

Native vegetation conservation vs. induced grass covered surfaces as a control measure for risk fauna



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12 ASA airports case study in Mexico



2011 Bird Strike North America Conference

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INTRODUCTION

Airports are due to maintain aerodrome conditions free of vegetation for visibility and safety, according to international regulations



Aerodromes

Volume I
Aerodrome Design and Operations

Fourth Edition
July 2004

International Civil Aviation Organization

Annex 14
to the Convention on
International Civil Aviation

Also...



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INTRODUCTION



Wildlife Hazard Management at Airports: A Manual for Airport Personnel

Edward C. Cleary Richard A. Dolbeer



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9.2.B HABITAT MODIFICATION AND EXCLUSION

Habitat modification means **changing the environment to make it less attractive or inaccessible to the problem wildlife**. All wildlife require food, cover, and water to survive. Any action that reduces, eliminates, or excludes one or more of these elements will result in a proportional reduction in the wildlife population at the airport.

The **management** of an airport's **airside ground cover to minimize bird activity is a controversial** subject in North America. **The general recommendation**, based on studies in England in the 1960s and 1970s, **has been to maintain a monoculture of grass** at a height of 6-10 inches (Transport Canada) or 7-14 inches (U.S. Air Force).

Tall grass, by interfering with visibility and ground movements, **is thought to discourage many species of birds from loafing and feeding**. However, the limited studies conducted in North America have not provided a consensus of opinion on the utility of tall-grass management for airports.

INTRODUCTION

What have we seen in our tropical/semiarid environments on 12 ASA airports?



Cardinals



Parrots



Whrens



Tucan



Peccary



Black-throated magpie jay



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Several native species prefer canopy/vegetation protected conditions than open spaces

INTRODUCTION

Whereas induced grass

Favors the entry of generalist , opportunistic and/or exotic species:

Increases risk because of their size and gregarious habits.



Domestic pigeon



Collared dove



Great-tailed-Grackle



Dogs



Cats



Jackrabbit



Cara cara

Cattle egret



NATIVE AND EXOTIC SPECIES



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USEC-FA

Airport	Native low risk species	Exotic, generalistic and high risk species
CEN Matorral xerófilo	Lince (<i>Lynx rufus</i>) Juancito (<i>Spermophilus</i> sp) Zorrillo (<i>Mephitis</i> sp.)	Perro (<i>Canis familiaris</i>) Gato (<i>Felis catus</i>) Zanate (<i>Quiscalus mexicanus</i>)

Airport	Native low risk species	Exotic, generalistic and high risk species
PXM Trópico seco	Zorra gris (<i>Urocyon cinereoargenteus</i>) Jaquarundi (<i>Herpailurus yagouaroundi</i>)	Perro (<i>Canis familiaris</i>) Zanate (<i>Quiscalus mexicanus</i>)

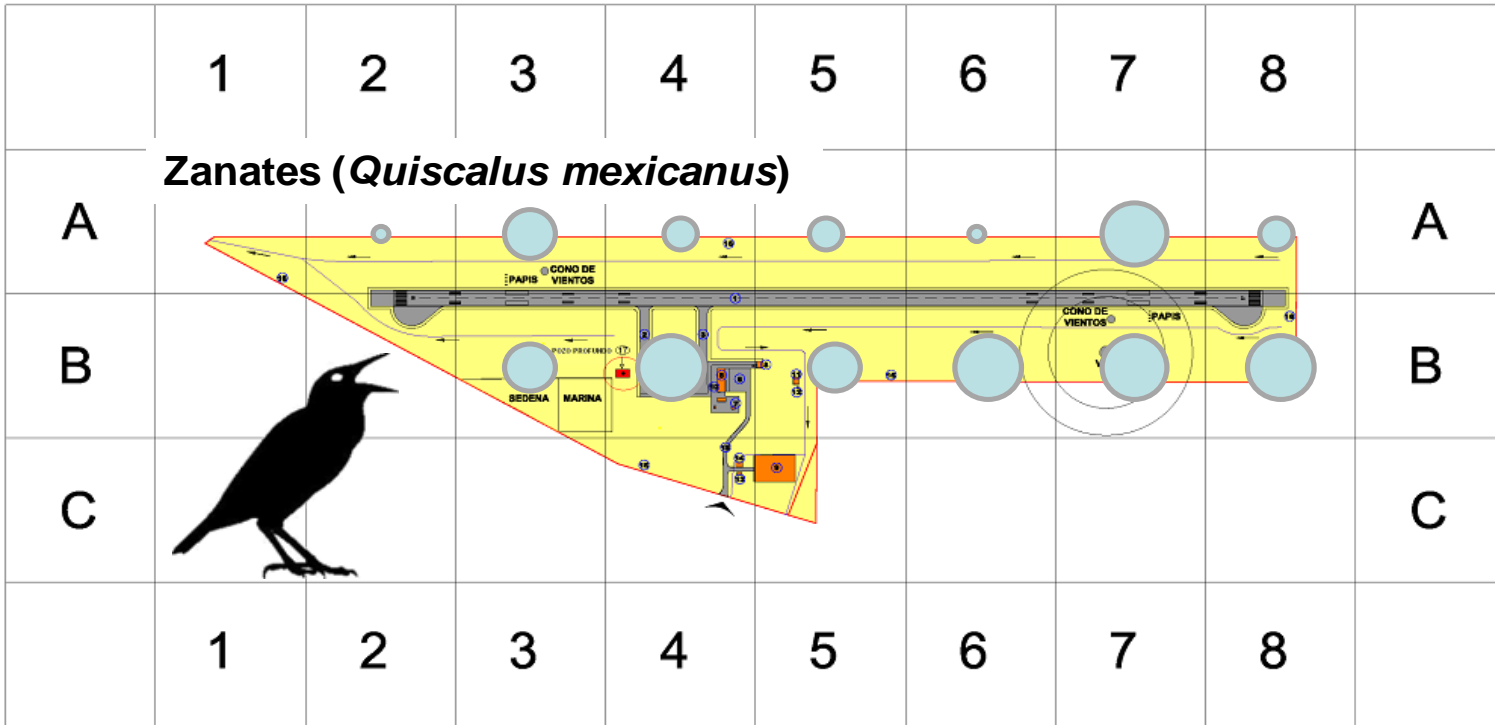
Airport	Native low risk species	Exotic, generalistic and high risk species	
PAZ Trópico húmedo	CTM Trópico húmedo	Zorra gris (<i>Urocyon cinereoargenteus</i>) Zereque (<i>Dasyprocta</i> sp) Tepezcuintle (<i>Cuniculus paca</i>) Coatí (<i>Nasua narica</i>) Mapache (<i>Procyon lotor</i>) Cuatro ojillos (<i>Philander opossum</i>) Tlacuache (<i>Didelphis</i> sp) Urracas (<i>Cyanocorax yucatanensis</i>) Lagartijas (Diversos géneros) Serpientes (Diversos géneros)	Zanate (<i>Quiscalus mexicanus</i>)
MAM Matorral espinoso	CVM Matorral espinoso	UPN Bosque de pino y	Perro (<i>Canis familiaris</i>) Gato (<i>Felis catus</i>) Zanate (<i>Quiscalus mexicanus</i>) Paloma doméstica (<i>Columba livia</i>)




TPQ	GYM Matorral xerófilo	Zorra gris (<i>Urocyon cinereoargenteus</i>) Zorrillo (<i>Mephitis</i> sp)	Perro (<i>Canis familiaris</i>) Paloma doméstica (<i>Columba livia</i>)
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LTO Matorral xerófilo	Lince (<i>Lynx rufus</i>) Zorrillo (<i>Mephitis</i> sp)	Perro (<i>Canis familiaris</i>)
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INTRODUCTION

Example: Great-tailed Grackle



-  $\geq 16 \leq 28$
-  $\geq 8 < 16$
-  $\geq 5 < 8$
-  $\geq 1 < 5$

Great-tailed Grackle abundances

INTERROGATIVE ?



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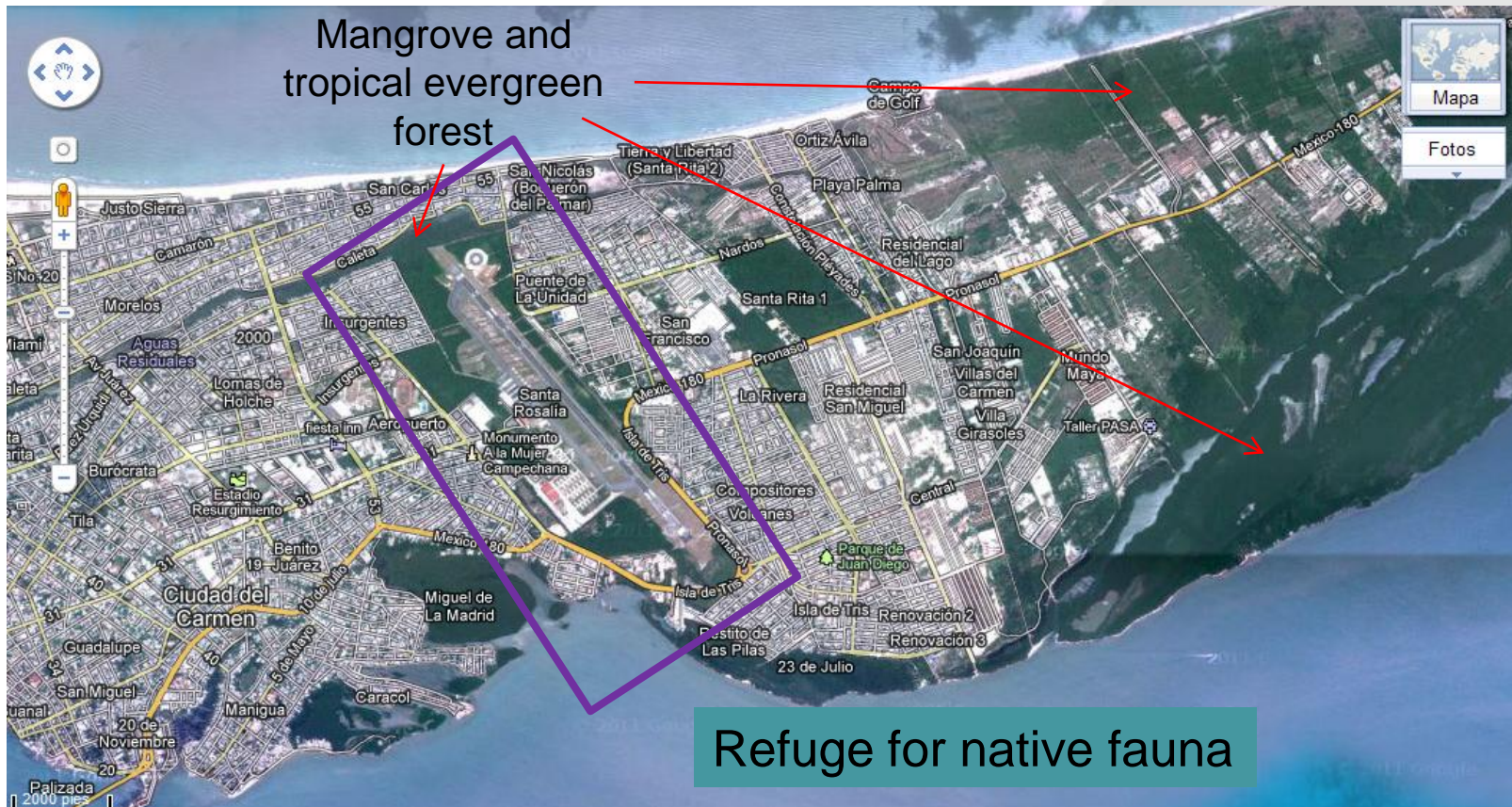
For Mexican tropical evergreen and semiarid airports.

Is a grass monoculture an appropriate measure to reduce risk fauna activity ?



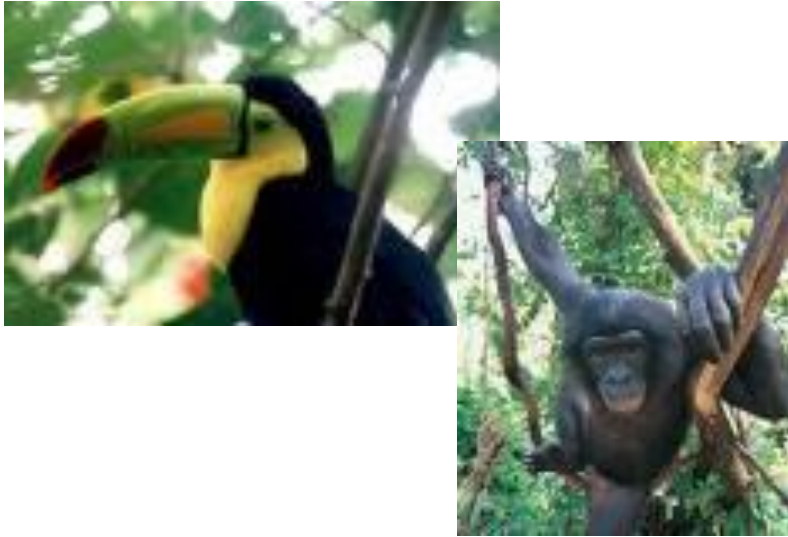
SITUATION

Many airports in Mexico represent high diversity islands within an urban/agricultural ocean.



Niche occupation by native species inside airport boundaries
(how an organism makes a living)

SITUATION: Niche occupation



Tropical landscape holds tropical fauna:

Satisfies all their needs for food, water, shelter, housing and reproduction

Animals don't go about searching for them elsewhere



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SITUATION: Niche occupation



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Semi-arid landscape holds semi-arid fauna:

Satisfies all their needs for food, water, shelter, housing and reproduction

Animals get exposed to environment/predators if they go about searching for them in more open areas

RESULTING SITUATION

Native fauna remains within native vegetation



Opportunistic gregarious species take advantage with airport clearings and grass monoculture establishment



RISK IMPLICATIONS?



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HYPOTHESIS

Native vegetation areas hold less high risk species, compared to modified landscapes with induced grass monoculture.

OBJECTIVE

To compare risk fauna species abundances in native vegetation and grass monoculture areas within different airports in Mexico.



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STUDY SITE

12 ASA airports under different native vegetation cover



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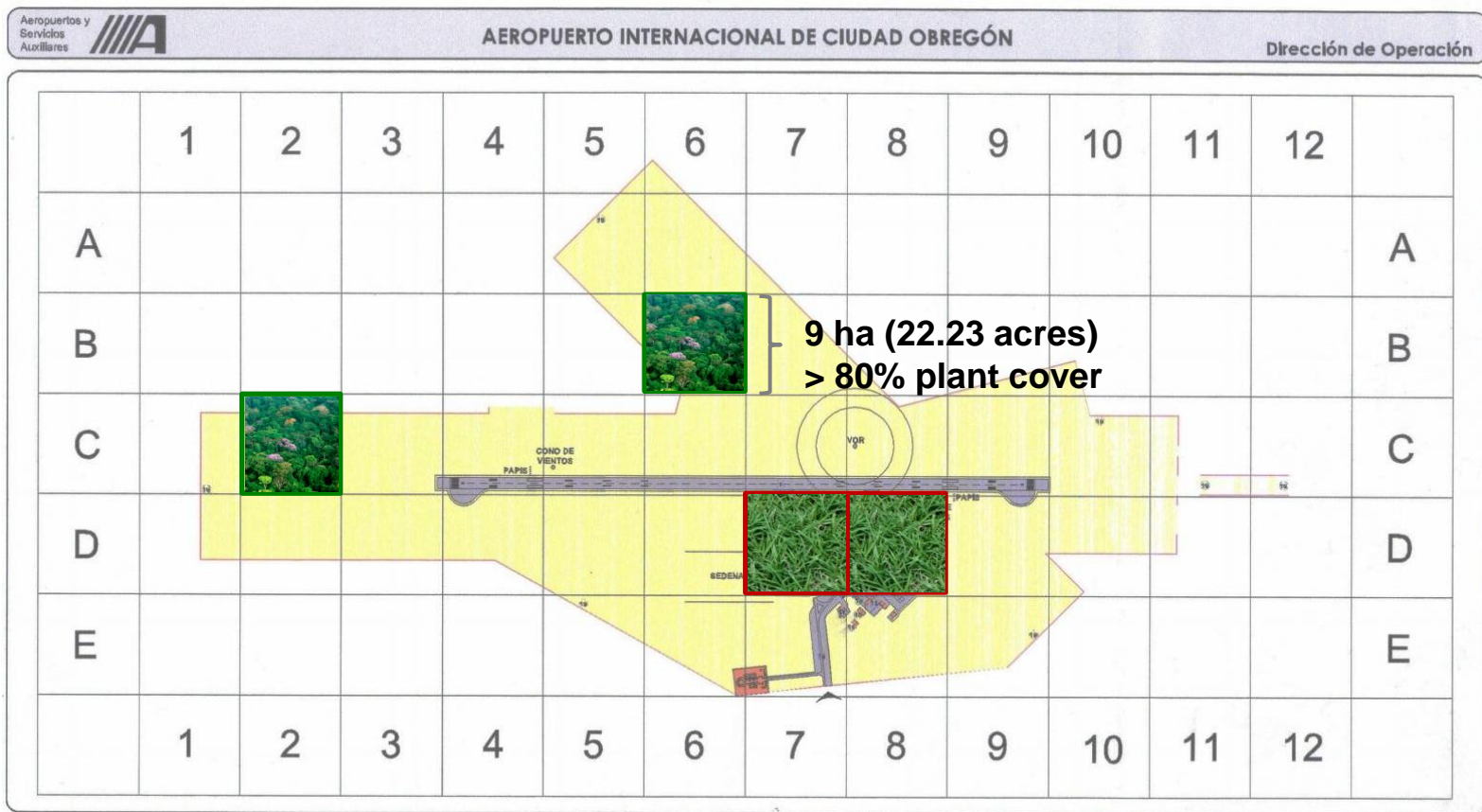
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SAMPLING



At each airport... 2 plots of each vegetation type

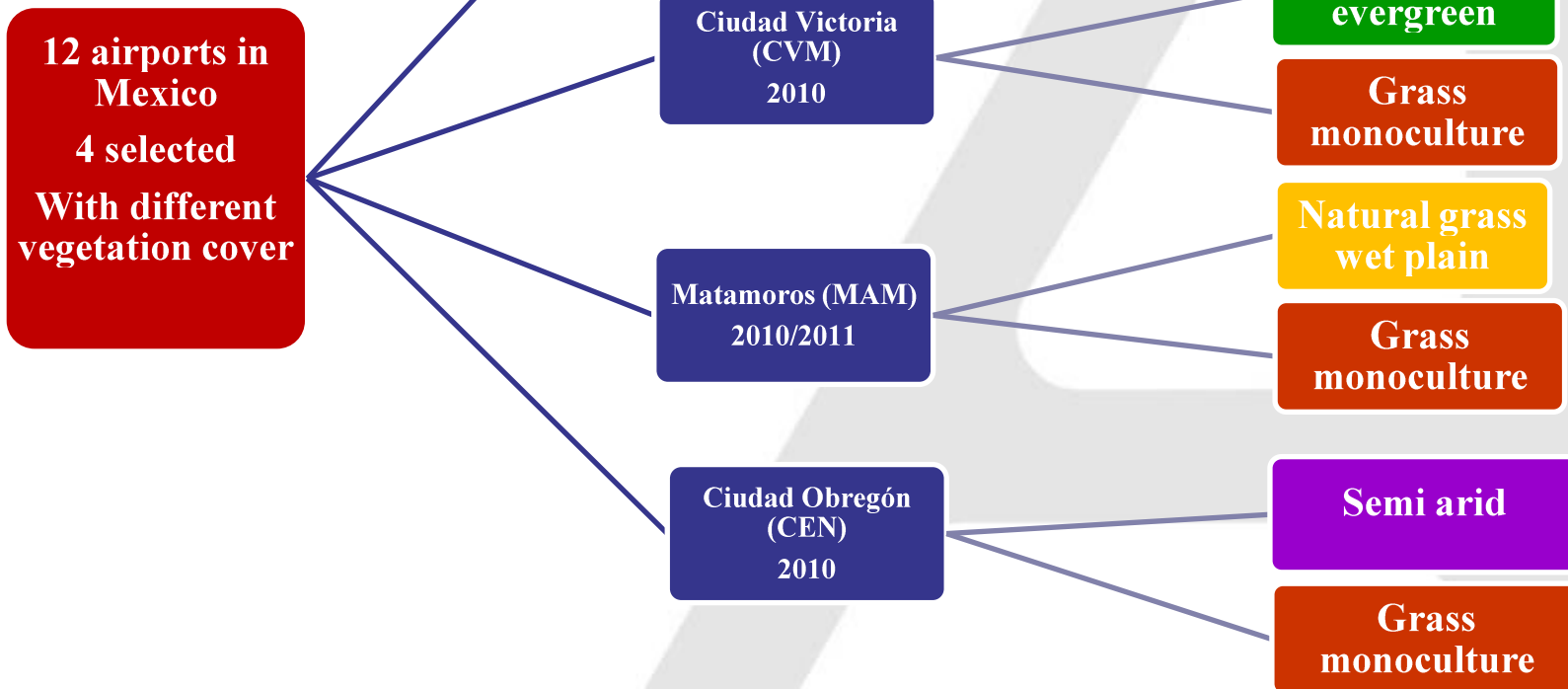


SAMPLING



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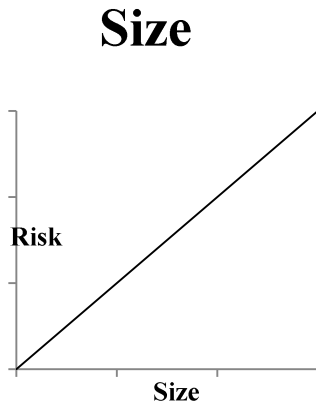
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HAZARDOUS FAUNA CRITERIA



Composed risk index



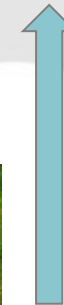
Behavior



Dep. time	To	Flight No.	Gate	Status
07:00	Bangkok	169003		Check in
08:30	Bangkok	FD3771		
10:00	Bangkok	TQ304/M8224		
10:10	Singapore	M851		
11:30	Taipei	A8328		
14:50	Kunming/Beijing	CA908		
16:33	Singapore	M8517		
17:00	Chiangmai	GT112		
19:45	Bangkok	TQ304/M8228		
20:10	Bangkok	BMS38/FG4546		

28 Feb 2008, 05:48 wired by BMS ITX-Cast. data will be closed 20 minutes later

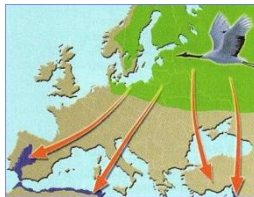
Abundance



High risk

Low risk

Frequency/movement



Migratory species



Resident species

Statistics (reported incidents)



HAZARD SPECIES CLASSIFICATION



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Category	Value	Definition
Very High	4	Species gathering 4 -5 hazard criteria
High	3	Large and abundant resident species. Activities near runway. Three risk factors are considered.
Medium	2	Medium gregarious species that use airport movement areas. Represent an indirect risk they attract predators
Low	1	Small size, lone habits, and do not use airport movement areas. They attract predators
Not determined	0	Not registered species. Airport workers report its presence, but we do not have enough information for establishing a risk category.

PRELIMINARY RESULTS



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Risk Species Abundances:

PAZ: Poza Rica

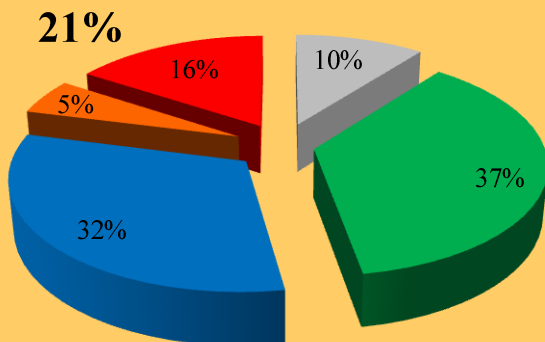
CVM: Cd Victoria

Native vegetation

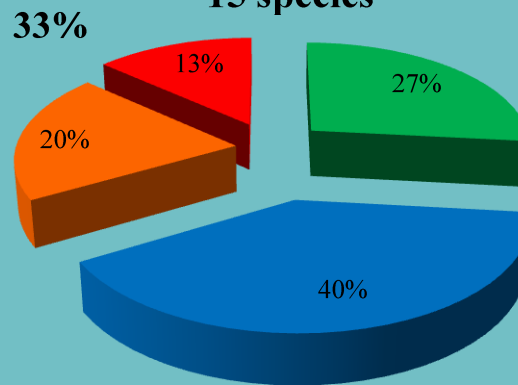
Tropical evergreen

Grass Monoculture

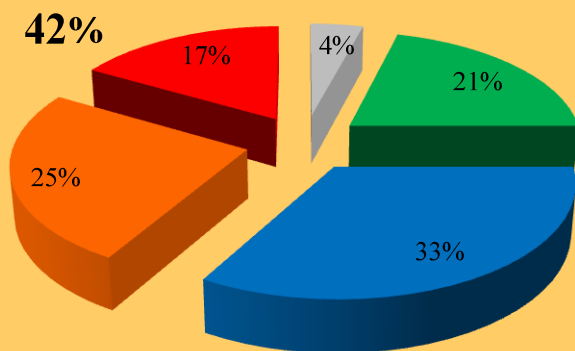
19 species



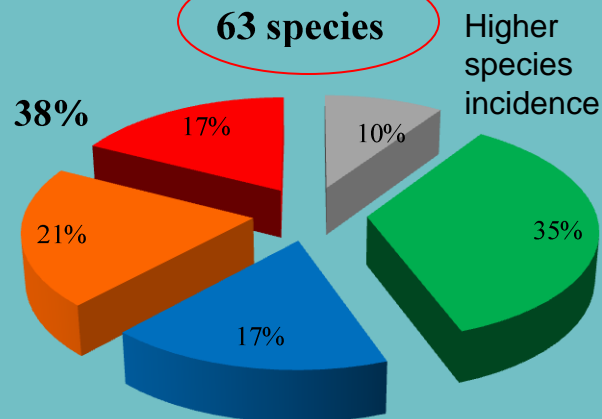
15 species



24 species



63 species



Very High	4
High	3
Medium	2
Low	1
Not det.	0

PRELIMINARY RESULTS



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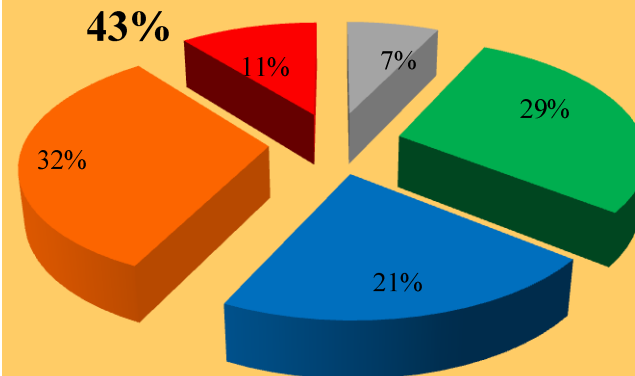
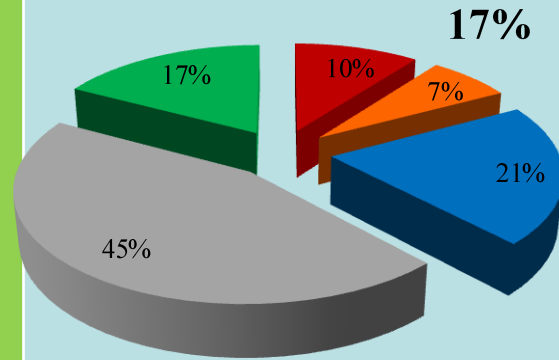
CEN: Nuevo Laredo

MAM: Matamoros

29 species

28 species

Native vegetation



Semi arid

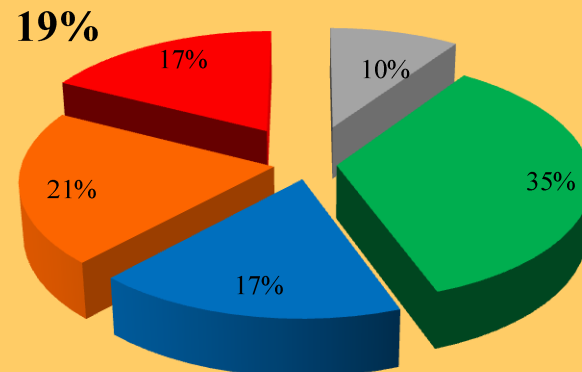
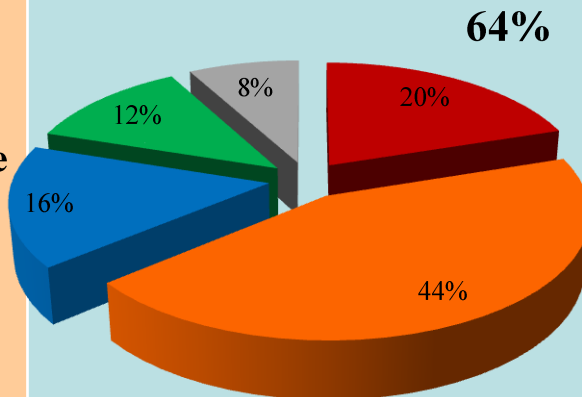
Natural grass/wet plain

25 species

63 species

Higher species incidences

Grass Monoculture



Very High	4
High	3
Medium	2
Low	1
Not det.	0

MAM: Matamoros airport

Natural grass/wet plain



PRELIMINARY RESULTS



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Airport	Native vegetation		Grass monoculture	
	Very high risk	High risk	Very high risk	High risk
MAM	3	9	11	13
CVM	2	3	4	3
CEN	3	2	5	11
PAZ	3	1	4	6
	11	15	24	33
TOTAL		26		57



OTHER ADVANTAGES



Conservation of native vegetation:

- Additional benefits:



Reduces maintenance costs



Environmental services



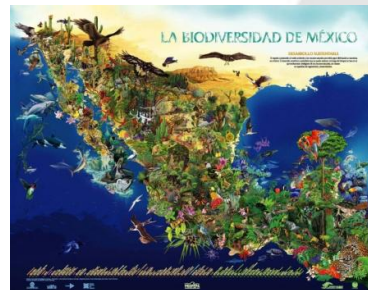
Prevents soil erosion



Noise isolation



Dust isolation



Supports local biodiversity



Improves landscape configuration

Maintenance of monotypic, uniform stands of tall grass is difficult and expensive on many airports because of varying soil conditions and the need for fertilizer and herbicide applications. Arid regions in the western USA cannot maintain tall grass without irrigation.

CONCLUSIONS

Preliminary results suggest:

- Substitution of a large portion of the natural vegetation within airport boundaries (under tropical evergreen and arid conditions) by induced grass monoculture seems to open niche possibilities for opportunistic species, which imply higher risk than natives due to their gregarious daring behavior, size and mobility.
- Induced pastures produce spikes and soil fauna that constitute abundant food sources for rodents, insects and birds, that attract predators of higher risk levels than the former. Therefore we think they should be restrained to the minimal surface required by airport safety requirements.
- Keeping native vegetation as much as possible helps to preserve biodiversity, soil, protects endemic and endangered species, avoids the entry of exotic and generalist species and doesn't need maintenance (less \$). *(The management of airside vegetation to minimize rodents, insects, and seeds might be complex, requiring insecticide, herbicide, and rodenticide applications; changes in vegetation cover; and adjustments in mowing schedules..-Cleary Richard A. Dolbeer, 2005)*



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WHAT'S NEXT?

Once we have at least one year of risk fauna monitoring at all ASA airports, we plan to analyze data grouped by type of native vegetation so that we can test our hypothesis in a more robust way.

If our suspicions are confirmed by such analysis, we would like to do some trial plots for different types of creeping vegetation/grasses and other materials to look for alternative solutions.



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THANK YOU!

