



# THE RAT RACE

## Protecting the Key Largo Woodrat

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The Key Largo woodrat (*Neotoma floridana smalli*) is a nocturnal species found only on the island of Key Largo, Florida. This forest-dwelling rodent builds large stick nests with several entrances and exits, allowing them to evade predators. They also make their homes in rock piles, the roots of large trees, and other material found in their tropical hardwood hammock habitat. Historically, the species was found over all of Key Largo, but now its range is restricted to the northern third of the island in two protected areas: Crocodile Lake National Wildlife Refuge and Dagny Johnson Key Largo Hammocks Botanical State Park. Habitat destruction, competition with black rats (*Rattus rattus*), and predation by feral cats are all possible contributing factors to the decline of the wild population.



Key Largo woodrat compound in an off-exhibit area at Disney's Animal Kingdom®

Due to their declining population and increased threats of habitat loss, Key Largo woodrats were listed as endangered by the U.S. Fish and Wildlife Service (USFWS) in 1984 and a recovery plan was developed to ensure the survival of this species. The recovery plan included the development of programs that would breed animals in captivity for eventual reintroduction to the wild. Lowry Park Zoo was the first AZA facility to obtain animals from the USFWS.

In August 2005, Disney's Animal Kingdom® joined in the efforts to develop captive breeding programs for Key Largo woodrats. USFWS and the Lowry Park Zoo provided six male and five female Key Largo woodrats. The goal was to develop safe and effective breeding techniques to produce progeny that would then be released in protected areas on Key Largo to increase the wild population. Breeding Key Largo woodrats has been a challenge because there is very little information available on the social structure, reproductive biology, or ecology of this elusive species. In addition, like other species of woodrats, adult Key Largo woodrats have been observed to display aggression toward each other. In captivity, pairing a male and female woodrat when the female is not receptive has resulted in aggressive encounters.

Due to the sensitive nature of this species, we designed a housing system at Disney's Animal Kingdom® that would maximize visual, auditory, and olfactory contact among the woodrats and allow us to closely monitor the behavior of individuals. Each Key Largo woodrat is housed in a separate, custom-designed, stackable enclosure in a large outdoor compound. Each enclosure is fitted with a nest box to simulate the sleeping chamber found in natural nests, and items such as palm fronds, Spanish moss, and sticks are placed in the enclosures to allow the natural behavior of building stick nests.

The husbandry and breeding protocols in the program are also designed to maximize natural behavior. The Night Keeper Team at Disney's Animal Kingdom® performs the husbandry routine in the early evening to be consistent with the nocturnal behavior of the woodrats. The Key Largo studbook is maintained by Disney's Animal Kingdom® (Rob Carlson, studbook keeper) and breeding recommendations are made in consultation with a U.S. Geological Survey geneticist to maximize genetic diversity in the colony. After pairing recommendations are received, the enclosures of the male and female to be paired are placed next to each other and connected by wire mesh tubes. The female is given continuous access to

the tube so that she can "meet" the male and become "acquainted" through the mesh door. One advantage of this design is that the woodrats need not be physically removed from their enclosures in order to be paired. Before pairing, keepers watch for male-female interactions through the wire mesh door that separates the male's enclosure from the connecting tube. During pairings, keepers watch for receptive behaviors (lordosis, chasing, raspy vocalization) that have been correlated with successful copulations in the past.

The Key Largo woodrat compound is equipped with infrared video cameras to allow filming of behavior during pairings and during the birth and development of pups. More than 1,488 hours of observation of maternal and pup behavior have been conducted. Since June 2006, 12 litters have been born in the colony with litter size ranging from one-to-three pups. Additional studies examining the activity budget and reproductive behavior of adult Key Largo woodrats, as well as recordings of ultrasonic vocalizations, are now in progress.

Our team enjoys sharing our enthusiasm for the Key Largo woodrats with guests at Disney's Animal Kingdom®. Young guests have the opportunity to learn about Key Largo woodrats as they help "Chef Remy" (a character from the film *Ratatouille*®) prepare a healthy woodrat meal. This special "magical moment" focuses on the diet of captive Key Largo woodrats and the food caching and nesting activities of wild Key Largo woodrats. Guests can also see Key Largo woodrat behavior on video and watch scientists at work in the Wildlife Tracking Center laboratory.

Our commitment to Key Largo woodrat conservation efforts goes beyond breeding animals for eventual reintroduction to the wild. We are collaborating with the U.S. Fish and Wildlife Service, Florida Fish and Wildlife Conservation Commission, and the University of St. Andrews to develop a method to monitor the population of wild woodrats. It's a challenging task to accurately count the number of tiny nocturnal woodrats in the wild. But using some innovative monitoring techniques, scientists are developing methods to estimate the size of the wild population and assess yearly trends. In addition, through the use of infrared cameras similar to the ones in our compound, we are analyzing Key Largo woodrat behavior at specially-designed supplemental nest structures in the wild on Key Largo.



A nest built by Key Largo woodrats in their natural habitat

Understanding the factors that influence the stability of Key Largo woodrat wild populations is of urgent concern. A major discovery was made in 2007 as the leader of our field team was tracking a radio-collared Key Largo woodrat. She found that a Burmese python (*Python molurus bivittatus*), had eaten one of the collared Key Largo woodrats! This resulted in an intensive effort to examine the distribution of Burmese pythons (a non-native, invasive species on Key Largo) and their impact on the Key Largo woodrats. In 2007, several Burmese pythons were killed on the road near the refuges and all of these pythons had consumed at least one Key Largo woodrat. Efforts are underway to remove Burmese pythons from the protected refuges in Key Largo. Our Animal Programs team

continues to make a significant contribution to the long-term conservation of the Key Largo woodrat. Through captive breeding and support for field studies, we can ensure that the Key Largo woodrat will continue to have a future in its island home.

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