THE SUCCESSFUL IMPLEMENTATION OF A BORDER COLLIE BIRD SCARING PROGRAM AT DURBAN INTERNATIONAL AIRPORT, SOUTH AFRICA

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Abstract

Durban International Airport has always been known as one of South Africa's airports with the highest incidence of bird strikes. The airport is located close to the coastline and the moist grassland habitat supports numerous bird species. The strategic partnership between the Airports Company of South Africa and the Endangered Wildlife Trust has over the past four years implemented an integrated wildlife hazard management program at the airport which includes both reactive and proactive bird hazard management techniques. Methods used include regular scaring patrols, habitat/grassland management and exclusion systems. The latest addition to the program was the introduction of a Border Collie dog – custom trained to scare birds away from the airfield. The Border Collie program has been highly successful and dramatic reductions in bird presence and abundance has been observed since implementation during April 2002. This paper provides a strategic overview of the bird strike risk and the bird hazard management programs implemented at Durban International Airport.

Key words: bird hazard management, bird strike statistics, habitat management, control methods, Border Collies

1. Introduction

Durban International Airport (DUR) is located along the subtropical east coast of South Africa and has always been know to have a particularly high incidence of bird strikes. The Airports Company South Africa (ACSA) – Endangered Wildlife Trust (EWT) Strategic Partnership identified DUR as a high priority and as a result focussed its attention on addressing the bird hazard risk at the airport. The airports' bio-geographical location, its airfield microhabitat of managed grassland and the area surrounding it is conducive to supporting a wide variety of bird species.

The Eastern and Southern African Office (ESAF) of the International Civil Aviation Organisation (ICAO) arranged a Second ESAF Workshop on Reduction of Bird Hazards to Aviation during August 2002 in Kampala, Uganda. It was stated there by the ICAO secretariat that many African States do not report bird strikes and as a result the extent of the problem cannot be clearly defined in the region. It was also noted that South Africa has the highest number of incidents (ICAO, 2002).

The high number of bird strike incidents which occurred annually at DUR and the correspondingly high bird abundance counts justified the implementation of an integrated bird hazard management program. Since 1999 it has been the role of the EWT to give advice on the implementation of effective wildlife hazard management practises at ACSA airports. The wildlife hazard management program began by using conventional scaring techniques and soon progressed to include some innovative habitat management practises such as a long grass management plan and vegetation replacement (FRONEMAN, 2000). As the effectiveness and importance of having a wildlife control program became more apparent to airport management a decision was taken to implement a Border Collie bird scaring program. The establishment of a Border Collie bird scaring program also necessitated that full time staff be appointed to deal with wildlife control activities on a daily basis.

The use of Border Collie dogs on an airport was first presented to the International Bird Strike Committee (IBSC) at its 25th meeting in Amsterdam (CARTER, 2000). Negotiations were then underway to implement a similar program at Air Force bases in Israel. Following successful trials conducted in Israel the option of also implementing a Border Collie program in South Africa was seriously being considered.

2. Background

Durban International Airport is situated between the coordinates 30º 56' 00'' and 30º 58' 00'' East and 29º 57' 20'' and 29º 59' 25'' South. The airport occurs on land that was formerly a river floodplain / wetland – today however the surface drainage of the remnants of this wetland drain into the Indian Ocean via a large canal known as the Mlazi canal which has been excavated through the coastal dune cordon. The climate is subtropical with a mean annual rainfall of 1 000mm. These conditions support a wide diversity of fauna and flora.

One runway (06 – 24) in a north south direction is serviced by 4 connecting taxiways from the apron. Durban International Airport had a total of 41 216 air traffic movements during the 2001/2 financial year ending Mar 2002 (ACSA, 2003).

Figure 1. *Durban International Airport aerial photograph.*

The airport occurs in a vegetation zone being classified as Coastal Forest and Thornveld (ACOCKS, 1988) and Coastal Bushveld-Grassland (GRANGER et. al., 1998). The airfield itself is managed as closed grassland frequently mown to varying heights as is prescribed in the wildlife management plan. The airfield itself is surrounded by a small patch of open land consisting of habitats ranging from forest, reedbeds, marshes, shrubland, grassland and small patches of commercial cultivation. The airfield and surrounding patches of open land is however largely isolated by industrial and urban development.

The diversity of habitat types on and surrounding the airport supports a wide variety of bird species – in excess of 150 species have been recorded at the airport over the past four years. Ten of these have been rated as posing a significant threat to aircraft due to their size, abundance and behaviour on and around the airfield.

The Airports Company of South Africa (ACSA) entered into a strategic partnership with the Endangered Wildlife Trust at the beginning of 1999 (Froneman, 2000) in order to establish effective wildlife hazard control measures at all ACSA airports. The initial phase of the project focussed on determining the bird strike risk at all ACSA airports from historical data and to implement proper reporting and monitoring procedures to evaluate the progress made with regard to implementation of new mitigation measures. Durban International Airport was shown to have a particularly high incidence of bird strikes and preliminary bird surveys at the time indicated that large numbers of birds aggregated on and near to the airport (FRONEMAN, 2000). Bird species identified as being the primary threats at the airport were Hadeda Ibis (*Bostrychia hagedash*), Blackheaded Heron (*Ardea melanocephala*), Yellowbilled Kite (Milvus parasitus), Egyptian Goose (*Alopochen aegyptiacus*), and Lanner Falcon (*Falco biarmicus*). The ACSA – EWT partnership then focussed its attention on DUR in order to mitigate the bird strike risk at the airport.

Hadeda Ibis

Blackheaded Heron

Yellowbilled Kite

Egyptian Goose

Lanner Falcon

Figure 2. *Birds most commonly found at DUR and constituting the greatest risk to aircraft.*

Not having had a dedicated wildlife control unit at DUR the Fire and Rescue Services was responsible for conducting the wildlife hazard control duties on the airfield. Volunteers from the local ornithological society – Birdlife Port Natal – was used to train the staff at the airport on bird identification and assisted in developing an interest in the bird hazard control program then being implemented at the airport. The frequency and efficiency of bird scaring patrols was increased and various habitat and grassland management programs were implemented in order to minimise the bird presence from both a re-active and proactive approach. Although these measures were effective to an extent the frequency of bird strike incidents and the remaining number of large birds present on the airfield was still of concern to the ACSA – EWT Partnership and the DUR airport management. A decision was then taken to seriously explore the option of using a Border Collie as part of the wildlife control program at the airport. Dr Nick Carter was then during 2001 invited to South Africa to demonstrate the use of a Border Collie as part of a bird hazard control program to ACSA.

3. Methods – an integrated bird hazard control program

The bird and wildlife hazard management program implemented at DUR is based upon an integrated environmental management approach. Emphasis is being placed on understanding the ecosystem and managing the bird hazard risks also taking into account the important role that the airport and surrounding open land plays in the Durban Metropolitan Open Space System.

3.1 Information management and reporting systems

In order to better understand the bird hazard risk at the airport two data management programs are being used. Bird presence and abundance data is recorded and all bird strike incidents are logged.

3.1.1 Bird monitoring database

Bird population dynamics in terms of species diversity and abundance is monitored through a detailed bird presence monitoring system. Data is entered onto the system on a daily basis and assists in detecting seasonal abundance trends of particular species and also most importantly to assess the effectiveness of control measures being implemented. The system generates customisable user specified reports on bird presence and abundance for a particular species or group of species, on a specific day or over a specified time period (FRONEMAN, 2002).

3.1.2 Bird strike reporting system

Bird strike incidents are reported in accordance with ICAO requirements (ICAO, 1991) on an ACSA – Accident and Incident intranet based reporting system. Per airport summaries or detailed reports can be generated from the system.

3.2 Bird hazard management – reactive methods

Bird hazard control at the airport has always been the responsibly of Fire and Rescue Services. Although bird hazard management is an added responsibility of the Fire and Rescue services at the airport a staff member is dedicated towards this responsibility on each shift. Regular (at least once per hour) bird scaring patrols are done out on the airfield. The designated fire and rescue staff member then patrols the airfield to scare away any birds observed close to or in the vicinity of the aircraft manoeuvring area. In order to facilitate easier manoeuvrability around the main runway a track has been established 50m off the edge of the runway (immediately outside of the runway strip safety area) – thereby patrols can be done relatively close to the runway without interfering with aircraft movements. During these patrols on the airfield the birds are scared using vehicle sirens and pyrotechnics (thunder-shot cartridges fired from a shotgun).

Figure 3. *Bird scaring patrols are conducted from a grass track alongside the runway (50m away) outside of the runway strip / manoeuvring area.*

3.3 Bird hazard management – proactive methods

3.3.1 Habitat management

- Grassland management
  A tall grass management programme was adopted at the airport during mid 1999. The grass was initially left to grow to a height of 40cm and kept at that height by means of regular mowing with modified slasher mowers. The 40cm height was found to be very effective in reducing the number of Hadeda Ibis on the airfield (FRONEMAN, 2001). The tall grass however resulted in an increase in the local rodent population. A corresponding increase was then also noted in the number of Blackheaded Herons. The herons were found to be hunting the rodents. The grass height was therefore reduced to a height of ±25cm at which insufficient cover exists for rodents and is still too tall for Hadeda Ibis to forage comfortably. Trimming the grass down to the required height at regular intervals also ensures that minimal seeding occurs which also eliminates the presence of small flocks of granivorous birds.

Figure 4. *Grass cutting with slasher mowers at DUR.*

- Vegetation replacement program:
  Due to the subtropical climate the grassland on the airfield at DUR supports a wide variety of arthropods which in turn serves as a food source for many bird species. Grassland specialists from the University of Natal Pietermaritzburg were consulted on this matter and it was recommended to establish a research programme which would investigate the feasibility of establishing plant species with the ability to repel insects off the airfield. Trials were conducted where molasses grass plugs were planted in rows in between the existing grassland. Preliminary results received recently, following two years of research, indicated that the grass has had the desired effect of reducing insect abundance in the small trail plots (GRANGER, 2003). Further large scale planting would have to be done to determine the overall food chain dependent link on insectivorous birds.

Figure 5. *Planting molasses grass plugs during the vegetation replacement research project.*

- Drainage of standing water
  At the onset of the establishment of the integrated bird hazard management program at DUR several areas of standing water existed on the airfield – especially following heavy rains. Further areas were created when the perimeter fence road was upgraded during 2000. Extensive re-landscaping and filling in of areas has resulted in many of these areas now being better drained and not attracting any water birds.

Figure 6. *An area where standing water collected has now been filled in with rubble and covered with soil.*

- Termite eradication program
  Termite alate emergences during the summer months were identified as a major attractant for numerous bird species to the airfield. Birds flocked to the area where the winged termites emerge and either feed while walking around (often on the paved surfaces e.g. runway and taxiways) or snatching up the termites in flight. A process was then embarked upon where all termitaria were identified and marked on the airfield. An approved target specific termiticide was then used to eradicate the termites.

- Bird anti-perching spikes and exclusion systems
  Birds were frequently observed using infrastructure on the airfield as hunting and loafing perches. A decision was then taken to fit these e.g. runway and taxiway signage with bird anti-perching spikes.

Figure 7. *Bird anti-perching spikes fitted to the runway signage boards.*

A thin rope exclusion system was also fitted to a section of canal running through the airport grounds to prevent water birds from aggregating in the canal immediately below the approach or departure path of the runway.

3.4 Border Collie program

Following the successes achieved with Border Collie bird scaring programs implemented in North America and Canada as presented by Carter at the 25th IBSC conference (CARTER, 2000) a decision was taken by the ACSA – EWT partnership to also investigate the feasibility of implementing a similar Border Collie program the DUR.

The following had to be considered, motivated for or implemented before the final go-ahead was given to introduce the Border Collie program at DUR:

- Perceived natural predator – A dog is perceived as a natural predator by terrestrial birds and if the area is regularly patrolled with the dog and the birds being chased frequently from preferred foraging and loafing areas they will tend to seek alternative less 'disturbed' feeding areas.
- Why a Border Collie – Border Collies are very energetic and are bred for their instinctive herding instinct and strict obedience. These dogs can also work in a wide range of environmental conditions for extended periods of time.
- Problem bird species – The most hazardous birds in terms of bird strike risk identified at DUR are terrestrial feeders i.e. Hadeda Ibis and Blackheaded Heron. Hadeda Ibis feed on sub-surface invertebrates by probing their long narrow beaks into soft soil. They prefer to feed in small flock in areas of short grass where they can see around them, allowing sufficient time to escape an approaching threat. The Border Collie would therefore be highly effective in scaring Hadeda Ibis. Blackheaded Herons on the other hand are more solitary and feed on larger prey such as rodents or larger arthropods which they hunt in a 'sit and wait' predator fashion. Regular disturbance and scaring with the Border Collie would disrupt the hunting pattern of these birds and drive them away. The overall presence of a terrestrial 'predator' in this instance the Border Collie would therefore serve the purpose to scare these two high risk species and other terrestrial birds such as geese, lapwings and other ibises away from the airfield.
- Border Collie training program – In order for the Border Collie program to be effectively implemented at DUR a rigorous and auditable training program was required. In order to achieve this local expert Border Collie trainers were requested to provide Border Collies trained specifically to scare birds and with a high and strict level of obedience. The Border Collies were carefully selected to ensure that the dogs being used were very energetic and not affected by noise.
- Cost – Due to the prohibitively high costs of importing a Border Collie bird scaring service / program from abroad or to merely purchase dogs from abroad for use in South Africa it was

decided to rather seek local expertise. This resulted in the program being far more cost effective. It must also be noted that the implementation of the Border Collie program at DUR coincided with the appointment of a dedicated wildlife control officer / dog handler which had further financial implications on the business unit. Durban airport opted to purchase the Border Collie and are therefore responsible as an airport for the overall implementation of the program with assistance from the EWT partnership.

- Policies and procedures – A detailed set of directives dealing with each an every aspect of handling the Border Collie from grooming, frequency of veterinary checkups, commands, operational aspects and how to approach different bird species with the dog had to be developed and signed off by senior ACSA management before the program was to be launched at DUR.
- Transport and mobility – In order to move around, the often waterlogged outer airfield terrain, very quickly and to provide a means whereby the dog can be transported an all terrain vehicle (ATV) or quad-bike is being used. Specific modifications were made to the ATV, these included the fitment of a platform at the rear where the dog sits and a custom fitted Air Traffic Control radio.
- Dedicated handler – In order for the Border Collie program to be a success a committed and dedicated handler is a prerequisite. The implementation of the Border Collie program at DUR motivated the appointment of a dedicated wildlife control officer / dog handler. The Border Collie trainers were integrally involved in the screening and selection of the most suitable candidate. The identified handler then underwent detailed training on how to work with the Border Collie on the airfield.
- Communication – The ability to monitor air traffic movements and be in regular contact with Air Traffic Control is critical to the success of the program. The wildlife control officer / dog handler while out on the airfield continuously monitors the air traffic control radio frequency in order to not scare birds into the approach or departure path of an aircraft. Clearance is also often required from ATC to enter the manoeuvring area in order to scare birds away. Over time an excellent working relationship has been developed between the wildlife control officer, air traffic controllers and pilots in addressing bird presence out on the airfield.
- Vegetation cover – the entire airfield grassland at DUR is being managed by means of a regular mowing program. The grassland is maintained at a height of no more than 30cm – this height also allows the Border Collie to easily spot larger birds and does not slow the dog down when running through it.
- Kennel facility – a kennel facility had to be constructed at the airport where the Border Collie could be kept safely and comfortably when not out on the airfield scaring birds. A suitable site on airside was identified and a kennel constructed which provides a roofed area plus an additional fenced off exercise area for the dog.

Figure 8. *'Mac' the Border Collie on the ATV with his handler at DUR.*

4. Results

4.1 Bird presence and abundance

The following graphs depict bird abundance information as collected at the airport over the past four years since May 1999 for the two most hazardous bird species. Bird presence and abundance counts are conducted on a regular daily basis at the airport and the data presented here is a reflection of what has been captured on the airport's bird presence and abundance monitoring database system.

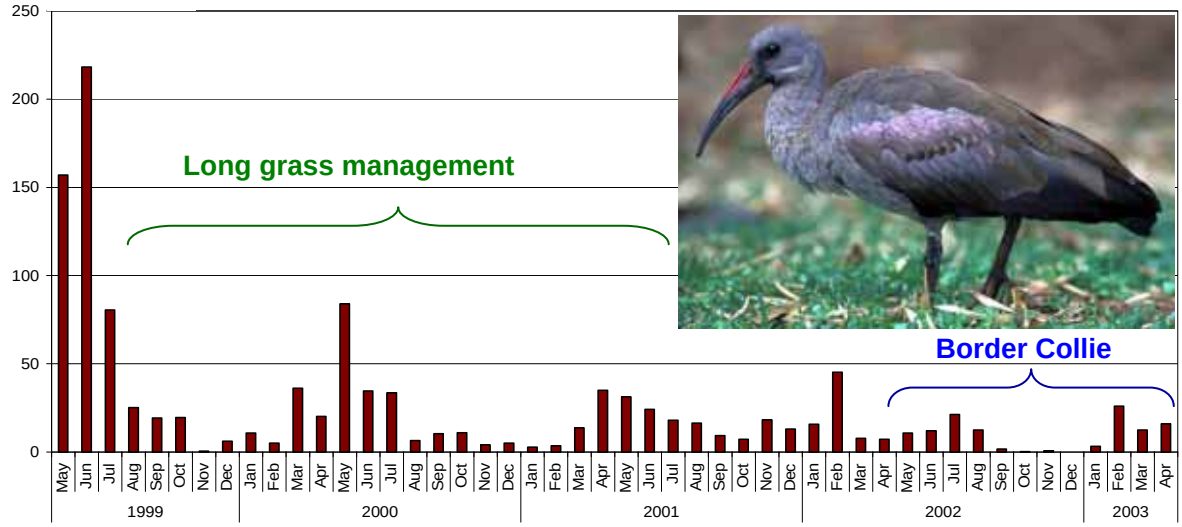

Figure 9. *Average number of Hadeda Ibis reported per patrol on a monthly basis at Durban International Airport (1999 – 2003).*

Hadeda Ibis numbers peaked during the autumn of 1999 and as a result of the implementation of a long grass policy their numbers declined dramatically. Seasonal increases were observed again during 2000 and 2001 but not to the extent of what was seen during 1999.

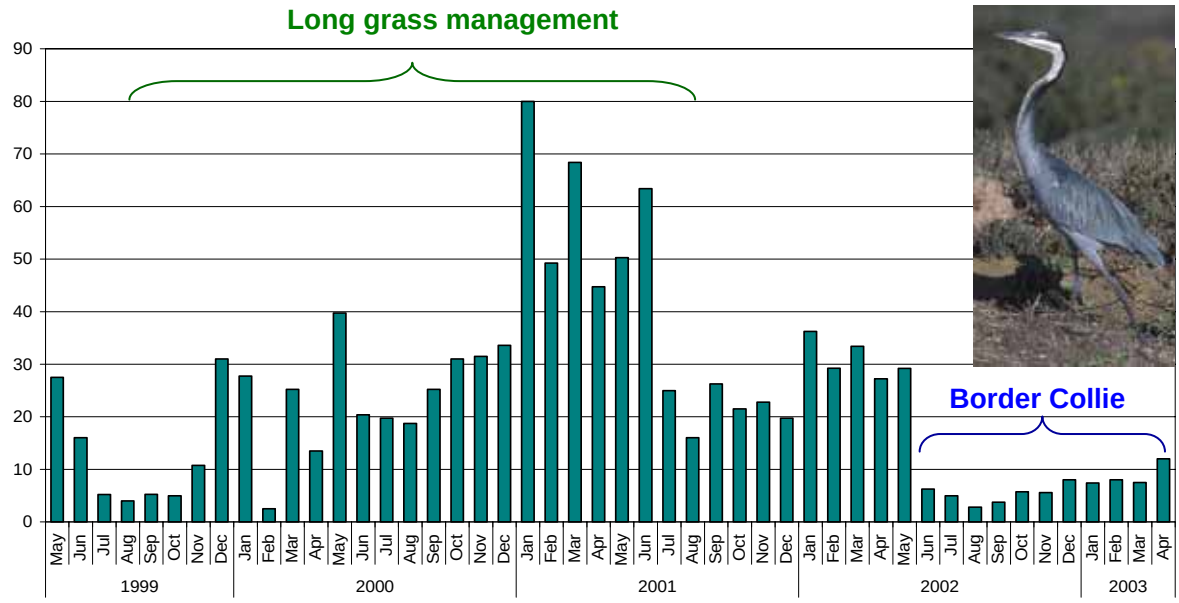

Figure 10. *Average number of Blackheaded Herons reported per patrol on a monthly basis at Durban International Airport (1999 – 2003).*

Blackheaded Heron numbers peaked during the summer months of 2000 and 2001 due to an increased rodent population on the airfield. Grass cutting activities also attracted these birds to the airfield. Numbers then declined when the grass was managed at a shorter height. A further more

dramatic decline in numbers was observed when the Border Collie was implemented during May 2002.

4.2 Bird strikes

The ultimate measure of any bird scaring technique is its ability to reduce the number of bird strike incidents reported at and airport compared to with what was experienced prior to its implementation.

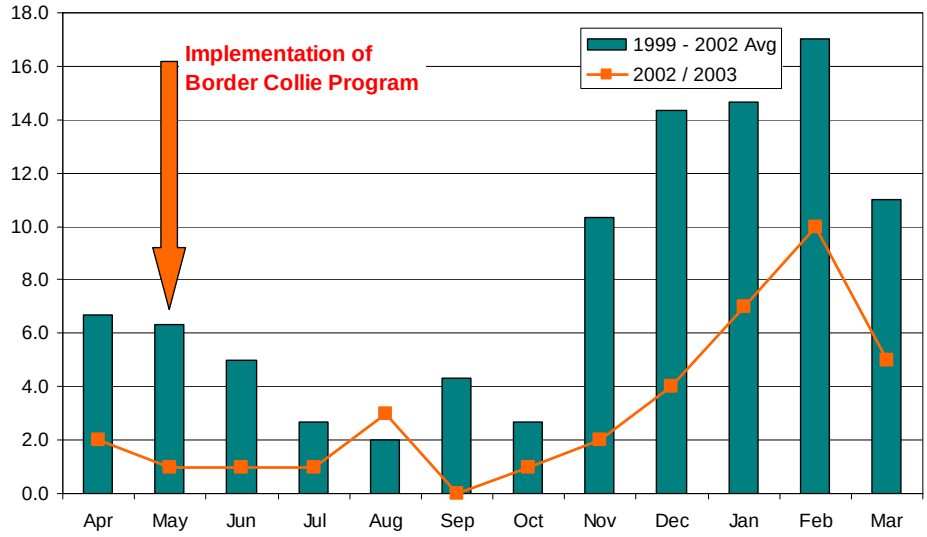

Figure 11. *The number of bird strike incidents recorded per month since the implementation of the Border Collie program plotted against the previous four year's monthly average.*

Bird Strike incidents reported since the implementation of the Border Collie has been consistently below the four year monthly average – except for August 2002 when the number of incidents were above the average due to excessively high rainfall experienced at the time. Overall the bird strike incidents have been reduced by 57% since the implementation of the Border Collie program at DUR.

5. Discussion

The implementation of the Border Collie bird scaring program at Durban International Airport had a significant positive impact on the effective management of the bird hazards at the airport. It is important to however to note the following with reference to what has been achieved:

- The Border Collie program does not stand on its own – it forms part of an integrated wildlife hazard management program
- The implementation of the Border Collie program necessitated the appointment of dedicated wildlife control officers / dog handlers
- The effectiveness of the program is dependent on the quality and level of training of the dog, and the dedication of the handler
- The amount of time spent with the dog out on the airfield actively scaring birds away from the manoeuvring area
- The bird species involved and the habitat characteristics of the grassland areas outside of the manoeuvring area of the airfield.

Due to the fact that at present there has only been one appointed wildlife control officer / dog handler at the airport the effectiveness of the program has been limited to the times that the handler has been on duty at the airport. During periods when the dog handler is not at the airport the bird control duties reverted back to Fire and Rescue services who then complied with regular runway and taxiway inspections to scare birds away. The appointment of a second wildlife control officer / dog handler has been motivated upon the effects achieved by one wildlife control officer. There is definitely potential for further reductions in bird presence and corresponding bird strikes which can be achieved if the dog is out on the airfield for longer periods every day.

The ACSA – EWT Partnership has played an instrumental role in facilitating the effective implementation of the Border Collie program at Durban International Airport. Liaison with all the different aviation industry stakeholders and ensuring that all safety standards were met ensured that the DUR Border Collie program has been in place for a full 12 month period without any concerns raised and a 57% reduction in the number of bird strike incidents.

6. Conclusion

The use of a Border Collie as part of an integrated bird / wildlife hazard management program can be recommended based on the findings presented above. Significant reductions in the number of birds present on the airfield and a corresponding reduction in the number of bird strikes can be achieved if the program is managed properly. Care should however be taken to ensure that the Border Collies are trained to an exceptionally high standard of bird scaring and obedience.

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- Mr L Wicks – Birdlife Port Natal
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