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THE POLITICAL, ECONOMIC AND MANAGEMENT HISTORY OF A SUCCESSFUL EXOTIC ERADICATION: THE CASE OF BLACK-TAILED JACKRABBITS IN ONE PART OF FLORIDA

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Abstract: Black-tailed jackrabbits are a prolific, mobile species that became established at Miami International Airport, Florida. These animals posed a potential threat for colonization through additional parts of Florida if they were able to spread beyond the expansive airport property. Moreover, their carcasses from collisions with vehicles and aircraft attracted large scavenging and predatory birds to the airport, causing potential airstrike hazards. While the jackrabbits ultimately were successfully eradicated, the political, economic and management paths to that success were convoluted. We describe that history here and how a beneficial outcome was ultimately achieved.

Key Words: airstrike hazard, invasive species, *Lepus californicus*, management economics.

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INTRODUCTION

Black-tailed jackrabbits (*Lepus californicus*) are not native to Florida, but by 2003 they had been well-established at Miami International Airport (MIA) for many years. How and when they were introduced to this expansive airport property (1307 ha) was unknown. Speculations as to their origins included escapes from a rabbit farm or escapes from transit to dog racing tracks for use in training greyhounds. By 2003, the black-tailed jackrabbit population at MIA was considered to be around 500.

Occupation of the MIA property by a large number of black-tailed jackrabbits posed two potential threats. First, while MIA is relatively encapsulated by the Miami metro area, the jackrabbits still posed a significant invasive threat for other parts of Florida. The species is highly fecund, with 2-7 litters/year and 2-5 young/litter (Flinders and Chapman 2003). Moreover, they are a mobile, fast-moving species (up to 56 kph [Flinders and Chapman 2003]), and once outside the confines of Miami could spread through other parts of Florida (and potentially beyond). The other potential problem their population posed was to cause an increase in bird airstrike hazards. Black-tailed jackrabbits were occasionally killed by collisions with aircraft and vehicles, or the back-blast from jet engines. Their carcasses proved highly attractive to vultures (*Cathartes aura*, *Coragyps atratus*) for forage. This created a considerable air safety concern, as vultures present significant hazards to aircraft while taking off or landing (e.g., Dolbeer et al. 2000). Besides safety concerns, bird strikes also result in lost revenue and very costly repairs to aircraft (Milsom and Horton 1990, Linnell et al. 1996). With the construction of a new runway, the problem was exacerbated by the decrease in green space the rabbits could occupy and an increase in space with aircraft and vehicular traffic that raised the number of killed rabbits. In fact, removal of the black-tailed jackrabbit population at MIA was instigated as a response to Federal Aviation Administration (FAA) regulations mandating the problem be solved for safety reasons. From March 2001 to March 2003 at least two dozen vultures were struck by aircraft at MIA. We discuss the political aspects, operational methods and their chronologies that eventually led to eradication of black-tailed jackrabbits at MIA before they could further expand their range.

DEVISING A PLAN

Suggestions for approaching the black-tailed jackrabbit problem were numerous. Miami's Metrozoo called for their extermination, as they believed live-capture was unlikely to eliminate all animals. The FAA concurred and recommended

that the US Department of Agriculture, Wildlife Services (WS), the Federal agency responsible for managing conflicts with wildlife (US Department of Agriculture 1997), carry out the eradication. At the same time, animal rights activists strongly urged live-capture and transfer of the black-tailed jackrabbits to their native range. Additionally, the recommendations from the general public included fencing, shooting, poisoning, sterilization, and sale to dog breeders. At that time, there was an increasing trend in bird airstrikes at MIA. Between 21 April and 21 August 2003, there were nine reported bird airstrikes at MIA. Most airports account for less than 20% of the actual number of strikes (Dolbeer et al. 1995). Wildlife strike statistics based on pilot reports generally are incomplete, because pilots either do not report strikes or the proportion of reported strikes varies due to factors such as decreased pilot acuity towards wildlife during critical phases of flight, size of the animal, group size, weather conditions, time of day, or heightened pilot awareness during migratory seasons (Linnell et al.1999). Thus, it is logical to assume that the same held true for MIA, and that more strikes may have occurred than have been reported.

The initial action plan by the Miami-Dade County Aviation Department (MDCAD), responsible for managing MIA, was to form an agreement with WS for the eradication of the black-tailed jackrabbits. However, once the plans for lethal control became known to the public, there was a vociferous outcry, a media frenzy, and a public relations nightmare. This generated substantial political pressure to forestall the eradication and use non-lethal means to remove and relocate the black-tailed jackrabbits from MIA.

The eradication was temporarily rejected and a modified plan was introduced. This second action plan called for the black-tailed jackrabbits to be live-captured by a reputable private firm and housed for translocation to a sanctuary near Hutchins, Texas, where they are native. Finally, any black-tailed jackrabbits remaining at MIA after a 2-month capture period would be eradicated by various methods by the WS.

PLAN IMPLEMENTATION AND DÉJÀ VU

Black-tailed jackrabbits were captured by several non-lethal methods including cage traps, hand capture (by hand or net), and tranquilization using dart guns. Nevertheless, a substantial number of black-tailed jackrabbits still remained at MIA when the time period for live-capture expired. This triggered the final stage of the plan, eradication of the remaining jackrabbits by WS. This in turn triggered another public outcry and a fight by animal activists to extend the time period in which the private contractor could live-trap black-tailed jackrabbits. Again, strong political pressure was built and eradication was delayed as the live-capture methods were given another (third) month to succeed. In the meantime, concerns about the safety problems at MIA continued.

Black-tailed jackrabbits remained at MIA at the expiration of the extension of the live-capture period. By this time 301 black-tailed jackrabbits had been captured at MIA (210 by cage traps, 45 by hand capture, 46 by tranquilizer dart) and another 34 inadvertently killed during capture attempts. Only 12-30 jackrabbits were claimed to remain at the end of this period (Rabin 2003a). The eradication portion of the action plan was again triggered. However, a strategy not completely successful on the ground might still succeed in court. Therefore, animal activist groups went to court to attempt to judicially impose more time for live-capture methods to succeed at complete black-tailed jackrabbit removal. The animal activists lost their appeal in court with the ruling citing that continued delays would jeopardize public safety. At this point, black-tailed jackrabbit removal reverted to the original approach by MDCAD: eradication by WS. As this phase moved forward, it was accompanied by protests and dramatic headlines in newspapers. In contrast to the above assessment of the number of jackrabbits remaining, newspapers reported that WS removed 35 on the first night of shooting (Rabin 2003b). In reality, WS removed 44 on the first night, 55 on the second night, and 172, overall, to complete the eradication.

MANAGEMENT ECONOMICS

The agreement for WS to eradicate the black-tailed jackrabbit at MIA was for 80 hrs of effort and a cost of $19,549. The initial estimate provided for live-capture and translocation of all black-tailed jackrabbit at MIA to Texas was about $7,500 (Associated Press 2003). Ultimately, it cost in excess of $50,000 to live-capture and translocate about 60% (301) of the MIA black-tailed jackrabbit population to Texas. The cost per rabbit for live-capture and translocation was, therefore, at least $166, whereas it cost $114 per rabbit to shoot the remainder. Moreover, as an animal removal

operation proceeds (by whatever methods), the amount of effort required per animal typically increases. The animals removed by WS were the last third of the population to be removed, thereby probably representing the most difficult portion of the population to eliminate. Because the WS contract was a fixed amount for black-tailed jackrabbit removal on airport property, we surmise that the cost per rabbit would have only been $39 had they removed all of the jackrabbits.

DISCUSSION

Florida joins Hawaii as the two states with the most severe invasive species problems in the United States (U.S. Congress 1993), with breeding populations of introduced or invasive vertebrate species regularly identified. The impacts from many introductions are unknown or not readily perceived by the public, while others are immediately apparent or have their negative potential revealed over time. Even highly prolific invasive species may fester for a considerable time before exhibiting an explosive expansion of their range (Shigesada and Kawasaki 1997). This was the case with the black-tailed jackrabbit at MIA. While their population anecdotally appeared to be in a relatively rapid increase phase, their true negative impacts to Florida's habitats would only have occurred had they dispersed beyond Miami. Fortunately, their population was extirpated before this could take place. Nevertheless, the existence of this invasive species at MIA created a potential threat to human health and safety as well as an economic burden for the damage to aircraft.

Although surveys continue at MIA, the eradication of black-tailed jackrabbits at MIA does not mean vigilance for the species should not be maintained in Florida. One other breeding population of black-tailed jackrabbits (in Broward County) had existed and has been extirpated. They also have been observed in other parts of Florida, but not as breeding populations (Florida Wildlife Commission, unpublished data). Black-tailed jackrabbits could easily be illegally or accidentally released in Florida again. Should that happen, the experiences from the MIA eradication could provide direction on how an effective and efficient removal program could be conducted.

Management of an exotic species requires more than the recognition of a potential problem, it also requires a government and public motivation to address the problem. In the case of the black-tailed jackrabbit, the human safety issue motivated their removal, rather than their potential for ecological harm should they have dispersed from MIA. Had it not been for their exacerbation of airstrike hazards at MIA, it is unlikely they would have been eradicated and their population would have continued to be a festering threat for eventual dispersal.

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