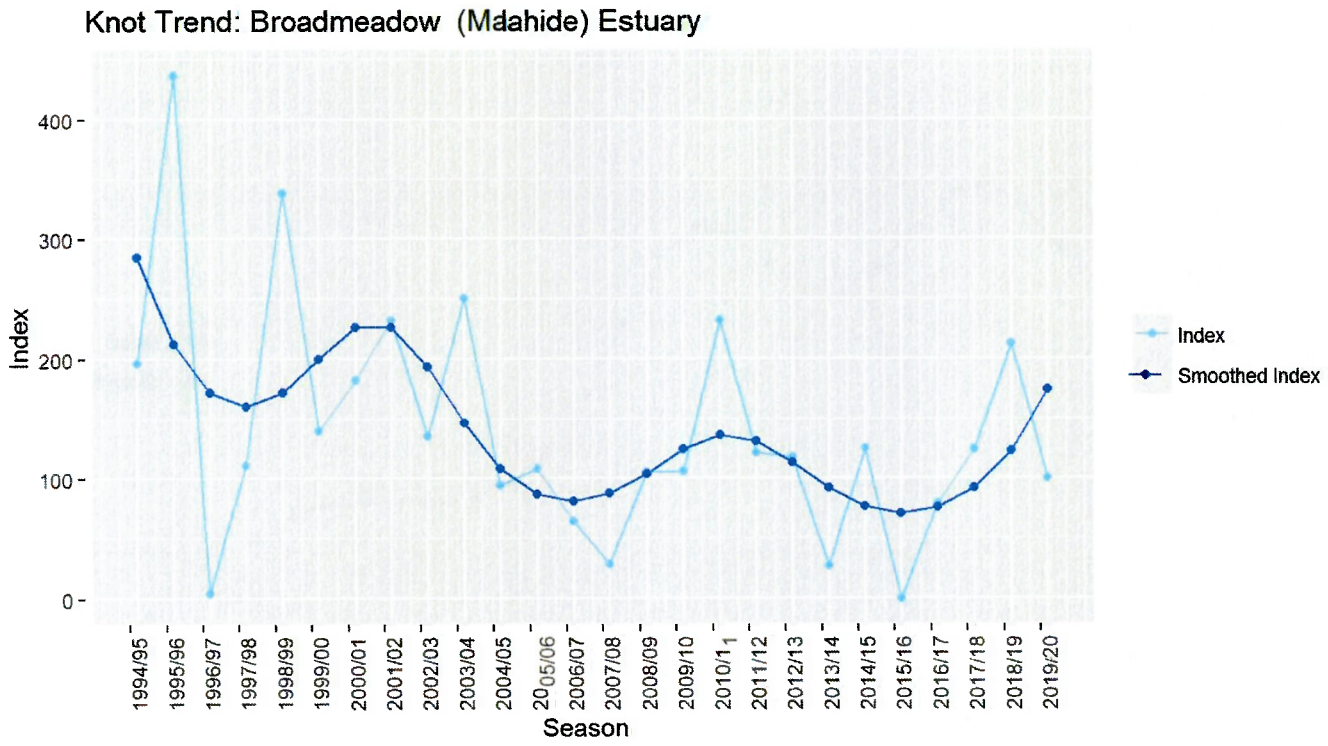
# Knot


Knot Trend: Broadmeadow (Malahide) Estuary
Index
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300
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100
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1994/95
1995/96
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2000/01
2001/02
2002/03
2003/04
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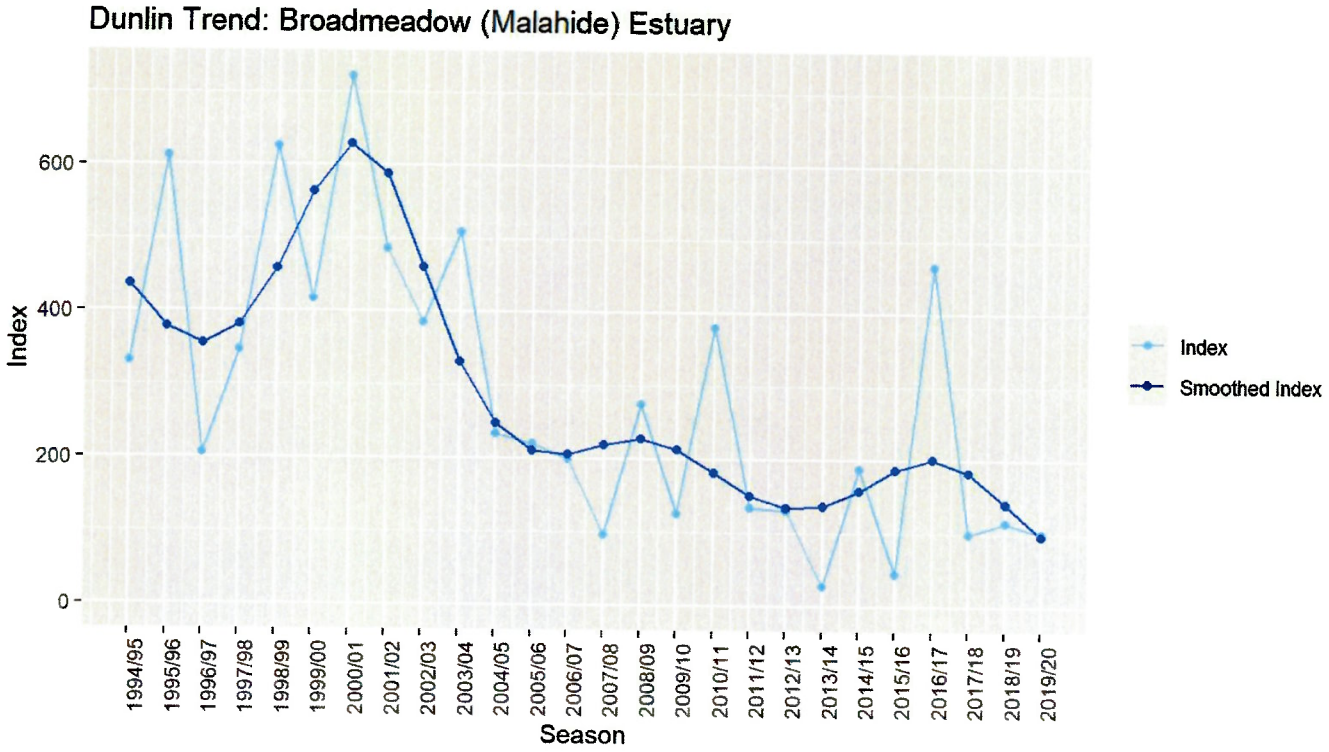
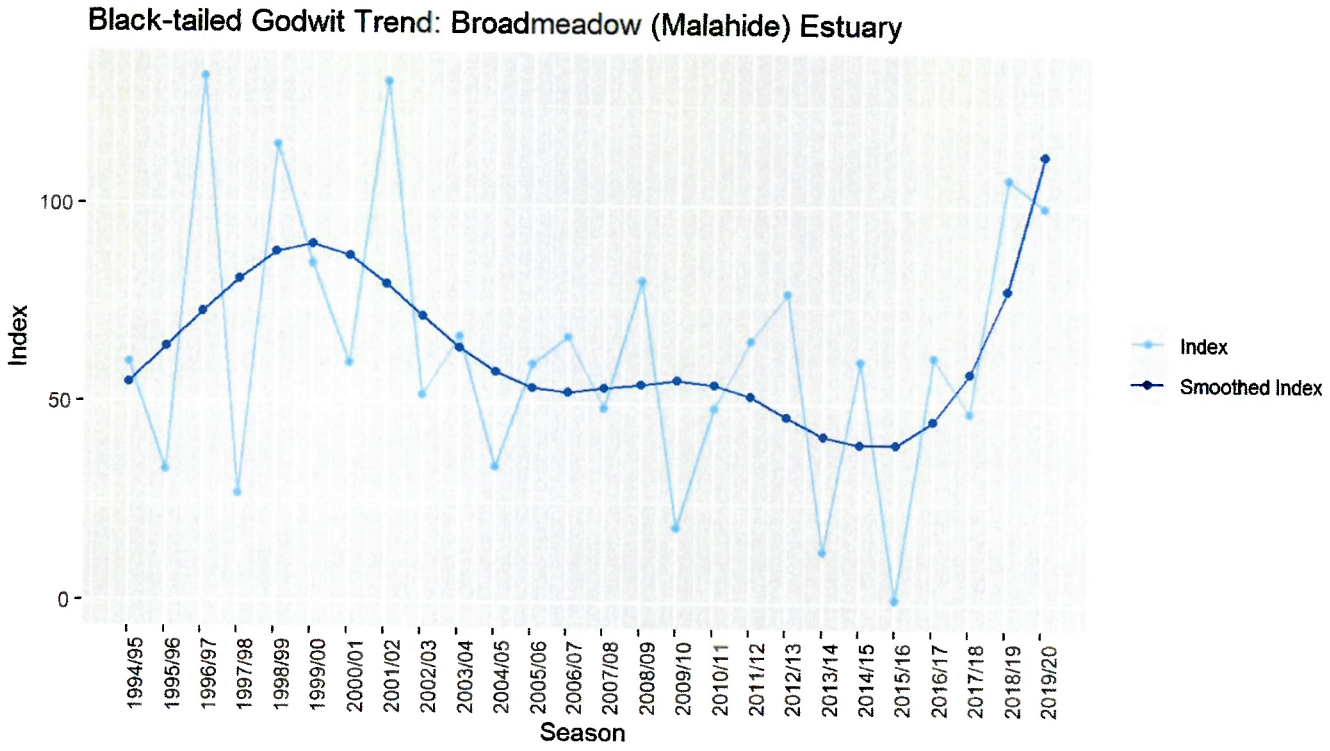
2009/10
2010/11
2011/12
2012/13
2013/14
2014/15
2015/16
2016/17
2017/18
2018/19
2019/20
Season
Index
Smoothed Index

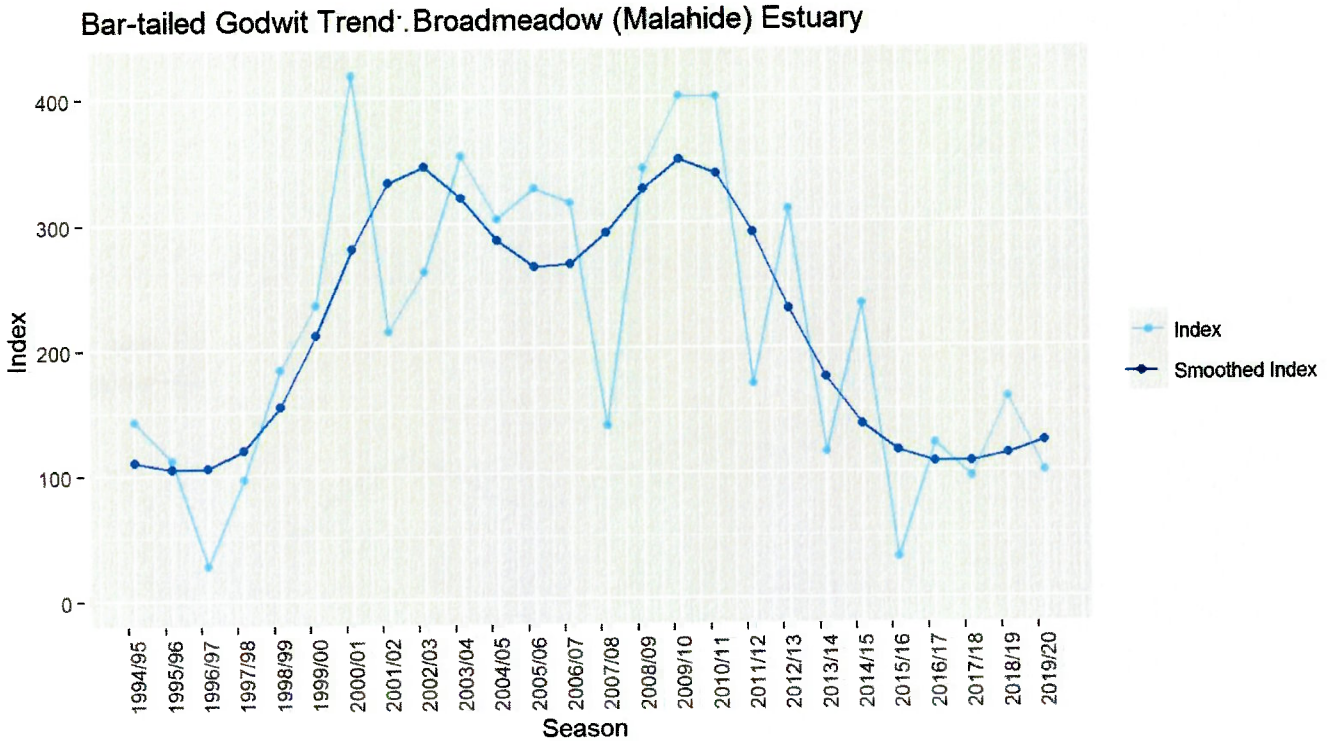
# Dunlin



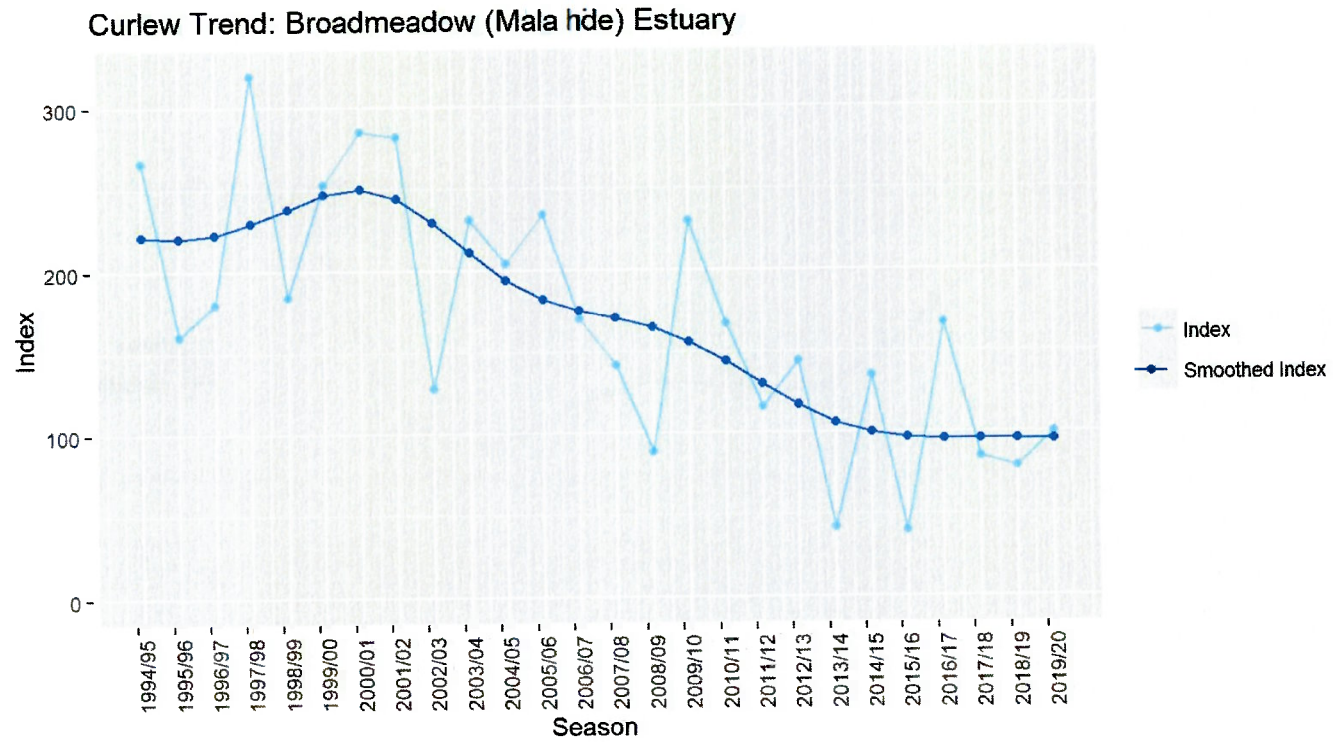

# Black-tailed Godwit



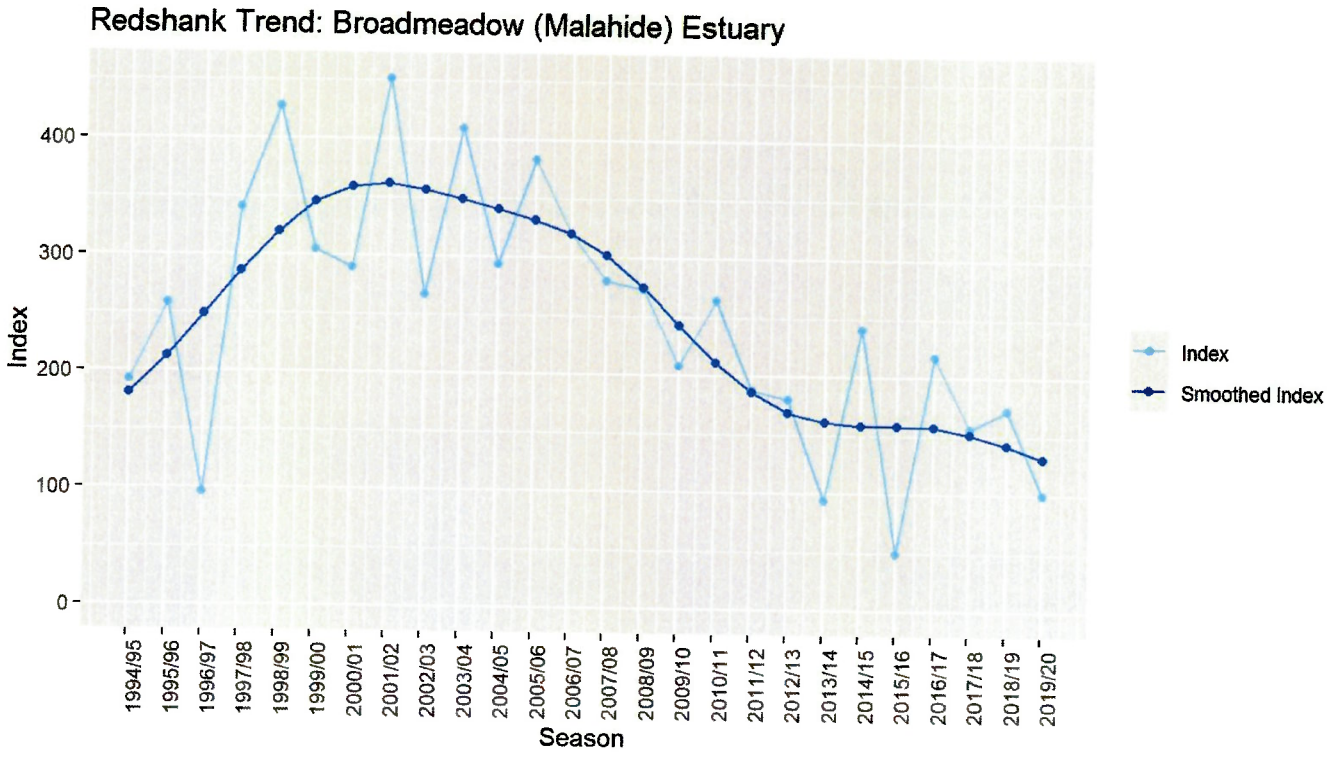

# Bar-tailed Godwit



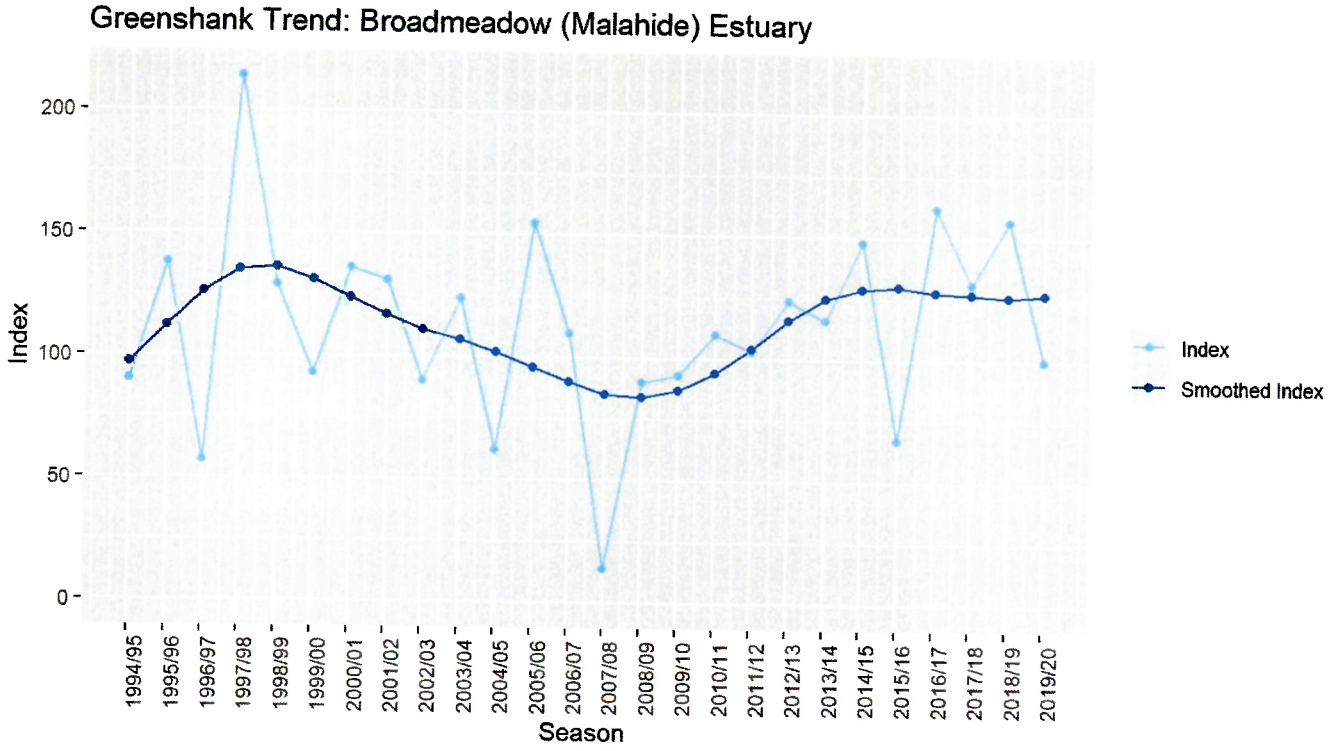

# Curlew



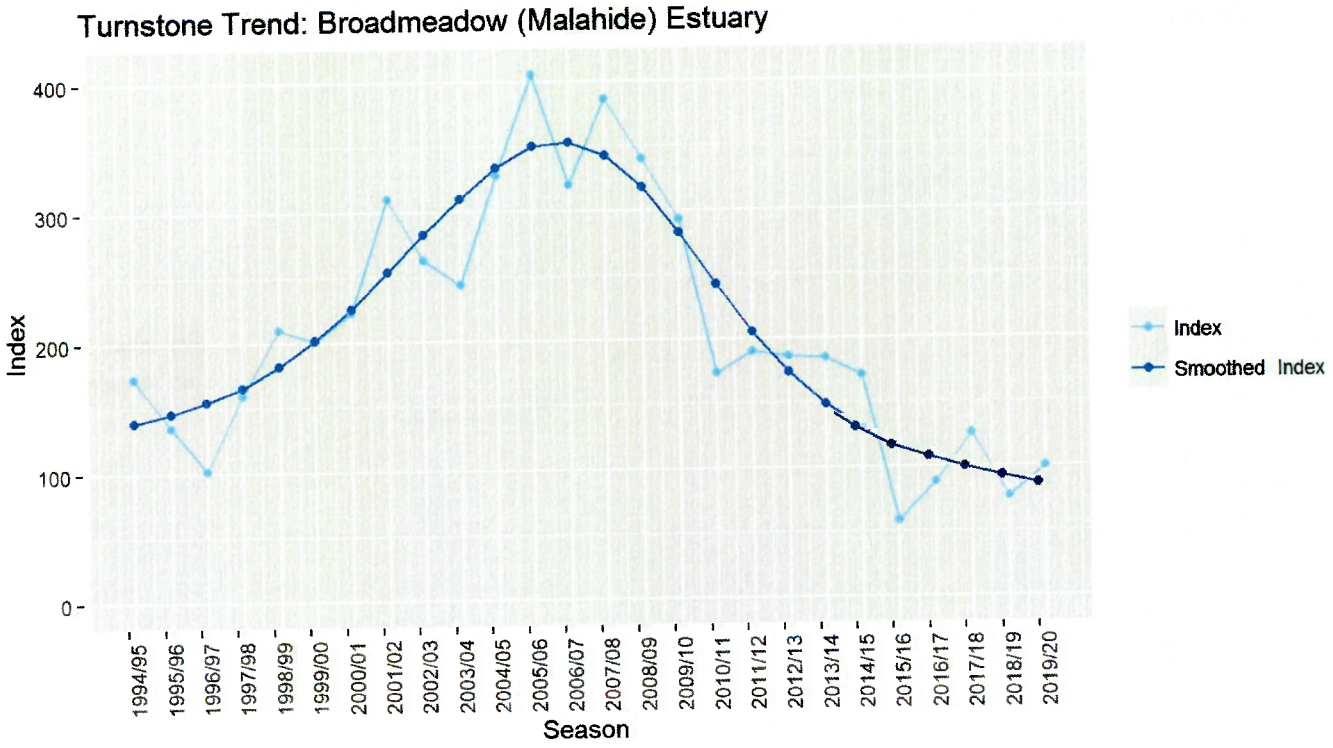

# Redshank




# Greenshank




# Turnstone




# Citations

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*(https://birdwatchireland.ie/app/uploads/2023/08/iwebs_trends_report.html)*

# I-WeBS Dublin Bay Trends Report

## I-WeBS Trends Report 1994/95 – 2019/20

First Published 2022-04-03, Updated 2023-08-17

# Introduction

This report presents site trends based on the data gathered by the Irish Wetland Bird Survey (I-WeBS). Only species with sufficient data at Dublin Bay (site code 0U404) are presented.

This report is part of the I-WeBS National and Site Trends Report 1994/95 – 2019/20.

For guidance on how to interpret these trends, please see the I-WeBS Trends Report Guidance.

For details on the methods used to generate these trends, please see the I-WeBS Trends Report Methodology.

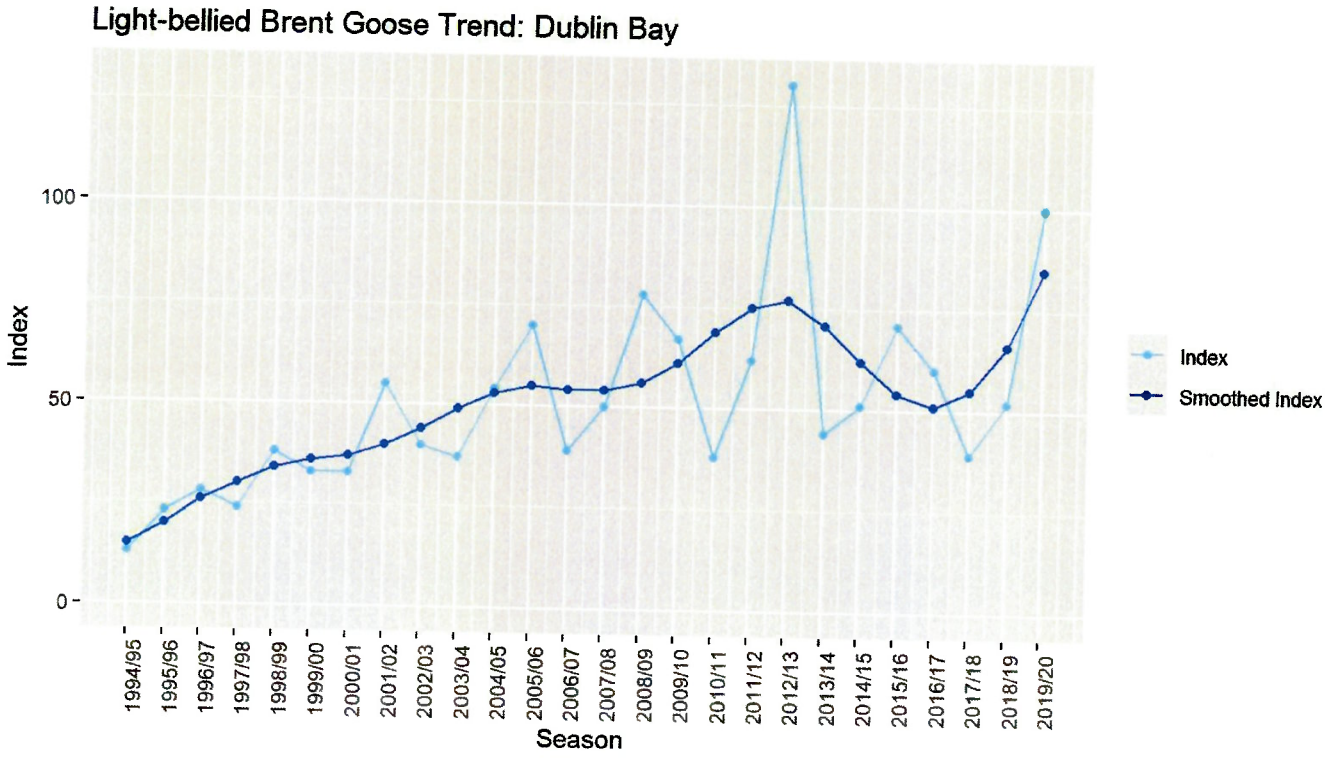
# Site Summary

| | Trend (%) | | | |
|---|---|---|---|---|
| **Species** | **Dublin Bay - 5 Year** | **Dublin Bay - 12 Year** | **Dublin Bay - 23 Year** | **Long Term Trend** |
| Grey Plover | 7.7 | -5.0 | -51.3 | Large Decline |
| Lapwing | -36.0 | -33.6 | -40.3 | Moderate Decline |
| Shoveler | -5.9 | 14.4 | -32.2 | |
| Ringed Plover | 6.5 | -52.1 | -14.5 | Intermediate Decline |
| Curlew | -14.1 | -22.7 | -4.5 | |
| Pintail | 24.4 | 78.3 | 8.1 | Stable or Increasing |
| Bar-tailed Godwit | -20.8 | 20.6 | 31.0 | |
| Dunlin | 69.6 | 18.6 | 32.7 | |
| Redshank | -5.3 | -8.2 | 45.9 | |
| Shelduck | 29.8 | 49.3 | 58.0 | |
| Wigeon | 61.9 | 126.7 | 78.9 | |
| Teal | 9.2 | 43.4 | 80.3 | |
| Sanderling | 15.0 | -13.2 | 84.0 | |
| Mallard | 32.2 | 134.7 | 91.7 | |

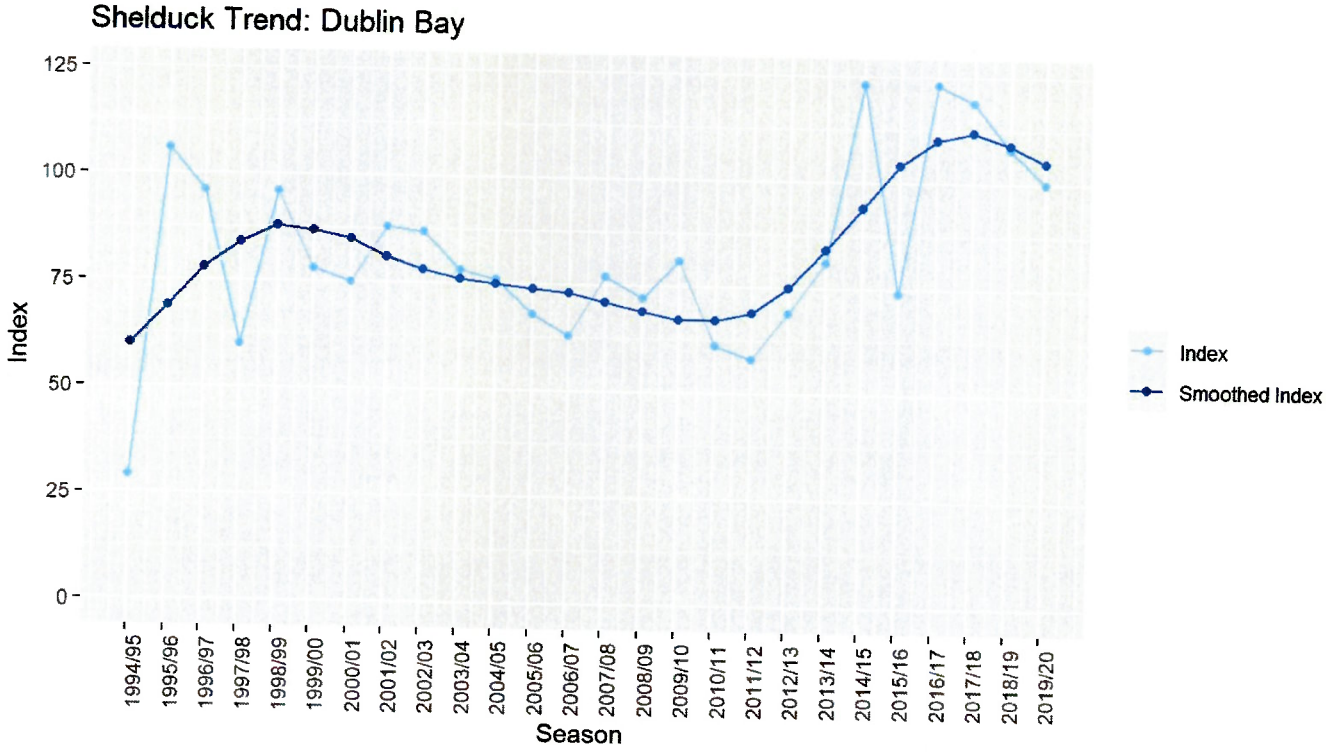
| Species | Trend (%) | | | |
|---|---|---|---|---|
| | Dublin Bay - 5 Year | Dublin Bay - 12 Year | Dublin Bay - 23 Year | Long Term Trend |
| Turnstone | -26.4 | -30.3 | 91.7 | |
| Oystercatcher | 1.9 | 12.8 | 103.8 | |
| Golden Plover | 948.0 | 147.2 | 114.8 | |
| Red-breasted Merganser | 2.9 | 37.3 | 118.8 | |
| Knot | 68.5 | 33.8 | 127.5 | |
| Grey Heron | 11.6 | 2.7 | 148.4 | |
| Great Crested Grebe | -54.1 | 69.9 | 188.4 | |
| Cormorant | 3.8 | -22.9 | 189.3 | |
| Light-bellied Brent Goose | -7.0 | 22.2 | 230.0 | |
| Greenshank | 15.6 | 48.6 | 235.5 | |
| Black-tailed Godwit | 120.0 | 193.3 | 780.0 | |
| Little Egret | 78.3 | 121.6 | 1540.0 | |

# Species Analysis

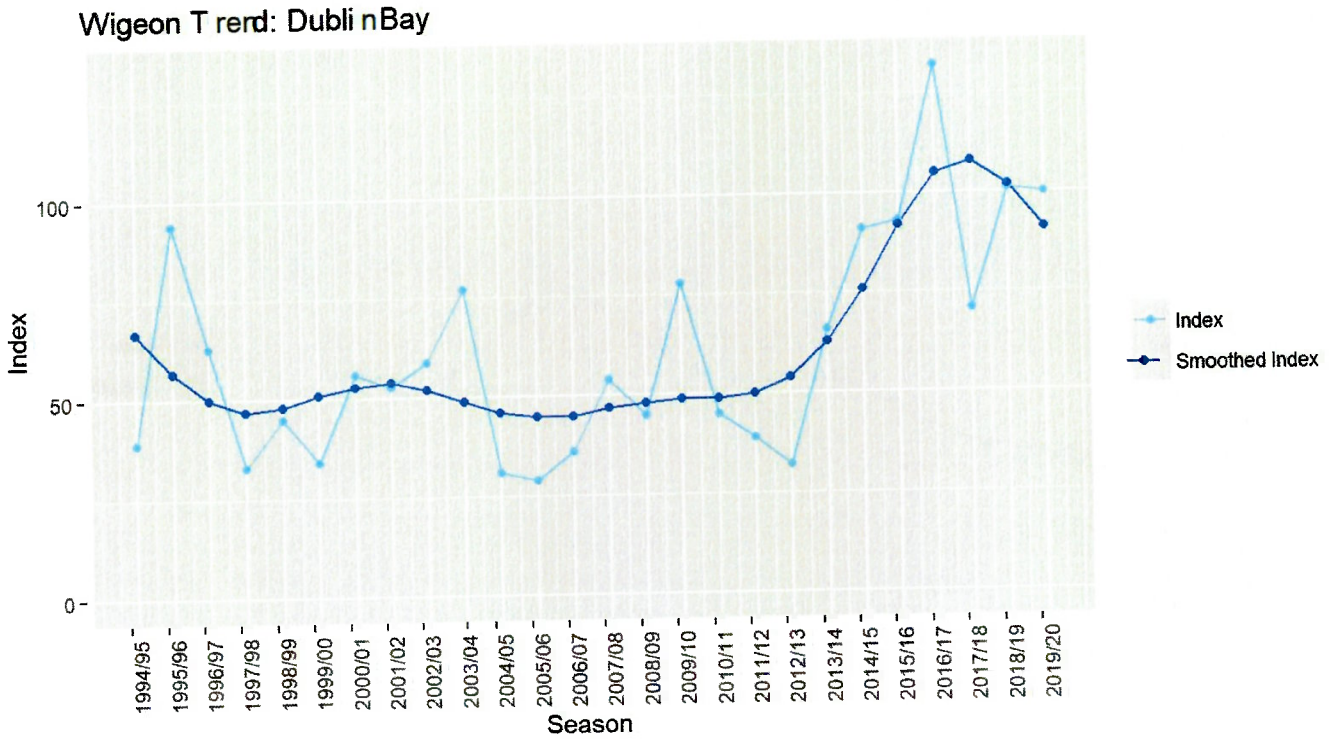
## Light-bellied Brent Goose



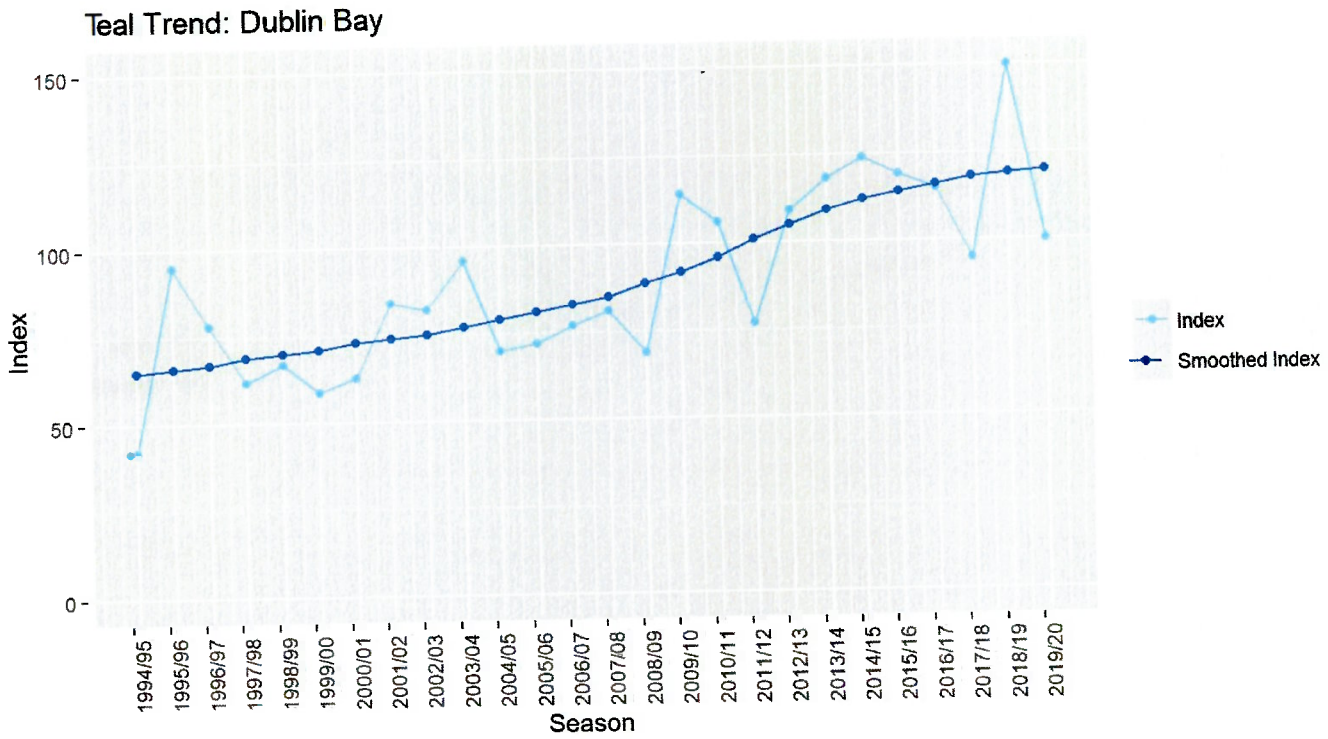

# Shelduck



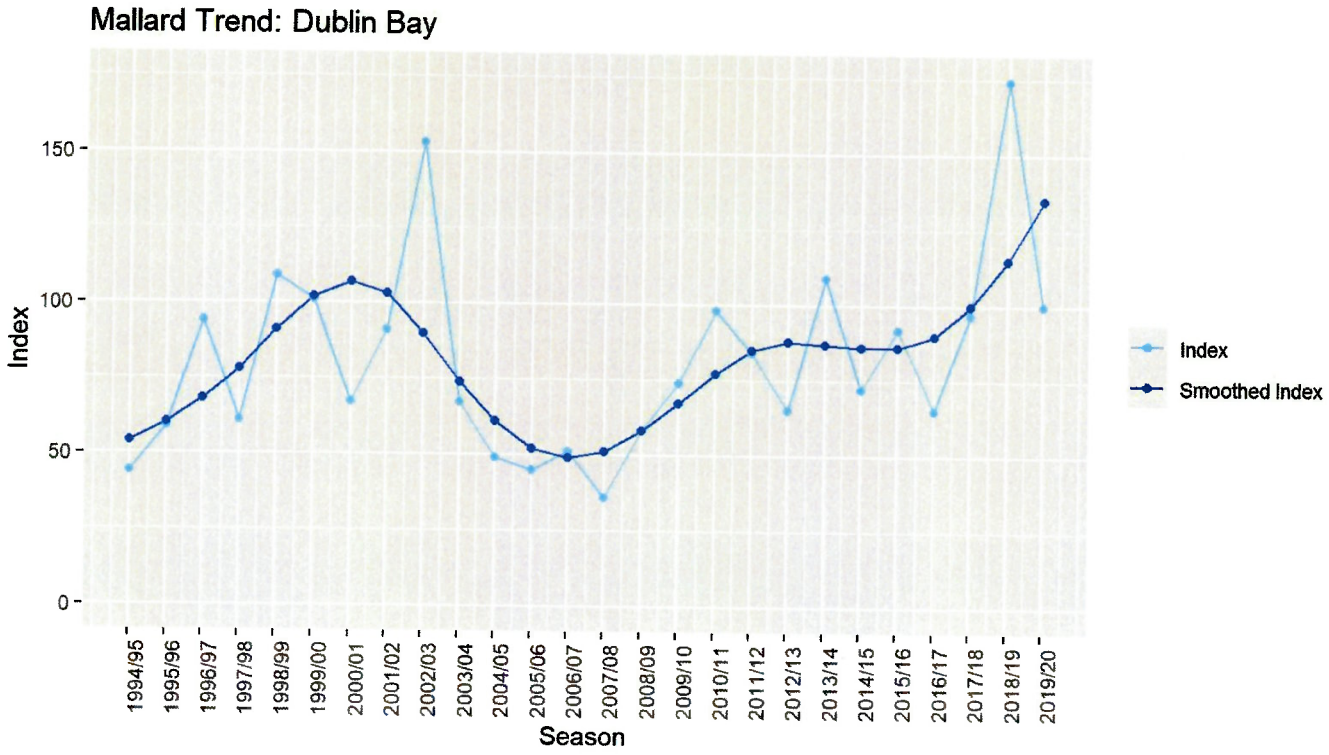

# Wigeon



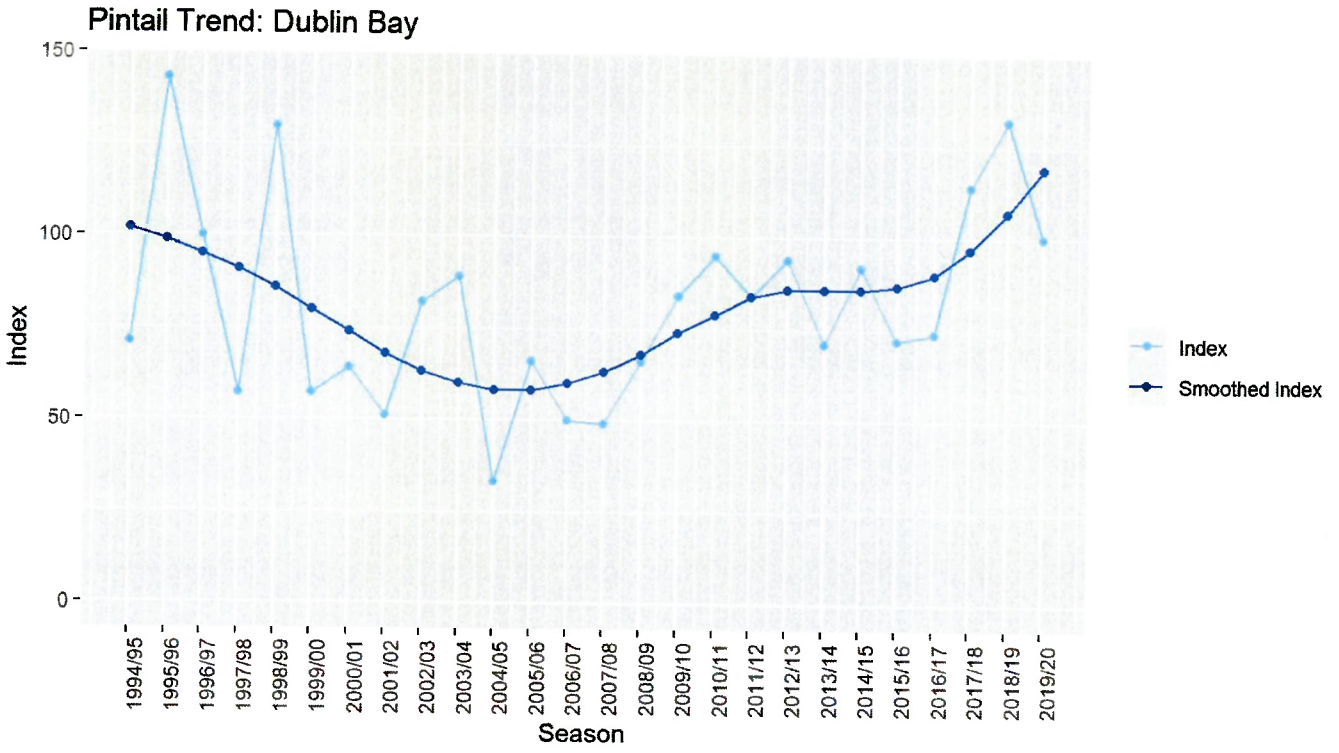

# Teal



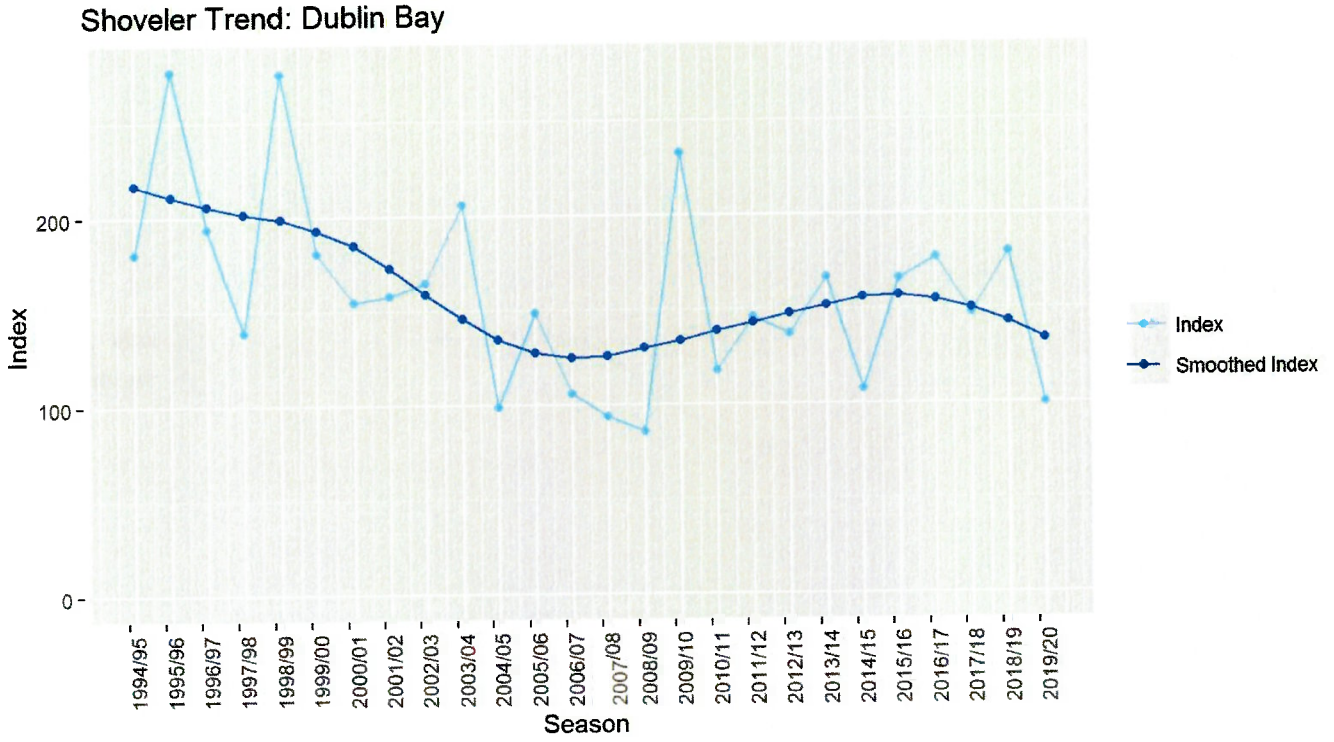

# Mallard



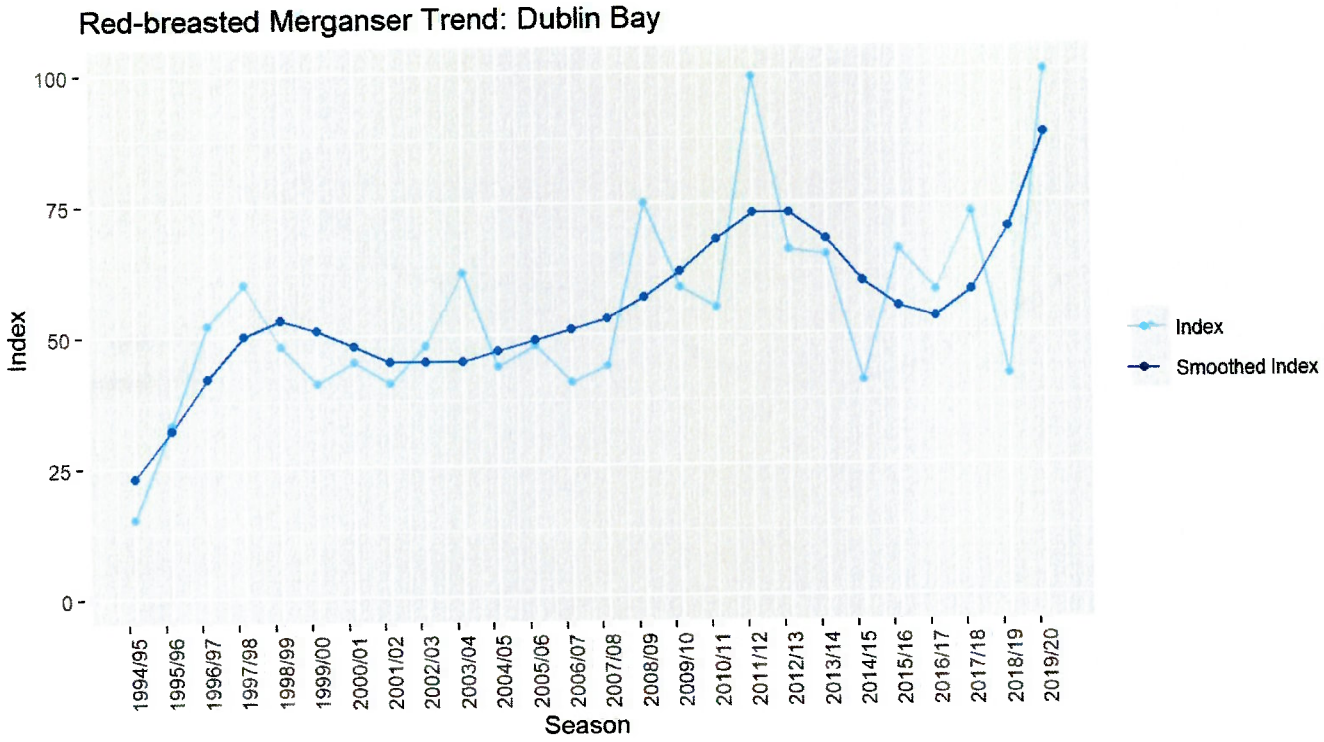

# Pintail



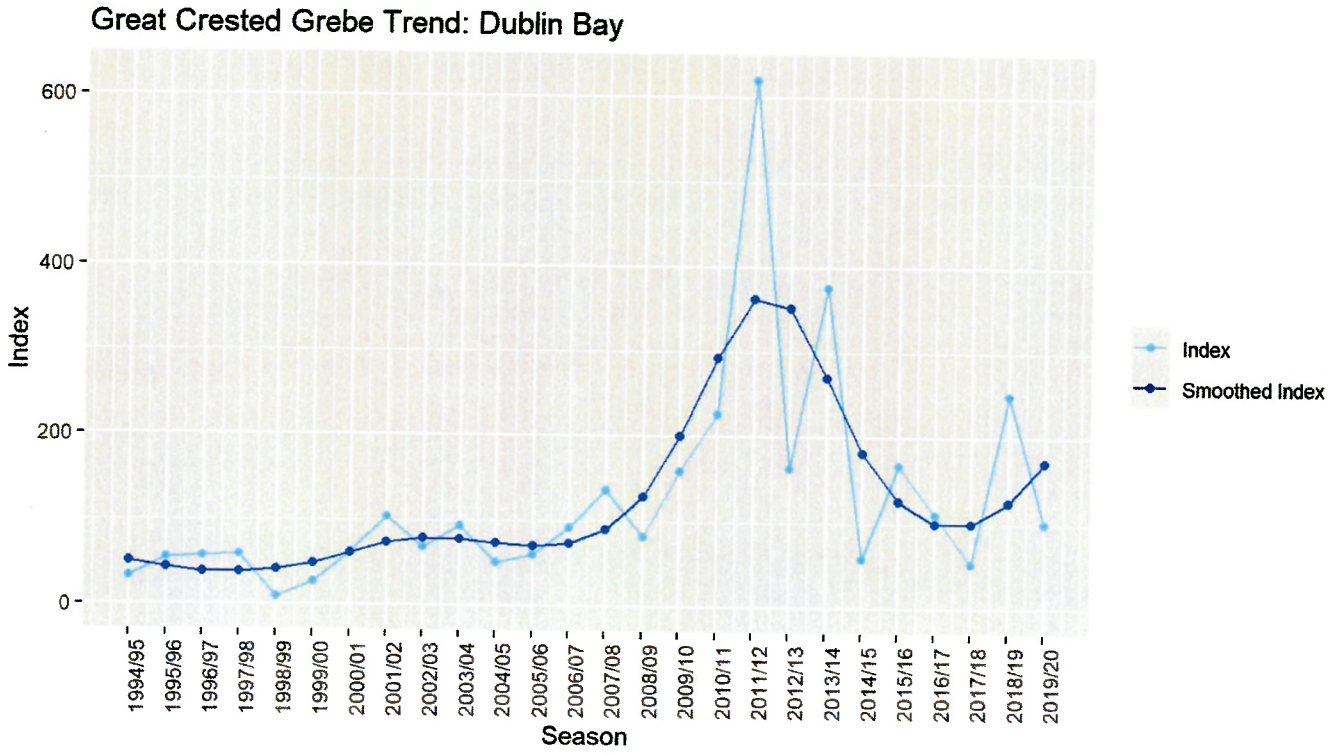

# Shoveler



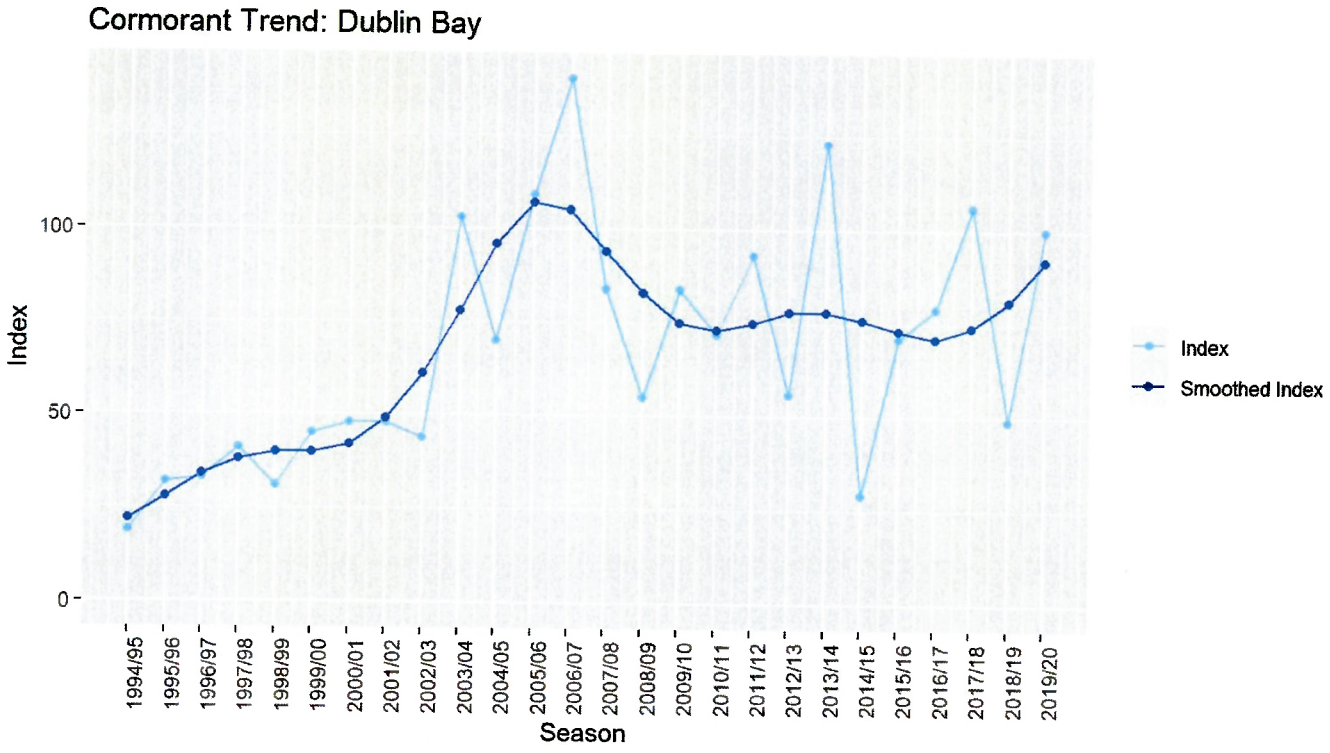

# Red-breasted Merganser



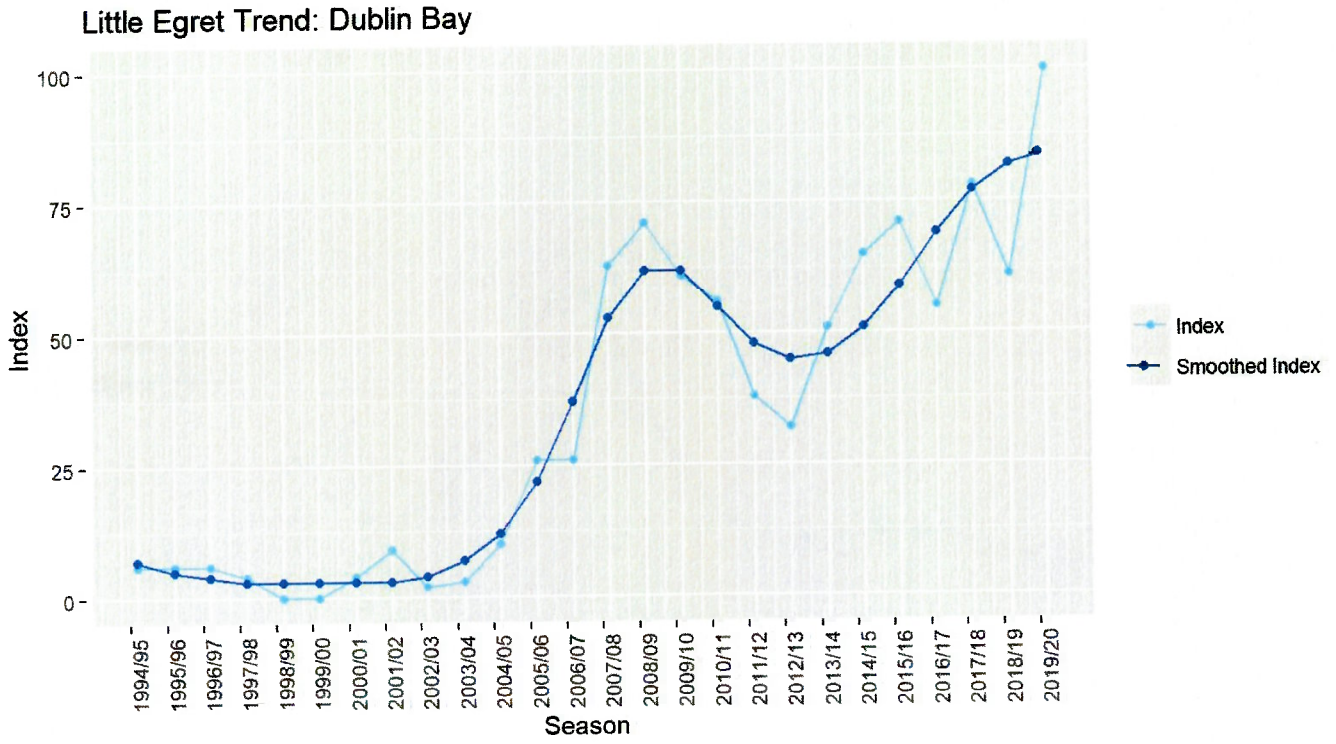

# Great Crested Grebe



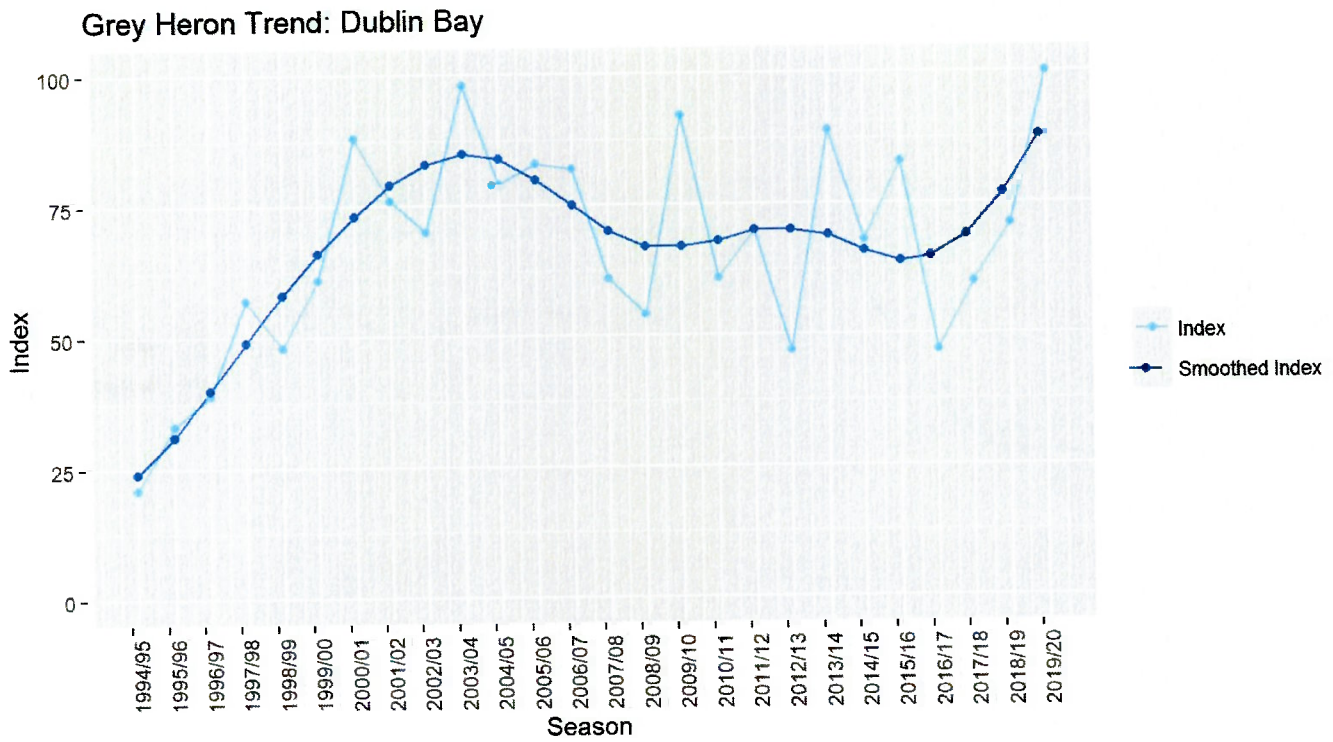

# Cormorant



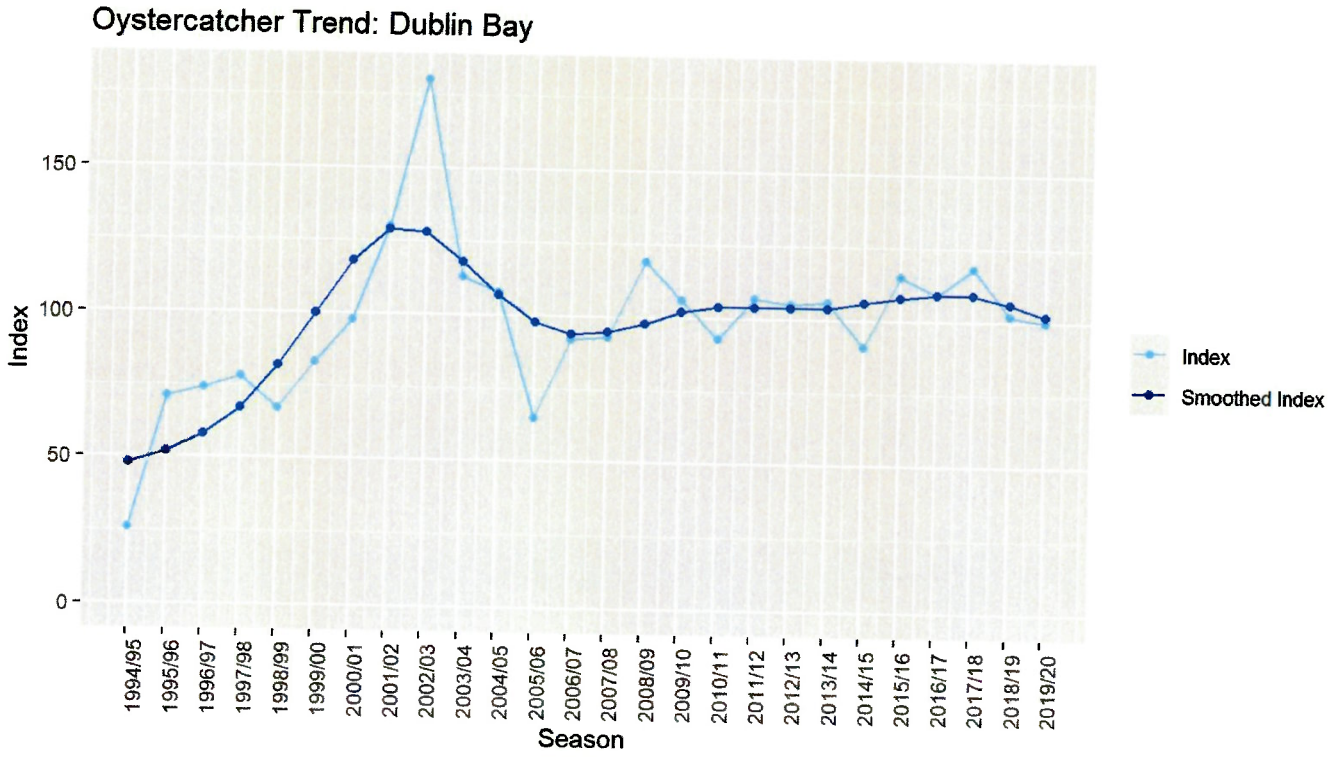

# Little Egret



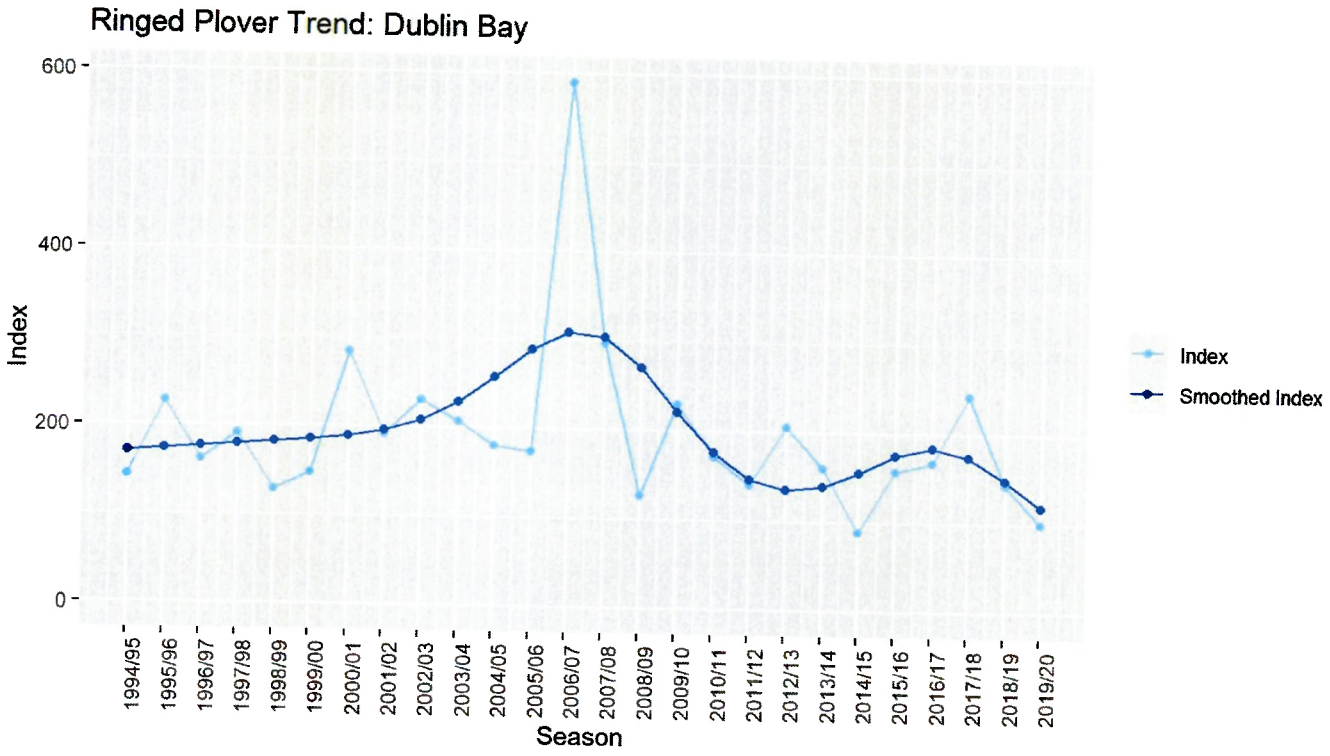

# Grey Heron



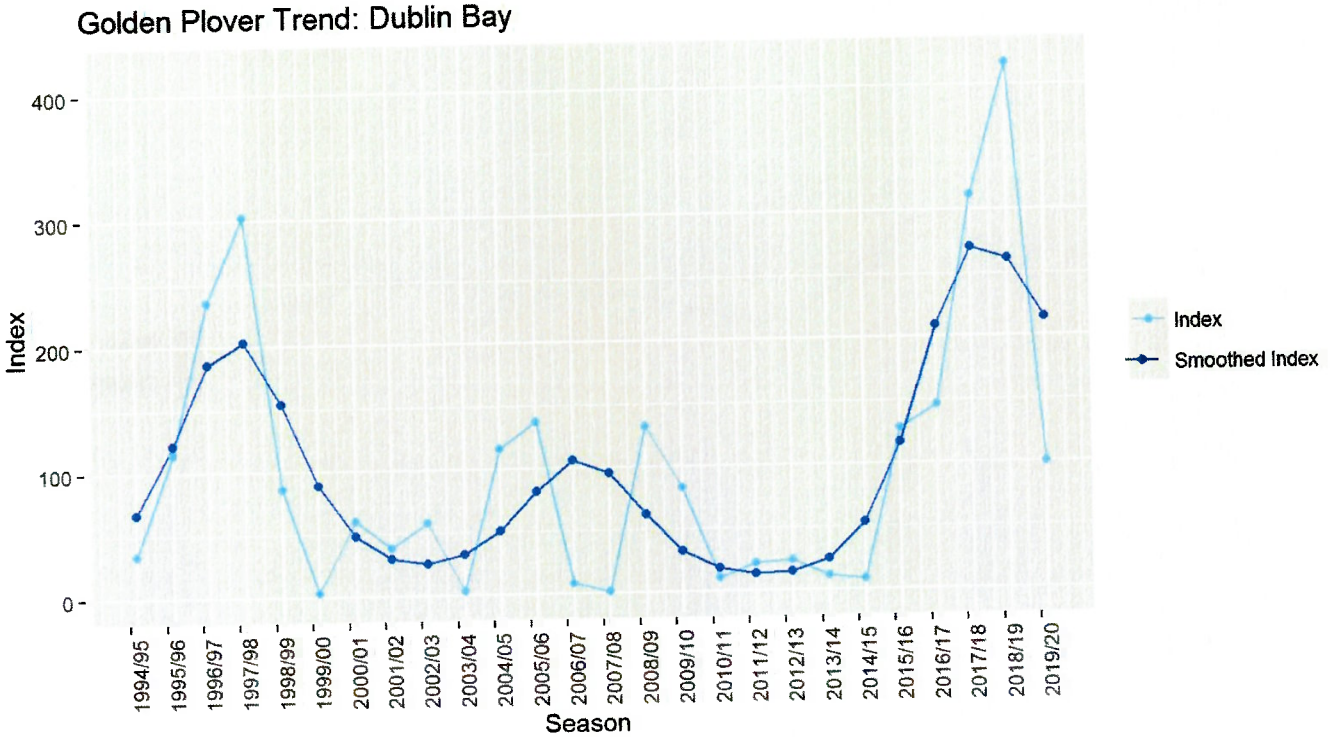

# Oystercatcher



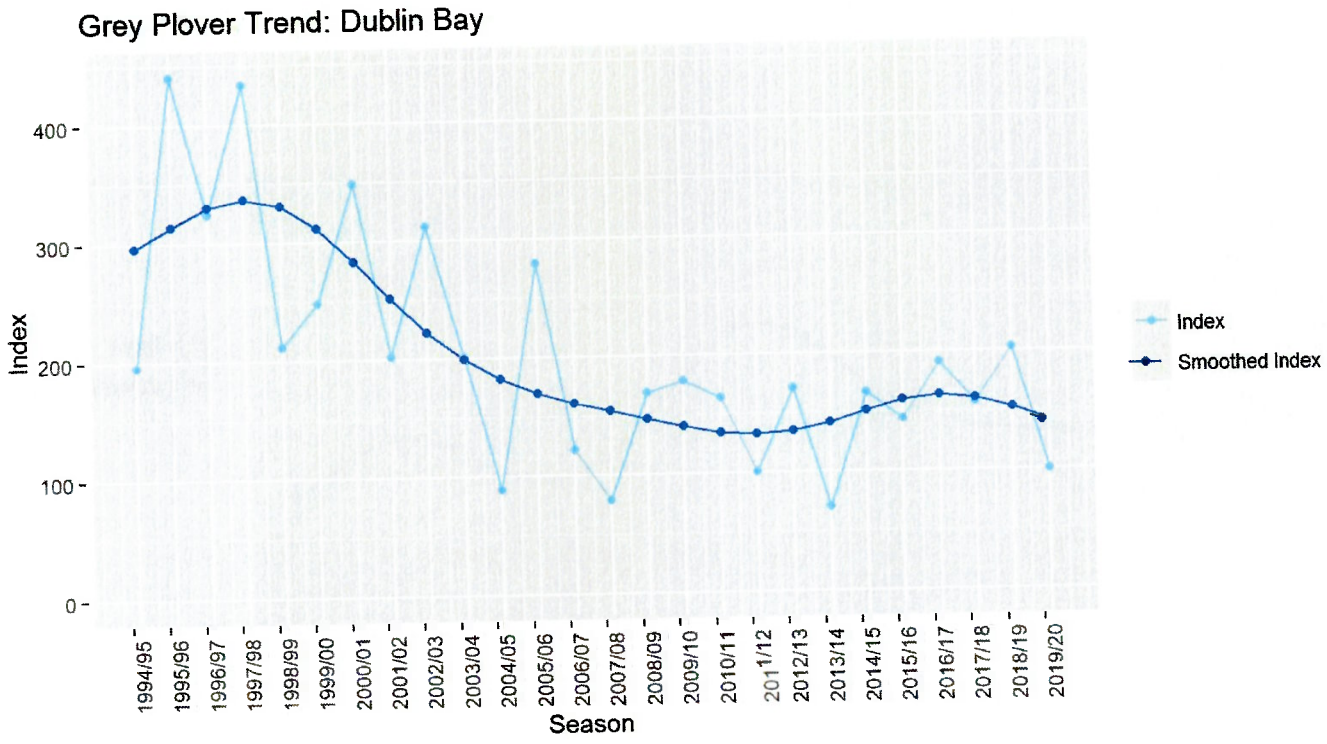

# Ringed Plover



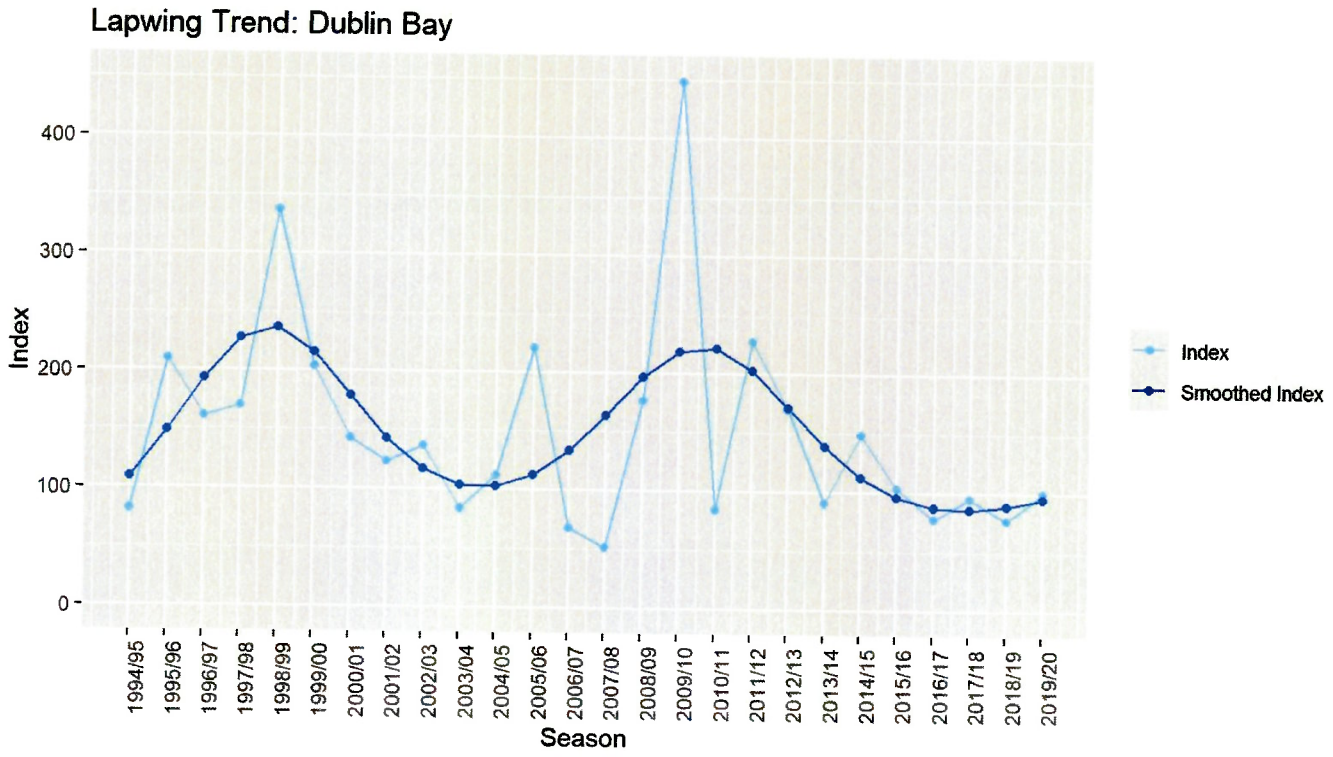

# Golden Plover



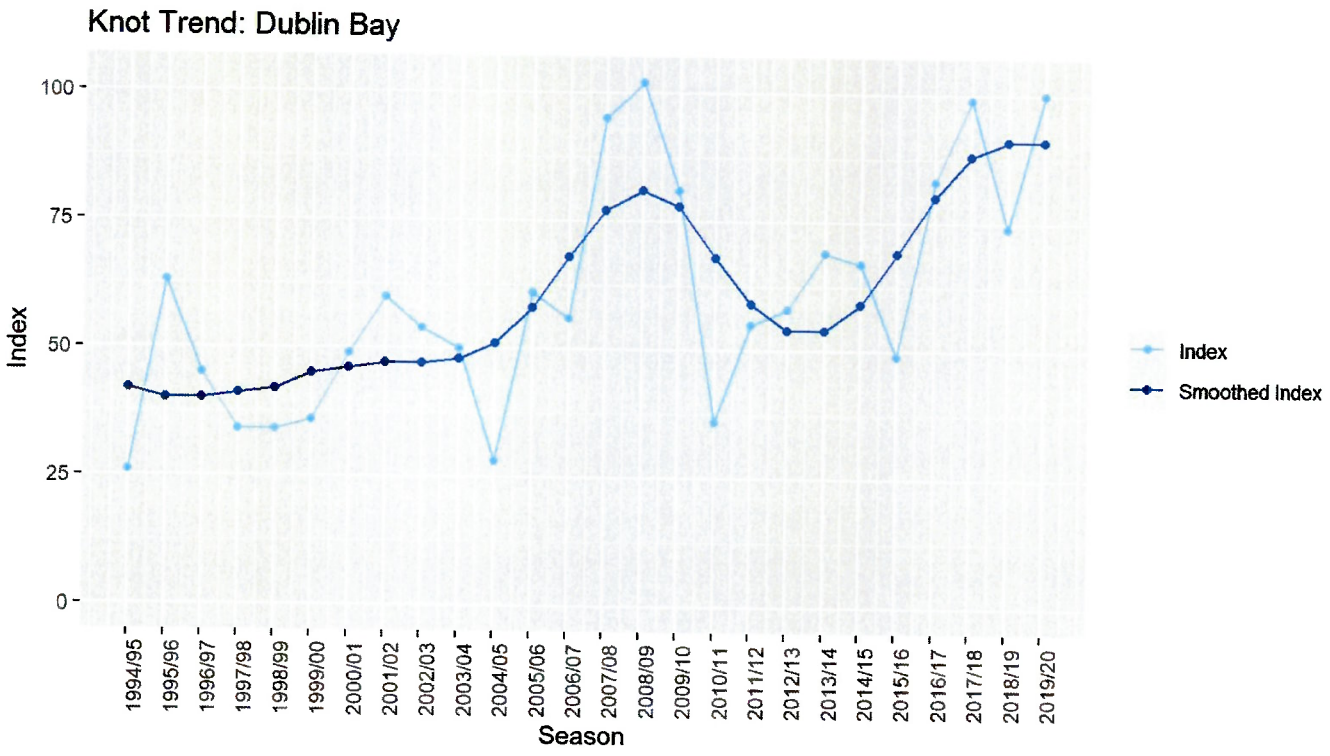

# Grey Plover



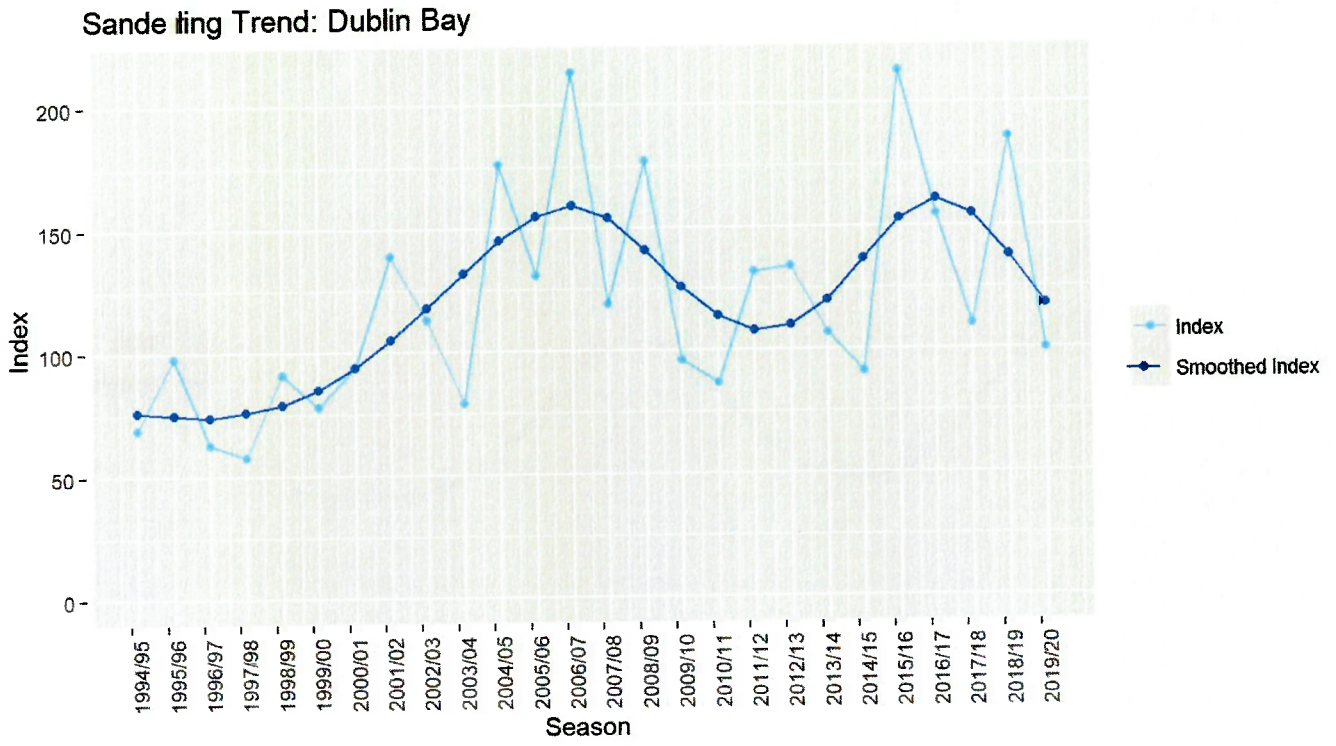

# Lapwing



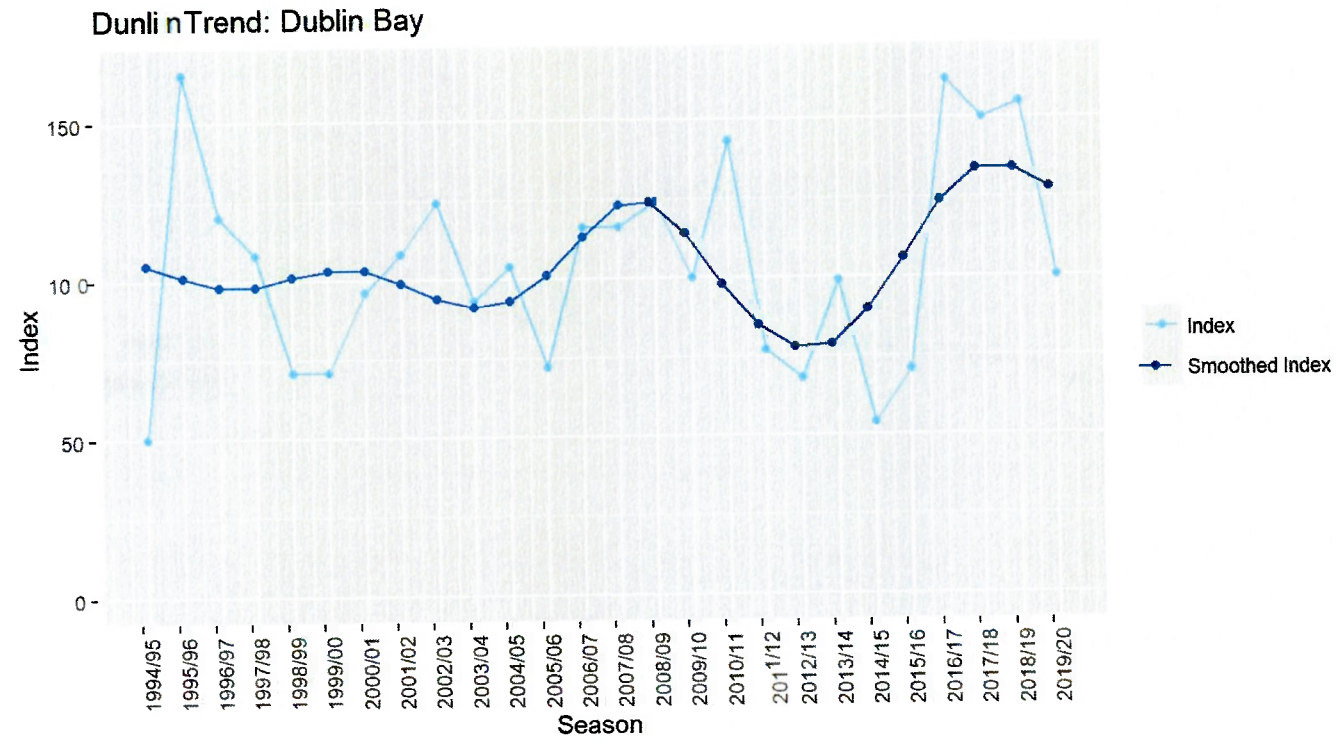

# Knot



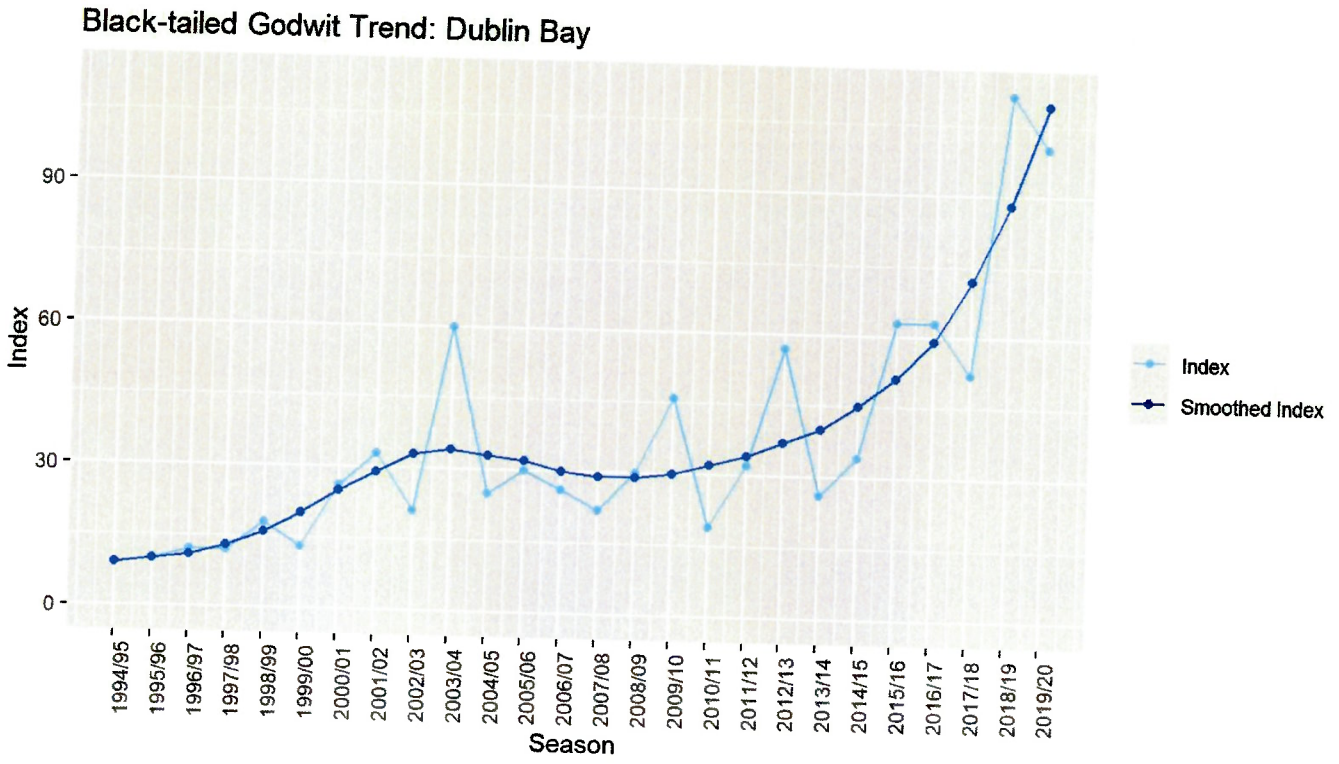

# Sanderling



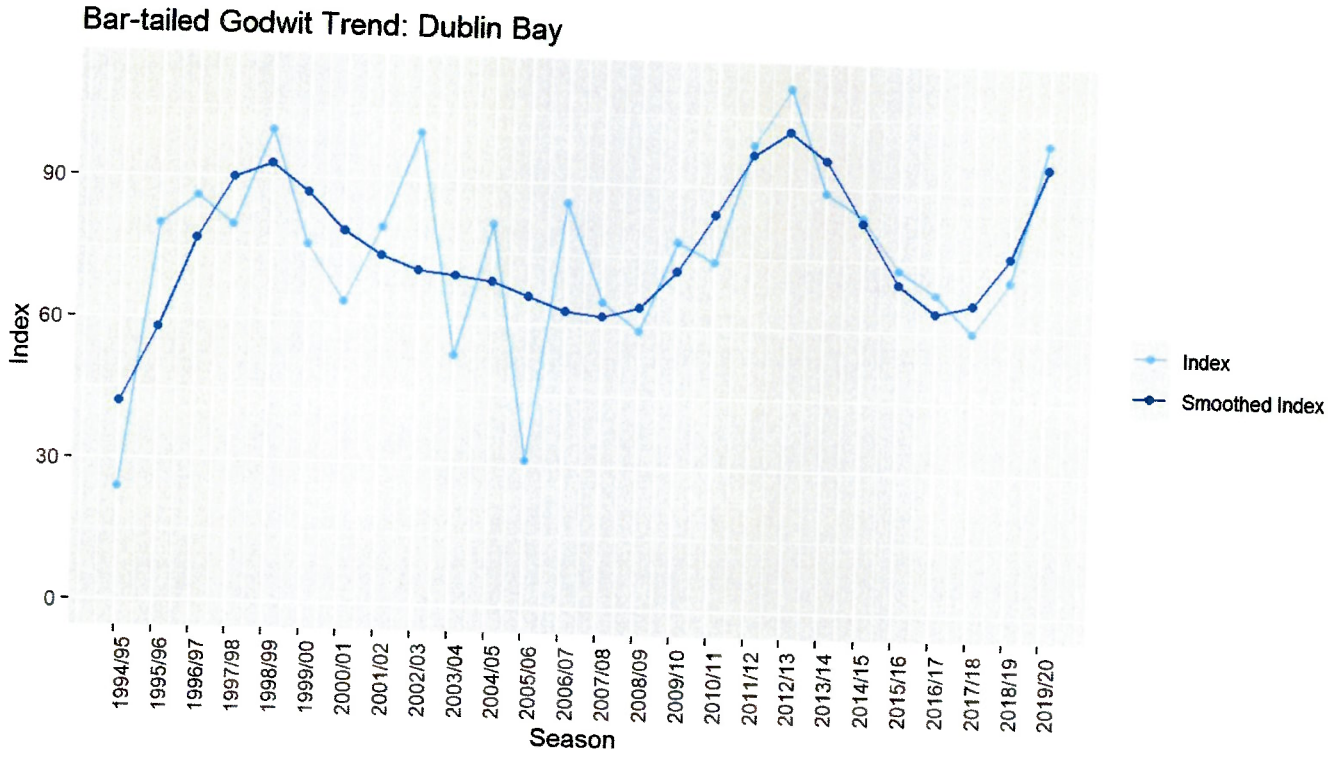

# Dunlin



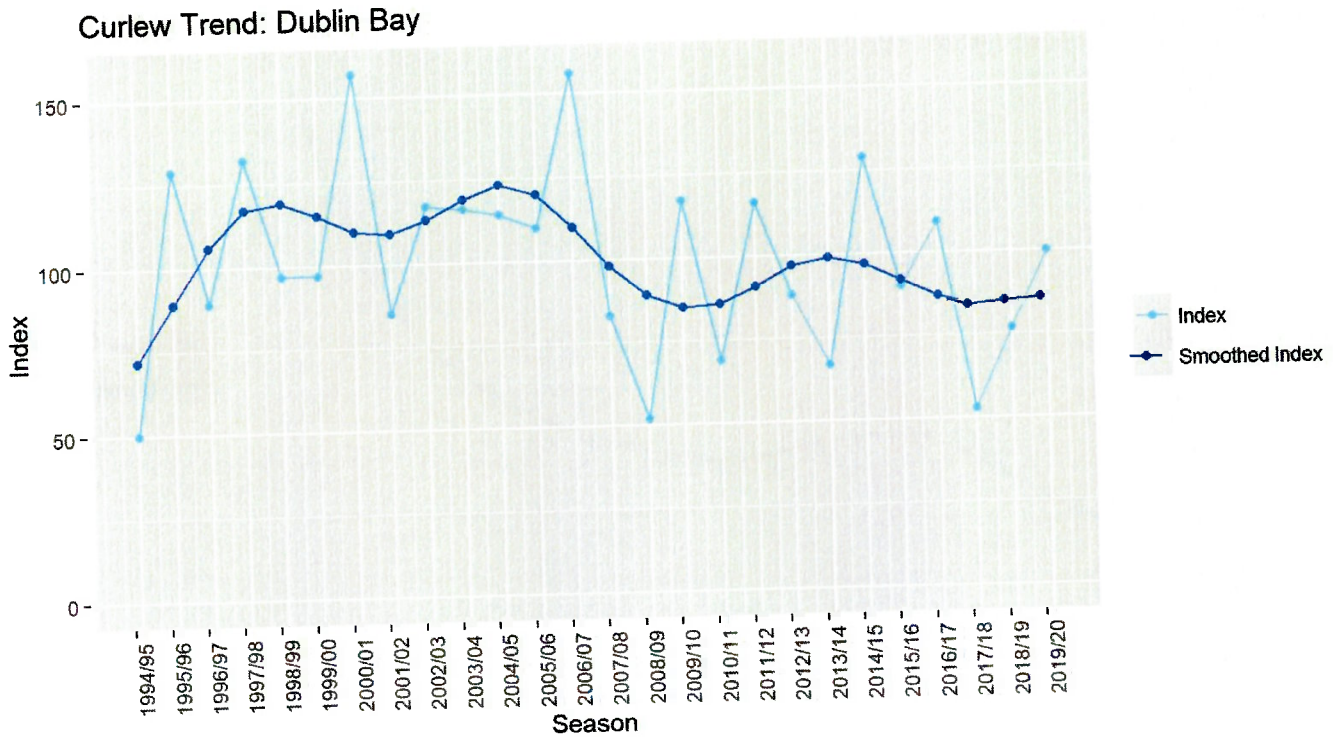

# Black-tailed Godwit



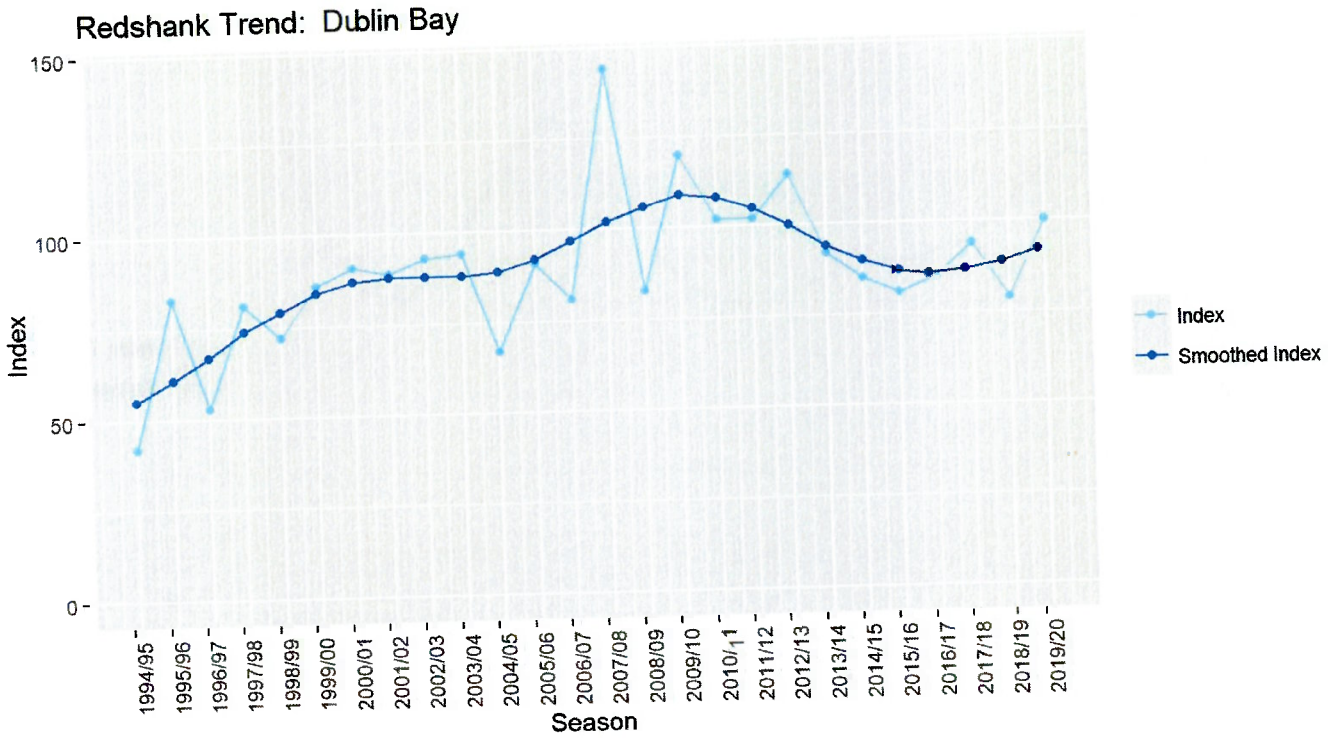

# Bar-tailed Godwit



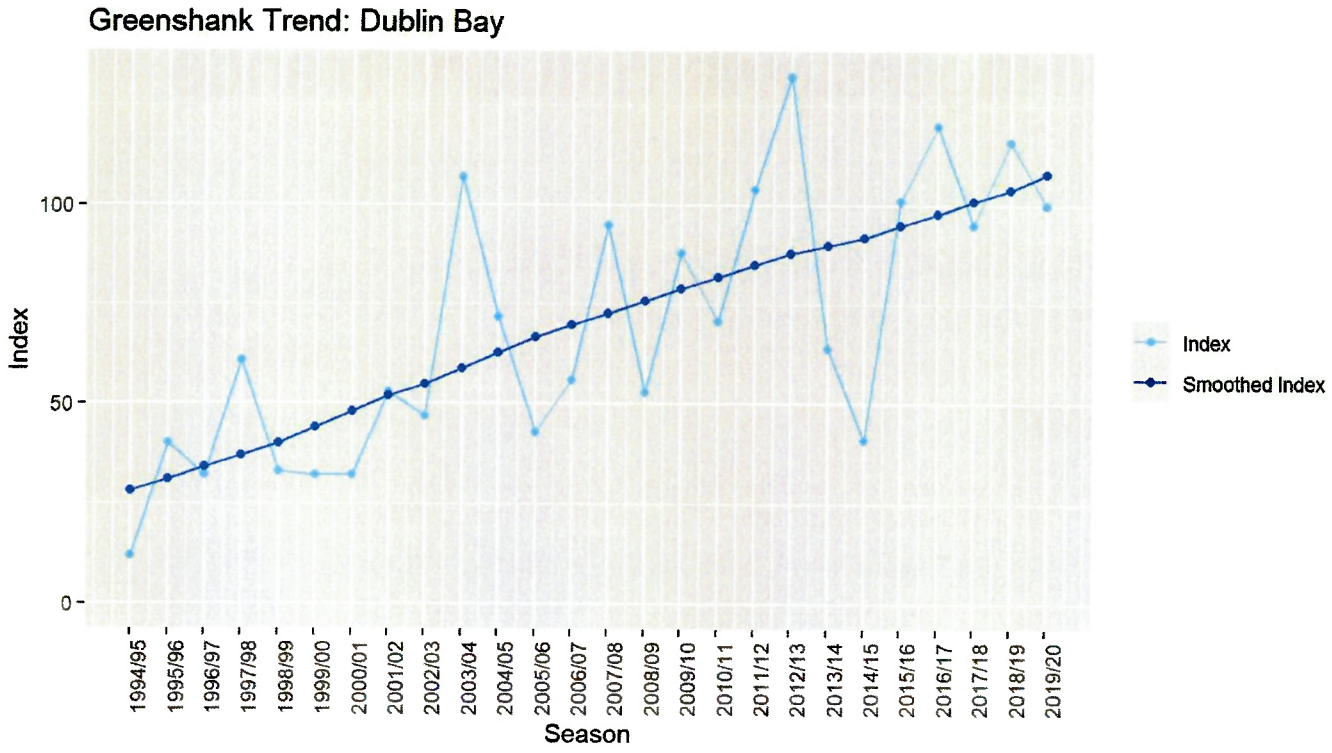

# Curlew



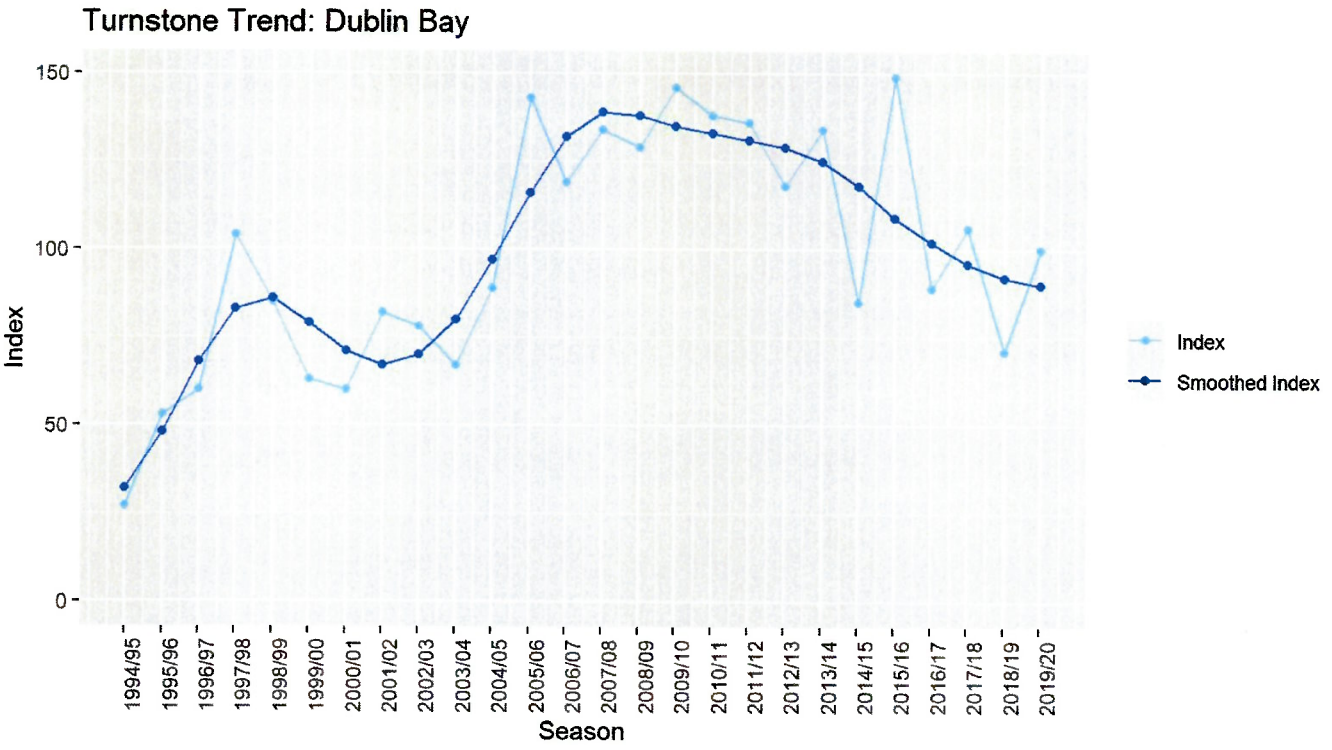

# Redshank




# Greenshank




# Turnstone




# Citations

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*(https://birdwatchireland.ie/app/uploads/2023/08/iwebs_trends_report.html)*

# I-WeBS Rogerstown Estuary Trends Report

## I-WeBS Trends Report 1994/95 – 2019/20

First Published 2022-04-03, Updated 2023-08-17

# Introduction

This report presents site trends based on the data gathered by the Irish Wetland Bird Survey (I-WeBS). Only species with sufficient data at Rogerstown Estuary (site code 0U407) are presented.

This report is part of the I-WeBS National and Site Trends Report 1994/95 – 2019/20.

For guidance on how to interpret these trends, please see the I-WeBS Trends Report Guidance.

For details on the methods used to generate these trends, please see the I-WeBS Trends Report Methodology.

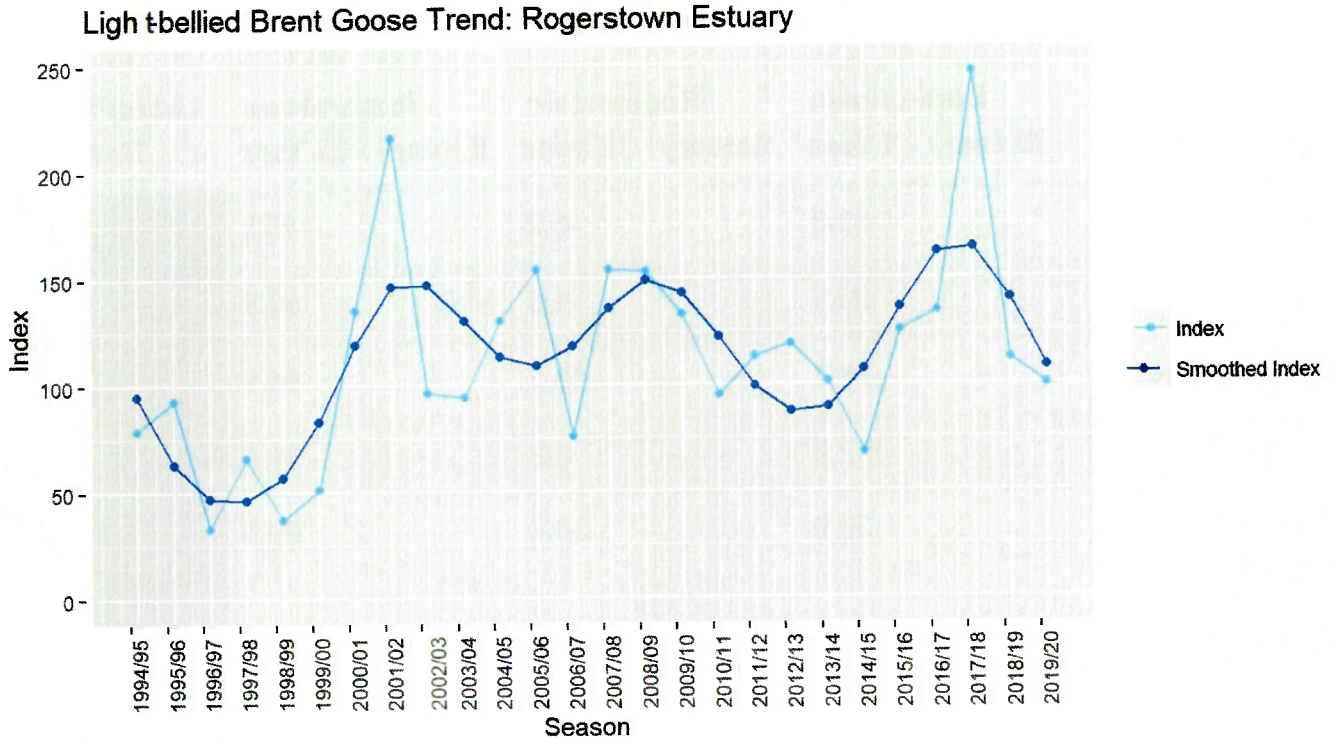
# Site Summary

| | Trend (%) | | | |
|---|---|---|---|---|
| **Species** | **Rogerstown Estuary - 5 Year** | **Rogerstown Estuary - 12 Year** | **Rogerstown Estuary - 23 Year** | **Long Term Trend** |
| Grey Plover | -51.1 | -71.9 | -66.0 | Large Decline |
| Knot | 262.7 | 29.7 | -63.8 | |
| Sanderling | -76.0 | -17.5 | -47.8 | Moderate Decline |
| Lapwing | 9.3 | -30.2 | -38.2 | |
| Dunlin | -24.4 | -59.6 | -34.8 | |
| Mallard | -29.1 | -35.7 | -19.5 | Intermediate Decline |
| Shoveler | 56.8 | -36.7 | 3.0 | Stable or Increasing |
| Shelduck | -14.1 | -12.3 | 6.7 | |
| Golden Plover | -16.5 | -71.0 | 9.8 | |
| Redshank | 6.9 | -24.4 | 25.9 | |
| Red-breasted Merganser | -9.3 | 11.4 | 35.4 | |

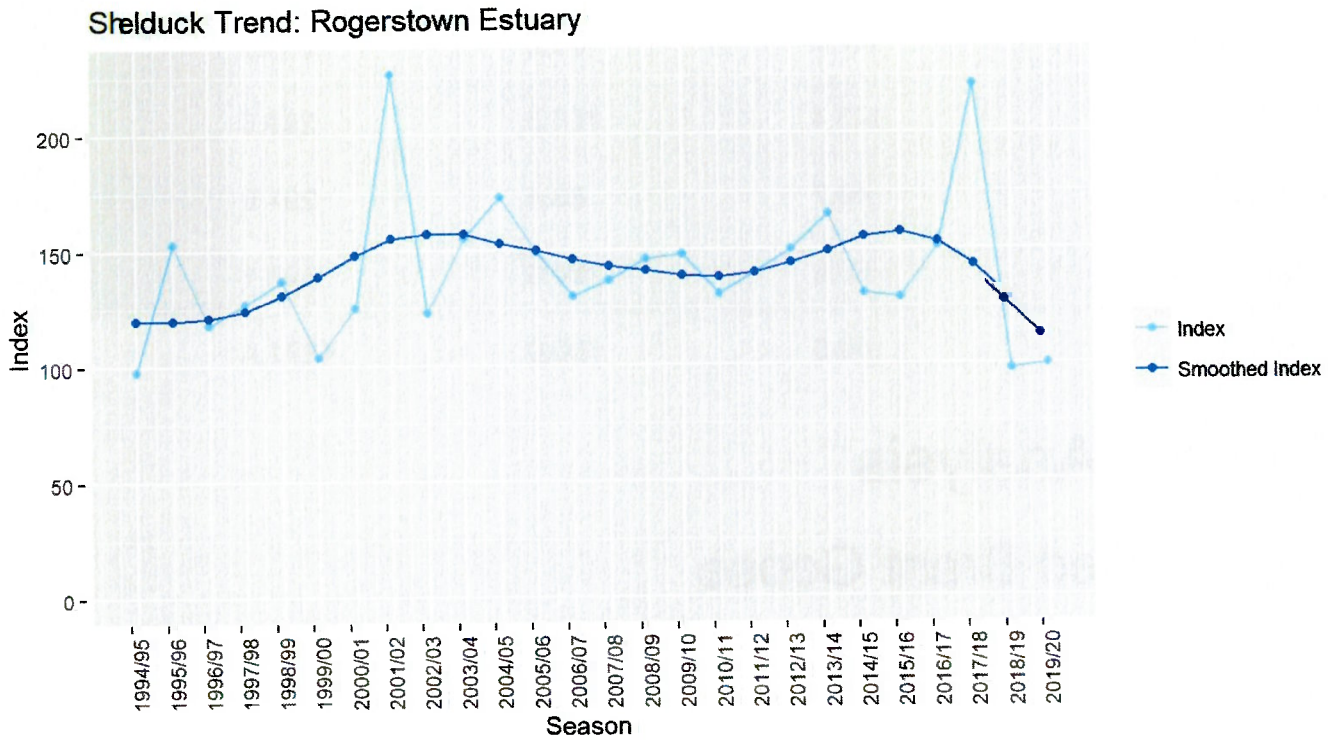
| Species | Trend (%) | | | |
|---|---|---|---|---|
| | Rogerstown Estuary - 5 Year | Rogerstown Estuary - 12 Year | Rogerstown Estuary - 23 Year | Long Term Trend |
| Grey Heron | 33.8 | -5.2 | 46.8 | |
| Turnstone | 20.5 | -1.9 | 53.6 | |
| Oystercatcher | -28.7 | -33.3 | 64.9 | |
| Curlew | 122.9 | -8.2 | 81.4 | |
| Black-tailed Godwit | 35.9 | -36.4 | 90.8 | |
| Light-bellied Brent Goose | 57.3 | 18.6 | 122.2 | |
| Ringed Plover | 222.0 | 2.3 | 149.1 | |
| Teal | 35.6 | 28.6 | 182.9 | |
| Cormorant | 117.3 | 71.6 | 219.6 | |
| Wigeon | 143.4 | 101.6 | 230.8 | |
| Greenshank | 40.7 | 83.4 | 297.0 | |
| Bar-tailed Godwit | 60.8 | 784.6 | 693.1 | |
| Little Egret | 59.0 | 100.0 | 1671.4 | |

# Species Analysis

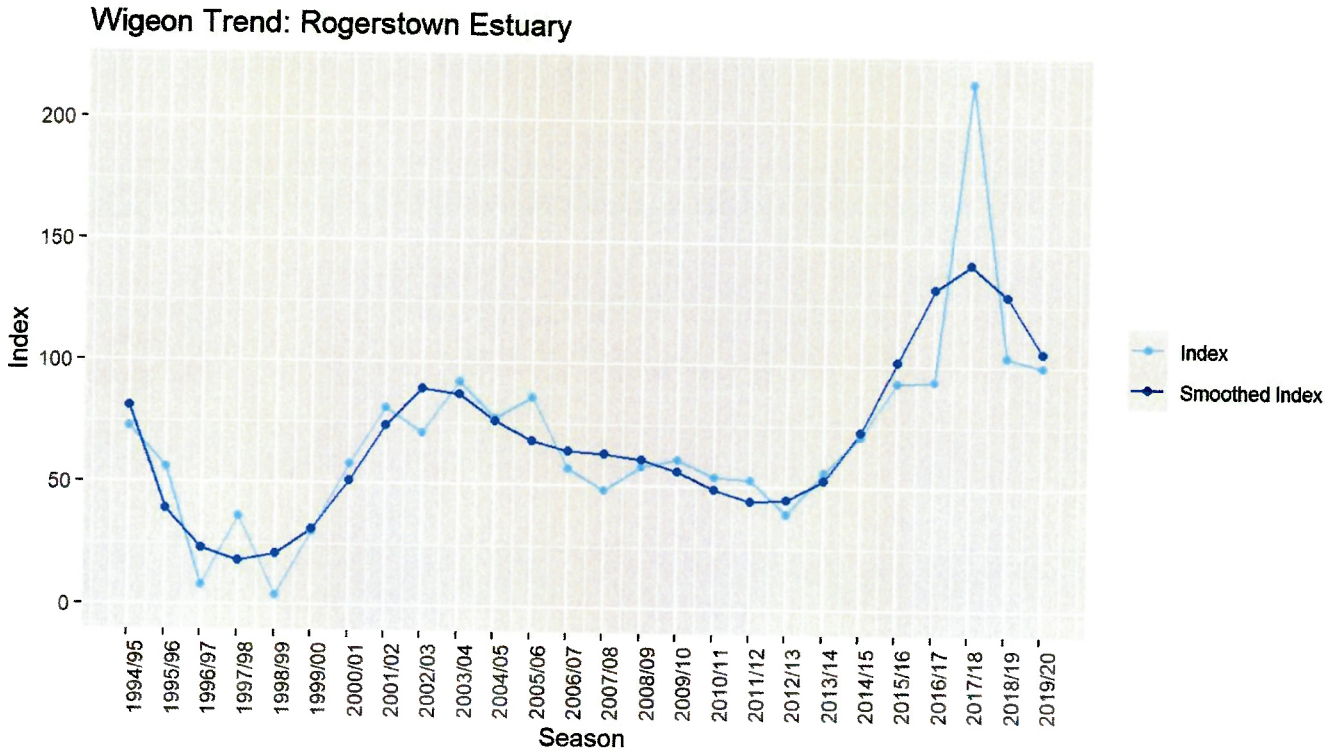
## Light-bellied Brent Goose



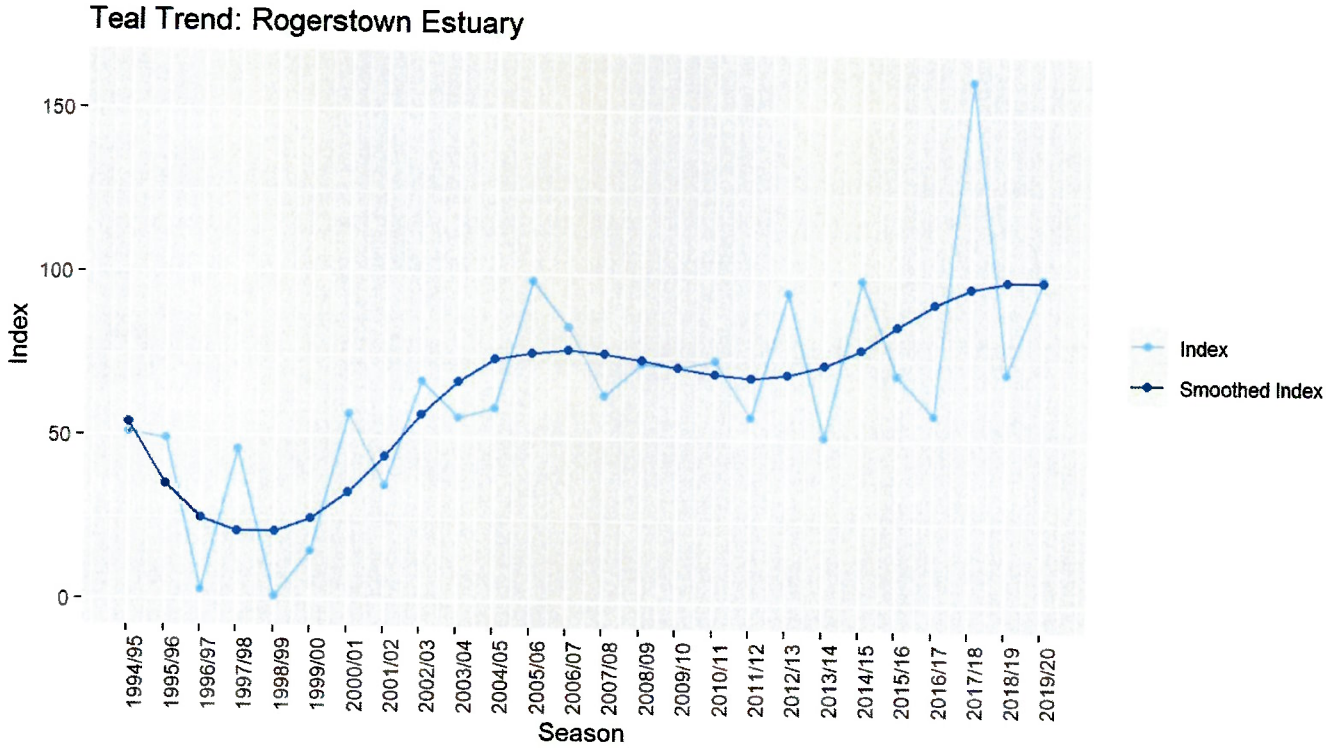

# Shelduck



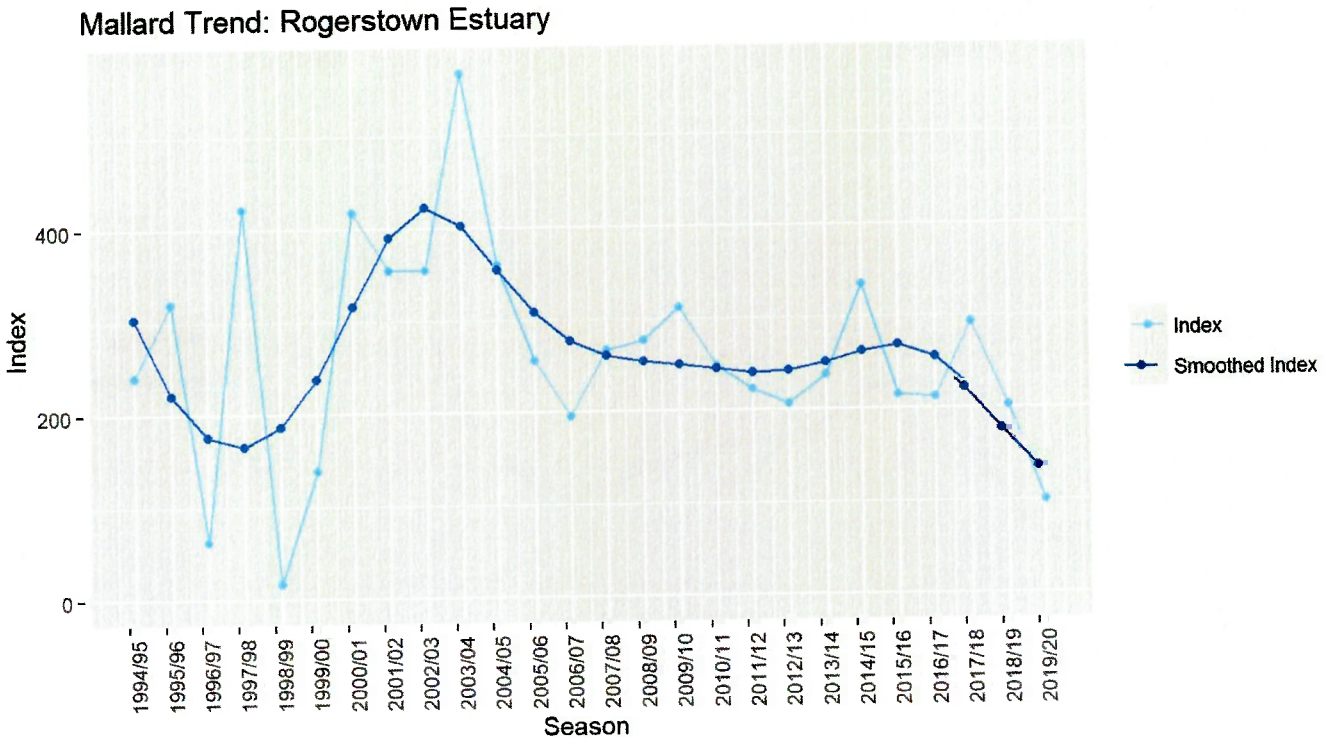

# Wigeon



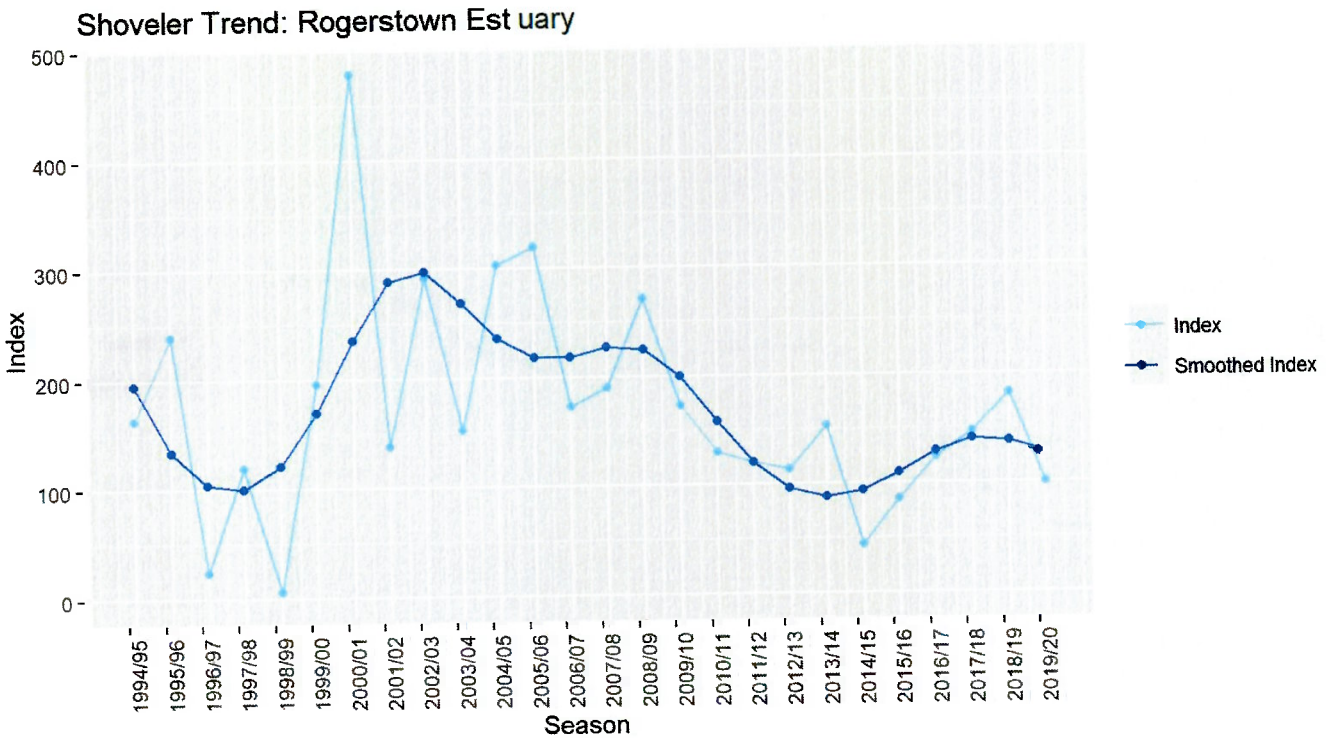

# Teal



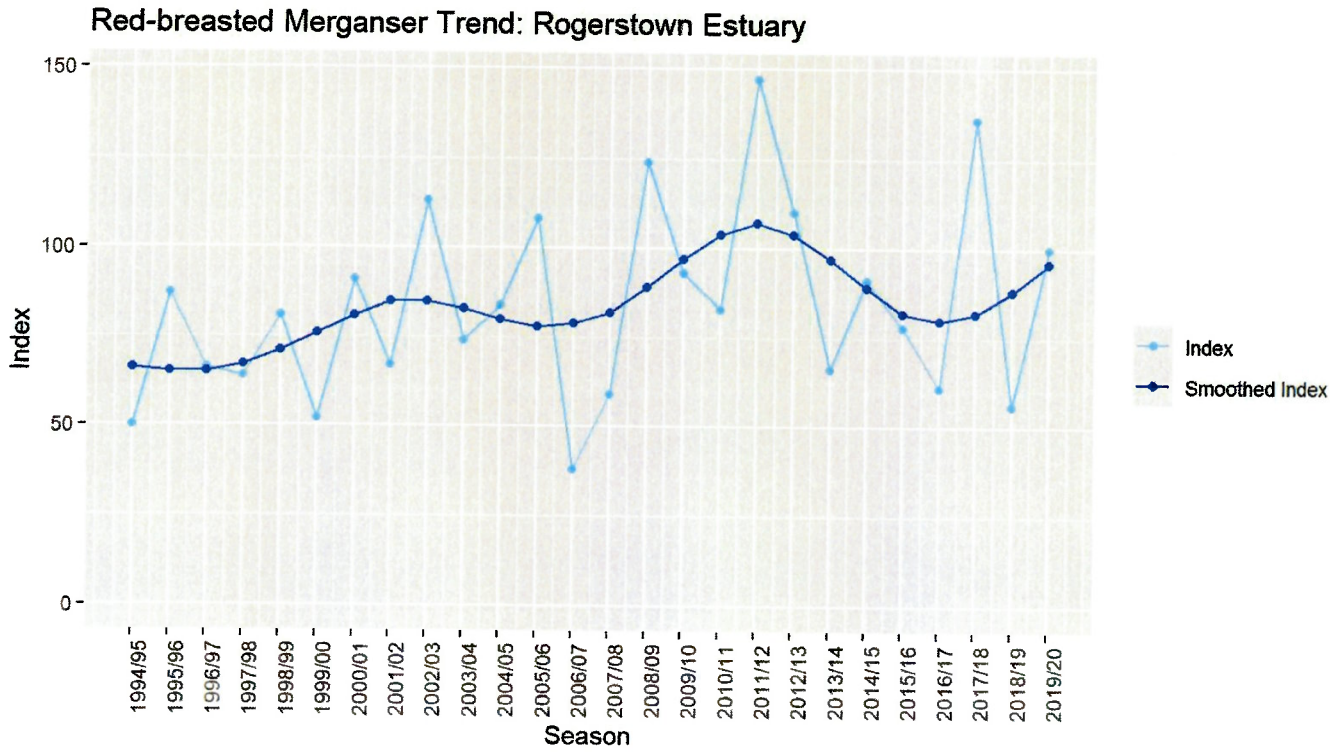

# Mallard



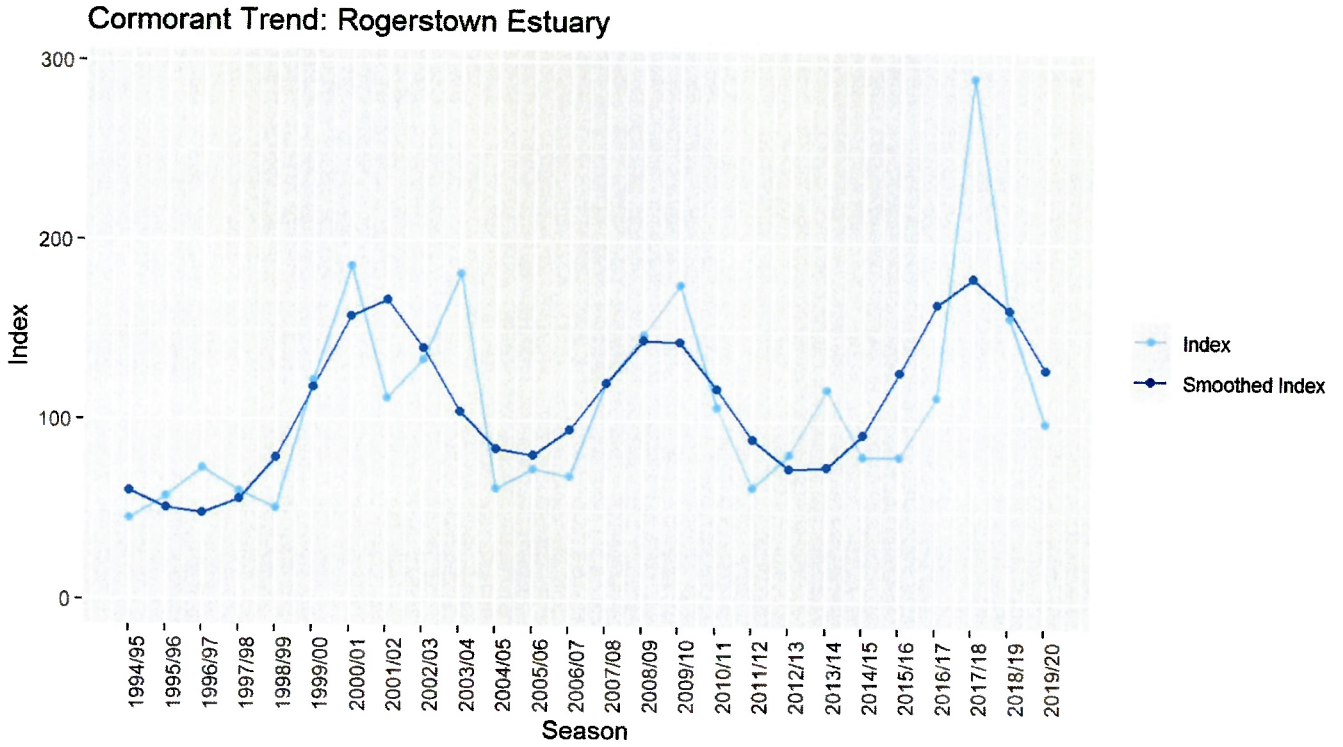

# Shoveler



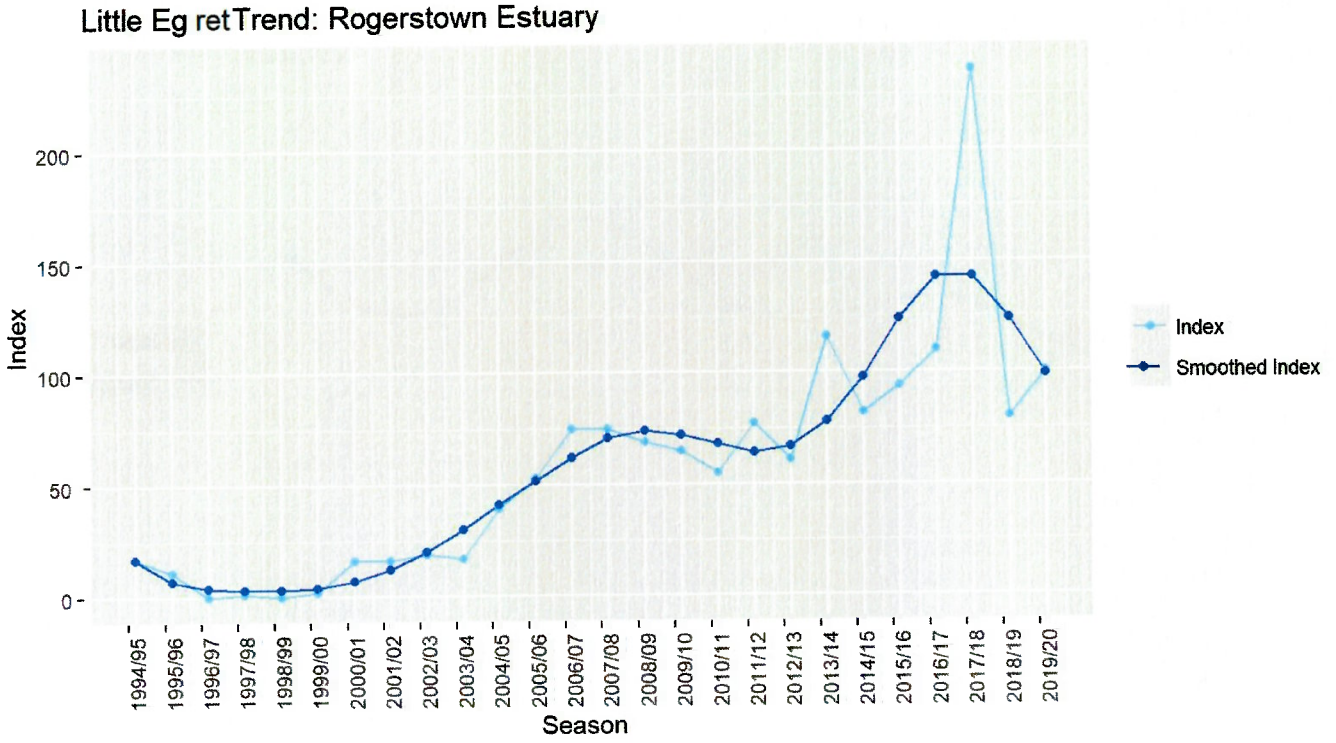

# Red-breasted Merganser



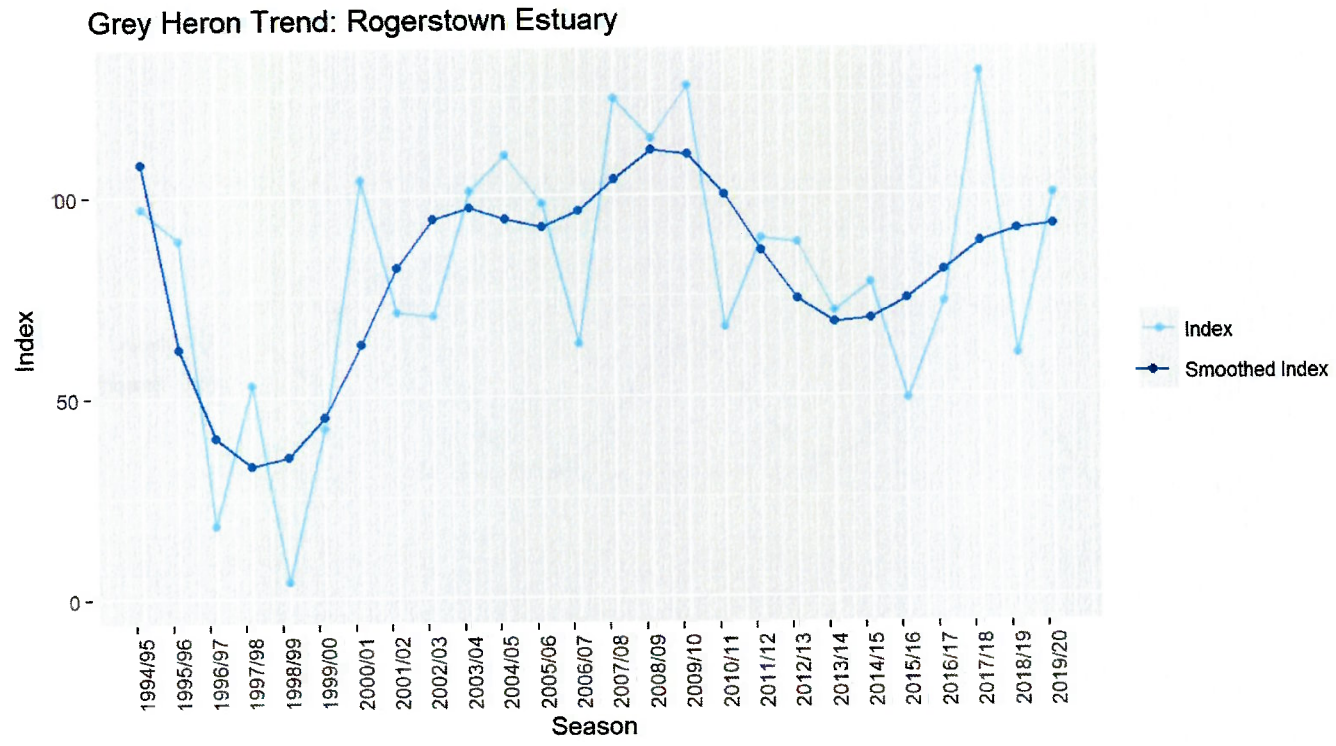

# Cormorant



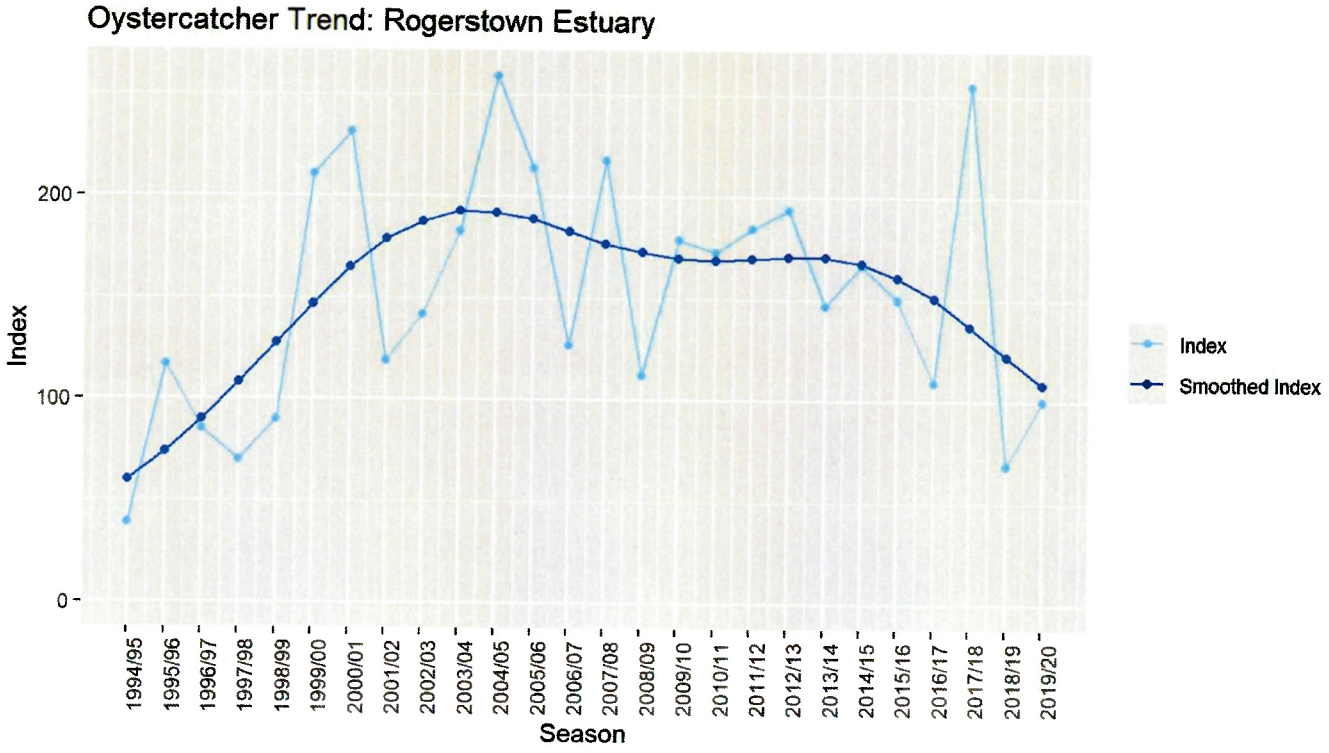

# Little Egret



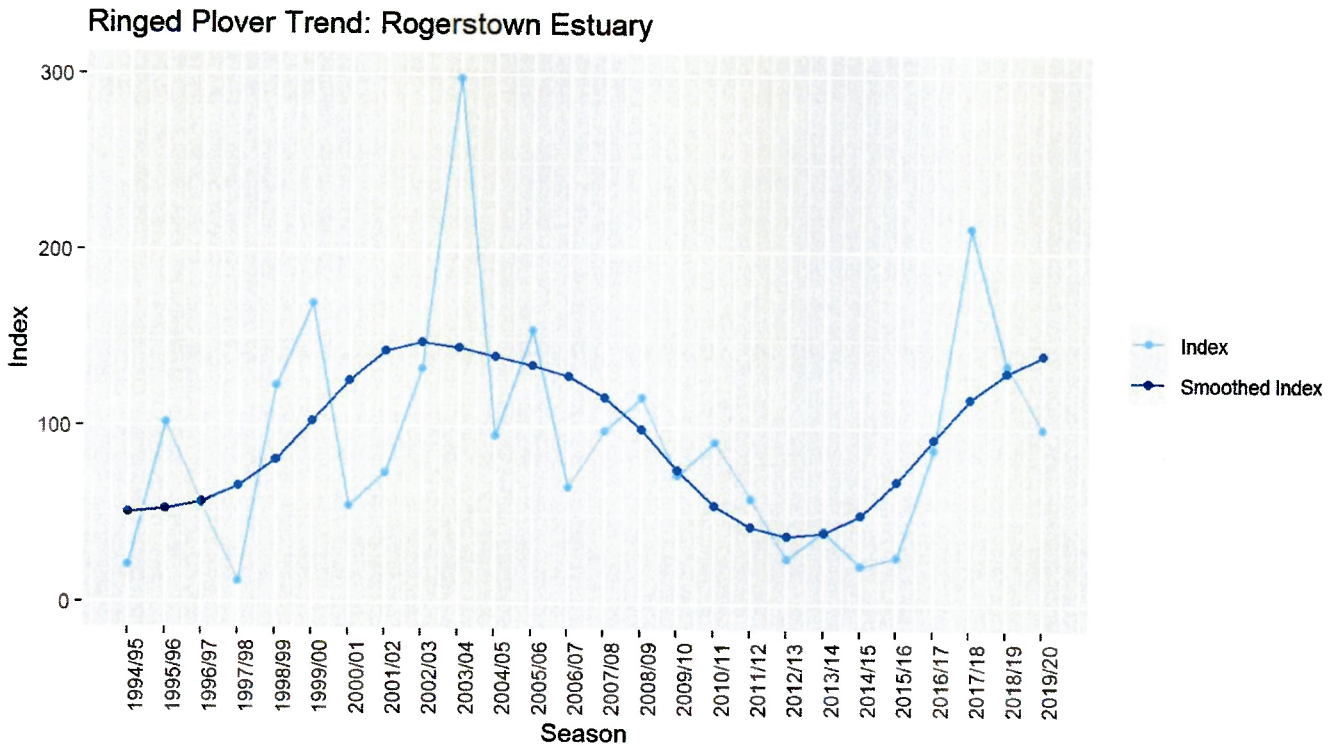

# Grey Heron



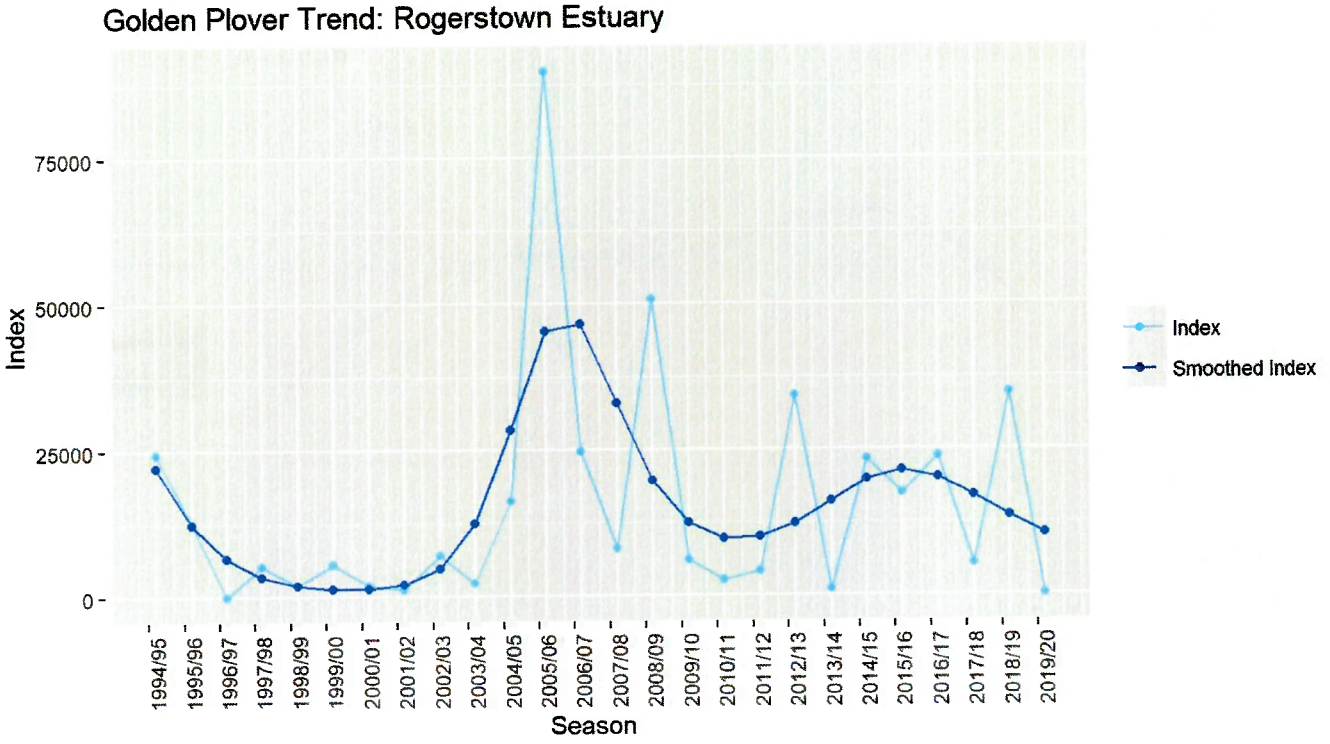

# Oystercatcher



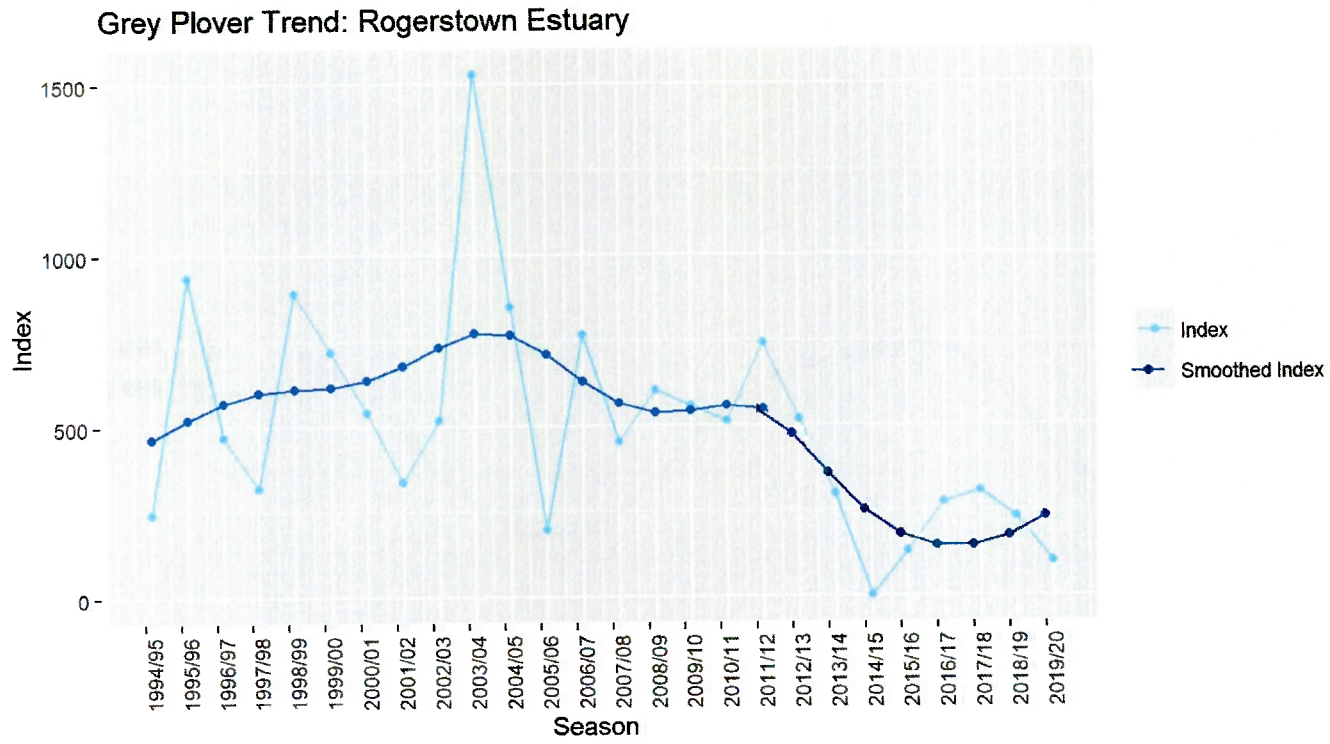

# Ringed Plover



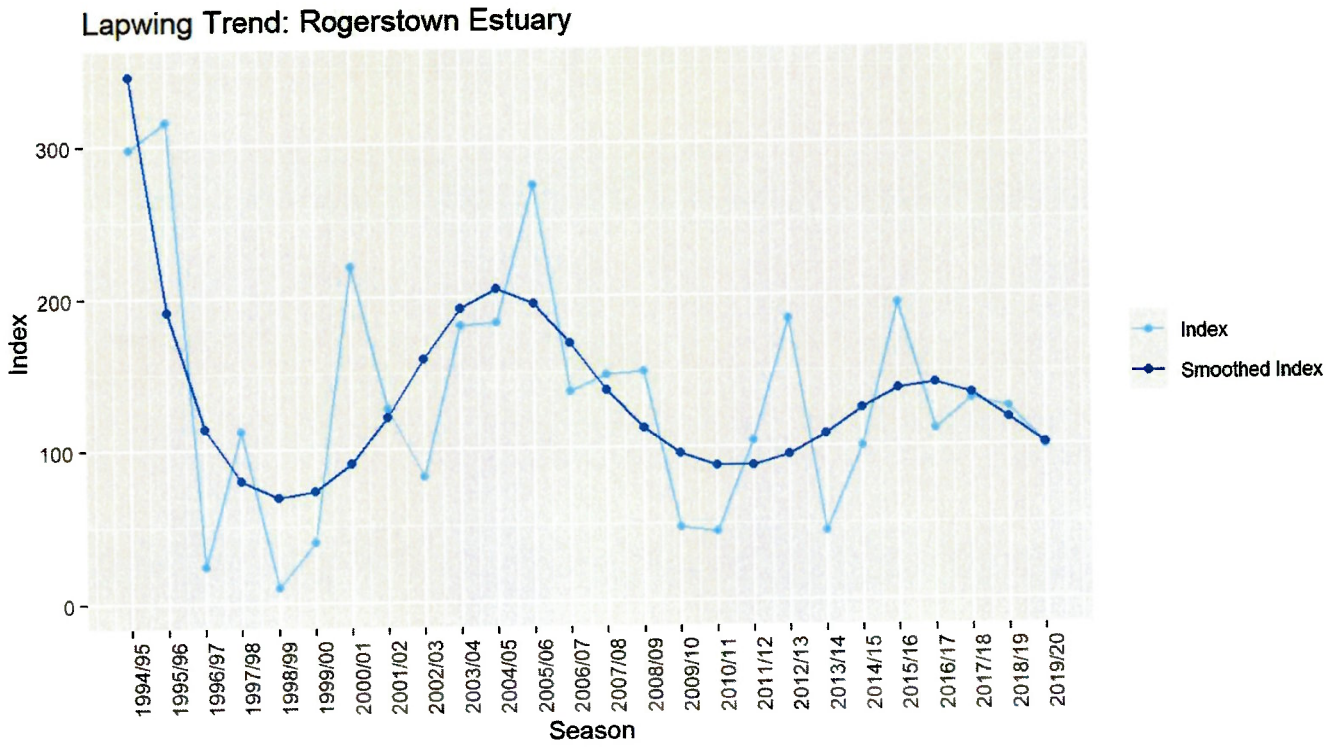

# Golden Plover



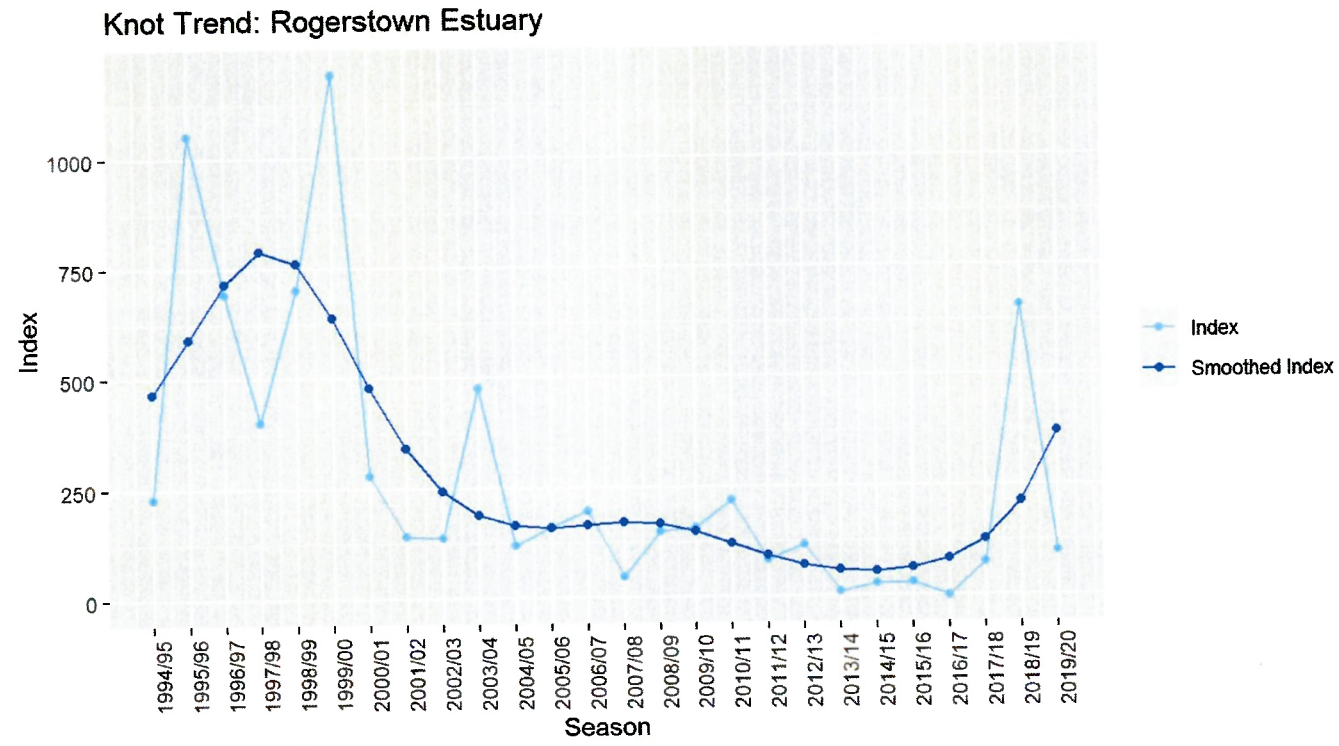

# Grey Plover



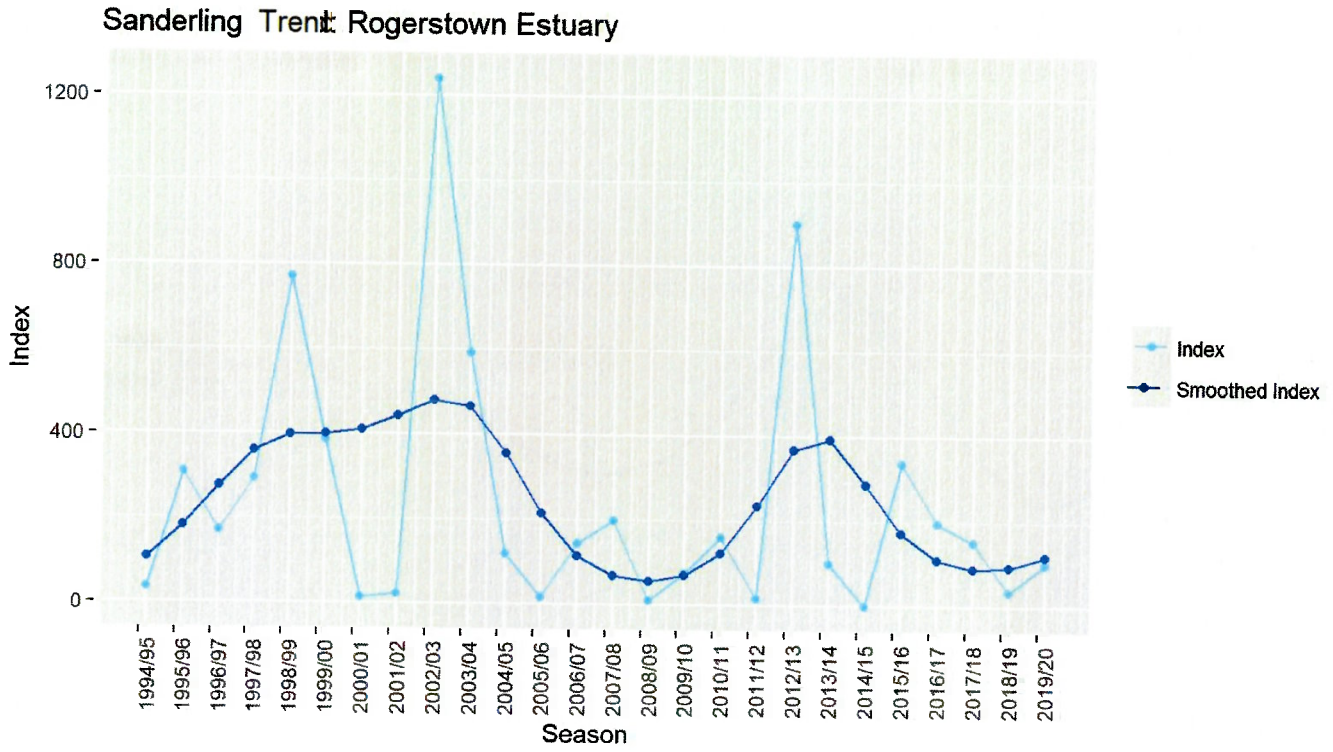

# Lapwing



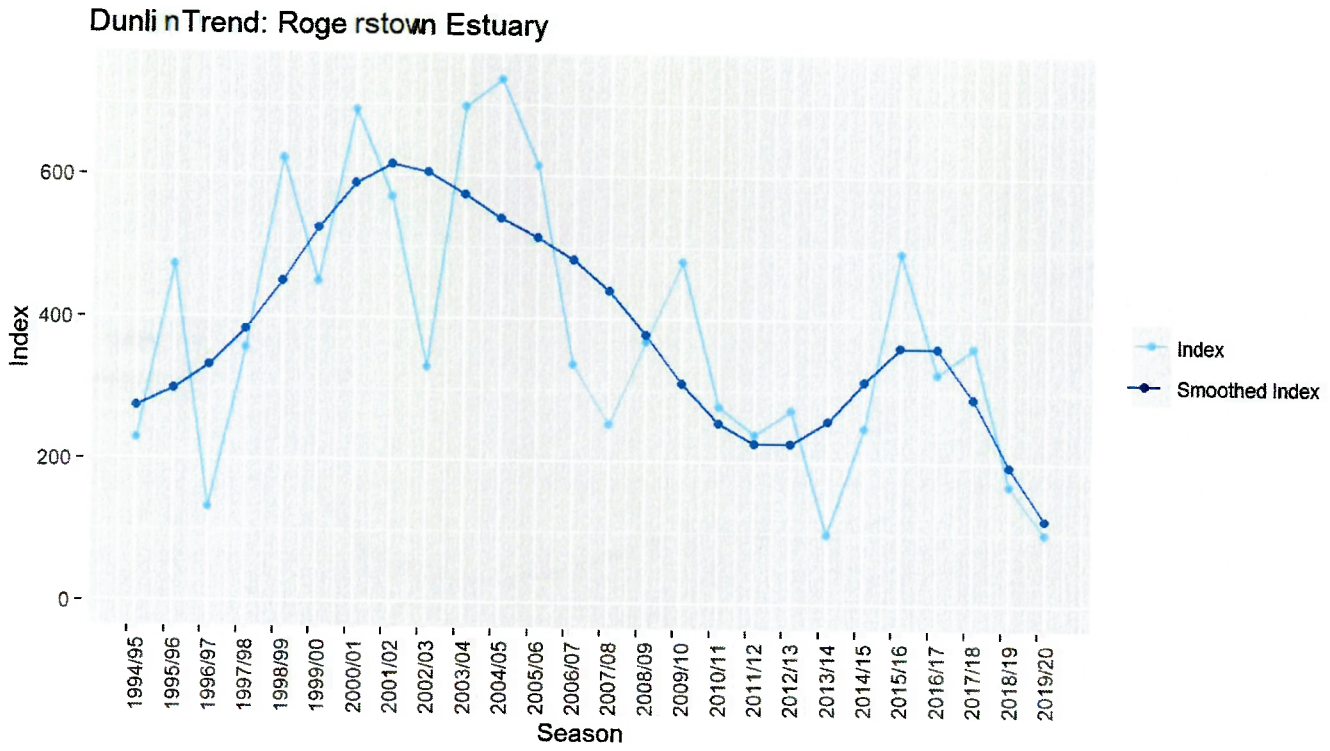

# Knot



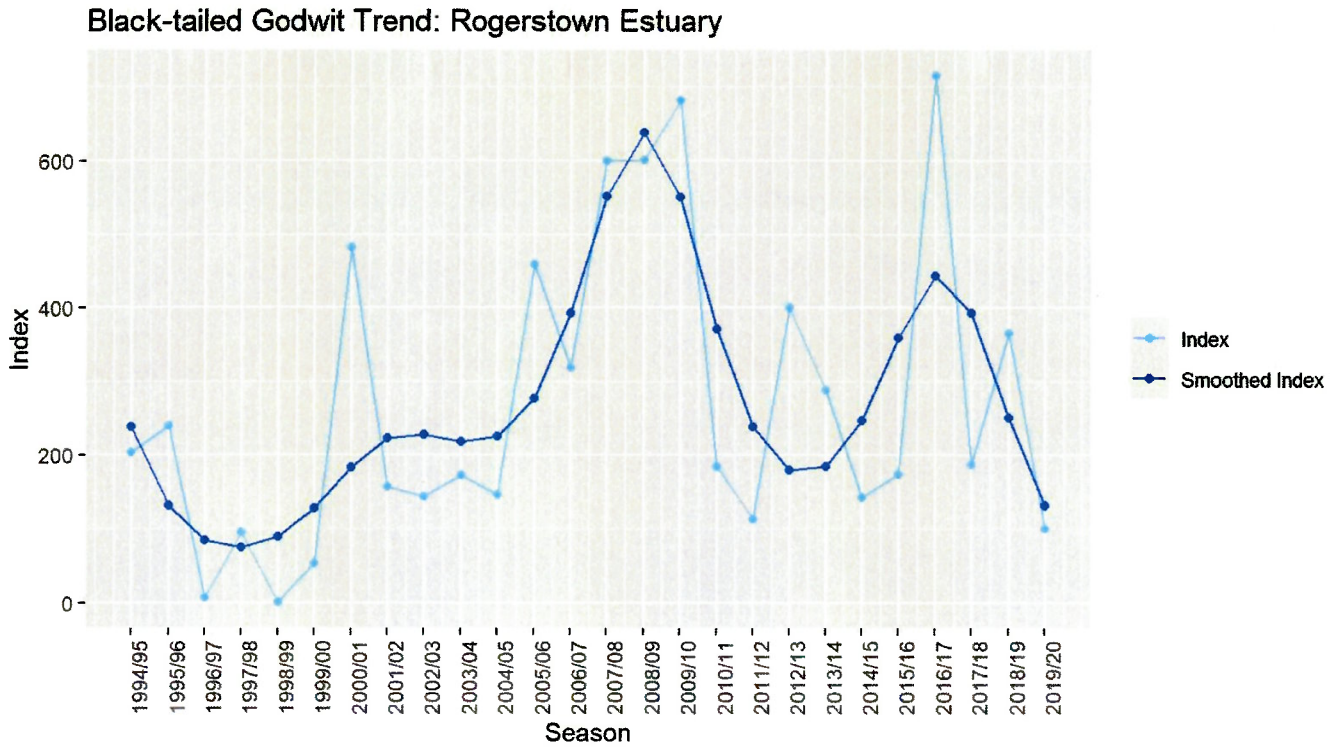

# Sanderling



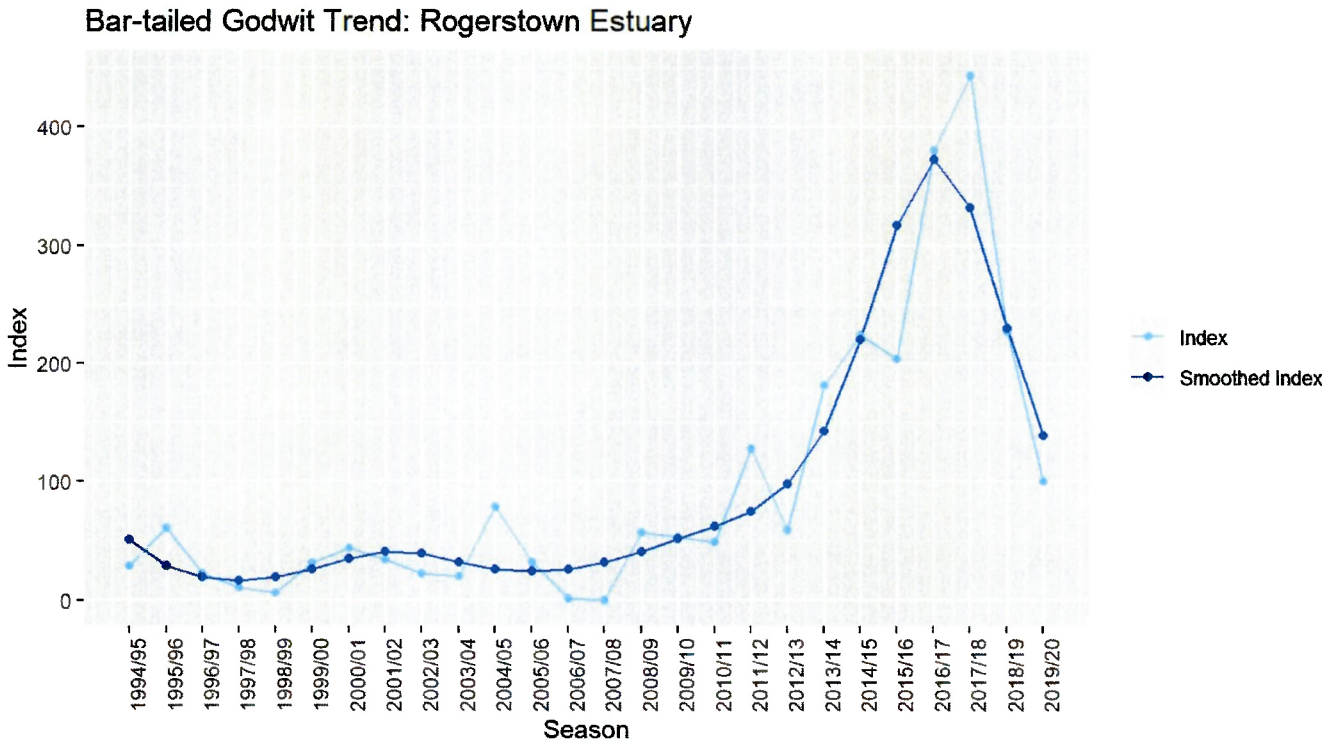

# Dunlin



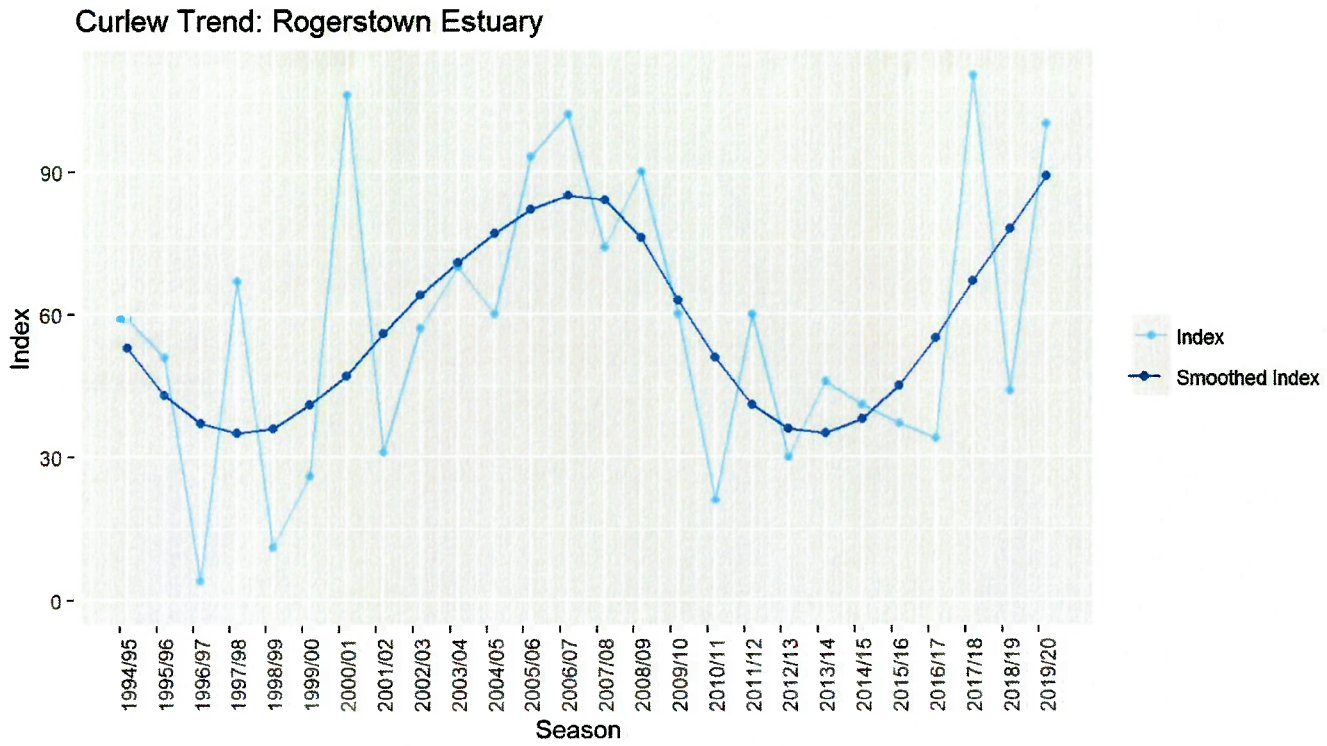

# Black-tailed Godwit



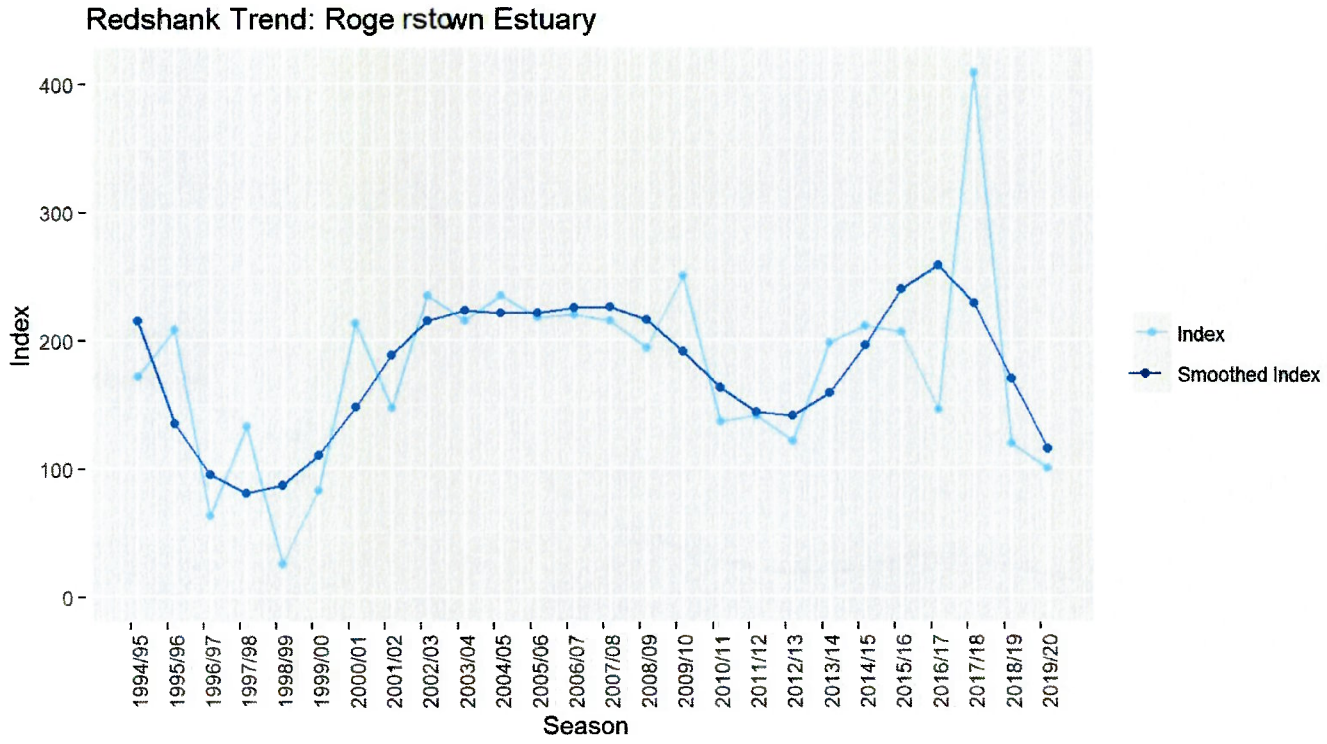

# Bar-tailed Godwit



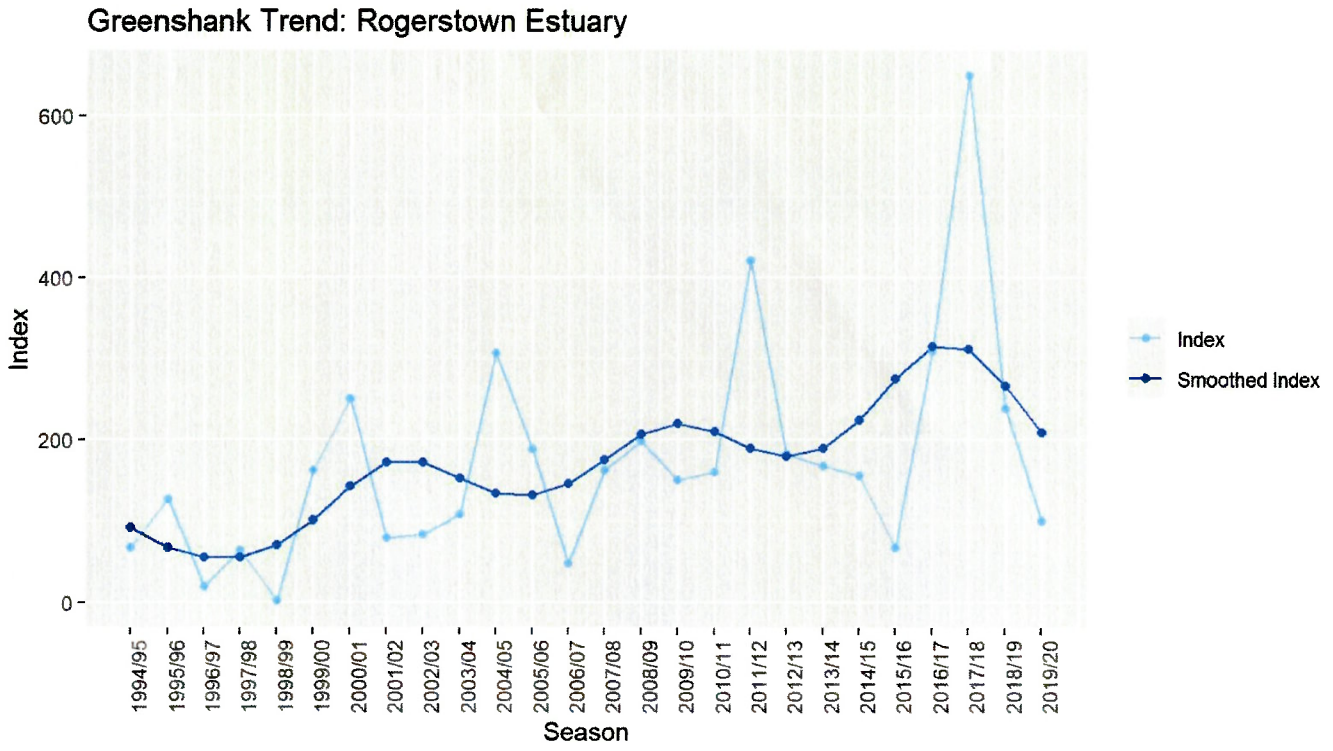

# Curlew



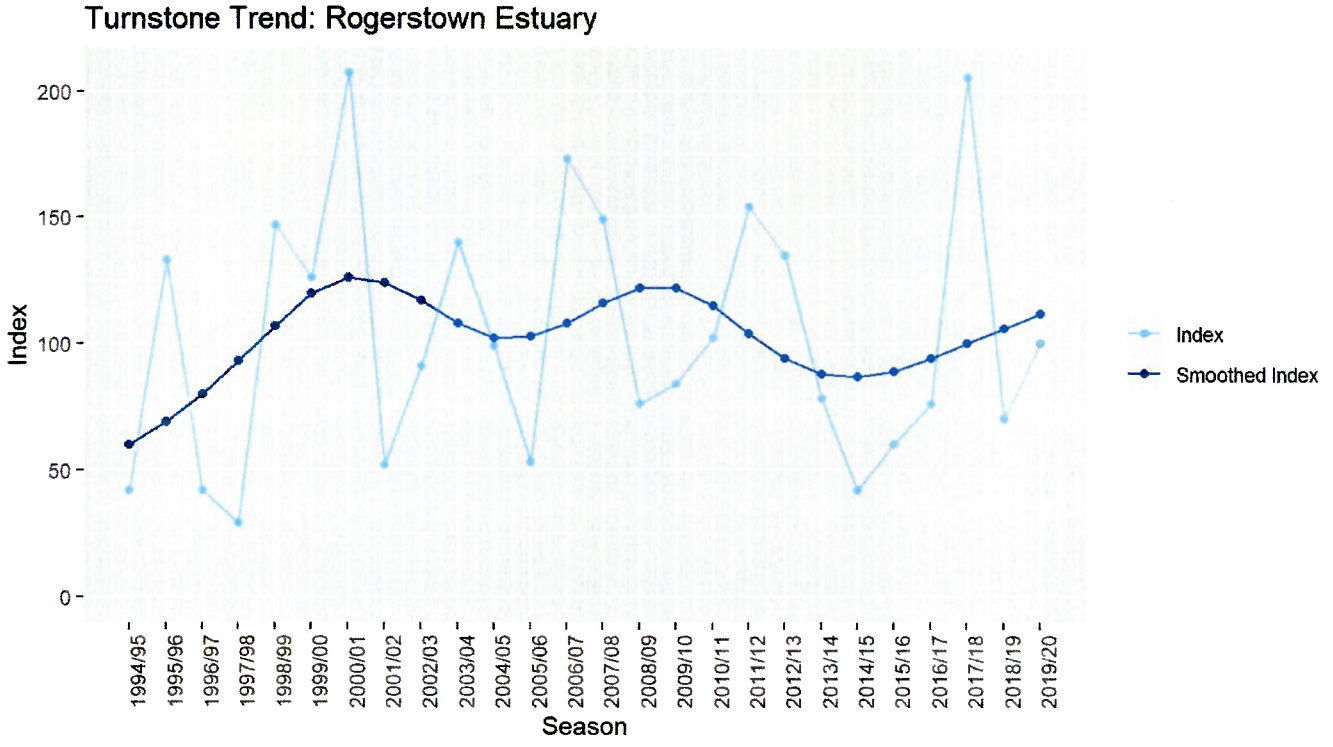

# Redshank




# Greenshank




# Turnstone




# Citations

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*(https://birdwatchireland.ie/app/uploads/2023/08/iwebs_trends_report.html)*