

California Black Rail (*Laterallus jamaicensis coturniculus*) Response to Marsh Enhancement at Point Pinole Regional Shoreline, California

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Abstract: California Black Rail (*Laterallus jamaicensis coturniculus*) is the smallest rail in North America and is largely a resident of fresh, brackish and saltwater wetlands. Due to habitat degradation and destruction, this species is listed as a threatened species in California. Protecting and managing its breeding habitat and restoring adjacent suitable marsh sites are strategies to help its population recover. Habitat enhancement efforts by staff and volunteers of the East Bay Regional Park District at Giant Marsh in Richmond, California have been improving conditions for this native species since 2004. Analysis of systematically obtained call count data, collected there during the breeding seasons of 2013 through 2021 is showing a positive trend of increasing California Black Rails, as compared to the first baseline information collected in 1977 at this location. Field research also is showing that the rail population is now four times higher at this site and that they are typically confined to high marsh habitat, at the upper limits of tidal flooding. Analyzing these trends occurring within Giant Marsh at Point Pinole Regional Shoreline is providing important information that will aid recovery efforts designed to preserve and manage breeding habitat for this threatened species.

Keywords: California Black Rail, Habitat Enhancement, Population Increase, Volunteer/Community Scientist Participation

1. Introduction

California Black Rail (*Laterallus jamaicensis coturniculus*) is listed as a threatened species [1], due to the loss, destruction and degradation of their fresh, brackish and saltwater wetland habitats [2]. This tiny, rarely seen slate-colored rail is about the size of a sparrow with faint white specks down its back [3], was historically known to be a year-round inhabitant of suitable marsh habitat on San Francisco Bay shores, and in delta regions of the Sacramento and San Joaquin Rivers [4]. During various times of the year, more than 200 species of birds, mammals, reptiles, and amphibian, and over 20 freshwater fish species are estimated to use the wetlands and aquatic components in the San Francisco Bay and Delta [5]. This is our most secretive rail species spending most of its life in rodent-made runways and corridors under dense marsh vegetation [3]. During the breeding season this cautious bird is almost never seen, and

field biologists must listen for its courtship calls at dawn or dusk to confirm the species occupancy in a given area.

The San Francisco Bay Estuary supports one of the largest extents of salt marsh in Western North America and in 1850 it covered an estimated 2200 km² [6]. However, since the mid-1800s, over 90% of the tidal marshes in the estuary have been lost to filling and diking [7]. This remaining habitat provides important staging and wintering areas for migratory waterfowl in the Pacific Flyway and is designated a Western Hemisphere Shorebird Reserve Network of international importance [8]. As pointed out by Mitsch and Gosslink [9], tidal marshes are highly productive ecosystems. Global warming scenarios including sea-level rise are significant factors threatening these ecosystems and their dependent biodiversity [10-12]. The United States Fish and Wildlife Service lists eleven wildlife species of concern, including the threatened California Black Rail, in the Recovery Plan for Tidal Marsh Ecosystems of northern and central California

and describes several ecosystem-level strategies to promote the recovery of these listed species [8].

Conducting research necessary to remove significant knowledge gaps on the California Black Rail that may hinder conservation efforts is one of these ecosystem-level strategies designed to promote species recovery and is the focus of this paper. Based on the work of Evans et al. [13] much of the breeding population is in San Pablo Bay, the northern shores of San Francisco Bay. It was estimated that 3,300 birds remained in northern San Francisco Bay [14]. However south of the above-mentioned locations, Manolis [15] reported detecting only one California Black Rail during systematic breeding season surveys at Point Pinole Regional Shoreline.

Proper management and conservation of this species in San Francisco Bay depends on protecting its remaining breeding marshes and restoring adjacent sites. East Bay Regional Park District has been restoring Giant Marsh at Point Pinole Regional Park for the California Black Rail. As Morrison [16] points out, restoration efforts aimed at improving the conditions for native species should be judged by how successful wildlife species respond to such attempts. This site-specific information on the California Black Rail response to marsh improvements along the eastern shore of the San Francisco Bay supports the Recovery Plan for Tidal Marsh Ecosystems of northern and central California [8] goal of managing, restoring and monitoring tidal marsh habitat to promote the recovery of this threatened species.

2. Study Area

Point Pinole Regional Shoreline contains approximately 700 HA (1,700 acres) of San Francisco Bay tidal marsh on the northwestern edge of Richmond, California. This park provides habitat for six special status wildlife species. Between 2004 and 2021, East Bay Regional Park District has worked cooperatively with more than 4,150 volunteers who have contributed 10,500 hours to remove over 120 cubic meters (>450 cubic yards) of non-native plants and in excess of 270 metric tons (>300 tons) of channel clogging debris at Giant Marsh (37.99414N, Lat., 122.36017W Long.) to improve tidal amplitude (or exchange), reduce mosquito problems and to

enhance marsh habitat conditions for listed wildlife species, which often forage in sediment along tidal creeks.

3. Methods

The author conducted call count surveys from 2013 through 2020 using standardized protocols for monitoring marsh birds: San Francisco Estuary Marsh Bird Survey Protocol (Version 2013.1), which is based on the North American Marsh Bird Monitoring Protocols by Conway [17], Don Edwards San Francisco Bay and San Pablo Bay National Wildlife Refuges developed by Wood et al. [18], which are all compatible with the Standardized North American Marsh Bird Monitoring Protocol by Conway and Seamans [19], requiring 10 minutes of listening per station: A 5-minute passive period prior to broadcasting bird calls (for California Black Rail, California Clapper Rail, Sora, Virginia Rail, and American Bittern) during the next 5-minute period. Typically, one and sometimes two protocol level surveys are abandoned due to weather or some other adverse condition (i.e., noise levels) that makes rail detections impractical. The actual number of rails detected was recorded, or if the detection was not heard clearly because of confound circumstances (e.g., distance from observer or environmental conditions) a range of the number of rails (e.g., 1 to 2) was sometimes recorded.

4. Results

Summarized trends for California Black Rails detection at the Giant Marsh from 2013 to 2020 can be found in Figure 1 (trendline $R^2 = 0.45$). This field research, based on call counts, is showing an increasing California Black Rail population which is now four times higher, on average, at this site prior to habitat enhancement efforts when only one rail was detected. All California Black Rails detected locations are mapped by year in Figure 2, showing that rails at this location seem confined to high marsh habitat at the upper limits of tidal flooding which are pickleweed and marsh grindelia -covered channel berms.

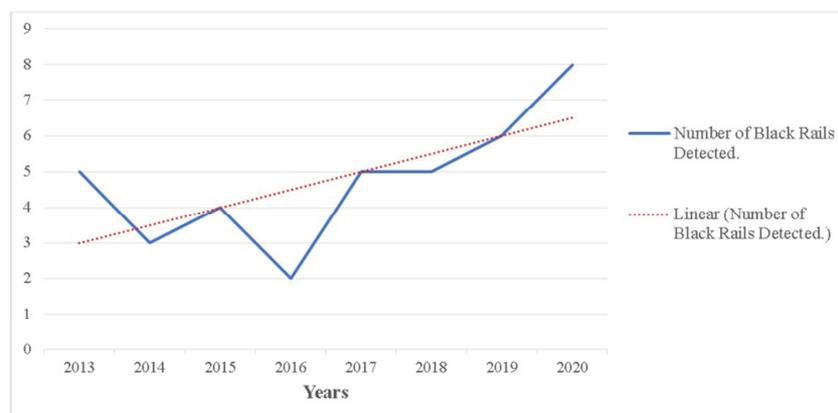


Figure 1. California Black Rail survey trends at Giant Marsh, Point Pinole, California. Prior to habitat enhancement efforts only one rail was detected. Following habitat improvements their population has increased on average four-fold (trendline $R^2 = 0.45$).

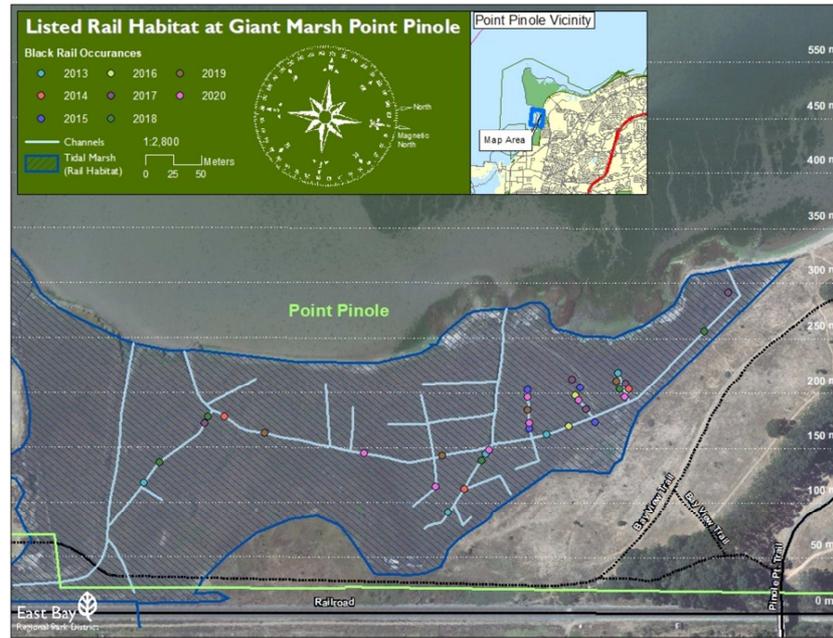


Figure 2. All California Black Rails detected locations are mapped by year. Rails at this location seem confined to high marsh habitat at the upper limits of tidal flooding which are pickleweed and marsh grindelia -covered channel berms.

5. Conclusion

Globally, anthropogenic activities are an ongoing threat to salt marshes. Worldwide more than 600 million people, or roughly 10% of the population resides along low elevation shorelines between the zero and ten meters [20]. An estimated 45% of the United States population also lives in coastal areas [21]. Land alterations practices such as filling, diking, and draining to convert to agriculture or urban development have significantly reduced their distribution internationally [6, 22]. Resource managers seeking to conserve salt marsh wildlife in light of all these many challenges may find these salt marsh enhancement efforts inspiring.

These marsh enhancement efforts to remove non-native plants and channel-clogging debris at Giant Marsh located at Point Pinole Regional Park in Richmond, California is demonstrating that with time the desired species can respond positively to habitat improvements. The call count data indicates that the California Black Rail population is four times higher now, than when Manolis [15] provided the first baseline information on the area. Like Manolis [15] findings, the California Black Rails at this location seem confined to high marsh habitat at the upper limits of tidal flooding. At Point Pinole this upper limit is usually along the pickleweed and marsh grindelia -covered channel berms (Figure 2). The threatened California Black Rail and the endangered Salt Marsh Harvest Mouse (*Reithrodontomys raviventris*) are closely associated with pickleweed plants, which they utilize for food, nesting, and protection from predators [23-25]. Under stable habitat condition with significant tidal marsh cover, above the extreme high tides, it is reported the adult Black Rail (*Laterallus jamaicensis*) survival is higher despite

predation on eggs and chicks and by herons and other avian predators, which can be the primary source of mortality for this species [26].

With the tidal brackish marshes of Suisun Bay being populated with relatively high densities of California Black Rails [27, 28] it is hopeful that dispersing juvenile rails may take up residence in the newly restored Dotson Family Marsh at the southern end of Point Pinole Regional Shoreline. This trend of gradually increasing numbers of apparently breeding California Black Rails at Giant Marsh, following habitat improvements supports the United States Fish and Wildlife Service Recovery Plan for Tidal Marsh Ecosystems of northern and central California [8] goals and is a tribute to the collaborative efforts of countless resource-minded individuals.

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