



EXTENSION

Institute of Food and Agricultural Sciences

Beach Mice¹

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Beach mice, as their name indicates, live on beaches in Florida and Alabama. Beach mice live in the dunes that are located just above the high-tide line (Figure 1). A variety of animals live with beach mice in these dune habitats, including the six-lined racer, monarch butterflies, snowy plovers, and coachwhip snakes. Beach mice occur *only* in dune habitats. Because they live only in this habitat, they are at high risk of extinction if their habitat is destroyed. Most beach mice are listed as threatened or endangered.

The main threats to beach mice are humans and coastal development. Coastal development -- construction of homes and condominiums -- has caused the destruction of dune habitats. In addition, domestic cats can affect beach mice populations. In the long run, understanding beach mice and current conservation efforts will help the future survival of this species.

Distribution and Status

Beach mice comprise eight *subspecies* of the oldfield mouse (*Peromyscus polionotus*). The eight subspecies include five on the Gulf Coast and three (historically) on the Atlantic Coast. The five Gulf Coast subspecies are found in geographically distinct



Figure 1. See the mouse? (Look in the center, near the plants.) The Santa Rosa beach mouse is well camouflaged for the white sand of its coastal habitat. Photo provided by the Florida Fish and Wildlife Conservation Commission. Credits: Florida Fish and Wildlife Conservation Commission

populations on barrier islands, keys, or coastal peninsulas between Mobile Bay, Alabama, and Cape San Blas, Florida (Figure 2).

Gulf Coast subspecies (5):

- Alabama beach mouse (*P. p. ammobates*)
- Perdido Key beach mouse (*P. p. tryssyllepsis*)

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- Santa Rosa beach mouse (*P. p. leucocephalus*)
- Choctawatchee beach mouse (*P. p. allophrys*)
- St. Andrew beach mouse (*P. p. peninsularis*)

Of the remaining three subspecies, one has already been declared extinct -- the Pallid beach mouse (*P. p. decoloratus*). The two surviving Atlantic Coast subspecies range along Florida's Atlantic coast between Ponte Vedra Beach and Hollywood Beach.

Remaining Atlantic Coast subspecies (2):

- Anastasia Island beach mouse (*P. p. phasma*)
- Southeastern beach mouse (*P. p. niveiventris*)

Currently, all beach mice subspecies except Santa Rosa are listed as threatened or endangered by the U.S. Fish and Wildlife Service or the Florida Fish and Wildlife Conservation Commission.



Historic Ranges of the Gulf Coast Beach Mouse Subspecies

Figure 2. Habitat Ranges of the Gulf Coast Beach Mouse Subspecies. Map created by Kathryn Smith. Credits: Kathryn Smith

Description

Beach mice are small, pale mice with large ears and dark eyes (Figure 1 and Figure 5). Males and non-reproductive females average 12.5 g in weight. Pregnant females may exceed 20 g. The pale coloration of beach mice is believed to be an adaptation to the white sands of their coastal habitat. Although pale, beach mice exhibit a hint of brownish or grayish coloration across their backs. Beach mice

are difficult to tell apart from other Florida mice. However, beach mice are normally much whiter than other mice. The amount and hue of coloration varies among subspecies, with the Santa Rosa beach mouse being the palest and the Alabama beach mouse having the most pigmentation. Subspecies also may be distinguished by the extent to which coat coloration extends onto their faces and down their sides, and by the presence or absence of a tail stripe.

Life History and Behavior

Breeding and Dispersal

Beach mice have a monogamous mating system. A male mates with one female. For perspective, monogamy appears in less than 3% of all mammals. Mating among beach mice peaks in the winter but continues year-round if food is available. Once pregnant, it takes about 23 days before the mother gives birth. Females give birth to an average of 4 pups per litter and are ready to breed again within 24 hours. Beach mice live 9 months to a year in the wild. Young mice have the ability to disperse several kilometers (1 km = 0.62 mile) from their birthplace to establish their own home ranges.

Home Range and Habitat Use

Home range size varies among subspecies but averages about 5000 m² (53,819 ft²). Individual home ranges commonly overlap. Beach mice often maintain multiple burrows (20 or more) within their home range. Burrows are used for sleeping, nesting, feeding, caching seeds, or as predator escapes. Burrows have a 1-2 inch triangular opening and a 2-3 foot tunnel leading to a main chamber. On the other side of the chamber, mice excavate a second tunnel that ends just below the sand surface. This serves as an escape tunnel from predators. If the burrow is disturbed, the resident mouse will often explode through this escape hatch. Burrows are occupied and maintained by a male-female pair, or by a female and her pups.

Beach mice prefer to construct their burrows in mature, sparsely vegetated dunes adjacent to the high tide line (primary dunes) (Figure 3) and the more densely vegetated dunes further inland (secondary dunes). Sea oats (*Uniola paniculata*), dune panic

grass (*Panicum amarum*), and bluestem (*Schizachrium maritimum*) are the dominant plant species. The majority of foraging activity occurs in primary and secondary dunes. However, mice use other areas within the dune ecosystem. Areas between primary and secondary dune systems (called “swales”) often contain a thick cover of sedges (*Cyperus spp.*), rushes (*Juncus spp.*), and salt-grass (*Distichlis spicata*). Mice use highly vegetated swale areas to move between primary and secondary dune habitats. Mice do not commonly feed in the swales but instead, use the dense vegetation as cover to avoid detection by predators.



Figure 3. Primary dunes. Beach mice prefer primary dune habitat. Photo provided by the Florida Fish and Wildlife Conservation Commission. Credits: Florida Fish and Wildlife Conservation Commission



Figure 4. Scrub dunes, found on the bay-side of islands. Beach mice use scrub dunes less often, but scrub dunes can play a key role in providing safe habitat for beach mice when hurricanes disturb or flatten their preferred habitat. Photo provided by the Florida Fish and Wildlife Conservation Commission. Credits: Florida Fish and Wildlife Conservation Commission

Beach mice also occur in the “scrub dunes” found on the bay side of islands (Figure 4). Scrub

dunes, are dominated by scrubby oaks (*Quercus virginiana*), dwarfed magnolia (*Magnolia grandiflora*), sand pine (*Pinus clausa*), and false rosemary (*Ceratiola ericoides*). Scrub dunes do not provide optimal habitat. However, scrub dunes are protected from storms by primary and secondary dunes. Thus, they may play a key role in providing safe habitat for beach mice when hurricanes disturb or flatten their preferred habitat.

Activity and Diet

Beach mice are active at night (nocturnal), spending the day sleeping in their burrows. Upon nightfall mice emerge from their burrows (often in pairs) and forage on seeds and fruits of beach plants, and insects. Mice gather seeds that have fallen or blown onto the sand or climb plant stems to harvest attached seed heads. Sea oats make up the bulk of a beach mouse's diet (Figure 5). However, based on seasonal availability, beach mice also feed on bluestem, ground cherry (*Physallis angustifolia*), evening primrose (*Oenothera humifusa*), beach pea (*Galactia spp.*), dune spurge (*Chamaesyce ammannioides*), jointweed (*Polygonella gracilis*), seashore elder (*Iva imbricata*), and seaside pennywort (*Hydrocotyle bonariensis*).

During the course of one night, mice make several trips to and from their burrows. They gather seeds and store them in their burrow. This behavior may help promote the dispersal and germination of beach plants, and, ultimately, influence the formation of dunes.

Conservation and Management Issues

Loss of Dune Habitat

Because of their specific habitat needs, beach mice are in danger. Both humans and natural environmental factors pose risks for beach mice. Construction of vacation and retirement homes has destroyed dune habitat. Dune habitats become fragmented and degraded (Figure 6). The threats



Figure 5. Beach mice feed mainly on seeds and fruits of beach plants, especially sea oat seeds. Beach mice also eat insects. Photo provided by the Florida Fish and Wildlife Conservation Commission. Credits: Florida Fish and Wildlife Conservation Commission

imposed by commercial and residential development are particularly ominous on islands. The conversion of dune habitat on islands means that little dune habitat remains for beach mice. In addition, development aggravates the natural instability of the coastal island ecosystem. In the absence of development, coastal islands are subjected to a dynamic hurricane-dune regeneration cycle. This cycle maintains the preferred dune habitat of beach mice. However, on heavily developed islands, human-made structures hinder rates of natural, post-hurricane dune regeneration.

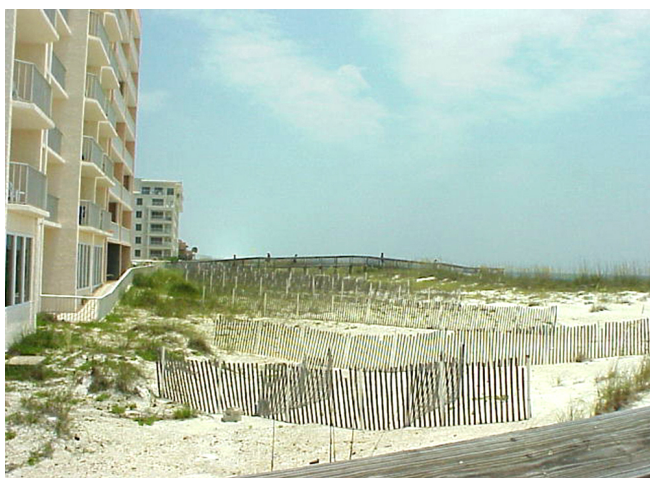


Figure 6. Conversion of dunes to vacation resorts destroys beach mouse habitat. Photo provided by the Florida Fish and Wildlife Conservation Commission. Credits: Florida Fish and Wildlife Conservation Commission

After a hurricane, dune plants must regenerate. As the plants grow, sand accumulates around them and small dunes begin to form. As the plants get

larger, the dunes also grow as the root systems act to hold more sand in place. This process is inhibited when buildings are constructed on the beaches. Natural plants are often destroyed during the construction process or are purposely removed to make way for new buildings. When this happens, there are no plants left to stabilize the dunes so the dunes are quickly blown away by the wind or washed away by the ocean. A long period of time will pass before new dunes can regenerate. Loss of dune habitat and reduction in dune regeneration rates may decrease the availability of safe havens for beach mice. Also, mice must persist for prolonged periods in marginal burrowing and foraging sites while dunes reform. Human development also contributes to the isolation of beach mouse populations. This isolation may restrict recolonization of habitat following the disappearance of local populations.

Introduced Predators

Beach mice populations are at risk from introduced predators. The domestic cat (*Felis catus*) and red fox (*Vulpes vulpes*) hunt beach mice. On islands, beach mice have evolved in the absence of these predators. They lack appropriate predator recognition and avoidance mechanisms and are highly vulnerable to predation by foxes and cats. Many scientists and agencies have cited introduced cats and foxes as a major threat to beach mouse populations and a potential cause of their decline. Removal of these species from beach mouse habitat is now recommended as a conservation practice. Some effort has been made to eradicate cats from Anastasia Island and foxes from Santa Rosa Island. However, no broad campaign has been established to control or eliminate introduced predators from beach mouse habitat as a whole.

Helping Remaining Beach Mice Populations

To help conserve and expand remaining beach mouse populations, biologists and wildlife managers recommend using translocation and reintroduction techniques. Both wild and captive-bred beach mice can be used in these techniques. *Translocation* involves adding beach mice to existing, but small, populations. Often, beach mice are taken from a large population and released into a small population. The

goal is to strengthen the small population by increasing the number of individuals and the genetic diversity. *Reintroduction* involves releasing beach mice into an area where beach mice were found in the past (historic range), but are not currently found there. When reintroducing beach mice into areas of historical range, biologists hope the beach mice will be able to successfully survive there again and rebuild a stable population.

In 1987, the Florida Game and Freshwater Fish Commission (now called the Florida Fish and Wildlife Conservation Commission) launched a translocation program for the Choctawhatchee beach mouse. A year-long effort resulted in a small but persistent population of the mice at Grayton Beach, Florida. More recently, efforts to reintroduce the Perdido Key beach mouse to the Gulf Islands National Seashore have resulted in a well-established population of mice in that area.

While these efforts have been successful, habitat loss limits the number of areas available for future translocations and reintroductions.

What You Can Do

There are several things you can do to help protect the remaining populations of beach mice. If you are a resident of a beach community, you can reduce the risk of cat predation by keeping cats indoors. Feeding stray cats in beach areas should be avoided as this will encourage stray cats to become permanent residents in beach mouse habitat. In addition, by staying off of the dunes while at the beach, you will help to preserve fragile beach mouse habitat. Over time, excessive foot traffic on dunes causes damage to native plants and ultimately destabilizes the dunes. You can reduce destruction of beach mouse habitat by remaining in the designated visitor areas or on designated walkways.

Encouraging the growth of native dune plants around private beach residences is another way to limit the negative effects that development can have on beach mouse habitat. Native dune plants such as sea oats, bluestem, evening primrose, and ground cherry can add color and structure to the landscape while providing food for beach mice and encouraging dune regeneration.

Finally, share with others what you've learned about beach mice here. The more awareness there is about these unique mice, the more hope there is that beach mice will survive well into the future.

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