Yumа Clapper Rail

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Common Name: Yuma clapper rail
Scientific Name: *Rallus longirostris yumanensis*
Order: Gruiformes
Family: Rallidae
Status: Endangered under the Endangered Species Act of the United States; Endangered in Mexico; Endangered in Arizona and California.
Threats: Habitat loss owing to water diversion and channelization for urban and agricultural uses and conversion of wetlands to crop land and urban development. Habitat quality is reduced when flood control by dams and fire suppression allows vegetative succession to different community types, contaminant accumulation from agricultural run-off, and invasion of marshlands by exotic salt cedar (*Tamarisk chinensis*).
Habitat: Emergent freshwater and brackish-water riverine wetlands exposed to periodic flooding (Todd 1986). Most commonly found in shallow, early and mid-successional cattail (*Typha* spp.) and bulrush (*Scirpus* spp.) marshes with high interspersion of both dense vegetation and open water/mudflat habitats (Conway 1990).
Distribution: Southwestern United States and northwestern Mexico. Historically, rails were found in extensive marshlands of the Colorado River delta and in backwater marshes and old oxbows of the lower Colorado and Gila Rivers. Currently, they reside in isolated Colorado River marshes from Needles, California, southward to the delta in Mexico, along the lower Gila River in Arizona, and in marshes associated with the Salton Sea in California (Todd 1986).

DESCRIPTION

The Yuma clapper rail is the size of a crow, with long, gray-brown legs and toes. The orange bill is long, thin, and slightly down-curved. The head, neck, and breast are gray-brown, and the back feathers are darker brown with black centers. Both the flanks and undertail covert feathers are distinctly marked with alternate black and white bars. Males and females are similar in plumage coloration. Adult mass varies seasonally, but males average 269 g and females 210 g. The body is laterally compressed, allowing rails to run quickly through dense emergent vegetation. The tail and wings are noticeably short and the legs are large and strong, evolutionary adaptations that allow birds to run through dense reeds or swim underwater to avoid danger.

NATURAL HISTORY

Unlike most races of clapper rail, *yumanensis* inhabits freshwater marshes. Yuma clapper rails feed on a variety of wetland invertebrates and small vertebrates, primarily crayfish (*Procambarus clarki* and *Orconectes virilis*), clams (*Corbicula* sp.), isopods, water beetles (Hydrophilidae), and small fish (Ohmart & Tomlinson 1977; Eddleman & Conway 1998). Birds forage by picking prey off vegetation and the surface of the ground, probing soft mud and sand with their long bill, and spearing prey beneath the water surface.

Male and female birds give loud, distinctive mate-attraction calls: "*Kek*" for males, "*Kek-burr*" for females. Pairs vocalize simultaneously, forming a duet that resembles the rapid clapping of hands and gives the species its name. Pairs are at least annually monogamous. Nesting occurs in February through May. Males may build multiple nests, and the female chooses one for egg-laying. Alternate or "dummy" nests are often used for preening, loafing, and as brood platforms, but they are used for incubation if predators or high water disturb the primary nest. Adults have the extraordinary ability to carry eggs in their bills to a new nest. Females lay large clutches (mean = 7.8 eggs; Bennett & Ohmart 1978). Male and female birds alternate incubating the clutch, with males typically incubating eggs throughout the night. Incubation begins before the last egg is laid and requires 21 to 29 days. Chicks can leave the nest almost immediately after hatching, and juveniles become independent at 5 to 6 weeks of age. Estimates of annual adult survival are rare but probably are 49 to 67%, with most mortality attributed to predation during fall and winter (Eddleman & Conway 1994).

Yuma clapper rails are mostly nonmigratory, although some winter movement may occur (Eddleman 1989). Birds only defend a small area around their nest site (Conway 1990). Home range size averages 7.6 hectares for males and 10.0 hectares for females (Conway et al. 1993). Densities may be as high as 0.15 birds per hectare (Smith 1975).

CONFLICTING ISSUES

Wetlands used by clapper rails also serve as settling basins for a wide variety of contaminants (Eddleman et al. 1988; Eddleman & Conway 1998). Selenium levels in Yuma clapper rail tissues were at levels that caused hatching defects in many other birds (Rusk 1991). Other clapper rail subspecies have relatively high residues of DDE (dichlorodiphenylethane), PCBs (polychlorinated biphenyl), and selenium in eggs, and moderate to high levels of mercury, DDD (dichlorodiphenyldichloroethane), DDT (dichlorodiphenyltrichloroethane), DDE, dieldrin, heptachlor epoxide, and PCBs in body tissues (Roth 1972; Odom 1975; Klaas et al. 1980; Jarman 1991; Lonzarich et al. 1992; Eddleman & Conway 1998).

Little is known about either the historic or current distribution in Mexico. The historic range of Yuma clapper rails in the United States was probably not significantly larger than it is today (Tomlinson & Todd 1973). However, one thing is certain: suitable habitat, and hence population size, has declined with the rapid and aggressive control of water on the Colorado River (Eddleman & Conway 1998). Historically, marsh habitat along the Colorado River shifted annually with existing marshes being wiped out by flood or fire and new marshes growing elsewhere (Sykes 1937; Ohmart et al. 1975). As a result, high quality, early-successional marshlands rich in productivity were probably always available, and Yuma clapper rails evolved behavioral adaptations and life history strategies to deal well with the dynamic nature of riverine wetlands.

In 1902 the U.S. Congress created what is now the U.S. Bureau of Reclamation (BOR) to develop water projects for farmers in the West. With water diversion, Congress hoped the arid West could support large cities and millions of small farms. The first Colorado River dam (Laguna) was completed in 1909. Early dams profoundly altered the dynamics of marshland creation and succession along the Colorado River (Grinnell 1914). Moreover, conversion of the Colorado River floodplain to agriculture reduced the number of oxbow river marshes that rails traditionally used for nesting and foraging. As croplands expanded in the arid desert regions, clapper rail habitat declined.

Upstream dams have altered hydrology and have profoundly impacted expansive rail habitat in the Colorado River delta. Approximately two-thirds of the formerly extensive marshlands of the delta quickly disappeared following completion of the first major Colorado River dam (Hoover Dam in 1935; Sykes 1937). As time passed more dams were built, and ever more water was taken from the river, leaving less to cross the Mexican border into the delta. Although small marshland habitats eventually became established behind the large U.S. dams, the once massive river delta marshes were gone. In recent years not a drop of Colorado River water typically reaches the delta. The water that is delivered to remnant marshes in the delta is mainly discharge from first-generation uses in the United States, such as irrigation runoff and municipal sewage effluent (Glenn et al. 1996).

Prior to 1922 federal water appropriation laws were based on "beneficial use." Once a state diverted water and used it to some "benefit," the state owned future rights to that water as long as it continued to divert. California's rapidly increasing diversion of Colorado River water left other western states worried that there would soon be none left. Thus in 1922 the U.S. Department of Commerce brought the seven Colorado River basin states together and established the Colorado River Compact. Fifteen million-acre feet (MAF) were appropriated among the seven states, presumably leaving 2 to 3 MAF excess both as a buffer for low flow years and for Mexico.

Those appropriations, still in effect today, were based on a 1922 estimated annual flow of 17 to 18 MAF. However, average annual flow since 1922 has only been 13.9 MAF. The overestimate was initially not a problem, but as states diverted more of their appropriations, water rights issues led to contentious legal battles. Not only is the struggle over Colorado River water a battle among states, but rapidly growing urban cities in the Southwest are fighting against agricultural interests within states. Hundreds of legal cases over water rights have been fought, with dozens reaching the Supreme Court.

It is in this intense legal battle over water that the Yuma clapper rail must persist. By the time the ESA was passed, the lower Colorado River was already a series of consecutive dams separated by water storage reservoirs and narrow delivery channels. Yuma clapper rails were declared Endangered in 1967, soon after the ESA was passed. Yet fish and wildlife have no legal right to water under current appropriation laws and no legitimate status as beneficiaries. Indeed, in efforts to store and divert more river water, the BOR considered removing all existing vegetation along the lower Colorado River and replacing it with vegetation that requires less water. Moreover, the agency responsible for endangered species recovery (the U.S. Fish and Wildlife Service or FWS) has no legal footing by which to stop the BOR. Few specific efforts aimed at recovery have been proposed, much less implemented.

In addition to issues of quantity of water, quality of the marshes that remain in the lower Colorado River basin is threatened. Irrigation runoff that re-enters the Colorado River contains high concentrations of salts, mineral deposits, and pesticides. At the same time, additional rail habitat has been lost in subsidiary river basins. Faced with dwindling flows of Colorado River water, farmers began to pump groundwater for irrigation. Extensive pumping has lowered groundwater aquifers, causing entire river basins in the Southwest (e.g., the San Pedro River) and their marshland habitats to dry up completely.

A recovery team was formed in 1972 (Gould 1975), and the team completed a recovery plan for the Yuma clapper rail in 1983 (U.S. Fish and Wildlife Service 1983). However, the recovery team was unable to address the large political issues. Membership on the recovery team was based on agency representation rather than on expertise. Members represented the BOR, FWS, Bureau of Land Management, Arizona Game and Fish Department, and California Department of Fish and Game. Some of these agency representatives were local rail experts, but others were not. If a recovery team member took a new job or switched positions within the same agency, his or her position on the team was usually filled by a replacement within the agency. Consequently, the recovery team had high turnover. Often, new members had no knowledge of or experiences with Yuma clapper rails. Such turnover and inexperienced membership limited the team's ability to promote recovery efforts.

Veteran recovery team members who had the knowledge and experience to push for active recovery efforts did not; however, the ability of these individuals to change river water flow and release schedules was probably nil. Although the FWS is legally mandated to establish and attempt to meet recovery objectives under the ESA, wildlife biologists within state natural resource agencies in California and Arizona assumed long-term leadership roles on the recovery team. These state agencies are administered by legislatures that have been immersed in legal battles to divert *more* water from the Colorado River for their expanding urban and agricultural needs. It is unlikely that state legislators in the West would urge their employees to fight to keep more water in-stream for rails while they sued other states to take more out.

When faced with difficult decisions, managers frequently stall by asking for additional information (Nichols 1999), and this is what the Yuma clapper rail recovery team did. After the recovery plan was completed, the only purpose of annual recovery team meetings was to coordinate annual population surveys. Methods of increasing population size, improving current habitat conditions, restoring historic habitat, or changing water flows to benefit rails were seldom, if ever, discussed. By 1990 the recovery team had dissolved. The water needs of agricultural and urban growth in the West were politically, socially, and economically too big to fight. Besides, rail populations in the United States appeared relatively stable (700–1,000 birds), and annual surveys could be coordinated among the agencies involved without holding meetings.

Consequently the primary efforts of the recovery team over the past 25 years have been to coordinate population surveys. Monitoring alone, however, is not likely to lead to better understanding or ensure long-term viability (Nichols 1991) unless it is coupled with experimental work to understand the mechanisms driving population change (Krebs 1991). Fortunately the U.S. Yuma clapper rail population has been relatively stable and appears healthy for the short term, with substantial numbers breeding in several state and federal wildlife management areas.

FUTURE AND PROGNOSIS

Despite the lack of active recovery efforts, the future for the Yuma clapper rail looks relatively good. The total U.S. population is estimated at 1,500 birds, and counts in the United States have remained relatively stable since the late 1980s (Anderson & Ohmart 1985; Shuford 1993; Small 1994; Piest & Campoy 1998). Numbers of birds in Mexico were until recently unknown, but surveys from 1998 suggest as many as 5,300 birds in the largest remaining delta wetland, Ciénega de Santa Clara (Piest & Campoy 1998). If these estimates are correct, the Yuma clapper rails' future appears promising as long as Mexican marshes are not developed or degraded. One requirement for delisting in the recovery plan is a signed agreement between Mexico and the United States for cooperative management of Yuma clapper rails and their habitat; such an agreement has not been reached. Habitats in Mexico require protection, and U.S. and Mexican officials will have to work together to prevent development or degradation of Ciénega de Santa Clara. Cooperation is essential because the quantity and quality of rail habitat in the delta are dependent on water from the United States.

Any future management or recovery efforts in the United States will be hampered by separate federal agencies working under different mandates. Federal agencies managing first-generation water uses (irrigation, flood control, hydroelectric power generation) are different from those managing second-generation uses (water pollution prevention, management of endangered species dependent on in-stream flow). Hence the agencies responsible for water flow (BOR, Army Corps of Engineers) have expended little effort in conserving endangered species, and the agency responsible for species recovery (FWS) has no authority over agencies controlling water flow. The separate missions of these agencies should be integrated into a comprehensive plan to manage the Colorado River ecosystem. Efforts to do this have begun recently.

Federal and state wildlife refuges on the lower Colorado River have traditionally managed marshlands exclusively to benefit migrating waterfowl. Refuges frequently drained, plowed, and mechanically treated marshes to increase waterfowl foraging opportunities. However, the state and federal wildlife refuges that support the largest number of rails have only recently included habitat requirements for Yuma clapper rails into their master management plans for the future. Additional efforts might include prescribed fire and occasional flooding to scour older marshlands, remove invading salt cedar, and stimulate new emergent growth for the benefit of rails. Many of the remaining habitats have contaminants in water inflows, sediments, or both (Eddleman & Conway 1998), and efforts to reduce contaminant inflows from agricultural runoff must be discussed. The recent discovery of the large rail population in Mexico should be taken as an opportunity to address the organizational and ecological problems preventing real progress on recovery and restoration on the lower Colorado River.