



Wildlife hazard management in aerodromes

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Aerodromes inspector's classroom training and on-the-job training
together with review of handbooks and procedures - Bilateral Course

22 – 31 July Myanmar

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An Agency of the European Union The European Union flag icon is a small blue square containing twelve yellow stars arranged in a circle.

Wildlife hazard management in aerodromes

Index

1. Regulation Requirements
2. Recording and reporting of wildlife strikes and ob
3. Wildlife study in aerodromes
4. Wildlife risk assessment
5. Wildlife risk management program
6. Procedures for wildlife hazard management (E.17)
7. Training for wildlife control
8. AESA Actions



Wildlife hazard management in aerodromes

1. Regulation Requirements



COMMISSION REGULATION (EU)
N. 139/2014
of 12 February 2014
laying down requirements and
administrative procedures
related to aerodromes pursuant
to Regulation (EC) No 216/2008
of the European Parliament and
of the Council



Wildlife

Wildlife hazard management in aerodromes

1. Regulation Requirements

WILDLIFE



1. RECORDING AND REPORTING
2. COLLECTING INFORMATION
3. RISK ASSESSMENT
4. PROGRAMME
5. PROCEDURES
6. TRAINING
7. COMMITTEES

Wildlife hazard management in aerodromes

1. Regulation Requirements

Article 10

Requirements in
the regulation

Wildlife hazard management

1. Member States shall ensure that wildlife strike hazards are assessed through:
 - (a) the establishment of a national procedure for recording and reporting wildlife strikes to aircraft;
 - (b) the collection of information from aircraft operators, aerodrome personnel and other sources on the presence of wildlife constituting a potential hazard to aircraft operations; and
 - (c) an ongoing evaluation of the wildlife hazard by competent personnel.
2. Member States shall ensure that wildlife strike reports are collected and forwarded to ICAO for inclusion in the ICAO Bird Strike Information System (IBIS) database.

Wildlife hazard management in aerodromes

1. Regulation Requirements

ADR.OPS.B.020 Wildlife strike hazard reduction

The aerodrome operator shall:

- (a) assess the wildlife hazard on, and in the surrounding, of the aerodrome;
- (b) establish means and procedures to minimise the risk of collisions between wildlife and aircraft, at the aerodrome; and
- (c) notify the appropriate authority if a wildlife assessment indicates conditions in the surroundings of the aerodrome are conducive to a wildlife hazard problem.

AMC1 ADR.OPS.B.020 Wildlife strike hazard reduction

GENERAL

The aerodrome operator should:

- (a) participate in the national wildlife strike hazard reduction programme;
- (b) establish procedures to record and report to the appropriate authority wildlife strikes to aircraft occurred at the aerodrome, in close cooperation with organisations operating, or providing services at the aerodrome;
- (c) ensure that wildlife hazard assessments are made by competent personnel; and
- (d) establish, implement and maintain a wildlife risk management programme.

Wildlife hazard management in aerodromes

1. Regulation Requirements

SUBPART E — AERODROME MANUAL AND DOCUMENTATION (ADR.OR.E)

ADR.OR.E.005 Aerodrome manual

- (a) The aerodrome operator shall establish and maintain an aerodrome manual.
- (b) The content of the aerodrome manual shall reflect the certification basis and the requirements set out in this Part and Part-ADR.OPS, as applicable, and shall not contravene the terms of the certificate. The aerodrome manual shall contain or refer to all necessary information for the safe use, operation and maintenance of the aerodrome, its equipment, as well as its obstacle limitation and protection surfaces and other areas associated with the aerodrome.

AMC/GM TO ANNEX III – PART-ADR-OR

SUBPART E -AERODROME MANUAL

E. PART E — PARTICULARS OF OPERATING PROCEDURES OF THE AERODROME, ITS EQUIPMENT, AND SAFETY MEASURES

- 17. Procedures for wildlife hazard management, including assessing wildlife hazards and arrangements for implementation of the wildlife control programme, and promulgation of the relevant information to the AIS; wildlife strike form.

Wildlife hazard management in aerodromes

1. Regulation Requirements

ADR.OR.D.017 Training and proficiency check programmes

- (a) The aerodrome operator shall establish and implement a training programme for personnel involved in the operation, maintenance and management of the aerodrome.

GM3 ADR.OPS.B.020 Wildlife strike hazard reduction

TRAINING FOR WILDLIFE CONTROL

- (a) The aerodrome wildlife control personnel should receive formal training prior to their initial engagement as wildlife controllers.

Wildlife hazard management in aerodromes

1. Regulation Requirements

How can the aerodrome operator comply?

- Recording and reporting of wildlife strikes and observed
- Collecting information (Wildlife study in aerodromes)
- Wildlife risk assessment
- Wildlife risk management programme
- Procedures for wildlife hazard management (E.17)
- Training for wildlife control
- Local wildlife committees
- Participation in the National wildlife Committee/Forum

Wildlife hazard management in aerodromes

2. Recording and reporting of wildlife strikes and observed wildlife

The screenshot shows the official website of the Spanish Civil Aviation Security Agency (AES) at www.seguridadaerea.gob.es/lang_castellano/g_r_seguridad/notificacion_sucesos/default.aspx. The page is in Spanish and features the AESA logo and the Spanish flag. The top navigation bar includes links for 'Bienvenido' (Welcome), 'Contratación', 'Normativa', 'Contacto', 'Imprimir', 'Mapa', and the date '16/04/2017'. On the left, there's a sidebar with links for 'La Agencia', 'Aeronaves', 'Aeropuertos', 'Navegación aérea', and 'Gestión de riesgos para la seguridad', which includes sub-links for 'Programa Estatal de Seguridad Operacional (PESO)', 'Plan de Acción de Seguridad Operacional (PASO)', and 'Sistema de'. The main content area displays the 'Sistema de Notificación de Sucesos (SNS)' (Event Notification System) with a large graphic of an airplane. Below the graphic, text discusses the importance of early incident detection and the EU Regulation (UE) 376/2014. A sidebar on the right, titled 'Sede electrónica', lists 'PESO', 'PASO', 'SMS', and 'CEANITA'.



Wildlife hazard management in aerodromes

2. Recording and reporting of wildlife strikes and observed wildlife

AMC1 ADR.OR.D.030 Safety reporting system

SAFETY REPORTING SYSTEM

(b) Wildlife hazard reporting

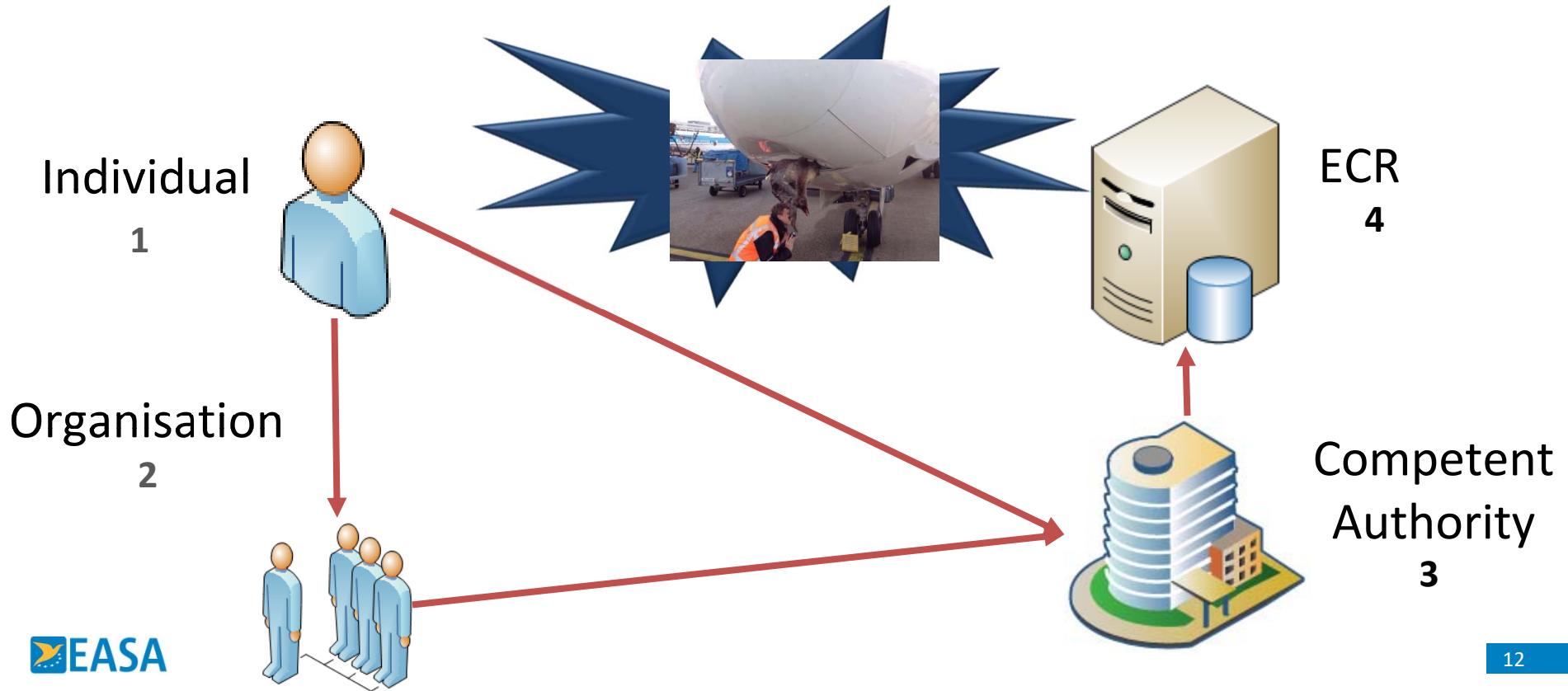
- (1) The aerodrome operator should ensure that its safety reporting system specifically addresses the requirement for all third parties (aircraft operators, aircraft mechanics, air traffic controllers, and other Air Traffic Services personnel, etc.) and all aerodrome personnel, to report to the aerodrome operator wildlife strikes, and relevant identified hazards.
- (2) The reporting of such third parties should be done irrespectively of any other requirements according to which they have to report to the Competent Authority of the aerodrome, or the state of registry of the aircraft involved, or any other Competent Authority in the context of the national occurrence reporting programme.



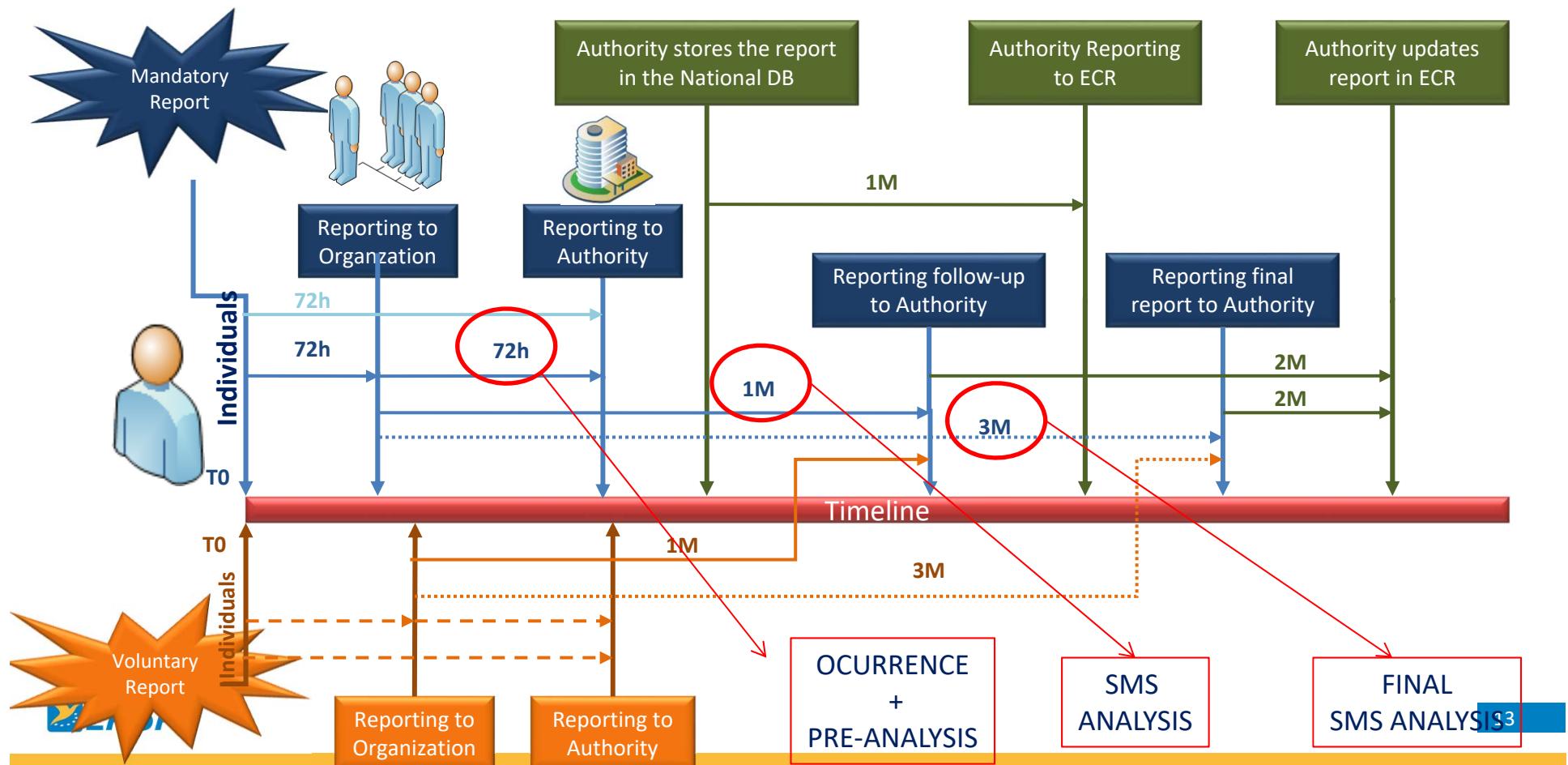
REGULATION (EU) No 376/2014 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 3 April 2014 on the reporting, analysis and follow-up of occurrences in civil aviation, amending Regulation (EU) No 996/2010 of the European Parliament and of the Council and repealing Directive 2003/42/EC of the European Parliament and of the Council and Commission Regulations (EC) No 1321/2007 and (EC) No 1330/2007

Wildlife hazard management in aerodromes

2. Recording and reporting of wildlife strikes and observed wildlife



2. Recording and reporting of wildlife strikes and observed wildlife



Wildlife hazard management in aerodromes

3. Collecting information: Wildlife studies in aerodromes



Wildlife hazard management in aerodromes

3. Wildlife studies in aerodromes

(a) The aerodrome operator should:

(1) conduct a risk assessment using strike data for each species, **as well as information on the presence of species, the number of individuals, and their biology**, and update this regularly;



Wildlife studies in aerodromes

Wildlife hazard management in aerodromes

3. Wildlife studies in aerodromes

Spanish background

- There has always been some kind of census or some regular monitoring in most of Spanish airports
 - ↳ Its methodology was not standardized and depended on the consultant or Wildlife Control Service who performed it
- Another information sources information about the airport wildlife are the fauna censuses from the Environmental Impact Studies of different projects related to the airports, as well as specific studies, etc.
- Year 1986 —> Aena 1st attempt of "wildlife study" with some scale and some standardization, for some Aena network airports

Wildlife hazard management in aerodromes

3. Wildlife studies in aerodromes

- Year 2004 —> 1st Spanish airports wildlife study (Aena network) on a large scale
 - Analysis of habitats inside and outside the airport
 - Bird Census by means of 1 interior transect and 1 exterior transect (and, in some cases, observation points)
 - Final complementary analysis of impacts and incidents
- Year 2008 —> Updating Spanish airports wildlife study (Aena network) on a large scale

Wildlife hazard management in aerodromes

3. Wildlife studies in aerodromes

Year 2014 → Development of the latest studies

GUIDANCE MATERIAL OF AESA TO HELP AIRPORTS TO COMPLY WITH REGULATIONS



GUIDE FOR THE MAKING OF STUDIES OF WILDLIFE AND THEIR HABITATS IN AIRPORT ENVIRONMENTS



Wildlife hazard management in aerodromes

3. Wildlife studies in aerodromes

- The guide on wildlife studies gives some basic indications on how wildlife studies should be carried out:
 - Ideally 2 years of field work
 - Renewal of studies every 5 years
 - Analysis of the internal and external **habitats** of the airport, up to 13 km
 - Analysis of the main **wildlife attraction points**
 - **Birds census** both inside and in the most risky areas outside the airport
 - Final selection of most **relevant attraction points and species to aeronautical operations, taking into account their possible interaction with aircraft**

Wildlife hazard management in aerodromes

3. Wildlife studies in aerodromes

Development of the
latest studies

~ 200 pages



Wildlife hazard management in aerodromes

3. Wildlife studies in aerodromes

Types of habitats inside

2004: 3 types



2014: 14 types

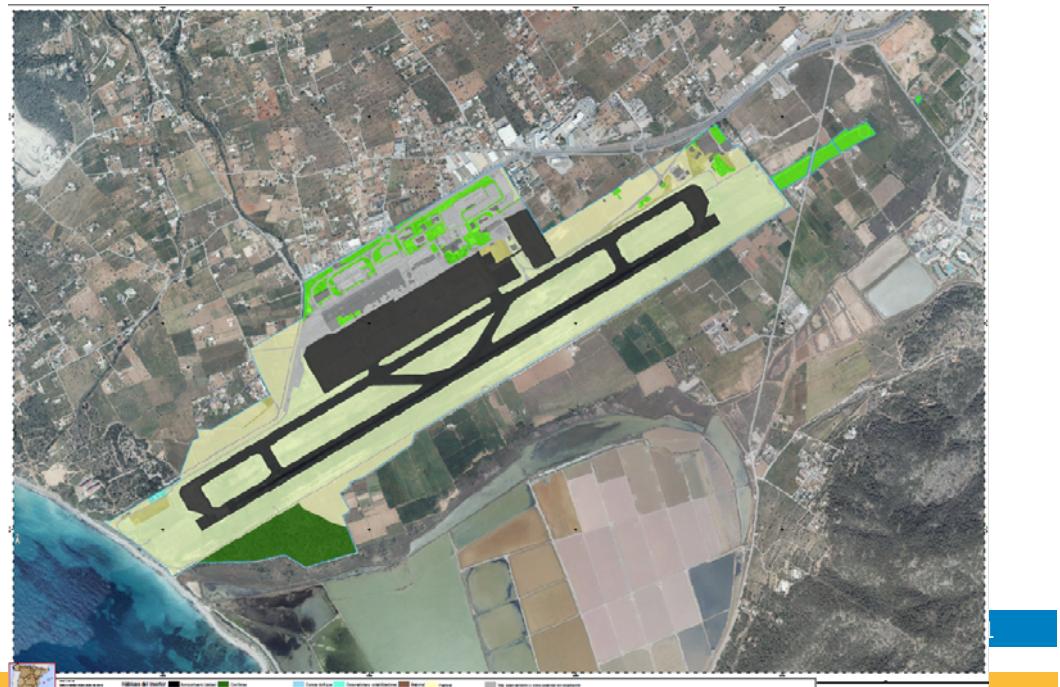


Figura 3: Reparto de los hábitats en el interior del aeropuerto (Estudio Prysma, 2009)

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3. Wildlife studies in aerodromes

Types of habitats outside (13 Km)



Wildlife hazard management in aerodromes

3. Wildlife studies in aerodromes

Analysis of the degree of attraction of each type of habitat for each relevant species

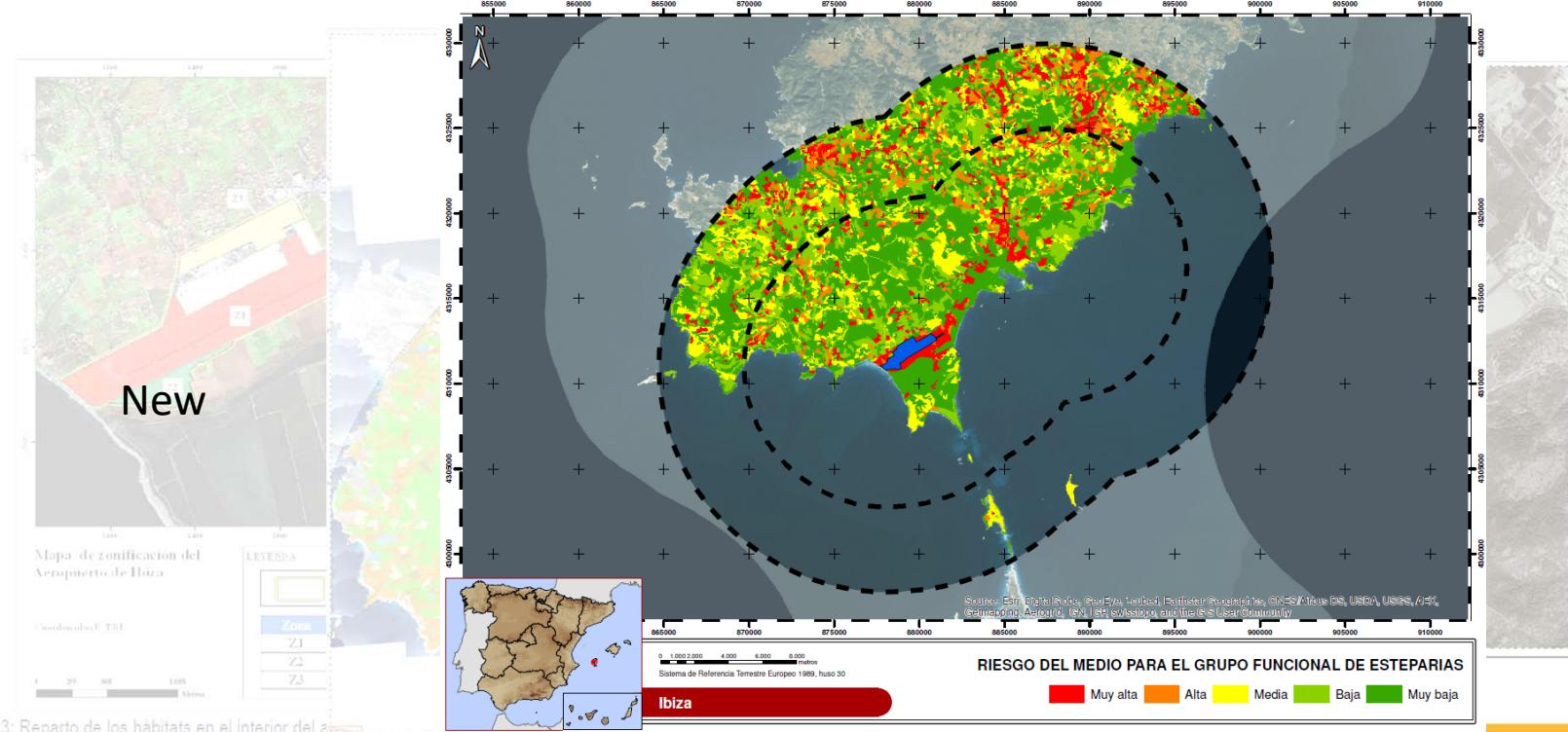


Figura 3: Reparto de los hábitats en el interior del área aerodromática.

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3. Wildlife studies in aerodromes

File per each habitat, describing the area occupied by the habitat



Wildlife hazard management in aerodromes

3. Wildlife studies in aerodromes

- An analysis of the **wildlife attraction points**, both inside and outside the airport, was carried out:
 - ▶ Different focuses categories were identified up to 13 km (and in specific cases, even beyond 13 km)
 - ▶ Finally, were selected those focuses considered to be a possible risk for aeronautical operations (including proximity or potential interactions with aircraft trajectories)
 - ▶ These focuses were described in the form of index cards that indicated the attraction factors, the attracted species, etc.

Wildlife hazard management in aerodromes

3. Wildlife studies in aerodromes

Preliminary analysis of the wildlife attraction points

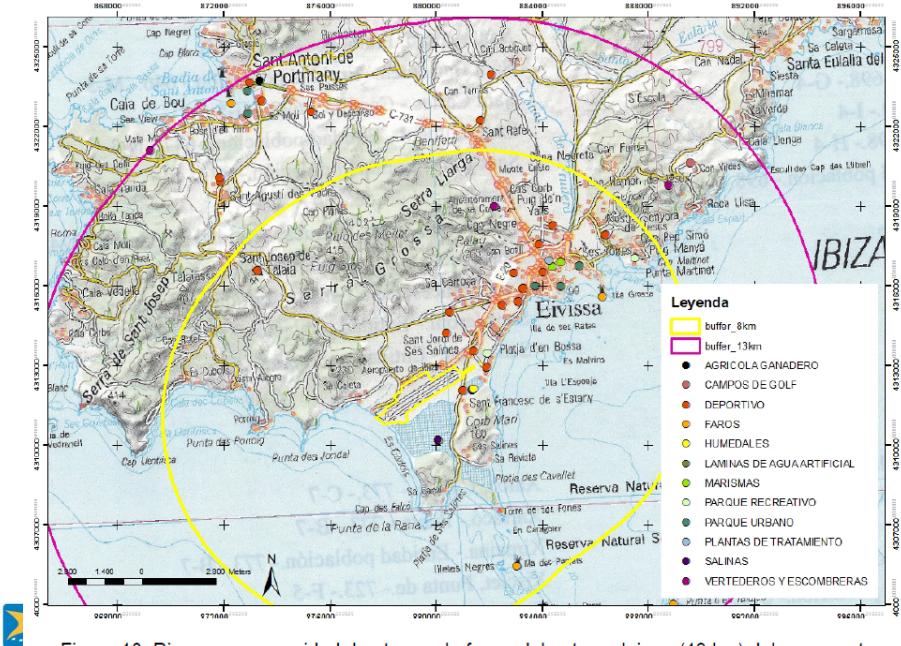


Figura 10: Riesgo por capacidad de atraer a la fauna del entorno lejano (13 km) del aeropuerto

Final selection of most important attraction points



Figura 12: trayectorias ILS-Z y focos

Wildlife hazard management in aerodromes

3. Wildlife studies in aerodromes

File for each wildlife attraction point

4.1.6. Parque Natural de Ses Salines d'Eivissa i Formentera

Foco de atracción	Parque Natural de Ses Salines	Localización	Extensión aproximada de 2800 ha
Naturaleza espacial	Areal	Dimensión	No determinada
Descripción			
Este parque natural, principal espacio natural continental de la isla y principal humedal de la misma, limita con el mar en su vertiente oeste, con el aeropuerto en el norte, y con la carretera que comunica Sant Jordi con el Cap de Ses Salines al este. Está formado por un conjunto de parcelas de salinas inundadas con sus respectivas acequias que evacuan el agua sobrante o comunican piscinas. El espacio tiene un alto valor ornitológico, al ser uno de los puntos de escala y descanso más importantes en la isla para las aves acuáticas.			
Localización			
Especies características del foco			
Especie	Motivo de presencia	Factores	
Flamenco	Cría, refugio, alimentación	Se alimenta en las grandes parcelas salinas inundadas, más abundante en otoño.	
Garceta			
Comorán grande	Alimentación, refugio	Especie acuática, se alimenta en este espacio natural en invierno	
Aguilucho lagunero	Alimentación, refugio	Especie ligada a humedales, más abundante en otoño-invierno	
Archibebe común	Cría, refugio, alimentación	Especie limícola acuática. Se refugia y cría en el espacio natural, junto a las formaciones de salicornia	



Figura 12: trayectorias ILS-Z y focos

Wildlife hazard management in aerodromes

3. Wildlife studies in aerodromes

- A wildlife census was carried out, both inside and outside the airport:
 - ▶ 9 or 12 visits per year (depending on airport size, number of operations, etc.)
 - ▶ Mostly morning census
 - ▶ Data on bird abundances as well as bird behavior (type of flight, etc.)
 - ▶ Linear transects from the 2004 study, sometimes updated
- ▶ There is the **exception** of some airports such as Barcelona-El Prat (and some private operators like Airports of Catalunya), which carry out annual censuses through observation and listening points for several years

Wildlife hazard management in aerodromes

3. Wildlife studies in aerodromes

Census by Linear transects

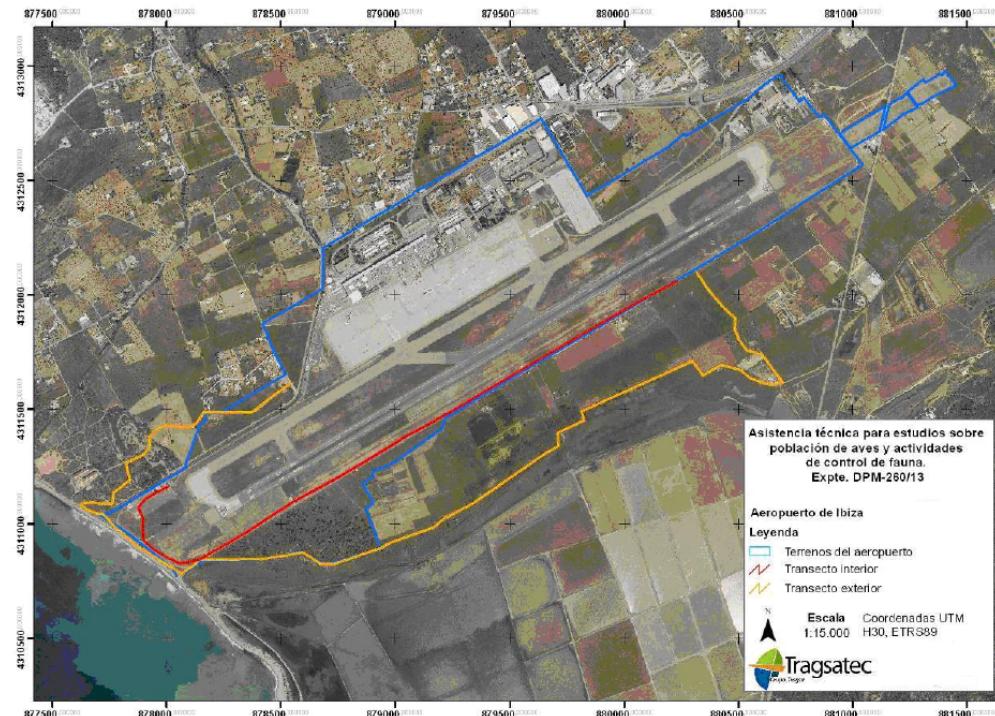
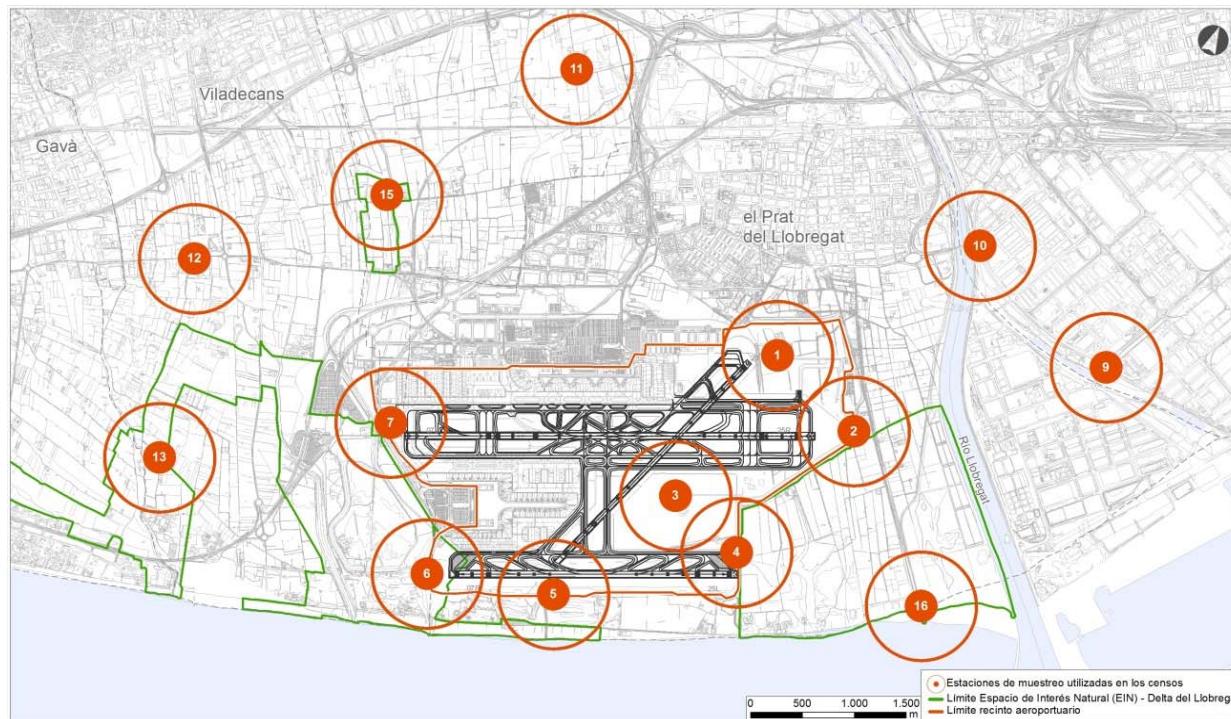


Figura 22: Recorrido del transecto interior (color rojo).

Wildlife hazard management in aerodromes

3. Wildlife studies in aerodromes

Census by Points of observation



Wildlife hazard management in aerodromes

3. Wildlife studies in aerodromes

- Different aspects were analyzed:
 - Species richness;
 - Individuals abundance;
 - Prevailing birds flight patterns, and their variations over the months.
- The analysis selected "relevant species" for the airport, describing them with specific files.
- These results were compared with information from the Wildlife Control Services, in addition to obtaining updated information on the airport environment at the Expert Sessions associated with Wildlife Risk Assessment.
- An analysis about the interaction between the bird flight flows and the trajectories of the airplanes was made to detect areas with greater hazard in the airport and its surroundings.

Wildlife hazard management in aerodromes

3. Wildlife studies in aerodromes

Table with the different species censed, their estimated weight and its abundance both inside and outside the airport.

3.2. *Inventario de especies y poblaciones*

Abundancias de aves

3.2.1.1. *Especies presentes*

Durante los trabajos realizados se han encontrado 8325 ejemplares de 98 especies de aves distintas, lo que constituye más del 25% de las aves reproductoras de España. Las más abundantes han sido los flamencos (1.979 ejemplares detectados en el transecto exterior), jilgueros (877 ejemplares), pardillos (546 ejemplares), gorriones comunes (312 ejemplares), el bisbita común (341 ejemplares), y la alondra común (295 ejemplares).

Tabla: Especies detectadas en el aeropuerto y nº total de observaciones, años 2014-15

Grupo	Especie	Nombre Común	PesoGr	Interior	Exterior	Total
Acuáticas	<i>Fulica atra</i>	Focha común	1200	0	1	1
Acuáticas	<i>Podiceps nigricollis</i>	Zampullín Cuellinegro	400	0	11	11
Esteparias	<i>Alectoris barbara</i>	Perdiz Moruna	400	2	0	2
Esteparias	<i>Alectoris rufa</i>	Perdiz Roja	500	30	3	33
Esteparias	<i>Burhinus oedicnemus</i>	Alcaraván común	400	1	0	1
Esteparias	<i>Vanellus vanellus</i>	Avefría Europea	200	1	0	1
Estorninos	<i>Sturnus unicolor</i>	Estornino Negro	80	211	32	243
Garzas	<i>Egretta garzetta</i>	Garceta común	600	0	13	13
Garzas sociales	<i>Phoenicopterus roseus</i>	Flamenco común	4000	0	1979	1979
Gaviotas	<i>Chroicocephalus ridibundus</i>	Gaviota reidora	340	0	84	84
Gaviotas	<i>Larus audouinii</i>	Gaviota de Audouin	700	12	2	14
Gaviotas	<i>Larus fuscus</i>	Gaviota Sombría	1200	4	11	15
Gaviotas	<i>Larus genei</i>	Gaviota Picoflina	140	0	1	1
Gaviotas	<i>Sterna albifrons</i>	Charrancito común	45	0	3	3
Gaviotas	<i>Sterna sandvicensis</i>	Charrán patinegro	250	0	22	22
Golondrinas	<i>Apus apus</i>	Vencejo común	45	108	153	261
Golondrinas	<i>Apus pallidus</i>	Vencejo pálido	45	1	0	1
Golondrinas	<i>Delichon urbicum</i>	Avión común	25	2	11	13
Golondrinas	<i>Hirundo rustica</i>	Golondrina común	20	74	78	152
Grandes acuáticas	<i>Anas platyrhynchos</i>	Anade Azulón	1600	15	128	143
Grandes acuáticas	<i>Tadorna tadorna</i>	Tarro Blanco	1500	0	179	179
Grandes garzas	<i>Ardea cinerea</i>	Garza Real	2000	24	26	50
Grandes garzas	<i>Egretta alba</i>	Garceta Grande	2000	0	4	4
Grandes gaviotas	<i>Larus michahellis</i>	Gaviota patiamarilla	1500	28	172	200

Wildlife hazard management in aerodromes

3. Wildlife studies in aerodromes

Comparative analysis of species richness and abundance of individuals



3.2. Inventario de especies y /

Abundancias de aves

3.2.1.1. Especies presentes

Durante los trabajos realizados se han encor constituye más del 25% de las aves reprodu (1.979 ejemplares detectados en el transecto gorriones comunes (312 ejemplares), el bisbita

Tabla: Especies detectadas en

Grupo	Espécie
Acuáticas	<i>Fulica atra</i>
Acuáticas	<i>Podiceps nigricollis</i>
Esteparias	<i>Alectoris barbata</i>
Esteparias	<i>Alectoris rufa</i>
Esteparias	<i>Burhinus oedicnemus</i>
Esteparias	<i>Vanellus vanellus</i>
Estomínomos	<i>Sturnus unicolor</i>
Garzas	<i>Egretta garzetta</i>
Garzas sociales	<i>Phoenicopterus roseus</i>
Garzas sociales	<i>Chroicocephalus ridibundus</i>
Gaviotas	<i>Larus argentatus</i>
Gaviotas	<i>Larus fuscus</i>
Gaviotas	<i>Larus genei</i>
Gaviotas	<i>Sterna albifrons</i>
Gaviotas	<i>Sterna sandvicensis</i>
Golondrinas	<i>Apus apus</i>
Golondrinas	<i>Apus pallidus</i>
Golondrinas	<i>Delichon urbicum</i>
Golondrinas	<i>Hirundo rustica</i>
Grandes acuáticas	<i>Anas platyrhynchos</i>
Grandes acuáticas	<i>Tadorna tadorna</i>
Grandes garzas	<i>Ardea cinerea</i>
Grandes garzas	<i>Egretta alba</i>
Grandes gaviotas	<i>Larus michaellii</i>

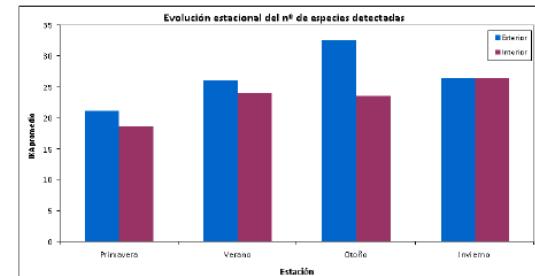


Figura 15: Evolución estacional del número de especies detectadas en el interior y en el exterior del aeropuerto

3.2.1.3. Dinámica general de la población de aves: abundancia

En el interior del aeropuerto se observan los máximos de abundancia de aves observadas durante la primera fase del invierno, en buena parte condicionado por la llegada de gran cantidad de alondras comunes y bimbitas comunes, así como por la concentración de bandos de jilgueros y pardillos en los herbazales. Se observa también algún repunte de abundancia en primavera, motivado por el paso prenupcial de numerosas aves migratorias.

Respecto al exterior, los máximos de abundancia se sitúan a finales de verano y principios de otoño, con el paso postnupcial, sumado a la llegada de invernantes. Cabe destacar que los máximos observados en cuanto al número de flamencos entre julio y octubre pueden haber incrementado los valores de IKA de manera sustancial.

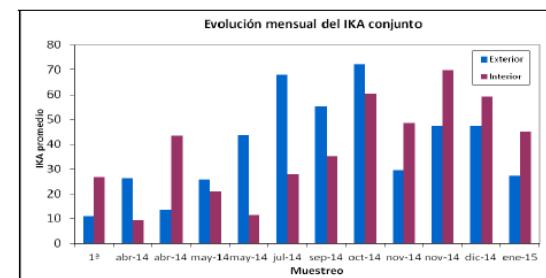


Figura 16: Evolución mensual del IKI conjunto de las especies observadas en los transectos

Wildlife hazard management in aerodromes

3. Wildlife studies in aerodromes

Final selection of the most relevant species for the operation of the airport



4.2. Identificación y descripción de las especies más relevantes por su potencial afección a la operación aeronáutica

Las especies detectadas y consideradas como más relevantes a partir de los análisis de riesgo previo (información procedente del estudio técnico de riesgos, a partir de la consideración conjunta de masa, tamaño de banda y abundancia; de forma que cada especie aporta al menos el 5% del total del riesgo previo del aeropuerto) son las siguientes (de forma ordenada y por consideración del riesgo aportado).

Especie	Nombre vulgar	Grupo funcional	% del riesgo del GF	% del riesgo del aeropuerto
<i>Larus michahellis</i>	Gaviota patiamarilla	Grandes gaviotas	95%	22%
<i>Columba palumbus</i>	Paloma torcaz	Palomas	51%	13%
<i>Ardea cinerea</i>	Garza real	Grandes garzas	100%	13%
<i>Columba livia</i>	Paloma bravía	Palomas	47%	12%
<i>Anas platyrhynchos</i>	Anáde real	Grandes acuáticas	70%	10%
<i>Sturnus unicolor</i>	Estornino común	Estorninos	100%	7%
<i>Tadorna tadorna</i>	Tarro blanco	Grandes acuáticas	30%	4%
<i>Apus apus</i>	Vencejo común	Golondrinas	92%	2%
<i>Falco tinnunculus</i>	Cernícalo vulgar	Pequeñas rapaces	65%	2%
<i>Passer domesticus</i>	Gorrón común	Paseriformes	20%	2%

En total estas 10 especies acumulan el 86% del riesgo potencial del aeropuerto.

La descripción resumida de las especies con más de un 5% del riesgo previo del aeropuerto es la siguiente:

Espezie	Abundancia int/ext	Hàbitat	Zona potencial peligro	Empleo
<i>Gaviota patiamanilla / Larus michahellis</i>	Màximo de 13,6 ex/km (ext) Màximo de 0,3 ex/km (int)	Humedales, costa, islotes, edificios, herbazales	Pastos internos manejados Playas Campos de Golf del entorno Parque natural de Ses Salines Puerto de Ibiza Illetes de Porroig Hotel Ushuaia Vertedero de Ca Na Putxa Cap des Falco	Alimentació Alimentació Alimentació Reposo
<i>Paloma torcaz / Columba palumbus</i>	Màximo de 1,6 ex/km (ext) Màximo de 7,6 ex/km (int)	Herbazales, pinares	Pinars Pastos internos gestionados Cultivos herbáceos	Reproducció Alimentació Alimentació
<i>Garza real / Ardea cinerea</i>	Màximo de 5,6 ex/km (ext) Màximo de 5,6 ex/km (int)	Acuàtica, herbazales y humedales	Pastos internos gestionados Playas Parque Natural de Ses Salines	Alimentació Alimentació Reproducció

Wildlife hazard management in aerodromes

3. Wildlife studies in aerodromes

File for each relevant species

4.2.1. Gaviota patiamarilla (*Larus michahellis*)

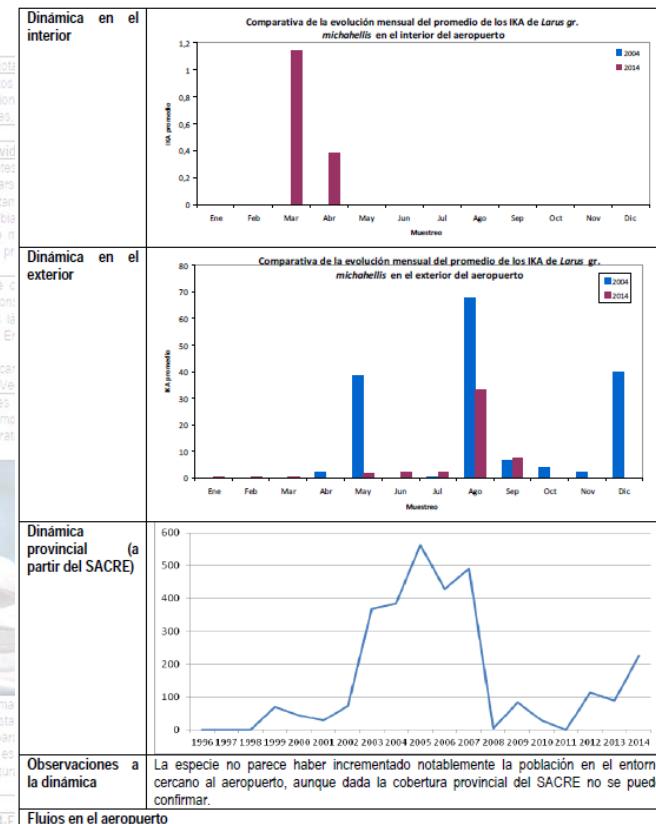
Especie	<i>Larus michahellis</i>	Nombre vulgar	Gaviota patiamarilla
Estacionalidad	Permanente	Habitat preferentes	Pastos internos gestionados, playas, islotes, humedales
Estatus	No protegida	Cinegética?	Si
Peso	1,5 kg	Bandada	Dispersa
Descripción	La gaviota patiamarilla es una de las aves marinas más abundantes de la cuenca del Mediterráneo, debido a su enorme adaptabilidad tanto para alimentarse como para elegir hábitat. Las gaviotas patiamarillas son de las gaviotas de mayor tamaño, con un peso generalmente superior a 1 kg. Se trata de un ave longeva, que cambia de plumaje con la edad. En toda su área de distribución muestra un comportamiento más sedentario que dispersivo, permaneciendo en la mayoría de las regiones que habita, próxima durante todo el año a sus colonias de cría.		
Ecología	Las gaviotas patiamarillas son especialmente generalistas, aunque con dos exigencias claras: sienten una importante predilección por los vertederos, que constituyen una de sus principales zonas de alimentación, incluso en zonas costeras y las láminas de agua de cierta entidad (lagos, embalses, ríos, marismas...) donde descansan. Entre ambos medios, no necesariamente próximos, establecen importantes flujos. En la isla de Ibiza existen algunas colonias que se sitúan en acantilados costeros y especialmente en islotes, como por ejemplo les Illetes de Porroig, Es-Vedrà y Es Vedranell.		
Posibles confusiones	Gaviota argéntea (<i>L. argentatus</i>) y <i>L. cachinnans</i> . <i>L. argentatus</i> es especie invernante fundamentalmente en la costa atlántica. Genéticamente muy emparentadas, ambas especies forman un grupo complejo, que en el presente trabajo se tratará como <i>Larus gr. michahellis</i> , incluyendo las observaciones de ambas especies.		
Aspecto			
Comportamiento en el aeropuerto	En el caso concreto del aeropuerto la presencia de gaviota patiamarilla se debe a los desplazamientos de éstas entre sus lugares de descanso en la costa (islotes y edificios costeros) hacia las zonas de alimentación (vertederos interiores y parque natural de Ses Salines). El flujo registrado en el presente estudio para las gaviotas es fundamentalmente el que recorre la costa, y algunos ejemplares que van del parque natural hacia el interior o viceversa.		
Abundancias máximas (ejemplares/km)			
2014-Int	0,3	2004-Int	12,3
2014-Ext	13,6	2004-Ext	35,5

Wildlife hazard management in aerodromes

3. Wildlife studies in aerodromes

4.2.1. Gaviota patiamarilla (*Larus michahellis*)

Especie	<i>Larus michahellis</i>	Nombre vulgar	Gaviota patiamarilla					
Estacionalidad	Permanente	Habitat preferentes	Pastos, gestión isletas.					
Estatus	No protegida	Cinegetica?	Sí					
Peso	1.5 kg	Bandada	Dispersa					
Descripción	La gaviota patiamarilla es una de las aves marinas más abundantes del Mediterráneo, debido a su enorme adaptabilidad tanto para alimentarse como para reproducirse. Las gaviotas patiamarillas son de las gaviotas de mayor tamaño, generalmente superior a 1 kg. Se trata de un ave longeva, que cambia de hábitat. En toda su área de distribución muestra un comportamiento más dispersivo, permaneciendo en la mayoría de las regiones que habita, principalmente a sus colonias de cría.							
Ecología	Las gaviotas patiamarillas son especialmente generalistas, aunque comen lo que encuentran. Suelen tener una importante predilección por los vertebrados, que constituyen las principales zonas de alimentación, incluso en zonas costeras y las más lejanas. La gaviota patiamarilla (<i>Larus michahellis</i>) es una especie que se encuentra en el continente europeo, África, Asia y Australia. Genéticamente muy similar a la gaviota ibérica (<i>Larus argentatus</i>), que en el presente trabajo se trató como una especie separada, incluyendo las observaciones de ambas especies.							
Aspecto								
Comportamiento en el aeropuerto	En el caso concreto del aeropuerto, la presencia de gaviota patiamarilla implica desplazamientos de éstas entre sus lugares de descanso en la costa costera) hacia las zonas de alimentación (vertebrados, interiores y parques naturales). El flujo registrado en el presente estudio para las gaviotas es el que recorre la costa, y algunos ejemplares que van desde el interior al exterior.							
Abundancias máximas (ejemplares/km)	2014-Int	0.3	2004-Int	12.3	2014-Ext	13.6	2004-E	



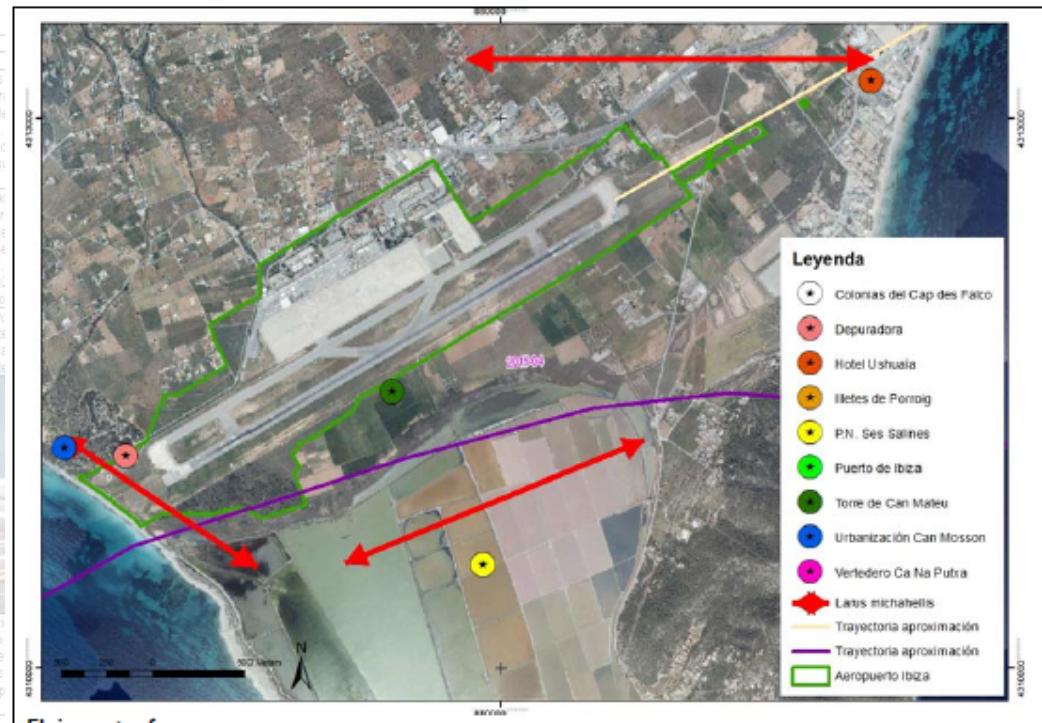
Wildlife hazard management in aerodromes

3. Wildlife studies in aerodromes

4.2.1. Gaviota patiamarilla (*Larus michahellis*)

Especie	<i>Larus michahellis</i>	Nombre vulgar	Gaviota patiamarilla			
Estacionalidad	Permanente	Habitat preferentes	Pastos internos			
Estatus	No protegida	Cinegetica?				
Peso	1.5 kg	Bandaña	Dispersa			
Descripción	La gaviota patiamarilla es una de las aves marinas más comunes del Mediterráneo, debido a su enorme adaptabilidad tanto para la nidificación como para la migración. Las gaviotas patiamarillas son de las gaviotas de mayor tamaño, con un peso generalmente superior a 1 kg. Se trata de un ave longeva, que vuela en parejas o en grupos pequeños. Su área de distribución muestra un comportamiento migratorio complejo, volando en la mayoría de las regiones que se extienden desde el norte de África hasta el sur de Europa.					
Ecología	Las gaviotas patiamarillas tienen una alimentación especialmente generalista, que incluye una gran variedad de presas, desde insectos y crustáceos hasta peces y moluscos. Durante la migración, incluso en zonas costeras apartadas (lagos, embalses, ríos, marismas, etc.) donde no suele haber actividad humana, establecen importantes grupos de cría. En algunas zonas existen algunas colonias que se sitúan especialmente en islotes, como por ejemplo les Illes de Ponent en Menorca.					
Peculiares	Gaviota patiamarilla / Larus michahellis. Cachimbar L. argenteus. Especie que se encuentra en el Mediterráneo y el Atlántico. Genéticamente las dos especies forman un grupo complejo, que en el presente trabajo se considera como una sola especie: <i>Larus michahellis</i> , incluyendo las observaciones de ambas especies.					
Comportamiento en el aeropuerto	En el caso concreto del aeropuerto la presencia de gaviotas es muy frecuente, realizando desplazamientos de éstas entre sus lugares de descanso (costeros) hacia las zonas de alimentación (vertebrados interiores). El flujo registrado en el presente estudio para las gaviotas patiamarillas es que éstas realizan desplazamientos entre el interior y la costa, y algunos ejemplares que van de un lado a otro.					
Abundancias máximas (ejemplares/km)	2014-Int	0.3	2004-Int	12.3	2014-Ext	13.6

And an analysis of the movements of that species with respect to the aerodrome, between external wildlife attraction points, etc.

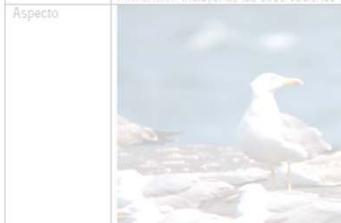


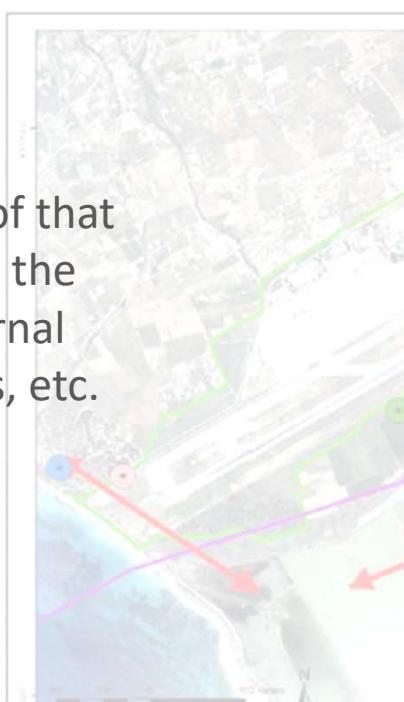
Flujos entre focos

Wildlife hazard management in aerodromes

3. Wildlife studies in aerodromes

4.2.1. Gaviota patiamarilla (*Larus michahellis*)

Especie	<i>Larus michahellis</i>	Nombre vi			
Estacionalidad	Permanente	Habitat pri			
Estatus	No protegida	Cinegeti			
Peso	1.5 kg	Bandada			
Descripción	La gaviota patiamarilla es una de las aves Mediterráneo, debido a su envergadura adaptab	Dispersa			
Ecología	Las gaviotas patiamarillas con especies bien claras sienten una importante predilección p	Vuelo			
Posibles confusiones	Las gaviotas patiamarillas se confunden fundamentalmente en la costa atlántica. Especies forman un grupo complejo que en				
Aspecto					
Comportamiento en el aeropuerto	En el caso concreto del aeropuerto la presencia desplazamientos de éstas entre sus lugares costeros, hacia las zonas de alimentación (Ses Salines). El flujo registrado en el presente es el que recorre la costa, y algunos ejemplares viceversa.				
Abundancias máximas (ejemplares/km)					
2014-Int	0.3	2004-Int	12.3	2014-Ext	13.6



Flujos entre focos

la dinámica	cercano al aeropuerto, aunc confirmar.
	Flujos en el aeropuerto



Observaciones a los flujos

Los flujos preferentes son a lo ancho de Ses Salines y por la costa en la zona de la cabecera 06. También hay flujos este oeste al norte del aeropuerto y en primavera. Este último flujo tiene que ver con el movimiento a las colonias de cría en los islotes del oeste de Ibiza. Respecto a los flujos inter-foco corresponden a desplazamiento costeros, así como desplazamientos hacia el vertedero Can na Putxa. No se dispone de la información necesaria para discriminar patrones a lo largo del día. Respecto al patrón anual el máximo de ejemplares observados en el interior del recinto se produjo entre los meses de mayo y abril, no detectándose ejemplares el resto del año.

Localización en el aeropuerto

Emplea el interior del aeropuerto como zona de paso y en algunas ocasiones en otoño entra a los herbazales a comer caracoles e insectos (Servicio Contreel de Fauna com. pers.).

Focos de atracción

Foco	Motivo	Foco	Motivo
Vertedero de Ca Na Putxa	Alimentación	Cap des Falco	Alimentación y reposo
Puerto de Ibiza	Alimentación	Illetes de Porroig	Alimentación y reposo
Parque natural de Ses Salines	Reposo y alimentación	Balsa de drenaje	Alimentación y reposo

Potenciales incidencias con la operación

No se ha constatado que estos flujos sean muy masivos, por lo que no es probable una incidencia en la operación, si bien la peligrosidad de la especie aconseja observar estos flujos en las dos cabeceras.

Wildlife hazard management in aerodromes

3. Wildlife studies in aerodromes

- Finally, all the previous information is summarized in conclusions, anticipating possible measures for the control of the risk produced by these selected focuses and species, although the final measures will derive from the results of the Wildlife Risk Assessment

EXAMPLE

Wildlife hazard management in aerodromes

4. Wildlife risk assessment



Wildlife hazard management in aerodromes

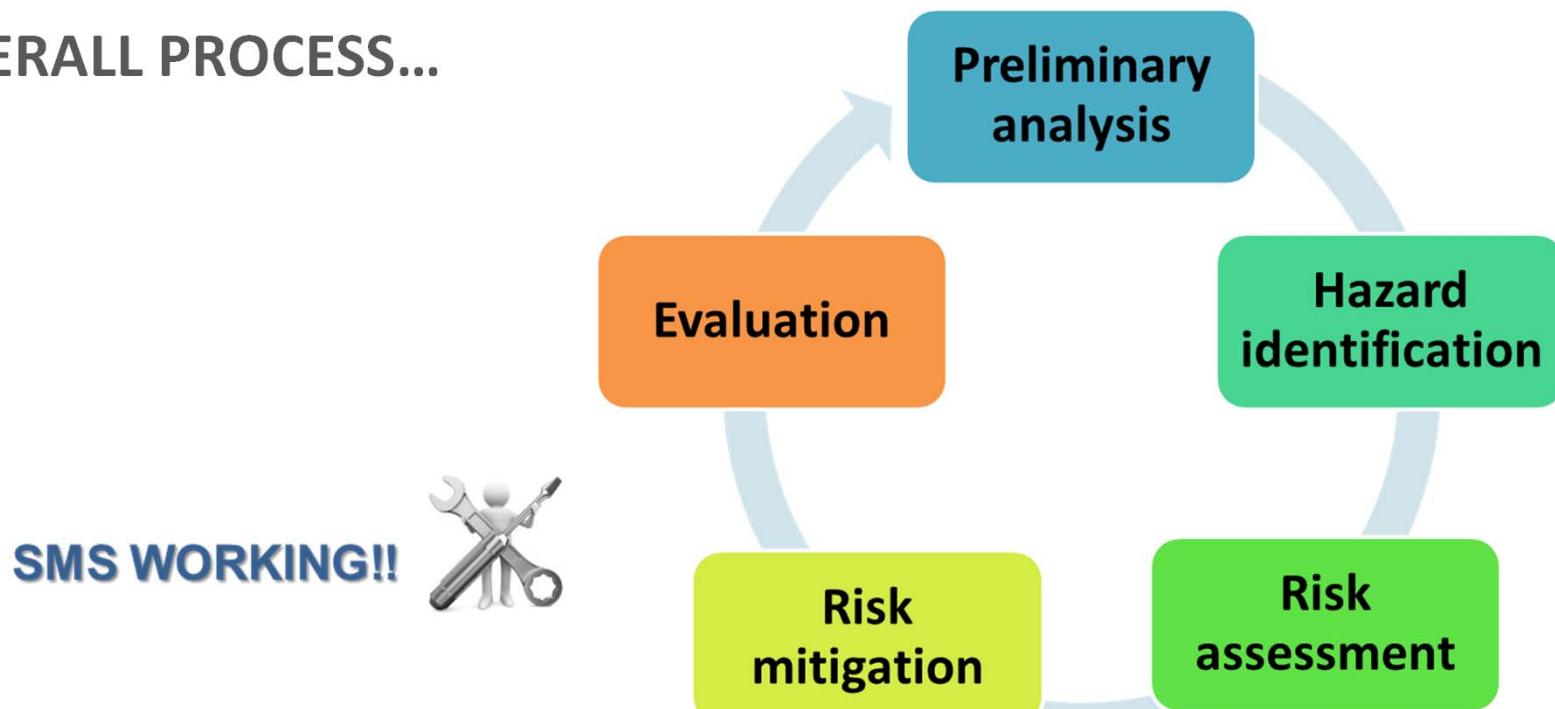
4. Wildlife risk assessment



Wildlife hazard management in aerodromes

4. Wildlife risk assessment

OVERALL PROCESS...



Wildlife hazard management in aerodromes

4. Wildlife risk assessment

STEP BY STEP...

Preliminary analysis

- Why? To connect aeronautical operation & information of wildlife
- What do we use? Our tools...
 - ✓ **Wildlife study in aerodromes:** list of species, migrations, behaviour, wildlife geographical distribution, airport surroundings, wildlife “hot spots”
 - ✓ **Aerodrome details:** airside details, meteo, operational info, flights distribution, environment regulation

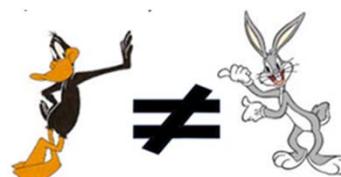
Wildlife hazard management in aerodromes

4. Wildlife risk assessment

STEP BY STEP...

Hazard identification

- Why? To make a full identification of hazards
- Input: preliminary analysis but also...
 - ✓ Bird strike information: occurrence reporting systems, pilot reports, airport wildlife services
 - ✓ Additional tools: hypothesis, risk factors, defenses... to simplify our analysis
- Both birds and mammals are different threats



Wildlife hazard management in aerodromes

4. Wildlife risk assessment

STEP BY STEP...

Risk assessment

- Why? Identify higher and specific risks, caused by specific species of birds affecting specific runways
- Potential risks...what do we need?



Wildlife hazard management in aerodromes

4. Wildlife risk assessment

STEP BY STEP...

Risk assessment

- ✓ **Probability**
 - Individual analysis: species or similar birds
 - Confirmed strikes but also bird observations. Last 5 years
- ✓ **Severity (Consequences)** (of bird strikes, different bird species)
 - Factors: bird weight, flocks
 - Different species, different consequences
 - ie: bird strike, big raptors

$$\text{Probability} = \frac{n \text{ bird strikes}}{n \text{ ops}} + \text{observation of birds}$$

Consequences	%
Catastrophic	0,50
Dangerous	10
Major	19
Minor	23
No effects	47

Source: FAA data base

Wildlife hazard management in aerodromes

4. Wildlife risk assessment

STEP BY STEP...

Risk
assessment

	CATASTRÓFICO	PELIGROSO	MAYOR	MENOR	SIN EFECTO
FRECUENTE					
RAZONABLEMENTE PROBABLE	RIESGO ALTO	RIESGO ALTO	RIESGO ALTO	RIESGO MEDIO	RIESGO BAJO
REMOTO				RIESGO MEDIO	RIESGO BAJO
EXTREMADAMENTE REMOTO		RIESGO MEDIO		RIESGO BAJO	RIESGO BAJO
EXTREMADAMENTE IMPROBABLE	RIESGO MEDIO	RIESGO BAJO			

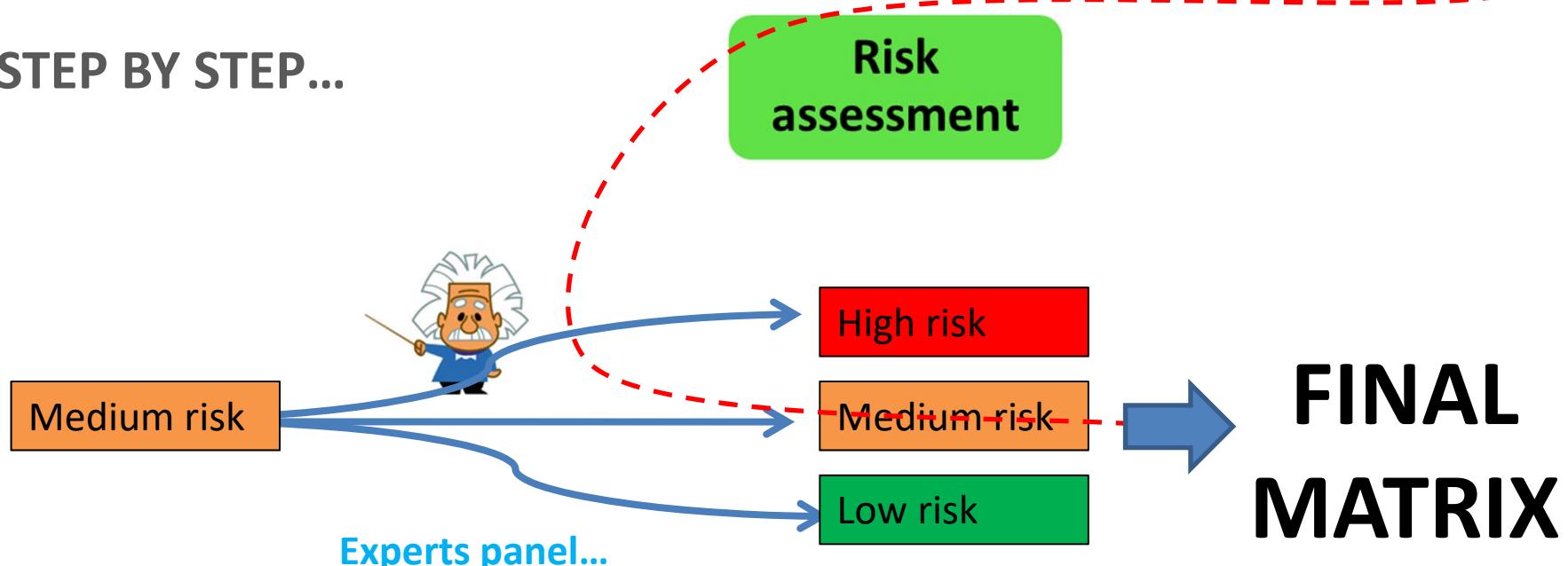


- Experts opinion (panel)
 - ✓ What for?
 - Nothing important has been left behind
 - Improve methodology and amend preliminary risks

Wildlife hazard management in aerodromes

4. Wildlife risk assessment

STEP BY STEP...



- ✓ Composition: ATC, ops, safety...but also environment and wildlife experts!

Wildlife hazard management in aerodromes

4. Wildlife risk assessment

STEP BY STEP...

Risk
mitigation

- Now we have identified the risks...
 - **Low:** carry on!
 - **Medium:** review, ALARP
 - **High:** new actions required (mitigation), even operational restrictions
- Specific problems, specific measures



Wildlife hazard management in aerodromes

4. Wildlife risk assessment

STEP BY STEP...

Evaluation

- Periodic review and oversight
- Measurable effectiveness

Wildlife hazard management in aerodromes

4. Wildlife risk assessment

AS A RESULT OF THE WHOLE PROCESS...WHAT HAVE WE ACHIEVED ?

1. A complete characterization (both wildlife and aeronautical) 
2. An identification of “problematic” species within the airport 
3. An identification of higher risks (**a risk prioritization**), caused by specific species of birds and affecting specific runways 
4. Definition and implementation of specific actions to reduce higher risks 
5. Continuous improvement → SMS 

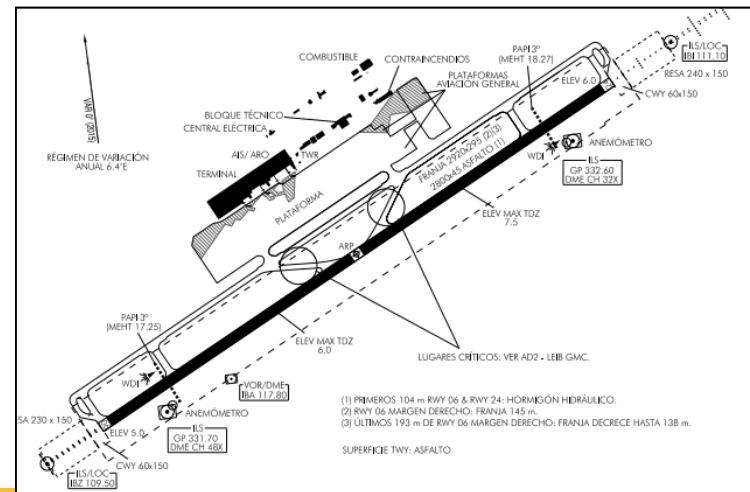
Wildlife hazard management in aerodromes

4. Wildlife risk assessment

EXAMPLE

- The airport
 - ✓ 8th busiest Spanish airport (7,4 M pax and 72.500 ops in 2016)
 - ✓ Simple airside configuration
 - ✓ Environmentally complex: natural parks, landfill, salt water lake, fishing activity
 - ✓ Bird strikes: intermediate national rate, 35 bird strikes/year, medium size

Species	Total bird strikes (2008-2014)
Swallow	22
Small raptors	20
Seagull	6
Steppe birds	6
Unknown	173
Other	24



Wildlife hazard management in aerodromes

4. Wildlife risk assessment

EXAMPLE

- Risk evaluation

PRELIMINAR RISK ASSESSMNT

+

EXPERTS PANEL



	Event	RWY 06	RWY 24	06/24
INSIDE AD	Catastrophic	Aquatic birds	Aquatic birds	Aquatic birds
	Dangerous	Aquatic birds	Aquatic birds	Aquatic birds
	Major		Aquatic birds	Aquatic birds
	Major		Small raptors	Small raptors
OUTSIDE AD	Catastrophic	Seagulls	Seagulls	
	Dangerous	Seagulls	Seagulls	

Wildlife hazard management in aerodromes

4. Wildlife risk assessment

EXAMPLE

- Mitigation measures: specific risks → specific measures

- ✓ Aquatic birds RWY 24, 06/24, RWY 24, RWY 06, 06/24
 - Monitoring of temporally wet areas
 - Study on new vegetation (airside)
 - Promotion of wildlife airport work group
 - Installation of nets on water treatment systems



- ✓ Small raptors RWY 24, 06/24
 - Study on nocturnal raptors
 - Reduction of food availability (animals)
 - Elimination of holes in buildings (for nests)



- ✓ Seagulls RWY 24, RWY 06,
 - Improvement of landfill management
 - Monitoring of drainage pool



Wildlife hazard management in aerodromes

5. Wildlife risk assessment program



Wildlife hazard management in aerodromes

5. Wildlife risk assessment program

REGULATION (EC) No 216/2008

ANNEX Va

ESSENTIAL REQUIREMENTS FOR AERODROMES

B — Operations and management

1. *The aerodrome operator is responsible for operation of the aerodrome. The responsibilities of the aerodrome operator are as follows:*
 - (a) the aerodrome operator shall have, directly or under contracts, all the means necessary to ensure safe operation of aircraft at the aerodrome. These means shall include, but are not limited to, facilities, personnel, equipment and material, documentation of tasks, responsibilities and procedures, access to relevant data and record-keeping;
 - (b) the aerodrome operator shall verify that the requirements of Section A are complied with at all times or take appropriate measures to mitigate the risks associated with non-compliance. Procedures shall be established and applied to make all users aware of such measures in a timely manner;
 - (c) the aerodrome operator shall establish and implement an appropriate aerodrome wildlife risk management programme;
 - (d) the aerodrome operator shall ensure that movements of vehicles and persons in the movement area and other operational areas are co-ordinated with movements of aircraft in order to avoid collisions and damage to aircraft;
 - (e) the aerodrome operator shall ensure that procedures to mitigate risks related to aerodrome operations in winter operation, adverse weather conditions, reduced visibility or at night, if applicable, are established and implemented;

Wildlife hazard management in aerodromes

5. Wildlife risk assessment program

The Wildlife Risk Management Program should be the tool that allows the Airport Manager:

- **Integrate information** from: wildlife and habitats reports, risk assessment, periodic censuses and the reporting and management of incidents caused by birds or other animals, in order to understand the real problems of wildlife at the airport.
- Establish and implement risk reduction or risk **mitigation measures** to achieve a low and controlled risk impact.
- Establish a **periodic monitoring and evaluation of the effectiveness of measures**. Efforts should focus on the application of most effective measures and seek alternative solutions in cases where the results are not satisfactory.

Wildlife hazard management in aerodromes

5. Wildlife risk assessment program

The Program should not only contemplate the establishment of internal actions, specific to the Airport Manager. In order to achieve an adequate and effective program, it's necessary involve to external entities (local authorities, associations, individuals, etc.) that manage wildlife habitats and wildlife zones of attraction.

Wildlife hazard management in aerodromes

5. Wildlife risk assessment program

HOW TO DEVELOPE THE WRMP?



GM2 ADR.OPS.B.020 Wildlife strike hazard reduction

WILDLIFE RISK MANAGEMENT PROGRAMME

The wildlife risk management programme may cover an area of approximately 13 km (7 NM) from the aerodrome reference point, and should include, at least, the following elements:

- (a) assignment of personnel:
 - (1) a person who is accountable for developing and implementing the wildlife risk programme;
 - (2) a person who oversees the daily wildlife control activities, and analyses the collected data and carries out risk assessments in order to develop and implement the wildlife risk management programme; and
 - (3) trained and qualified staff who detect and record the birds/wildlife, and assess the bird/wildlife hazard, and expel hazardous birds/wildlife;
- (b) a process to report, collect, and record data of struck and living birds/wildlife;
- (c) a process to analyse the data and to assess the bird/wildlife hazard to develop mitigation, proactive, and reactive measures. This should include a risk assessment methodology;
- (d) a process of habitat and land management both on, and in its surroundings, whenever possible, in order to reduce the attractiveness of the area to birds/wildlife;
- (e) a process to remove hazardous birds/wildlife;
- (f) a process for liaison with non-aerodrome agencies and local landowners, etc. to ensure the aerodrome is aware of developments that may contribute to creating additional bird hazards within the surrounding of the aerodrome's infrastructure, vegetation, land use and activities (for example crop harvesting, seed planting, ploughing, establishment of land or water features, hunting, etc. that might attract birds/wildlife).

Wildlife hazard management in aerodromes

5. Wildlife risk assessment program

Development of technical documentation
by AESA



Technical Instruction for the elaboration of
Wildlife Risk Management Programme



AESA
AGENCIA ESPAÑOLA DE SEGURIDAD AÉREA

ELABORACIÓN DEL PROGRAMA DE GESTIÓN DEL RIESGO DE FAUNA

CSA-16-ITC-111
Edición 1.0
DSANA
PS-DAN-INDP-01

NO RESTRINGIDO
INSTRUCCIÓN TÉCNICA

ELABORACIÓN DEL PROGRAMA DE GESTIÓN DEL RIESGO DE FAUNA

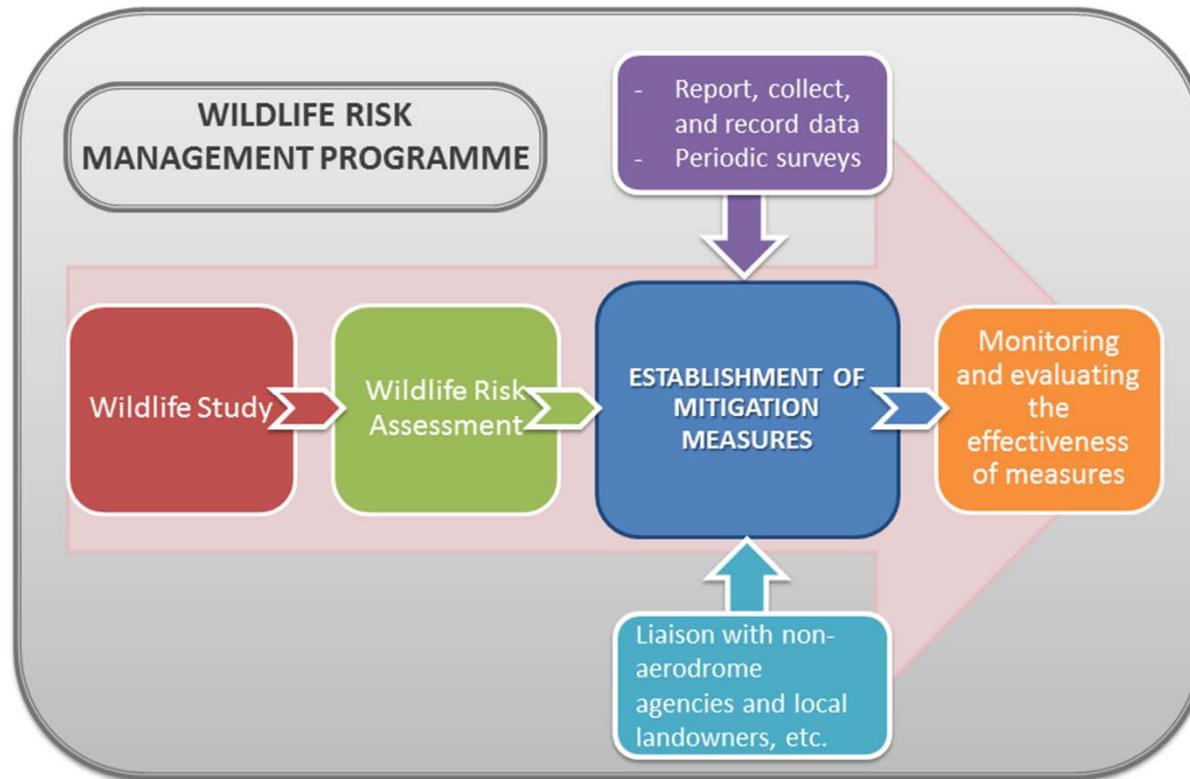
	RESPONSABLE	FIRMA	CARGO
Elaboración:	Enrique de Castro García		Técnico
Revisión:	Ruth Herrero Martín		Jefa de División de Inspecciones Aeroportuarias
Conformidad:	Juan Luis Maestre Martínez		Coordinador de Seguridad de Aeropuertos
Aprobación:	David Nieto Sepúlveda		Director de seguridad de Aeropuertos y Navegación Aérea

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1/22

Wildlife hazard management in aerodromes

5. Wildlife risk assessment program



Wildlife hazard management in aerodromes

5. Wildlife risk assessment program

Wildlife Risk Management Program Index

1. Introduction
2. Available resources
 - a) Responsible and training
 - b) Material resources
3. Flow of communications and contracts / agreements with external entities
4. Wildlife at the airport and its surroundings
 - a) Habitats and hot spots inside and outside the airport
 - b) Species with greater risk inside and outside the airport
 - c) Results of risk assessments
 - d) Record of sightings and periodic censuses
 - e) Record of wildlife strikes
 - f) List of other documents that have been used to carry out the Programme
 - g) Coordination with external entities
5. Wildlife management measures
 - a) Measures inside the airport
 - b) Measures outside the airport
6. Self-evaluation of the program
7. Implementation of wildlife committees in the airport
8. Conclusions

Wildlife hazard management in aerodromes

5. Wildlife risk assessment program

DESCRIPTION OF MEASURES IMPLEMENTED	
Risk Element or Risk Activity	Brief description of the risk element for aeronautical operations. <i>Ex.: Water pond next to the 07 runway that attracts water birds....</i>
Measure to apply	Brief description of the measure that will be implemented to reduce the risk. <i>Example: Removal of the water pond.....</i>
Type of measure	<i>Example: Habitat management measure in the airfield.</i>
Objective	Specify the species on which to act. <i>Example: Decrease the presence of mallard in the pond.....</i>
Technical details	Resources available and processes to be used to achieve the objective <i>Example: Desiccation using the next technique: [.....]</i>
Entity responsible for the activity/element	Holder element or entity responsible of the risky activity (in case of external measure).
Date for implementation	Indicate the date of implementation and the term of application.
Responsibility	Responsible for the implementation. Responsible for the execution.
Results	Indicate the number of times the measurement is applied (if it has been necessary to do periodic repetitions). Indicate the results obtained with the implementation of the measure.
Monitoring and evaluation of the effectiveness of the measure	Indicate the methods used to evaluate the effectiveness of the measure. The methodology of the monitoring, the periodicity and responsible for the evaluation will be indicated.
Improvements and observations	Necessary improvements in the application of this measure, if the results were not expected. The deadline for implementation of these improvements will also be indicated.

Wildlife hazard management in aerodromes

6. Procedures for wildlife hazard management (E.17)



Wildlife hazard management in aerodromes

6. Procedures for wildlife hazard management (E.17)

- Wildlife Control Service (Internal/External company)

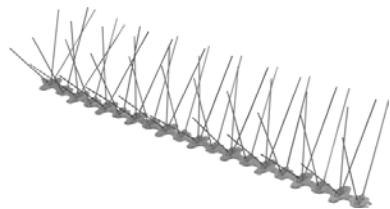


- Wildlife hazard management contract (Internal/External company).
- Liaison / agreements with non-aerodrome entities and local authorities in the area.

Wildlife hazard management in aerodromes

6. Procedures for wildlife hazard management (E.17)

- Preventive measures



- Corrective measures



Wildlife hazard management in aerodromes

7. AESA Actions

The screenshot shows the official website of the Agencia Estatal de Seguridad Aérea (AESA) of Spain. The top navigation bar includes links for 'Bienvenido' (Welcome), 'Contact us', 'Print', 'Map', and the date '14/03/2017'. The main content area is titled 'Aeropuertos' (Airports) and features three images of airport infrastructure: an airplane at a gate, a runway, and a modern terminal building. Below the images is a list of links under the heading 'Aeródromos y helipuertos de uso restringido' (Restricted-use airports and heliports). One of these links, 'Certificación/Verificación de aeródromos' (Certification/Verification of airports), is highlighted with a red arrow pointing to it. To the left, a sidebar lists various agency services, and to the right, a column of icons represents 'Online services'.

Bienvenido Benvingut Ongi etorri Benvindo Benvingut Welcome Bienvenue

Search

Empleo público Contratación Normativa Contact us Print Map 14/03/2017

AESA

The Agency

Aircrafts

Airports

- Aeródromos y helipuertos de uso restringido
- Aeródromos de uso público (incluidos helipuertos)

Air navigation

Safety & risk management

Fees and charges

Citizens

Companies and industry

AESA > Airports

Airports Aeropuertos

Aeródromos y helipuertos de uso restringido

Aeródromos de uso público (incluidos helipuertos)

- Certificación/Verificación de aeródromos
- Control normativo
- Plan de emergencia d
- Grupos de trabajo

Servidumbres aeronáuticas

Modelos de orden de actuación y de designación de equipo de inspecciones aeronáuticas

Online services

News Room

Drones

Claims for cancellations and delays

Passenger rights

Complaints and suggestions

EASA

Wildlife hazard management in aerodromes

7. AESA Actions



Guidance Material

Revision and analysis of wildlife studies and wildlife risk assessments

Inspection

Consultations

Attendance to local wildlife committees in aerodromes

Working groups:
- Standardization of wildlife events
- National wildlife map

National Wildlife Forum

Participation in international wildlife working groups (EASA, OACI...)

Collaboration with other authorities

Assistance to international wildlife committees

Wildlife hazard management in aerodromes

7. AESA Actions

Development of guidance material for:

- Wildlife studies in aerodromes
- Wildlife risk assessments
- Wildlife risk management programmes in aerodromes
- Training programme and proficiency checks for wildlife management staff



Wildlife hazard management in aerodromes

7. AESA Actions

Working groups

- Standardization of wildlife events



- National wildlife map

Main wildlife issues in [Spain](#)



Wildlife hazard management in aerodromes

7. AESA Actions

Wildlife and Aviation National Forum

- Madrid - 8th June 2017
- Objectives
- Attendees
- Local / Specific working groups



EASA



71

Article 9

Monitoring of aerodrome surroundings

Member States shall ensure that consultations are conducted with regard to human activities and land use such as:

- (a) any development or change in land use in the aerodrome area;
- (b) any development which may create obstacle-induced turbulence that could be hazardous to aircraft operations;
- (c) the use of hazardous, confusing and misleading lights;
- (d) the use of highly reflective surfaces which may cause dazzling;
- (e) the creation of areas that might encourage wildlife activity harmful to aircraft operations;

Wildlife hazard management in aerodromes





European Union Aviation Safety Agency



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