

**THE STATUS OF YUMA CLAPPER RAIL AND YELLOW-BILLED CUCKOO ALONG
PORTIONS OF VIRGIN RIVER, MUDDY RIVER,
AND LAS VEGAS WASH, SOUTHERN NEVADA, 2001**

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INTRODUCTION

The Yuma Clapper Rail (*Rallus longirostris yumanensis*) is restricted to the lower Colorado River drainage system and the Salton Sea in the Imperial Valley of California (Anderson and Ohmart 1985). However, there have been documented occurrences of the Yuma Clapper Rail (YCRA) in extreme southern Nevada dating back to 1959 (Alcorn 1988) and recent observations along the lower Virgin River (McKernan and Braden 1998 and 1999). The 1959 observations are from the Las Vegas Wash area by A.A. Alcorn and occurrences along the lower Virgin River are from 1997 through 1999.

The Yellow-billed Cuckoo (*Coccyzus americanus*) (YBCU) breeds from the interior of California (formerly north to western Washington), southern Idaho, Wyoming, southern Montana, the Dakotas through southern Canada, south to southern Baja California, southern Arizona, and sporadically farther south in Mexico, the Florida Keys and Greater Antilles and Puerto Rico. In recent years, western distribution has contracted for the Western Yellow-billed Cuckoo (*Coccyzus americanus occidentalis*) and it has always been considered a rare summer resident species in Nevada. The YBCU is primarily found in western and southern Nevada. Breeding populations in Nevada are declining to nearly extinct in Nevada (Alcorn 1988).

Within southern Nevada, the lower Virgin and Muddy Rivers and Las Vegas Wash in Clark County contain extensive riparian and wetland habitats. These habitats are suitable for breeding YCRA and YBCU. Recent avian studies in southern Nevada, specific along the lower Virgin and Las Vegas Wash indicate that YCRA and YBCU do occur in these two areas (McKernan and Braden 1999). However, the breadth of occupation and relative abundance of these two species is unknown. To improve the understanding on the status of the U.S. Fish and Wildlife Service endangered YCRA and the YBCU which is proposed for USFWS listing as either threatened or endangered, focused surveys were conducted in 2001. Whereas essentially nothing is known regarding the occurrence of YCRA and YBCU within southern Nevada, based on incidental observations during summer 1997 through 1999 along the lower Virgin River, YCRA and YBCU do occur during the breeding period (McKernan and Braden 1998 and 1999).

STUDY AREA

The survey areas were chosen along the Virgin River and Muddy River, Clark County, Nevada, and a small portion of the Virgin River, near Littlefield, Mohave County, Arizona (Figure 1 and 2). In addition, portions of Las Vegas Wash, Clark County, Nevada was surveyed for YCRA. Generally marsh vegetation within the Las Vegas Marsh was unsuitable in 2001 based on the lack of surface water and desiccated conditions of the marsh habitats.

Marsh vegetation along portions of the Virgin and Muddy Rivers were surveyed for YCRA (Figure 2). The marsh vegetation along both rivers was dominated by cattail (*Typha domingensis*), and bullwhip bullrush (*Scirpus californicus*). All marsh habitats had components of tamarisk (*Tamarix chinensis*) either along the margins of the marshes or intermixed within the marsh vegetation. Both the Virgin and Muddy Rivers have perennial water flows, while the Virgin River is a relatively unaltered river system, the Muddy River does contain lateral canals and flood control structures for agricultural purposes. Part of the Virgin River near Mesquite, Nevada contains some flood control structures. However, the southern reach of the Virgin River south of Riverside, Nevada is free flowing.

The survey areas for YBCU were chosen along the Virgin River and Muddy River, Clark County, Nevada, and a small portion of the Virgin River, near Littlefield, Mohave County, Arizona (Figure 2). Yellow-billed Cuckoo survey areas coincided with the San Bernardino County Museums studies and surveys for the Southwestern Willow Flycatcher (*Empidonax traillii extimus*) along the Virgin and Muddy Rivers (McKernan and Braden 2000). Vegetation at the YBCU surveyed areas included native and nonnative riparian habitats, composed of willow (*Salix spp.*), Fremont cottonwood, and tamarisk (*Tamarix chinensis*).

METHODS

Sixteen weeks of field surveys were conducted along the Virgin and Muddy Rivers and Las Vegas Wash to determine the presence/absence for the Yuma Clapper Rail during March through June 2001. Prior to the YCRA field surveys, potential marsh habitats were identified using aerial photographs of the Virgin River and portions of the Muddy River and Las Vegas Wash. Three general locations were surveyed for YCRA along the Virgin River; Mormon Mesa, Mesquite, and Littlefield, while two general locations were surveyed for YCRA along the Muddy River; NDOW Refuge and near Overton, and one general area was surveyed in the Las Vegas Wash (Figure 2, Table 3). Surveys consisted of walking inexact transects which usually circumnavigated all suitable habitats and sometimes bisecting suitable habitats. At points along each transect an observer would stop at distances between 30 and 50m apart and play a one minute continuous loop tape of a female solicitation call "ker-burr." The play back solicitation calls last between 1 and 2 minutes with 2 to 3 minute pauses between tape calls. Surveys were conducted between 0430 and 1000 with additional surveys conducted between 1730 and 2000. During those days when inclement weather conditions persisted, surveys were canceled.

Eight weeks of field surveys were conducted along the Virgin and Muddy Rivers for the Yellow-billed Cuckoo between 15 June and 15 August. Based on previous work conducted along rivers, suitable YBCU habitats had already been identified (McKernan and Braden 2000). Three general locations were surveyed for YCRA along the Virgin River, Mormon Mesa, Mesquite, and Littlefield, while two general locations were surveyed for YCRA along the Muddy River; NDOW Refuge and near Overton, and one general area was surveyed in the Las Vegas Wash (Figure 2, Table 2). Surveys for Yellow-billed Cuckoo were performed in association with Southwestern Willow Flycatcher surveys. Morning surveys usually began at 0430 and continued until 1100. Play back tapes were used to elicit YBCU detections. The playback recording consisted of the rapid throaty *ka ka ka ka kow kow kowlp kowlp* calls. Playback intervals were usually for 30 to 45 second durations with a 2 minute pause. Absolute coverage was conducted of all suitable habitats.

Habitat description. The habitat description for each surveyed site was determined during June by visually estimating the dominant marsh and riparian vegetation (Table 1 and 2). Percentages were

derived for dominant plant species by an observer walking through and along the perimeter of a site. Relative cover, percent bareground, percent standing water, percent saturated soils, percent litter, and percent forbs, were visually estimated for each site.

All YCRA habitat was classified in three wetland systems. The Riverine System which includes non-persistent emergent wetlands and deep water habitats (except dammed reservoirs) contained within a free-flowing channel, the Lacustrine System included wetlands and a deepwater habitat situated in topographic depressions of dammed river channels lacking trees, scrubs, or persistent emergents, and the Palustrine System, included wetlands dominated by trees, shrubs, or persistent emergents.

RESULTS

Yuma Clapper Rail – Virgin River

Littlefield north, Mohave County, Arizona

The Littlefield north site was within the Beaver Dam Wash near the confluence of the Virgin River (Table 3). The suitable habitat was approximately 175m in length by 20m wide composed of 80% open water. The edges of the open water habitat contained margins of even-aged stands of cattail marsh with some willow (*Salix sp.*) stands. This site was considered 85% Riverine and 15% Lacustrine.

No YCRA were detected at this site between March and June 2001. This site was problematic to survey based on the extensive construction noise adjacent to this site as well as Interstate 15 highway noise. Generally this site is suitable for YCRA, however, the amount and extent of suitable habitat varies among years based on the scouring water effects of Beaver Wash.

Littlefield Bridge, Mohave County, Arizona

The Littlefield Bridge site was within the Beaver Dam Wash at the confluence of the Virgin River

(Table 3). The suitable habitat was less than 5 acres with most being linear with a shallow low flow. The edges of the open water habitat contained margins of even-aged stands of cattail marsh with some willow (*Salix sp.*). This site was considered 95% Riverine and 5% Lacustrine.

No YCRA were detected at this site between March and June 2001. Although, suitable habitat did exist at this site during 2001, depending on riverine conditions, marsh habitat appears subject to removal by river flows.

Littlefield South, Mohave County, Arizona

The Littlefield South Site was within the Virgin River (Table 3). The suitable habitat was greater than 20 acres of marsh habitat principally composed of cattails and mixed cattails and tamarisk. This extensive marsh is generally closed and disconnected from the Virgin River. The source of water for the marsh appears to be from ground water. Very little open water exists at this site with 70% of this site containing emergent vegetation, mainly even-aged stands of cattail marsh with some tamarisk stands. This site was considered 75% Lacustrine, 20% Palustrine, and 5% Rivervine.

No YCRA were detected at this site between March and June 2001. Similar to the Littlefield North Site, this site was also problematic to survey based on the proximity to Interstate 15 and associated highway noise. This site is highly suitable for YCRA and appears stable regarding the existence of marsh vegetation.

Mesquite, Clark County, Nevada

At Mesquite, three areas were surveyed, all in close proximity to the Mesquite Bridge along the Virgin River, the Mesquite Bridge Site, Mesquite Bridge North Site, and Mesquite Field Site (Table 3). The Mesquite Bridge Site was immediately adjacent to the bridge and the suitable habitat ranged between 5 and 15 acres of linear marsh habitat principally composed of cattails and mixed cattails and tamarisk. The Mesquite Bridge North Site was upstream of the bridge along the eastern portion of the

Virgin River and this survey site was a series of small marshes, ± 3 acres composed of cattails. These small marshes were within the active river channel. The Mesquite Fields Site was located along the western margin of the Virgin River, outside of the active river channel, suitable habitats were linear cattail marsh within an earthen agricultural ditch . These sites were considered 80% Lacustrine and 20% Rivervine..

No YCRA were detected at this site between March and June 2001.

Big Marsh Site, Mormon Mesa, Clark County, Nevada

The Big Marsh Site is located along the western portion of the Virgin River near Mormon Mesa (Table 3). The Big Marsh Site was so named because of the large expanse of marsh habitat. This site is approximately 500m in length and 200m in width. The Big Marsh is connected to the Virgin River and is also receiving water from an underground aquifer. The marsh habitat was 65% submergent vegetation composed of cattail and tamarisk, and 15% emergent vegetation also composed of cattail and tamarisk, with approximately 20% open water habitat . This site was considered 80% Lacustrine and 20% Rivervine

Surveys were conducted between March through June at the Big Marsh Site. Eight to twelve YCRA individuals were detected through this period (Table 3).

Long Marsh Site, Mormon Mesa, Clark County, Nevada

The Long Marsh Site is located along the central portion of the Virgin River near Mormon Mesa (Table 3). The Long Marsh Site was named because of the long linear shape of marsh habitats. This site is approximately 300m in length and 100m in width. The Long Marsh is connected to the Virgin River and its location is within the active floodplain. This marsh appears too persistent and is dependant on seasonal flows of the river. During the 2001 surveys Long Marsh contained shallow low flows with direct flushing from the Virgin River. As of June 2001 with the subsidence of Spring flows, Long Marsh had begun to dry out, although some portions of the marsh remained wet through

August. The marsh habitat was 60% submergent vegetation and 30% emergent vegetation composed of cattail, tamarisk, willow, and Fremont cottonwood, with approximately 10% open water habitat. This site was considered 60% Riverine and 40% Palustrine.

Surveys conducted at Long Marsh between March through June detected one YCRA. The individual was detected on 24 April.

East Marsh Site, Mormon Mesa, Clark County, Nevada

The East Marsh Site is located along the eastern portion of the Virgin River near Mormon Mesa (Table 3). The East Marsh Site is adjacent to the eastern buff of the Virgin River floodplain. The East Marsh is fed by the active river channel and an underground aquifer. This site is approximately 250m in length and 175m in width. A portion, >50% of East Marsh occupied the active floodplain of the Virgin River. As with changes in seasonal river flows, approximately 50% of the marsh began drying out during late June 2001. Although, at least half of the marsh had permanently deepwater through the summer period. The marsh habitat was 70% submergent vegetation and 25% emergent vegetation composed of cattail, tamarisk, and willow, with approximately 10% open water habitat. This site was considered 30% Riverine and 70% Palustrine.

During surveys conducted at East Marsh between March through June, two YCRA were detected on 24 April. Most visual and vocal detections for YCRA at this site were from dense submerged tamarisk thickets.

Yuma Clapper Rail - Muddy River

Overton State Wildlife Area, Overton, Nevada

A portion of the Nevada Division of Wildlife (NDOW), Overton State Wildlife Area was surveyed for YCRA (Table 3). The specific site is known as Honeybee Pond, which is within the Muddy River floodplain. The pond surveyed was a managed waterfowl area which is fed by irrigation canals. The

pond is approximately 250m in length and 150m in width, primarily composed of cattail marsh and open water.

Surveys conducted at Honeybee Pond between March through June. No YCRA were detected during this period.

Maverick Ditch, Overton, Nevada

Maverick Ditch is within the town of Overton, and is a earthen irrigation canal used for agricultural purposes (Table 3). The canal is approximately 20m wide with intermittent flows, and suitable habitats were patchy with the largest section of suitable habitat being approximately 60m in length. The vegetation in the canal is principally composed of cattail marsh, with some tamarisk intermixed. Surveys were conducted between March and June 2001, with no YCRA detected at this site.

Yellow-billed Cuckoo - Virgin River

Littlefield north, Mohave County, Arizona

The Littlefield North Site has been surveyed by the San Bernardino County Museum for Southwestern Willow Flycatchers (*Empidonax traillii extimus*) for several years (McKernan and Braden 1999). These surveys have provided an opportunity to determine the status of other riparian obligate bird species at Littlefield North. The vegetation is multi-layered riparian gallery forest principally composed of Fremont cottonwood and Goodding willow (Table 2).

No YBCU were detected at this site during 2001 (Table 4).

Mesquite, Clark County, Nevada

At Mesquite, Nevada in close proximity to the Mesquite Bridge along the Virgin River, there were dense stands of Goodding willow and tamarisk which appeared suitable for YBCU. This habitat has

recently (1999 /2000) developed enough structurally too be considered suitable for YBCU (Table 4). No YBCU were detected at this site during 2001 (Table 4).

Mormon Mesa, Clark County, Nevada

Along the Virgin River near Mormon Mesa are several areas were SWWF breed (McKernan and Braden 1999). These habitats along the portion of the Virgin River reach near Mormon Mesa was a mixture of native and non-native (Table 2).

Results from surveys conducted along the Virgin River near Mormon Mesa detected eight to twelve YBCU using dense stands of tamarisk. One nesting pair was confirmed on 13 July 2001. This pair had a single egg in the nest. Nest success is unknown.

DISCUSSION

Prior to surveys and studies conducted by the San Bernardino County Museum along the Virgin River and Muddy River, the Yuma Clapper Rail had only been recorded on a few occasions in Nevada (Alcorn 1988). Studies performed by SBCM in 1997 through 1999 have recorded YCRA as a summer resident bird in a variety of locations along the Virgin River (McKernan and Braden 1999). The distribution of the YCRA was regularly assumed to be south of the Nevada along the lower Colorado River, with the northern limits for the subspecies occurring at Needles, California (Rosenberg et al. 1991). However, the YCRA is unquestionably a summer resident bird species in portions of southern Nevada. This is based on multiple observations of territorial pairs and evidence of YCRA nesting along the Virgin River, Nevada during 2001, as well as in past years (McKernan, in prep., Western Birds manuscript). In addition, based on the amount of suitable habitats historically and currently present along the Virgin and Muddy Rivers in southern Nevada, suggests that southern Nevada constitutes the subspecies normal breeding range.

One perplexing aspect of the YCRA recent occurrences in southern Nevada are the recent observations related to a current range expansion for the subspecies, or has the subspecies always occurred within

suitable habitats in the southern portion of Nevada? Although this question is unanswerable based on current data, the fact that no systematic YCRA surveys have been conducted in southern Nevada prior to the late 1990's leads one to believe that YCRA have most likely always occurred in Nevada. Based on the habitat requirements of YCRA, the dynamics of marsh habitats along the Virgin River, Muddy River, and Las Vegas Wash, the observations dating back to late 1950's, the migratory behavior of the species and the historic presences of suitable habitat for the subspecies in southern Nevada, makes for strong circumstantial evidence that this subspecies has likely always occurred in southern Nevada.

Nevada is within the historic range of the Western Yellow-billed Cuckoo (Rosenberg et al 1991). However, the occurrence of historic suitable habitats for the species in the southern part of Nevada is questionable. Based on current suitable habitats in southern Nevada and observation from the SBCM surveys, more systematic surveys will probably detect additional YBCU individuals.

SUMMARY

Focused surveys for Yuma Clapper Rail and Western Yellow-billed Cuckoo were conducted in Spring and Summer 2001 along the Virgin and Muddy Rivers in southern Nevada. Ten to fourteen YCRA were detected along the Virgin River. Because of unsuitable conditions in the 2001 within Las Vegas Wash, surveys were conducted. Twelve YBCU were detected along the near Mormon Mesa. One nesting pair with a single egg was confirmed in the Mormon Mesa area.

REFERENCES

- Alcorn, J.R. 1988. *The Birds of Nevada*. Fairview West Publishing, Nevada.
- Garrett, K. and J. Dunn. 1981. *Birds of Southern California: status and distribution*. Los Angeles Audubon Society, Los Angeles, California.
- Grinnell, J. 1914. An account of the mammals and birds of the lower Colorado Valley, with special reference to the distributional problems presented. Univ. Calif. Publ. Zool. 12:51-294.
- Grinnell, J. and A.H. Miller. 1944. The distribution of birds of California. Pac. Coast Avifauna, No. 27: 1-608
- McKernan, R.L. 1997. Status, distribution, and habitat affinities of the Southwestern Willow Flycatcher along the lower Colorado River, Year 1-1996. Rept. To U.S. Bur. Rec. Boulder City, NV, and USFWS, Carlsbad, CA. 42 pp.
- McKernan, R.L. 1998. Status, distribution, and habitat affinities of the Southwestern Willow Flycatcher along the lower Colorado River, Year 2-1997. Rept. To U.S. Bur. Rec. Boulder City, NV, and USFWS, Carlsbad, CA. 76 pp.
- McKernan, R.L. 1999. Status, distribution, and habitat affinities of the Southwestern Willow Flycatcher along the lower Colorado River, Year 3-1998. Rept. To U.S. Bur. Rec. Boulder City, NV, and USFWS, Carlsbad, CA. 83 pp.
- McKernan, R.L. 2000. Status, distribution, and habitat affinities of the Southwestern Willow Flycatcher along the lower Colorado River, Year 4-1999. Rept. To U.S. Bur. Rec. Boulder City, NV, and USFWS, Carlsbad, CA. 87 pp.
- McKernan, R.L., W.D. Wanger, R.S. Landry, and M.D. McCrary. 1984. Utilization by migrant and resident birds of the San Gorgonio Pass, Coachella Valley, and Southern Mojave Desert of California. Report to Southern Cal. Edison through The Los Angeles Co. Nat. Hist. Mus. 242 pp.
- Monson, G. and A.R. Phillips. 1981. Annotated checklist of the birds of Arizona. University Of Arizona Press, Tucson, Arizona. 240 pp.
- Phillips, A.R., J. Marshall, and G. Monson. 1964. *The birds of Arizona*. University of Arizona Press, Tucson, Arizona. 212 pp.

Figure 1. Study area during 2001.

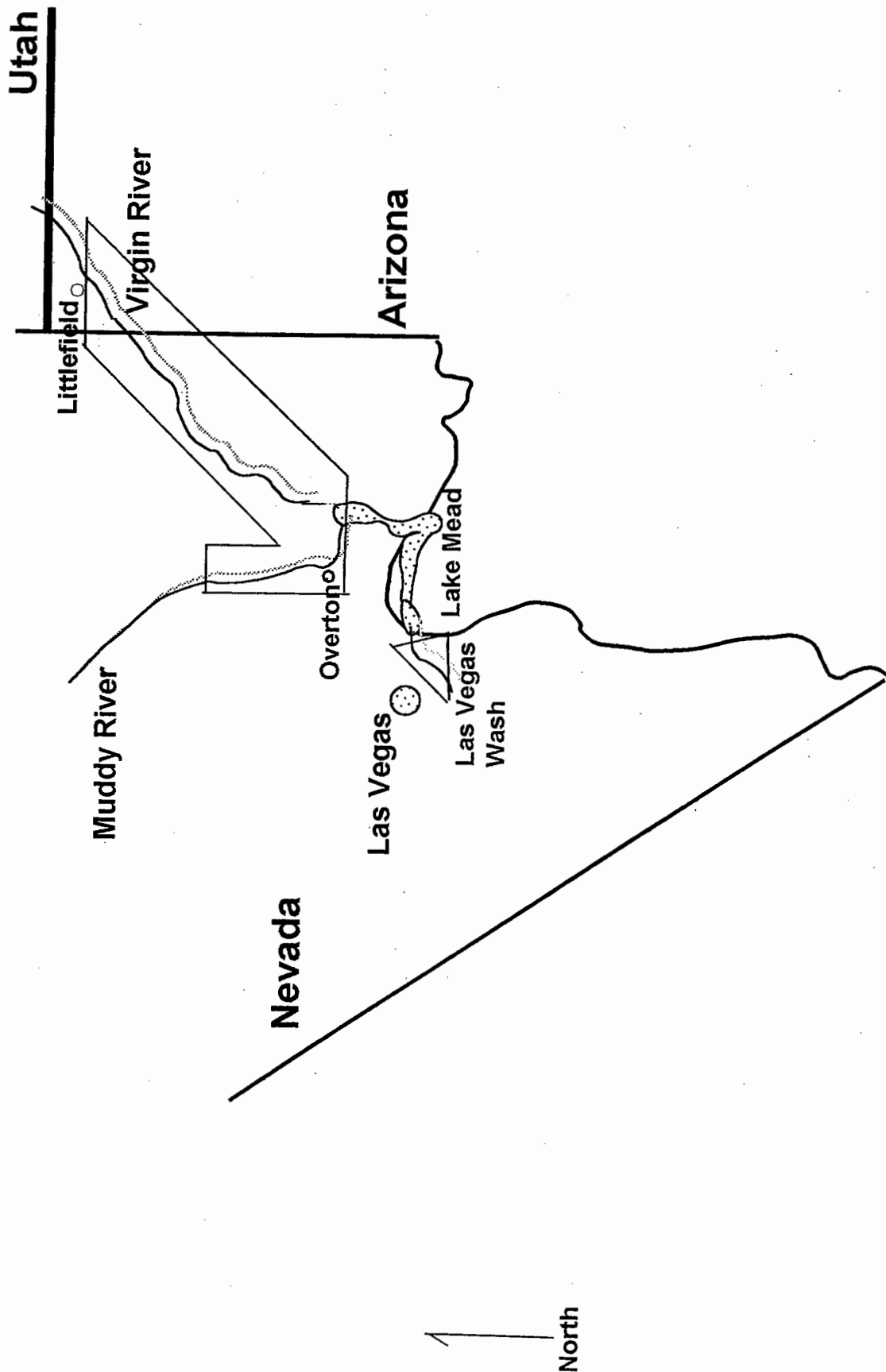


Figure 2. Survey areas and locations for Yuma Clapper Rail and Yellow-billed Cuckoo during 2001.

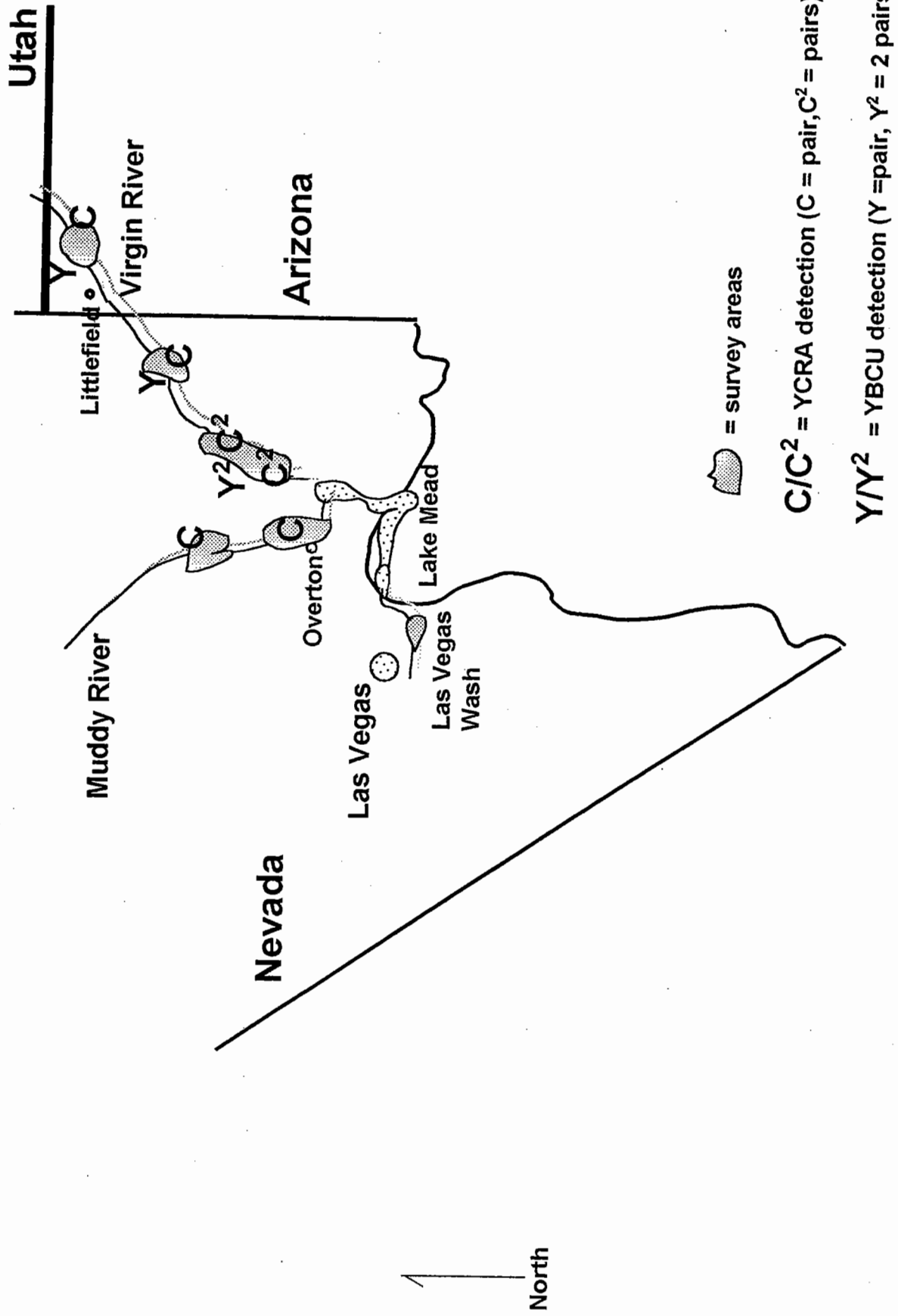


Table 1. Habitat descriptions using Braun-Blanquet releve' method for Yuma Clapper Rail survey sites along the Virgin River and Muddy River, Nevada 2001.

Location	Site	<i>Salix goodingii</i>	<i>Salix exigua</i>	<i>Tamarix chinensis</i>	<i>Populus fremontii</i>	<i>Typha spp.</i>
<u>Virgin River</u>						
Littlefield, AZ	Littlefield, north	10%	20%	20%	5%	45%
Littlefield, AZ	Littlefield, south	5%	10%	20%	0	65%
Littlefield, AZ	Littlefield, Bridge	5%	5%	20%	0	70%
Mesquite, NV	Mesquite, Bridge	10%	10%	20%	0	60%
Mesquite, NV	North Mesquite Bridge	5%	10%	20%	0	65%
Mesquite, NV	Mesquite Field	5%	0	5%	0	90%
Overton, NV	Mormon Mesa, Big Marsh	10%	10%	20%	0	60%
Overton, NV	Mormon Mesa, East Marsh	5%	5%	20%	0	70%
Overton, NV	Mormon Mesa, N.Long Marsh	5%	5%	20%	0	70%
Overton, NV	Mormon Mesa, Long Marsh	10%	10%	20%	0	60%
<u>Muddy River</u>						
Overton, NV	Overton State Wildlife Area	5%	0	20%	0	75%
<u>Las Vegas Wash</u>						
Las Vegas, NV	Las Vegas Wash	0	0	30%	0	70%

Table 2. Habitat descriptions using Braun-Blanquet releve' method for the Yellow-billed Cuckoo survey sites along the Virgin River and Muddy Rivers, Nevada 2001.

Location	Sites	<i>Salix goodingii</i>	<i>Salix exigua</i>	<i>Tamarix chinensis</i>	<i>Populus fremontii</i>	<i>Typha spp.</i>
<u>Virgin River</u>						
Littlefield, AZ	Littlefield, north	10%	20%	20%	50%	0
Mesquite, NV	North Mesquite Bridge	30%	20%	50%	0	0
Overton, NV	Mormon Mesa,	30%	0	50%	20%	0
Overton, NV	Mormon Mesa,	30%	0	50%	20%	0
<u>Muddy River</u>						
Overton, NV	Overton State Wildlife Area	30%	0	50%	20%	0

Table 3. GPS Coordinates for Yuma Clapper Rail suitable habitat, survey sites, and detections along the Virgin River and Muddy River, Nevada, Spring 2000.

Location	YCRA	Site	North coordinates	South coordinates	East coordinates	West coordinates
Virgin River						
Littlefield, AZ	0	Littlefield, north	36°53.81	36°53.66	113°55.26	113°55.44
Littlefield, AZ	0	Littlefield, south	36°53.56	36°53.50	113°55.39	113°55.51
Littlefield, AZ	0	Littlefield, Bridge	36°54.12	36°54.02	113°55.88	113°55.99
Mesquite, NV	0	Mesquite, Bridge	36°47.48	36°47.41	113°05.52	113°05.88
Mesquite, NV	0	North Mesquite Bridge	36°47.44	36°47.36	114°05.30	114°05.46
Mesquite, NV	0	Mesquite Field	36°48.45	36°48.29	114°03.14	114°03.16
Overton, NV	8-12 (4-6 pair)	Mormon Mesa, Big Marsh	36°38.44	36°38.11	114°19.27	114°19.42
Overton, NV	2 (1 pair)	Mormon Mesa, East Marsh	36°37.97	36°37.87	114°18.72	114°18.87
Overton, NV	1	Mormon Mesa, Long Marsh	36°37.64	36°37.44	114°19.21	114°19.25
Muddy River						
Overton, NV	0	Overton State Wildlife Area	36°52.64			114°41.67
Overton, NV	0	Maverick Ditch	36°54.41			114°44.26

Table 4. GPS Coordinates for Yellow-billed Cuckoo detections along the Virgin River and Muddy River, Nevada, Spring and Summer 2001.

Location	YBCU	Site	North coordinates	West coordinates
<u>Virgin River</u>				
Littlefield, AZ	0	Littlefield north	36°53.81	113°55.44
Mesquite, NV	0	North Mesquite Bridge	36°47.44	114°05.46
Overton, NV	4	Mormon Mesa,	36°37.81	114°19.17
Overton, NV	8	Mormon Mesa,	36°37.64	114°19.25
<u>Muddy River</u>				
Overton, NV	0	Overton State Wildlife Area	36°52.64	114°41.67