

EDINBURGH AIRPORT AIRSPACE CHANGE PROGRAMME - HABITATS REGULATIONS APPRAISAL SCREENING REPORT

Authorisations

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Executive Summary

- 1 The Edinburgh Airport Airspace Change Programme is currently consulting on changes to flight paths used by aircraft approaching and departing the airport. This project requires a Habitats Regulations Appraisal (“HRA”) screening to ensure that it does not adversely affect any designated sites protected by either Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora (“the Habitats Directive”) or Council Directive 2009/147/EC on the conservation of wild birds (codified version) (“the Birds Directive”).
- 2 This report assesses the proposed change in flight routes and their potential to negatively affect designated sites within the Zone of Influence of the routes by undertaking an appraisal of no likely significant effects on those sites.
- 3 A very precautionary approach was used, based on the experience of HiDef Aerial Surveying Ltd. (“HiDef”) flying twin engine survey aircraft to collect high definition digital aerial video data on birds, mammals and habitats.
- 4 Connectivity between designated sites was determined using a three dimensional approach incorporating bands of 1km, 2km, 4km, and 8km from the central flight path to designated sites, and using altitude based on the relative size of aircraft flying to and from Edinburgh Airport and HiDef’s survey aircraft.
- 5 A long list of 15 designated sites were initially identified, which was reduced down to four sites when altitude was assessed. For each of these four sites, the proposed changes to the flight routes did not result in a material change in disturbance compared to current flight paths. This was due to the altitudes low enough to represent a potentially disturbing effect occurring only relatively close to the airport, and therefore not representing an important difference to the current activity.
- 6 It was therefore possible to objectively conclude no likely significant effect to any Natura 2000 sites from the proposed Edinburgh Airport Airspace Change programme.

1 Introduction

- 1 Edinburgh Airport has been undertaking consultations with stakeholders on proposed changes to the routes taken by aircraft to and from the airport. These changes have the potential to cause impacts on the qualifying features of sites designated under Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora (“the Habitats Directive”) or Council Directive 2009/147/EC on the conservation of wild birds (codified version) (“the Birds Directive”).
- 2 These directives are enacted in to law in Scotland by the The Conservation (Natural Habitats, & c.) Regulations 1994, as amended (referred to as the “Habitats Regulations”) and as such, where licensed activities cannot be objectively shown to have no likely significant effect (“LSE”) on the qualifying features, the Competent Authority (“CA”) is required to undertake an Appropriate Assessment. The CA carries out this assessment using information provided by the applicant.
- 3 This report undertakes a Habitats Regulations Appraisal (“HRA”) screening of sites designated under the Birds Directive and the Habitats Directive (together known as “Natura 2000” sites) for the Edinburgh Airport Airspace Change Programme.
- 4 The Natura 2000 network has been established across European Union (“EU”) member states to conserve natural habitats and species, particularly those that are rare, endangered, vulnerable to human pressures, or endemic within the EU. The Habitats Directive has established protected Special Areas of Conservation (“SAC”) for habitats and species other than wild birds, while the Birds Directive has similarly established Special Protection Areas (“SPA”) for birds.
- 5 In addition, as a matter of government policy, Natura 2000 sites that have been proposed by the UK but not yet formally accepted as protected sites by the European Commission (candidate SACs (“cSACs”) in the case of the Habitats Directive and potential SPAs (“pSPAs”) in the case of the Birds Directive) are given the same level of protection as formally protected sites. In addition, sites identified as internationally important wetlands under the Ramsar Convention (1971) are considered under the HRA process.
- 6 Guidance from the European Commission on the assessment of plans or projects requiring a HRA recommends four steps be undertaken:
 - 1) Screening. The potential effects on Natura 2000 sites of plans or projects are identified and those sites where no LSE can objectively be concluded (alone and in combination with other reasonably foreseeable plans and projects) are screening out of the HRA.
 - 2) Appropriate Assessment. Where no LSE cannot be concluded the CA is required to undertake an Appropriate Assessment in order to show that the plan or project, along and in combination, will not constitute an adverse effect on site integrity, beyond reasonable scientific doubt.
 - 3) Alternatives. Where the CA cannot conclude no adverse effect on site integrity, an assessment of reasonable alternative plans, which achieve the same objective, must be undertaken.
 - 4) Imperative Reason of Overriding Public Interest (“IROPI”). If the CA cannot demonstrate there are reasonable alternatives, the plan or project can only proceed if the CA can demonstrate that there is an IROPI case for it to be undertaken and must also demonstrate that sufficient compensation can be achieved to maintain the favourable conservation status of the Natura 2000 network.

7 The objectives of this report are to:

- 1) Determine which Natura 2000 sites may have connectivity to the proposed new flight paths;
- 2) Determine whether the new flight paths result in a route to impact on the qualifying features of the sites identified; and,
- 3) Determine whether it can be objectively determined whether there is no LSE on the sites identified.

8 Scottish Natural Heritage (“SNH”) guidance recommends that the no LSE step should be “a simple decision”. In general, it is relatively simple to establish connectivity between a plan or project and a Natura 2000 sites, as the assessment is typically a two dimensional one. However, while the decision for concluding no LSE or not may be a simple one, due to the three-dimensional aspect of assessing disturbance from flying aircraft, the process of determining this is more complicated than many plans or projects. Here the assessment of no LSE has considered both the two-dimensional aspects of connectivity, by determining distance from the proposed new flight routes on the ground, and the third dimensional aspect of disturbance caused by aircraft altitude.

2 Methods

- 9 To establish the Zone of Influence (“Zoi”) of the Airspace Change Programme it was necessary to determine both the new flight path corridors and the zone of influence around them. The impacts being assessed here are only direct disturbance caused by the presence of overflying aircraft, or the noise they generate. A hypothetical source of impact is collisions with aircraft (i.e. bird strike). resulting in the death of protected birds from SPAs with connectivity. Bird strikes are extremely rare and monitored by the Civil Aviation Authority (“CAA”).
- 10 This HRA only considers the new flight paths being proposed, as the existing flight paths form the baseline of the current site condition of the Natura 2000 sites. This is the “do nothing” scenario, against which the proposed changed to flight paths is compared.
- 11 There are three key factors which must exist to be unable to conclude that there is no LSE; connectivity, route to impact and the presence of non-trivial abundance of the qualifying feature. The methods used here considered each of these in turn.
- 12 Connectivity was established by determining which SPAs and SACs would be overflown by aircraft using the proposed new flight paths. In addition, since both flight paths may not be exactly followed, and aircraft would be visible and audible from distances from sites, buffers of 2km, 4km and 8km of the flight paths were also used to determine which Natura 2000 sites may have connectivity.
- 13 A further aspect of connectivity is the altitude of aircraft. As altitude increases the visual appearance decreases (all other aspects being equal). So, the approximate altitude of aircraft using the flight routes was also determined for each Natura 2000 site. Since there was no published data on the effects of disturbance of airliners on wildlife at different altitudes, the cut off altitude was based on the minimum acceptable altitude used by HiDef when surveying highly sensitive species. From unpublished data, we know that altitudes of less than 500m, when flying a DA-42 twin engine, 4 seat aircraft, can cause reactions from birds such as scoters and divers, which are generally recognised as the most sensitive seabirds to disturbance from aircraft (Furness *et al.* 2013). This has been confirmed in a recent study by the British Trust for Ornithology (“BTO”) (Thaxter *et al.*, 2015) which considers flight altitudes below 500m to cause flushing of sensitive species. Taking the airliners used in two thirds of flights to and from Edinburgh Airport as a basis for this, the altitude of these aircraft to give a similar appearance of size to a DA-42 at 500m was calculated. These results show that between 3,600 and 4,300 feet, two thirds of airliners using Edinburgh Airport, would have the same physical appearance as a DA-42 (

- 14 Table 1). To provide context we also calculated the altitude that the largest commercial airliner, the A380, would need to fly to also give the same appearance. This was approximately 10,000 feet. A value of 5,000 feet was therefore used as a threshold for connectivity in the vertical plane (i.e. any flights more than 5,000 feet would have no connectivity).

Table 1 Wing span of the two thirds most common aircraft using Edinburgh Airport compared with a DA-42 survey aircraft.

Aircraft type	Wing span (m)	Equivalent altitude (feet)	Percentage of departures
DA-42	13.0	1,640	n/a
A319	34.0	4,290	16.5%
DH8D	28.5	3,596	15.1%
B738	34.3	4,328	14.8%
A320	34.1	4,303	14.0%
E190	29.0	3,659	7.3%
A380	80.0	10,095	n/a

- 15 Routes to impact will depend on the qualifying features of the Natura 2000 site. These will vary from insensitive to visual and audible disturbance and collisions (e.g. habitat features of SACs) to features that are known to be very sensitive to disturbance (e.g. seaduck features of SPAs).
- 16 Finally, an assessment of the presence of qualifying features to be impacted was assessed. For large sites, not all features may occur across the whole site, so the flight paths may not result in disturbing all features.

3 Results

3.1 Long list of Natura 2000 sites

- 17 The analysis of the proposed new flight paths identified 15 Natura 2000 sites. 10 were SACs and 5 were SPAs.

Table 2 Assessment of Natura 2000 sites for potential connectivity with the proposed new flight paths.

Site name	Route (Buffer (km) and minimum approximate altitude (feet))																			Connectivity	
	A		B1		B2		C		D1		E1		F1		G		H1		H2		
Black Loch Moss SAC			4	>10 k	8	>10k					8	>10k							8	>10k	N
Blawhorn Moss SAC			2	>9k	8	>9k													8	>10k	N
Braehead Moss SAC																			8	>10k	N
Craigengar SAC	4	>8k															2	>10k	8	>10k	N
Moffat Hills SAC	8	>10k															8	>10k			N
Moorfoot Hills SAC									1	>10k					1	>10k					N
North Shotts Moss SAC			8	>10 k															1	>10k	N
River Tweed SAC	1	>9k							1	>10k					1	>10k	1	>10k	8	>10k	N
West Fannyside Moss SAC			8	>10 k	2	>10k					2	>10k									N
Fala Flow SAC									1	>10k					1	>10k					N

Site name	Route (Buffer (km) and minimum approximate altitude (feet))																				Connectivity
	A		B1		B2		C		D1		E1		F1		G		H1		H2		
Firth of Forth SPA							1	>4k	1	>5k	1	<2k	1	<2k	1	<2k	1	<2k	1	<2k	Y
Forth Islands SPA							8	>5k	1	>8k	1	>2k	1	<2k	1	>2k	1	>2k	1	>2k	Y
Imperial Dock Lock, Leith SPA									4	>10k					8	>4k'	2	>4k	2	>4k	Y
Slamannan Plateau SPA			8	>10 k	1	>10k					1	>10k									N
Westwater SPA	1	>10k															8	>10k	8	>10k	N
Outer Firth of Forth and St Andrews Bay Complex pSPA							1	>4k	1	>7k	1	<2k	1	<2k	1	<2k	1	<2k	1	<2k	Y

- 18 For each Natura 2000 site with potential connectivity, the qualifying features of the site, and their site condition was summarised in Table 3.

Table 3 The qualifying features and site condition of Natura 2000 sites identified as having potential connectivity with the proposed new flight paths.

Designation	Name of site	Qualifying features	Site condition
SPA	Firth of Forth	Bar-tailed godwit <i>Limosa lapponica</i> , non-breeding	Favourable Declining
		Common scoter <i>Melanitta nigra</i> , non-breeding	Unfavourable Declining
		Cormorant <i>Phalacrocorax carbo</i> , non-breeding	Favourable Maintained
		Curlew <i>Numenius arquata</i> , non-breeding	Favourable Maintained
		Dunlin <i>Calidris alpina alpina</i> , non-breeding	Favourable Declining
		Eider <i>Somateria mollissima</i> , non-breeding	Favourable Declining
		Golden plover (<i>Pluvialis apricaria</i>), non-breeding	Favourable Maintained
		Goldeneye <i>Bucephala clangula</i> , non-breeding	Unfavourable Declining
		Great crested grebe <i>Podiceps cristatus</i> , non-breeding	Unfavourable Declining
		Grey plover <i>Pluvialis squatarola</i> , non-breeding	Favourable Declining
		Knot <i>Calidris canutus</i> , non-breeding	Unfavourable Declining
		Lapwing <i>Vanellus vanellus</i> , non-breeding	Favourable Maintained
		Long-tailed duck <i>Clangula hyemalis</i> , non-breeding	Unfavourable Declining
		Mallard <i>Anas platyrhynchos</i> , non-breeding	Unfavourable Declining
		Oystercatcher <i>Haematopus ostralegus</i>) non-breeding	Favourable Maintained
		Pink-footed goose <i>Anser brachyrhynchus</i> , non-breeding	Favourable Maintained
		Red-breasted merganser <i>Mergus serrator</i> , non-breeding	Favourable Declining
		Red-throated diver <i>Gavia stellata</i> , non-breeding	Favourable Maintained
		Redshank <i>Tringa totanus</i> , non-breeding	Favourable Maintained
		Ringed plover <i>Charadrius hiaticula</i> , non-breeding	Favourable Maintained
		Sandwich tern <i>Sterna sandvicensis</i> , passage	Favourable Declining
		Scaup <i>Aythya marila</i> , non-breeding	Unfavourable Declining

Designation	Name of site	Qualifying features	Site condition
		Shelduck <i>Tadorna tadorna</i> , non-breeding	Favourable Declining
		Slavonian grebe <i>Podiceps auritus</i> , non-breeding	Favourable Declining
		Turnstone <i>Arenaria interpres</i> , non-breeding	Favourable Maintained
		Velvet scoter <i>Melanitta fusca</i> , non-breeding	Favourable Maintained
		Waterfowl assemblage, non-breeding	Favourable Declining
		Wigeon <i>Anas penelope</i> , non-breeding	Favourable Recovered
SPA	Forth Islands	Arctic tern <i>Sterna paradisaea</i> , breeding	Favourable Declining
		Common tern <i>Sterna hirundo</i> , breeding	Favourable Maintained
		Cormorant, breeding	Favourable Declining
		Fulmar <i>Fulmarus glacialis</i> , breeding	Favourable Maintained
		Gannet <i>Morus bassanus</i> , breeding	Favourable Maintained
		Guillemot <i>Uria aalge</i> , breeding	Favourable Maintained
		Herring gull <i>Larus argentatus</i> , breeding	Favourable Maintained
		Kittiwake <i>Rissa tridactyla</i> , breeding	Unfavourable Declining
		Lesser black-backed gull <i>Larus fuscus</i> , breeding	Favourable Maintained
		Puffin <i>Fratercula arctica</i> , breeding	Favourable Maintained
		Razorbill <i>Alca torda</i> , breeding	Favourable Maintained
		Roseate tern <i>Sterna dougalli i</i> , breeding	Unfavourable Declining
		Sandwich tern, breeding	Unfavourable Declining
		Seabird assemblage, breeding	Unfavourable Declining
		Shag <i>Phalacrocorax ar istotelis</i> , breeding	Unfavourable Recovering
SPA	Imperial Dock Lock, Leith	Common tern <i>Sterna hirundo</i> , breeding	Favourable Maintained
pSPA	Outer Firth of Forth and St Andrews Bay Complex	Arctic tern, breeding	n/a
		Black-headed gull <i>Chroicocephalus ridibundus</i> , non-breeding	n/a
		Common gull <i>Larus canus</i> , non-breeding	n/a
		Common scoter, non-breeding	n/a
		Common tern, breeding	n/a
		Eider, non-breeding	n/a
		Gannet, breeding	n/a

Designation	Name of site	Qualifying features	Site condition
		Goldeneye, non-breeding	n/a
		Guillemot, breeding	n/a
		Guillemot, non-breeding	n/a
		Herring gull , breeding	n/a
		Herring gull , non-breeding	n/a
		Kittiwake, breeding	n/a
		Kittiwake, non-breeding	n/a
		Little gull, non-breeding	n/a
		Long-tailed duck, non-breeding	n/a
		Manx shearwater <i>Puffinus puffinus</i> , non-breeding	n/a
		Puffin, breeding	n/a
		Razorbill, non-breeding	n/a
		Red-breasted merganser, non-breeding	n/a
		Red-throated diver, non-breeding	n/a
		Seabird assemblage, breeding	n/a
		Seabird assemblage, non-breeding	n/a
		Shag, breeding	n/a
		Shag, non-breeding	n/a
		Slavonian grebe, non-breeding	n/a
		Velvet scoter, non-breeding	n/a
		Waterfowl assemblage, non-breeding	n/a

- 19 Note that there is no site condition for the qualifying features of the Outer Firth of Forth and St Andrews Bay Complex pSPA as this site is new and has therefore not been assessed for site condition.
- 20 Since some of the Natura 2000 sites with connectivity are very large, there is the possibility that the qualifying features are not distributed across all areas within the site. Therefore, the distribution of species across each site with connectivity was checked (Table 4)

Table 4 The distribution of qualifying features within each Natura 2000 sites identified as having potential connectivity with the proposed new flight paths.

Name of site	Qualifying features	Connectivity based on distribution	Reason
Firth of Forth SPA	Bar-tailed godwit, non-breeding	Y	Assumed present in all areas
	Common scoter, non-breeding	Y	Assumed present in all areas
	Cormorant, non-breeding	Y	Assumed present in all areas
	Curlew, non-breeding	Y	Assumed present in all areas
	Dunlin, non-breeding	Y	Assumed present in all areas
	Eider, non-breeding	Y	Assumed present in all areas
	Golden plover, non-breeding	Y	Assumed present in all areas
	Goldeneye, non-breeding	Y	Assumed present in all areas
	Great crested grebe, non-breeding	Y	Assumed present in all areas
	Grey plover, non-breeding	Y	Assumed present in all areas
	Knot, non-breeding	Y	Assumed present in all areas
	Lapwing, non-breeding	Y	Assumed present in all areas
	Long-tailed duck, non-breeding	Y	Assumed present in all areas
	Mallard, non-breeding	Y	Assumed present in all areas
	Oystercatcher, non-breeding	Y	Assumed present in all areas
	Pink-footed goose, non-breeding	Y	Assumed present in all areas
	Red-breasted merganser, non-breeding	Y	Assumed present in all areas
Red-throated diver, non-breeding	Y	Assumed present in all areas	

Name of site	Qualifying features	Connectivity based on distribution	Reason
	Redshank, non-breeding	Y	Assumed present in all areas
	Ringed plover, non-breeding	Y	Assumed present in all areas
	Sandwich tern, passage	Y	Assumed present in all areas
	Scaup, non-breeding	Y	Assumed present in all areas
	Shelduck, non-breeding	Y	Assumed present in all areas
	Slavonian grebe, non-breeding	Y	Assumed present in all areas
	Turnstone, non-breeding	Y	Assumed present in all areas
	Velvet scoter, non-breeding	Y	Assumed present in all areas
	Waterfowl assemblage, non-breeding	Y	Assumed present in all areas
	Wigeon, non-breeding	Y	Assumed present in all areas
	Forth Islands SPA	Arctic tern, breeding	N
Common tern, breeding		Y	On Long Craig Island
Cormorant, breeding		Y	On Inchkeith
Fulmar, breeding		Y	On Inchkeith
Gannet, breeding		N	Only on Bass Rock
Guillemot, breeding		Y	On Inchkeith
Herring gull, breeding		Y	On Inchkeith
Kittiwake, breeding		Y	On Inchkeith
Lesser black-backed gull, breeding		Y	On Inchkeith
Puffin, breeding		Y	On Inchkeith
Razorbill, breeding		Y	On Inchkeith
Roseate tern, breeding		Y	On Long Craig Island

Name of site	Qualifying features	Connectivity based on distribution	Reason
	Sandwich tern, breeding	N	Only on Isle of May
	Seabird assemblage, breeding	Y	On Inchkeith
	Shag, breeding	Y	On Inchkeith
Imperial Dock Lock, Leith SPA	Common tern, breeding	Y	On Imperial Dock Lock
Outer Firth of Forth and St Andrews Bay Complex pSPA	Arctic tern, breeding	N	Only on Isle of May
	Black-headed gull, non-breeding	Y	Assumed present in all areas
	Common gull, non-breeding	Y	Assumed present in all areas
	Common scoter, non-breeding	Y	Present (in low densities) west of Edinburgh & Kirkcaldy
	Common tern, breeding	Y	Main concentrations west of Edinburgh & Kirkcaldy, and around the Isle of May
	Eider, non-breeding	Y	Present (in low densities) west of Edinburgh & Kirkcaldy
	Gannet, breeding	N	Only in and around the Bass Rock
	Goldeneye, non-breeding	Y	Present (in low densities) west of Edinburgh & Kirkcaldy
	Guillemot, breeding	Y	Assumed present in all areas
	Guillemot, non-breeding	Y	Main concentrations west of Edinburgh & Kirkcaldy, and around the Isle of May
	Herring gull, breeding	Y	Assumed present in all areas
	Herring gull, non-breeding	Y	Assumed present in all areas
	Kittiwake, breeding	Y	Assumed present in all areas
	Kittiwake, non-breeding	Y	Assumed present in all areas
	Little gull, non-breeding	Y	Present (in low densities) west of Edinburgh & Kirkcaldy
Long-tailed duck, non-breeding	Y	Present (in low densities) west of Edinburgh & Kirkcaldy	

Name of site	Qualifying features	Connectivity based on distribution	Reason
	Manx shearwater, non-breeding	N	Only present in offshore waters
	Puffin, breeding	N	Not present in inner Firth of Forth
	Razorbill, non-breeding	Y	Assumed present in all areas
	Red-breasted merganser, non-breeding	Y	Present (in low densities) west of Edinburgh & Kirkcaldy
	Red-throated diver, non-breeding	Y	Present (in low densities) west of Edinburgh & Kirkcaldy
	Seabird assemblage, breeding	Y	Assumed present in all areas
	Seabird assemblage, non-breeding	Y	Assumed present in all areas
	Shag, breeding	N	Main concentration around the Isle of May
	Shag, non-breeding	N	Main concentration around the Isle of May
	Slavonian grebe, non-breeding	N	Main concentrations in Largo Bay, Gosford Bay and off Musselburgh
	Velvet scoter, non-breeding	N	Only present in St Andrews Bay and Tay Bay
	Waterfowl assemblage, non-breeding	Y	Assumed present in all areas

- 21 For the Firth of Forth SPA, it was necessary to assume that all species could potentially occur in all parts of the SPA. This is unlikely to be true, but the combination of a lack of complete counts and the very mobile nature of the features meant this precautionary assumption had to be made. However, several of the qualifying features of the Forth Islands SPA did not occur within the area of connectivity of the new flight paths. These species breed only on the outer Firth of Forth Islands and the flight paths do not pass over these and aircraft will be above 10,000 feet at their closest point. It should be noted that two species are qualifying features of the Forth Islands SPA but no longer occur as breeding birds; Sandwich tern and roseate tern. Sandwich tern formally bred on the Isle of May, so there would be no connectivity with the proposed new flight routes even if they did occur. Roseate tern formally bred on Long Craig Island, so there would be potential connectivity to the proposed new flight paths, should the species return to Long Craig in the future.
- 22 The very large Outer Firth of Forth and St Andrews Bay Complex pSPA included several features that do not occur in the area of connectivity. These included several seabirds that only breed in the outer

Firth of Forth islands (Arctic tern, gannet, puffin and shag) or were designated on the basis of patterns of abundance in offshore waters. In addition, several waterfowl species also do not occur in the inner part of the Firth of Forth west of a line between Edinburgh and Kirkcaldy (Slavonian grebe and Velvet scoter).

3.2 Comparison with existing activity

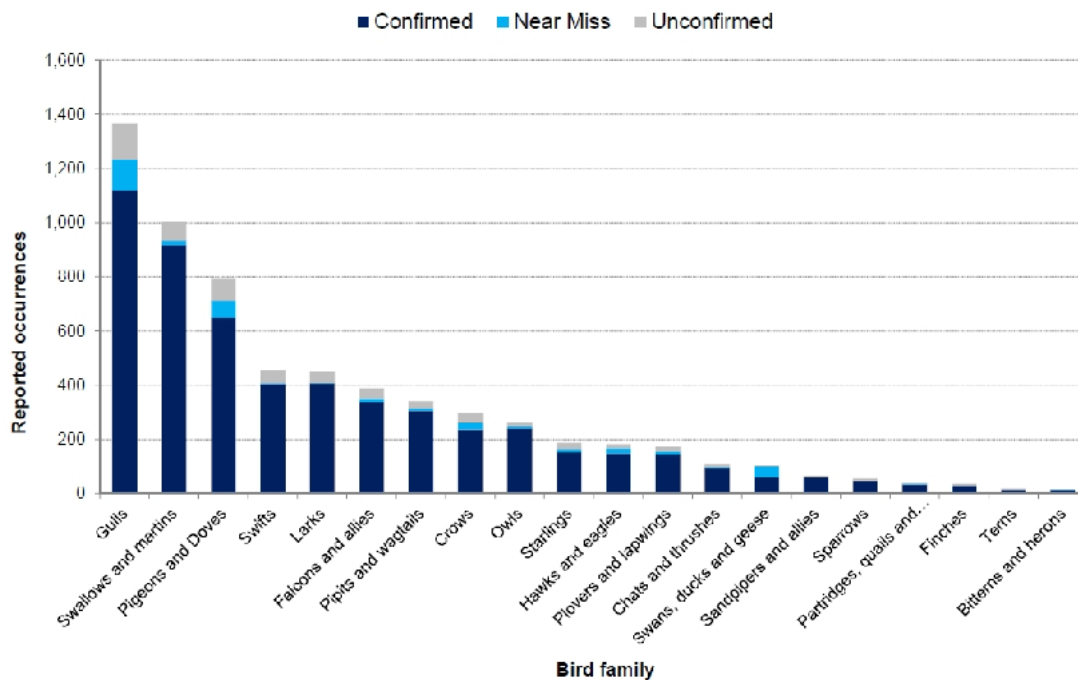
- 23 Before considering what represents a potential route to impact to the Natura 2000 sites identified as having connectivity it is important to determine what the change from the current flight paths will be. The existing flight paths are the “do nothing” scenario and are therefore not the subject of this screening. Since all aircraft must arrive and depart from Edinburgh Airport on one of two runways, changes to disturbance are only occurring where the new routes deviate from the current routes taken. These are necessarily the same when closer to the airport.
- 24 Considering each route in turn, the current flight paths (see figures 2, 3 & 4 of the Initial Consultation Book) were compared to the changes from a biological disturbance perspective.
- 25 Routes A and B were determined to have no connectivity with any Natura 2000 sites due to either flight routes or typical flight altitudes. Route C had connectivity with Firth of Forth SPA, since it crossed part of the SPA on the south side of the Forth Estuary (near Blackness). By the time aircraft reach the north side of the estuary their altitude is greater than 5,000 feet, so this assessment has found this not represent connectivity with the site. Route C, below 5,000 feet, is essentially the same as the current departure route “GRICE”. Most aircraft taking this departure route currently cross the SPA between Bo’ness and Queensferry at about 5,000 feet, so connectivity is only just achieved. Thus, Route C does not represent a change in the current pattern of use from the perspective of disturbance to the Firth of Forth SPA.
- 26 Route D also only has connectivity with the Firth of Forth SPA. While it also crossed the Forth Islands SPA and Outer Firth of Forth and St Andrews Bay Complex pSPA, aircraft would be above the 5,000 foot threshold used here. While Route D does represent a change to any current departure route, crossing the Firth of Forth SPA between Blackness and the Forth Bridge, from a biological disturbance perspective, it would be very similar to disturbance currently caused by departure route “GOSAM”. Thus, Route D does not represent a change in the current pattern of use from the perspective of disturbance to the Firth of Forth SPA.
- 27 Route E has connectivity with three of the Natura 2000 sites identified: Firth of Forth SPA, Forth Islands SPA and Outer Firth of Forth and St Andrews Bay Complex pSPA. However, below the connectivity threshold of 5,000 feet, it is only the area west of Crammond Island and east of the Forth Bridge that is of interest. This area is currently already used by departure routes “GOSAM” and “TALIA”. Thus, Route E does not represent a change in the current pattern of use from the perspective of disturbance to the Firth of Forth SPA, Forth Islands SPA and Outer Firth of Forth and St Andrews Bay Complex pSPA.
- 28 Route F has connectivity with the same three Nature 2000 sites as Route E: Firth of Forth SPA, Forth Islands SPA and Outer Firth of Forth and St Andrews Bay Complex pSPA. It also passes over the area between Crammond, the Forth Bridge and Aberdour which Route E passes over. This is also the area the departure routes “GOSAM” and “TALIA” cross at present. To a lesser extent, arrival route “TWEED” using runway 24 west also crosses this area. Thus, Route F does not represent a change in the current pattern of use from the perspective of disturbance to the Firth of Forth SPA, Forth Islands SPA and Outer Firth of Forth and St Andrews Bay Complex pSPA.

- 29 Route G also has similarities to Routes E and F, but the area of connectivity extends further east to Inchkeith. Both current departure route “TALIA” and arrival route “TWEED” for runway 24 west, also use this area. Thus, Route G does not represent a change in the current pattern of use from the perspective of disturbance to the Firth of Forth SPA, Forth Islands SPA and Outer Firth of Forth and St Andrews Bay Complex pSPA.
- 30 Finally, Route H also has connectivity with the same area of sea to the west of Inchkeith. In addition to connectivity to Firth of Forth SPA, Forth Islands SPA and Outer Firth of Forth and St Andrews Bay Complex pSPA, it also has connectivity to the Imperial Dock Lock, Leith SPA. This route is further south than the others in this area, following the coastline until heading south over Musselburgh. From a disturbance perspective, it is very similar to arrival route “TWEED” for runway 24 west. Route H does pass slightly closer to the Imperial Dock Lock, Leith SPA, though at a higher altitude. Most currently arriving aircraft will be below 4,000 feet and descending as they pass the Imperial Dock Lock, Leith SPA, while most aircraft using this proposed Route H will be about 5,000 feet and climbing at the same stage in their flight. Thus, the disturbance aspects of both appearance and noise will be similar to the current route used. Thus, Route H does not represent a change in the current pattern of use from the perspective of disturbance to the Firth of Forth SPA, Forth Islands SPA and Outer Firth of Forth and St Andrews Bay Complex pSPA.

3.3 Route to impact - bird strike

- 31 The assessment of connectivity with and disturbance from the proposed new flight paths has indicated either no connectivity or no change in disturbance to species protected by Natura 2000 sites. However, a further route to impact from aircraft is mortality to SPA protected birds from collisions. For this assessment, two aspects of bird strike are important. Firstly, the number of bird strikes that are likely to happen, and secondly whether the change in routes is likely to represent a change in mortality rates. Assessment of bird strikes by the CAA from 2012 to 2016 found that gulls were the most common species struck (CAA 2017), with other families potentially from SPAs in the area much less relatively abundant in bird strike data (i.e. plovers, and swans, ducks and geese) (

Figure 1 Relative abundance of bird strikes by family from 2012 to 2016 (from CAA 2017)



- 32 Data collected by Edinburgh Airport confirms this, but also highlights how rare this phenomenon is. In 2015 and 2016 one lesser black-backed gull, one black-headed gull and three herring gulls were known to have been struck by aircraft. These birds were from the whole population of birds in the area around the airport, not just birds from SPAs and not just birds from a single SPA. In comparison to the population sizes in the area generally and the local SPAs these collision risks are trivial and represent no LSE on any SPA.
- 33 It is also important to note that it is only the change in flight routes that are subject to a HRA. Flight routes are only changing well away from the airport. As the runways are not subject to change both the departure and final legs of all aircraft journeys will remain the same. A review of the height distribution of bird strikes from the USA found that the majority (74%) occurred below 500 feet and 93% were below 3,500 feet (Dolbeer 2006). Thus the proposed changes to flight routes are not likely to result in any changes to collisions from aircraft departing or arriving at Edinburgh Airport.

3.4 Route to impact - noise

- 34 Noise impacts on birds from aircraft has been studied many times in the past. The two important components that need to be considered are noise levels, and habituation. Burger (1981) studied nesting herring gulls (*Larus argentatus*) near John F. Kennedy International Airport, New York. The noise levels that were measured in relation to potentially disturbing effects were: ambient noise 77 dBA, subsonic jet aircraft 91.8 dBA, and supersonic aircraft (i.e. Concorde) 108.2 dBA. The author found that while gull did react significantly to noise from supersonic aircraft, they did not react significantly to subsonic aircraft.
- 35 Research on nesting crested terns (*Thalasseus bergii*) in Australia found ambient noise levels of 55 - 65 dBA, noise levels from calling birds was 60 - 75 dBA and aircraft noise was 65 - 95 dBA. This study found that birds did not significantly react until noise level were above 85 dBA.

- 36 It is therefore apparent that only changes at noise levels of around 80 to 100 dBA are likely to cause disturbance to birds. It is clear from the noise analysis carried out for the Edinburgh Airspace Change Programme that the *changes* in noise profiles over or near Natura sites (see Figures 4, 6, 10, 14, 19, and 23 of the CAA Noise assessment Technical Note (v.2)) are extremely small in area, and at much lower noise levels than those that are likely to cause disturbance to birds. It is important to note that while the areas where these small changes may occur are already highly disturbed by human activity, this likely means that most birds are already habituated to these disturbances. The likely sources of important disturbances to the qualifying features of the SPAs in the Firth of Forth are recreational human activity, which is known to have potentially important effects on some species, unlike aircraft disturbance, which is known to have little or no effect (Burger, 1986).

4 Conclusion

- 37 This screening assessment of no LSE found connectivity and a route to impact for three SPAs and one pSPA (Table 5). No assessment of trivial abundance of qualifying features could be made as there was no empirical data readily available to make such an assessment. For each SPA and the one pSPA it was possible to conclude no LSE as a result of the proposed Airspace Change Programme for Edinburgh Airport. This was due to the changes to flight paths being unimportant from a biological perspective at altitudes below 5,000 feet, when compared to the current, “do nothing”, scenario.

Table 5 Conclusions on the assessment of no LSE for sites with connectivity and a route to impact.

Name of site	No LSE?	Reasoning
Firth of Forth SPA	Y	No change in disturbance from current activity.
Forth Islands SPA	Y	No change in disturbance from current activity.
Imperial Dock Lock, Leith SPA	Y	No change in disturbance from current activity.
Outer Firth of Forth and St Andrews Bay Complex pSPA	Y	No change in disturbance from current activity.

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