



Social Responsibility in Aerodrome WHM

- **Introduction**
- **Bird strike impacts**
- **Airspace occupation – Aircrafts vs Birds**
- **Why BASHM at Airports**
- **Importance of Birds/Wildlife - An Indian prespective**
- **Social Responsibility in Aerodrome WHM**
- **Case study - A co-existence perspective**



Focus Areas



PHOTOGRAPH BY GEORGE MCKENZIE JR

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New research estimates there are between 50 billion and 430 billion birds on Earth.

BY DOUGLAS MAIN

11000 bird species

150 bird species have gone extinct over the last five centuries

1400 bird species are threatened with extinction today

Bird population across globe have been mixed trends:
Common forest species have seen an increase in numbers while farmland species have seen a decline

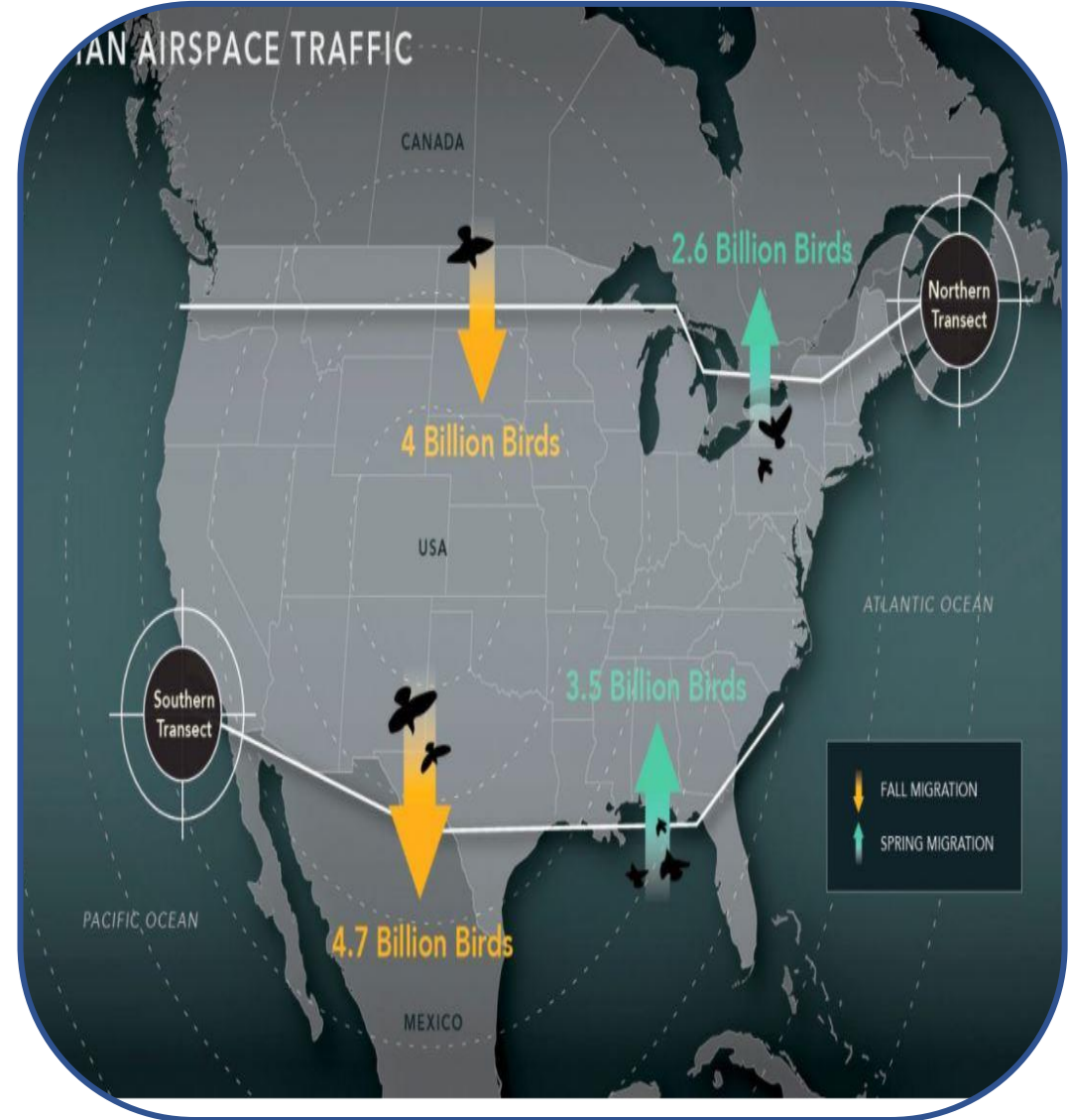
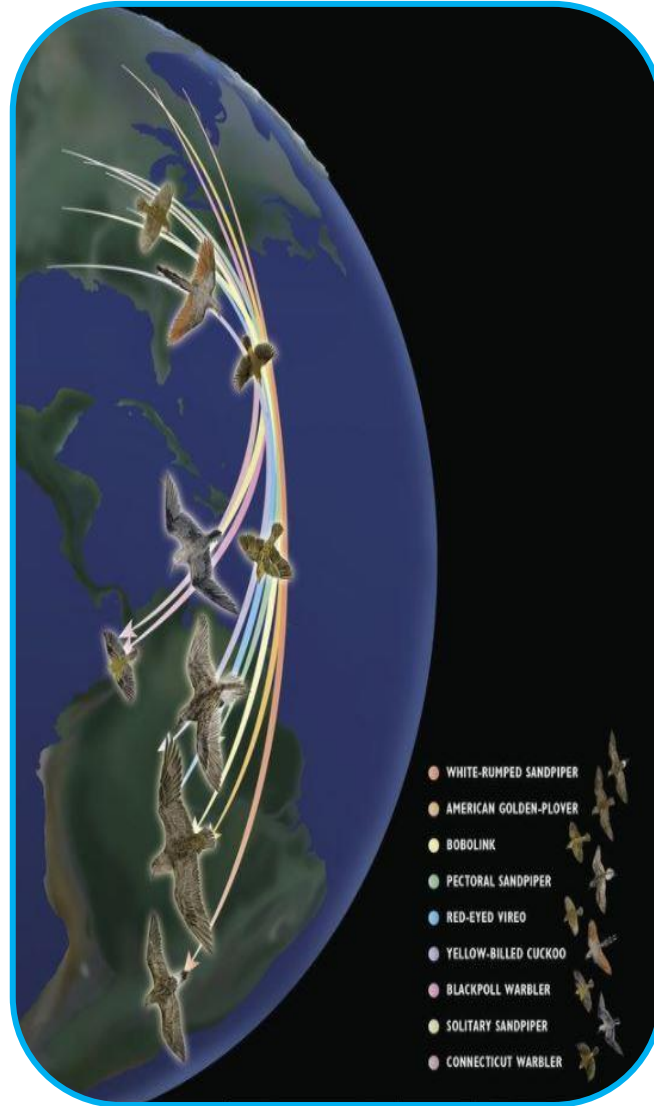


Impacts

- Heavy economic consequences**
- Safety Concerns to operations**
- Significant threat to passengers**

Public Perception

The sky Above : It is not just Air but a Habitat



Why Bird(Wildlife Hazard Management at Airports



Rapid localization to habitat from altitude

Quick localization spot from altitude
(highflyer species – soaring birds)

Birds' Regular affair on aerodrome

Soaring birds well sought destination
Gaming, mating, grooming of juveniles

Fears on this instinct

Diving speed raptors - >300 Km/h
No mid flight adjustments to its trajectory

Serious impact on conflict





Sky belongs to us –
Until we are taken care

THE MOST SACRED ANIMALS ON THE PLANET

WWW.LOVEVETERINARY.COM **LOVE**

COW According to legend, Lord Brahma, the Hindu god of creation, is believed to have created the cow and the milk it produces.

SNAKE Snakes are considered sacred in many cultures. In Hinduism, the snake is believed to be the vehicle of Lord Shiva, the Hindu god of destruction and rebirth.

TIGER According to the Hindu religion, the tiger is regarded as the symbol of the god Lord Hanuman. They symbolize power and courage and are believed to ward off evil and bring about good luck.

DOG They are considered sacred in many cultures. In Hinduism, the dog is believed to be the vehicle of Lord Yama, the Hindu god of death.

ELEPHANT Elephants are considered sacred in many cultures. In Hinduism, the elephant is believed to be the vehicle of Lord Ganesha, the Hindu god with an elephant head.

GOAT The goat is one of the 10 signs in the Chinese Zodiac. The goat has been worshipped since Greek and Egyptian mythology.

PIG The pig is considered sacred in many cultures. In Hinduism, the pig is believed to be the vehicle of Lord Hanuman, the Hindu god of strength and courage.

CAT The cat is considered sacred in many cultures. In Hinduism, the cat is believed to be the vehicle of Lord Shiva, the Hindu god of destruction and rebirth.

In addition, monkeys are regarded as sacred in many cultures. The monkey is believed to be the vehicle of Lord Hanuman, the Hindu god of strength and courage.



Social responsibility in WHM – A Co-existence perspective

Bird movement data management from dawn to dusk

Risk Assessment and awarding Risk Index to species – Endemic, Migratory & wildlife(animals

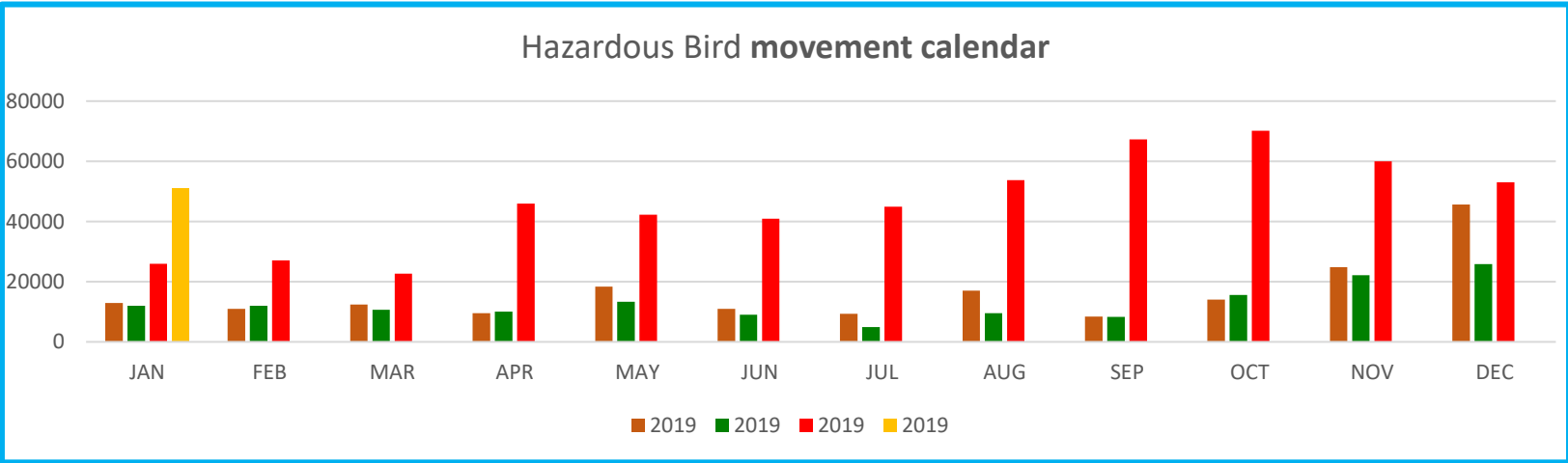
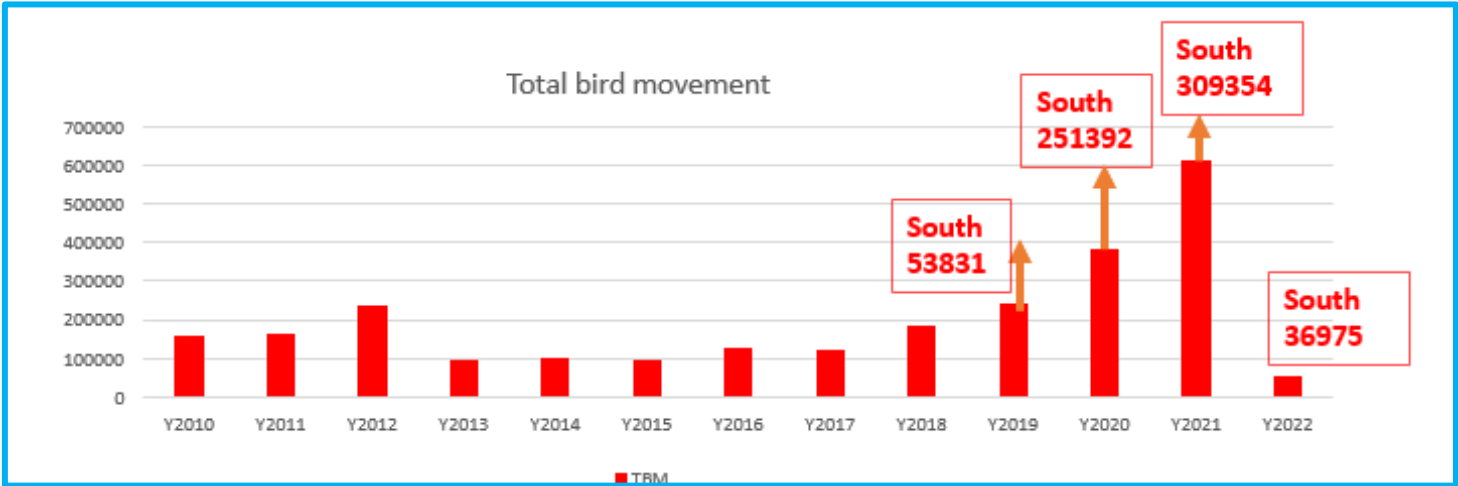
Categorization of Potential Hazardous and least hazardous species

Study the behaviors and instincts of the potential hazardous species

Engage eco friendly measures or alternatives for their safe being

A quick case study - BASHM, Bangalore international Airport Limited

BASHM – Bird Movement Calendar



Risk Assessment and Risk Index of species

BIAL - HAZARD RANKING OF SPECIES

Sl.NO	Species of Wildlife	Ranking based on Mass	Ranking based on Wing span/ length	Ranking based on movement at airside	Ranking based on flocking behaviour at PHZ	Ranking based on involvement with bird strike incidents at BIAL	Sum of Ranking (F =Sum of A+B+C +D+E)	Hazard Ranking of the Species for BIAL
		A	B	C	D	E	F	RI
1	PK	10	4	1	2	1	18	1
2	GH	4	3.9	10	6	0	23.9	2
3	Owl	2	3	11	9	4	29	3
4	MH	11	0.6	10	9	0	30.6	4
5	Bat	6	4	11	8	2	31	5

RA/RA - ENDEMIC WILDLIFE

Sl.No	Species	RA	RI
1	Primate	3B	1
2	Jungle Cat	4D	2
3	Hare	3D	3
4	Mongoose	4E	4
5	Pangoline	3E	5
6	Reptiles	3E	6

Ecological management – Scavenger/Raptor (Endemic)



Pariah Kite	
Category	Scavenger/Raptor/Soaring bird
Hazard Ranking	1
Concerns	83 % movements on aerodrome
Impact	Involvement in 35% bird strikes
Attraction	Thermals
Activity	Gaming, mating & Grooming
Behaviour	Flocking during rainy season
Deterrance	Physical deterrance
Critical season	Jul - Aug & Oct- Nov

Period	Zone F	Zone E	Zone D	Zone C	Zone B	Zone A
7th Week	957	732	614	735	1074	657
8th Week	621	646	533	639	791	646

PARIAH KITE														
Year	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Bird log	49616	114666	111776	138152	59022	76466	68026	60702	60841	73983	213459	150105	161654	31014
Bird strike	13	11	7	9	7	7	3	3	1	1		1	4	0

Co- existence measures - Endemic species



Species	Lapwing
Category	Ground bird
Specification	Ground nesting bird
Hazard Rank	1(nocturnal) /13 (Day)
Concerns	Moderate movements
Impact	Bird strike minimal numbers
Attraction	Safe habitat for breeding
Activity	Occuying tranquil space and laying eggs and taking care
Behaviour	Takes care of the area of living - Informer bird
Area	Critical areas
Deterrance	Physical deterrance
Critical season	Jan - Apr

Lapwing														
Year	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Bird log	1975	620	400	348	393	787	1446	5177	2494	5363	4550	5380	6995	3059
Bird strike	13	11	7	9	7	7	3	3	1	1	0	1	0	0

Ecological management – Nocturnal birds



Eagle Owl	
Category	Raptor
Specification	Nocturnal
Hazard Rank	Day 3/Night 2
Concerns	Uncontrolled movement
Attraction	Prey
Activity	Slow manouvering big sized
Behaviour	Hunting on basic strips
Area	Critical areas
Deterrance	Cut down food source
Critical season	All seasons

Owl														
Year	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Bird log	85	98	123	223	295	321	287	340	393	376	345	398	285	96
Bird strike	1	0	3	0	5	4	1	4	1	0	0	0	1	0

Ecological management



Treated the entire basic strip & moved out all the rodents



Away from critical area an undisturbed habitat left unattended and left for occupation

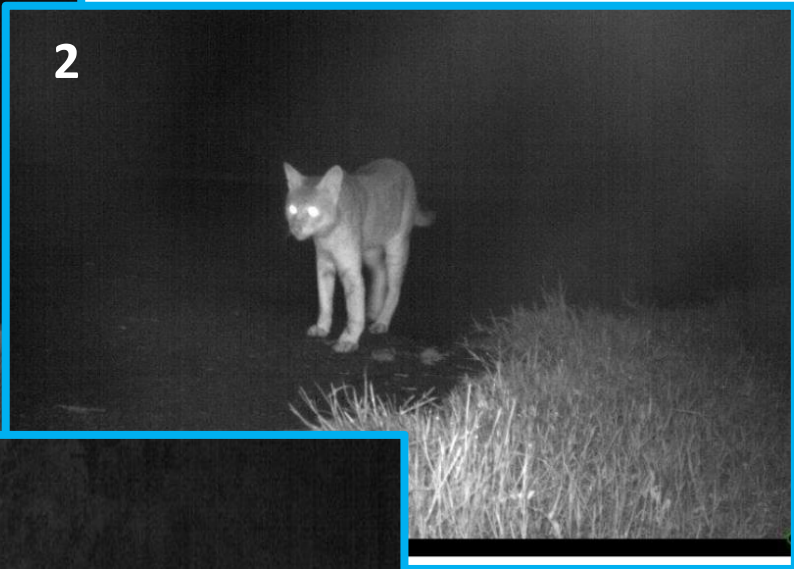


Relocated all the captured snakes from aerodrome premises and released at this area

Noticed a natural balance
Much effective than treatment
Rodent easily escapes killer application
Reduce Rodent population
Reduce Owl attraction to airside
Pulled all Owls from critical areas to non effective area

This area marked as snake habitat

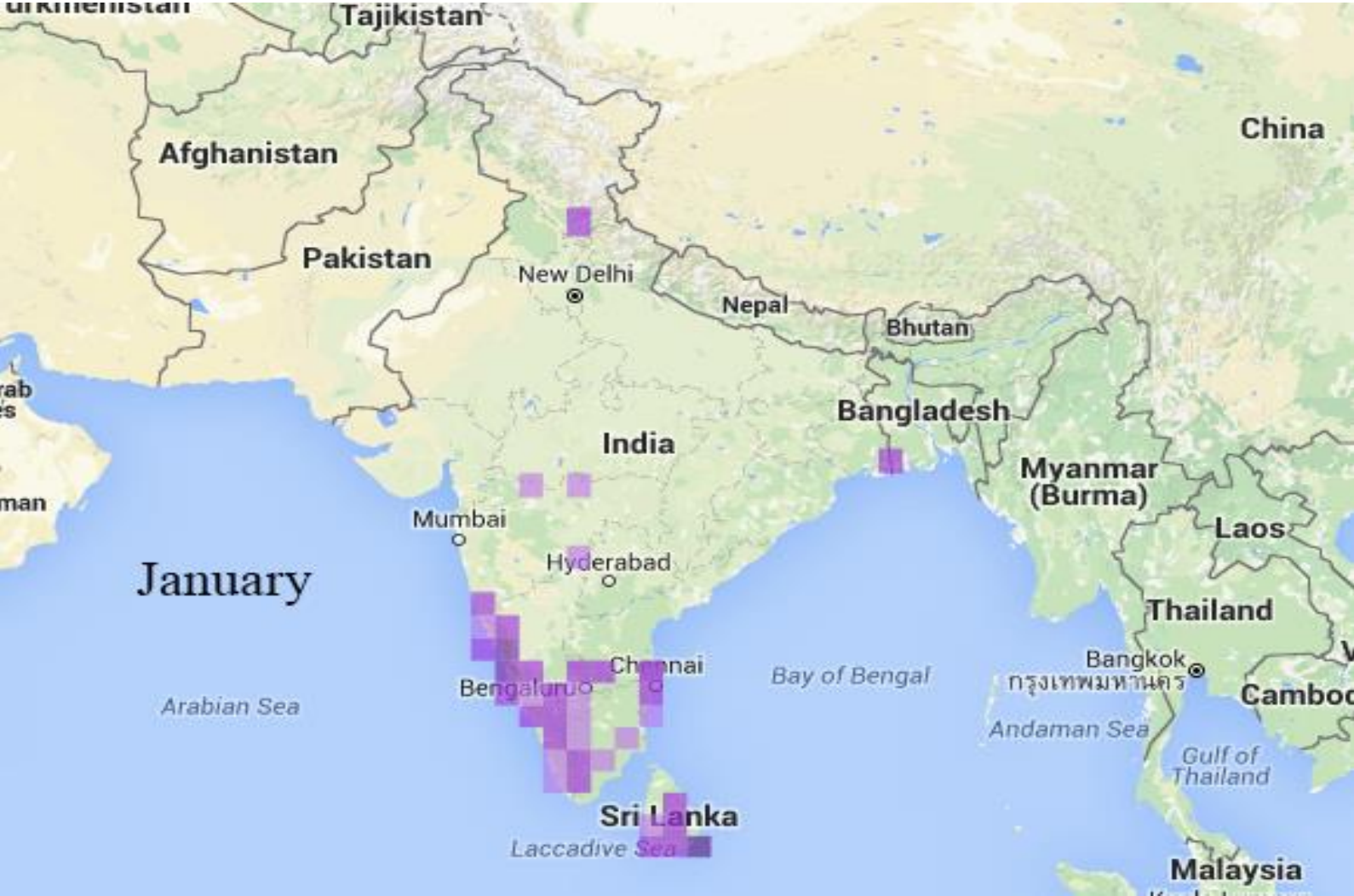
Ecological management



Black Napped Hare	
Hazard Ranking	Day 12/Night 3
Concerns	Nocturnal
Impact	Fast moving
Attraction	Grass blades
Activity	Moving around for food
Behaviour	Desperate movements
Deterrance	Chasing with sound/light
Critical season	Dec - May



Migration map endemic species - Swallows



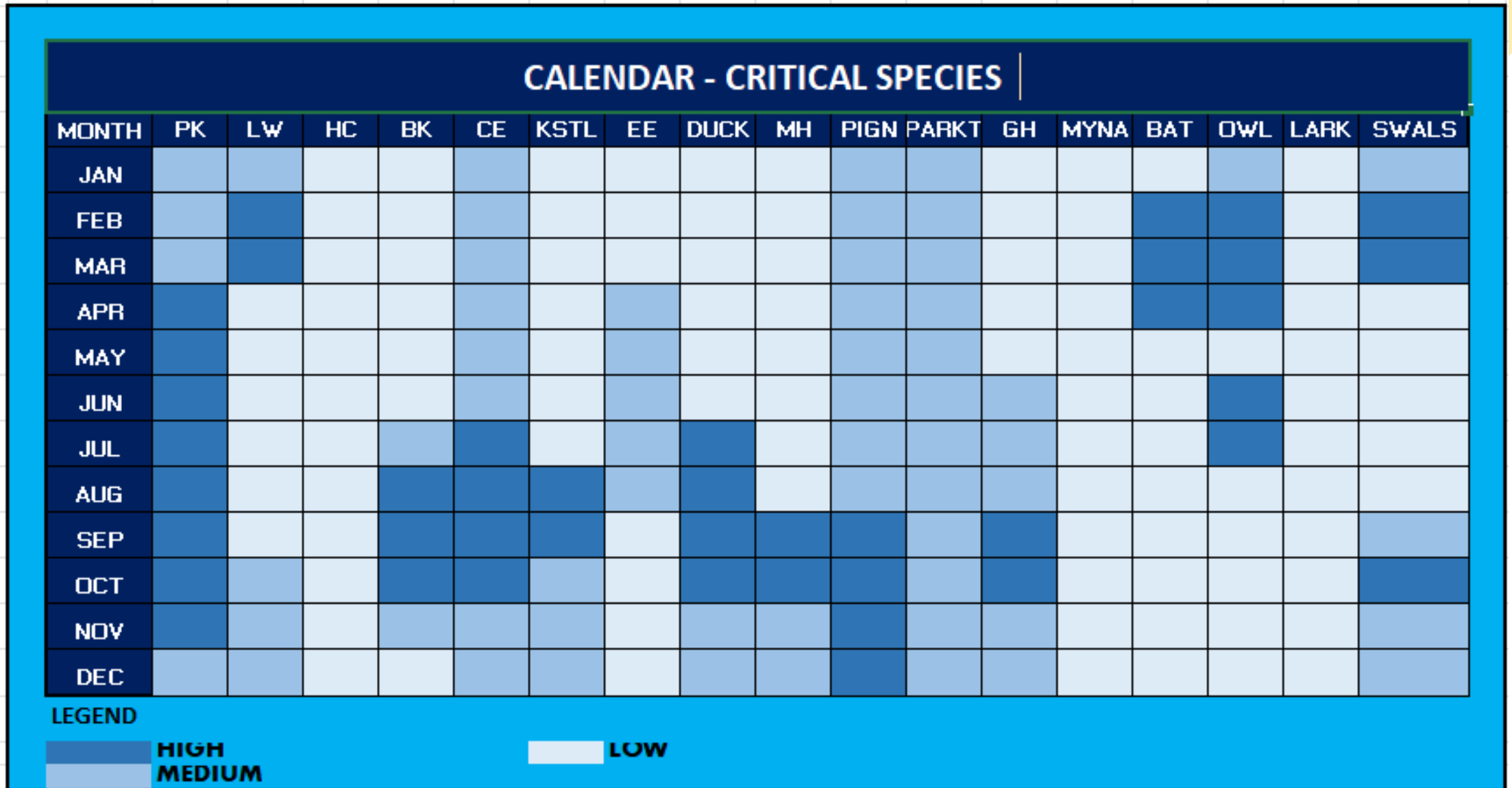
Transit migratory bird management



Swallows									
Year	2014	2015	2016	2017	2018	2019	2020	2021	2022
Bird log	722	495	8976	5535	23686	32643	23691	6726	2465
Bird strike	2	0	12	0	3	3	3	0	0



Calendar – Critical species



Aerodrome airside habitat – Monitoring & Management



Kikuyu 60: Bermuda 40 (Period – 2009 – 2013)



Invasion of natural species Period – 2013 - 2016



Spear grass (Period – 2016 - 2018)



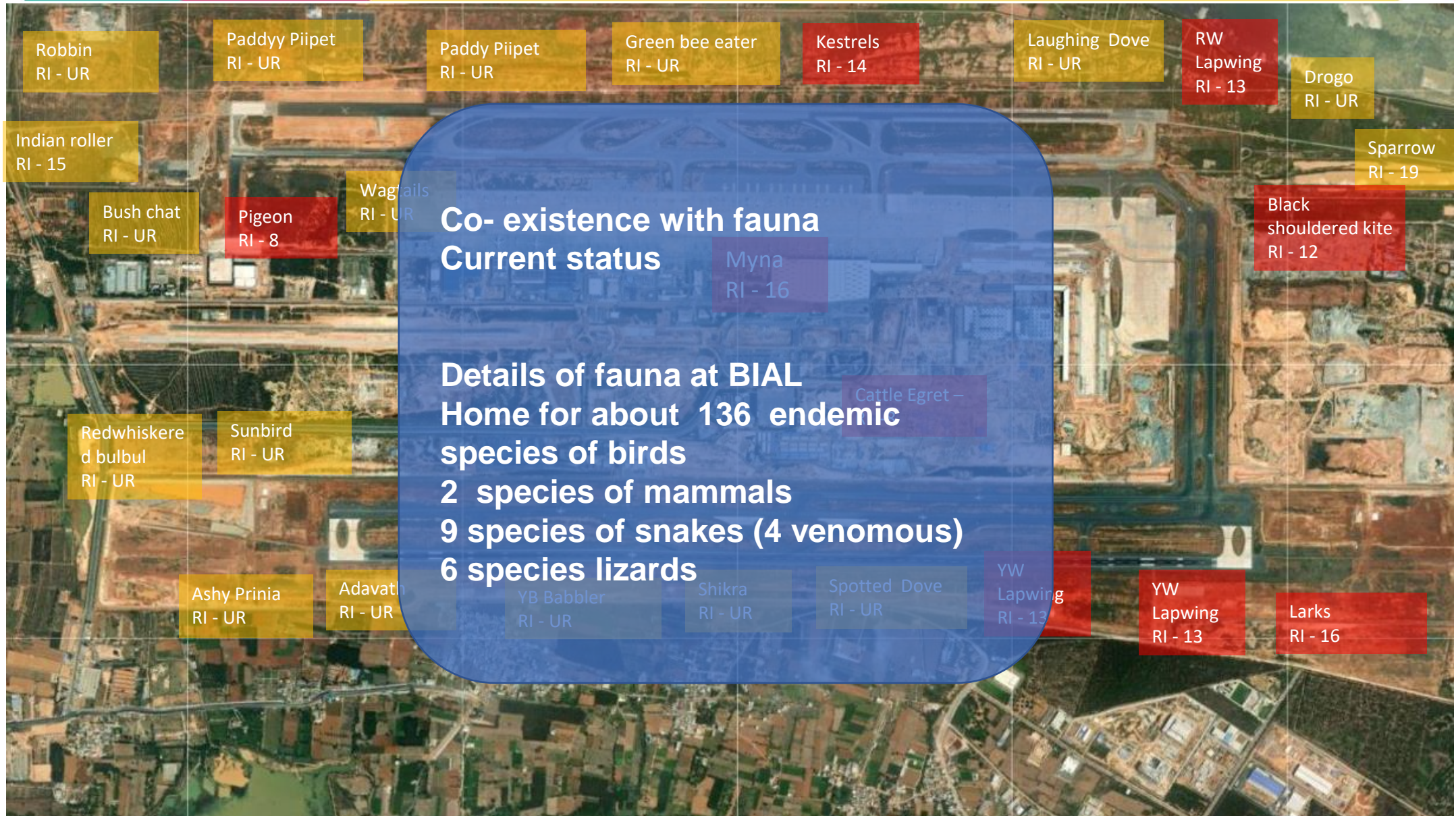
Stylosanthes (Period – 2017 - 2019)

Aerodrome Biodiversity Project stage 1



Details of fauna at BIAL
Home for about 147 endemic species of birds
2 species of mammals
11 species of snakes (4 venomous)
6 species lizards
7 species of toads
42 type of butterflies
3 species of moths

Tour – Topical Habitat - On Project completion



THANK YOU

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