



Status: State endangered

Global and state rank: G4G5/S1

Family: Rallidae (Rails, Gallinules, Coots)

Taxonomy: The clapper rail (*Rallus longirostris*), which inhabits saltwater marshes along ocean coasts, and the king rail are considered by some to be the same species (Ripley 1977). Hybridizing populations of the two species exist in brackish marshes in Delaware and possibly in other areas along the Atlantic coast (Meanley and Wetherbee 1962). Mitochondrial DNA studies have been inconclusive (Avisé and Zink 1988).

Total Range: The king rail is widely distributed in the eastern U.S., but barely reaches southeastern Canada. The king rail breeds from the Great Plains through southern Ontario and New England’s Atlantic Coast to the Gulf Coast and Cuba. It is absent throughout the Appalachian Mountains and is only a local breeder north of the marsh-rice belts of the southern states and tidal marshes of the Atlantic Coast. An isolated breeding population has been reported in central Mexico (Warner and Dickerman 1959). Wintering range includes tidewater areas from the Delaware Valley to southeastern Georgia, southward through interior Florida to the Everglades, westward through the Gulf Coast and

rice belts of Louisiana and Texas, as well as north into the Arkansas rice belt.

State Distribution: In Michigan, the king rail is at the northern limit of its breeding range, and all breeding pairs are migratory. Nesting activity has been reported from the Saginaw Bay area west to Muskegon County and south to the state line, although there are several summer and nesting records in the northern Lower Peninsula and strays have been reported from the Upper Peninsula (Illicky 1969). King rails were reported from 9 counties during the 1980’s and 1990’s (see distribution map). In addition, Michigan Breeding Bird Atlas data for 1983 to 1988 notes possible breeding birds for three more counties (Menominee, Lake and Ottawa)(Brewer et al. 1991). Observations prior to 1980 exist for 16 additional counties, although only Lapeer, Calhoun and Washtenaw are represented by more than a single observation at a single site (Michigan Natural Features Inventory 2001).

Recognition: The king rail is a **large, slender**, rust-colored marsh bird with a **long bill** and long toes; it is the largest North American rail. Upper body parts are olive brown, the **breast is reddish-brown, flanks are barred with black and white**; the tail is short and often uplifted. Males appear similar to females. Meanley (1992) presents detailed information on the appearance



and plumage of chicks and adults. Average length and wingspan of adult birds are 15 - 19 inches and 21 - 25 inches, respectively. Males weigh about 12 ounces and females weigh 11 - 13 ounces (Ripley 1977). Although seldom flushed, flight is usually short, skimming the top of emergent vegetation; flight begins with legs dangling. The similar Virginia rail (*Rallus limicola*) occurs in the same habitats, but is a gray-cheeked, smaller version of its larger relative and lacks the king rail's extensive barring on the sides and undertail coverts. The clapper rail, while similar in appearance, does not breed in Michigan.

Best Survey Time: Because of their secretive behavior, rails are more often heard than seen. Birds are quite vocal at night during courtship and most of the incubation period (generally mid April to mid May), and readily respond to taped recordings of their loud and diagnostic calls. Rabe (1986) noted that king rails responded more consistently to taped calls played within 300 feet and during evening hours (2100 - 2400 hr). The call most commonly used is grunt-like, and may be described as *jupe-jupe-jupe*. The first several notes in this series are louder than succeeding ones and tempo increases toward the end of the call when the notes seem to run together. This call can be answered by other nearby king rails including a mate; it sometimes is used when a bird is startled (Meanley 1992). The courtship or mating call is basically a series of staccato notes (e.g., *kik-kik-kik*). As the nesting period approaches this call all but ceases and a number of other calls, mostly soft and subdued, are used. Meanley (1992) presents detailed information on vocalizations of chicks and adults. Calls of the Virginia rail can sound similar, and they should be carefully compared before field surveys are initiated. In general, king rail calls are deeper, louder and slower. Individual birds and females with chicks can be seen sporadically throughout the breeding season. Mowed areas next to good nesting habitat are often used for feeding, so birds have been observed on dikes, edges of parking lots, and lawns. Rails have been located by traversing, on foot or by boat, all potential habitat; dogs can be used as an aid in flushing rails (Andrews 1973). Once rails have been located by calls or searches, drive traps and walk-in traps can be used for capture (Andrews 1973).

Habitat: The king rail prefers permanent freshwater marshes in the Midwest, although it uses brackish

wetlands elsewhere. Grasses (Poaceae), sedges (Cyperaceae) and rushes (Juncaceae) are important cover types; cattail (*Typha* spp.) is a key plant throughout the range (Meanley 1992). Studies in Michigan have found king rails in monotypic cattail stands, cattail-sedge-shrub mixtures, and tussock-forming sedge-grass wetlands (Evers 1984, Rabe 1986). Although expansive stands of marshy herbaceous vegetation are typically considered preferred habitats, Rabe (1986) found king rails occupying marsh habitats interspersed with willow (*Salix* spp.) and dogwood (*Cornus* spp.) when Great Lakes water levels are high. Meanley (1969) believes this species uses a wider variety of habitats than any other rail.

Biology: King rails arrive at Michigan marshes in mid April, with pairs often returning to the same marsh in consecutive years. Territories are aggressively defended against rival king rails as well as soras (*Porzana carolina*) and Virginia rails. During courtship, the male attracts a female by strutting with its tail held vertically, exposing the white undertail coverts (Meanley 1957). The nest site is generally chosen by the male, which also assumes most of the nest building responsibilities. The presence of tussocks or clumps of vegetation in a rail territory is a key determinant of nest site location. Nest sites are usually in shallow water with depths of less than 10 inches (Meanley 1969). The nest is placed in a clump or tussock above water level and generally has a canopy and an entrance ramp. In uniform stands of vegetation, this canopy, which is formed by bending over the nearby plant stalks, may be very noticeable. Several brood nests, usually without canopies, are constructed near the egg nest. The clutch consists of 10 - 11 eggs. Both parents incubate the eggs for 21 - 23 days. After hatching, the downy black, semiprecocial young quickly vacate the nest. Day-old chicks can follow their parents for a considerable distance. Adults feed chicks 1 - 3 weeks of age almost exclusively; at 4 - 6 weeks of age, chicks pick up at least 60% of their own food; by 7 - 9 weeks, adults rarely feed chicks (Reid 1989). Most young broods (1 - 3 weeks of age) associate with two foraging adults, but older broods with only one (Reid 1989). Meanley (1969) estimated a 50% survival rate of young until two weeks of age. By the ninth or tenth week of age (mid-August), most young have fledged. Breeders depart by late September, although December records exist for Roscommon and Jackson counties for individuals caught in muskrat traps. Little is known about



migratory behavior, but birds appear to migrate alone and at night (Meanley 1992). Raccoons (*Procyon lotor*), mink (*Mustela vison*) and red fox (*Vulpes vulpina*) are known to prey on king rails, especially their nests. Adults also fall prey to northern harriers (*Circus cyaneus*) (Errington and Breckenridge 1936) and great horned owls (*Bubo virginianus*) (Errington 1932). King rails are diurnal feeders typically foraging in dense vegetation and shallow water approximately 2 to 3 inches in depth. Occasionally, individuals forage in open water and cultivated fields adjacent to suitable wetland habitats. Their diet consists of small crustaceans, especially crayfish, and aquatic insects. Fish, frogs, terrestrial insects (e.g., grasshoppers), and aquatic plant seeds also are eaten when available. Exoskeleton fragments are regurgitated; as many as 14 pellets (adult pellets average 0.8 inches long by 0.5 inches wide) have been counted on the top of one muskrat lodge (Meanley 1992).

Conservation/Management: Despite the king rail's broad geographic range, its populations have declined alarmingly in the past 30 years throughout major portions of its range, owing mostly to loss of wetlands. While severe declines have been reported in the northern part of the range, populations appear somewhat stable in most of the southern U.S., especially in Louisiana and Florida. The king rail's Midwest breeding population is declining due to wetland destruction and degradation as well as high pesticide residues. The king rail's decline in Michigan is not fully understood, but these factors further stress a population already constrained by its peripheral status. Migratory northern king rail populations may be geographically isolated from the more abundant and sedentary southern populations. Therefore, even though self-sustaining rail populations are present in the southern United States, northern populations cannot rely on recruitment from southern populations. In the early 1900's, king rails were frequently reported during the breeding season along Saginaw Bay and in the southern four-county tier of the Lower Peninsula. Since the mid-1900's, king rail populations have not recovered in Michigan and are currently confined to large marshes along Lake Erie, Lake St. Clair and Saginaw Bay with only sporadic occurrences reported from interior wetland complexes.

As nocturnal migrants, individuals strike various illuminated structures such as television towers, tall

buildings, and lighthouses. They also are struck and killed by automobiles. The king rail is considered a game bird in Gulf and Atlantic coast states (Meanley 1969), and there are annual harvests of king rails on their wintering grounds (Eddleman et al. 1988). Lead poisoning also may be a significant factor in declining rail populations. Soras have been found with ingested lead in their gizzards, indicating lead as a major contaminant among rails (Artman and Martin 1975).

Since the availability of suitable habitat is a major limiting factor, protection of occupied habitats is needed as well as artificial manipulation to enhance areas for migrating and nesting rails. Hummocky topography and natural swales should be maintained for nesting and foraging. Artificial land leveling should be discouraged. Beds of perennial vegetation should be encouraged where water depths are moist to 10 inches. In a continuum of preferred water depths for inland-breeding rallids, king rails nest in the most shallow water areas. These shallow, seasonally flooded sites are most easily drained and impacted by agriculture, especially in the Great Lakes Region when water levels are low. Row crops, other than rice (Meanley 1969) have little value for any rallid species. Suitable rail habitat can be created by flooding impoundments in spring to permit shallow water depths (less than 10 inches), followed by drawdowns in late summer to maintain vegetation density and coverage. Water depth and vegetation structure are probably more important than plant species composition. Brood foraging sites with open mud flats adjacent to dense vegetation are also crucial.

Improved nest success when nests were located in the interior of marshes suggests that beds of desired vegetation should be encouraged within the interior, not the periphery, of managed wetland units. Borrow areas along the edges of units may serve as travel lanes for mammalian predators. Nests located along ditches may be susceptible to increased predation and flooding (Meanley 1969). Borrow areas may, however, be the only remaining habitat available in intensively farmed regions (Meanley 1969), and roadside mowing of borrow areas should be discouraged during the nesting and brood-rearing periods. On intensively managed refuges, a complex of wetland units should include marsh habitats that naturally dry during the summer and may include extensive perennial vegetation. Floating nesting platforms are a potential management tool and



have increased breeding success of clapper rails in areas with limited nesting sites (Wiley and Zembal 1989).

Research Needs: More research needs to be completed to evaluate the relationship between chemical use and the levels ingested by king rails foraging on aquatic insects. The amount of hybridization with sympatric clapper rails needs further study. Evaluate timing and consistency of King rail use of interior wetland systems. Knowledge of the relative use of interior and coastal wetlands would assist recovery efforts.

Related Abstracts: Great Lakes marsh, lakeplain wet prairie, lakeplain wet-mesic prairie, prairie Indian-plantain, Sullivant's milkweed, eastern prairie fringed orchid, northern harrier, black tern, Forester's tern, American bittern, least bittern, Blanding's turtle, eastern fox snake, lake sturgeon

Selected References:

Andrews, D.A. 1973. Habitat utilization by sora, Virginia rails and king rails near southwestern Lake Erie. M.S. thesis, The Ohio State Univ. 112 pp.

Artman, J.W. and E.W. Martin. 1975. Incidence of ingested lead shot in sora rails. *J. Wildl. Mgmt.* 39:514-519.

Avise, J.C. and R.M. Zink. 1988. Molecular genetic divergence between avian sibling species: king and clapper rails, long-billed and short-billed dowitchers, boat-tailed and great-tailed grackles, and tufted and black-crested titmice. *Auk* 105:516-528.

Brewer, R., G.A. McPeck and R.J. Adams, Jr. (eds.). 1991. Atlas of breeding birds in Michigan. Mich. State Univ. Press, East Lansing, MI. 590 pp.

Eddleman, W.R., F.L. Knopf, B. Meanley, F.A. Reid, and R. Zembal. 1988. Conservation of North American rallids. *Wilson Bull.* 100:458-475.

Errington, P.L. 1932. Food habits of Wisconsin raptors; Part I, owls. *Condor* 34:178-186.

Errington, P.L. and W.J. Breckenridge. 1936. Food habits of marsh hawks in the glaciated prairie region of north-central United States. *Am. Midl. Nat.* 17:831-848.

Evers, D.C. 1984. King rail survey-1984. Mich. Nat. Feat. Invent., Unpubl. Rept.

Illicky, N.J. 1969. Sighting of a king rail in the Upper Peninsula. *Jack-Pine Warbler* 47:104.

Meanley, B. 1957. Notes on the courtship behavior of the king rail. *Auk* 74:433-440.

Meanley, B. 1969. Natural history of the king rail. *N. Am. Fauna* No. 67.

Meanley, B. 1992. King Rail. *In* The Birds of North America, No. 3 (A. Poole, P. Stettenheim, and F. Gill, Eds.). Philadelphia: The Academy of Natural Sciences; Washington, D.C.: The American Ornithologists' Union.

Meanley, B. and D.K. Wetherbee. 1962. Ecological notes on mixed populations of king rails and clapper rails in Delaware Bay marshes. *Auk* 79:453-457.

Michigan Natural Features Inventory. 2001. Biological and conservation data system. Lansing, MI.

Rabe, M.L. 1986. King rail census-1986: population status and habitat utilization. Mich. Dept. Nat. Resour., Unpubl. Rept.

Reid, F.A. 1989. Differential habitat use of waterbirds in a managed wetland complex. Ph.D. diss. Univ. Missouri, Columbia.

Ripley, S.D. 1977. Rails of the world: a monograph of the family Rallidae. David R. Godine, Boston, MA.

Warner, D.W. and R.W. Dickerman. 1959. The status of *Rallus elegans tenuirostris* in Mexico. *Condor* 61:49-51.

Wiley, J.W. and R. Zembal. 1989. Concern grows for the light-footed clapper rail. *Endangered Species Tech. Bull.* 14:6-7.

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