

## Yuma Clapper Rail (*Rallus longirostris yumanensis*)



### Legal Status

**State:** Threatened,  
Fully Protected

**Federal:** Endangered

**Critical Habitat:** N/A

**Recovery Planning:** A federal recovery plan for the Yuma clapper rail was completed on February 4, 1983, by the U.S. Fish and Wildlife Service (USFWS 1983). A Draft Revised Recovery Plan was published in February 2010 (USFWS 2010).

### Taxonomy

In 1902, Herbert Brown described a clapper rail he had captured near Yuma, Arizona, as a light-footed clapper rail (*Rallus levipes*). In 1923, Dickey described it as a new species, the Yuma clapper rail (*Rallus yumanensis*) (Todd 1986; USFWS 2010), based on several minor morphological differences from other clapper rails, as well as its isolated range and freshwater habitats (Banks and Tomlinson 1974).

Although there was some subsequent controversy over the rail's classification (Van Rossem 1929; Oberholser 1937), for over 60 years it has been widely treated as a subspecies of *R. longirostris* (i.e., *R. longirostris yumanensis*). This designation is consistent with available molecular genetic analysis (Fleischer et al. 1995).

A description of the species' physical characteristics can be found in the Draft Revised Recovery Plan (USFWS 2010).

### Distribution

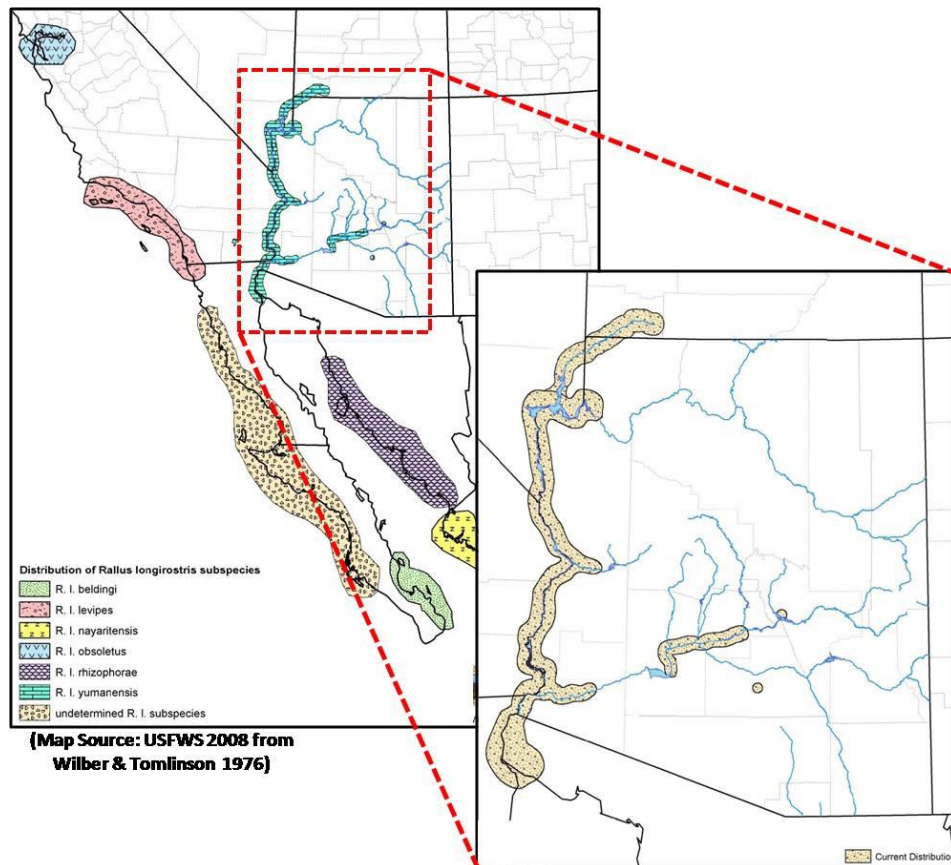
#### General

The Yuma clapper rail breeds along the lower Colorado River (including La Ciénega de Santa Clara in Mexico), the Gila River drainage in Arizona, Lake Mead (and the Overton Arm) and its local tributaries,

the Virgin River in Nevada and Utah, and the Salton Sea/Imperial Valley areas of California. Figure 1 shows the general breeding range of the species, while Figure SP-B16 indicates known occurrence in the Plan Area. In the Plan Area, the main habitat areas for this subspecies are located along the Colorado River and around the Salton Sea (including Dos Palmas Springs).

There are at least three “outlier” observations for Yuma clapper rail. In 1977, an individual was identified by vocalization on several days at Harper Lake northwest of Barstow (Figure SP-B16) but was not observed subsequently and was considered to be an unpaired individual (CDFW 2013). In 1978, the Yuma clapper rail was identified at Cronese Lake in the central Mojave (Garrett and Dunn 1981). In 1989, a single Yuma clapper rail was observed at the Ash Meadows National Wildlife Area located about 90 miles northwest of Las Vegas.

Figure 1. Range of the Yuma Clapper Rail



## Distribution and Occurrences within the Plan Area

### *Historical*

The historical distribution of the Yuma clapper rail is unclear. Todd (1986), in an extensive investigation of the Yuma clapper rail literature, reported that rails were first observed by J.G. Cooper near Fort Mojave in 1884. This is likely the earliest record. However, Joseph Grinnell performed an extensive survey of the Colorado River between Needles and Yuma in 1914 and did not record any observations of this species. However, he later documented the Yuma clapper rail from the lower Colorado River (Grinnell and Miller 1944, cited in Todd 1986). The Desert Renewable Energy Conservation Plan (DRECP) Area includes eight historical (i.e., pre-1990) records of the Yuma clapper rail in the California Natural Diversity Database (CNDDB) and others located just outside the Plan Area (Figure SP-B16) (CDFW 2013). Several of the historical occurrences occur along the lower Colorado River south of Parker to about 22 miles north of Yuma, Arizona (Figure SP-B16). Historical occurrences are also located at the Salton Sea, along the All American Canal, the New River, and the Holtville main drain in the Imperial Valley, as well as the single record each at Harper Lake in 1977, and Cronese Lake in 1978. (Figure SP-B16).

The Yuma clapper rail appears to respond positively to human activities that create habitat. Construction of dams both on the Colorado River and along adjacent tributaries has possibly contributed to the shift in the Yuma clapper rail's distribution (Ohmart and Smith 1973; Anderson and Ohmart 1985). Table 1 shows the relationship of upstream distribution of the Yuma clapper rail in relation to water management activities. These dams have the effect of creating sedimentation and backwater areas, thus providing additional shallow-water emergent habitat required by the Yuma clapper rail (CVCC 2007). Near the edge of the Salton Sea freshwater marsh ponds have been built and maintained to create habitat that now supports Yuma clapper rails.

**Table 1.** Upstream Distribution of the Yuma Clapper Rail and Relationship to Dam Construction and the Salton Sea Flood Event

Location	Year completed	Year Yuma clapper rail first found
Salton Sea	1905 (flooded)	1931
Laguna Dam	1905	1921
Headgate Dam	1941	1946
Parker Dam	1938	1954
Topock and Upper Lake Havasu	1938	1966
Needles Area	—	1982
Hoover Dam	1936	1986
Virgin River	—	1998

**Source:** USFWS 2010

### **Recent**

The recent (i.e., since 1990) documented distribution of the Yuma clapper rail in the Plan Area is similar to the historic distribution, but with some apparent shift along the Colorado River. The distribution now ranges from about Lake Havasu to near Yuma, Arizona (Figure SP-B16). The recent distribution in the Salton Sea/Imperial Valley area is similar to the historic distribution. The Coachella Valley Habitat Conservation Plan (CVCC 2007) reports the Yuma Clapper Rail is found on Salt Creek and the Dos Palmas oasis in the southern Coachella Valley. The CNDDDB contains 37 records for the period between 1990 and 2010 (CDFW 2013) and the USFWS database includes 20 records from 2004 to 2010 (USFWS 2011). The records from the USFWS database are located around the eastern edge of the Salton Sea, south of El Centro, and along the Colorado River near the Colorado River Indian Reservation and near the Imperial Reservoir. (It appears that there is some overlap between the USFWS and CNDDDB databases for the period from 2004 to 2010, but the USFWS database contains the most recent data from USFWS protocol surveys.)

Yuma clapper rail has also colonized Ash Meadows National Wildlife Refuge (NWR) and has established a resident population there. Yuma clapper rail has also been known to inhabit Wixom Marsh near Seeley in the Imperial Valley. A May 2007 survey detected Yuma clapper rails defending breeding territories, and a Yuma clapper rail was heard calling in the marsh in January 2013. The marsh is thought to support two breeding territories.

## Natural History

### Habitat Requirements

Among the subspecies of clapper rail, only *yumanensis* is known to breed in freshwater marshes. By far, the preferred habitat consists of cattails (*Typha* spp.) and bulrush (*Scirpus* spp.) (Anderson and Ohmart 1985; Todd 1986; Eddleman 1989). Eddleman (1989) found that habitat use by the subspecies on two study sites varied somewhat over different seasonal periods (i.e., early breeding, late breeding, post-breeding, early winter, and late winter), but that some combination of cattail and bulrush accounted for the majority of the observations across all periods. Combining data from the two study sites, use of cattail/bulrush habitats ranged from 66% of observations in the post-breeding period to 86% in the early breeding period (Eddleman 1989). Notably, on one of the sites, rails were observed in tamarisk (*Tamarix* spp.) second-most frequently behind cattail, with a range of 11% of the observations in the late winter period to 37% in the post-breeding and 36% in the early winter periods (Eddleman 1989). USFWS (2010) notes that the subspecies has been observed in shoreline areas with a mix of trees, including willow (*Salix* spp.) and tamarisk. However, although they are occasionally observed under the woody vegetation fringing a freshwater marsh, woody vegetation doesn't hold much habitat value for Yuma clapper rail compared to marsh vegetation (i.e., cattails and bulrushes).

Optimum habitat for the Yuma clapper rail results from a complex interplay of water levels, appropriate vegetation and vegetation characteristics (e.g., matting, dry areas, senescence), the timing of seasonal flooding, and possibly the timing of crayfish (*Procambarus clarkii* and *Orconectes virilis*, its primary prey) reproduction (Bennett and Ohmart 1978; Todd 1986). In a draft Recovery Plan

for the Yuma clapper rail, the USFWS (2010) characterized optimum habitat as consisting of:

“... a mosaic of emergent vegetation averaging greater than 2 meters (6 feet) high (Anderson and Ohmart 1985; Eddleman 1989), shallow (less than 30 centimeters [12 inches]) open water areas either as channels or pools with minimal daily water fluctuation (Tomlinson and Todd 1973; Gould 1975), open dry ground (slightly higher than the water level) between water, vegetation, or marsh edge for foraging and movement (Gould 1975; Anderson and Ohmart 1985; Eddleman 1989; Conway et al. 1993), and a band of riparian vegetation on the higher ground along the fringes of the marsh that provides cover and buffer areas that may be used seasonally (Eddleman 1989).”

An overriding consideration for nesting by the Yuma clapper rail is that the nest substrate be stable (Eddleman 1989; USFWS 2006, 2010). Sparsely vegetated areas are more likely to be occupied if crayfish are abundant (Anderson and Ohmart, 1985). The Yuma clapper rail depends on a continuous source of water, most likely because crayfish are similarly dependent. However, the species also seems tolerant of seasonal fluctuations in water level that characterize the Colorado River (Eddleman 1989), as long as the change in level is not too abrupt (Conway and Eddleman 2000, cited in USFWS 2010). Similarly, Gould (1975) suggested that short-term changes in water level should be avoided. Rails may have several nests and can move eggs to nests that are less threatened if need be, but if the habitat dries out, rails will abandon the area (Bennett and Ohmart 1978; Johnson and Dinsmore 1985).

According to Gould (1975), in addition to the basic habitat requirements of standing water and marshland vegetation, the following habitat parameters are desirable to support high Yuma clapper rail densities:

1. “Water - flowing through many small channels, from 0.5 to 3 meters (1.5 to 10 feet) wide either covered by vegetation or

appearing as open water -or appearing as small bodies of open water, 0.02 to 0.2 hectare (0.05 to 0.5 acre) in size.

2. Extensive areas of water where depth is less 0.3 meter (1 foot). Little or no daily fluctuation in water level.
3. High ground found in strips, or less importantly as small isolated islands.
4. Emergent vegetation being cattail and bulrush with little or no carrizo cane [aka, giant reed (*Arundo donax*)]. In areas of carrizo cane, stem density is generally too high and there are few down stems.”

An important aspect of Yuma clapper rail habitat is that over time, without occasional scouring by seasonal floods, marshes tend to become both overgrown (e.g., stem density too high), and much of the open or semi-open water fills with mats of old vegetation. The effects of this maturing process, or senescence, are that it becomes impossible for rails to move through vegetated habitat areas compared to open or semi-open aquatic habitat. Thus, foraging efficiency decreases as the habitat becomes choked with vegetation matting (Hinojosa-Huerta et al. 2008).

### Foraging Requirements

As mentioned previously, the principal prey of the Yuma clapper rail are the two introduced species of crayfish that occur in the area (Inman et al. 1998). Ohmart and Tomlinson (1977) found that about 95% of the stomach contents of two Yuma clapper rail specimens were crayfish, leading them to suggest that the range shift of the Yuma clapper rail may have been facilitated by the introduction and spread of the crayfish. Other prey items taken by Yuma clapper rail include small fish, insects, amphibian larvae, clams, and other aquatic invertebrates (Todd 1986; USFWS 2010).

### Reproduction

The Yuma clapper rail begins breeding activities in the early spring, usually in March or early April (Eddleman 1989), although mating calls may be heard as early as February (USFWS 2010). Breeding begins with the establishment of breeding territories. Birds occupying more

peripheral territories may mate a month or so later (Arizona Game and Fish Department 2007). Both males and females vigorously defend territories. Nesting occurs from March through May, but can vary with location and annual seasonal rainfall patterns (USFWS 2010).

Observed clutch sizes for 15 Yuma clapper rails nests in the lower Colorado River and Salton Sea ranged from 5 to 8 eggs (Eddleman and Conway 2012). Incubation was observed to last 23 to 28 days at nests in Arizona (Eddleman and Conway 2012). Both males and females incubate the eggs, with males incubating during the night shift and females incubating during the day (Eddleman 1989). Hatching success is high but juvenile mortality is also high (Bennett and Ohmart 1978; Eddleman 1989).

Young are precocial and within about 2 days of hatching they accompany adults on foraging trips, learning quickly to capture their own prey (Hunter et al. 1991). Family groups stay together for about 1 month, after which time the chicks separate from the parents. First flight occurs about 60 days after hatching (Arizona Game and Fish Department 2007).

Although nests may be from 6 centimeters (approximately 2.5 inches) to over 1 meter (approximately 3.3 feet) above the water level (average = 19.8 centimeters [approximately 7.8 inches]) (Eddleman 1989), as water levels rise, the birds may raise the level of existing nests or move eggs to a different nest. Consequently, the Yuma clapper rail may have several nests available for use (Conway and Eddleman 2000, cited in USFWS 2010).

### **Spatial Behavior**

Migration and dispersal patterns of Yuma clapper rails are not well understood. The current scientific thinking is that Yuma clapper rails do not migrate seasonally. However, post breeding dispersal is likely possible over long distances. It was first assumed that the Yuma clapper rail migrated south during the winter (Smith 1974; Todd 1986), but Eddleman (1989) observed that up to 70% of the populations he studied remained at their site year-round in the lower Colorado River area. Also, as noted in Distribution and Occurrences, the observations for Yuma clapper rail at Harper Lake northwest of



Barstow in 1977 (CDFW 2013), another at Cronese Lake in 1978, an unpaired individual at Ash Meadows National Wildlife Area in 1989 (Garnett et al. 2004), and the finding in 2013 of an individual at a desert solar project located 32 miles from the nearest occupied habitat indicate that Yuma clapper rails are capable of long-distance movements. The purposes, frequency, and distances involved in long-range movements by Yuma clapper rails remain unclear, and is an important topic for future research (USFWS 2006, 2010).

The Yuma clapper rail also shows seasonal variability in its use of habitat and in its home range size (USFWS 2010). According to Eddleman (1989), there are five movement patterns by Yuma clapper rail outside of their breeding territory:

- Dispersal by juveniles
- Dispersal during the breeding season by unpaired males
- Movements of post-breeding adults
- Movements during late winter
- Home-range shifts associated with high water.

The triggers for these movements appear to be the need to find suitable habitat (juvenile dispersal, post-breeding movements, late winter movements), the need to find mates (late winter movements, movements of unpaired males during the breeding season), and/or the need to locate food (post-breeding and late winter movements) (Eddleman 1989). Home ranges are variable over different seasons, ranging on average from 7 to 8 hectares (17 to 20 acres) in the early and late breeding periods, to 15 hectares (37 acres) in the post-breeding period, and 24 hectares (59 acres) in the late winter period (Conway et al. 1993). Females have larger ranges than males in the post-breeding period at 21 hectares (51 acres), compared to 9 hectares (22 acres), but the two sexes have similar home range sizes the rest of the year (Eddleman 1989).

### Ecological Relationships

The Yuma clapper rail is prey for several species, including coyote (*Canis latrans*), common raccoon (*Procyon lotor*), great horned owl (*Bubo virginianus*), Harris' hawk (*Parabuteo unicinctus*), and northern

harrier (*Circus cyaneus*) (USFWS 2010). Eddleman (1989) attributed 36 out of 37 known mortalities from natural causes to predation (50% by mammalian predators, 22% by avian predators, and 28% by unknown predators). Because these predators are generalists, however, the rail probably is not a critical element of their diets and likely is taken opportunistically.

As discussed previously, suitable habitat for the Yuma clapper rail depends on water levels, appropriate vegetation, the timing of seasonal flooding, and possibly the timing of crayfish reproduction. The subspecies appears to be particularly sensitive to water levels and may have several nests and can move eggs to nests that are less threatened by rising water levels if need be.

## Population Status and Trends

**Global:** Vulnerable (NatureServe 2010)

**State:** Critically imperiled (NatureServe 2010)

**Within Plan Area:** Critically imperiled (NatureServe 2010)

The Yuma clapper rail in the United States has shown recent range extensions northward from the Colorado River Delta and the southern end of the Colorado River into Lake Mead and the Virgin River, indicating that the species is reproducing enough to support such a range shift (USFWS 2006, 2010). The species' first recovery plan (USFWS 1983) indicated that the breeding population had been stable for 10 years at the desired level of 700 to 1,000 individuals. As a result, a down-listing package was prepared for the Federal Register in 1983. However, subsequent flooding of important habitat on the lower Colorado River resulted in the proposal not being published (USFWS 2006).

The long-term assessment of population trends is complicated by several factors identified by the USFWS (2010), including:

- Inconsistencies in the proportion of suitable habitat surveyed in different years; and
- Different survey protocols, such as playback methods (e.g., continuous vs. intermittent call playback), seasons of surveys, and differing levels of surveyor experience.

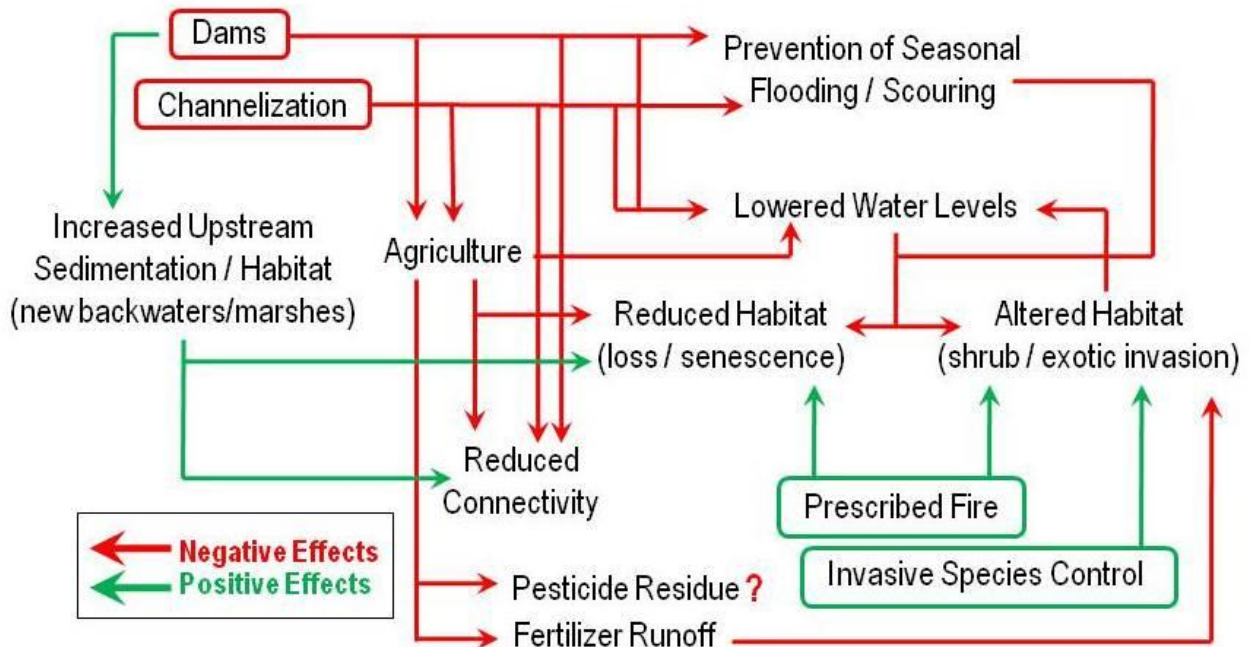
While the data for the United States populations of Yuma clapper rail do not allow for statistical population estimates, they do provide minimum number of rails in the census areas, which is the actual count of rails detected on survey routes, and which represents some subset of the actual population. Between 2000 and 2008, the minimum numbers in the United States ranged from 503 individuals in 2000 to 890 individuals in 2005 (USFWS 2010, Table 1). In the Plan Area, including the Colorado River and Salton Sea, the range over this same period was 472 individuals in 2001 to 849 individuals in 2005. The 2008 minimum number was 592 individuals along the Colorado River and at the Salton Sea (USFWS 2010). Within the lower Colorado River Delta region of Mexico (Ciénega de Santa Clara), Hinojosa-Huerta et al. (2008) documented a decline of 55% for the period of 1999 to 2002, but there was no statistically significant change between 1999 and 2006. The population was estimated to be 5,974 individuals (95% Confidence Interval = 4,698–7,482) in 2006, making it the largest documented population of the Yuma clapper rail.

### Threats and Environmental Stressors

Habitat destruction and modification is the primary threat to the Yuma clapper rail (USFWS 2010). The natural hydrologic regime along the lower Colorado River has been altered by damming, channelization, and bank stabilization, the last of which has separated the main river channel from backwater and floodplain areas where marsh habitats would naturally form (USFWS 2010). While damming has likely created additional marsh habitat for rail in some areas, the dams have resulted in altered flood regimes from historical seasonal winter and spring flooding events that are necessary to maintain healthy marsh systems. These natural flooding events would have removed much of the thick matting of dead vegetation and build-up of sediments that allow for efficient foraging and escape from predation. Without active management, the value of these marsh habitats for Yuma clapper rail is reduced, and the habitat may disappear altogether (USFWS 2010). On the other hand, dams have also resulted in sedimentation of ancillary streams and creeks upstream, thereby increasing the extent of backwaters and marshes available for the Yuma clapper rail. This creation of new habitat has been cited as one reason for the shift of the species' range upstream (see Distribution and Occurrences within the Plan Area).

Figure 2 presents a generalized conceptual model of water management (dams, channelization) and their potential negative and beneficial effects on marsh habitat for the Yuma clapper rail.

**Figure 2.** A Generalized Conceptual Model for the Effects of Water Management on the Yuma Clapper Rail



Currently, the marshes at the Salton Sea Sonny Bono National Wildlife Refuge (NWR) and Imperial Wildlife Area are managed by flushing salts from the wetland ponds. Use of water for management of clapper rail habitat has increased since 2004 and may be constrained in the future by competing water uses, such as agriculture, that may increase the cost and availability of water (USFWS 2010).

Environmental contaminants may also pose threats to the species. Eddleman (1989) documented high levels of selenium in the Yuma clapper rail, its eggs, and its primary food source (i.e., crayfish). Similar levels of selenium were responsible for reproductive damage in mallards (*Anas platyrhynchos*) (Lemly and Smith 1987, cited in Eddleman 1989). Several studies have found high concentrations of selenium in the Colorado River and the Salton Sea (Andrews et al.

1997; King et al. 2000; Rusk 1991, cited in USFWS 2010). In the discussion of these studies, USFWS (2010) stated, “selenium levels in those studies were high enough to indicate the potential for exposure and adverse effects to Yuma clapper rails.” Also, “... based on the available data, we do identify it [selenium] as a long-term threat to survival and recovery” (USFWS 2010, p. 16).

### Conservation and Management Activities

A Yuma Clapper Rail Recovery Team was created in 1972 (USFWS 2006, 2010) that instituted survey protocols and additional research on the species. A formal recovery plan was created in 1983 and some of the recommended recovery actions commenced. Following these initial studies, the recovery team became inactive except for the coordination of annual surveys completed by volunteers from state and federal agencies (USFWS 2010).

In 1995, a group composed of local, state, and federal agencies; water and power agencies; environmental and recreational groups; and Native American tribes was formed to develop the Lower Colorado River Multi-Species Conservation Program (LCRMSCP). In December 2004, the LCRMSCP was completed (LCRMSCP 2004). Covering 26 species, including the Yuma clapper rail, the LCRMSCP calls for the creation of an additional 512 acres of Yuma clapper rail habitat and its management in an adaptive management framework to not only protect the Yuma clapper rail but also to understand how the management of threats and stressors affects Yuma clapper rail abundance.

Other programs to protect and enhance Yuma clapper rail habitat have been created at the Salton Sea by the U.S. Bureau of Reclamation (USFWS 2002) and at the Torres Martinez Desert Cahuilla Indians in 2005. Prescribed fire has been used to enhance Yuma clapper rail habitat at the Sonny Bono, Havasu, and Imperial NWRs, as well as the Mittry Lake Wildlife Area (USFWS 2010).

In 2006, a 5-year review of the recovery plan was completed (USFWS 2006), and the following five actions were recommended:

- Revise the recovery plan.
- Involve USFWS with the protection of the Ciénega de Santa Clara (Mexico), ensuring a continuous water source for this highly

significant sub-population, which, based on the 2006 population estimate by Hinojosa-Huerta et al. (2008) accounts for approximately 87% of the known Yuma clapper rail population.

- Establish new survey protocol and training using an adaptive management scenario to determine the effectiveness of management actions.
- Develop or revise management plans for the National Wildlife Refuges and State Wildlife Areas focusing on areas of declining Yuma clapper rail populations and habitat quality.
- Continue to support research efforts into the Yuma clapper rail, especially the possible effects of elevated selenium levels.

The federal government initiated efforts to implement these recommendations in 2007 (USFWS 2010). In February 2010, a Draft Revised Recovery Plan was released for public review (USFWS 2010). In this revision, the strategies used for the continued persistence of the Yuma clapper rail focused on "... providing long-term management and protection for a sufficient amount of core and other habitats to support a viable population of Yuma clapper rails, monitoring of populations and habitats, research to provide effective conservation and recovery, and application of research results and monitoring through adaptive management" (USFWS 2010, p. iv).

## Data Characterization

Numerous surveys have been conducted for the Yuma clapper rail throughout its range in the U.S. and the Plan Area. Table 1 of the Draft Revised Recovery Plan shows that surveys were conducted along the lower Colorado River and at the Salton Sea every year from 1969 to 2007 (USFWS 2010). These data are not appropriate for estimating population sizes for various reasons, as discussed in Population Status and Trends, but they do provide information for the actual number of individuals observed along survey routes and allow some insight into occurrence population fluctuations and trends from year to year.

Despite the annual surveys and a reasonably good understanding of suitable habitat characteristics, information gaps that would inform management still exist, and research into the following topics should be conducted:

- The effects of elevated levels of selenium and pesticide residue on Yuma clapper rail reproduction and survival.
- The extent and importance of seasonal migration.
- Re-nesting.
- The effects of prescribed fire on senescent marshes and the Yuma clapper rail.
- The possible effects of increases in opportunistic predators associated with human presence and development (e.g., coyotes, feral pets, common raven (*Corvus corax*)).
- Genetic structure and gene flow.
- Seasonality and population structure of crayfish.
- The effects of human activities on the Yuma clapper rail, including noise, lighting, human presence, wildfire, and power lines.

## Management and Monitoring Considerations

Management for the Yuma clapper rail should focus on maintaining high-quality marsh habitat. This includes not only the amount of available habitat, but the need for addressing water management issues important for maintaining high-habitat quality. Such issues include controlling water flows; establishing appropriate seasonal flooding and/or prescribed fire regimes to prevent decline and overgrowth of marshes; controlling of water levels during nesting periods; maintaining a habitat mosaic, that includes some upland areas; controlling exotic invasive species (e.g., tamarisk, giant reed); and controlling potentially harmful chemicals and other pollutants.

All management actions should be in concert with the goals of the Draft Revised Recovery Plan (USFWS 2010), which includes the following specific recommendations:

1. Define the minimum population size that must be maintained for the Yuma clapper rail in the U.S. to achieve recovery and document progress toward meeting that population size.
  - Determine the number of breeding birds in the U.S. that provides for a statistically and genetically secure population.
  - Conduct coordinated surveys for Yuma clapper rail in the U.S. to document when minimum viable population levels are met.
2. Define the physical parameters of and document the amount of Yuma clapper rail habitat in the U.S. needed to support the minimum viable population size.
  - Refine knowledge of rail use of habitats that support determination of the total amount of habitat needed in the U.S.
  - Develop techniques for managing habitats to maintain suitable conditions for Yuma clapper rail.
  - Complete an assessment of the amount and location of Yuma clapper rail habitat in the U.S. every 5 years.
3. Ensure that existing and new habitats for Yuma clapper rail are protected and managed for long-term habitat suitability.
  - Develop and implement management plans for all important federal- and state-owned core areas to maintain suitable habitat conditions.
  - Ensure all core areas in the U.S. have secure water sources that provide for a quantity and quality of water sufficient to manage existing and newly created rail habitat.
  - As possible, provide protection for other habitat areas supporting breeding Yuma clapper rails through management plans associated with easements, mitigation associated with federal actions, habitat conservation plans, safe harbor agreements, the Partners for Fish and Wildlife Program, tribal cooperation, and other options.



4. Provide a mechanism for coordination and implementation of recovery actions.
  - Establish a recovery implementation team with responsibilities for implementing recovery activities, with emphasis on tasks relating to survey management, research, and development of partnerships.
  - Cooperate with partners in Mexico on issues related to long-term survival of Yuma clapper rail.

## Species Modeled Habitat Distribution

This section provides the results of habitat modeling for Yuma clapper rail, using available spatial information and occurrence information, as appropriate. For this reason, the term “modeled suitable habitat” is used in this section to distinguish modeled habitat from the habitat information provided in Habitat Requirements, which may include additional habitat and/or microhabitat factors that are important for species occupation, but for which information is not available for habitat modeling.

There are 54,978 acres of modeled suitable habitat for Yuma clapper rail in the Plan Area. Appendix C includes a figure showing the modeled suitable habitat in the Plan Area.

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