

**U.S. FISH AND WILDLIFE SERVICE
SPECIES ASSESSMENT AND LISTING PRIORITY ASSIGNMENT FORM**

SCIENTIFIC NAME: *Coccyzus americanus*

COMMON NAME: Yellow-billed Cuckoo, Western United States Distinct Population Segment

LEAD REGION: Region 8

INFORMATION CURRENT AS OF: April 28, 2010

STATUS/ACTION

Species assessment - determined we do not have sufficient information on file to support a proposal to list the species and, therefore, it was not elevated to Candidate status

New candidate

Continuing candidate

Non-petitioned

Petitioned - Date petition received: February 9, 1998

90-day positive - FR date: February 17, 2000

12-month warranted but precluded - FR date: July 25, 2001

Did the petition request a reclassification of a listed species?

FOR PETITIONED CANDIDATE SPECIES:

a. Is listing warranted? yes

b. To date, has publication of a proposal to list been precluded by other higher priority listing actions? yes

c. If the answer to a. and b. is "yes", provide an explanation of why the action is precluded:

Higher priority listing actions, including court-approved settlements, court-ordered and statutory deadlines for petition findings and listing determinations, emergency listing determinations, and responses to litigation, continue to preclude the proposed and final listing rules for the species. We continue to monitor populations and will change its status or implement an emergency listing if necessary. The "Progress on Revising the Lists" section of the current CNOR (<http://endangered.fws.gov/>) provides information on listing actions taken during the last 12 months.

Listing priority change

Former LP: ____

New LP: ____

Date when the species first became a Candidate (as currently defined): July 25, 2001

Candidate removal: Former LPN: ____

- A – Taxon is more abundant or widespread than previously believed or not subject to the degree of threats sufficient to warrant issuance of a proposed listing or continuance of candidate status.
- U – Taxon not subject to the degree of threats sufficient to warrant issuance of a proposed listing or continuance of candidate status due, in part or totally, to conservation efforts that remove or reduce the threats to the species.
- F – Range is no longer a U.S. territory.
- I – Insufficient information exists on biological vulnerability and threats to support listing.
- M – Taxon mistakenly included in past notice of review.
- N – Taxon does not meet the Act’s definition of “species.”
- X – Taxon believed to be extinct.

ANIMAL/PLANT GROUP AND FAMILY: Birds, Family Cuculidae and Order Cuculiformes

HISTORICAL STATES/TERRITORIES/COUNTRIES OF OCCURRENCE: California, Oregon, Washington, Arizona, Colorado, Montana, Idaho, Nevada, Wyoming, New Mexico, Texas, Utah, British Columbia, and Mexico. The species over-winters from northern South America south to northern Argentina.

CURRENT STATES/COUNTIES/TERRITORIES/COUNTRIES OF OCCURRENCE: California, Arizona, Colorado, Idaho, Nevada, Wyoming, New Mexico, Texas, Utah, and Mexico. The species over-winters from northern South America south to northern Argentina.

LAND OWNERSHIP: Occurs in western United States east of the Rocky Mountains. Major Federal landownership includes Bureau of Land Management, and U.S. Forest Service.

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BIOLOGICAL INFORMATION:

Species Description

The yellow-billed cuckoo (*Coccyzus americanus*) is a member of the avian family Cuculidae and order Cuculiformes. The approximate 128 members of Cuculidae share the common feature of a zygodactyl foot, in which two toes point forwards and two toes point backwards. Most species have moderate to heavy bills, somewhat elongated bodies, a ring of colored bare skin around the eye, and loose plumage. Six species of Cuculidae breed in the United States; two of these species breed west of the Continental Divide - the yellow-billed cuckoo and the greater roadrunner.

The yellow-billed cuckoo is a medium-sized bird of about 12 inches (in.) (30 centimeters (cm)) in length, and weighing about 2 ounces (oz) (60 grams (g)). The species has a slender, long-tailed profile, with a fairly stout and slightly down-curved bill, which is blue-black with yellow on the basal half of the lower mandible. Plumage is grayish-brown above and white below, with rufous primary flight feathers. The tail feathers are boldly patterned with black and white below. The legs are short and bluish-gray, and adults have a narrow, yellow eye ring. Juveniles resemble adults, except the tail patterning is less distinct, and the lower bill may have little or no yellow. Males and females differ slightly. Males tend to have a slightly larger bill, and the white in the tail tends to form oval spots, whereas in females the white spots tend to be connected and less distinct (Hughes 1999, pp. 2–3).



Photo by L. Page Brown, Cornell Laboratory of Ornithology

Taxonomy

Ridgway (1887, p. 273) separated the yellow-billed cuckoo into eastern and western subspecies, based on western birds being “larger, with proportionately larger and stouter bill.” Wetmore (1968, pp. 325–326) added that western birds are slightly more gray above, and eastern birds more brown. Ridgway assigned birds from the area north and west from extreme west Texas to the Pacific Coast to the subspecies *C. a. occidentalis*, and other cuckoos in North America to *C. a. americanus*. Ridgway’s western subspecies included birds from the Great Basin portions of Colorado and Wyoming, west and north to the Pacific Coast and southwestern British Columbia.

The two subspecies were generally included in ornithological treatments through the 1960s (e.g., American Ornithologist's Union (AOU 1957, pp. 269–270) ; Oberholser and Kincaid 1974, pp. 434–435). Many ornithologists, however, have questioned the separation of the species into two subspecies (Todd and Carriker 1922, pp. 209–213; Swarth 1929, pp. 297–298; Van Tyne and Sutton 1937, p. 35; Bent 1940, p. 67), citing the small magnitude and inconsistency of differences between eastern and western cuckoos, and the broad overlap in the size of eastern and western individuals. During this time, however, there was no systematic analysis of geographic variation and the yellow-billed cuckoo subspecies question. Since 1983, AOU checklists (the recognized authority for taxonomy of North American birds) have not used subspecies names for any of the bird species in the checklist, stating practical grounds and that the validity of many described avian subspecies needs to be evaluated, as does the potential for unrecognized subspecies (AOU 1983, p. 284; AOU 1998, pp. 1–19). In the preface to the most recent checklist (AOU 1998, pp. 1–19) refers readers to the sixth edition 1957 checklist (AOU 1957, pp. 269–270) for subspecies taxonomy, while noting, as stated above, the questionable validity of many subspecies. The AOU Checklist Committee (which makes taxonomic decisions for North American birds) has begun the process of reviewing the taxonomic status of subspecies for the North American families of birds, a task that is expected to take at least several years (Banks 1999, pp. 1–2).

Yellow-billed cuckoo taxonomy was first reviewed in the late 1980s, when the Service requested that Dr. Banks, an avian taxonomist, evaluate the validity of the cuckoo subspecies. This request was in response to the 1986 petition to list the cuckoo in the States of California, Washington, Oregon, Idaho, and Nevada. Banks compared three morphological characteristics (bill length, depth of upper mandible, and wing length) of almost 700 adult specimens of yellow-billed cuckoos and visually examined the colors of specimens. He found: (1) no pattern of geographic variation in color; (2) substantial overlap between eastern and western birds in wing length, bill length and mandible depth; and (3) no significant differences for these three characteristics. He concluded that the data did not justify the separation into eastern and western subspecies (Banks 1988, pp. 473–477). Subsequently, statistical errors were discovered in Banks' study (Spiller 1988, pp. 1–3), and a reanalysis of the same data indicated statistically significant differences between eastern and western cuckoos ($p < 0.001$), for the three characteristics measured by Banks. Banks published a correction to his earlier paper (Banks 1990, p. 538), acknowledging the computational error, and stating that the “statistical difference cannot be equated to a biological or practical difference.” In support of this, he cited the small differences between mean measurements, the large degree of overlap between eastern and western birds in the ranges of measurements for the three characteristics he measured, and the sensitivity of the statistical procedure to detect very small differences as “significant,” given the large sample sizes. Banks concluded that his fundamental finding remained unchanged, that is, separation into subspecies was not warranted by the morphological data, and that all yellow-billed cuckoos in North America should be classified simply as *Coccyzus americanus*.

Banks provided his data to two avian ecologists (Franzreb and Laymon 1993, pp. 17–28) who analyzed the same data set, supplemented by measurements for a fourth characteristic (tail length), and from a small number of additional specimens of western birds. Franzreb and

Laymon (1993, pp. 17–28) noted statistical errors by Banks (1988, pp. 473–477), finding that western birds are larger than eastern birds, and that one could separate a majority of western cuckoos from eastern cuckoos using discriminant analysis. Franzreb and Laymon (1993, pp. 17–28) also considered behavioral and ecological differences between western and eastern birds, and found evidence of differences in the timing of migration and breeding. They concluded that: (1) “the recognition of subspecies on the basis of measurements of existing specimens is equivocal”; (2) study of geographical variation in vocalizations, bill color, and genetics was warranted; (3) the two subspecies should be retained pending the above studies; and (4) “because the western cuckoo is so critically endangered . . . changes in its classification should be made only after the best possible study.” Banks did not respond in print to their paper, but has stated that his conclusion remains unchanged (Banks 1999, pp. 1–2). A genetic study funded by the Service was not able to detect any diagnostic differences, reciprocal monophyly, or significant divergence between the eastern and western subspecies, after analyzing variation at two regions of the mitochondrial DNA (Fleischer 2001, pp. 14–16). However, another genetic study that examined a different region of the mitochondrial DNA determined that the eastern and western subspecies diverged approximately 205,000–465,000 years ago, with the two subspecies having four fixed base changes, supporting the recognition of the western subspecies as a distinct population segment (Pruett *et al.* 2000, p. 229).

Habitat/Life History

Western cuckoos breed in large blocks of riparian habitats, particularly woodlands with cottonwoods (*Populus fremontii*) and willows (*Salix* sp.), while eastern cuckoos breed in a wider range of habitats, including deciduous woodlands and parks (Ehrlich *et al.* 1988, p. 286). Dense understory foliage appears to be an important factor in nest site selection, while cottonwood trees are an important foraging habitat in areas where the species has been studied in California (Hughes 1999, p. 6). Clutch size is usually two or three eggs, and development of the young is very rapid, with a breeding cycle of 17 days from egg-laying to fledging of young. Although yellow-billed cuckoos usually raise their own young, they are facultative brood parasites, occasionally laying eggs in the nests of other yellow-billed cuckoos or of other bird species (Hughes 1999, pp. 16–17).

Historical and Current Range/Distribution

We consider the yellow-billed cuckoos that occur in the western United States as a distinct population segment (DPS). The area for this DPS is west of the crest of the Rocky Mountains. For the northern tier of Rocky Mountain states (Montana, Wyoming, northern and central Colorado), the crest coincides with the Continental Divide. In the southern tier of Colorado and New Mexico, the crest coincides with the eastern boundary of the upper Rio Grande drainage, including the Sangre de Cristo Mountains and excluding the drainage of the Pecos River. In west Texas, the DPS boundary is the line of mountain ranges that form a southeastern extension of the Rocky Mountains to the Big Bend area of west Texas, and that form the western boundary of the Pecos River drainage.

Based on historic accounts, the species was widespread and locally common in California and Arizona, locally common in a few river reaches in New Mexico, locally common in Oregon and Washington, generally local and uncommon in scattered drainages of the arid and semiarid portions of western Colorado, western Wyoming, Idaho, Nevada, and Utah, and probably uncommon and local in British Columbia. Hughes (1999, pp. 1–4) summarizes the species' historic range and distribution in these areas, which are described in detail below.

California

In California prior to the 1930s, the species was widely distributed in suitable river bottom habitats, and was locally common (Grinnell and Miller 1944, pp. 186–187; Small 1994, 130–131). Yellow-billed cuckoos nested primarily in coastal counties from San Diego County near the Mexico border to Sonoma County in the San Francisco Bay region, in the Central Valley from Kern County through Shasta County, and along the lower Colorado River (Dawson 1923, pp.2–7; Grinnell and Miller 1944, pp. 186–187; Gaines and Laymon 1984, pp. 53–58; Small 1994, 130–131). Cuckoos also bred locally elsewhere in the State, including in Inyo, San Bernardino, and Siskiyou Counties (Grinnell and Miller 1944, pp. 186–187).

The early literature relating to the cuckoo in California has been summarized and evaluated by Gaines (1974a, p. 204 and 1974b, pp. 2–4), Gaines and Laymon (1984, pp. 53–58), and Hughes (1999, p. 4). Collectively, they report dozens of locations where the species was historically reported and/or collected, sometimes in apparent abundance, but not subsequently found. Laymon and Halterman (1987b, p. 24) estimate that in California the species' range is now about 30 percent of its historical extent. Hughes (1999, p. 2) provides an estimate of 15,000 pairs of breeding birds for the California breeding population during the late 19th century. Gaines (1974, p. 208a) believed that pre-development cuckoo populations in California were even greater than implied by the early literature, due to the species' inconspicuous behavior and the fact that large tracts of floodplain riparian habitat had already been removed for development before the first records and accounts of the species began appearing in literature. There is clearly a broad unanimity among modern investigators that a catastrophic decline of the cuckoo in California occurred following the start of the major era of development beginning about the mid-1800s (Gaines and Laymon 1984, p. 73; Laymon and Halterman 1987b, p. 19; Launer *et al.* 1990, pp. 2–3).

Based on a 1986–87 statewide survey, only three areas in the State support more than about five breeding pairs on a regular basis: the Sacramento River (roughly between Colusa and Red Bluff); the South Fork of the Kern River upstream of Lake Isabella; and the lower Colorado River (Laymon and Halterman 1987a, pp. 1–18). Laymon and Halterman (1987a, p. 7) estimated 31 to 42 breeding pairs in the State, a decline of 66-81 percent from a 1977 survey (Gaines and Laymon 1984, pp. 59–72). The lower Colorado River, on the California-Arizona border, supported an estimated 180-240 pairs in 1976-1977, a number which had declined by an estimated 80-90 percent in 1986 (Laymon and Halterman 1987a, pp. 34–35); one study (Rosenberg *et al.* 1991, p. 203) estimated a decline of 93 percent over this period, from an initial 242 pairs in 1976-1977. These declines coincided with habitat losses resulting from high water

levels of long duration in 1983-1984 and 1986 (Laymon and Halterman 1987b, p. 22; Rosenberg *et al.* 1991, p. 203). Final results from a Service-funded 1999 statewide survey indicate that cuckoo numbers in the Sacramento Valley and along the Kern River are comparable to numbers from the 1980s, while only two pairs were located on the California side of the Colorado River. No pairs were found in the part of the state west of the Colorado River and south of the Kern River (Halterman 1999, p. 1). In 2006, surveys were conducted at various sites throughout the Lower Colorado River Multi-Species Conservation Plan Boundary area for the yellow billed cuckoo (Johnson *et al.* 2007, pp. 1–220). Two survey areas were on the California side of the Lower Colorado River, the Picacho State Recreation Area and the Imperial National Wildlife Reserve (Imperial paradise area). Only one bird was detected at the Picacho State Recreation Area (Johnson *et al.* 2007, p. 25). The 3,300 acre (ac) (1,335 hectare (ha)) riparian forest in the South Fork Kern River Valley is one of the largest remaining contiguous tracts of riparian habitat in California. In 2008 and 2009, presence-absence surveys for yellow-billed cuckoos were conducted along the South Fork of the Kern River in the Valley, yielding detections of 20 (2008) and 21 birds (2009), and indicating that the area continues to be an important breeding area for the species (Henneman 2010, p. 2, 3, 8, 14). Local populations are known to fluctuate drastically from year to year, and are thought to be influenced by inter-annual water-level fluctuations at Lake Isabella, which is located at the western end of the Valley. However, the actual mechanism influencing population fluctuations is not known (Henneman 2010, p. 12–14). Additional surveys are planned for 2010.

An example of the species' decline in California is the San Joaquin Valley. Cuckoos had been recorded from every county in the San Joaquin Valley region except Kings County and were locally common as a breeding bird at least in San Joaquin, Kern, Fresno, and Stanislaus Counties (Gaines and Laymon 1984, p. 66). Despite surveys for the species there have been few records from the San Joaquin Valley since the 1960s. If the species still breeds there, the number of breeding pairs is very small (Gaines and Laymon 1984, p. 66). In contrast, a ten year study and monitoring report on songbird population, health, management, and riparian restoration efforts in the Sacramento Valley determined that of twenty avian riparian habitat species in the study only one showed a decline and eleven showed an increase in population (Gardali *et al.* 2005, p. 13–15).

In 2010, surveys are planned for the Sacramento-San Joaquin River Delta, for the South Fork Kern River Valley, and for areas along the Sacramento River from Red Bluff to Colusa, especially areas included in the Sacramento National Wildlife Refuge Complex.

Pacific Northwest

In the Pacific Northwest, the species was formerly fairly common locally in willow bottoms along Willamette and Columbia Rivers in Oregon, and in the Puget Sound lowlands and along the lower Columbia River in Washington (Gabrielson and Jewett 1970, pp. 329–330; Jewett *et al.* 1953, pp. 342–343; Roberson 1980, pp. 225–226; Marshall 1996). The species was also found locally in southeast British Columbia (Hughes 1999), but the available data are not adequate to determine historic abundance. The species was rare east of the Cascade Mountains

in these States and provinces. The last confirmed breeding records were in the 1930s in Washington. It may now be extirpated from Washington. The Washington Department of Fish and Wildlife rank the species as having historical occurrences only, but still being expected to occur in Washington and it is currently a state candidate species (Washington Natural Heritage Program 2009, p. 9, 35; Washington Department of Fish and Wildlife 2007, p. 4). Although several surveys have been conducted in Okanogan and Yakima Counties in the last several years to check locations of previous sightings (Okanogan County) and potential habitat (Yakima County), no cuckoos were detected, despite a small number of statewide accounts in recent years (Salzer 2010, p. 1–3).

In Oregon, the last confirmed breeding records were in the 1940s in Oregon. However, four cuckoo sightings were made west of the Cascade Mountains between 1970 and 1994, and at least 20 records east of the Cascades (Gilligan 1994, pp. 162–163). A few pairs may nest very locally east of Cascades in Oregon. A 1988 survey in eastern Oregon and Klamath County located no birds, but identified potential breeding habitat along the lower Owyhee River (Littlefield 1988, p. 34). Most recent records were from May and June of 1999 (Johnson and O’Neil 2001, pp. 460–461) and a single yellow-billed cuckoo was sited during the breeding season (June 26-27 1999) along Bonita Road in Malheur County. This species is considered a rare visitor at the Malheur National Wildlife Refuge each year (Service 2009, p. 2).

The species occurred in southwest British Columbia (Victoria, Kamloops, Chilliwack) (Bent 1940, p. 64), but was apparently never common; the last confirmed breeding was in 1920s. The species has been recorded twice in British Columbia since the 1920s (Siddle 1992, p. 1169), and is considered extirpated (British Columbia Conservation Data Centre 1999, p. 5; Hughes 1999, p. 2).

Arizona

Arizona probably contains the largest remaining cuckoo population among States west of the Rocky Mountains. The species was historically widespread and locally common (Phillips *et al.* 1964, pp. 1-212; Groschupf 1987, p. 7). Losses of riparian habitats from historic levels have been substantial in Arizona (Rosenberg *et al.* 1991, pp. 18–23; Ohmart 1994, p. 273; Noss *et al.* 1995, p. 47). Losses have been greatest at lower elevations (below about 3,000 feet (ft) (914 meters (m))) along the Lower Colorado River and its major tributaries, which have been strongly affected by upstream dams, flow alterations, channel modification, and clearing of land for agriculture (Ohmart 1994, pp. 273–285). As habitat has declined, cuckoo numbers have likely declined, as has been documented for the lower Colorado River (Rosenberg *et al.* 1991, pp. 202–205), and described above for California. Following the high water levels of 1983-1984 and 1986, cuckoo numbers also declined by 70-75 percent on the Bill Williams River delta, which abuts the lower Colorado River (Rosenberg *et al.* 1991, p. 203). Habitat has since recovered on the Bill Williams River delta, but cuckoo numbers remain low (Halterman 1999, p. 1). In some Arizona areas, such as the San Pedro Riparian National Conservation Area along about 40 mi (65 km) of the upper San Pedro River, ongoing conservation efforts may improve habitat conditions for the species. The species is considered a Species of Concern by the Arizona Game and Fish

Department, a designation that does not provide protection to the species (Corman 1999, p. 1). One hundred and sixty-eight cuckoo pairs and 80 single birds were located in Arizona in 1999, based on preliminary results from a state-wide survey which covered 265 miles (mi) (426 kilometers (km)) of river and creek bottoms (Magill 1999, pp. 1–2). From these results, it is evident that cuckoo numbers in 1999 were substantially less than some previous estimates for Arizona, including a 1976 estimate of 846 pairs for the lower Colorado River and five major tributaries 1976 (Groschupf 1987, pp. 20–28). In 2006, surveys were conducted at various sites throughout the Lower Colorado River Multi-Species Conservation Plan Boundary area for the yellow billed cuckoo (Johnson *et al.* 2007, pp. 1–220). Thirteen areas were surveyed in Arizona along the Lower Colorado River. In nine of the thirteen areas surveyed, 173 birds were observed (Johnson *et al.* 2007, pp. 31–34). In 2009, surveys were conducted in the Tumacacori National Historic Park to assess the effects of fire damage to riparian broadleaf forest along the Santa Cruz River in 2008 (Krebbs and Moss 2009, pp. 7, 8). Surveys detected an estimated four pairs of birds, but no evidence of nesting, although a nest was located by other researchers working in the area. Presence was not detected in the burn area, where more than 50 percent of the trees were destroyed. Managers are implementing several actions, including restriction of livestock grazing, to meet recommended conservation measures that are expected to slow the decline of the yellow-billed cuckoo, and additional surveys are planned in 2010 (Krebbs and Moss 2009, pp. 7, 8). Additional recent data for Arizona is being compiled by yellow-billed cuckoo working group partners for inclusion in the 2011 report.

Colorado

In Colorado west of the Continental Divide, the species was probably never common (Bailey and Niedrach 1965, pp. 404–406) and is now extremely rare (Kingery 1998, pp. 1–636). The yellow-billed cuckoo is an uncommon summer resident of Colorado. Within the species western DPS west of the Rocky Mountains, yellow-billed cuckoos were found along the Colorado River in Palisade, near Grand Junction (Mesa County) annually through the 1950s and 1960s (Righter *et al.* 2004, pp. 1–214). Cuckoos were also regularly detected as recently as the mid-1980s along the Uncompahgre and Gunnison Rivers near Delta (Delta County) (Rich Levad 2010, p. 1). In 1998, the Colorado Breeding Atlas (1998, pp. 1–636), gave the general status of the yellow-billed cuckoo in Colorado as nearly extirpated in the West with once common eastern populations becoming uncommon to rare. During the 1987 to 1994 period covered by the Atlas, only three cuckoos were recorded on the western slope, with one confirmed nesting observation that occurred along the Yampa River near Hayden in 1988. Other confirmed nesting records (mid-1980s) were associated with outbreaks of caterpillar infestations in box elders in the Four Corners Region/Durango area, although subsequent actions were taken to limit box elder infestations (Colyer 2001, pp. 1-6). National Park Service surveys in southwest Colorado from 1988 through 1995 for the Colorado Bird Breeding Atlas provided no records of yellow-billed cuckoo. In 1998, biologists surveyed 242 mi (389 km) of lowland river riparian habitat along six rivers in west-central Colorado for cuckoos. They found one cuckoo, representing a probable nesting pair (Dexter 1998, p. 3).

Since 2000, detections of yellow-billed cuckoos have been limited in western Colorado, with reports of single yellow-billed cuckoos coming primarily from the Grand Junction area and Mesa County in 2001, 2002, 2005, and 2008, and a report of more than one cuckoo at Orchard Mesa Wildlife Area in 2006 (Arnold 2010, p. 1; Beason 2010, p. 1; Wright 2010, p. 1). Additional reports included a report of a cuckoo along the Gunnison River near Gunnison in 2007 (Hicks 2001, p. 1), and detections by the Rocky Mountain Bird Observatory along the Yampa River near Craig in 2007 and 2008, and in far western Colorado near Nucla in 2005 (Beason 2010, p. 1; Dexter 2010, p. 1). However, consistent cuckoo observations have been recorded at only two locations in the range of the Western Distinct Population Segment of the Yellow-billed Cuckoo in western Colorado. They have been detected annually in the San Luis Valley of south-central Colorado since 2001, where breeding is suspected, but not confirmed (Banks and Lucero 2004, Beason 2010, p.1). Since 2003 they have also been detected annually at the North Fork of the Gunnison River (North Fork River) valley of west-central Colorado, where breeding was confirmed in 2008 near Hotchkiss (Delta County). These observations of Yellow-billed Cuckoos represent all credible observations for western Colorado since 2000. Detections in Delta County and, near Craig and Nucla in 2008 resulted from surveys completed by the Rocky Mountain Bird Observatory in five western Colorado counties. However, surveys repeated in two of the counties in 2009 failed to detect birds. Survey results to date are insufficient to determine population size or trend. In 2010 surveys are planned for Montezuma and La Plata Counties in southwest Colorado (Beason 2010, pp. 1, 2).

Wyoming

Wyoming the summer breeding range for the yellow-billed cuckoo appears along the boundary between the eastern and western population segments of the species, with the western DPS occurring on the western side of the Rocky Mountains along the Lower Green River Basin from the Seedskafee National Wildlife Refuge to the Flaming Gorge Reservoir and west to the Bear River Drainage. Prior to 2001, the distribution of summer records of yellow-billed cuckoos from the Wyoming Natural Heritage Database showed a few scattered sightings, with potentially three records from the western range. Although breeding habitat is limited, most riparian habitat is located along rivers east of the Rocky Mountains (Bennett and Keinath 2001, pp. 3 – 5, 8, 9). In 2005 survey routes were located on the Green River. One of the routes was surveyed in 2006, but no cuckoos were detected although one cuckoo was reported downriver from the surveyed transect, at the Seedskafee National Wildlife Refuge. No other recent surveys have occurred to date (Orabona 2010, p. 2,3).

Montana

There are very limited data for the area west of the Continental Divide in Montana. Three specimens of the yellow-billed cuckoo have been collected since the early 1960s, and there are few recorded sightings of the yellow-billed cuckoo since the early 1900s (Saunders 1921, p. 174). Local records for the species around the Flathead River area are scarce. A few records indicate that yellow-billed cuckoos do occur in this area, but no confirmed breeding information exists (Lenard 2001, pp. 1–3). Yellow-billed cuckoos may be seen locally in the southern portion of the

state along the larger stream corridors that run from Montana into northeastern Wyoming (Nordstrom 2001, p. 1).

Idaho

In Idaho, the species was considered a rare and local summer resident (Burleigh 1972, p. 159) with only three records for the State over the previous 100 years. In northern and central Idaho, there are only four records of yellow-billed cuckoo over the last century. The most recent record for this area comes from the S. Fork of the Snake River in 1992 (Stephens and Sturts 1997, p. 36). In southwestern Idaho, the yellow-billed cuckoo has been considered a rare, sometimes erratic, visitor and breeder in the Snake River valley. Numerous sightings have been recorded in the southwestern part of the state during the past 25 years. The yellow-billed cuckoo appears to be hanging on precariously in Idaho and could easily become extirpated from the State in the near future. Therefore, available information is inadequate to judge population or distributional trends. The breeding population in Idaho is likely limited to a few breeding pairs at most. A recent survey of yellow-billed cuckoo continues to show the majority of sightings are in the Snake River corridor in southeast Idaho with other areas where the cuckoo has been historically observed having few if no sightings (Reynolds and Hinckley 2004, pp. 6–7). However, a survey in 2009 located a singing male in a location that was previously unknown, and additional surveys in Idaho are planned for 2010, (Carlisle 2010, p. 2, 3).

New Mexico

In New Mexico, the species is found in riparian zones with dense understory vegetation, most commonly in the south and along major drainages (New Mexico Partners in Flight 2007, pp. 1–5). The species was historically rare Statewide, but common in riparian areas along Pecos and Rio Grande, as well as uncommon to common locally along portions of the Gila, San Francisco and San Juan rivers (Bailey 1928, pp. 307–309; Hubbard 1978, p. 32). Current information is inadequate to judge trends, but the species was fairly common in the mid-1980s along the Rio Grande between Albuquerque and Elephant Butte Reservoir, and along the Pecos River in southeastern New Mexico. Numbers may have increased there in response to salt cedar (*Tamarix* spp.) colonization of riparian areas formerly devoid of riparian vegetation (Howe 1986, pp. 12–13). A review on the status of the species in New Mexico concluded that the species would likely decline in the future due to loss of riparian woodlands (Howe 1986, pp. 14–15). In the eastern third of the state, nonnative salt cedar has provided habitat for approximately 1000 pairs of yellow-billed cuckoos in historically unforested areas. The broad-scale clearing of exotic vegetation, such as salt cedar along the Pecos River, will likely result in additional loss of nesting habitat for the yellow-billed cuckoo (New Mexico Partners in Flight 2007, pp. 1–5). In the western portion of the state, damage to native riparian habitat is occurring. Along the Rio Grande, understory is being removed to reduce fire risk, and land is being converted to agriculture. Throughout New Mexico, grazing is impacting the quality of riparian habitat available to yellow-billed cuckoos (Howe 1986, pp. 12–13). Continuing surveys along the Middle Rio Grande are planned for 2010.

Texas

The portion of Texas west of the Pecos River has been identified as within the range of the historic western subspecies (Oberholser and Kincaid 1974, pp. 434–435), but other authors consider birds from this area more similar to eastern cuckoos (Hughes 1999, pp. 4–5). The species still occurs in this area but information on its conservation status is lacking (Groschupf 1987, p. 30). Population reports of the yellow-billed cuckoo in the Trans-Pecos area of western Texas near Big Bend National Park support scattered populations of yellow-billed cuckoo (Wauer 1971, pp. 18, 27). These populations tend to be associated with areas of springs and developed wells or earthen ponds supporting mesic vegetation such as cottonwood and willow. The bird checklist of Guadalupe Mountains National Park on the New Mexico border lists the yellow-billed cuckoo as a rare summer and fall breeder. Yellow-billed cuckoo population trends from 1966 to 1998 for the entire state of Texas are showing a decline (U.S. Geological Survey-Biological Resources Division 1999, p. 1). Yellow-billed cuckoo call studies from the University of Texas at El Paso, conducted from 1988 to 1998, found a significant decline in response calls over numerous sites in southern New Mexico and western Texas. Average response percentages went from 30 percent in 1988 to 5 percent in 1998. The study concluded that the yellow-billed cuckoo is a rare and highly vulnerable species in the Rio Grande Valley of Southern New Mexico and extreme west Texas (Sproul 2000, p. 5). The Texas Parks and Wildlife Department (TPWD) currently does not separate the eastern and western populations of the yellow-billed cuckoo and identifies the species as globally abundant and State secure since the State ranking was last revised in 1994. However, subsequent publications by the TPWD indicate the species is becoming increasingly rare and declining due to urban development and reduction of habitat (Shackelford and Lockwood 2000, p. 1). The species has been thought to be fairly common at elevations of 3,000–7,500 ft (900–2,200 m) in El Paso, Hudspeth, Culberson, and Presidio Counties; and widespread and uncommon to common in central and eastern Texas (Oberholser and Kincaid 1974, pp. 434–435; Rappole and Blacklock 1994, pp. 125–126), although Peterson and Zimmer (1998, p. 66) reported that the yellow-billed cuckoo might be declining due to habitat destruction in El Paso County.

Utah

In Utah, the species was historically uncommon to rare along river bottoms. There are at least two recent breeding records (Ouray National Wildlife Refuge on the Green River, and the Matheson Wetland Preserve near Moab) and reports from at least five other areas where breeding has been suspected (Owens 1998, pp. 3–6). Recent avian surveys of riparian habitats within the historic range (the Salt Lake Valley) recorded three cuckoos in 7,000 survey hours (Owens 1998, pp. 3–6). Threats to yellow-billed cuckoos and their habitat along the Green River in Utah include habitat loss and fragmentation from flooding and dewatering, encroachment by nonnative tamarisk, grazing, and oil and gas development (Howe and Hanberg 2000, p. 1.7). Management of flow regimes was identified as a major impact on habitat with extremely high flows removing habitat and extended periods of low flows likely drying up yellow-billed cuckoo habitat which could result in the loss of suitable habitat and invasion by tamarisk. Cattle grazing has also been identified as a possible threat to patches of yellow-billed cuckoo habitat by contributing to the

loss of subcanopy vegetation and cottonwood regeneration by grazing and trampling. Another potential threat to yellow-billed cuckoo habitat was attributed to recreational impacts by river users (e.g., use of cottonwood stands for campsites and “lunch spots”). The Utah Division of Wildlife Resources (1998, p. 10) stated that the yellow-billed cuckoo is threatened by habitat loss from agricultural, water, road and urban development, and has declined significantly across its range.

Nevada

The historic status of the yellow-billed cuckoo in Nevada is poorly documented although there is evidence it was nesting in western Nevada along the lower Truckee and Carson Rivers and in southern Nevada along the Colorado and Virgin Rivers (Linsdale 1951, p. 235; Neel 1999, pp. 118–120). The only set of persistent sightings along the Carson River occurred on portions near Lahontan Reservoir (Neel 1999, pp. 118–120), where the persistent sightings of single birds year after year suggested long-term occupancy for the period from 1986–1997, although limited information was found after that period (Tomlinson 2010, p. 1). Surveys using call-playback techniques were completed along the Truckee, Carson, and Walker rivers in the early 1970s. In surveys of the six remaining habitats able to support yellow-billed cuckoos, as described by Gaines (1974a, p. 206), no birds were heard or seen (Oakleaf 1974, pp. 18–19). Early documentation of yellow-billed cuckoo nesting in Nevada was a pair at Beaver Dam Wash, Lincoln County in 1979 (Neel 1999, p. 119). Between 1990 and 1999, Neel (1999, p. 119) reported only sporadic sightings of single birds throughout the State.

Beginning in 2000, annual survey efforts became more consistent in the southern portion of the state. The Nevada Division of Wildlife (NDW) (2001, pp. 1–8) conducted surveys in 2000 in southern Nevada and documented 19 yellow-billed cuckoos, comprising 4 pairs and 11 unpaired birds with no nests being found. NDW surveys in 2000 and 2001 detected more birds (19 and 28, respectively) than in succeeding years, with a general decline in detections from 2002 to 2009, although lack of access to private lands may have factored in results (Tomlinson 2010, p. 1). Surveys conducted at the Warm Springs Natural Area on the Muddy River documented a nesting record for the species in 2000, but also indicated a general decline in bird numbers from 2002 to 2009 (Tomlinson 2010, p. 1). Surveys conducted by the San Bernardino County Museum at sites along the Virgin and Muddy Rivers between 2000 and 2007 provided total detections of 6 and 10 in 2000 and 2001, respectively, total detections between 0 and 3 from 2002 to 2005, 6 and 12 detections in 2006 and 2007, respectively, and 3 detections in 2008 (Braden et al. 2009, pp. 1–58), although the number of sites surveyed generally increased in the last four years. These surveys were resumed by the Southern Sierra Research Station in 2009 and detected one bird at each of two locations; Pahranaagat Valley and the Key Pittman Wildlife Area (Tomlinson 2010, p. 2). In 2006, surveys were conducted for the yellow billed cuckoo at four Nevada sites within the Lower Colorado River Multi-Species Conservation Plan Boundary area (Johnson *et al.* 2007, pp. 1–220), resulting in detection of eight birds (Johnson *et al.* 2007, pp. 13-16). Fairly extensive surveys of potential habitat at the Ash Meadows NWR resulted in detection of single cuckoos in 2008 and 2009 (Tomlinson 2010, p. 2).

Suitable habitat for the yellow-billed cuckoo is very limited in Nevada due to the fragmentation of most areas of cottonwood riparian forests (Nevada Division of Wildlife 2001, pp. 1–8). National Park Service studies from Great Basin National Park (National Park Service 2001, pp. 1-2) in the South Snake Mountain Range determined that of the 469 ac (190 ha) of existing riparian habitat only 8 ac (3.2 ha) was suitable for supporting yellow-billed cuckoo. Most of the suitable habitat along the Truckee, Carson, and Walker rivers has been modified or destroyed (Nevada Division of Wildlife 1985, pp. 1–4 and 1990, pp. 1–2), leaving limited stands of cottonwood and willow. A 145,500 dollar grant from the Service for tribal entities was given in 2005 for restoration activities for a twenty mile stretch of the Truckee River to remove fish barriers and restore riparian habitat (Service 2006, p. 35). The scattered cottonwoods on the Colorado River tributaries (Virgin, Muddy, and Pahrangat) are the last places in Nevada where the yellow-billed cuckoo can reliably be expected to occur (Draft Nevada Comprehensive Wildlife Conservation Strategy 2005, p. 155). However, conservation planning, land acquisition, and riparian restoration efforts currently underway at various sites, including the lower Virgin River, lower Truckee River, Muddy River, Ash Meadows, and Pahrangat Valley are expected to benefit the species in Nevada (Tomlinson 2010, pp. 5–7). Additional surveys will be conducted in 2010: in southern Nevada along the lower Colorado and the Virgin Rivers, in the Pahrangat Valley, and at the Ash meadows National Wildlife Refuge, Warm Springs Natural Area, and several other locations.

Mexico

The yellow-billed cuckoo breeds locally in Mexico and is a widespread transient during migration (Howell and Webb 1995, pp. 346–347). The species has been recorded as a summer resident (presumably breeding) locally within several regions of Mexico, including the state of Baja California Sur; northwest Mexico from Sonora and Chihuahua south to Zacatecas; northeast Mexico on the Atlantic slope from Coahuila to Tamaulipas; and in the northern Yucatan Peninsula (Howell and Webb 1995, pp. 346–347). The species has been recorded as locally common in the State of Sonora (Russell and Monson 1998, p. 131). Surveys of 16 secondary watersheds (4 primary watersheds) in northern Sonora between 2000 and 2007 indicated that the yellow-billed cuckoo was rare or uncommon in all but one secondary watershed. In one watershed the species had been observed in earlier studies, but was not observed during the 2000–2007 study (Flesch 2008, p. 35). Within these watersheds, broadleaf and riparian woodland and gallery forest occurred along valleys bottoms and in canyons. Although large areas of the Sonora-Arizona borderlands are managed with conservation objectives, significant threats to riparian areas exist due to agriculture, loss of groundwater, and unsustainable grazing practices. Cottonwood forests along have been declining along the Magdalena River, while riparian forests throughout much of the Santa Cruz Valley have been highly degraded and are also declining locally along the Altar River (Flesch 2008, p. 29, 32, 44). The Fish and Wildlife Service has also conducted yellow-billed cuckoo and riparian bird surveys in Sonora (Mesta 2010, p. 1); compiled results are expected for the 2011 assessment.

Range East of Continental Divide (outside the range of the western DPS)

In the United States east of the Rocky Mountains, the yellow-billed cuckoo is uncommon to common as a breeding bird. The species' habitat in this region, riparian and other broad-leaved woodlands (Ehrlich *et al.* 1988, p. 286), occupies a significant area of the region (Service 1981, p. 6). This is in sharp contrast to the west; where suitable habitat is limited to narrow and often widely separated riparian zones that occupy a fraction of 1 percent of the western landscape (Service 1981, p. 6; Knopf and Samson 1994, p. 670). Trend data based on detections by the Breeding Bird Survey (BBS) program (BBS 1999, pp. 1–7) indicate significant population declines between 1966 and 1996 in 12 of 29 eastern and central States; the average annual decline during this period was 1.9 percent. Most of these declines have occurred since 1980. The average number of detections of cuckoos increased in these 29 States for the interval from 1966 to 1979; however, the average number of detections decreased in all 29 States between 1980 and 1996. In 15 of these States, the decline between 1980 and 1996 is statistically significant, and the average annual decline during this period was 2.8 percent. Trends vary widely between states, ranging from a decline of 15.8 percent (Connecticut, 1966-1996) to an increase of 17 percent (Nebraska, 1966-1979). Bird survey data are insufficient to evaluate population trends in regions west of the Continental Divide, but for two Service regions that span both sides of the Divide, the BBS data indicate declines of 2.7 percent in Region 2 (Arizona, Oklahoma, Texas, and New Mexico; 1980-1996), and 4.7 percent in Region 6 (Kansas, Nebraska, the Dakotas, Montana, Colorado, Utah, and Wyoming; 1980-1996).

(Range map follows):



Legend
 — Rivers
 — Lakes
 — DPS Boundary Line

**Yellow-Billed Cuckoo
 Delineation of Eastern and Western
 Distinct Population Segments**

USFWS Sacramento Fish and Wildlife Office
 June 2001 (Recreated April 2009)



File Name: N:_YBCU_DPS_Boundary_(Albers).mxd

Population Estimates/Status

Since 1980, state-wide surveys from New Mexico, Arizona, and California, indicate an overall estimated 52 percent decline with numbers too low to establish trends from Idaho, Montana, Utah, Nevada and Colorado. Trend information is also lacking from west Texas and Mexico. However, we believe yellow-billed cuckoos exist in large enough numbers to be surveyed. The yellow-billed cuckoo has been extirpated as a breeding bird in Washington, Oregon, and British Columbia. Studies in California along the Sacramento River were initiated by the Service in 2008 to determine presence, abundance and habitat use by the yellow-billed cuckoo in the Sacramento Valley. The information gathered during these studies is still under analysis and no results have been finalized. A final report is expected in December of 2010.

DISTINCT POPULATION SEGMENT (DPS)

Pursuant to the Act, we must consider for listing any species, subspecies, or, for vertebrates, any distinct population segment (DPS) of these taxa if sufficient information indicates that such action may be warranted. The Service along with NOAA Fisheries adopted the interagency policy and published it in the **Federal Register** on February 7, 1996 (61 FR 4722). The policy allows for more refined application of the Act that better reflects the biological needs of the taxon being considered, and avoids the inclusion of entities that do not require its protective measures. Under our DPS policy, three elements are considered in a decision regarding the status of a possible DPS as endangered or threatened under the Act. These are applied similarly for additions to the list of endangered and threatened species, reclassification, and removal from the list. They are: (1) Discreteness of the population segment in relation to the remainder of the taxon; (2) the significance of the population segment to the taxon to which it belongs; and (3) the population segment's conservation status in relation to the Act's standards for listing (i.e., is the population segment, when treated as if it were a species, endangered or threatened?). A systematic application of the above elements is appropriate, with discreteness criteria applied first, followed by significance analysis. Discreteness refers to the isolation of a population from other members of the species and we evaluate this based on specific criteria. We determine significance by using the available scientific information to determine the DPS's importance to the taxon to which it belongs. If we determine that a population segment is discrete and significant, we then evaluate it for endangered or threatened status based on the Act's standards.

Discreteness

Under our Policy Regarding the Recognition of Distinct Vertebrate Population Segments, a population segment of a vertebrate species may be considered discrete if it satisfies either one of the following conditions: (1) It is markedly separated from other populations of the same taxon as a consequence of physical, physiological, ecological, or behavioral factors. Quantitative measures of genetic or morphological discontinuity may provide evidence of this separation; and (2) It is delimited by international governmental boundaries within which differences in control of exploitation, management of habitat, conservation status, or regulatory mechanisms exist that are significant in light of section 4(a)(1)(D) of the Act.

Below, we address under our DPS policy the population segment of yellow-billed cuckoos that occurs in the western United States. The area for this DPS would be the area west of the crest of the Rocky Mountains. For the northern tier of Rocky Mountain states (Montana, Wyoming, northern and central Colorado), the crest coincides with the Continental Divide. In the southern Colorado and New Mexico the crest coincides with the eastern boundary of the upper Rio Grande drainage, including the Sangre de Cristo Mountains and excluding the drainage of the Pecos River. In west Texas the DPS boundary is the line of mountain ranges that form a southeastern extension of the Rocky Mountains to the Big Bend area of west Texas, and which form the western boundary of the Pecos River drainage. The DPS for the yellow-billed cuckoo is based primarily on the first of the two conditions cited above; the population segment is markedly separated from other populations. In addition, the northern and southern boundaries of the proposed DPS are the international boundaries with Canada and with Mexico since the DPS policy allows us to delimit the boundaries of a DPS along international boundaries.

We recognize that cuckoos within the described DPS are not wholly isolated from eastern cuckoo populations by the Rocky Mountain crest in west Texas, and to a lesser extent, further north. As discussed above, morphologic data and recent genetic data do not support separation of the yellow-billed cuckoo into eastern and western subspecies. Our DPS policy explicitly states that complete reproductive isolation is not required to recognize discreteness of a DPS, and DPS recognition can be appropriate where differences between populations are not sufficiently large to merit recognition of subspecies.

Yellow-billed cuckoos breed on both sides of the crest of the Rocky Mountains, where suitable habitat occurs (Johnsgard 1986, pp. 1–504). Although the Rocky Mountains may not wholly prevent movement of cuckoos across the Rocky Mountain crest, the available information indicates that the Rocky Mountains substantially separate cuckoo populations occurring east and west of their crest. Physical factors also interact with ecological factors, as altitudinal, topographic, and climatic factors influence the distribution of suitable habitat for nesting cuckoos.

Along most of the DPS boundary, nesting birds are separated physically from nesting cuckoo populations east of the Rocky Mountains. In the northern Rocky Mountains and northern Great Plains--from the Canada border south through Colorado--the cuckoo is extremely rare and local as a breeding bird (Hughes 1999, p. 3). While the species breeds locally in southeast Montana, southern Idaho, northeast and southwest Wyoming, west Colorado, and Utah), it is quite rare or absent within the higher Rocky Mountains (Hughes 1999, p. 3). An examination of the distributional records for the Rocky Mountain region indicate that within this area of few cuckoos, the species is even more scarce at elevations above approximately 2,000 m (6,700 ft). Most sources describe the species range as extending up to this elevation (often described as occurring in the Sonoran Life Zones in older works) (Bailey 1928, p. 308; Bailey and Niedrach 1965, p. 404; Phillips *et. al* 1964, pp. 1–220; Johnsgard 1986, pp. 1–504; Long 2001, pp. 1–8). Most of the Rocky Mountain crest exceeding 2,000 m (6,700 ft) includes a wide region. In Colorado and Wyoming the region above 2,000 m (6,700 ft) is typically at least 240 km (150 mi) wide on an east-west axis (USGS 1970, p. 59).

Within western Montana and southern Wyoming the crest is less marked. In western Montana, the unoccupied region includes the area west of the Continental Divide, and extends into the panhandle of northern Idaho. The high elevation zone in western Montana narrows to 80 km (50 mi) width and sometimes less, where deep river valleys of the Columbia River drainage cut through the high mountains. However, the scarcity of records from this region indicates that nesting west of the Continental Divide in Montana is at most very limited and sporadic, and the region of effective separation in Montana may be as wide as 800 km (500 mi) ((Hughes 1999, p. 3; Laymon 2000, pp. 1, 29; Hendricks 2001, p. 1). Coupled with the rarity of cuckoos in adjacent areas to the west and east, the available information indicates that the Rocky Mountain region in Montana and northern Idaho forms a wide break between cuckoo populations to the east and west.

The band of unoccupied habitat in Wyoming includes Park, Fremont, western Hot Springs, and central and eastern Sweetwater counties (Deibert 2001, p. 2). In southern Wyoming, the crest of the Rocky Mountains dips to near 2,300 meters (7,500 feet) to the southeast of the Wind River Range. In this area, the Great Divide Basin forms a high, internal basin which separates the Snake River drainage from the Missouri River drainage. This basin, while not a physical barrier topographically, it is a high desert lacking in cuckoo habitat (Deibert 2001, p. 1). The basin consists mostly of rolling plains, extensive playas and dune fields that receives 2.25 cm (0.8 in.) of precipitation annually (Reiners and Thurston 1996, pp. 11, 14). Although this lower area may be less of a physical barrier to birds, reported yellow-billed cuckoo sites to the east and west in this area are separated by about 240 km (150 mi) of similar unsuitable habitat, as is true for the rest of the Rocky Mountain crest from the Montana to Colorado border (Reiners and Thurston 1996, pp. 10–15; Wyoming Game & Fish 2001, pp. 2–3). Therefore, we find that the appropriate DPS boundary is that which encompasses the Snake River basin, which is, following the southern and western edge of the Great Divide Basin.

In Colorado, the band of high-elevation is over 150 km (100 mi) wide along the entire north-south axis of the Rocky Mountains. The available data indicate that cuckoos do not nest within this broad highlands region, and reveal few records of cuckoos at all in the mountainous region of the state; as noted above, the species was probably never common and is now extremely rare (Bailey and Niedrach 1965, pp. 404–406; Kingery 1998, pp. 204–205). Based on the available information, the Rocky Mountains in Colorado form a substantial break between cuckoo populations east and west of the crest, a break which is accentuated by the species current extreme rarity in Colorado west of the Great Plains.

The separation of western and eastern populations of yellow-billed cuckoo continues south along the Rocky Mountain crest into Southern Colorado, eastern New Mexico and southwest Texas, terminating at the Rio Grande River in the Big Bend National Park. Thus, the western yellow-billed cuckoo DPS includes the upper and middle portions of the Rio Grande hydrological basin, and excludes the Pecos River drainage.

The inclusion of the Rio Grande basin within the DPS deviates from the rest of the DPS in that it includes an area, which drains to the Gulf of Mexico, but is consistent in several other respects.

First, it follows the crest of the southeastern extent of the Rocky Mountains. This crest includes highlands above 2,000 m (6,700 ft) which separate the Rio Grande and Pecos River drainages for all of New Mexico except in the extreme south. Cuckoos are limited to nesting in riparian areas at lower to middle elevations, and thus the crest is expected to separate eastern and western populations here as it would further north. Second, ecologically, the portion of the Upper Rio Grande basin with the DPS has greater affinity with the western United States than with the area east of the Rocky Mountains (Graham 1992, pp. 23, 83; U.S. North American Bird Conservation Initiative (NABCI) 2000, pp. 17–21; Pashley *et al.* 2000, pp. 65, 75), whereas regions east of the DPS (lower Rio Grande) have greater affinity for the Great Plains and other eastern ecological regions. The riparian habitats in the Upper Rio Grande of New Mexico and west Texas are similar to those occupied by cuckoos in other western regions, being dominated by Fremont cottonwood and willows, whereas most cuckoo habitat along the Pecos River in New Mexico historically lacked cottonwood forests, and today is dominated by non-native tamarisk trees (Howe 2004, pp. 1–6; Hunter *et al.* 1988, pp. 113–114; Ellis 1994, pp. 339–341). For these reasons, the crest of the Rocky Mountains presents a clearer geographic and biologic separation in New Mexico and west Texas, than does the continental divide.

In the western Great Plains, yellow-billed cuckoos nest in riparian corridors that extend westward towards the Rocky Mountains along watercourses draining into the Missouri and Mississippi rivers. These corridors no doubt lessen the separation of eastern and western cuckoos by providing corridors across otherwise unsuitable habitat in the Great Plains. The taxonomic identity of yellow-billed cuckoos nesting along the eastern edge of the Rocky Mountains from central Montana south to eastern New Mexico throughout this area have traditionally been attributed to eastern cuckoo origins (Bailey and Niedrach 1965, p. 404; Laymon 2000, p. 1). Not all evidence supports this view; recent data from an ongoing study suggests that cuckoos from the South Platte River in Nebraska may be more similar to western cuckoos based on morphologic measurements (Scharf 2001, p. 3). As already noted, however, the crest of the Rocky Mountains still presents a wide band of unsuitable habitat between Great Plains cuckoos and cuckoos in the western DPS.

In west Texas and southern New Mexico, the physical separation is less marked, where the Rocky Mountains become a series of relatively low, isolated ranges within a high plateau, stretching between the Guadalupe Mountains on the Texas-New Mexico border to the Chisos Mountains in the Big Bend National Park, on the border with Mexico. In this region the DPS boundary and the separation between eastern and western birds may be less complete than for the rest of the DPS. Our 90-day administrative finding noted the lack of a barrier between the Rio Grande and Gila River drainages in southern New Mexico. This problem is addressed by the DPS boundary, which includes both of these drainages, for reasons described above. The affinity of cuckoos from west Texas is still problematic, however, in that the Pecos River drainage is not strongly separated from the Rio Grande drainage upstream of the Big Bend, and cuckoo movement and interchange across the DPS boundary is expected to be greater in this region than along the rest of the DPS boundary. Such interchange and resulting diffusing of differences may be the reason why west Texas cuckoos have been reported to be morphologically aligned with eastern cuckoo populations (Hughes 1999, pp. 4–5) and with western cuckoos. The majority of

the available information, including timing of nesting, indicates that birds from Texas west of the Pecos River and from the Big Bend upstream exhibit greater similarity to western cuckoos (Wauer 1973, p. 96; Oberholser and Kincaid 1974, pp. 434–435; Franzreb and Laymon 1993, pp. 17–26). Considering these factors along with the information on physical factors, we have included west Texas within the western DPS. This inclusion would be reconsidered during preparation of a listing proposal, should new information become available.

In our 90-day administrative finding (**Federal Register** (65 FR 8104-8107) February 17, 2000), we discussed the fact that the cuckoo is a mobile species, migrating to South America during the non-breeding season. This mobility raises the question of whether 150 miles of mountains poses a barrier to movement between populations east and west of the crest of the Rocky Mountains. We are unaware of scientific data which would allow us to directly address the effectiveness of the mountains as a physical separation between cuckoo populations, but some evidence bears on the question. We have already described the observation that a broad area of unsuitable habitat largely separates suitable, occupied habitat east and west of the crest of the Rocky Mountains. Also, many other bird species migrate between Central/South America and North America and have maintained discrete populations or subspecies that are separated by the Rocky Mountains (Pitelka 1947, pp. 113–136; Udvardy 1963, pp. 1153–1158; Johnsgard 1986, pp. 10–11).

Data from movements of banded cuckoos provide no evidence of movement between eastern and western cuckoo populations, across the Rocky Mountain crest. We received banding information from the U.S. Geological Survey-Biological Resources Division, Bird Banding Laboratory (BBL). Of a total of 8,673 banded cuckoos, of which 26 bands were recovered, no western birds were found east of the Rocky Mountain crest, nor eastern birds recovered west of the crest. While the data provide no evidence for movement between eastern and western cuckoo populations, the sample size is too small to adequately test the hypothesis that movement is limited between eastern and western regions. Only 251 cuckoos were banded in western states, with only one band recovery. Eight of the 26 recovered birds were found in a state different from where banded. Of these, only one significant displacement occurred on an east to west axis, for a bird banded in Iowa and recovered in Pennsylvania.

The extent to which cuckoos nesting in different regions of North America commingle during migration, or while overwintering, is unknown. Data provided by the U.S. Geological Survey-Biological Resources Division, Bird Banding Laboratory (BBL), from bird band returns to date is insufficient to determine migration or wintering patterns (BBL 1998, pp. 1–3). Some scientists have provided information supporting the hypothesis that yellow-billed cuckoos breeding in the western United States winter in different regions of South America than do cuckoos nesting east of the Rocky Mountains (Ridgely 2000, pers comm.; Hughes 2000, pers comm.; Laymon 2000, pp. 19–20). The fact that statements by several ornithologists favor this hypothesis lends it credence, although the information available is not sufficient to test the hypothesis.

Western cuckoos have historically occurred and/or still occur in several distinct ecoregions including the Great Basin, Sonoran Desert, Sonoran and Mohave Deserts, Northern Pacific Rainforest, Northern Rockies, Southern Rockies/Colorado Plateau, Coastal California, and Sierra

Madre Occidental ecoregions (Graham 1992, pp. 23–27, 84–99; U.S. NABCI 2000, pp. 7, 9, 12, 19–22; Pashley *et al.* 2000, pp. 64–65, 75–79). While these western ecoregions differ in many respects, they are joined by common factors, which also distinguish them from most eastern ecoregions within which yellow-billed cuckoos occur. Foremost among these is the fact that western cuckoo populations, and the vast majority of yellow-billed cuckoos, occur along narrow and patchy riparian corridors which provide relatively suitable moist deciduous woodlands within arid landscapes otherwise dominated vegetation types unable to support cuckoos. By contrast, east of the Rocky Mountains, the yellow-billed cuckoo occurs in extensive bottomland forests in the Mississippi River and other drainages, as well in deciduous woodlands in non-riparian situations, including deciduous forests such as oak hickory forests, parks, and some suburban areas (Wilson 1999, pp. 31–33; Amundson *et al.* 2000, p. 3).

Data collected from publications and other sources demonstrate, to varying degrees of certainty, the existence of morphological, physiological and behavioral differences between eastern and western yellow-billed cuckoos exist.

Based on the available information, the best evidence of behavioral/physiological differences between cuckoo populations west and east of the Rocky Mountain crest is differences in the timing of arrival during the spring migration, and the timing of nesting. Several authors have observed that western cuckoos arrive and nest substantially later than do eastern cuckoos (Franzreb and Laymon 1993, pp. 24–26; Hughes 1999, pp. 5–6; Laymon 2000, pp. 15–17), while an Arizona study found less of a pattern, but noted that Arizona cuckoos appeared to nest several weeks later than California cuckoos (Hamilton and Hamilton 1965, pp. 427–429). Franzreb and Laymon (1993, pp. 24–26;) and Hughes (1999, pp. 5–6) concluded that the nesting season in western states begins a full three to four weeks later than it does east of the Rocky Mountains, and that western cuckoos arrive on their breeding grounds four to eight weeks later than do eastern cuckoos at similar latitudes. One scientist has also suggested that breeding season of western birds is shorter than for eastern birds, due to later spring arrival and earlier fall departure, and that is evidence of evolved behavioral differences between eastern and western cuckoos (Hughes 2000, pers comm.).

We have conducted our own analysis of the timing of arrival on breeding grounds and conclude that there is at least a three to four week difference in the peak of migration and onset of nesting season with eastern yellow-billed cuckoos being the earliest (Franzreb and Laymon 1993, pp. 24–26; Hughes 1999, pp. 5–6; Laymon 2000, pp. 15–17). In our 90-day finding published February 17, 2000, in the **Federal Register** (65 FR 8104-8107), we speculated that differences in timing of arrival on breeding grounds and in breeding could be the result of genetically-similar birds responding to local environmental cues. We believe this remains as one hypothesis for timing of breeding, although the difference could also reflect genetic-based differences. In the case of timing of arrival on breeding grounds, comments received in response to the 90-day finding (Laymon 2000, pp. 15–17; Hughes 2000, pers comm.; Amundson *et al.* 2000, p. 3) provide a persuasive argument that timing of arrival is more likely the result of an evolved response to east-west differences, via mechanisms likely under genetic control.

Other behavior differences between cuckoos in the proposed western DPS and eastern cuckoos exist, and provide additional evidence of discreteness. These differences include: Larger egg size and weight (mass in grams) with thicker egg shells in western birds (Hughes 1999, p. 14) which may correlate with potential higher egg water loss from hotter, dryer conditions in the west than the east (Ar *et al.* 1974, pp. 153–158; Rahn and Ar 1974, pp. 147–152).

Eastern juveniles have been reported to have yellow bills (Oberholser and Kincaid 1974, p. 435) while California juveniles western are reported to have all-black bills (Franzreb and Laymon 1993, p. 26). Because bill color in juveniles changes from grayish to yellow and black around the age of 60 days (Hughes 1999, p. 22), this reported difference needs to be verified, taking into account juvenile age.

Western adult cuckoos have been reported to have an orange lower mandible, while eastern adults have a yellow lower mandible (Franzreb and Laymon 1993, p. 26; Laymon 2000, p. 14). Western adults, on average, are larger and heavier than eastern adult birds (Banks 1988, p. 475, 1990, p. 538; Franzreb and Laymon 1993, pp. 19–23; Oberholser and Kincaid 1974, p. 435), and are evidence of some degree of physical isolation, although, as discussed by Banks (1988, pp. 475–476, 1990, p. 538), the differences are not strong, and may be clinal.

From the analysis of two different mtDNA genes (control region and ATP8) totaling 736 base pair sequences, Dr. Fleischer concluded that the mitochondrial DNA results do not support the hypothesis that the western populations of the yellow-billed cuckoo are a separate subspecies from the eastern populations. There were however, significant divergence in haplotype frequencies between eastern and western samples which suggests that they may not currently be exchanging many migrants and that selection of more variable markers with higher mutation rates may reveal significant genetic structure (Fleischer 2001, pp. 15–16).

In view of the above information, and considering that our DPS policy does not require complete barriers, we find that the available information supports the recognition of a western DPS of the yellow-billed cuckoo, as described, based on the physical, ecological, and behavioral discreteness of the population segment.

Significance

If we determine a population segment is discrete, we next consider available scientific evidence of its significance to the taxon to which it belongs. Our policy states that this consideration may include, but is not limited to: 1. Persistence of the discrete population segment in an ecological setting unusual or unique for the taxon, 2. Evidence that loss of the discrete population segment would result in a significant gap in the range of the taxon, 3. Evidence that the discrete population segment represents the only surviving natural occurrence of a taxon that may be more abundant elsewhere as an introduced population outside its historic range, or 4. Evidence that the discrete population segment differs markedly from other populations of the species in its genetic characteristics. We address these significance factors below as they relate to the population

segment of yellow-billed cuckoos that occurs west of the Rocky Mountain crest. We focus primarily on the significant gap in the range of taxon that would result from the loss of this population segment in demonstrating significance of the DPS, and secondarily on ecological setting.

Persistence in an unusual or unique ecological setting

We discussed above the manner in which the western yellow-billed cuckoo DPS differs fundamentally from eastern cuckoos, because of its strong association with non-montane riparian woodlands, contrasting sharply with states east of the Rocky Mountains, where cuckoos nest across a much broader range of habitat conditions. In the western states, the cuckoo occurs primarily in arid regions, where riparian woodlands, particularly those which include cottonwood trees as a dominant, provide ecological conditions which are unique for the region. These conditions are essential to the survival of yellow-billed cuckoo in the west, as well as to the survival of many other riparian-dependent species (Hunter *et al.* 1987, p. 17; Sanders and Edge 1998, pp. 469–470; Knopf and Samson 1994, p. 672).

The western yellow-billed cuckoo populations have persisted over long periods, despite the small number of breeding pairs, which breed in relatively isolated areas. Although site fidelity and dispersal patterns have not been studied, a limited number of banding returns from the cuckoo population on the South Fork Kern River in California indicate that adult birds return to the same nesting areas in subsequent years (Laymon 2000, p. 18). Although the species is reported to have nomadic tendencies (Hughes 1999, p. 5), the repeated return from South America each spring to relatively isolated breeding sites, is strongly suggestive of site fidelity. A scenario of strong breeding site fidelity, and often-isolated breeding population, and combined with most river reaches supporting very few (less than 20) breeding pairs, suggests that local western populations may constitute important isolated units. Under this same scenario, these units may contain important genetic and phenotypic diversity.

Evidence that the discrete population segment differs markedly from other population segments in its genetic characteristics

Many subspecies of birds have their taxonomic origins based on their physical and behavioral differences; however they may not show corresponding significant genetic differences. Among 111 subspecies of song (passerine) birds only 26 percent demonstrated significant genetic differences when using mitochondrial DNA (mtDNA) gene sequence data (Zink *et al.* 2000, p). Dr. Fleischer did not find significant genetic differences among the 66 yellow-billed cuckoos samples from across North America and Mexico to separate western birds from eastern cuckoos at the subspecies level (Fleischer 2001, pp. 15–16).

In a genetic study by the University of Alaska Museum, mtDNA from a 978 base pair section of the cytochrome b gene was analyzed from a substantially small data set of four birds, two of which were vagrants (migrating) from Alaska and two were birds from Minnesota. They found the eastern and western haplotypes differed by five fixed base pair changes and conclude that they diverged 410,000- 460,000 years ago (Pruett *et al.* 2000, p. 230).

Evidence that loss of the discrete population segment would result in a significant gap in the range of the taxon

The potential loss of the western yellow-billed cuckoo population would constitute a significant gap in the range of the yellow-billed cuckoo in the Continental United States in North America. We recognize that this conclusion is contrary to our conclusion drawn in our 90-day findings which was based on: (1) the fact that the species is dependent upon riparian ecosystems in the western United States, and occurs both in riparian ecosystems and other habitats in the eastern United States; and (2) data on the extent of riparian ecosystems, which indicate that the area of potential habitat available to yellow-billed cuckoos west of the continental divide represents less than five percent of the available cuckoo habitat in its United States range. However, excluding Washington and Oregon where the cuckoo has been extirpated already, the western population would represent about 22.5 percent of the species range. Including Washington and Oregon, the proposed DPS would represent about 28 percent of the species range, based on the area of the states where the species occurs or formerly occurred as a breeding bird. We have evaluated all the information available. After consideration of the information, including the ecological distinctness of the western DPS, the western cottonwood-willow riparian woodlands upon which the western DPS depends, and other factors discussed above, we conclude that the loss of the species from the United States west of the Rocky Mountain crest would represent a significant gap in the species range.

Summary of Discreteness and Significance Evaluations

Based on the above consideration of the western U.S. population of the yellow-billed cuckoo's discreteness and its significance to the remainder of the taxon, we find that it is a distinct population segment. The population's discreteness is due to its separation from other populations of the same taxon as a consequence of physical factors, banding return information, as well as ecological, physiological, behavioral, morphological, biogeographical patterns and genetic information and differences from the remainder of the taxon. The population segment's significance to the remainder of the taxon is due principally to the significant gap that its loss would represent in the range of the taxon and also on ecological setting with western cuckoos having a strong association with non-montane riparian woodlands.

THREATS

A. The present or threatened destruction, modification, or curtailment of its habitat or range.

Principal causes of riparian habitat losses are conversion to agricultural and other uses, dams and river flow management, stream channelization and stabilization, and livestock grazing. Available breeding habitats for cuckoos have also been substantially reduced in area and quality by groundwater pumping and the replacement of native riparian habitats by invasive non-native plants, particularly tamarisk (Groschupf 1987, p. 29; Rosenberg *et al.* 1991, pp. 18–23). Estimates of riparian habitat losses include 90-95 percent for Arizona, 90 percent for New

Mexico, 90-99 percent for California, and more than 70 percent nationwide (Ohmart 1994, pp. 276–281; U.S. Department of Interior (DOI) 1994, p. 215; Noss *et al.* 1995, pp. 37, 46). Much of the remaining habitat is in poor condition and heavily affected by human use (Almand and Krohn 1978, p. 359; U.S. Department of Interior 1994, p. 215). Fragmentation effects include the loss of patches large enough to sustain local populations, leading to local extinctions, and the potential loss of migratory corridors, affecting the ability to recolonize habitat patches (Hunter 1996, pp. 179–187).

Dahl (1990, p. 6) reviewed estimated losses of wetlands between 1780 and the 1980s in the Southwest: California is estimated to have lost 91 percent, Nevada 52 percent, Utah 30 percent, Arizona 36 percent, New Mexico 33 percent, and Texas 52 percent. As much as 90 percent of major lowland riparian habitat has been lost or modified in Arizona (State of Arizona 1990, p. 4). Franzreb (1987, p. 4) noted that “[B]ottomland riparian forests are the most highly modified of natural landscapes in California.”

Much of the catastrophic decline of the cuckoo in California has been directly attributed to breeding habitat loss from clearing and removal of huge areas of riparian forest for agriculture, urban development and flood control (Gaines 1974b, pp. 2–4; Gaines and Laymon 1984, p. 73; Laymon and Halterman 1987b, p. 19; Launer *et al.* 1990, p. 3; Hughes 1999, p. 4). Losses in the Central Valley alone have been huge, especially along the Valley’s formerly free-flowing rivers such as the Sacramento, where under pristine conditions, broad overflow plains and dense riparian forests extended for up to 4 mi (6 km) from both banks (Thompson 1961, p. 307; Franzreb 1987, p. 4). Katibah (1984, pp. 26–27) estimated the presettlement riparian vegetation for the entire Central Valley at more than 373,000 ha (924,000 ac), and that as of 1979, about 41,300 ha (102,000 ac) of riparian forest remained in the Central Valley, an 87 percent loss. Of the remaining habitat approximately 85 percent is considered in a disturbed or degraded condition (Katibah 1984, pp 26–27). Similar losses of riparian habitat have been documented throughout the U.S. (Noss *et al.* 1977, pp. 37, 46).

A recent study of the San Joaquin River between Friant Dam and Merced River confluence found that between 1937 and 1993, the area of riparian forest and scrub decreased 28 percent, from 6,787 to 4,914 ac (2,727 to 1,989 ha) and the herbaceous riparian vegetation decreased from 4,076 to 780 ac (1,650 to 316 ha) (Jones and Stokes Associates, Inc. 1998, p. 5-1).

Suitable habitat for the yellow-billed cuckoo is very limited in Nevada with most areas of cottonwood riparian forests being fragmented (NDW 2001, pp. 2–8). National Park Service studies from Great Basin National Park (National Park Service 2001, pp. 1–2) in the South Snake Mountain Range determined that of the 469 ac (190 ha) of existing riparian habitat only 8 ac (3.3 ha) was suitable for supporting yellow-billed cuckoo. Most of the suitable habitat along the Truckee, Carson, and Walker rivers has been modified or destroyed (NDW 1990, pp. 1–2 and 1985, pp. 1–4).

Loss and modification of southwestern riparian habitats have occurred from urban and agricultural development, water diversion and impoundment, channelization, livestock grazing, off-road vehicle and other recreational uses, and hydrological changes resulting from these and other land uses. Rosenberg *et al.* (1991, p. 33) noted “it is the cottonwood-willow plant community that has declined most with modern river management.” Loss of the cottonwood-willow riparian forests has had widespread impact on the distribution and abundance of bird species associated with that forest type (Hunter *et al.* 1987, pp. 10–18; Hunter *et al.* 1988, p. 113; Rosenberg *et al.* 1991, pp. 31–34).

Overuse by livestock has been a major factor in the degradation and modification of riparian habitats in the western United States. The effects include changes in plant community structure and species composition and in relative abundance of species and plant density. These changes are often linked to more widespread changes in watershed hydrology (Rea 1983, p. 40; Belsky *et al.* 1999, pp. 419–431). Livestock grazing and other alterations in stream flow in riparian habitats typically results in reduction of plant species diversity and density, especially of palatable broadleaf plants like willows and cottonwood saplings, and is one of the most common causes of riparian degradation (Carothers 1977, p; Rickard and Cushing 1982, pp. 2–4; Cannon and Knopf 1984, p. 236; Klebenow and Oakleaf 1984, p. 202; Clary and Webster 1989, pp. 1–2; Schultz and Leininger 1990, pp. 298–299; Bock *et al.* 1993, p. 300).

Increases in abundance of riparian bird species have followed reduction, modification, or removal of cattle (*Bos* sp.) grazing. Krueper (1993, pp. 322–323) found the following increases in birds associated with cottonwood-willow habitat on Arizona’s San Pedro River 4 years after the removal of livestock: yellow warbler - 606 percent; common yellow-throat (*Geothlypis trichas*) - 2,128 percent; yellow-breasted chat (*Icteria virens*) - 423 percent. Bock *et al.* (1993, pp. 300–301) found that 40 percent of the riparian bird species they examined were negatively affected by livestock grazing.

The Service believes that documentation of livestock impacts on willow flycatcher subspecies is relevant to yellow-billed cuckoo because linear riparian habitats in the arid range of the yellow-billed cuckoo are especially vulnerable to fragmentation and destruction by livestock. As shady, cool, wet areas providing abundant forage, they are disproportionately preferred by livestock over the surrounding xeric uplands (Ames 1977, p. 49; Valentine *et al.* 1988, p. 111; Johnson 1989, pp. 38–39). Harris *et al.* (1986, p. 22) believed that termination of grazing along portions of the South Fork of the Kern River in California was responsible for increases in riparian vegetation.

Another likely factor in the loss and modification of the yellow-billed cuckoo is the invasion by the exotic tamarisk (*Tamarisk* sp.). Tamarisk was introduced into western North America from the Middle East in the late 1800s as an ornamental windbreak and for erosion control. It has spread rapidly along southwestern watercourses, typically at the expense of native riparian vegetation, especially cottonwood/willow communities. Although tamarisk is present in nearly every southwestern riparian community, its dominance varies. It has replaced some communities entirely, but occurs at a low frequency in others.

The spread and persistence of tamarisk has resulted in significant changes in riparian plant communities. In monotypic tamarisk stands, the most striking change is the loss of community structure. The multi-layered community of herbaceous understory, small shrubs, middle-layer willows, and over-story deciduous trees is often replaced by one monotonous layer. Plant species diversity has declined in many areas and relative species abundance has shifted in others. Other effects include changes in percent cover, total biomass, fire cycles, thermal regimes, and perhaps insect fauna (Kerpez and Smith 1987, pp. 1–5; Rosenberg *et al.* 1991, pp. 18–23; Busch and Smith 1993, pp. 186–194).

Disturbance regimes imposed by humans (*e.g.*, grazing, water diversion, flood control, woodcutting, and vegetation clearing) have facilitated the spread of tamarisk (Kerpez and Smith 1987, pp. 1–5; Hunter *et al.* 1988, p. 113; Rosenberg *et al.* 1991, pp. 18–23). Cattle find tamarisk unpalatable. However, they eat the shoots and seedlings of cottonwood and willow, acting as a selective agent to shift the relative abundance of these species (Kerpez and Smith 1987, pp. 1–5). Degradation and, in some cases loss of native riparian vegetation, lowered the water table and resulted in the loss of perennial flows in some streams. With its deep root system and adaptive reproductive strategy, tamarisk thrives or persists where surface flow has been reduced or lost. Further, tamarisk establishment often results in a self-perpetuating regime of periodic fires, which were uncommon in native riparian woodlands (Busch and Smith 1993, pp. 186–194).

Manipulation of perennial rivers and streams has resulted in habitats that tend to allow tamarisk to out-compete native vegetation. Construction of dams created impoundments that destroyed native riparian communities. Dams also eliminated or changed flood regimes, which were essential in maintaining native riparian ecosystems (Vogl 1980, pp. 84–86; Rosenberg *et al.* 1991, pp. 18–23). Changing (usually eliminating) flood regimes provided a competitive edge to tamarisk. In contrast to native phreatophytes, tamarisk does not need floods and is intolerant of submersion when young (Kerpez and Smith 1987, pp. 1–5). Diversion of water caused the lowering of near-surface groundwater and reduced the relative success of native species in becoming established. Irrigation water containing high levels of dissolved salts also favors tamarisk, which is more tolerant of high salt levels than most native species (Kerpez and Smith 1987, pp. 1–5; Busch and Smith 1993, pp. 186–194).

Conversion to tamarisk typically coincides with reduction or complete loss of bird species strongly associated with cottonwood-willow habitat including the yellow-billed cuckoo (Hunter *et al.* 1987; Hunter *et al.* 1988, pp. 118–119; Rosenberg *et al.* 1991, p. 32). While Brown and Trosset (1989, pp. 268–269) believed tamarisk may serve as an “ecological equivalent” to native vegetation, they noted that their study occurred where a tamarisk community became established where no native equivalent existed before. This is especially evident along the Pecos River in Texas (Hunter *et al.* 1988, p. 113).

Water developments also likely reduced and modified yellow-billed cuckoo habitat. The series of dams along most major southwestern rivers (Colorado, Gila, Salt, Verde, Rio Grande, Kern, San Diego, and Mojave) have altered riparian habitats downstream of dams through hydrological changes, vegetational changes, and inundated habitats upstream. New habitat is sometimes

created along the shoreline of reservoirs, but this habitat (often tamarisk) is often unstable because of fluctuating levels of regulated reservoirs (Rosenberg *et al.* 1991, pp. 22–23). Diversion and channelization of natural watercourses are also likely to have reduced yellow-billed cuckoo habitat. Diversion results in diminished surface flows and increased salinity of residual flows. Consequent reductions and composition changes in riparian vegetation are likely. Channelization often alters stream banks and fluvial dynamics necessary to maintain native riparian vegetation (Vogl 1980, pp. 84–86).

River channelization, construction of levees close to the river, and rock riprap armoring along the levees have caused the Sacramento River to exhibit habitat fragmentation and disconnection from ecological processes which both renew and restore riparian and aquatic habitats (Laymon and Halterman 1987a, pp. 11–14; Halterman 1991, pp. 1–2). More than one-half of the Sacramento River's banks within the lowermost 194 mi (312 km) of river have now been riprapped by four decades of bank protection under U.S. Army Corps of Engineers' auspices (Service 2000b, pp. 26–29). The result is that much of the river's remaining riparian habitat now occurs in narrow disconnected linear strips (Service 2000b, pp. 26–29; Halterman *et al.* 2001, p. 4), which are not utilized by the cuckoo for nesting (Gaines 1974a, p. 204). This may be due to the loss of continuous migration corridors, lack of patches of adequate size for nesting, and the species inability to use highly isolated patches (Halterman 1991, pp. 33–38). Exacerbating such problems is the fact that the cuckoo now, for unknown reasons, utilizes a narrower range of habitat in California, now predominantly cottonwood-willow complex, than it did historically (Laymon and Halterman 1987b, pp. 19–25).

The yellow-billed cuckoo is considered very vulnerable to tropical deforestation on its wintering grounds (Morton 1992, pp. 582–583), and while losses of neotropical forests and woodlands have been substantial and ongoing, particularly in Central America and northern South America (Hartshorn 1992, pp. 13–18; Brown and Lomolino 1998, pp. 558–561), the relationship between over-wintering habitat and yellow-billed cuckoo populations has not been studied.

B. Overutilization for commercial, recreational, scientific, or educational purposes.

The Service is unaware of threats resulting from overutilization

C. Disease or predation.

West Nile virus is spreading throughout portions of the western United States and poses a threat to bird species. The National Wildlife Health Center of the U.S. Geological Survey (USGS) has identified the yellow-billed cuckoo as a species that may be affected by West Nile virus (USGS, 2005, p. 2).

Predation is also a potential threat to the cuckoo. Adults have been preyed upon by falcons (Hector 1985, p. 338), and nestlings have been taken by hawks, jays, grackles (*Quiscalus quiscula*) (Nolan and Thompson 1975, p. 498; Launer *et al.* 1990, pp. 9–10; Hughes 1999, p. 11) and by various snake and mammal species (Nolan 1963, pp. 311–312). From a study done by

Wilson on 252 nests of yellow-billed cuckoos in Arkansas, predation accounted for 91 percent of all nest failures, with small mammals, birds, and reptiles depredating the greatest proportion (Wilson 1999, p. 12).

D. The inadequacy of existing regulatory mechanisms.

The Migratory Bird Treaty Act (MBTA) (16 U.S.C. Sec. 703-712) is the only current Federal protection provided for the yellow-billed cuckoo. The MBTA prohibits “take” of any migratory bird, which is defined as: “to pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to pursue, hunt, shoot, wound, kill, trap, capture, or collect.” However, there are no provisions in the MBTA preventing habitat destruction unless direct mortality or destruction of active nests occurs.

The majority of the occupied areas west of the Continental Divide for the yellow-billed cuckoo lie within California, Arizona, and New Mexico (Hughes 1999, p. 1). Only California classifies the yellow-billed cuckoo as endangered (California Department of Fish and Game (CDFG) 2008, p. 9). In Arizona, it was listed as threatened by the Arizona Department of Game and Fish; however, it is now listed as a species of concern (Arizona Game and Fish Department 2002, p. 3). The bird has no special protective status in Wyoming, New Mexico, Colorado, Idaho, or Texas (Groschupf 1987, p. 2), and habitat protection or protection of individuals is not provided beyond existing regulations on capture, handling, transportation, and take of native wildlife. Utah considers the cuckoo as threatened. In Nevada, the cuckoo is identified as critically imperiled due to extreme rarity, imminent threats or biological factors and is proposed for protection as threatened. The California Endangered Species Act (CESA) prohibits unpermitted possession, purchase, sale, or take of listed species. However, the CESA definition of take does not include harm, which under the Act can include destruction of habitat that actually kills or injures wildlife by significantly impairing essential behavioral patterns (50 CFR 17.3). CESA does require consultation between the CDFG and other State agencies to ensure that activities of State agencies will not jeopardize the continued existence of State-listed species. Yellow-billed cuckoos have no State status in Oregon because it has not been considered an active breeding species since the 1940s (Oregon Department of Fish and Wildlife 2005, p. 3). In Washington, the yellow-billed cuckoo is considered critically imperiled (five or fewer occurrences); however no active nesting has been documented since the 1930s. The Service believes that these and other regulatory mechanisms are inadequate to ensure the continued existence of the yellow-billed cuckoo.

E. Other natural or manmade factors affecting its continued existence.

Environmental, demographic, and genetic vulnerability to random extinction are recognized as interacting factors that might contribute to a population’s extinction (Hunter 1996, pp. 189–190). Environmental random extinction refers to random events, climate, nutrients, water, cover, pollutants, and relationships with other species such as prey, predators, competitors, or pathogens, which may affect habitat quality.

The riparian habitat of the yellow-billed cuckoo has always been rare throughout the western continental U.S. and has become more so. Its habitat rarity and small, isolated populations make the remaining cuckoo populations in this region increasingly susceptible to local extirpation through stochastic events such as floods, fire, brood parasitism, predation, depredation, and land development.

The disjunct nature of habitats and small breeding populations impede the flow of genetic material and reduce the chance of demographic rescue from migration for adjacent populations. The resulting constraints on the gene pool intensify the external threats to the species.

Brood parasitism by the brown-headed cowbird (*Molothrus ater*) has been documented only six times (Friedmann 1971, pp. 241–242; Wilson 1999, p. 7), and less so by the bronzed cowbird (*Molothrus aeneus*) (Clotfelter and Brush 1995, pp. 814–815). With the incubation period of 10–13 days and fledgling 10–11 days, the brown-headed cowbird requires more development time before fledging than the yellow-billed cuckoo. Therefore, successful parasitism of yellow-billed cuckoo nest by brown-headed cowbird is unlikely (Ehrlich *et al.* 1988, p. 286).

In addition to destruction and degradation of riparian habitats, pesticides may affect cuckoo populations (Groschupf 1987, p. 29; Hughes 1999, p. 2), although the evidence is too limited to evaluate this effect. It warrants further study. In areas where riparian habitat borders agricultural lands, e.g., in California's central valley, pesticide use may indirectly affect cuckoos by reducing prey numbers, or by poisoning nestlings if sprayed directly in areas where the birds are nesting (Laymon and Halterman 1987b, p. 23). Accumulation of chlorinated hydrocarbon pesticides, particularly dichlorodiphenyltrichloroethylene (DDT), has affected other bird species, particularly top predators (Robinson and Bolen 1989, pp. 269–275). Pesticides may affect behavior (e.g., loss of balance) or cause death by direct contact. Laymon (1980, pp. 11–12) reported sublethal poisoning of young caused by spraying active nests in walnut orchards. Pesticide use may also contaminate preferred prey items, particularly lepidopteran larva, other invertebrates and food sources next to areas adjoining agricultural land (Laymon and Halterman 1987b, p. 23).

Although DDT use has been banned in the United States since 1972, cuckoos may be exposed to DDT on wintering grounds where DDT use has not been banned. Analysis of two eggs collected in California in 1979 showed very low levels of dichlorodiphenyldichloroethylene (DDE), a stable metabolite of DDT, but eggshell fragments collected in 1985 from three nests along the South Fork of the Kern River in California averaged 19 percent thinner than pre-DDT era eggshells (Laymon and Halterman 1987b, pp. 22–23). DDT has caused eggshell thinning in other bird species, but its role in the Kern River observations is unknown.

CONSERVATION MEASURES PLANNED OR IMPLEMENTED

State Wildlife action plans that include the yellow-billed cuckoo as a species of conservation concern are: California, Washington, Arizona, Colorado, Montana, Idaho, New Mexico, Utah,

Texas, Nevada, and Wyoming. In southeastern Arizona, a Federal, State and Private cooperative effort was able to purchase and protect in perpetuity 2,628 ac (1064 ha) of land for numerous threatened species as well as the yellow-billed cuckoo. The land will be managed by the Arizona Game and Fish Department (Arizona Game and Fish Department 2005, pp. 3–4). In New Mexico, over \$787,000 in grants were given to Tribal entities for the monitoring and restoration of riparian habitats and species including both the southwestern willow flycatcher and yellow-billed cuckoo; and in Nevada \$145,500 was given to the Tribes for restoration of approximately 20 miles of the Truckee River as part of the Tribal Landowner Incentives Program (TLIP) and Tribal Wildlife Grant Program (TWG) (Service 2005, pp.1–3). In California, over \$151,000 in Federal grants were given to the State for neotropical bird habitat and overwintering site studies, and approximately 400 agricultural ac (162 ha) in the Colusa region are or are being planned to be restored to native riparian habitat adjacent to known occurrences of the yellow-billed cuckoo (Golet et al. 2008, p. 20). We are also directly funding three status survey and habitat assessment studies in 2008 along the Sacramento River and along the South Fork of the Kern River in California. In Colorado, over \$120,000 in Federal grants were given to the State for developing conservation plans for neotropical bird species (Service 2005b, pp. 1–9). Several states have also implemented or are planning exotic plant removal projects and riparian area restoration (e.g. McLaughlin Reserve - California; Virgin River - Utah, Arizona, Nevada; 10-year plan submitted to Governor in 2004 – Colorado). A group comprised of Federal, State, and non-governmental agencies organized by the Service (Region 8, Sacramento Fish and Wildlife Office) is currently in the process of completing a range wide conservation assessment and strategy for the Western yellow-billed cuckoo. Researchers have used the group to develop a consistent survey protocol for use by the various partners within the species range. The conservation assessment is in early stages of development with work projected to begin on a conservation strategy in 2011.

SUMMARY OF THREATS (including reasons for addition or removal from candidacy, if appropriate)

The threats facing the western U.S. population of the yellow-billed cuckoo continue to be as a result of habitat loss from clearing and removal or alteration and fragmentation of riparian forest for agriculture, urban development, flood control, and the invasion by the exotic species. The majority of the habitat for the cuckoo is on private lands and continues to be lost or significantly altered. The threats affecting the species and its habitat are ongoing and riparian habitat is continuing to be destroyed through land use conversion and grazing. We find that the yellow-billed cuckoo western United States distinct population segment is warranted for listing throughout all its range, and, therefore, find that it is unnecessary to analyze whether it is threatened or endangered in a significant portion of its range.

For species that are being removed from candidate status:

___ Is the removal based in whole or in part on one or more individual conservation efforts that you determined met the standards in the Policy for Evaluation of Conservation Efforts When Making Listing Decisions (PECE)?

RECOMMENDED CONSERVATION MEASURES

Conservation recommendations include: determine numbers and locations of remnant populations; acquire and improve riparian habitats; eliminate pesticide spraying in orchards adjacent to riparian areas; restore hydrologic functioning of riparian areas in managed river systems and investigate feasibility reintroduction to naturally regenerated or reforested habitat. In addition, habitat and ecological requirements on migratory routes and wintering grounds in Central and South America should be investigated. Brood parasitism by the Yellow-billed Cuckoo requires further study to identify the physiological and behavioral controls associated with the production of extra eggs. Furthermore, comprehensive nest surveys should be undertaken to quantify the frequency of parasitism and the overall success rates of parasitically laid eggs. In addition, baseline population estimates and wintering habitat monitoring and evaluation are required in Mexico and Central America to determine conservation status in these areas. We should continue to work with Federal and State wildlife and land management agencies to determine population status of the species throughout the western DPS range.

LISTING PRIORITY

| THREAT | | | |
|--------------------|-----------------|------------------------------|-----------|
| Magnitude | Immediacy | Taxonomy | Priority |
| High | Imminent | Monotypic genus | 1 |
| | | Species | 2 |
| | | Subspecies/population | 3* |
| | Non-imminent | Monotypic genus | 4 |
| | | Species | 5 |
| | | Subspecies/population | 6 |
| Moderate to Low | Imminent | Monotypic genus | 7 |
| | | Species | 8 |
| | | Subspecies/population | 9 |
| | Non-imminent | Monotypic genus | 10 |
| | | Species | 11 |
| | | Subspecies/population | 12 |

Rationale for listing priority number:

Magnitude: The magnitude of threats to the yellow-billed cuckoo was determined to be high. Much of the decline of the cuckoo is due to huge habitat loss from clearing and removal of large areas of riparian forest for agriculture, urban development and flood control, and the invasion by the exotic tamarisk and salt cedar. The majority of the habitat for the cuckoo is on private lands and continues to be lost or significantly altered.

Imminence: Threats affecting the species and its habitat are ongoing, and are therefore considered imminent. Riparian habitat is continuing to be destroyed through land use conversion and grazing and altered through flood control and hydrological changes. However, active restoration of riparian habitat is occurring throughout the range of the yellow-billed cuckoo.

Rationale for Change in Listing Priority Number (insert if appropriate)

X Have you promptly reviewed all of the information received regarding the species for the purpose of determining whether emergency listing is needed?

Is Emergency Listing Warranted?

After reviewing the current status and distribution of the yellow-billed cuckoo and the threats associated with the species we have determined that an emergency listing of the species is not warranted at this time. Monitoring throughout the range of the species continues to show that the species, although found in small numbers and in fragmented habitats continues to persist. Large scale habitat loss is not occurring as was in the past and other federally listed species, such as the southwestern willow flycatcher and least bell's vireo, co-occur in habitats used by the yellow-billed cuckoo. Protections afforded for these species under the Endangered Species Act may provide some protections for the yellow-billed cuckoo.

DESCRIPTION OF MONITORING

Monitoring of the western continental DPS of the yellow-billed cuckoo includes reviewing the current scientific literature, and contacting species experts and State agencies regarding yellow-billed cuckoo status and threats. We work with private and public land owner staff on identifying yellow-billed cuckoo status and threats. These efforts will be on-going through out the monitoring period and occur as information becomes available or on a 6 month basis. Due to the wide-ranging nature of the species and its distribution within areas often managed by Federal agencies (e.g. U.S. Forest Service, Park Service, Bureau of Land Management, Department of Defense), it is our opinion that such a level of monitoring is appropriate to update the status of the species, given the biology of the species and the threats it faces. In California, a monitoring report on songbird population, health, management, and riparian restoration efforts determined that of twenty species in the study only one showed a decline and eleven showed an increase in population (Gardali *et al.* 2005, pp. 13–15). We have funded three status surveys, one for the Sacramento River and two for the South Fork of the Kern River in California for 2008/2009.

COORDINATION WITH STATES

State(s) (within the range of the species) provided information or comments on the species or latest species assessment: California, Arizona, Oregon, Washington, New Mexico, Colorado, Idaho, Montana, Wyoming, Texas and Nevada.

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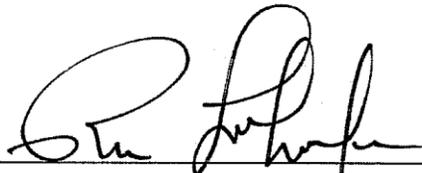
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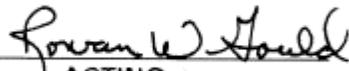
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APPROVAL/CONCURRENCE: Lead Regions must obtain written concurrence from all other Regions within the range of the species before recommending changes, including elevations or removals from candidate status and listing priority changes; the Regional Director must approve all such recommendations. The Director must concur on all resubmitted 12-month petition findings, additions or removal of species from candidate status, and listing priority changes.

Approve: 
Regional Director, Fish and Wildlife Service Date 6.7.2010

Concur: 
ACTING
Director, Fish and Wildlife Service Date: October 22, 2010

Do not concur: _____
Director, Fish and Wildlife Service Date

Director's Remarks:

Date of annual review: April 28, 2010
Conducted by Arnold Roessler

FY 2010, R8 CNOR: Yellow-billed Cuckoo, Western United States Distinct Population Segment