Rodent Pest Control Through the Reintroduction of an Extirpated Raptor Species

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Abstract

Zoos, by nature, are breeding grounds for high numbers of rodents. The use of poisons and traps has been the main tool for rodent control. By acquiring and reintroducing avian predators, specifically barn owls, into a zoo setting, the rodent population could be controlled naturally. Barn owls (*Tyto alba*) once flourished in Pennsylvania and surrounding areas, particularly in old wooden barns, but the development of new prefabricated barns has left the owls with fewer places to nest. This study focuses on installing several man-made nest boxes for three avian predators on the grounds of the Pittsburgh Zoo & PPG Aquarium and surrounding areas. In time, it is hoped that the owls will begin to breed and higher densities will be achieved, as well as a suppressed rodent population.

Resumen

Los zoos son tierras de reproducción para muchos roedores. El uso del veneno y trampas son los métodos principales para controlarlos. Con la adquisición y re-introducción de predadores naturales, específicamente el búho de granero, en un zoo, la población de roedores puede ser controlada naturalmente. Los búhos (*Tyto alba*) fueron muy abundante en Pennsylvania y sus alrededores, particularmente en los graneros viejos de madera, pero el desarrollo de graneros pre-fabricados ha dejado a los búhos con menos lugares para criar. Este estudio se enfoca en la instalación de tres criaderos artificiales para tres aves predadoras en el Pittsburgh Zoo & PPG Aquario y sus alrededores. Con el tiempo, esperamos que los búhos se empiecen a procrear y lleguen a una densidad mas alta, además de suprimir la población de roedores.

Introduction

The Pittsburgh Zoo & PPG Aquarium is a 77-acre natural habitat that lies within the confines of the city and surrounding development. It is adjacent to a major city park, Highland Park, which serves as a refuge for all types of wildlife. Due to large amounts of available food, year-round heated buildings, and the varied ground cover, there is an unusually high rodent population at the Pittsburgh Zoo. Rodent control is an ongoing concern because of the loss of grain and structure damage these rodents can cause. Mice and rats are also potential vectors of various diseases.

Mark Browning, an animal trainer and researcher at the Pittsburgh Zoo & PPG Aquarium, has always had an interest in environmental concerns as well as a passion for birds. In 1996, he proposed a plan to place nest boxes throughout the zoo for three avian predators: the barn owl (*Tyto alba*), screech owl (*Otus asio*), and the sparrow hawk (*Falco sparverius*). The goal was to achieve an increase in the population of those predators by providing the nest boxes, and to some degree, that increase could effect rodent control. Many studies have shown positive correlation between the numbers of prey and their predators. Serventy and Whittel (1950) determined that a significant increase in the average clutch size of three raptor species occurred when the recently introduced rabbit moved into their range in Australia; and Welty (1975) comments: "Hawks and owls generally have larger clutches in years when mice are abundant." Mark Browning was inspired to conduct his study by projects that used barn owls as pest control in vineyards throughout the United States and palm oil nut plantations in southeast Asia. Also, he saw the importance of trying to reestablish barn owls in an area where they had once been extirpated because of deforestation, urbanization of rural areas, and the use of pesticides.

Methods

Mark Browning's study will compliment the Integrated Pest Maagement (IPM) program already established by the Horticultural Department at the Pittsburgh Zoo & PPG Aquarium. They are focusing on plant insect pests along with mice, roaches, and ants in the indoor amazon rainforest exhibit.

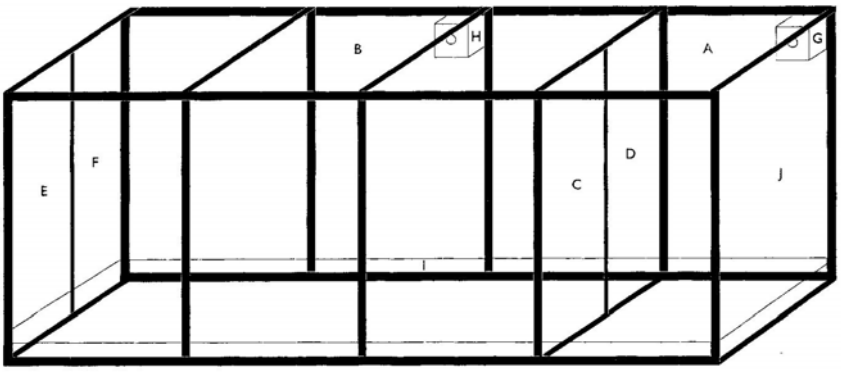
With the zoo's high densities of rodents (deer mice, white-footed mice, house mice, shrews, moles, and Norway rats), a relatively high density of rodent predators could be achieved. To do this, a large number of nest boxes were erected and mounted to trees on zoo grounds, to provide a safe haven for and attract the certain raptor species. Frank Pizzi, Curator of Horticulture and Grounds at the Pittsburgh Zoo & PPG Aquarium, donated the material used to build 20 screech owl and kestrel boxes. These are approximately 10" deep, 16" high, and 10" wide. In addition, a total of five barn owl boxes were built. They are 18" cubes with a 4" entrance hole. All of the nest boxes have ventilation holes on the sides and top and a hatch to open for viewing and cleaning. The 20 screech owl boxes, along with three barn owl boxes, were placed randomly around the zoo grounds. Two of the barn owl boxes were placed in a 30' x 12' x 12' hacking pen (figure 2). A hacking pen is an open flight cage that is traditionally used to rear or rehabilitate a raptor for release back into the wild. It is a

Figure 1. Barn owls in a nest box.

means of introduction, breeding, and to simulate a home for the bird to recognize and feel comfortable in. Also, within the pen, young owls can learn to hunt. Unlike other hacking pens where rehabilitators use dead mice, Mark uses live mice and places them in the pen for the owls to naturally find on their own. The hacking pen used in this study was divided in half for breeding purposes. Mark acquired 13 barn owls (pairs and babies) from Flamingo Gardens in Florida, two from the Bronx Zoo, and one male from Elmwood Park Zoo in Norristown, Pa. One breeding pair is housed on one end of the hacking pen, while one male occupies the other end awaiting a female. One pair was given to a private land owner with a breeding facility, not far from the zoo. Another pair was given to The National Aviary in Pittsburgh, where the babies from that pair are destined to come back to the zoo to be released. In early 2004, Mark did release four adult barn owls; one has been seen hunting on zoo grounds. As well as the boxes set up at the Pittsburgh Zoo & PPG Aquarium, West Deer High School became involved and set up an additional 13 barn owl nest boxes in the West Deer District, a few miles from the zoo.

Throughout the breeding season, which begins in the late winter/early spring, the boxes are checked regularly for use. This is done by the naked eye, through binoculars, and by checking the ground beneath for signs of use (pellets, droppings, etc.). Nest boxes in use will be visited and checked at a point some time after the babies have hatched and prior to their fledging to determine the number of successful young. Each year, the number of breeding pairs and successfully reared young will be compared to previous years numbers. Owls have traditionally been counted through broadcasting tapes of their calls to draw them down into a spotlight for individual identification. This study is projected to continue until it is determined that maximum density of avian predators has been established or a desired degree of rodent control has been achieved.

Figure 2. Diagram of a hacking pen.



A. Breeding end of enclosure which can be closed off using C + D panels (8 x 12 x 12)
B. Fledgling section (12 x 12 x 24 when closed off from breeding area)
C. Man-gate panel (12 x 6) hinged to D (removable)
D. Stationary panel (12 x 6) (removable)
E. Outside man-gate panel with padlock (removable)
F. Stationary panel (removable)
G. Breeder nest box
H. Fledgling nest box (removable)
I. 1' high Plexiglas running around entire perimeter on the inside
J. Plywood wall with feeding and watering doors for remote servicing of enclosure

Results

This project has resulted in successfully acquiring and establishing three different breeding pairs of barn owls, the young of which will be released in hacking areas. In 2004, three eggs successfully hatched from the breeding pair in the hacking pen at the zoo, which Mark plans to release in the spring and summer of 2005. The National Audubon Society has encouraged programs like this, since similar efforts to put up nests in Delaware, New Jersey, and Florida have had great success. In Pennsylvania, over 100 barn owl boxes have been

erected in adjacent counties by the Moraine Preservation Fund, which was independent of Mark's project, but led to a cooperative effort.

Conclusions

Mark Browning's efforts, so far, have developed into a two-prong project: to utilize raptors as part of an Integrated Pest Management program and to reestablish barn owls in an area where they had once been extirpated. As far as is known, such an experiment has never been conducted on the grounds of a zoological institution. Positive results could potentially benefit such institutions by using this as a low-cost, natural pest control and the institutions could provide more safe havens to these vulnerable raptor species. On a conservation note, this project could also help reduce or eliminate the need for rodent poisons or traps. Mark Browning wanted barn owls to "get out there and start breeding on their own." With the help of the distributed nest boxes, he believes the animals will essentially establish themselves as local residents and part of the local indigenous wildlife population. This is quite notable, since the subjects studied are probably the first breeding barn owls in Allegheny County in quite some time. Mark hopes to eventually get funding for satellite telemetry, which is a new tool for wildlife research and management. It determines the location of the bird, throughout the world, by transmitters that are attached under its wing. This would help with monitoring the movement of the species, enabling researchers to see the distribution, preferred habitats, and where they feed. The loss of nesting sites and lack of natural habitat has practically wiped out the barn owl population in Pennsylvania and several other states. With Mark's efforts to reintroduce this species to our area, satellite telemetry would definitely benefit this project by making it easier to monitor barn owls in a wider range.

For more information on the owl project, contact Mark Browning at 412-365-2395.

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