ARIZONA GAME AND FISH DEPARTMENT
HERITAGE DATA MANAGEMENT SYSTEM

Animal Abstract **Element Code:** ABNME0501A
Data Sensitivity: No

CLASSIFICATION, NOMENCLATURE, DESCRIPTION, RANGE

NAME: *Rallus longirostris yumanensis*
COMMON NAME: Yuma Clapper Rail
SYNONYMS: *Rallus yumanensis, Rallus obsoletus yumanensis, Rallus elegans yumanensis*
FAMILY: Rallinae:Rallidae

AUTHOR, PLACE OF PUBLICATION: Dickey. 1923. Auk. 40(1): 90.

TYPE LOCALITY: Laguna Dam near Bard, Imperial County, California.

TYPE SPECIMEN: USNM. D.R. Dickey collection number J-1039, May Canfield and Laurence M. Huey, 15 May 1921.

TAXONOMIC UNIQUENESS: Rallidae includes rails, crakes, coots, moorhens, and gallinules. *Rallus* has 24 species (3 extinct) (Ripley 1977), although Olson (1973) considers only 9 species. *R. l. yumanensis* is 1 of 24 subspecies; 1 of 3 races of federally endangered western clapper rail populations. Only western subspecies that inhabits freshwater marshes.

DESCRIPTION:

Adult: A smaller subspecies of clapper rail, males are larger than females, standing 20-23 cm (8-9 in) tall. Average weight of adults is 253.0 g (8.9 oz), with males averaging 266.8 g (9.3 oz), and females averaging 226.2 g (7.9 oz) (Todd 1986). Eddleman (1989) differs, stating that average weight of females is 193.0 g (6.8 oz). Adult males have a tawny-orange or burnt-orange breast, orangish beak (usually brighter than breast), while females have a brick-orange breast displayed during the breeding season. The upper mandible of the long, slightly decurved bill is darkish gray, diffusing into orange base. Beak tip is often gray, suffused with orange; forehead and crown dark grayish-brown extending down nape to scapular area on back. Side of head behind and below the eye is subdued gray. Colors of browns and oranges are present toward underside of the head, and in the upperside-neck region. Light eyebrow stripe extends from just above the eye forward to upper mandible; eyelid white; iris dark brownish-orange. Chin and upper throat subdued white, diffusing into color of adjacent body parts. Upper body surfaces, including back, scapulars, rump and upperwing coverts, patterned by light grays and dark browns becoming blotchy and dominant posteriorly on rump, distally on wings. Flanks and underside, including belly just forward of legs, dark gray with narrow vertical white stripes, producing barred effect. Outside of tibia is a light grayish-brown. The long toes, long tarsi and distal tibia are unfeathered, and orange-flesh tone. The tail is dark brown above, white below.

Juvenile: Molting in young is presumed similar to other clapper rails. Young retain the black natal down through most of their first month. Juvenile body plumage is obtained in the second month; first winter plumage is similar to adults. Juvenile plumage varies on fully feathered juveniles with some resembling dull-colored grayish eastern races of clapper rail, while others have extensive black feathering on sides and flanks, resembling Virginia rails (*R. limicola*). Birds in full juvenile plumage begin to attain buffy adult ventral plumage through second body molt, which takes 6-7 weeks. Existence of flightless period during pre-basic molt has been found in all nearctic rails studied; this molt takes about 1 month. First pre-basic molt in juveniles does not begin until after flight feathers have grown. This molt is completed in early September for most eastern birds, but seems to take a month longer in Yuma clapper rails. Timing and duration of pre-alternate molt is speculative because of the ability to distinguish adults and juveniles after September (Eddleman 1989).

AIDS TO IDENTIFICATION: *R. l. yumanensis* differs from other clapper rails by inhabiting primarily freshwater habitats, with the exception of those populations along the west coast of Mexico (which some consider to be of two separate subspecies). Taxonomic uncertainties within *Rallus* reflect the fact that the number of subspecies is poorly represented, both as to scientific specimens and field observation data (Todd 1986). Separation of clapper rails (*longirostris*) and King rails (*elegans*) as distinct *Rallus* species is controversial. Habitat selection per se, has long been one of the most important criteria for separating 2 species. (As we have no King rails in Arizona, this may be a moot point). Vocal calls, is another way to distinguish these 2 birds. While Yuma clapper rails nest in freshwater marshes, King rails generally nest in saltwater marshes. Many, if not most, of the black downy young of Yuma clapper rails have white neossoptiles (downy feathers on most newly hatched birds) on their anterior abdominal regions, but all of King rail downy young examined lacked this white down (Wetherbee and Meanley 1965). According to Scott (editor 1987), Yuma clapper rails are larger than Virginia rails, but duller in color than King rails. Also, Yuma clapper rails are brighter below compared to east coast rails.

ILLUSTRATIONS: Line drawing (Eddleman 1989: cover)
Color drawing (Peterson 1990: 119)
Black and White photo (Rosenberg 1991: 165)
Color drawing (Scott 1987: 97)
Color photo (Terres 1980: 724)
Color & Black and White photos (Todd 1986: cover & pp. 2, 5, 6, 17, 66)

TOTAL RANGE: Lower Colorado River (LCR) from Gulf of California in Mexico to Virgin River and Las Vegas area in northern Arizona and Nevada (Garnett et al. 2004), with concentrations in the U.S. along the LCR from the vicinity of Laughlin, Nevada to Yuma, Arizona. Also around the Salton Sea in California, and on several major river drainages in central and southwestern Arizona. Clapper rail populations on the west coast of Mexico from central Sonora to southern Nayarit, were formerly considered to be of 2 separate subspecies, but are currently attributed to *yumanensis*. Confirmation of this classification is needed

(Eddleman and Conway 1998). Significant breeding areas include Mittry Lake (AZ), Imperial Reservoir, Imperial National Wildlife Refuge (NWR), Bill Williams River NWR, Topock Gorge and Topock Marsh on Havasu NWR, Cibola NWR, Imperial Wildlife Area, Sonny Bono Salton Sea NWR, and the Cienega de Santa Clara. Smaller populations occur along this range and along the Gila River where moderately extensive emergent vegetation is persistent, including backwaters. Most populations thought to be non-migratory (Eddleman 1989), possibly excepting those along the Gila River.

RANGE WITHIN ARIZONA: Colorado River as far north as Lake Mead, Virgin River, Bill Williams River, the lower Gila River from near Phoenix to the Colorado River, and the lower Salt and Verde Rivers. Occasional records outside this range include Picacho Reservoir, Tavasci Marsh, Roosevelt Lake, and Quitobaquito Pond (unpublished survey records and reports). See "**Total Range**" for breeding range.

SPECIES BIOLOGY AND POPULATION TRENDS

BIOLOGY: Yuma clapper rails probably do not have a long life-span in wild. Longevity record is 7.6 years (Todd 1986).

They usually walk upright with up-twitching of short tails (distinguishes them from other birds). Often, they take their alarm cues from other birds' actions. When moderately alarmed or cautious, they usually walk off into vegetation. Laterally compressed bodies and the ability to steer right and left enable them to make considerable speed afoot through dense vegetation. They have a slow, weak, fluttering flight, with legs dangling, and the head held high. Adults are good swimmers (short distances), swimming with a slightly jerky motion as if continuing walking gait in the water.

Vocalization: Vocal responses of birds to playback recordings are used regularly to survey populations (used in all rail populations), and to evaluate habitat suitability. They should be surveyed only during early nesting season, because rates of response to taped calls decrease significantly thereafter (Conway et al. 1993). Birds normally are heard rather than seen. "Clatter" (rapid series of "*keks*") seems to be multifunctional, though basically a territorial call; sometimes used as all-is-well call. "Clatter" calls often are given in unison in early part of breeding season, at times given at night. Male advertising call sounds like slow-paced continuous and monotonous "*kek-kek-kek*," like stick being dragged along wooden picket fence (Todd 1986). They are noisiest at dawn, dusk, on moonlit nights, just before a storm, and when startled (Terres 1980; Eddleman and Conway 1999).

Predation: They are not known to be subject to high rates of predation, once adulthood is attained. Coyotes and other carnivorous mammals may be more important predators, especially on nests. Predation of eggs and chicks commonly occur from marsh wrens, great-tailed grackles, northern ravens, coyotes, raccoons, and striped skunks. Red-tail hawks, owls, and northern harriers are common predators during nocturnal calling. Historically, Harris and

Cooper's hawks are common predators (Todd 1986). Eddleman (1989) found that causes of mortality among 37 adult Yuma clapper rails were attributed to predation in 36 cases (50% mammals, 22.2% avian, 27.8% unknown), and disease in 1 case.

Migration: Formerly thought to migrate south for the winter (Smith 1974; Todd 1986). This was based primarily on a lack of sight records, lack of responses to call playbacks during the winter, and a presumed decline in prey base. Eddleman (1989), however, documented that at least 70% of telemetered clapper rails on the Lower Colorado River did not migrate, and he suspected that none did. He believed permanency may be favored with the recent introduction of favored food items such as crayfish and clams which have increased the winter prey base. Birds along the Gila River are thought to migrate during the winter, perhaps because of cooler temperatures at those slightly higher elevations (Corman and Wise 2005).

Home Range: Basic requirements of nest site availability, prey diversity and abundance, and protection from avian predators, is all met within a very small area of the wet marsh, often no larger than 0.12 ha (0.29 ac). Home ranges of individuals or pairs, may encompass up to 43.0 ha (106.25 ac), but year-round home ranges averaged 7.50 ha (18.53 ac), (Rosenberg et al. 1991). Eddleman (1989) estimated home ranges for Yuma clapper rails, based on vocalizing birds, as being 0.1-1.6 ha (0.24-4.0 ac) for paired birds and 0.7-3.6 ha (1.8-8.9 ac) for unpaired birds. Observed females had smaller home ranges than males during late breeding, incubation, and early winter. However, post breeding, they had larger home ranges than males, probably due to increased foraging effort because the food base was more sporadically distributed or because the available prey in the breeding home ranges may be depleted. In work done almost entirely in lake and delta cattail marshes at Topock Marsh, Smith (1974) determined an overall density estimate of 1 pair of clapper rails per 13.5 ha (33.4 ac) or 1 rail per 6.8 ha (16.8 ac). Todd (1980) found overall density estimate of 1 pair per 2.1 ha (5.1 ac) or 1 rail per 1.0 ha (2.5 ac), on 77.0 ha (190.3 ac) at Mittry Lake, which is comprised mainly of cattail marshes. In 1981, 42 Yuma clapper rails found on Hall Island (on the Colorado Indian Reservation on CA side of river) for a density of 1 rail per 0.3 ha (0.8 ac). Occasionally, home range of Yuma clapper rails in lacustrine and delta marshes extends 52 m (57 yd) or farther from shore. Movements of Yuma clapper rails beyond established home ranges were of 5 basic types: dispersal of juveniles, dispersal during the breeding season by unpaired males, movements of post breeding adults, movements during late winter, and home range shifts associated with high water (Eddleman 1989).

REPRODUCTION: Yuma clapper rails first breed after establishing breeding territories, around March-April; distant localities may occur later in early May. Territory is dependent on food base, available nest sites, and competition from other clapper rails. They are highly territorial during breeding season, with both sexes defending territory. Energy reserves, particularly in females, may determine when egg laying actually begins. Most eggs hatch during first week of June. Despite long breeding period, there is only 1 clutch of 6-8 eggs (8-10 for species *longirostris*), unless the clutch is lost, then they will re-nest. Eggs are yellow-buff to green-buff, irregularly blotched or spotted with brown. Incubation begins after last egg is laid (lay 1 per day), and lasts about 21-23 days; all eggs hatch within 24 hour period.

Hatching success is usually high, but mortality among young is also high. Precocial young follow adults through marsh within 48 hours of hatching. Adults lead young to productive feeding grounds, where they quickly learn to feed on their own (Rosenberg et al. 1991). Family groups of clapper rails stay together for about 24-30 days post hatching. Chicks become independent of parents at 35-42 days post hatching, with first flight occurring 63-70 days post hatching (Terres 1980).

FOOD HABITS: On lower Colorado River, introduced crayfish (for use as fish bait) are most common food consumed in bulk except on delta where insect and fish consumption prevail. They prefer crustaceans including amphipods, but also take fish, frogs, clams, spiders, grasshoppers, crickets, dragonflies, aquatic plant seeds, and bird eggs, etc. Clapper rails forage while walking on prevailing substrate, including mud flats, sandbars, recumbent stems of marsh plants, and between stems of marsh plants, etc. (Todd 1986). Rosenberg et al. (1991), believes that crayfish abundance may be a limiting factor in determining Yuma clapper rails occurrence today. Seasonal shifts in habitat use by crayfish, may affect use of habitats by the rails. In contrast to findings of Bennett and Ohmart (1978), crayfish are present year-round according to Eddleman (1989), suggesting that populations of Yuma clapper rails may be supported in breeding range during winter.

HABITAT: This is the only clapper rail to breed in freshwater marshes; also inhabit brackish water marshes and side waters. They prefer the tallest, densest cattail and bulrush marshes (Rosenberg et al. 1991). Most are found within the Lower Colorado Subdivision of the Sonoran Desertscrub biome. Todd (1986) reported the "average annual rainfall in Yuma clapper rail habitat is usually less than 12.7 cm (5.0 in)." Average daily July temperature exceeds 32^{o} C (89.6^{o} F) along Colorado River and most of the Gila River west of Phoenix. Winters are relatively mild, with January temperatures for Yuma and Gila Bend averaging about 12.8^{o} C (55.0^{o} F). Territories appear to be distributed along a zone where standing water gives way to saturated soil within marsh. Interface between water, soil and vegetation seems far more important than plant species that cover a site. As soon as ground surface of marsh dries out, clapper rails move elsewhere. Plants that typify *yumanensis* habitat include cattail (*Typha domingensis*), which is most dominant and most important plant in water saturated soil interface in U.S. portion of Lower Colorado River Drainage. Often, they are associated with giant bulrush (*Scirpus californicus*) along the Colorado River. Giant bulrush occurs mostly in pure stands, though it also mixes with cattail. It is capable of invading and persisting in somewhat deeper water than cattail, and produces mat of recumbent stems that clapper rails use. Common reed (*Phragmites australis*) marshes are mainly inhabited by Yuma clapper rails where it is bordered or mixed with cattail. Salt cedar (*Tamarix chinensis*), as minor associate of cattail, does form part of the cover used by territorial Yuma clapper rail in some areas. The appearance of this plant in cattail marshs' indicates a drying trend at soil surface, or local high spot in the marsh.

In winter, most Yuma clapper rails are found in heavily overgrown, relatively narrow, wet sloughs and backwaters, which have more varied vegetation cover of mature and decadent herbaceous and woody vegetation than do lacustrine marshes. Sloughs, especially of smaller

size, seem to be important during breeding season, where they have been found in cattail or bulrush choked sloughs. Eddleman (1989) reported that micro-habitats during the breeding season include sites with <30.0 cm (11.8 in) of water, vegetation that is optimally >40.0 cm (15.8 in) tall, and marshes with interface between upland and marsh habitats, or with higher sites within marsh. Stable water levels are important during nesting. Mosaic of variable-aged stands of emergent vegetation interspersed with shallow open-water pools, are necessary for year-round clapper rail habitat (Conway et al. 1993).

Nests usually built in dense vegetation near water's edge or, if available, on small high site within marsh. They commonly nest along channels where banks are slightly higher than adjacent marsh areas. Such nests are often placed beneath woody shrubs or small trees or in clumped herbaceous growth. Nests elevated over vegetation or soil, have runways leading into them that rails habitually use. Nests consists of dry sedges and grasses, are 18.0-24.0 in (45.7-61.0 cm) tall, 7.0-10.0 in (18.0-25.4 cm) across, are well cupped and 8.0-12.0 in (20.3-30.5 cm) above mud (Terres 1980). Changes that determine habitat suitability include: rapid accretion from flood, bed scour and channel shifting, elevation of riverbed (determines seasonal and annual persistence of backwaters and sloughs), and volume and rate of water flow.

ELEVATION: Below sea level at Salton Sea to 396 m (1,300 ft.) east of Phoenix along the Salt River. Based on Breeding Bird Atlas and annual Clapper Rail survey data (Corman and Wise-Gervais 2005), in Arizona Clapper Rails are found at elevations ranging from about 100 to 1,000 ft (30-305 m) and very locally to 1,500 ft (457 m). Unpublished records in the Heritage Data Management System (HDMS), showed elevation ranges from 75 - 1,700 ft (23 - 519 m), incidental ranges to 2,200 ft (AGFD, accessed 2006).

PLANT COMMUNITY: Lower Colorado Subdivision of the Sonoran Desertscrub biome. On a smaller scale, this includes fresh water marshes consisting mainly of cattails, bulrushes and to a lesser extent, common reed.

POPULATION TRENDS: Prior to dam building on the Colorado River, it is believed that river dynamics prevented the existence of significant marsh areas, and Yuma clapper rail distribution was thought to be restricted to primarily the delta in Mexico. Early naturalists did not record clapper rails or extensive marshes above the Gila River confluence until 1921 (Rosenberg et al 1991). The first intensive surveys in the U.S. were conducted in 1973, 1974, and 1981, and yielded counts of 702, 821, and 787 respectively. USFWS (1983) estimated a stable population of more than 700 rails from 1969-1981. Todd (1986) believed the summer population in the U.S. to average between 900 and 1,000 from the 1960s through mid 1970s. Based on densities estimated during their study and the amount of available habitat, Anderson and Ohmart (1985) estimated 739 rails for the lower Colorado River north of Mexico in the late 1970s. Annual counts conducted by agency biologists have varied from 503 to 1,076 during 1990-2005 (USFWS, unpub. data). The fluctuations may be more related to variations in survey effort than to actual populations. Initial surveys of the population in the Colorado River delta in Mexico resulted in counts of 145 in 1973 and 104 in 1974 (Todd 1986). A

survey in 1976 of 20% of an estimated 24,000 ha area yielded a count of 700 (USFWS 1983; unclear whether this was actual birds detected or an estimate). Eddleman (1989) counted 42 rails at the Cienega de Santa Clara in 1987 and estimated a population of 200-400. Overall, he counted 102 rails in the delta and estimated a population of 450-970. Piest and Campoy (1998) counted 240 rails in an estimated 7.5% of cattail habitat at the Cienega de Santa Clara in 1998 and estimated a total population of 5,300. Subsequent estimates at the Cienega have been from 6,300 in 1999 to less than 3,000 in 2002 (Hinojosa Huerta *et al*. 2001; Hinojosa Huerta *et al*. 2003). The Cienega apparently comprises approximately 90% of the Mexican population of Yuma clapper rails and 70% of the total population.

SPECIES PROTECTION AND CONSERVATION

ENDANGERED SPECIES ACT STATUS: LE (USDI, FWS 1967)
Recovery Plan (USDI, FWS 1983)

STATE STATUS: WSC (AGFD, WSCA in prep)
[State Threatened AGFD, TNW 1988]

OTHER STATUS: No FS Status (USDA, FS Region 3 1999)
[Forest Service Sensitive USDA, FS Region 3 1988]
Group P (Secretaria de Desarrollo Social 1994, 2000)

MANAGEMENT FACTORS: **Threats:** habitat destruction through river channelization, dredging, and drying and flooding of marshes; diversion of water sources; wildfires; toxic levels of heavy metals (selenium).

Selenium derived from natural sources in the upper Colorado River basin becomes concentrated by water evaporation in the lower Colorado River. This contaminant is further concentrated in food chains and can cause acute toxicity and reproductive impairment. Eddleman (1989) first documented elevated levels of selenium in Yuma clapper rails and their eggs. Subsequent studies along the lower Colorado River also revealed elevated levels within substrates and clapper rail food items (Rusk 1991, Lusk 1993), and at levels above the threshold for reproductive impairment and embryo toxicity in surrogate bird species (Martinez 1994). Most recently, King *et al*. (2000) found concentrations that were two to three times higher than 10 years prior. Mortality or reproductive impairment has thus far not been detected for Yuma clapper rails. Casual observation would be unlikely, however, and this issue needs focused investigation. In addition, a systematic monitoring program for selenium should be initiated.

Management needs: maintain, enhance, and create marsh habitat; maintain constant flows through lower Colorado River dams sufficient to retain breeding habitat; maintain water flow to the Cienega de Santa Clara; monitor distribution and abundance of breeding birds; monitor heavy metal content in eggs and/or tissue. (AGFD in prep).

Management options should be oriented toward preferred habitat perpetuation and creation. Fundamental criteria of standards for all sites should include the presence of: 1) dense vegetation (60.0 cm or more) on wet site with water depths of 30-40 cm (12-16 in), 2) low vegetated hummocks or rises above water adjacent to or within marsh or swamp, 3) adequate food base. Given ephemeral nature of habitat at any one site, and ease with which it is destroyed by floods and man, there should be a minimum of 20 localities established for Yuma clapper rail management. Each site should be suitable for minimum of 8 pairs of clapper rails, with overall average of 15 pairs per locale (Todd 1986). Habitat vigor should be maintained by periodic removal of accumulated vegetation, most likely through controlled burning. The Lower Colorado River Multi-Species Conservation Plan provides for the creation of clapper rail habitat; implementation should be given a high priority.

PROTECTIVE MEASURES TAKEN: Commitments to habitat protection within management plans for AGFD wildlife areas, National Wildlife Refuges, and BLM jurisdictional lands.

SUGGESTED PROJECTS: Continue annual call-count surveys of breeding populations; survey the amount of breeding habitat available once every 5 years; assess migratory movements, particularly along the Gila River; evaluate selenium levels within populations and use captive birds to evaluate tolerance; initiate a monitoring program for selenium in clapper rail habitats; experimentally manipulate clapper rail habitats to evaluate clapper rail response; continue to investigate the use of prescribed burns to rejuvenate clapper rail habitat; study biology of crayfish and determine the effects of various management practices (Latta *et al*. 1999); resolve taxonomic status of west Mexico coastal populations; implement provisions within the Lower Colorado River Multi-Species Conservation Plan.

LAND MANAGEMENT/OWNERSHIP: In Arizona: BIA - Colorado River, Cocopah, Fort Yuma, Gila River, and Salt River Nations; BLM - Kingman, Phoenix, and Yuma Field Offices; BOR; FWS - Bill Williams, Cibola, Havasu, and Imperial National Wildlife Refuges; NPS – Organ Pipe Cactus National Monument; USFS - Tonto National Forest; State Land Department; AGFD - Arlington, Base and Meridian, Mittry, Picacho, Quigley, and Robbins Butte Wildlife Areas; Private. California: Imperial Wildlife Area; FWS – Salton Sea Sonny Bono NWR. Nevada: BOR – Boulder City.

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ADDITIONAL INFORMATION:

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