ENAC
ENTE NAZIONALE PER L'AVIAZIONE CIVILE

Strategies and oversight of the Italian Civil Aviation Authority against the wildlife strike hazard

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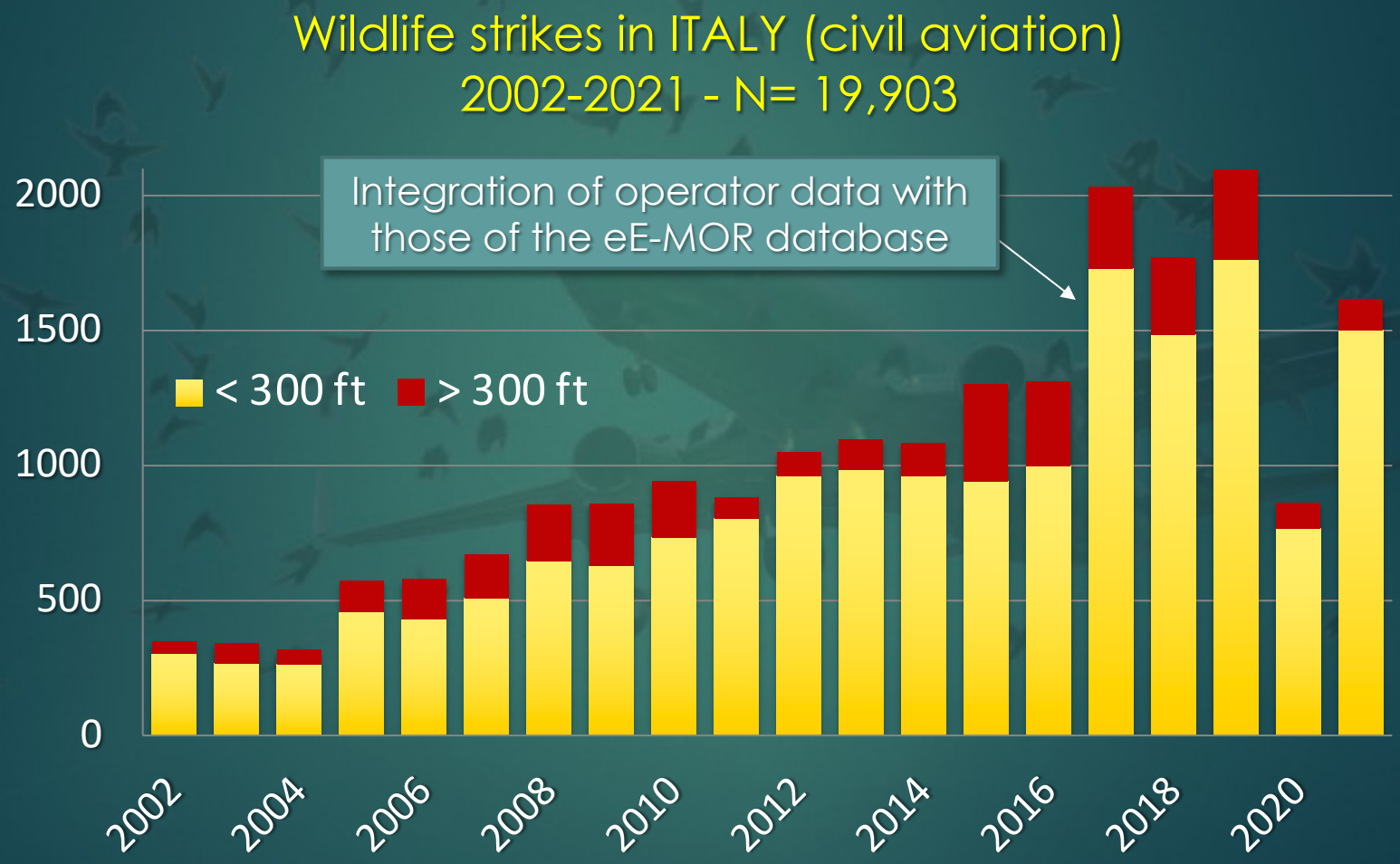
The topic

- Wildlife Strike hazard is increasing all over the world;
- The consequences can be severe as the energy released can lead to significant damage to the aircraft;
- More than 580 people have been killed worldwide due to wildlife strikes, and at least 427 military aircraft and 230 civil aircraft have been destroyed.

Scale of the problem



Type of events

	No effect	Damage	Multiple	Ingestion	EOF
2012	873	46	121	37	30
2013	887	25	179	13	22
2014	938	26	121	8	12
2015	1128	51	98	24	39
2016	1146	57	97	41	56
2017	1773	37	132	95	33
2018	1519	53	102	121	46
2019	1811	209	117	116	80
2020	728	25	54	55	36
2021	1380	35	108	116	48

COVID IMPACT ON ITALIAN AERODROMES

- Substantial reduction on movements and passengers (62% and 72,5% respectively)
- Due to Italian government decision almost all aerodromes had remained open
- Althoughaerodromes operators have experienced reduction in employees wildlife inspections performed according to the approved procedures
- Traffic recovery in 2021 and 2022.
- Number of events reported has incresaed after the reduction experienced in 2020

Who deals with the issue

- In Italy, the Bird Strike Committee Italy (BSCI) was set up in 1987, formally recognized in 1993 as the Technical Commission of the Ministry of Transport and reconstituted in 2001 within the Ente Nazionale Aviazione Civile (ENAC, Italian CAA).
- The Committee since 2001 is composed of 13 members - all experts in aviation safety issues, including a professional ornithologist - from the following institutions:
  - ENAC (National CAA)
  - AM (National Air Force)
  - ENAV (National ATM)
  - ASSAEREO (National Association of Air Carriers and Air Transport Operators)
  - UP (Italian Union of Pilots)
  - ANPAC (National Association of commercial aviation pilots)
  - ASSAEROPORTI (National Association of Airport Managers)
  - IBAR (National Board of Airline Representatives)

- In 2006, by order of ENAC's Director General, the BSCI was reconstituted as a permanent working group within ENAC.
- Currently, the working group is functionally dependent on Direzione Centrale Programmazione Economica e Sviluppo Infrastrutture, with the aim of maintaining contacts with the country's various aviation stakeholders and promoting study and knowledge on the subject.
- It is made up of :
  - ENAC professional engineers
  - ENAC flight inspectors
  - ENAC airport inspectors
  - Professional ornithologist
- It periodically interfaces with a Committee composed of representatives of the above-mentioned institutions appointed.

- The main tasks of the BSCI are:
  - *promulgate and enforce relevant legislation;*
  - *collect, process and send statistics to the ICAO;*
  - *support internal ENAC bodies and airport operators;*
  - *carry out training courses, targeted visits and awareness actions;*
  - *involve local authorities and maintain international relations.*

BSCI tools

- ICAO Annex 14
- EU Regulations 216/2008 and 139/2014;
- Regulations for the Construction and Operation of Airports, ENAC - Chap. 4 -5;
- Itaslian Navigation Code - Articles 707 and 711;
- ENAC Circular APT-01.

The role of the airport operator

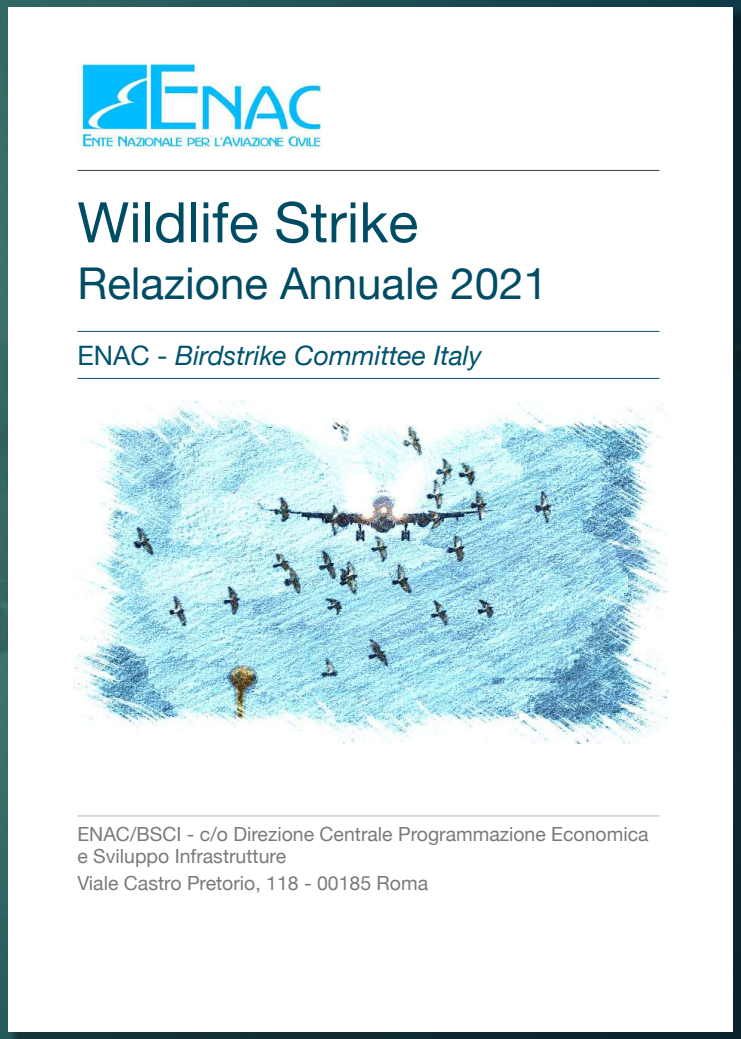
- Reporting
  - BSRF (Bird Strike Reporting Forms) for each event
  - eE-MOR (now ECCAIRS2)
- Airport Ecological Assessment
  - 12-month research on species and environment
- Management Plan
  - Roles, procedures and mitigation practices/systems
  - BCU (Bird Control Unit) establishment and training
  - Continuous monitoring
- Annual wildlife strike report
  - Includes Birdstrike Risk Index (BRI) calculation
  - Identification and monitoring of external attractive sources

BSCI products

- Wildlife Strike in Italy Annual Report
- Pilot Awareness Brochure
- ICAO database
- Fact-finding visits to airports
- Technical advice
- Regulatory review
- Guidelines on risk management around airports
- International representation

Wildlife Strike Annual Report

- For each airport:
  - regulatory compliance
  - no. of impacts
  - species involved
  - effects on flight
  - monitoring
  - mitigation systems in use
  - risk index and three-year trend
  - future actions
- General statistical analysis
  - altitude
  - flight phases
  - species involved
  - time
  - seasonality
  - type of impact
  - aircraft parts affected
- Comparison with past years/other States
- Future perspectives



Pilot Awareness Brochure

- Introduction to the problem
- Birds in Italy: how many, where and how they live
- The wildlife strike in Italy
- Instructions in the event of a wildlife strike
  - During the take-off phase
  - During the cruise phase
  - Remaining calm
- How to avoid a wildlife strike
  - Inform yourself
  - Carry out thorough pre-flight checks
  - Observe bird activity in the area
  - Take special care when approaching and landing
  - Appropriate flight procedures
  - Natural areas and wildlife strikes
  - Periods of the year and particular behaviour
  - Post-impact inspections and reporting
- Decalogue

ICAO Database

- Collection, analysis and cleaning of all wildlife strike data that occurred in Italy during the year in electronic format according to the IBIS model

≤ 300 ft	AEROPORTO	ICAO	Date	Day	Month	Year	Local Time	Ora arrotondata	Runway Used	Location if en route
0	Genova	GOA	08/02/16	8	2	2016	7:38	08:00	28	
0	Roma Fiumicino	LIRF	09/02/16	9	2	2016	15:06	15:00	25	
0	Genova	GOA	30/03/16	30	3	2016	18:30	19:00		
0	Genova	GOA	11/04/16	11	4	2016	17:47	18:00	28	
0	Genova	GOA	13/04/16	13	4	2016	15:19	15:00	28	
0	Roma Fiumicino	LIRF	20/04/16	20	4	2016	18:20	18:00	16L	
0	Genova	GOA	20/04/16	20	4	2016	13:25	13:00	28	
0	Genova	GOA	23/04/16	23	4	2016	22:24	22:00	28	
1	Roma Fiumicino	LIRF	30/04/16	30	4	2016	10:08	10:00	25	
0	Roma Fiumicino	LIRF	11/05/16	11	5	2016	9:30	10:00	16L	
0	Roma Ciampino	LIRA	14/05/16	14	5	2016	12:00	12:00	33	
0	Roma Fiumicino	LIRF	20/05/16	20	5	2016	20:20	20:00	16R	
0	Roma Fiumicino	LIRF	26/05/16	26	5	2016	10:10	10:00	16L	
0	Roma Fiumicino	LIRF	27/05/16	27	5	2016	17:43	18:00	16L	
0	Roma Fiumicino	LIRF	27/05/16	27	5	2016	18:20	18:00	16L	
0	Roma Fiumicino	LIRF	27/05/16	27	5	2016	16:34	17:00	25	
0	Roma Fiumicino	LIRF	28/05/16	28	5	2016	20:15	20:00	16L	
0	Roma Fiumicino	LIRF	29/05/16	29	5	2016	17:48	18:00		
0	Roma Fiumicino	LIRF	29/05/16	29	5	2016	20:35	21:00	16L	
0	Roma Fiumicino	LIRF	31/05/16	31	5	2016	17:17	17:00	16L	
0	Genova	GOA	01/06/16	1	6	2016	12:46	13:00	10	
0	Roma Fiumicino	LIRF	03/06/16	3	6	2016	17:13	17:00		
0	Roma Fiumicino	LIRF	03/06/16	3	6	2016	17:13	17:00		
0	Roma Fiumicino	LIRF	05/06/16	5	6	2016	11:00	11:00	16L	
0	Genova	GOA	12/06/16	12	6	2016	5:57	06:00	28	
0	Roma Fiumicino	LIRF	13/06/16	13	6	2016	10:17	10:00	16R	
0	Roma Fiumicino	LIRF	22/06/16	22	6	2016	18:21	18:00	7	
0	Roma Fiumicino	LIRF	23/06/16	23	6	2016	15:00	15:00	7	
0	Roma Fiumicino	LIRF	01/07/16	1	7	2016	9:33	10:00	16R	
0	Genova	GOA	03/07/16	3	7	2016	7:33	08:00	28	
0	Roma Fiumicino	LIRF	04/07/16	4	7	2016	7:45	08:00		
0	Genova	GOA	13/07/16	13	7	2016	11:10	11:00		
0	Genova	GOA	13/07/16	13	7	2016	17:40	18:00	28	
0	Roma Ciampino	LIRA	14/07/16	14	7	2016	15:52	16:00		
0	Roma Fiumicino	LIRF	17/07/16	17	7	2016	12:48	13:00	25	
0	Roma Fiumicino	LIRF	18/07/16	18	7	2016	7:20	07:00	16R	
0	Genova	GOA	23/07/16	23	7	2016	10:15	10:00	28	
0	Roma Ciampino	LIRA	30/07/16	30	7	2016	16:47	17:00	33	
0	Roma Fiumicino	LIRF	01/08/16	1	8	2016	18:00	18:00	16L	
0	Roma Fiumicino	LIRF	28/08/16	28	8	2016	19:30	20:00	16L	
0	Roma Fiumicino	LIRF	30/08/16	30	8	2016	23:30	00:00	7	
0	Roma Fiumicino	LIRF	14/09/16	14	9	2016	13:36	14:00	25	
0	Roma Fiumicino	LIRF	19/09/16	19	9	2016	12:10	12:00	25	
0	Roma Fiumicino	LIRF	20/09/16	20	9	2016	8:40	09:00	25	
0	Roma Fiumicino	LIRF	24/09/16	24	9	2016	13:05	13:00	25	
0	Roma Fiumicino	LIRF	24/09/16	24	9	2016	6:53	07:00	25	
0	Roma Fiumicino	LIRF	30/09/16	30	9	2016	17:50	18:00	16R	
0	Roma Fiumicino	LIRF	30/09/16	30	9	2016	19:50	20:00	16L	
0	Roma Fiumicino	LIRF	01/10/16	1	10	2016	19:30	20:00	16R	
0	Roma Fiumicino	LIRF	25/10/16	25	10	2016	10:55	11:00	16L	
0	Genova	GOA	05/11/16	5	11	2016	22:05	22:00	28	
0	Roma Fiumicino	LIRF	07/11/16	7	11	2016	11:15	11:00	25	
0	Genova	GOA	08/11/16	8	11	2016	19:20	19:00	28	
0	Roma Fiumicino	LIRF	26/11/16	26	11	2016	13:10	13:00	16R	
0	Roma Fiumicino	LIRF	27/11/16	27	11	2016	14:28	14:00	25	
0	Roma Fiumicino	LIRF	18/12/16	18	12	2016	9:42	10:00	16L	

Fact-finding visits to airports

- Selection through the use of standardised indicators to assess the annual performance of the airport in terms of wildlife strike risk management.
- These indicators cover:
  - airport compliance with regard to regulations
  - data collection
  - risk measurement
  - implementation of mitigation measures.

Argomento	Indicatori di performance	Punteggio attribuibile	Valutazione
Applicazione Normativa	La 'Ricerca naturalistica' è aggiornata e/o la 'Relazione annuale wildlife strike' è sostitutiva del rinnovo?	Si = 10 No = 0	
	Il 'Piano anti wildlife strike' (procedura operativa dell'aeroporto) è compliance con la 'Ricerca naturalistica'?	Si = 10 No = 0	
	La 'Relazione annuale wildlife strike' del gestore è completa/ congrua alla normativa?	Min = 0 Max = 10	
	L'aeroporto ha una BCU dedicata ?	Si = 5 No = 0	
	l'attività della BCU è di tipo continuativo (min. 1 ispezione/ora)?	Si = 10 No = 0	
	Il Gestore ha partecipato e/o promosso per l'anno in esame tavoli tecnici con gli enti territoriali?	Max = 5 Min = 0	
Raccolta dati e risk assessment	Il n. di eventi di wildlife strike dichiarato dal Gestore per l'anno in esame è congruo con quello in possesso a ENAC?	Min = 0 Max = 5	
	La valutazione degli eventi di wildlife strike per l'anno in esame è compliance con la norma e corretta?	Min = 0 Max = 10	
	BRI_2 dell'anno in esame ≤ 0,1	15	
	0,1 > BRI_2 dell'anno in esame ≤ 0,2	14	
	0,2 > BRI_2 dell'anno in esame ≤ 0,3	13	
	0,3 > BRI_2 dell'anno in esame ≤ 0,4	12	
	0,4 > BRI_2 dell'anno in esame ≤ 0,5	11	
	BRI_2 dell'anno in esame > 0,5	0	
	Il trend del BRI_2 negli ultimi tre anni è negativo (*)	10	
	Il trend del BRI_2 negli ultimi tre anni è positivo(*)	0	
	Il trend del BRI_2 negli ultimi è piatto(*)	5	
Azioni di mitigazione	Se il BRI_2 per l'anno in esame è < 0,5 e il trend del BRI_2 negli ultimi tre anni è negativo, il Gestore ha previsto nella 'Relazione annuale wildlife strike' nuove azioni di mitigazione del rischio?	Min = 0 Max = 10	
	Se il BRI_2 per l'anno in esame è > 0,5 e/o il trend dello stesso è positivo negli ultimi tre anni, il Gestore ha previsto nella 'Relazione annuale wildlife strike' nuove azioni di mitigazione del rischio? E ha implementato, se del caso, quelle previste l'anno precedente?	Min = 0 Max = 10	
		Max = 100	

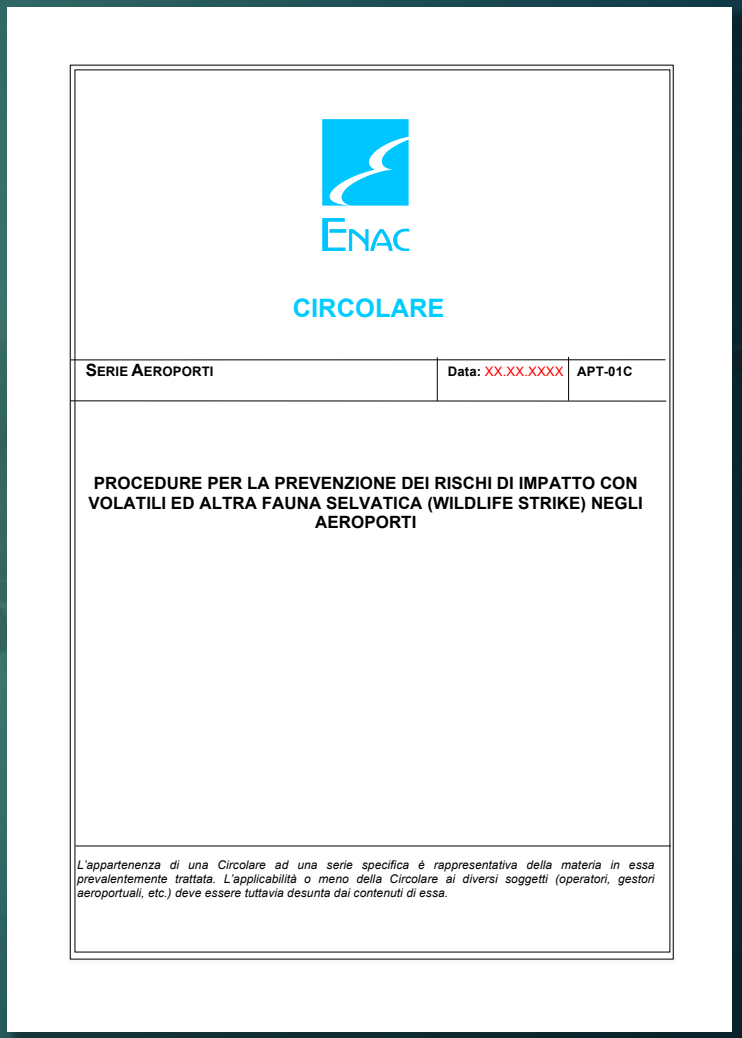
Technical advice

- Issuing assessments and technical advice on the construction of works, plantations or the exercise of activities that may attract wildlife in restricted areas around airports based on:
  - Chapters 4 and 5 of ENAC's Regulations for the Construction and Operation of Airports
  - Articles 707 and 711 of the Navigation Code
  - Article 10 of Regulation (EU) No. 139/2014
  - Annex Va (point C.2.e) of Regulation (EC) No. 1108/2009

PROVINCIA DI BRESCIA	COMUNE DI REZZATO
Nuovo Piano delle attività estrattive della Provincia di Brescia -settore sabbia e ghiaia- approvato con D.C.R. VII/1114 del 25.11.2004	
ISTANZA DI AUTORIZZAZIONE ALL'ESERCIZIO DI ATTIVITA' ESTRATTIVA -PROGETTO ATTUATIVO- (ART. 12-14 DELLA L.R. 14/98)	
Località Cascina Castella	
Nota tecnica	
Il richiedente	**I progettisti**
Gaburri S.p.A.	
Luglio 2012	

Regulatory review

- Adaptation to European regulations
- Adaptation to the new ENAC reorganisation
- Introduction of the new electronic database for reporting
- converting circulars into regulations



ENAC

CIRCOLARE

SERIE AEROPORTI	Data: XX.XX.XXXX	APT-01C

PROCEDURE PER LA PREVENZIONE DEI RISCHI DI IMPATTO CON VOLATILI ED ALTRA FAUNA SELVATICA (WILDLIFE STRIKE) NEGLI AEROPORTI

L'appartenenza di una Circolare ad una serie specifica è rappresentativa della materia in essa prevalentemente trattata. L'applicabilità o meno della Circolare ai diversi soggetti (operatori, gestori aeroportuali, etc.) deve essere tuttavia desunta dai contenuti di essa.

Guidelines on risk management around airports

- Assessment of the hazard of works, plantations or the exercise of activities that may attract wildlife near the airport
- Use of objective proximity and risk assessment criteria for different types of attractor source
- Recommended actions
- Punctual indications of mitigation by type of hazard
- Role of territorial stakeholders

International representation

- Regular attendance at international meetings and on EASA and WBA boards
- Presentations at meetings
- Publication of international scientific contributions

Birdstrike Risk Index (BRI2): a new approach to the wildlife strike risk assessment

Alessandro Montemaggiori[1], Cecilia Soldatini[2], Yuri Vladimir Albores-Barajas[2], Tomas Lovato[2,4], Adriano Andreon[3], Patrizia Torricelli[2], Cosimo Corsa[1], Vyron Georgalas[2]

[1] Bird Strike Committee Italy – c/o ENAC – Ente Nazionale Aviazione Civile, Rome, Italy, [2]Department of Environmental Sciences, Informatics and Statistics, University Ca'Foscari of Venice, Venice, Italy, [3]Aeroporto di Venezia Marco Polo S.p.A. SAVE, Venice, Italy, [4]CMCC – Centro Euro-Mediterraneo per i Cambiamenti Climatici, Bologna, Italy

INTRODUCTION

Among the methods to estimate wildlife strike hazard published in ISI journals [1,2,3,4], some use an economic perspective [1,4], while others use data collected on a national level [2]. The major problem with these approaches is that they may not reflect the characteristics of each individual airport, making comparisons between airports difficult. Moreover it often happens that the wildlife strike data available are incomplete because records from pilots may lack species information or carcasses may be lost [5]. Thus, there is a general need for a standardized method that is easy to apply and statistically robust. It must be taken also into account that often different wildlife monitoring programs are run at airports, therefore the risk assessment tool should work with different time series of data.

A method that takes into account the ecological characteristics of the bird communities present in the airport area, together with the local history of wildlife strikes, their effects on flight and the number of aircraft movements is presented here.

The main achievement is a site-specific analysis that avoids flattening wildlife strike events on a large scale while maintaining comparable airport risk assessments.

MATERIALS AND METHODS

DATA COLLECTION

Wildlife presence data, collected by professional ornithologists or professionally trained airport ground staff (Bird Control Units) on an hourly basis during daylight or every 2-3 hours per day where provided for eight Italian international airports representative of the 37 present in Italy in terms of air traffic. The average daily abundance for each species was used for the computation of the wildlife strike risk index.

The aircraft movement data for each airport (in terms of flight numbers per month comprising both landings and takeoffs) were provided directly by the airport management authority. The airports were subdivided into 3 classes according to the yearly averaged Total Flight Number (TFN) registered in period 2003-2010 (**Table 1**): class 1: small-scale airport 1<TFN<50,000; class 2: medium-scale airport 50,001<TFN<99,999; class 3: large-scale airport TFN>100,000.

The wildlife strike data were provided from the Italian CAA (ENAC) for the years 2006-2010 while strike data of the period prior to 2006 were provided directly from each airport authority. A summary of the wildlife abundance and strike data used in the present paper for each airport is reported in **Table 1**.

Airport	Airport class	Wildlife data availability (years)	Wildlife strike data availability (years)
A	1	2007-2008	2006-2010
B	1	1999	2006-2010
C	1	2007-2010	2006-2010
D	1	2006-2009	2006-2010
E	1	2010	2006-2010
F	2	2007, 2009-2010	2004, 2006-2010
G	2	2006-2010	2006-2010
H	3	2007, 2009-2010	2006-2010

Table 1. List of investigated airports (ID letter), with the specific traffic size class, and the available time series extension for wildlife observations and strikes data.

BRI2 INDEX

In order to determine the BRI2 (Birdstrike Risk Index ver. 2), 17 functional groups of species have been created according to their ecological patterns (habitat and diet), body size and social behaviour (flocking vs. non flocking species) (**Table 2**)

ID group	Species group	Some examples
1	Grebes and divers	*Tachybaptus ruficollis, Gavia immer*
2	Cormorant, pelicans, swans and geese	*Phalacrocorax carbo, Cygnus olor, Anser anser*
3	Herons, storks, flamingoes	*Ardea cinerea, Ciconia nigra, Phoenicopterus ruber*
4	Ducks, pheasants, rallids	*Anas platyrhynchos, Phasianus colchicus*
5	Birds of prey - large	*Buteo buteo, Circus aeruginosus*
6	Birds of prey - small	*Falco subbuteo, Falco tinnunculus*
7	Seabirds - large	*Larus michahellis, Larus argentatus*
8	Seabirds - small	*Chroicocephalus ridibundus, Sterna hirundo*
9	Waders	*Charadrius alexandrinus, Tringa totanus*
10	Doves	*Columba livia, Streptopelia decaocto*
11	Owls	*Athene noctua, Tyto alba*
12	Swifts and swallows	*Apus apus, Hirundo rustica*
13	Corvids	*Corvus corone, Corvus monedula*
14	Non-flocking passerines and bats	*Motacilla alba, Turdus merula, Nyctalus noctula*
15	Flocking passerines	*Sturnus vulgaris*
16	Small mammals (<10 kg)	*Vulpes vulpes*
17	Large mammals (>10 kg)	*Dama dama*

Table 2. Distribution of wildlife species among different groups, based on species-specific ecological patterns (habitat, diet), body size, and social behaviour (flocking vs. non flocking species).

Then the following set of equations was calculated :

$$1: GF_i = \overline{W}_i \cdot Ag \cdot \frac{BS_i}{TFN} \cdot EOF_i^{95} \qquad 2: GSR_i = \frac{GF_i}{\sum_{i=1,N} GF_i} \cdot DB_i \qquad 3: BRI2 = \left(\frac{\sum_{i=1,N} GSR_i \cdot DF}{TFN} \right)$$

which represent, respectively, the historical risk associated to a species, or Group Factor (GF_i), the actual Group Specific Risk (GSR_i), and the second version of the index (BRI2).

In Eq. 1-3, *i* indicates a species group (see **Table 2**), *N* is the group total, $\overline{W}$ the average weight of the i^{th} group, *Ag* the group specific aggregation index, *BS* is the mean value of impacts recorded per year, TFN is the mean value of flights per year and TFN its monthly average. *DB*, represents the mean daily number of birds of the i^{th} group, and *DF* is the mean daily flight traffic calculated on a monthly basis. EOF^{95} is the 95th percentile of the EOF (Effect On Flight). EOF was defined according to the possible effects, from no effect to airplane damage beyond reparability, according to the 5 level ranking proposed in **Table 3**.

EOF Value	Category	Description
1	None	None
2	Minor	Delay
3	Substantial	Precautionary landing, aborted take-off
4	Serious	Engine(s) shutdown, forced landing, vision obscured
5	Catastrophic	Damage sustained makes it inadvisable to restore aircraft

Table 3. Categories of the Effect On Flight (EOF) provoked by wildlife strike events.

RESULTS

The results obtained from the application of BRI2 to the eight investigated airports are depicted in **Figure 1**.

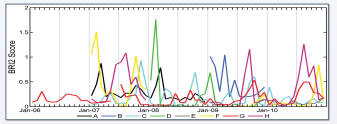


Figure 1. BRI2 scores for the eight investigated Italian airports in the period 2006-2010.

As expected, each airport presents different seasonal trends due to differences in wildlife community composition and their site-specific strike history. For example in airport G the seasonal trend with higher values in late summer is attributable to the first autumn migration movements which are associated to the large presence of hazardous groups 6, 7, and 12 (juveniles of kestrels, gulls and migratory species), while airport F shows higher BRI2 scores during the cold seasons, because of the foraging movements of the starlings (group 15) from the city to the surrounding cropland areas.

Among the 8 investigated airports, the highest wildlife strike risk is associated to the airport D, which belongs to the air traffic class 1. Such a result can be easily explained by considering that the wildlife strike risk history associated to the group of waders (mainly *Vanellus vanellus*) is significantly higher than all the others groups, having a EOF_{95} equal to 2 and an aggregation index of 30 individuals.

The analysis of BRI2 scores degradation due to the presence of an increasing number of undetermined values in the wildlife strike reporting lead to encouraging results.

It was possible to accept up to a 20% reduction of the strikes dataset for the airport G, before the BRI2 trend significantly degraded, as a consequence of a poor reliability of the Group Factor.

DISCUSSION

In all airports studied in the present work, apart from airport D, no significant correlations were found between the increase in air traffic and the number of wildlife strike events. This indicates that the variation in the number of wildlife strike events do not reflect the sole increase of air traffic trend. It is therefore important to investigate the ecological and behavioural characteristics of wildlife communities present in airport areas.

A key aspect of the proposed index is the possibility to compare the risk level associated with wildlife presence, even if differences exist among site communities and surrounding environment information are missing. In particular, direct environmental information are neglected in the computation of BRI2, since they are assumed to be triggered by the local wildlife community composition.

Wildlife communities are extremely dynamic. In Italy *Sturnus vulgaris* populations increased dramatically and migrate or are resident depending on the latitude [6], assembling in larger flocks in southern Italy. The variability shown by this species is only an example of what can be expressed by a whole community at the local level. Therefore, a "risk coefficient" calculated on a national (or international) scale would flatten a species' hazardousness at the local level, preventing a site-specific risk assessment [1,2].

The results obtained by applying the BRI2 algorithm on 8 Italian airports with an homogeneous distribution of air traffic characteristics are encouraging and allow a comparison between different airport sizes thus providing a site-specific evaluation of the wildlife strike risk. To our opinion BRI2 application renders comparison between different size-class airports possible even if wildlife monitoring data are non-homogenously collected and without the need to incorporate environmental characteristics information. However, a proper and complete monitoring program should be implemented to reasonably rely on the BRI2 scores.

Our results show that there are different wildlife strike risk level trends for each airport (Figure 1). These trends can be explained at a site-specific level by the seasonal variation in local wildlife communities, thus allowing site-specific management planning.

Finally, the index was conceived as a tool capable of describing an airport specific wildlife strike risk, based upon historical trend of wildlife observations, in order to identify critical periods during the year. Therefore, the index is not meant to be a prognostic index since bird distribution throughout the years is unlikely predictable although it can be applied to assess specific theoretical risk scenarios.

The BRI2 algorithm was adopted as a standard by ENAC in order to perform a wildlife risk assessment (ENAC Advisory Circular APT-01B) at a national level.

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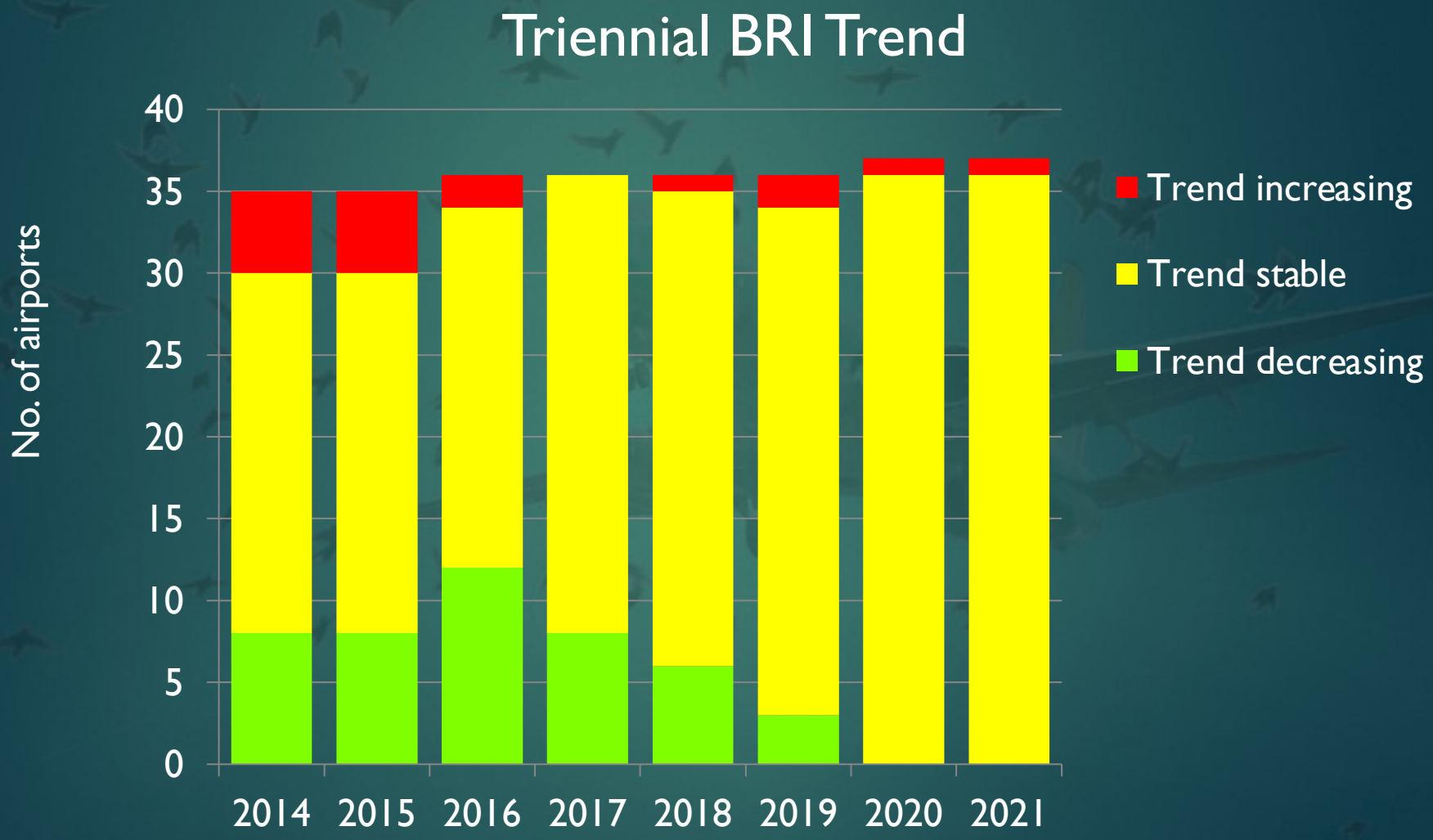
The near future 1

- **Creation of a thematic website**
  - A new website, open to the general public, where main sources of attraction of wildlife at and around Italian airports subject to EU Regulation 139/2014 and the species most relevant to aviation operations are represented, with information on their movements and the mitigation measures implemented by airport operators.
- **Monitoring and deterrence systems**
  - Evaluation and direct testing of new monitoring and deterrence systems submitted to the Authority both nationally and internationally. Where deemed promising, proposals are referred to the airport operator's associations. ENAC does not certify the various systems, but merely makes merit judgments based on studies published in peer reviewed scientific journals and magazines.

The near future 2

- **Seminars**
  - Organization of technical seminars open to the general public in order to explore specific wildlife strike risk issues, such as the management of airport surroundings or innovations in the field of wildlife monitoring and deterrence systems and methodologies, through targeted interventions.
- **Research**
  - ENAC is concluding a series of surveys in order to gain a better understanding of the distribution, phenology and flight altitude of the species most affected by wildlife strikes. Similarly, it is estimating the real cost of wildlife strikes in terms of economic damage.
- **Risk assessment**
  - ENAC is continuing to explore different and even more robust algorithms about risk assessment also making use of possible agreements with other parties.

Where do we go



The risk of wildlife strikes can never be completely zeroed out. ENAC is aiming at a high level of awareness by everyone towards this problem, building and using a whole series of vigilance tools and activities, which aim at:

- to an increasingly precise collection of qualitative information;
- To the achievement of an extremely punctual level of analysis;
- To cooperation among all actors in the field.

In fact, only through the synergy of quality information, timely analysis, and the participation of everyone, primarily the airport operator, local authorities, and local stakeholders, is it possible to deal with such a complex hazard and achieve increasingly acceptable safety standards.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Thank you