

# **Conserving the Elusive King Rail**

Investigating the secretive life of a threatened  
freshwater marsh bird at Mackay Island National  
Wildlife Refuge

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King rails are a secretive marsh bird that reside in freshwater to oligohaline marshes throughout eastern North America. Seldom seen, but more readily heard, these chicken-sized birds are difficult to study due to the emergent vegetation that they hide within.

In addition to their secretive nature, king rails are difficult to study due to declining numbers. These rails have been decreasing across their range for over half a century . This concerning decline is mainly attributed to habitat loss due to anthropogenic land conversion and climate change. As a species of conservation concern, researchers are interested in

better understanding these cryptic birds in order to inform management strategies.



*Oligohaline waters are defined by salt concentrations between 0.5 and 5 ppt. Pictured is a researcher kayaking at Mackay Island NWR.*

Photo: Carol Gause



*Emergent plants are those that root underwater but whose leaves emerge above the water's surface.*

Photo: Carol Gause



*Anthropogenic change refers to direct or indirect human-driven changes in an environment. This picture shows Knotts island, which is divided down the center by the natural marshes of mackay Island NWR (left) and residential areas (right).*

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Photo: Katie Quine

## Threats

Due to drastic decreases in inland marsh habitat, king rail populations have become concentrated along the southeastern coasts of North America where many are year-round residents. In these coastal freshwater marshes, sea

level rise and an increase in frequency and intensity of storms due to climate change have led to more instances of saltwater inundation. This can render these habitats unsuitable, leading to displacement and selection against king rails. The king rail is listed as federally endangered in Canada and as threatened or endangered by 12 states in the United States

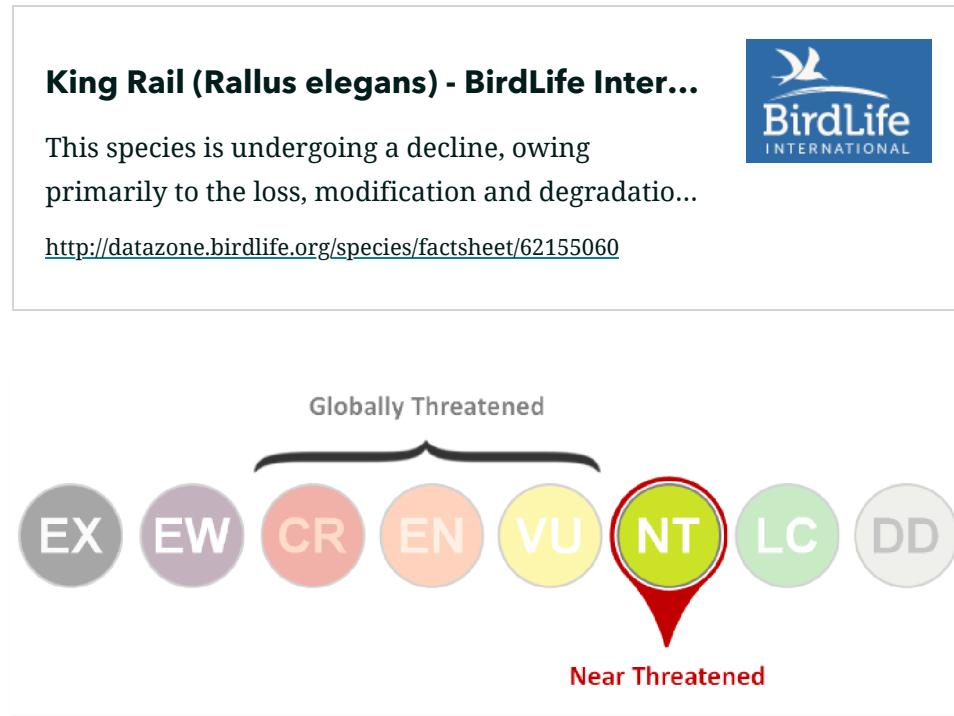


Figure: <http://datazone.birdlife.org/>

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## Our research initiative

A 10-year partnership between the U.S. Fish & Wildlife Service and East Carolina University has allowed researchers to study king rails at one of their most reproductively successful sites: Mackay Island NWR. The goal of this study is to move towards an understanding of the reasons behind king rail breeding success at this refuge using monitoring techniques.

Mackay Island National Wildlife Refuge is located along the coast of North Carolina near the border of Virginia.

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## **Nest Monitoring & Breeding Success**

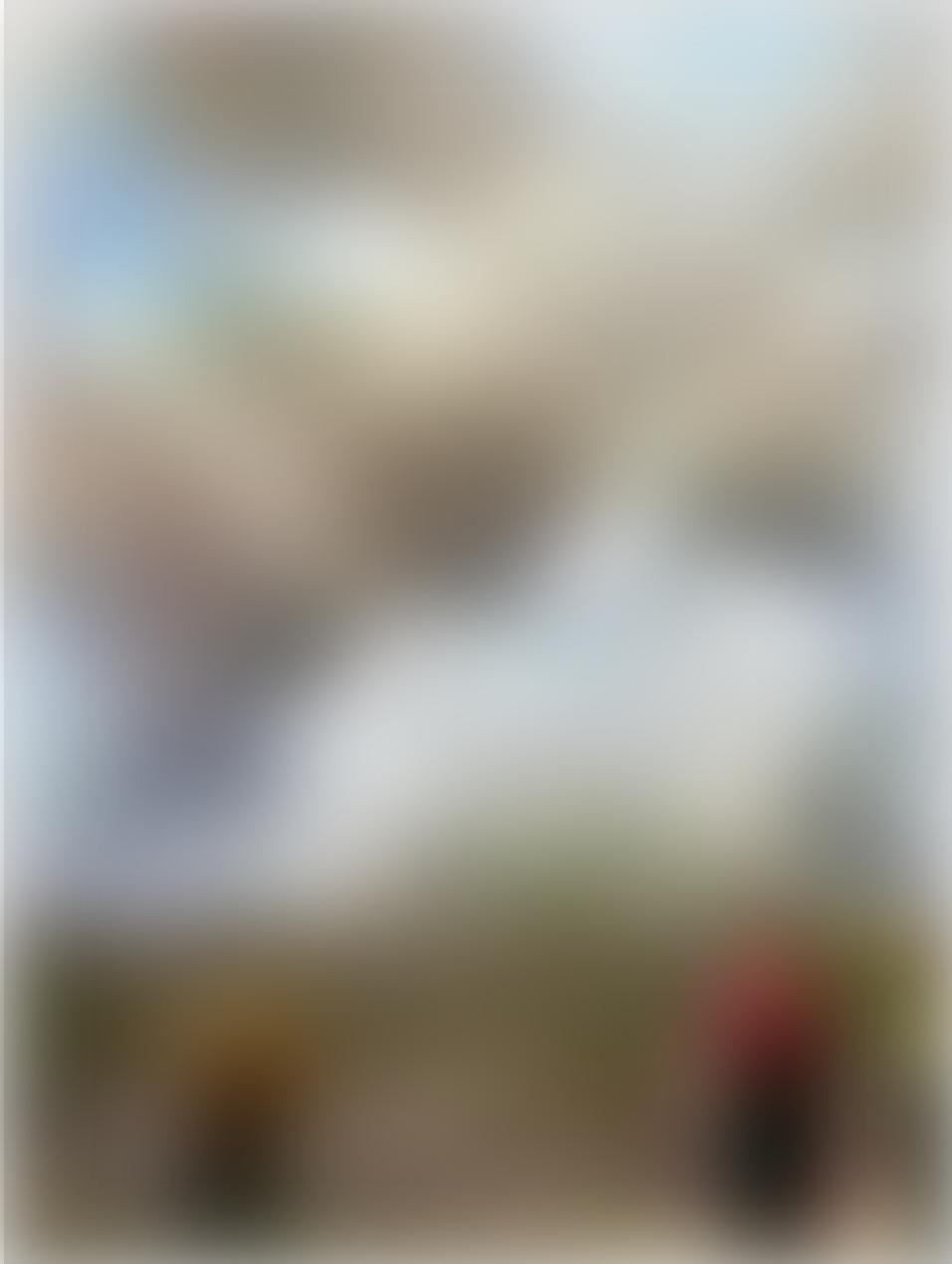
Relating land management variables to king rail occupancy and nesting habitat at Mackay Island National Wildlife Refuge in relation to marsh management strategies is important to understand the needs of these rails. We can do this by collecting information about nesting and brood-rearing.

King rails have semi-precocial chicks. The young are covered in black, fluffy down and are able to walk soon after hatching. This developmental pattern is characterized by staying at the nest and relying on parents for food. Those that fledge successfully will face many challenges in adulthood due to a changing climate and habitat loss.



Chicks are safely caught by trained professionals and standard measurements are collected.

Providing estimates of the local breeding population of king rails, recording nest fates, and monitoring habitat usage can tell us which marsh management strategies are working and which aren't. A method of particular interest to this study is controlled burning.



Monitoring a prescribed burn in a wetland along the NC coast. Photo:  
Nicolas Xiques

Much of the marsh within Mackay Island NWR is managed using prescribed fire. This strategy disturbs the environment in a healthy way and is used during the fall and winter (the non-breeding season). Burning the marsh decreases the encroachment of woody vegetation and invasive plants such as common reed (*Phragmites australis* var. *australis*). Additionally, burning keeps the vegetation at an early successional stage that king rails prefer for nesting, foraging, and chick-rearing.

For our study, we take into consideration different types of management (like prescribed fire) and compare across sites. This research directly impacts land-management decisions for the critical source population at Mackay Island NWR. Furthermore, what we learn can have diverse applications for king rail conservation across the entire range.

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## Funding

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