

2003

NEVADA DEPARTMENT OF WILDLIFE

Southern Region
Diversity Program

Program Activities Report
January 1, 2003 through December 31, 2003

BREEDING STATUS AND SURVEYS FOR THE SOUTHWESTERN WILLOW FLYCATCHER AND YELLOW-BILLED CUCKOO AT SITES IN SOUTHERN NEVADA

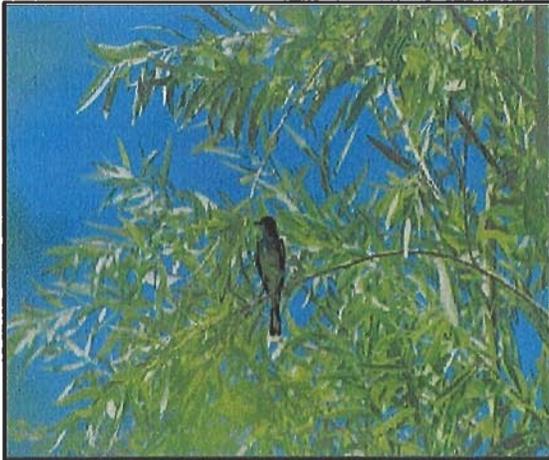


Photo by: Charles Lohman



Photo by: Polly Sullivan

Prepared By:

Bob Furtek
Conservation Aid

Cris R. Tomlinson
Diversity Biologist

Edited By:

Sandy Canning
Diversity Chief

Larry A. Neel
Diversity Staff Biologist

October 2003

TABLE OF CONTENTS

• Study Sites	3
<u>SOUTHWESTERN WILLOW FLYCATCHER</u>	
• Introduction	4
• Methods	4
• Study Site Descriptions	5
• Results	
○ S.W. Willow Flycatcher Population Data	7
○ S.W. Willow Flycatcher Nest and Habitat Components	8
○ Banded Birds	9
○ Brown-Headed Cowbirds	9
○ Grazing Management	10
• Discussion	11
• Management Recommendations	13

YELLOW-BILLED CUCKOO

• Introduction	16
• Methods	16
• Study Site Descriptions	17
• Results	
○ Yellow-billed Cuckoo Population Data and Habitat Use	18
○ Grazing Management	19
• Discussion	20
• Management Recommendations	22

Tables

Table 1- S.W. Willow Flycatcher Survey Summary – 2003 (2002)	8
Table 2- S.W. Willow Flycatcher Nesting Pairs and Fledglings - 1999-2003	8
Table 3- S.W. Willow Flycatcher Nesting Habitat Analysis – 2003	9
Table 4- S.W. Willow Flycatcher Banding Information – 2003	9
Table 5- Yellow-billed Cuckoo Population Data – 2000-2003	19

Images

Image 1- Willow Habitat Patches and Low Lake Levels Key Pittman WMA - 2002	7
Image 2- Willow and Cottonwood Habitat the Crystal South Site - 2002	10
Image 3- Willow Habitat Patches at Key Pittman WMA - 2002	14
Image 4- Riparian Habitat Utilized by Cuckoo's at Warm Springs Ranch - 2003	18
Image 5- Grazed Riparian Habitat at Warm Springs Ranch - 2003	20

Appendices

Appendix A	Avifauna Summary
Appendix B	S.W. Willow Flycatcher Survey Forms and Maps
Appendix C	Yellow-billed Cuckoo Survey Forms and Maps

Literature Cited	23
------------------	----

Study Sites



- Yellow Billed Cuckoo
- ▲ S.W. Willow Flycatcher
- Highway
- Counties



Southwestern Willow Flycatcher

Introduction

The southwestern willow flycatcher (*Empidonax traillii extimus*) is a neotropical migratory land bird that breeds in riparian habitat of seven southwestern states including New Mexico, Arizona, California, Utah, Nevada, Colorado, and Texas (Sogge 1997). It is one of the four or possibly five subspecies of willow flycatchers currently recognized (McKernan & Braden 1999). The southwestern willow flycatcher is known to winter in Mexico, Central and South America. Dense vegetation near watercourses or inundated wetlands is required for flycatcher nesting.

The loss of riparian habitats, invasion of exotic plant species, brown-headed cowbird (*Molothrus ater*) brood parasitism, and loss of wintering habitats have contributed to the decline of this subspecies (McKernan & Braden 1999). The United States Fish and Wildlife Service (USFWS) listed the southwestern willow flycatcher as an Endangered Species in March 1995 and designated critical habitat in July 1997 (Federal Register 60 (38): 10694, Sogge 1997). The USFWS reinitiated comments for additional critical habitat in 2002. The Nevada Department of Wildlife provided recommendations for areas both warranted and not warranted as designation as critical habitat. The Department recommended including the Lower Virgin River and distinct sections of Pahrangat Valley and Key Pittman State Wildlife Management Area into the Critical Habitat Designation.

A Recovery Plan for the southwestern willow flycatcher became available as of the fall of 2002. Consequently, information on the status and distribution of flycatchers in Nevada is needed to guide the recovery effort as well as critical habitat re-designation.

In southern Nevada there have been recent advancements in the overall knowledge of breeding distribution and abundance of flycatchers. From the 1997 through 2003 seasons, standardized surveys in breeding habitat were conducted at sites on the Virgin and Muddy Rivers, and their confluences with Lake Mead, as well as Pahrangat National Wildlife Refuge (NWR), Ash Meadows NWR, Oasis Valley, and Meadow Valley Wash. The surveys were conducted by the following: U.S. Geological Survey, Biological Resources Division (Colorado Plateau Field Station), San Bernardino County Museum and the Nevada Department of Wildlife. During the 2003 breeding season, the Nevada Department of Wildlife surveyed areas that contained potential flycatcher habitat. (See Study Site Descriptions).

Methods

The survey protocol for the southwestern willow flycatcher, established by the U.S. Fish and Wildlife Service, was adapted from Sogge *et al.* (1997), with USFWS revisions (2000). A minimum of one survey was conducted within three defined periods of May 15-31, June 1-21, and June 22 through July 17. Where there was evidence of nesting, the number of visits was increased during the third survey period in order to monitor the entire nesting process effectively. Surveys were continued until all birds had fledged. Demographic data were collected and reproductive success evaluated.

Standardized forms were utilized on all surveys. Data collected included site name/location, time and date of surveys, observers, number of birds, estimated number

of pairs, territories, nests, and presence of cowbirds and livestock. Habitat and nest information included: nest height, canopy height, canopy cover, and UTM (Universal Transverse Mercator) location. Canopy cover was measured with a densiometer at each nest area. Where applicable, nest contents were observed using a mirror pole. Each nest was monitored throughout the breeding season to observe clutch size, nestlings produced, and fledglings. Nests were considered successful if young were actively seen fledging from the nest or fledglings were visually seen or heard in the nest area. Nest failure was documented if nests were empty or destroyed, deserted with eggs remaining, or parasitized by brown-headed cowbirds with no willow flycatcher fledglings produced. The number of cowbirds in survey areas and horse and cattle use was also documented.

Study Site Descriptions

Ash Meadows-Carson Slough, (T17S R50E Sec 9 and 16) Elevation 2230 ft: This site is located in the northwest corner of the Ash Meadows National Wildlife Refuge. The slough was highly disturbed in the past due to heavy peat removal and ranching. Suitable flycatcher habitat at this site consists of large stands of screwbean mesquite (*Prosopis pubescens*), and tamarisk (*Tamarix chinensis*). These stands are interrupted by large saltbush (*Atriplex spp.*) scrublands. Water sources consist of small flowing tributaries from nearby springs that began to dry as the survey period progressed. Both areas contain dense mesquite and tamarisk with no permanent water source within 400 m. In the fall of 2000, a fire occurred to the east-northeast area of this site. The fire was contained approximately 60 m from the survey area. The fire traveled to the eastern edge of the willow flycatcher territories but did not appear to damage any of the potential breeding habitats.

Crystal Springs, (T5S R60E Sec 10) Elevation 3800 ft: This site was surveyed for flycatchers in 2002, when a pair nested at this location. The site is located on the south side of Highway 375, near the intersection of Highway 375 and Highway 318, south of Key Pittman State Wildlife Management Area. The habitat is riparian (spring) with two man-made ponds. Cottonwoods (*Populus fremontii*) occupy the overstory (24-27 m), while black willow (*Salix gooddingii* 15-18 m) occurs in the midstory. Approximately 80% is pasture bordered on the west by a concrete channel. Cattle do not have access to the area. The Russian olive (*Eleagnus angustifolia*) occupied the area thru the 2002 season. Afterwards, the Russian olive was removed, and replaced with native coyote willow and cottonwood. Further revegetation efforts will occur in the fall of 2003.

Moapa Valley-Pump Station, (T14S R65E Sec 15 and 16) Elevation 1750 ft: This site was first surveyed in 2000. This site is contiguous with the Warm Springs Ranch Site immediately to the southeast (see next paragraph). It is located approximately eight miles north of the town of Glendale, off State Route 168. The survey begins where the Warm Springs Road crosses the Muddy River. The survey transect follows the Muddy River upstream and continues north about 1200 m. Most of the vegetation along the river is 5-8 m tall tamarisk and 2.5 m tall arrowweed (*Pluchea sericea*). A few stands of 20-30 m tall Fremont cottonwood and 3-4 m tall honey mesquite (*Prosopis glandulosa*) are located nearby.

Moapa Valley-Warm Springs Ranch, (T14S R65E Sec 15 and 16) Elevation 1750 ft: This site was first surveyed in 2000. It is located nine miles north of the town of Glendale, on Warm Springs Road near State Route 168. Survey transects were

established along two waterways, including a drainage area to the west and the Muddy River to the east. Considerable tamarisk occurred at the east area, while dense mesquite occurred with tamarisk at the west area. Considerable water and dense vegetation was located at the site along the Muddy River. Willow, tamarisk, and honey mesquite canopy heights ranged from 5 to 8 meters, with palms (*Washingtonia spp.*), ash, and Fremont cottonwoods ranging from 15 to 30 m high. The wetland vegetation was primarily cattail (*Typha sp.*), sedge and bulrush (*Scirpus sp.*), surrounded by a wet meadow.

Oasis Valley-South, (T12S R47E Sec 7) Elevation 3270 ft: This site is located east of U.S. Highway 95 just before entering the city limits of Beatty. It is a small riparian strip along the Amargosa River. Vegetation is patchy and mainly composed of large Fremont cottonwoods, coyote willow (*Salix exigua*), tamarisk, and cattail patches. The streambed was dry in much of the area by the end of the survey period, with small patches of running water throughout.

Oasis Valley-Springdale, (T10S R47E Sec 31) Elevation 3960 ft: This site was first surveyed in 2001. Springdale is located 12 miles north of Beatty along U.S. Highway 95. The vegetation in this area is diverse. The center of the property is a short circular patch of coyote willow (approximately 3-4 m in height) bordered on the south side by a small pond and a small stand of 8 m tall black willow. The surrounding area consists of inundated bulrush. The rest of the property is scattered with large deciduous trees including ash and cottonwood. All trees are over 14 m in height.

Pahrnagat Valley-Key Pittman (Nesbitt Lake), (T4S R60E Sec 23 and 27) Elevation 3834 ft: This State Wildlife Management Area is located south of Hiko Springs off Highway 318. The site consists of coyote willow patches that are located on the western edge of Nesbitt Lake. The willow patches comprise 1.42 acres, with an average canopy height of 8.6 m. At the beginning of the survey period, a few of the willow patches contained small amounts of standing water. As the survey season progressed, the lake level lowered considerably (see Image 1). As a result, the soil beneath the willow patches dried and by August some of the willows were showing signs of distress. At the end of the survey period, lake water was 35-100 m away from the willow patches. During 2003, cattle began grazing the management area at the end of June and continued grazing through August.



Image 1. Willow Habitat Patches and Low Lake Levels at Nesbitt Lake, Key Pittman State Wildlife Management Area, Summer of 2002 (similar to 2003 conditions).

Results

Southwestern Willow Flycatcher Population Data

For the 2003 survey season, a total of 13 resident southwestern willow flycatchers were located (Table 1). Resident willow flycatchers were found at Ash Meadows-Carson Slough, Warm Springs Ranch in Moapa Valley, and Key Pittman-Nesbitt Lake. The total was comprised of four pairs and five unpaired birds. All four of the pairs attempted to nest. Of the five unpaired birds, three occurred at Key Pittman and the other two occurred at Warm Springs Ranch-Moapa Valley. No resident or transient willow flycatchers were detected at any of the remaining sites.

In 2003, seven willow flycatcher sites were surveyed. Warm Springs Ranch-Moapa Valley was the only new site with breeding flycatchers (Table 1). A total of 6 nests were detected in 2003, in comparison to 13 nests in 2002. Of the 6 nests this year, only one was determined to be successful for a nest success rate of 16.7 percent. Successful nests were determined if at least one young was fledged from the nest. Fledglings were not observed at one nest in late July, although three nestlings were observed at this same nest in early July. A total of 3 known flycatcher fledglings were produced (14 in 2002). In 2003, the average clutch size (includes only nest with at least one egg) was 2.8 (2.8 in 2002) and the average number of fledglings produced was 3 per successful nest (one nest). The average number of fledglings for 2002 was 1.8.

Table 1. Southwestern Willow Flycatcher Survey Summary – 2003/2002

SITE	# Adult SWFLs		# Pairs		Single Birds		SWFL Nests		BHCO Parasit.		Abandoned Nests		Egg Numbers		Fledgling Numbers		Successful Nests	
	03	02	03	02	03	02	03	02	03	02	03	02	03	02	03	02	03	02
Ash Meadows - Carson Slough	2	3	1	1	0	1	2	1	2	0	2	0	5	4	0	2	0	1
Moapa Valley – Warm Spr. Ranch	4	0	1	0	2	0	1	0	0	0	0	0	3	0	Unk	0	Unk	0
Pahranagat Valley - Crystal Springs	0	2	0	1	0	0	0	1	0	0	0	0	0	2	0	2	0	1
Pahranagat Valley - Key Pittman	7	17	2	8	3	1	3	11	0	2	2	3	9	22	3	10	1	6
TOTALS	13	22	4	10	5	2	6	13	2	2	4	3	17	28	3	14	1	8

Unk. = Unknown Status

Migratory movement into the areas was seen at the beginning of the survey period in the middle of May this year with males arriving first and females migrating into areas a few days to weeks later. Nesting began in the beginning of June with the first fledgling event occurring in late-July. Two re-nesting attempts were documented in early-July and fledging occurred in late-July. A summary of all nesting data is shown in Table 1.

Table 2 reports nesting pair and fledgling counts for all sites where active Southwestern Willow Flycatcher nesting was detected between 1999 and 2003. The most complete dataset exists for Key Pittman WMA and Ash Meadows-Carson Slough. An upward trend in both number of pairs and fledglings produced is evident for Key Pittman WMA, except for 2003. The Carson Slough site has steadily maintained at least one nesting pair since 1999, and fledglings have been produced there every year but 2000 and 2003.

Table 2. Southwestern Willow Flycatcher Nesting Pairs and Fledglings All Sites 1999-2003

Site	1999		2000		2001		2002		2003	
	Pairs	Fledglings								
Pahranagat Valley - Key Pittman	2	7	3	6	4	9	8	10	2	3
Pahranagat Valley - North	5	13	8	26	6	12	Ns	Ns	Ns	Ns
Pahranagat Valley - Crystal Springs	Ns	Ns	Ns	Ns	Ns	Ns	1	2	0	0
Ash Meadows - Carson Slough	2	5	1	0	1	1	1	2	1	0
Moapa Valley - Warm Springs Ranch	0	0	0	0	0	0	0	0	1	Unk

Ns = Not Surveyed

Southwestern Willow Flycatcher Nest and Habitat Components

Habitat measurements for all nest sites were combined for an average of 3.4 m for nest height (3.6 m in 2002) and 7.1 m for overall canopy height (6.6 m in 2002) for all

nest sites. Percent canopy cover averaged at 92.3 percent (92.8 percent in 2002). It should be noted that the averages stated above are for areas where nesting occurred. Habitat measurements for all the survey sites are shown in Table 3.

Site	Ave. Nest Height (m)	Ave. Canopy Height (m) (At Nest)	Ave. Canopy Cover (%) (At Nest)	Dominant Species*
Ash Meadows-Carson Slough	2.8	6.7	92.5	Tamarisk, Honey/Screwbean mesquite
Moapa Valley-Warm Springs Ranch	3.7	6.4	89.9	Cottonwood, Mesquite, Tamarisk
Pahrnagat Valley-Key Pittman	3.8	8.2	94.4	Coyote willow
Overall Average	3.4	7.1	92.3	

*Plant species are listed in order of dominance

Three nests were found in coyote willow, and three in tamarisk. Of the three sites where willow flycatchers nested, two sites (Moapa Valley-Warm Springs Ranch and Key Pittman at Nesbitt Lake) had water within 5 - 300 m. Water occurred within approximately 250 m of the two nests located at the Ash Meadows-Carson Slough site. Water levels varied among all the sites throughout survey periods, with a notable water level drop at Key Pittman by the end of the summer.

Banded Birds

Two banded flycatchers were observed during the 2003 survey. One of the banded flycatchers was located at Key Pittman WMA and one at Ash Meadows - Carson Slough. The flycatcher observed at Ash Meadows was an adult male captured and color-banded by Colorado Plateau Field Station (CPFS) on July 10th 1998 at Ash Meadows. The flycatcher was first seen on the 27th of May. The WIFL at Key Pittman was an adult female banded in Pahrnagat Valley NWR on June 17, 1998 by the San Bernardino County Museum (SBCM) and was first seen on May 16. Hence, both flycatchers are at least six years old. The male flycatcher at Ash Meadows did successfully pair and the pair was unsuccessful in raising fledglings. This male was observed in 1999, 2000, 2002, and again in 2003. The banded adult female flycatcher at Key Pittman did successfully pair and nest and was also unsuccessful in raising any fledglings. See table 4 for details.

Site	Bird	Left Leg Band	Right Leg Band	Status
Ash Meadows-Carson Slough	1	Yellow over Red	Aluminum	Paired, nested (unsuccessful)
Pahrnagat Valley-Key Pittman	2	Aluminum	Blue	Paired, nested (unsuccessful)

Brown-headed Cowbird

Cowbirds were detected at all the sites surveyed, yet brood parasitism on flycatchers was documented at only one location in 2003 (two in 2002). Parasitism by cowbirds was documented in the 1999, 2000, and 2002 seasons, but not in 2001. In 2003, numbers of cowbirds fluctuated considerably between survey days with a range of

one to 11 cowbirds. Brown-headed cowbirds (BHCO) were most abundant at the following locations: Pahrnagat Valley-Key Pittman, Moapa Valley-Warm Springs Ranch, Oasis Valley-South, and Ash Meadows at Carson Slough.

Grazing Management

The Department of Wildlife is working with private landowners and federal partners to manage grazing at sites where willow flycatchers occur. At Key Pittman State WMA, efforts have been made to reduce grazing pressures on flycatcher habitat while still accommodating management efforts directed at waterfowl and upland game. In the mid 1990's, cattle numbers were reduced from 100 to 75. During the same period, the season of grazing was reduced by two months, from April 1st thru August 31st to June 30 thru August 31st. This grazing regime continued thru the 2001, 2002, and 2003 seasons. The Department of Wildlife has continuously monitored willow flycatcher nesting status at this site since 1999. During this period, the Department has documented an increasing number of flycatchers, nesting pairs, and number of nests. The Area Manager has observed an expansion of the willow habitat in the past seven years (Bart Tanner, pers. comm.).

- Quantify this

Grazing has occurred throughout the Pahrnagat Valley during the five-year survey period. While no willow flycatchers were documented at Pahrnagat Valley-Crystal South (not surveyed in 2003), the habitat has good nesting potential for willow flycatchers and other birds (see Image 2). The Department is currently working with the private landowner of this site to enhance the riparian habitat while maintaining grazing interests.

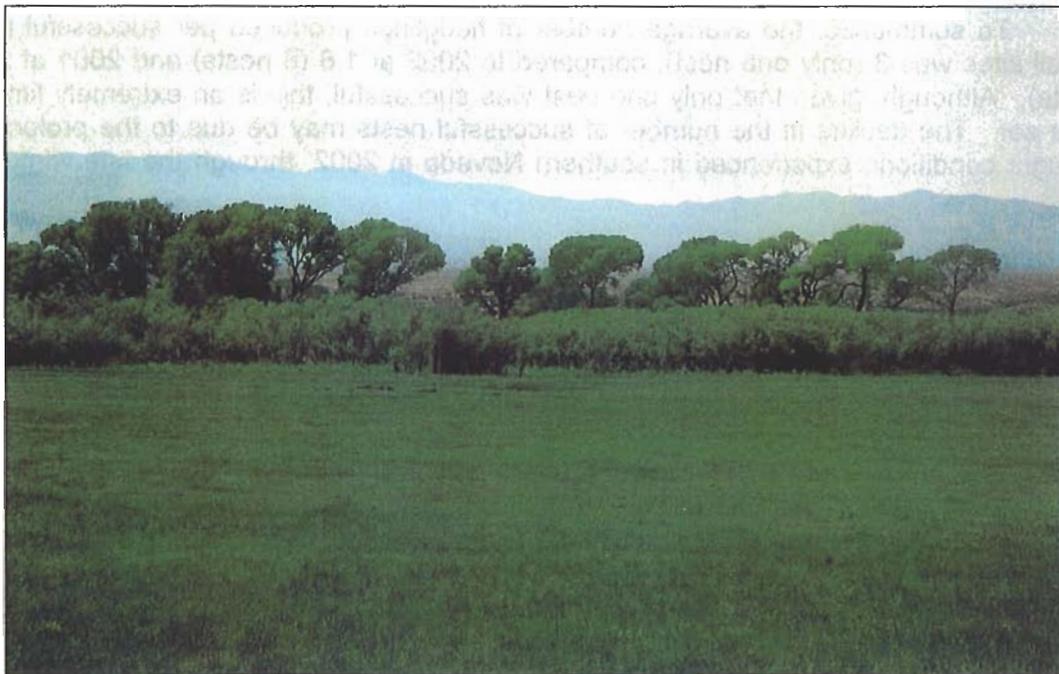


Image 2. Willow and Cottonwood Habitat at the Pahrnagat Valley, Crystal South Site, Summer of 2002. (The area has considerable future potential for willow flycatchers).

Cattle and horses were grazing the Moapa Valley-Warm Springs Ranch site in 2003. With the exception of the 2001 survey season, this area has been grazed for several years.

At Oasis Valley, the riparian habitat has improved in the area, in particular at the Oasis Valley-South area (south of the town of Beatty). The improvement in habitat condition is primarily due to the removal of approximately 900 burros in 1995 and 1996 by the Bureau of Land Management. A small number of burros remain.

Avifauna Summary

A total of 98 bird species (123 in 2002) were observed during the endangered bird surveys. The decrease is largely due to Meadow Valley Wash not being surveyed this year. The most unique species was a male adult Northern Parula observed at Oasis Valley – South. A detailed list of all bird species, their occurrence and breeding status can be found in Appendix A.

Discussion

Surveys for the southwestern willow flycatcher found one new breeding site in 2003 compared to 2001 and 2002. The Pahranaagat Valley-North site, which contained an abundant breeding population of flycatchers in 2001, was not surveyed in 2002/2003 as access was not granted. The Department is working with the private landowner at this site to establish a conservation easement as well as gain access to survey the property. Reports of reproductive effort of flycatcher populations do not reflect this site for 2002 or 2003.

To summarize, the average number of fledglings produced per successful nest for all sites was 3 (only one nest), compared to 2002 at 1.8 (8 nests) and 2001 at 2 (5 nests). Although, given that only one nest was successful, this is an extremely limited data set. The decline in the number of successful nests may be due to the prolonged drought conditions experienced in southern Nevada in 2002, through the late winter of 2003.

Obstacles affecting successful reproduction, including predation and unhatched eggs, were documented. During the 2003 survey season, 6 nests were detected of which 3 were abandoned. One of the remaining three nests successfully fledged a total of three willow flycatchers (one nest was unknown although it contained three nestlings), from an original 17 eggs (successful and unsuccessful nests). In 2002 ten flycatchers were produced from 28 eggs.

At Key Pittman WMA, two eggs were lost within two nests. One pair constructed two nests at Key Pittman, as the pair's first nest was unsuccessful. The first and second nests had three eggs each. Each nest later lost one egg and both produced two nestlings. Subsequent surveys found the nestlings missing in the first nest and abandoned in early-July. The same circumstances occurred with the second nest and was abandoned in late-July. A possible reason for loss of eggs/nestlings was predation. Egg loss was attributed to predation if nests were destroyed or fragments of nest or eggshells were on the ground. Predation may have caused the loss of two flycatcher eggs. However, predation cannot be confirmed because predators were never actually observed.

At Ash Meadows-Carson Slough, five eggs were lost within two nests. One pair constructed two nests. The first nest with three eggs was destroyed in late-June. Most of the nest and fragments of willow flycatcher and brown-headed cowbird eggshells were found on the ground under nest remnants in the tamarisk. After a period of recuperation of about 12 days when willow flycatchers were not observed in the area, the pair constructed a second nest. The nest contained two WIFL eggs. Five days later, the WIFL eggs were gone and a BHCO egg was in the nest. No eggshells were on the ground, and there was no nest defense. Again willow flycatchers were not observed and the nest was abandoned in late-July. Further surveys revealed that the female willow flycatcher returned near the nest area to feed from a screwbean mesquite and soon afterwards left the area. The nest continued to have the BHCO egg.

During the 2003 survey period, flycatcher behaviors were observed and documented. On several occasions playing the tape of flycatcher calls was not necessary, as birds were often heard singing before territories were approached and the taped call was not needed. Flycatcher interactions with other birds were varied and numerous. In past survey years, Department biologists observed flycatchers defending their territories against brown-headed cowbirds, common yellowthroats, an ash-throated flycatcher, a black-chinned hummingbird, yellow-breasted chats, and a western kingbird. In 2003, most of the willow flycatchers were vocally defensive, and would produce a 'whit' call when nests or fledglings were approached. In a few cases adults would produce a "whit" call within a meter of the surveyor.

At Ash Meadows-Carson Slough, a banded male returned to the same territory in this location on May 27 of this year and May 31 of last year. Not only did the bird return to the same territory, but also to its' favorite perches near the 2002 nest. During one survey, the female WIFL went to the 2002 nest and was quickly followed by two female BHCOs. At a later date the 2002 nest was removed from its position in a tamarisk and "tossed" to the ground. This banded male and his mate had their first nest destroyed in late-June. In early-July the male returned and "fitz-bewed" only twice with a quiet time of 20-30 minutes, then "fitz-bewed" two more times. After recuperating from losing his first nest, this behavior may have been to reestablish his territory without attracting too much attention. Usually, males "fitz-bew" continuously when establishing territories.

At Key Pittman WMA, a female WIFL chased three BHCOs away from her first and only nest. This nest was successful in raising three willow flycatcher fledglings. During a survey in late-July, it is believed that the female and fledglings left the area, but the male remained. He became very vocal again, "fitz-bewing" at the nest area with an occasional "weo." Was this male thinking it was single? This vocalization is typical when the bird is single and establishing its territory.

Distraction calls may be given by flycatchers to ward off predators, other birds, and even surveyors. At Ash Meadows-Carson Slough, flycatchers gave a series of defensive calls including "whit" and "weo", and their nest was eventually found nearby at approximately nine meters away from their calls.

Adults depart from breeding territories as early as mid-August, but may stay until mid-September if the adults have fledged young late in the season (M. Whitfield and W. Haas, unpublished data). Pairs of flycatchers with or without a successful nest at all sites left the areas by the end of July. Two unmated male flycatchers at Key Pittman

departed at the end of July also. One unmated male from the same location left at the end of June. Thus, these unmated males remained in the area from 25 days to 10 weeks. In Arizona, unmated males remained on territory through the early part of the breeding season, yet departed by mid-July (Sogge 1995). However, in late-July two flycatchers, (one that successfully mated and, one unmated) at Key Pittman responded with a "fitz-bew" much like an unpaired male would do early in the season. These males were at adjacent coyote willow patches.

Nest placement within certain habitat is predictable for certain bird species based on vegetation distribution (Arizona Game & Fish Department 1999). Dense canopies seem to be preferred by southwestern willow flycatchers. Average canopy cover for the 2003 surveys was 92.3 percent at nest sites. Nest height did not vary greatly between habitat types. Nest height in coyote willow ranged from 3.3 to 4.1 m. The nests in tamarisk were 2 m to 3.7 m high. The overall average for all nest heights was 3.4 m (3.6 m in 2002). Most nests were placed 3-6 m from the edge of the woodland patch. Where standing water was present or near sites in past survey years, it was noticeably drier in the 2002-3 survey seasons.

Nesting territories are found in much of the same areas as previous years, although nest placement varies within those territories. At Ash Meadows-Carson Slough, after the flycatcher pair's first nest failed (parasitized), the pair constructed their second nest 5.5 m from the first nest. A pair at Key Pittman built their second nest 6.0 m from their first nest, but their first nest was only 1.2 m from an old nest constructed in late-June 2000.

J. C. Uyehara et. al. (2000) states that the early nests of flycatchers are at a higher risk of parasitism than later nests. At Ash Meadows-Carson Slough, two nests were parasitized with BHCO eggs, one in late June and the other in late-July. Decreased parasitism levels have been associated with dense vegetative cover around the nesting heights (Farmer 1999). However, our parasitized nests A1 (at 3.6 m) and A2 (at 2 m) had high canopy cover percentages of 93.5 and 91.4, respectively.

The presence of the willow flycatcher at Key Pittman Wildlife Management Area is of immediate interest to the Department of Wildlife in respect to future management of this property. Seven southwestern willow flycatchers were found at Key Pittman WMA (17 in 2002). This is a decrease from 2001 and 2002. Ash Meadows National Wildlife Refuge also holds much potential for additional nesting birds.

Management Recommendations

Management and conservation of identified southwestern willow flycatcher breeding habitats as well as potential breeding habitats is very important in order to insure persistence of these birds in Nevada. Management recommendations for these selected sites entail controlling potentially harmful land use practices that impact breeding habitat such as improper grazing, water diversion, and destruction of willow stands and other riparian habitats.

After five years of surveys, the Department has determined that cowbird management is not warranted at this time for protection of the flycatcher. The cowbird parasitism rate of the surveyed areas is less than 20-30% for the five-year period, which is the recommended percentage to initiate cowbird control (Smith 2000).

In 2003 parasitism rates were high, as four willow flycatcher nests were predated. Brown-headed cowbirds were observed to be responsible for two of these predation cases, and suspected to be responsible for the other two cases. In a report by the Arizona Game and Fish Department (1999), cowbirds were observed to be nest predators, ejecting eggs or nestlings without depositing their own eggs. Thus, brood parasitism may not occur, while cowbirds may still be accountable for nest failure by predation.

Based on information from the current study, willow flycatchers prefer dense patches of coyote willow for breeding habitat. This habitat type is easy to enhance, as the willows will quickly propagate given an adequate amount of water and protection of the saplings from grazing. For example, patches of coyote willow at Key Pittman have expanded to an affordable size to support nesting flycatchers within a five-year time frame (Bart Tanner, NDOW, pers. comm.). Some patches that were no more than one-tenth of an acre supported nesting flycatchers (See Image 3).



Image 3. Willow Habitat Patches at Key Pittman State Wildlife Management Area – Nesbitt Lake, summer of 2002-3. Some of the willow patches had nesting flycatchers in 2003.

At Key Pittman State WMA, efforts have been made to reduce grazing pressures on flycatcher habitat while still accommodating management efforts directed at waterfowl and upland game birds. The Department of Wildlife has documented an increased number of willow flycatchers at Key Pittman in the past four of five years (6 in 1999, 9 in 2000, 14 in 2001, 17 in 2002, 7 in 2003) and the recommendation is to continue to monitor the population of flycatchers at this site. The willow habitat near Nesbitt Lake has expanded in acreage in the past ten years. The recommendation is to allow this trend to continue.

At the conclusion of the willow flycatcher surveys at Key Pittman WMA this year, it was decided that adequate protection of the coyote willow habitat requires additional protection from grazing. Cattle were observed grazing and walking through coyote willow below or near flycatcher nests. Also, there were other instances of cattle grazing within willow habitat during the nest-building season. Beginning in the Fall of 2002 and into 2003, the Department is developing Conservation Guidelines in the form of Federal Safe Harbor Agreements for the Key Pittman WMA. Within the guidelines, the Department will make efforts to reduce grazing within the willow habitat by fencing. This will allow the willow to expand within the fences and keep cattle from disturbing the nests.

The structure of habitat at the Carson Slough site at Ash Meadows was comparable to all the other sites; however, the species composition differed from all other breeding sites, as it was a mixture of tamarisk and screwbean mesquite. Since flycatcher surveys commenced in 1999, this site has not been as productive as other sites surveyed. Further surveys are needed at this site to evaluate long-term breeding success.

Cooperative efforts with the U.S. Fish and Wildlife Service regarding distribution and status of the southwestern willow flycatcher should continue, including further investigation into other possible breeding habitats. In 2004, all sites which previously had breeding birds should continue to be surveyed and nests monitored. This year the Department was not granted access to survey the Pahrnagat Valley-North site. This was the most productive site for willow flycatchers in 1999 thru 2001 and efforts will continue to be made to acquire access to the site for future surveys.

Yellow-billed Cuckoo

Introduction

The yellow-billed cuckoo (*Coccyzus americanus*) historically bred throughout most of western North America from British Columbia to Mexico and in most regions of California, as well as in most of the eastern United States (Hughes 1999). The yellow-billed cuckoo inhabits woodlands found along river and streams throughout North America.

In Nevada, the yellow-billed cuckoo has been documented primarily in the western and southern portions of the state. In western Nevada, yellow-billed cuckoos have been documented along the Carson River, Lahontan Valley and the Fallon area (Alcorn 1988). In southern Nevada, the cuckoo has been documented at Beaver Dam Wash, Pahrangat Valley and Meadow Valley Wash in Lincoln County. In Clark County, the yellow-billed cuckoo has been documented along the Lower Virgin River, Las Vegas Valley, Corn Creek and Moapa Valley (Alcorn 1988, NDOW 2000-2002). The only known nest records for the yellow-billed cuckoo is at Warm Springs in Moapa Valley in 2001 (NDOW 2000-2002).

The yellow-billed cuckoo has declined from much of its previous range in the western United States and southern British Columbia (Laymon and Halterman 1987). The early decline of the species in the west is linked to loss of riparian habitat in nesting areas as a consequence of inundation by reservoirs, channelization, and urban development (Gaines and Laymon 1984; Laymon and Halterman 1987). The cuckoo was petitioned for listing as an Endangered Species by the Southwest Center for Biological Diversity and several other groups in February of 1998 (Suckling et al. 1998). The U.S. Fish and Wildlife Service found the petition to be warranted, but precluded by higher priority listing actions. Consequently, the yellow-billed cuckoo was added to the candidate species list as of July 18, 2001 (USFWS 2001).

Breeding season surveys for yellow-billed cuckoos have been conducted yearly since 2000 to determine distribution and breeding status of cuckoos in select riparian areas of Southern Nevada.

Methods

Yellow-billed cuckoo surveys typically follow methods developed by (Halterman et. al. 2002). Surveys consist of walking along suitable habitat, stopping and playing a recording of cuckoo calls, and listening for a response. The tape was played two to five times at each stop, pausing for one minute between each playback. Birds were recorded as unmated if they were heard "cooing", and/or showed interest in the recording (Hughes 1999). If the bird responded with any other call, such as the "Kowlp" or "knocker" call, did not fly and did not respond further, it was recorded as mated.

Standardized forms were utilized on all surveys. Data collected included site name/location, time and date of surveys, observers, number of birds, estimated number of pairs, territories, nests, and presence of cowbirds and livestock. Habitat and nest information included: nest height, canopy height, canopy cover, and UTM (Universal Transverse Mercator) location.

Study Site Descriptions

Corn Creek, (T17S R59E Sec 34) Elevation 2920 ft: This site was not previously regularly surveyed for yellow-billed cuckoos. It is located approximately 20 miles northwest of Las Vegas off of Highway 95, about three miles to the east. The area is within the Desert National Wildlife Refuge managed by the US Fish & Wildlife Service. The habitat includes three ponds (an upper pond and two lower ponds) surrounded by marsh reed (*Phragmites sp*) and cattail (*Typha sp*). The upper pond (40 ft wide x 60 ft long) is fed by a nearby spring, Corn Creek Springs. An irrigation ditch then flows from the upper pond to the lower ponds (20-30 ft in diameter). Several species of trees, both native and introduced, dominate the area. Native trees include 15.2-18.2 m tall cottonwood (*Populus fremontii*), 15.2 m tall black willow (*Salix gooddingii*), and 9.1 m tall honey mesquite (*Prosopis glandulosa*). Non-native species are 13.6-15.2 m tall Russian olive, 15.2 m tall elm, 18.2 m tall black locust and fruiting mulberry. Several species of fruit trees, such as apple, apricot, and pecan are also present. A pasture for horses and mules is adjacent to this forested area to the southeast.

Crystal Springs, (T5S R60E Sec 10) Elevation 3800 ft: The site is located on the south side of Highway 375, near the intersection of Highway 375 and Highway 318, south of Key Pittman State Wildlife Management Area. The habitat is riparian (spring) with two man-made ponds. Cottonwoods (*Populus fremontii*) occupy the overstory (24-27 m), while black willow (*Salix gooddingii* 15-18 m) occurs in the midstory. Approximately 80% is pasture bordered on the west by a concrete channel. Cattle do not have access to the area. The Russian olive (*Eleagnus angustifolia*) occupied the area thru the 2002 season. Afterwards, the Russian olive was removed, and replaced with native coyote willow and cottonwood. Further revegetation efforts will occur in the fall of 2003.

Moapa Valley-Pump Station, (T14S R65E Sec 15 and 16) Elevation 1750 ft: This site was first surveyed in 2000. This site is contiguous with the Warm Springs Ranch Site immediately to the southeast (see next paragraph). It is located approximately 8 miles north of the town of Glendale, off State Route 168. The survey begins where the Warm Springs Road crosses the Muddy River. The survey transect follows the Muddy River upstream and continues north about 1200 m. Most of the vegetation along the river is 5-8 m tamarisk and 2.5 m arrowweed (*Pluchea sericea*). A few stands of 20-30 m tall Fremont cottonwood and 2-3 m tall honey mesquite are located nearby.

Moapa Valley-Warm Springs Ranch, (T14S R65E Sec 15 and 16) Elevation 1750 ft: This site was first surveyed in 2000. It is located on Warm Springs Road nine miles north of the town of Glendale near State Route 168. Survey transects were established along two waterways, including a drainage area to the west and the Muddy River to the east. Considerable tamarisk occurred at the east area, while dense mesquite occurred with tamarisk at the west area. Considerable water and dense vegetation occurred at the site along the Muddy River. Willow, tamarisk, and honey mesquite canopy heights ranged from five to eight meters, with palms (*Washingtonia spp.*), ash, and Fremont cottonwoods ranging from 15 to 30 m high. The wetland vegetation was primarily cattail, sedge and bulrush, surrounded by a wet meadow (See Image 4).



Image 4. Riparian Habitat Warm at Springs Ranch in Moapa Valley, Summer of 2003.

Oasis Valley-South, (T12S R47E Sec 7) Elevation 3270 ft: This site is located east of U.S. Highway 95 just before entering the city limits of Beatty. It is a small riparian strip along the Amargosa River. Vegetation is patchy and mainly composed of large Fremont cottonwoods, coyote willow, tamarisk, and cattail patches. The streambed was dry in much of the area by the end of the survey period, with small patches of running water throughout.

Oasis Valley-Springdale, (T10S R47E Sec 31) Elevation 3960 ft: This site was first surveyed in 2001. Springdale is located along U.S. Highway 95 twelve miles north of Beatty. The vegetation in this area is diverse. The center of the property is a short circular patch of coyote willow (approximately 3-4 m in height) bordered on the south side by a small pond and a small stand of 8 m tall black willow. The surrounding area consists of inundated bulrush. The rest of the property is scattered with large deciduous trees including ash and cottonwood. All trees are over 14 m in height.

Results

Yellow-billed Cuckoo Population Data and Habitat Use

A total of three adult yellow-billed cuckoos (4 in 2002, 28 in 2001 and 19 in 2000) were detected in 2003. All three cuckoos were unmated (Table 5). These numbers are less than in past years (2001 – 19 unmated, nine mated; 2000 – eight unmated, 11 mated). A total of six sites were surveyed in 2003 (table 5 lists those sites that had cuckoos).

**Table 5. Yellow-billed Cuckoo Mated and Unmated Birds at All Sites
2000-2003**

Site	2000		2001		2002		2003	
	Mated	Unmated	Mated	Unmated	Mated	Unmated	Mated	Unmated
Corn Creek	Ns	Ns	Ns	Ns	Ns	Ns	0	1
Meadow Valley Wash - Mile 14	Ns	Ns	Ns	Ns	0	1	Ns	Ns
Meadow Valley Wash - Mile 37-57	0	0	1	0	Ns	Ns	Ns	Ns
Moapa Valley - Pump Station	0	0	2	2	0	1	0	0
Moapa Valley - Warm Springs Ranch	4	5	6*	6	0	1	0	1
Oasis Valley - South	0	1	2	0	0	0	0	1
Oasis Valley - Springdale	Ns	Ns	2	0	0	0	0	0
Pahrnatagat Valley - Crystal Springs	0	0	2	0	0	0	0	0
Pahrnatagat Valley - Crystal South	0	1	0	0	0	1	Ns	Ns
Pahrnatagat Valley - North	4	4	4	1	Ns	Ns	Ns	Ns
Total Mated/Unmated	8	11	19	9	0	4	0	3
Total Adults	19		28		4		3	

Ns = Not Surveyed, * Includes 4 nests

One of the cuckoos located this year was from the upper Muddy River, at Warm Springs Ranch. In 2000, nine cuckoos, in 2001 twelve cuckoos, and in 2002 four cuckoos were observed on the Warm Springs Ranch transect. In 2001, this included six mated and six unmated birds with four nests (no nest in 2000, 2002, 2003). The single cuckoo detected from the Warm Springs Ranch transect in 2002 occupied the area from 27 June through 19 July. In 2003, however, the single cuckoo was observed during one survey July 11. At the Pump Station transect, no cuckoos were observed this season. In 2002, a single cuckoo was observed 3 July in a mesquite grove. No cuckoos were detected in 2000 and four (two mated and two unmated) were detected in 2001 from this area.

One YBCU was observed at Corn Creek within the Desert National Wildlife Refuge, and another cuckoo was located at the Oasis Valley-South transect. All cuckoo behavior is reported within the Discussion section.

Grazing Management

The Department of Wildlife is working with private landowners and federal partners to manage grazing at sites with both grazing and populations of cuckoos. This year, grazing by horses and cattle occurred at Moapa Valley-Warm Springs Ranch. A small population of burros occurs at Oasis Valley-South. No other sites had appreciable grazing pressures.

Cattle and horses have grazed the Moapa Valley sites several years. In the winter of 2000, cattle and horses had been removed from the area for several months before cuckoo surveys were initiated, and as a result during the cuckoo survey season the meadow grasses were 0.5-1.0 m high, and provided substantial habitat for grasshoppers, one primary prey source for yellow-billed cuckoos. Contents of 10 stomachs in Nebraska contained 416 locusts and grasshoppers (Bent 1940). In winter 2001, cattle and horses were reintroduced to the Moapa Valley sites for grazing. Throughout the 2002-3 survey seasons meadow grasses were substantially foraged upon and grasshoppers were rare. Also, the extreme drought conditions in 2002-3 are suspected as contributing to the low population of grasshoppers (see image 5).

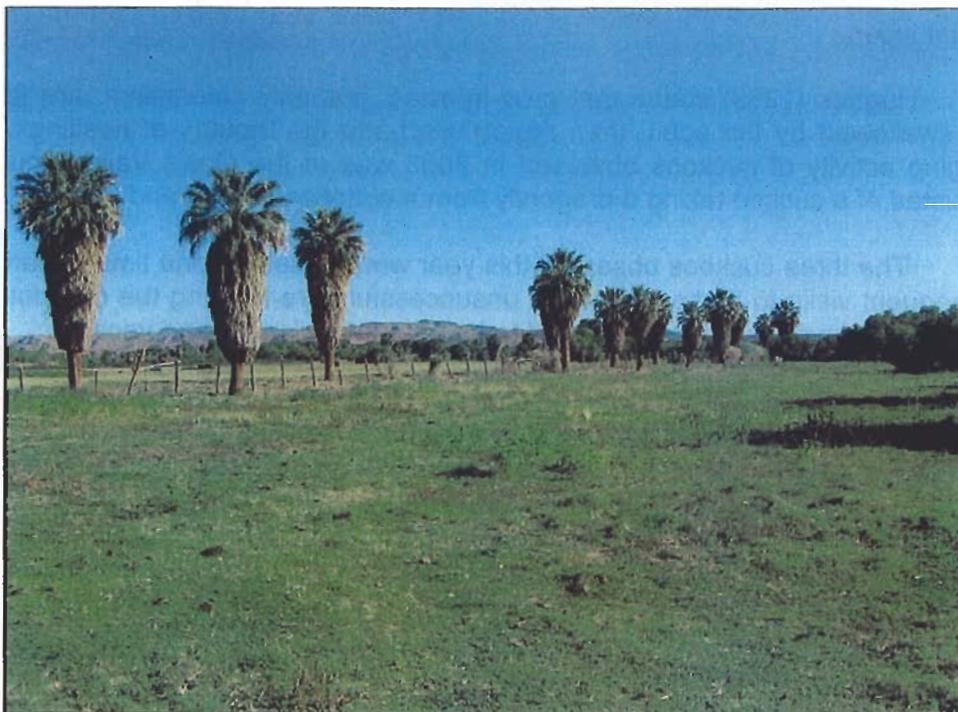


Image 5. Grazed Riparian Habitat in Warm Springs Ranch in Moapa Valley, Summer of 2003.

Avifauna Summary

A total of 98 bird species were observed (123 in 2002) during the surveys. The decrease is largely due to Meadow Valley Wash not being surveyed this year. A detailed list of all bird species, their occurrence and breeding status can be found in Appendix A.

Discussion

The yellow-billed cuckoo is characterized by its secretive behavior. These birds are not easily detected and nests are even more difficult to locate (Halterman 2000; Hughes 1999). Often detection is by vocalization rather than visual contact. In some cases birds responded to a taped call by either calling back or flying out to investigate the source of the call. Methods for determining male and female cuckoos are being developed by experts at this time (Halterman pers. comm.). The Department of Wildlife

did not attempt to differentiate cuckoos to sex. Birds were merely described as mated and unmated based on call variations. Although birds may be referred to as 'mated' this does not necessarily indicate a pair was present unless noted.

Nests are difficult to locate due to the elusive behavior of the cuckoos, the dense habitat in which they utilize and the relatively short breeding season. Nest construction takes two to four days (Haltermann, et. al. 2000). Seventeen days are required from egg laying to fledging of young (Hughes 1999). Habitats in which cuckoos were located were relatively dense and the birds seemed to prefer the tops of canopies, making sightings difficult. Haltermann (2001) stated that it is important to confirm breeding at southern Nevada sites, as cuckoos found in California and Arizona utilize substantially different habitat types.

Hughes (1999) states that prey species, primarily caterpillars, are first crushed and swallowed by the adult, then regurgitated into the mouths of nestlings. The only foraging activity of cuckoos observed in 2003 was at the Oasis Valley-South site and consisted of a cuckoo taking a dragonfly from a cottonwood tree and eating it.

The three cuckoos observed this year were observed one time in early July, and subsequent visits to these sites were unsuccessful in re-locating the cuckoos. All three cuckoos observed this year appeared to be unmated (visually and vocally).

The one cuckoo observed at Corn Creek in early-July responded vocally to the survey tape. It first vocalized with two subdued "kowlps" while in an elm tree, and eventually flew to a black willow tree where it "cooed" several times. The cuckoo observed at Oasis Valley-South did not respond vocally to the survey tape. It flew into a cottonwood about 20 feet from the surveyor and proceeded to check out the surveyor. The bird was relaxed since it then caught and ate a dragonfly. The single cuckoo at Moapa Valley-Warm Springs Ranch responded to the survey tape with "coos." The "coos", however, were not strong or loud and were short, i.e. with a series of two-three "coos" rather than the usual six-seven "coos."

Several factors play key roles from year to year in determination of suitable habitat for the cuckoo. These include but are not limited to canopy cover, distance to water, vegetation type, vegetation structure, and abundance of food items. In terms of food items, Laymon (1980) reported cuckoo food items included 40 caterpillars, 30 grasshoppers, five katydids, and 25 other insects brought to one nest. Clearly food type and quantity is critical for chick growth and development. In 2003, there seemed to be an abundance of dragonflies at most of the sites. However, in 2002 large insects were considerably less at all sites than in 2001, although food abundance between sites was not quantified.

The low abundance of cuckoos observed in 2003 is believed to be primarily a result of the current extreme drought Nevada is experiencing, which is suspected to be a primary cause for low prey base. Although, in 2003 there was considerable rain in the early part of Spring, coupled with monsoon rain in the summer, it is possible this rain did not influence cuckoo numbers in 2003 given the prolonged period of drought prior to these rains. Grazing of meadow grasses, such as at the Moapa Valley-Warm Springs Ranch, may also play a key role in limiting prey base for cuckoos.

Management Recommendations

Management and conservation of yellow-billed cuckoo breeding habitats as well as potential breeding habitats is very important in order to insure persistence of these birds in Nevada. Management recommendations for these selected sites entail controlling potentially harmful land use practices that impact breeding habitat such as improper grazing, water diversion, and destruction of riparian habitats.

Cattle and horse grazing occurred at Moapa Valley–Warm Springs Ranch. The Department of Wildlife, in coordination with the private landowner of the Pahrnagat Valley-Crystal South site is developing a habitat improvement project for the site. Safe Harbor agreements are also being explored to enhance riparian habitats while maintaining grazing interests.

Management goals for the yellow-billed cuckoo include continued population monitoring at sites where cuckoos have been found, with an emphasis on the Moapa Valley-Warm Springs Area, and the Pahrnagat Valley-North Site (not surveyed in 2002 and 2003). Additional surveys are needed in Oasis Valley to determine the population status of the cuckoo in that area.

Yellow-billed cuckoo habitats must also be maintained and expanded for the cuckoo to survive. Large riparian corridors with tall stands of cottonwood, ash, and black willow along with dense understories need to be protected from any future loss, and management strategies intended to expand and replace suitable habitat should be implemented.

Literature Cited

- Alcorn, J.R. 1988. *The Birds of Nevada*. Fairview West Publishing, Fallon, NV. 418 pp.
- Arizona Game and Fish Department. 1999, 2000, 2001, 2002. Southwestern willow flycatcher 1998, 1999, 2000 and 2001 survey and nest monitoring reports. Technical Report 141, 151, 175 and 191.
- Bent, A. C. 1940. Life histories of North American cuckoos, goatsuckers, hummingbirds and their allies. US Nat'l. Mus. Bull. No. 176.
- Farmer, C. 1999. The density and distribution of Brown-Headed Cowbird: the central coastal California enigma. *Studies in Avian Biology* No.18. Allen Press, Inc., Lawrence, Kansas.
- Finch, Deborah M.; Stoleson, Scott H., eds. 2000. Status, ecology, and conservation of the Southwestern Willow Flycatcher. Gen. Tech. Rep. RMRS-GTR-60. Ogden, UT: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 131p.
- Halterman, D. H., S. A. Laymon, D. S. Gilmer, G. Falxa. 2000. Status of the Yellow-billed Cuckoo in California-1999.
- Halterman, M. D. 2001. Population status of the Yellow-billed Cuckoo at the Bill Williams River NWR and Alamo Dam, Arizona, and Southern Nevada: Summer 2000.
- Halterman, M. D., M. Johnson, T. Corman, R. McGill. 2002. Survey Methodology and Natural History of the Yellow-billed Cuckoo. Southern Sierra Research Station, P.O. Box 1316 Weldon CA 93255.
- Hughes, J. M. 1999. Yellow-billed Cuckoo. *The Birds of North America* No. 418: 1-27.
- Johnson, R.R., and L.T., Height. 1984. Riparian problems and initiatives in the American southwest: a regional perspective. Pp. 404-411 in R.E. Warner and K.M. Hendrix (editors). *California Riparian Systems: ecology, conservation and productive management*. University of California Press, Berkeley, CA.
- Laymon, S. A. 1980. Feeding and nesting behavior of the Yellow-billed Cuckoo in the Sacramento Valley. *Wildl. Manage. Admin. Rep. 80-2*, Calif. Dept. Fish and Wildlife, Sacramento.
- Laymon, S.A. and M.D. Halterman. 1987a. Can the western subspecies of the Yellow-billed Cuckoo be saved from extinction? *Western Birds* 18:19-25.
- Laymon, S.A. and M.D. Halterman. 1989. A proposed management plan for the Yellow-billed Cuckoo in California. pp. 272-277. In D. Abell, Tech. Coord. *Proceedings for the California Riparian Systems Conference: Protection, management, and restoration for the 1990's*. U.S.D.A. Forest Service Gen. Tech. Rep. PSW-110, Berkeley, CA.

- Laymon, S. A., and M. D. Halterman. 1989. A proposed habitat management plan for Yellow-billed Cuckoos in California. USDA For. Serv. Gen. Tech. Rep. PSW-110: 272-277.
- McKernan, R.L., and G. Braden. 1999. Status, distribution, and habitat affinities of the Southwestern Willow Flycatcher along the lower Colorado River. Year 3 - 1998.
- Neel, L.A., ed. 1999. The Nevada Partners in Flight Bird Conservation Plan. The Nevada Partners in Flight Working Group, Reno, NV. 335 pp.
- Nevada Division of Wildlife. 2000-2002. Breeding Status and Surveys for the Southwestern Willow Flycatcher and Yellow-billed Cuckoo at Various Sites in Southern Nevada.
- Smith, J.N.M., T.L. Cook, S.K. Robinson, S.I. Rothstein, and S.G. Sealy, eds. 2000. Ecology and Management of Cowbirds and Their Hosts, Univ. of Texas Press, Austin, Texas. 388 pp.
- Sogge, M.K. 1995. Southwestern Willow Flycatcher (*Empidonax traillii extimus*) monitoring at Tuzigoot national Monument. 1995 progress report to NPS. National Biological Service Colorado Plateau Research Sta/Northern Arizona University report. 20 p.
- Sogge, M.K., R.M. Marshall, S.J. Sferra, and T.J. Tibbitts. 1999. Preliminary evaluation of the effectiveness of the southwestern willow flycatcher survey protocol (Sogge et al. 1997). A briefing statement to the U.S. Fish and Wildlife Service, Arizona Ecological Services Office, Phoenix, AZ.
- Sogge, M. et. al. 1997. A Southwestern Willow Flycatcher natural history summary and survey protocol. Technical Report NPS/NAUCPRS/NRTR-97/12.
- Sogge, M. K. 2000. Breeding season ecology. Pp 57-70 in Status, ecology, and conservation of the Southwestern Willow Flycatcher. USDA Forest Service Gen. Tech. Rep. RMRS-GTR-60.
- Suckling, K. et. al. 1998. Petition to list the yellow-billed cuckoo as endangered pursuant to the Endangered Species Act. ESA 5 U.S.C. 553 (e) and 50 CFR 424.14 (1990).
- Tacha, T.C., and C.E. Braun. 1994. Migratory Shore and Upland Game Bird Management in North America. IAFWA. Chapter 12.
- United States Fish and Wildlife Service. 2001. Proposed Rule for a 12-month finding to petition to list the Yellow-billed Cuckoo (*Coccyzus americanus*) in the Western Continental United States. Federal Register. 50 CFR Part 17: 38611-626.
- Uyehara, J. C., M. J. Whitfield and L. Goldwasser. 2000. The ecology of Brown-Headed Cowbirds and their effects on Southwestern Willow Flycatchers. USDA Forest Service Gen. Tech. Rep. RMRS-GTR-60. Chapter 9.

Whitfield, M.J., M.K. Sogge. 1999. Range-wide impact of brown-headed cowbird parasitism on the southwestern willow flycatcher (*Empidonax traillii extimus*). *Studies in Avian Biology* 18:182-190.

APPENDIX A

AVIFAUNA SUMMARY

X Occurrence						
P Pair						
N Nest						
F Fledged Young						
Species	Corn Creek	Ash Meadows	Key Pittman	Crystal Springs	Oasis Valley	Moapa Valley
Abert's Towhee						X, P, N, F
American Coot			X,P,N,F	X,P,F		
American Kestrel	X,P,N,F					
American Robin				X		
American White Pelican			X			
Ash-throated Flycatcher	X,F	X	X		X	X
Barn Owl		X	X		X	
Belted Kingfisher	X					
Bell's Vireo			X		X	X, P
Bewick's Wren		X,P,N,F	X,P,F			X, F
Black Phoebe				X,P	X	X, P, F
Black-chinned Hummingbird	X		X	X	X,P,F	
Black-crowned Night Heron			X, F		X	
Black-headed Grosbeak		X			X	
Black-throated Sparrow					X,P,N,F	
Blue Grosbeak		X	X,P,N	X,P,N,F	X,P,N,F	X, P, N, F
Blue-gray Gnatcatcher		X			X,P,N,F	X
Brown-headed Cowbird	X	X, P, F	X, P	X,P	X,P,F	X,P
Bullock's Oriole		X,P,N	X,P	X,P,N	X,P,F	X,P
Bushtit						X
Canada Goose			X, P, F			
Cedar Waxwing	X					
Chukar					X,F	
Cinnamon Teal			X,P,N,F			
Common Raven	X	X	X,P,N,F	X,P,N	X, P	X
Common Yellowthroat		X, N, F	X, P, F	X,P	X,P	X,P
Cooper's Hawk	X		X,P,N	X, F	X, F	X
Costa's Hummingbird					X	
Crissal Thrasher	X,P,F	X,P,F				X,P
Double-crested Cormorant			X			
European Starling	X, F			X	X	
Gadwall			X,P			
Gambel's Quail		X,P,F	X		X,P,F	X, P, F
Great Blue Heron	X	X	X			X
Great Egret			X			
Greater Roadrunner			X			X
Great-tailed Grackle		X,P	X,P,N,F	X	X, P, N, F	X
Green-backed Heron				X		
Hooded Oriole						X
House Sparrow	X			X	X,P	X
House Wren			X		X	
Housefinch	X,P		X,P	X, P	X,P	X,P,N
Killdeer			X,P,N		X, P, N	X,P,N,F
Ladder-backed Woodpecker				X,P		X,P

Species	Corn Creek	Ash Meadows	Key Pittman	Crystal Springs	Oasis Valley	Moapa Valley
Lark Sparrow	X		X,F			
Lesser Goldfinch						X
Lesser Nighthawk	X	X				
Loggerhead Shrike		X				X
Long-billed Dowitcher			X			
MacGillivray's Warbler				X		
Mallard			X,P,N,F	X,P,F		X
Marsh Wren			X			
Mourning Dove	X,F	X, P, N, F		X	X,P,N,F	X, P, N, F
Northern Flicker (Red-Shafted)						X
Northern Harrier		X,P			X	
Northern Mockingbird	X	X, P	X	X,P,N	X,P,F	X, P, N, F
Northern Parula					X	
Northern Rough-winged Swallow		X	X	X	X	X, P
Peregrine Falcon						X
Phainopepla	X,P	X		X		X,P,N,F
Pied-billed Grebe			X			
Prairie Falcon					X	X
Redhead			X, P			
Red-tailed Hawk				X		X
Red-winged Blackbird		X,P,N,F	X,P,N,F	X,P,N,F	X,P,F	X, P, N, F
Ring-billed Gull			X			
Ring-necked Pheasant						X
Rock Dove	X					
Rock Wren			X			
Ruddy Duck			X,P,N,F			
Sage Sparrow					X,P	
Say's Phoebe			X		X	X, F
Short-eared Owl		X				X
Snowy Egret	X					
Song Sparrow		X				X
Spotted Sandpiper			X			
Summer Tanager				X,P		X
Turkey Vulture			X	X	X	X
Verdin	X	X,P,N,F		X	X	X, P, F
Vermilion Flycatcher						X, P, N, F
Violet-green Swallow						X
Virginia Rail		X, P	X			X, P
Warbling Vireo			X			
Western Flycatcher						X
Western Grebe			X			
Western Kingbird	X,P,N,F	X,P,N,F	X, P	X,P,N,F	X,P,N,F	X,P,N
Western Meadowlark	X	X				X
Western Tanager				X	X,F	X
Western Wood-Pewee		X,P		X	X	X
White-faced Ibis			X	X	X	
White-throated Swift	X				X	
Willow Flycatcher (SW)		X,P,N	X, P, N, F			X,P,N
White-throated Swift	X				X	
Wilson's Warbler		X	X, P			
Yellow Warbler		X	X, P	X,P,F	X	

Species	Corn Creek	Ash Meadows	Key Pittman	Crystal Springs	Oasis Valley	Moapa Valley
Yellow-billed Cuckoo	X				X	X
Yellow-breasted Chat		X,P,N	X,P,N,F			X
Yellow-headed Blackbird		X	X,P,N,F			
Yellow-rumped Warbler			X	X,P		

