

Assessing the Risk of Off-airport Bird Hazards

Phil Shaw
Managing Director
&
Will Jamieson

Risk Score Card 2009/10

ITEM	2007/08	2008/09	2009/10 target	2009/10 actuals	Next Years Target
Total Strikes	11	8	6	5	5
Damaging strikes	1	1	0	0	0

Damaging Strike Benchmark?

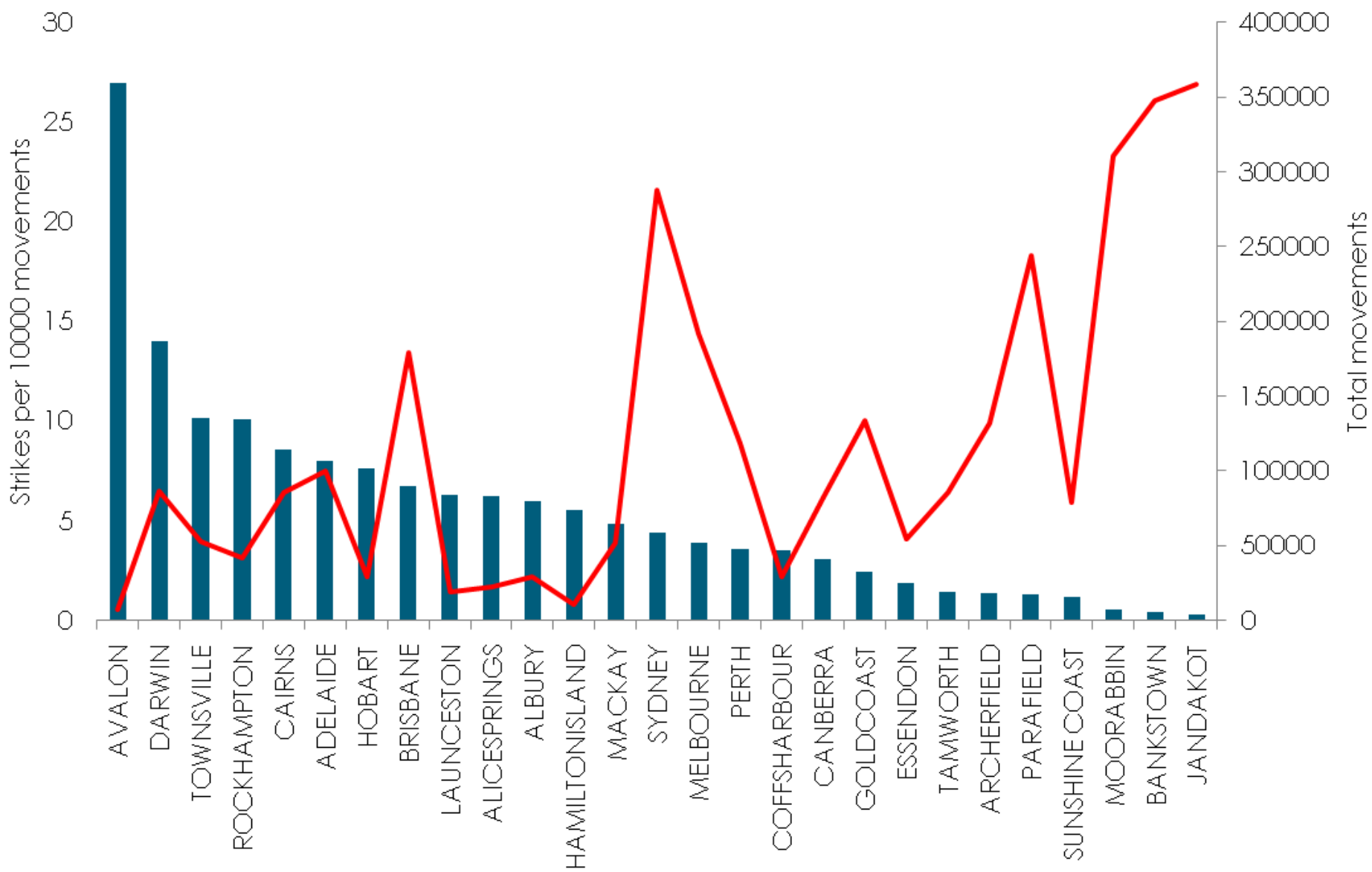


1 per 100,000
aircraft movements

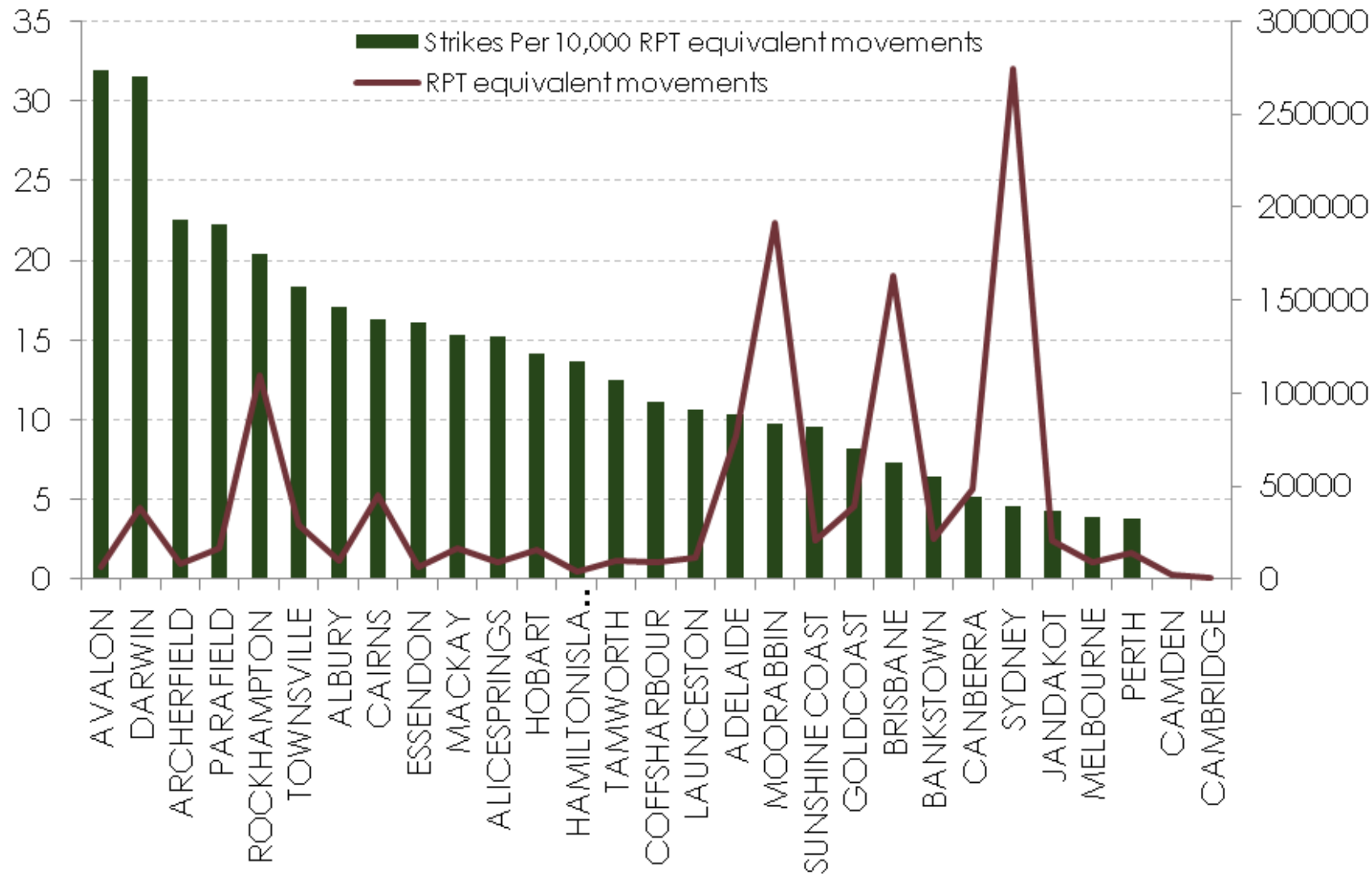
(Dolbeer 2008)

Risk Score Card 2009/10

ITEM	2007/08	2008/09	2009/10 target	2009/10 actuals	Next Years Target
Total Strikes	11	8	6	5	5
Damaging strikes	1	1	0	0	0
Strikes affecting planned flight	5	1	1	1	0
Strikes Rate per 10,000 Movements (RSR)	16.1	9.6	8	5.5	6
Strikes per 10,000 RPTEM Corrected (CSR)	47.1	32.5	30	21.1	25



Strikes per 10,000 RPT Equivalent Movements



RPT Equivalent Movements

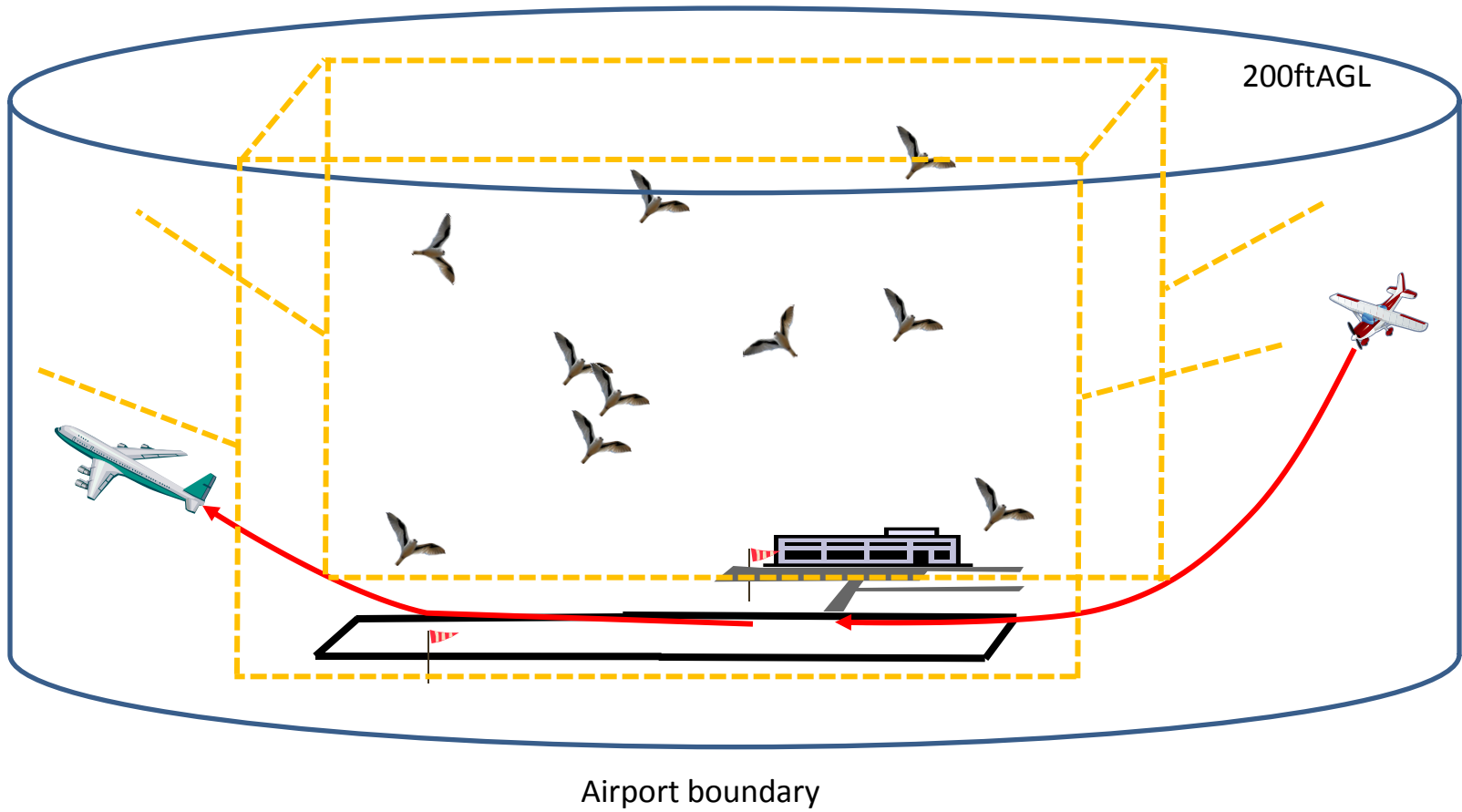
Risk Score Card 2009/10

ITEM	2007/08	2008/09	2009/10 target	2009/10 actuals	Next Years Target
Total Strikes	11	8	6	5	5
Damaging strikes	1	1	0	0	0
Strikes affecting planned flight	5	1	1	1	0
Strikes Rate per 10,000 Movements (RSR)	16.1	9.6	8	5.5	6
Strikes per 10,000 RPTEM Corrected (CSR)	47.1	32.5	30	21.1	25
Ranking at Australian Airports	2	5	6	5	6
Total Mass Struck (g)	5861	1935	2000	2691	2000
Mass Struck per RPTEM (g)	2.5	0.83	0.86	1.16	0.86

Risk Score Card 2009/10

ITEM	2007/08	2008/09	2009/10 target	2009/10 actuals	Next Years Target
Total Strikes	11	8	6	5	5
Damaging strikes	1	1	0	0	0
Strikes affecting planned flight	5	1	1	1	0
Strikes Rate per 10,000 Movements (RSR)	16.1	9.6	8	5.5	6
Strikes per 10,000 RPTEM Corrected (CSR)	47.1	32.5	30	21.1	25
Ranking at Australian Airports	2	5	6	5	6
Total Mass Struck (g)	5861	1935	2000	2691	2000
Mass Struck per RPTEM (g)	2.5	0.83	0.86	1.16	0.86
Infringement Rate - Risk species in CA/hour	15	14	10	18	10

Infringement Rates



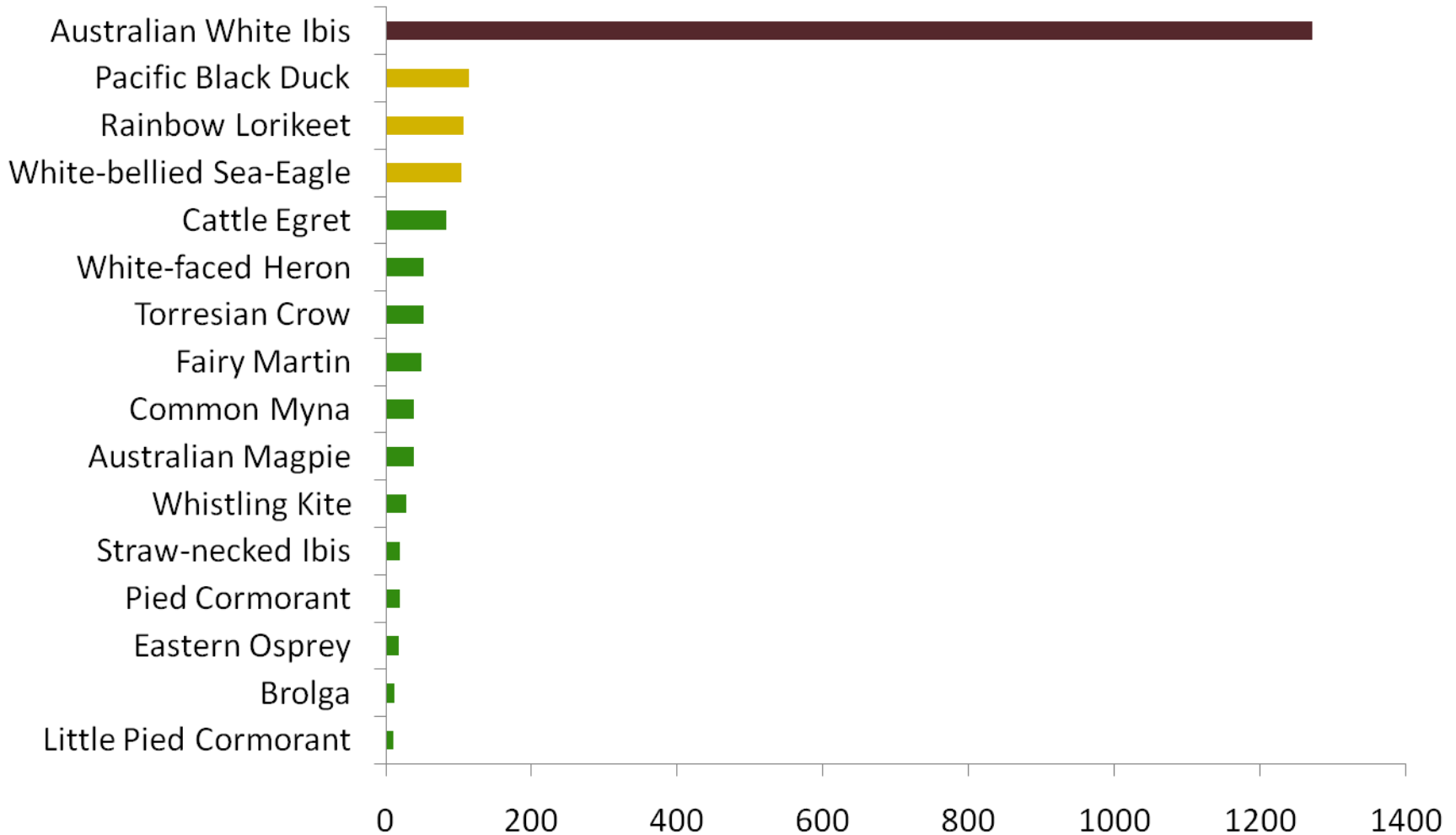
Risk Score Card 2009/10

ITEM	2007/08	2008/09	2009/10 target	2009/10 actuals	Next Years Target
Total Strikes	11	8	6	5	5
Damaging strikes	1	1	0	0	0
Strikes affecting planned flight	5	1	1	1	0
Strikes Rate per 10,000 Movements (RSR)	16.1	9.6	8	5.5	6
Strikes per 10,000 RPTEM Corrected (CSR)	47.1	32.5	30	21.1	25
Ranking at Australian Airports	2	5	6	5	6
Total Mass Struck (g)	5861	1935	2000	2691	2000
Mass Struck per RPTEM (g)	2.5	0.83	0.86	1.16	0.86
Infringement Rate - Risk species in CA/hour	15	14	10	18	10
Very high risk species	1	0	0	1	0
High risk species	5	4	3	4	3
Moderate risk species	16	13	13	14	13
Airport Survey Risk Index	2590	953	900	2130	1000

Risk by species from the survey record

Risk Characteristic	
Population	Probability of a strike
Ability to avoid aircraft	
Location on airport	
Time spent in air	
Mass	Consequence of a strike
Flock Size	

Risk by species from the survey record



Risk by species from the strike record

		Probability of strikes (5 year strike average for each species)				
		Very Low	Low	Moderate	High	Very High
Probability of damage	Very Low	Green	Green	Green	Green	Green
	Low	Green	Green	Green	Yellow	Yellow
	Moderate	Green	Green	Yellow	Dark Red	Dark Red
	High	Yellow	Yellow	Dark Red	Dark Red	Dark Red
	Very High	Yellow	Dark Red	Dark Red	Dark Red	Dark Red

Low Risk: no further action beyond current management is required

Medium Risk: review current management practices & options for additional action required

High Risk: immediate action required to reduce the current risk

Risk by species from the strike record

(% Damage = 0.014 x mass in grams)

		Probability of strikes (5 year strike average for each species)				
		Very Low	Low	Moderate	High	Very High
Probability of damage	< 140g Very Low					
	140-414g Low					
	415-696g Moderate					
	697-1407g High					
	> 1408g Very High					

Low Risk: no further action beyond current management is required

Medium Risk: review current management practices & options for additional action required

High Risk: immediate action required to reduce the current risk

Risk by species from the strike record

Probability of strikes (5 year strike average for each species)							
Probability of damage		Very Low	Low	Moderate	High	Very High	
	Very Low	House Sparrow Nankeen Kestrel Richard Pipit Tree Martin Welcome Swallow	Unknown Small Bird				
	Low	Australian Hobby Silver Gull	Australian Magpie Unknown Medium Bird Masked Lapwing	Unknown Bird			
	Moderate		White-faced Heron				
	High	Nankeen Night Heron	Cattle Egret Whistling Kite	Unknown Flying-fox			
	Very High	Australian White Ibis	Black Duck Wood Duck				

Low Risk: no further action beyond current management is required

Medium Risk: review current management practices & options for additional action required

High Risk: immediate action required to reduce the current risk

Combined risk species

COMBINED Risk Category	Species	TREND
Very High	Australian White Ibis	Increase
High	Flying-fox	
High	Pacific Black Duck	
High	Rainbow Lorikeet	Increase
High	White-bellied Sea-Eagle	Increase
High	Cattle Egret	Increase
High	Wood Duck	Increase
Moderate	White-faced Heron	
Moderate	Torresian Crow	
Moderate	Fairy Martin	New addition (SRI)
Moderate	Common Myna	New addition (SRI)
Moderate	Australian Magpie	
Moderate	Whistling Kite	Decrease
Moderate	Straw-necked Ibis	
Moderate	Pied Cormorant	New addition (SRI)
Moderate	Eastern Osprey	New addition (SRI)
Moderate	Brolga	New addition (SRI)
Moderate	Little Pied Cormorant	New addition (SRI)
Moderate	Nankeen Night Heron	New addition (strike)

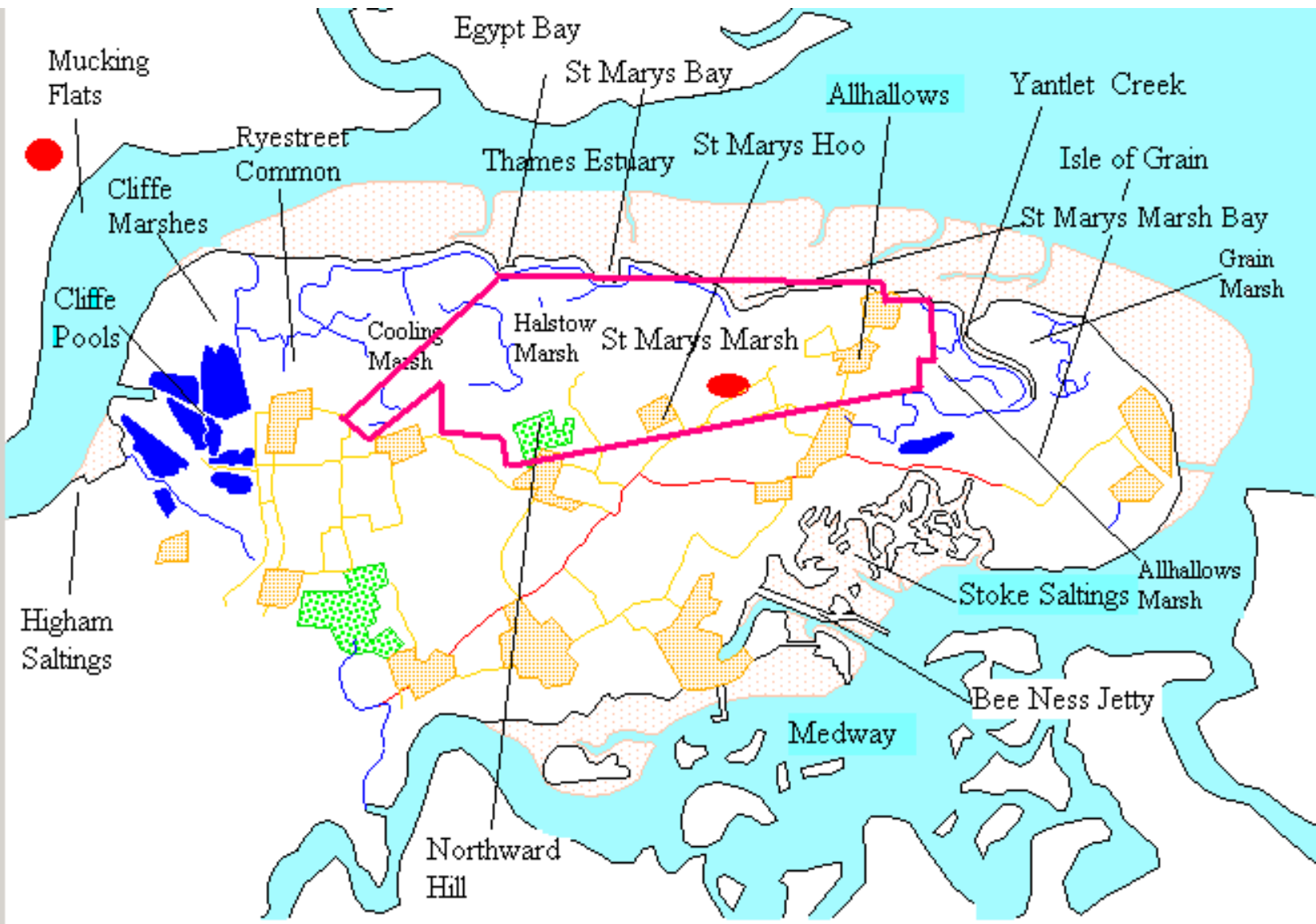
Risk Score Card 2009/10

ITEM	2007/08	2008/09	2009/10 target	2009/10 actuals	Next Years Target
Total Strikes	11	8	6	5	5
Damaging strikes	1	1	0	0	0
Strikes affecting planned flight	5	1	1	1	0
Strikes Rate per 10,000 Movements (RSR)	16.1	9.6	8	5.5	6
Strikes per 10,000 RPTEM Corrected (CSR)	47.1	32.5	30	21.1	25
Ranking at Australian Airports	2	5	6	5	6
Total Mass Struck (g)	5861	1935	2000	2691	2000
Mass Struck per RPTEM (g)	2.5	0.83	0.86	1.16	0.86
Infringement Rate - Risk species in CA/hour	15	14	10	18	10
Very high risk species	1	0	0	1	0
High risk species	5	4	3	4	3
Moderate risk species	16	13	13	14	13
Airport Survey Risk Index	2590	953	900	2130	1000

Off-airport bird/bat hazards

- Transiting birds/bats to and from roosting, nesting or foraging sites
- Build up of populations off airport
 - Airport
 - Approaches
 - En-route







Off-airport bird/bat hazards

Consequence		
Mass		
> 1408g	5	Very High
697-1407g	4	High
415-696g	3	Moderate
140-414g	2	Low
< 140g	1	Very Low

Add 1 to score if in multiple strikes

Off-airport bird/bat hazards

Likelihood		
Total Strikes Past 5 Years		
> 50	5	Very High
15-50	4	High
5 - 14	3	Moderate
2 - 4	2	Low
1	1	Very Low
0	0	Very very low

Off-airport bird/bat hazards

Likelihood		
Numbers per Ha		
>50	5	Very High
31 - 50	4	High
16 - 30	3	Moderate
5 - 15	2	Low
<5	1	Very Low

Off-airport bird/bat hazards

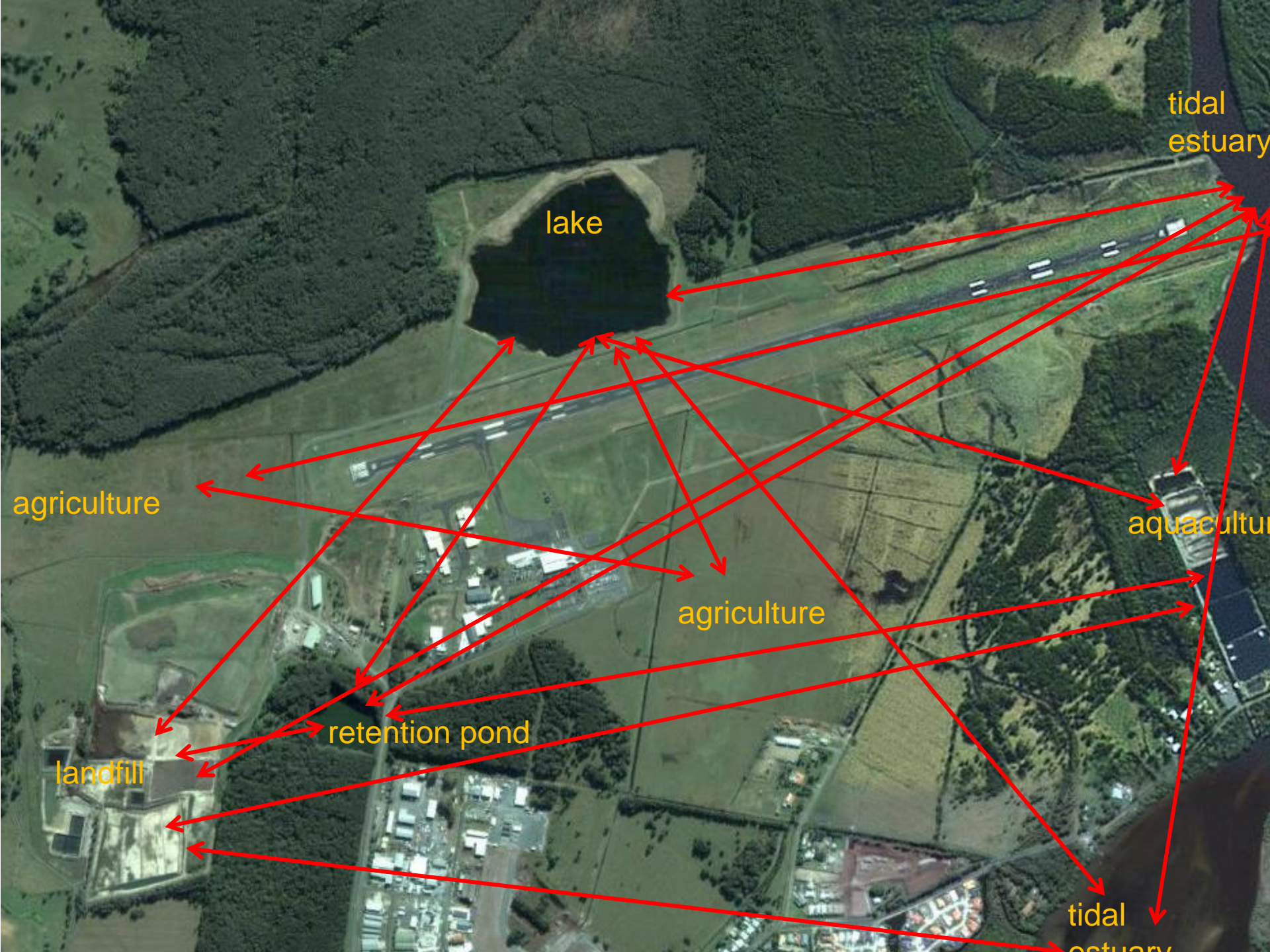
Likelihood		
Distance from airport		
<0.8km	5	Very High
0.8-1.6km	4	High
1.6-8km	3	Moderate
8-13km	2	Low
>13km	1	Very Low

Off-airport bird/bat hazards

Likelihood		
Likely frequency of crossing airspace		
Multiple times per day	5	Very High
Once per day	4	High
Weekly	3	Moderate
Monthly	2	Low
Almost never	1	Very Low

Likely frequency of crossing airspace

- Location of strikes
- Altitude of bird mvts
- Proximity to aircraft flight paths
- Complimentary habitats
 - Number
 - Location
 - Habitat quality



tidal estuary

lake

agriculture

aquaculture

agriculture

retention pond

landfill

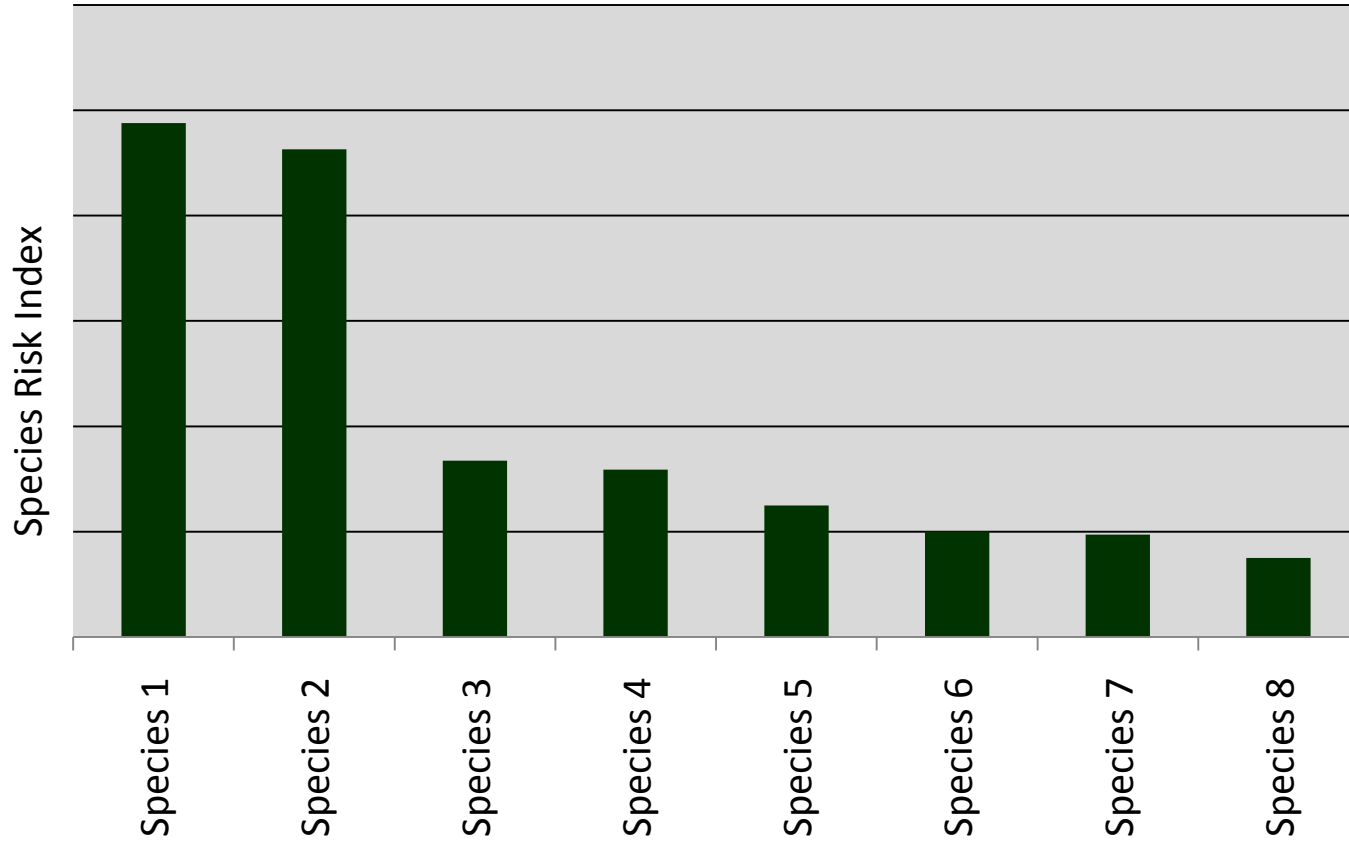
tidal estuary

Site Risk = Consequence x Likelihood

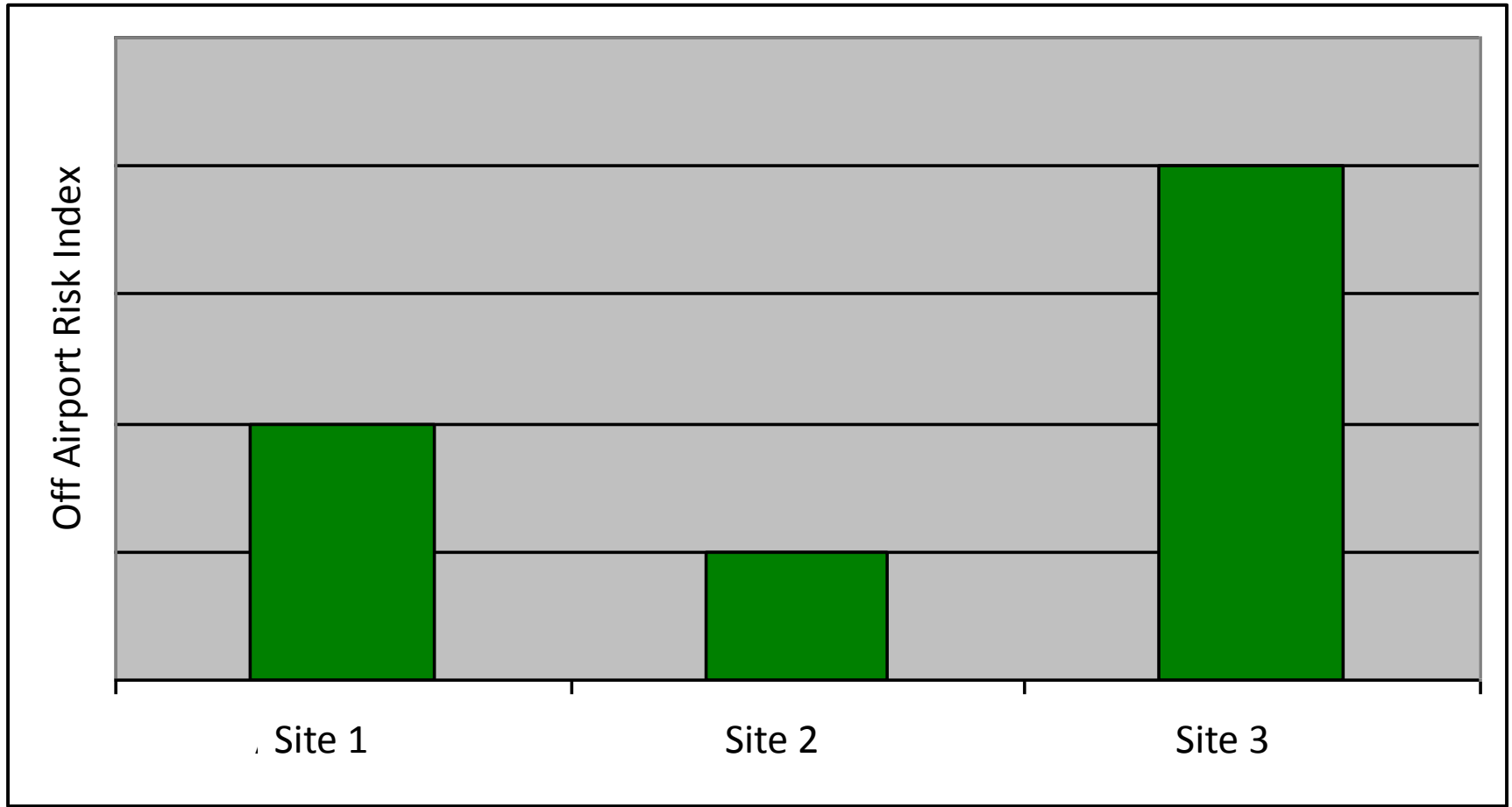
= Mass x

(Strikes + Number + Distance + Cross Airspace)

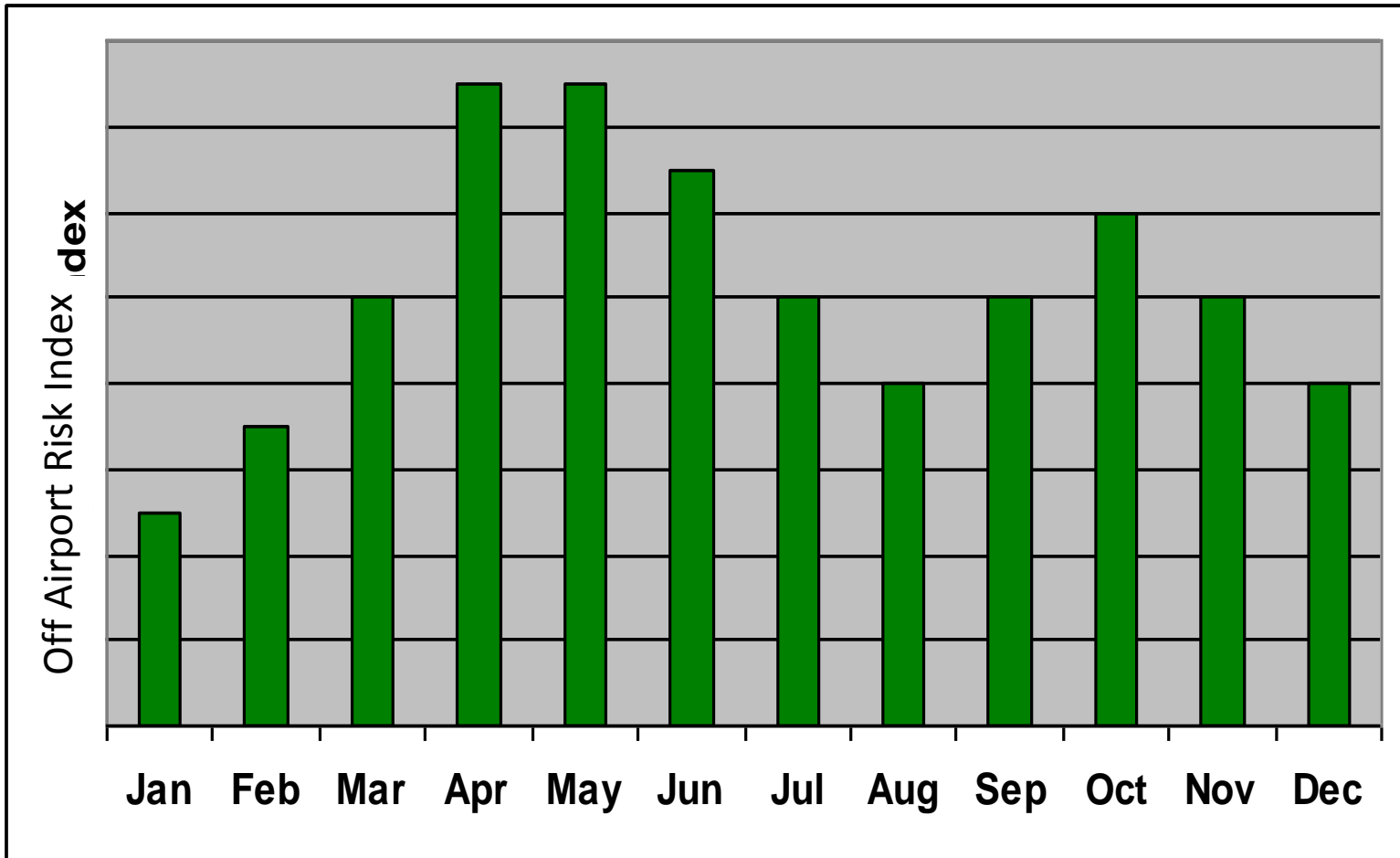
Compare risk by species



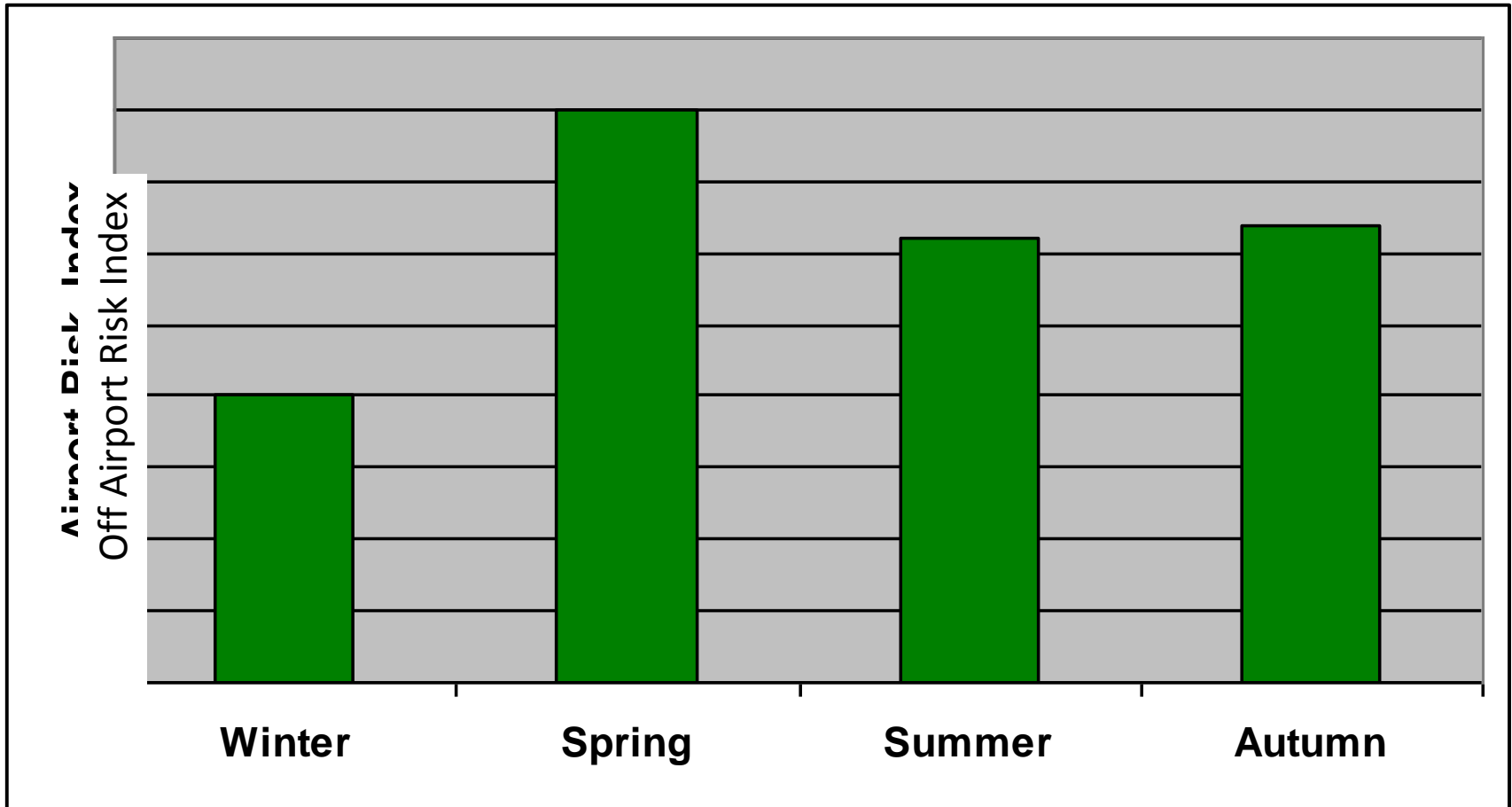
Compare risk by sites



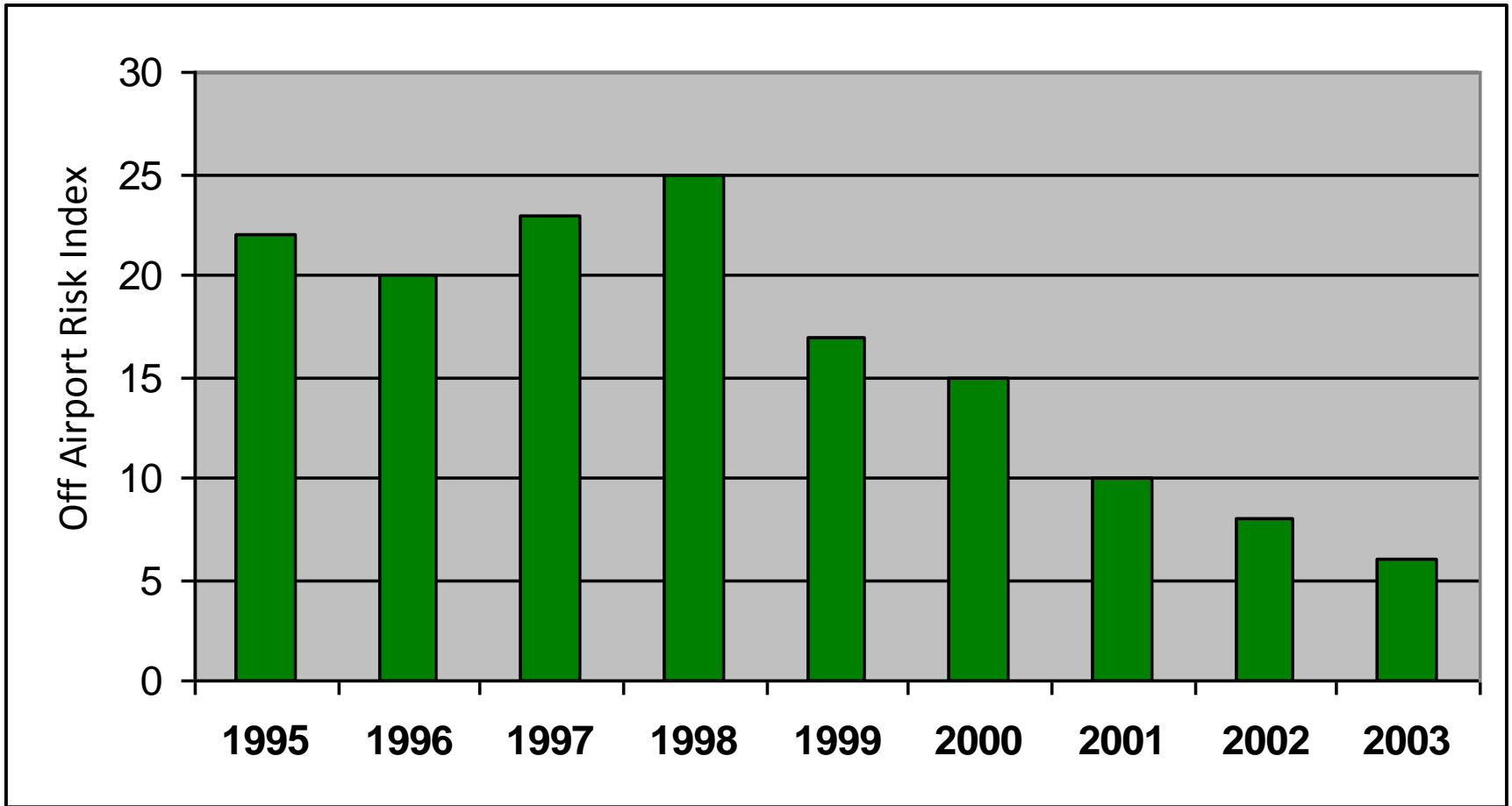
Compare risk over months



Compare risk over seasons



Compare risks over years



Managing off-airport risk

Setting thresholds for action

Low risk sites

- Annual monitoring

Moderate risk:

- Seasonal monitoring

High risk sites monitored:

- Weekly/Monthly monitoring
- Action Plan required

Very High Risk:

- Daily Monitoring
- Immediate Management required

Points for consideration

- Stakeholder engagement
- Existing sites
- Can be used modified for new airports
- Airport expansions
- New land use proposals

QUESTIONS?

