ARIZONA MINING ASSOCIATION

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Kelly Norton, President

December 2, 2013

Via electronic delivery

Public Comments Processing
Division of Policy and Directives Management
U.S. Fish & Wildlife Service
4401 North Fairfax Drive
Suite 222
Arlington, Virginia 22203

Attn: Docket No. FWS-R8-ES-2013-0104

Re: Proposed Threatened Status for the Western Distinct Population Segment of the Yellow-billed Cuckoo (*Coccyzus americanus*), 78 Fed. Reg. 61622 (Oct. 3, 2013)

Dear Sir or Madam:

I am the President of the Arizona Mining Association ("the AMA"), and I am writing on behalf of the AMA and its members to submit comments on the proposed rule entitled Proposed Threatened Status for the Western Distinct Population Segment of the Yellow-billed Cuckoo (*Coccyzus americanus*), 78 Fed. Reg. 61622 (Oct. 3, 2013), issued by the U.S. Fish and Wildlife Service ("the Service").

The AMA is a non-profit business league comprised of companies engaged in metal mining, beneficiation and mineral processing activities in Arizona. Our members include (but are not limited to): ASARCO LLC, BHP Copper Inc., Freeport-McMoRan Copper & Gold Inc., Carlota Copper Company, Mineral Park Inc., Rosemont Copper Company, Resolution Copper Company, and Peabody Energy. During 2012, mining activity in Arizona generated $4.8 billion in total income for workers, business and property owners, and governments across Arizona, accounting for 12,100 direct jobs through the payrolls of mining companies and indirectly generating an additional 40,000 jobs through vendor purchases of mining companies, consumer spending of workers, and the spending of state and local governments out of new taxes.

Arizona has been a top producer of copper in the United States for more than a century. In each year since 1973, Arizona has accounted for more than one-half of total U.S. copper production. In 2012, 65 percent of U.S. copper mining output came from mines in Arizona.

This copper was used throughout the world in homes, offices, cars, communications systems and many other applications. In fact, copper has become one of the most important metals in generating and bringing renewable clean energy to our homes and businesses, and is helping to drive down auto emissions through its application in hybrid and electric vehicles. Our technology-driven economy demands more metals and minerals than ever to achieve our country's energy and environmental goals for future generations. Through mining in Arizona, AMA member companies make our country safer, more environmentally sustainable, and less dependent on other countries for metals and minerals needed by a variety of industries and businesses.

AMA members own land and water rights used to support their mining-related activities that may be adversely affected by the listing of the western population of the yellow-billed cuckoo ("YBCU") as threatened and, therefore, are commenting on this listing proposal. In addition, the AMA and its members have an interest in how the Endangered Species Act ("ESA") is interpreted and administered, including the criteria for listing populations of wildlife as "species" under the ESA, and the quality of the scientific data, analysis and information used to support species' listings and make decisions under the ESA.

The AMA has retained legal counsel, Fennemore Craig, to review and provide comments on the proposed rule. In addition, we retained WestLand Resources Inc., an environmental consulting firm with extensive experience on wildlife matters, to review the proposed rule and provide technical comments. Both sets of comments are attached to and are submitted with this letter.

For the reasons discussed in those comments, we believe the Proposed Listing Rule is contrary to the ESA in several important respects, including:

- The western YBCU population is not markedly separated – either geographically or biologically – in the Southwest from other YBCU populations and therefore it is not "discrete," as required by the DPS Policy. *See Policy Regarding Recognition of Distinct Vertebrate Population Segments Under the Endangered Species Act*, 61 Fed. Reg. 4722 (Feb. 7, 1996).

- The western population is not "significant" to the YBCU taxon as a whole, as required by the DPS Policy. Cuckoos have never been widespread in the western United States, and the western population does not differ markedly from other populations in its genetic or behavioral characteristics.

- The Service's assertion that YBCU require large blocks of riparian habitat is erroneous. In fact, in the Southwest and Mexico, the YBCU uses a much broader array of habitats, including tropical deciduous forest, Madrean evergreen woodland, thornscrub, and upland Sonoran desert communities.

- There is also no credible support for the Service's assertion that dramatic losses of riparian habitats have occurred along rivers and streams in the Southwest. Instead, the best available evidence shows that riparian vegetation has actually increased, providing additional breeding habitat for the species.

- Because the Service has mischaracterized the habitat used by YBCU and has erroneously assumed large losses of riparian habitat throughout the West, the agency's analysis of the threats to the species is incomplete, exaggerated and erroneous.

It is apparent that the Service has not performed a thorough review of available scientific information concerning the YBCU. Under the ESA, the Service must use the best scientific and commercial data available in making listing determinations. Here, the agency has relied on inaccurate scientific information, inadequate analysis and speculation to support its proposed action. As a result, the listing proposal lacks credible scientific support and should not have been issued.

The AMA therefore requests that the Service withdraw the proposed rule and terminate this listing action.

The AMA and its member companies appreciate the opportunity to submit comments on the Proposed Rule. If you have questions or require any additional information, please feel free to contact me.

Sincerely,

Kelly Norton
President, Arizona Mining Association

Enclosures

cc. Jennifer Norris, Field Supervisor, U.S. Fish & Wildlife Service (w/encl.)

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Re: Proposed Threatened Status for the Western Distinct Population Segment of the Yellow-billed Cuckoo (*Coccyzus americanus*), 78 Fed. Reg. 61622 (Oct. 3, 2013)

Dear Sir or Madam:

We have been asked by the Arizona Mining Association ("the AMA") to conduct a review of the proposed rule entitled *Proposed Threatened Status for the Western Distinct Population Segment of the Yellow-billed Cuckoo (Coccyzus americanus)*, 78 Fed. Reg. 61622 (Oct. 3, 2013), ("Proposed Listing Rule") issued by the U.S. Fish and Wildlife Service ("the Service"). Based on our review of the Proposed Listing Rule, a technical report evaluating the Proposed Listing Rule prepared by WestLand Resources, an environmental consulting firm with extensive experience on wildlife matters,[1] and other background materials, we have prepared the following comments for the AMA.

The proposed action is to list the "western population" of the yellow-billed cuckoo (*Coccyzus americanus*) ("YBCU"). This grouping of the species would be classified as a distinct population segment or "DPS" pursuant to the *Policy Regarding Recognition of Distinct*

[1] WestLand Resources, Inc., *Comments on the 2013 Proposal to List The Western Distinct Population Segment of the Yellow-Billed Cuckoo (Coccyzus Americanus) as Threatened* (Dec. 2013) ("WestLand Comments"). The WestLand Comments have been filed by the AMA in this docket.

Vertebrate Population Segments Under the Endangered Species Act, 61 Fed. Reg. 4722 (Feb. 7, 1996) ("DPS Policy"), and listed as a threatened species under the Endangered Species Act ("ESA"), 16 U.S.C. § 1531 *et seq.* As discussed below, it is apparent that the Service has failed to conduct a thorough status review and relied on inaccurate scientific information, inadequate analysis and speculation to support its action.

The bottom line is that the Service has focused on major rivers in California, while largely ignoring other portions of the species' range, including the Southwest and northern Mexico. As a result, the agency has ignored recent data on the cuckoo's migration and movement patterns, failed to evaluate the status of taxon as a whole to determine the western population's significance, exaggerated the change in the population numbers, mischaracterized the types of habitat YBCU use in the Southwest, and grossly underestimated current woody vegetation along rivers and streams in the Southwest.

In short, the western YBCU population does not meet the requirements of the DPS Policy and therefore cannot be classified as a DPS and treated as a "species" under the ESA. As discussed below, this population is neither discrete nor significant to the taxon as a whole. Furthermore, the western YBCU population is not facing threats that would support the population's listing as threatened under the ESA. Therefore, the Service should determine that this population is not eligible for listing and issue a notice withdrawing the Proposed Listing Rule.

A. ESA Background.

1. Overview of the ESA Listing Process.

The listing process consists of three legal requirements. First, the Service must identify a valid species within the meaning of the ESA. As defined in the ESA, a "species" means a species, subspecies or "distinct population segment of any species of vertebrate fish or wildlife which interbreeds when mature." 16 U.S.C. § 1532(16). If a valid species does not exist, then the group of animals is not eligible to be listed. *See NW Ecosystem Alliance v. U.S. Fish & Wildlife Serv.*, 475 F.3d 1136 (9th Cir. 2007) (affirming decision denying petition to classify western gray squirrels in Washington state as a DPS); *Nat'l Ass'n of Home Builders v. Norton*, 340 F.3d 835 (9th Cir. 2003) (holding that the Service arbitrarily classified the Arizona cactus ferruginous pygmy-owl population as a DPS).

Second, the Service must determine whether that species unit – species, subspecies or DPS – is "endangered" or "threatened." To constitute an "endangered species," the species unit must be "in danger of extinction throughout all or a significant portion of its range." 16 U.S.C. § 1532(6). To constitute a "threatened species," the species unit must be "likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range." 16 U.S.C. § 1532(20). In making this determination, the Service must consider five statutory factors:

(A) The present or threatened destruction, modification or curtailment of the species' habitat or range;

(B) Overuse for commercial, recreational, scientific or educational purposes;

(C) Disease or predation;

(D) The inadequacy of existing regulatory mechanisms to protect the species; or

(E) Other natural or man-made factors concerning or affecting the species' continued existence.

16 U.S.C. § 1533(a)(1); *see also* 50 C.F.R. § 424.11 (factors for listing, delisting or reclassifying species). A determination will be arbitrary and capricious if it fails to articulate a rational basis for the agency's decision using the five factors listed above. *See, e.g., San Luis & Delta-Mendota Water Auth. v. Badgley*, 136 F.Supp.2d 1136 (E.D. Cal. 2000) (FWS failed to consider data contrary to proposed listing and failed to provide a rational explanation for its determination).

Third, if the Service determines the species is eligible for listing as endangered or threatened, the agency must amend the appropriate list codified in the Code of Federal Regulations. *See* 50 C.F.R. §§ 17.11 (animals), 17.12 (plants). ESA Section 4(c)(1) provides that "[e]ach list [of endangered and threatened species] shall refer to the species contained therein by scientific and common name or names, if any, specify what portion of its range it is endangered or threatened, and specify any critical habitat within such range." 16 U.S.C. § 1533(c)(1). Thus, when the species is listed, the Service must specify the geographic area in which the species receives protection under the ESA and the location of any critical habitat.

Finally, it should be emphasized that all listing determinations must be based "solely" on "the best scientific and commercial data available." 16 U.S.C. § 1533(b)(1)(A). The use of the word "solely" was added to the statute in 1982 to "ensure that decisions pertaining to the listing and delisting of species are based solely upon biological criteria and to prevent non-biological considerations from affecting such decisions." H. Rep. No. 97-567, at 19 (1982), *reprinted in* 1982 U.S.C.C.A.N. 2807, 2819; *see also id.* at 20, *reprinted in* 1982 U.S.C.C.A.N. at 2820.

The seminal statement of what constitutes use of the best available scientific data is found in *Bennett v. Spear*, 520 U.S. 152 (1997), which involved a challenge to a biological opinion issued under Section 7 of the ESA, 16 U.S.C. § 1536(a)(2). In discussing the petitioners' challenge, the Court stated:

> The obvious purpose of the requirement that each agency "use the best scientific and commercial data available" is to ensure that the ESA not be implemented haphazardly, on the basis of speculation or surmise. While this no doubt serves to advance the ESA's overall goal of species preservation, we think it readily apparent that another objective (if not indeed the primary one) is to avoid needless economic dislocation produced by agency officials zealously but unintelligently pursuing their environmental objectives.

Id. at 176-77. Congress also cautioned that "the listing of a species for emotional reasons or based on improper biological data is just as improper as not listing a species for economic reasons." H. Rep. No. 97-567, at 22, *reprinted in* 1982 U.S.C.C.A.N. at 2822 (also noting that a number of species' listings were probably not justified).

2. A Vertebrate Population May Be Treated as a DPS Only if It Is Both "Discrete" and "Significant."

In 1973, when the ESA was enacted, the species units entitled to the statute's protections included species, subspecies, and "any other group of fish or wildlife of the same species or smaller taxa in common spatial arrangement that interbreed when mature." Pub. L. No. 93-205, § 3(11), *reprinted in* 1973 U.S.C.C.A.N. 981. In 1978, Congress narrowed the definition of "species" by eliminating the vague reference to groups of animals "in common spatial arrangement" and substituting "distinct population segment of any species of vertebrate fish or wildlife which interbreeds when mature." Pub. L. No. 95-632, § 2(5), 92 Stat. 3752 (1978) (currently at 16 U.S.C. § 1532(16)).

The following year, Congress reconsidered its decision to allow populations to be listed. At that time, the General Accounting Office asserted that the Service "has interpreted the term 'species' to include any population of the animal, regardless of its size, location or total numbers," which "could result in the listing of squirrels in a specific city park, even though there is an abundance of squirrels in other parks in the same city, or elsewhere in the country." S. Rep. No. 96-151, at 6-7 (1979). Although Congress did not restrict the Service's authority to treat populations as "species," the Senate Committee on Environment and Public Works stated that it "is aware of the great potential for abuse" and "expects the FWS to use the ability to list populations *sparingly* and only when the biological evidence indicates that such action is warranted." *Id.* (emphasis added); *see also NW Ecosystem*, 475 F.3d at 1144 (discussing the Service's acknowledgement that populations should be listed "sparingly" in developing the DPS Policy).

In 1996, the Service and the National Marine Fisheries Service jointly adopted the DPS Policy, which established the requirements for treating a population of vertebrate fish or wildlife as a DPS. Under the DPS Policy, a population of animals may be listed only if the population is,

first, "discrete" (separated from other populations of the same species) and, second, "significant" (important to the welfare of the species as a whole). DPS Policy, 61 Fed. Reg. at 4725. Only if both criteria are satisfied is the population's conservation status evaluated based on the five statutory factors to determine whether the population is an endangered or threatened species. *Id.*; *see also NW Ecosystem*, 475 F.3d at 1138 ("If a population is deemed to be a DPS, the inquiry then proceeds to whether it is endangered or threatened."). Consequently, it is improper to classify a population as a DPS based on its conservation status.

B. The Western YBCU Population Is Not "Discrete."

The YBCU is a secretive, "highly migratory" bird that winters in South America and migrates through Central America and the Caribbean, ultimately spending three to four months each year in the United States and northern Mexico where it breeds. Proposed Listing Rule at 61628. The Service is proposing to divide the YBCU based on breeding area even though there is no physical barrier preventing movement between the eastern and western population in the southwestern United States and Mexico. This lack of physical separation is highlighted by the Service's failure to issue a proposed rule that clearly delineates the area purportedly occupied by the proposed DPS. Instead, this area is vaguely identified as "NM (western)" and "TX (western)." *See* Proposed Listing Rule at 61665.

Under the DPS Policy, a population must be discrete, i.e., "*markedly separated* from other populations of the same taxon as a consequence of physical, physiological, ecological, or behavioral factors." DPS Policy at 4725.[2] The DPS Policy states:

> The standard established for discreteness is simply an attempt to allow an entity given DPS status under the Act *to be adequately defined and described. If some level of discreteness were not required, it is difficult to imagine how the Act could be effectively administered or enforced....*
>
> The interests of conserving genetic diversity would not be well served by efforts directed at either well-defined but insignificant units or entities believed to be significant *but around which boundaries cannot be recognized.*

[2] A population segment may also be discrete if 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." DPS Policy at 4725. This test for discreteness is not relevant here.

DPS Policy at 4724 (emphasis supplied); *see also* Proposed Listing Rule at 61629 (explaining the discreteness requirement requires "the entity being considered for a DPS to be *defined and described*" (emphasis added)).

Consequently, to be "markedly separated," the separation must be readily apprehended as distinct or separate from other populations of the same species. While "absolute" separation is not required (*see* DPS Policy at 4724), the population's members must be defined in a manner that allows them to be readily identified. Otherwise, members of the protected population cannot be distinguished from other members of the species, and the ESA cannot be effectively administered and enforced, as the DPS Policy explains.

Here, the proposed division of the YBCU species into a western population and an eastern population is based solely on the species' apparent range during the three-month breeding season because the species' winter range in South America and its migration routes are poorly understood. Proposed Listing Rule at 61626. This division occurs along the Continental Divide, which the agency describes as "generally the crest of the Rocky Mountains based on watershed boundaries." *Id.* However, this division breaks down in the southwestern United States and northern Mexico, where the breeding ranges of the two populations are adjacent and, in some areas, may overlap. In that area, the Service has generally described a vague, meandering line along "the watershed divide between the Rio Grande and Pecos River, and the Chihuahuan Desert" that supposedly separates eastern and western YBCU populations. *Id.*; *compare id.* at 61665 (text of proposed rule).

In New Mexico and Texas, the Service describes the geographic separation as follows:

> [T]he separation is along the watershed boundary between the Rio Grande and the Pecos Rivers in central New Mexico (Sangre de Cristo Mountains), and southwest Texas, terminating at the Rio Grande in the Big Bend National Park. In this region, the eastern and western yellow-billed cuckoo populations are separated by arid basins and isolated mountain ranges that emerge from a high desert plateau.

Proposed Listing Rule at 61627. The Service acknowledges that in this region, the Rio Grande (believed to support breeding birds from the western population) and Pecos River (believed to support breeding birds from the eastern population) are as close as 50 miles. *Id.* at 61627-28. In fact, a careful review of maps of the region show that these river systems have tributaries that are much closer than 50 miles, with no physical features preventing these highly mobile birds, which travel thousands of miles during migration, from moving between them.

The Service also has speculated that the "gap" between the eastern and western populations was once larger because the Pecos River was colonized by YBCU following the development of riparian habitat capable of supporting YBCU:

> Historically, this gap was wider, because the banks of the Pecos River did not have riparian woodland and the area was not used by the species. Today, the riverine habitat along the Pecos River consists primarily of introduced tamarisk (*Tamarix* spp.), and *it is thought that yellow-billed cuckoos from eastern North America* have colonized the Pecos River system. Much of the area between the Pecos River and the Rio Grande in New Mexico and Texas consists of internal ephemeral drainages that are not connected to any major river systems and have no riparian habitat.

Proposed Listing Rule at 61628. Notably, no references are given for this discussion. It is equally plausible that that cuckoos from the western population have "colonized" the Pecos River given the large population of YBCU detected along the Middle Rio Grande in recent surveys.[3]

An example of how this easily could have occurred is shown by a recent YBCU migration study conducted by the Bureau of Reclamation biologists. Juddson D. Sechrist, Eben H. Paxton, Darrell D. Ahlers, Robert H. Doster & Vicky M. Ryan, *One Year of Migration Data for a Western Yellow-Billed Cuckoo*, *Western Birds* Vol. 43-1 (2012). As summarized by the Bureau,

> In the Southwest, YBCUs typically arrive at breeding grounds by late-May and initiate migration to wintering grounds in Central and South America by mid-August (Halterman et al. 2000). In 2010, a YBCU from the Middle Rio Grande was confirmed to have overwintered in parts of Paraguay and Northern Argentina (Sechrist et al. 2011). *And perhaps of more interest was the individual's apparent use of the Pecos River for both its spring and fall migration routes leading to and from the Rio Grande.*

U.S. Department of the Interior, Bureau of Reclamation, *Yellow-billed Cuckoo Study Results – 2012: Survey Results from New Mexico Highway 60 to Elephant Butte Reservoir: Middle Rio Grande, NM* 1 (Jan. 2013) (emphasis added). If birds from both populations use the same areas during migration, there is no basis on which to assume that YBCU along the Pecos River are eastern birds, particularly since YBCU have low site fidelity and may select breeding locations based on the conditions they encounter. Cynthia S. A. Wallace, Miguel L. Villarreal & Charles van Riper, *Influence of Monsoon-Related Riparian Phenology on Yellow-Billed Cuckoo Habitat*

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[3] A total of 415 YBCU detections were documented during the 2012 breeding season along a 90-mile reach of the Middle Rio Grande. *See* U.S. Department of the Interior, Bureau of Reclamation, *Yellow-billed Cuckoo Study Results – 2012: Survey Results from New Mexico Highway 60 to Elephant Butte Reservoir: Middle Rio Grande, NM* (Jan. 2013).

Selection in Arizona, 40 Journal of Biogeography 2094, 2102 (2013); *see also* Proposed Listing Rule at 61633 ("[T]he dramatic fluctuation in breeding pairs at long-term study sites indicates that year-to-year movement between potential breeding areas also occurs.").

The tracking records from the Bureau of Reclamation study also show that the cuckoo moved considerable distances *during the breeding season.* Although the individual bird nested along the Middle Rio Grande, it moved through portions of western and central Texas and northeastern Mexico – areas considered to be occupied by members of the eastern YBCU population.

A more recent study of YBCU nesting along the Pecos River provides additional evidence that cuckoos nesting along the Pecos River have similar movement and migration patterns as cuckoos nesting along the Rio Grande:

> [W]hen the migration route of the YBCU ... captured within the Rio Grande Basin is overlaid with the partial route of the YBCU ... from the Pecos Basin – the two points differed only by a distance of approximately 80 km (50 miles) in the vicinity of central Texas – well within the geolocator's margin of error (Figure 10). Also within central Texas, during the second week of Sept. (2009 and 2011, respectively) the two YBCUs were within 200 km (125 miles) of each other again suggesting similar migration routes.

U.S. Department of the Interior, Bureau of Reclamation, *Yellow-billed Cuckoo Migration Study Results, Pecos River, New Mexico 2011–2012* 11 (Nov. 2012).

Consistent with these recent studies, the Proposed Listing Rule acknowledges that there is uncertainty about whether YBCUs breeding in the Southwest (and in northern Mexico) are eastern or western cuckoos:

> Information, including timing of migration, indicates that yellow-billed cuckoos from Texas west of the Pecos River (from the Rio Grande upstream of Big Bend) and from northwestern Mexico (Chihuahua, Sonora, Sinaloa, Durango, Baja California Sur) exhibit *greater similarity* to yellow-billed cuckoos in western North America, and those on the Pecos River in Texas and eastern Mexico (Coahuila, Nuevo Leon, Tamaulipas, San Luis Potosi) *are more similar* to yellow-billed cuckoos in the east.

Proposed Listing Rule at 61628 (emphasis added). The descriptors "greater similarity" and "more similar" are hardly indicative of a marked separation between the two populations, as

required by the DPS Policy. The reality is that cuckoos in the southwestern portion of the YBCU's breeding range are not readily distinguishable as members of either "population."

WestLand also discusses the serious problems with treating YBCU in the western states and northwest Mexico as discrete. *See* WestLand Comments at 2-3 (discussing the lack of physical separation between eastern and western YBCU), 4-5 (discussing why differences in migratory timing are not an evolved trait), 8-15 (discussing why taxonomic differences are exaggerated). In short, WestLand explains why the scientific data do not support the Service's finding that there are marked behavioral and taxonomic differences between eastern and western cuckoos. As WestLand explains, some data suggest that western YBCU could arrive in the Southwest much earlier than suggested and that YBCU breeding is tied to environmental conditions, such as variability in food resources. YBCU may arrive to the Southwest much earlier than thought, and are not detected because of temporal and spatial sampling bias. These differences do not support treating western cuckoos as being markedly separate from cuckoos in the remainder of the United States and northern Mexico.

As previously stated, the lack of a marked separation between the two populations is highlighted by the text of the Service's proposed rule, which delineates the boundary of the western YBCU population as follows:

> U.S.A. (AZ, CA, CO (western), ID, MT (western), *NM (western)*, NV, OR, *TX (western)*, UT, WA, WY (western)), Canada (British Columbia), Mexico (Baja California, Baja California Sur, Chihuahua, *Durango (western)*, Sinaloa, Sonora)).

Proposed Listing Rule at 61665 (emphasis added). From this vague description, it is impossible to identify the boundary between the listed population and other cuckoos in the southwestern portion of the species' summer range. Given the species' high mobility, unpredictable movement pattern, ability to travel long distances, and opportunistic nesting behavior, there will be considerable confusion over exactly what is listed under the ESA. This arbitrary division also means that members of the western population will not be listed in "eastern" New Mexico and Texas, or in Coahuila, Nuevo Neon and "eastern" Durango, while members of the eastern population will be listed in "western" New Mexico and "western" Texas, Chihuahua, Sinaloa and "western" Durango. Clearly, this is not a "discrete" population segment.

In short, YBCU in the southwestern United States and northern Mexico are not readily distinguishable from other YBCU in terms of their physical, physiological, ecological, or behavioral factors. YBCU are highly mobile and, as recent studies show, use the same migration routes, and move frequently during the breeding season. The use of a meandering, indistinct boundary based on the watersheds of two rivers – which is not set forth in the text of the proposed rule – to separate the species into eastern and western populations would be arbitrary and capricious.

C. The Western YBCU Population Is Not "Significant" to the Taxon.

As discussed, the "significance" requirement in the DPS Policy is intended to ensure that the ability to list a population of animals is used sparingly, in accordance with Congress' intent:

> The requirement that a DPS be significant is intended to carry out the expressed congressional intent that "th[e] authority [to list populations] be exercised sparingly" as well as to concentrate conservation efforts undertaken under the Act on avoiding important losses of genetic diversity.

DPS Policy, 61 Fed. Reg. at 4724 (quoting S. Rep. No. 96-151, at 6-7 (1979)); *see also Nat'l Ass'n of Home Builders,* 340 F.3d at 844. To determine whether a population segment is "significant," the Service must evaluate the population's "importance to the taxon to which it belongs." DPS Policy, 61 Fed. Reg. at 4725. Four factors are normally considered: (1) whether the population "persist[s] in an ecological setting unusual or unique to the taxon," (2) whether its loss "would result in a significant gap in the range of the taxon," (3) whether it is the "only natural surviving occurrence of the taxon," and (4) whether it "differs markedly from other populations of the species in its genetic characteristics." *Id.*

In the Proposed Listing Rule, the Service has provided only a cursory discussion of the basis for finding that the western YBCU population is significant to the YBCU species – the taxon to which the population belongs. *See* Proposed Listing Rule at 61629-30. In this discussion, the Service has relied on factors (2) and (4), above. However, neither factor applies in this case.[4]

1. The Loss of the Western YBCU Population Would Not Result in a Significant Gap in the Range of the Species.

In the Proposed Listing Rule, the Service has devoted one paragraph to explaining why the loss of the western YBCU population would result in a significant gap in the range of the taxon. Proposed Listing Rule at 61629. This discussion is cursory and result-driven. Most critically, the Service has failed to evaluate the significance of the western YBCU population to the taxon as a whole, which is the focal point of the DPS Policy's significance requirement.

The Service's primary contention is that an "extensive area" would no longer have cuckoos if the western population were lost. *Id.* According to the Service, "[s]even entire states

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[4] Obviously, the western YBCU population does not persist in an ecological setting unusual or unique to the taxon (significance factor (1)), nor does it represent the only surviving natural occurrence of a taxon that is more abundant elsewhere as an introduced population (significance factor (3)).

and substantial portions of five additional states in the United States, and six states in Mexico, that are currently occupied would have no breeding populations of the species." *Id.* Elsewhere, however, the Service explains that the YBCU was never common in most of the western United States:

- "In Oregon, the last confirmed breeding records are from the 1940s. Historically, western yellow-billed cuckoos were considered rare in [Oregon], both in the Willamette Valley, along the lower Columbia River, and in eastern Oregon along the Snake River, …." 78 Fed. Reg. at 61634.

- "In Washington, the last confirmed breeding records of yellow-billed cuckoos are from the 1930s, …. Of the 24 records between 1836 and 1940 …, 23 were found west and one east of the Cascades." *Id.*

- "Yellow-billed cuckoos historically occurred in southwest British Columbia, Canada, …. The species was apparently never common with 23 records (18 specimen and 5 sight records) between 1881 and 1927." *Id.* at 61635.

- We have very limited data for yellow-billed cuckoos from the area west of the Continental Divide in Montana. Three specimens have been collected since the early 1960s, and there are few recorded sightings since the early 1900s." *Id.*

- "In Idaho, the yellow-billed cuckoo is considered a rare visitor and local summer resident that occurs in scattered drainages, primarily in the southeastern portion of the State …. In northern and central Idaho, there were only four records of yellow-billed cuckoos during the 20th century." *Id.*

- "Historically, yellow-billed cuckoos were rare and local in Wyoming." *Id.*

- "West of the Continental Divide in Colorado, the yellow-billed cuckoo was probably never common." *Id.*

- "Historically yellow-billed cuckoos were uncommon in Utah in woodlands along streams in the lower valleys, especially the Salt Lake Valley …. There are scattered records for the State, mainly from the vicinity of Provo, Ogden, and Salt Lake City, as well as the Virgin River in the southwestern portion of Utah, and one record from southeastern Utah." *Id.* at 61636.

- The historical status of the yellow-billed cuckoo in Nevada is poorly documented, although there is evidence the species nested in western Nevada along the lower Truckee and Carson Rivers and in southern Nevada along the Colorado and Virgin Rivers …. *Id.*

- In New Mexico, "[y]ellow-billed cuckoos were historically common in riparian areas along the Rio Grande, as well as uncommon to common locally along portions of the Gila, San Francisco, and San Juan Rivers." *Id.* at 61640.

The bottom line is that the YBCU was rare throughout much of the species' range in the western United States, and was at most locally common in a few locations, as the Service's discussion shows. This is not surprising given the arid and semi-arid nature of the most of this area. Indeed, the Service asserts (contrary to recent Bureau of Reclamation studies) that cuckoos are unable to fly from the Rio Grande to the Pecos River or across the Chihuahuan Desert in northern Mexico due to desert conditions. Proposed Listing Rule at 61627-28. If the "high desert plateau" separating the Rio Grande and Pecos River forms a barrier to YBCU movement, then most of the West is incapable of supporting large breeding populations of cuckoos.

Moreover, the Service's dramatic decreases in the YBCU populations in the western United States are exaggerated, as WestLand explains in its comments. *See* WestLand Comments at 15-19. In sum, the Service has inappropriately used population estimates derived from the extrapolation of YBCU detections across unsurveyed areas to derive historic baseline numbers of YBCU. These estimates were then compared to current surveys of YBCU, which use different survey protocols and are far more conservative in estimating the number of breeding pairs. This data mismatch artificially inflates the historic baseline population while undercounting current population levels, making population changes appear larger. In addition, the Service has not included population data from smaller streams and drainages used by YBCU in the Southwest, apparently due to its erroneous belief that YBCU nest only in large blocks of riparian habitat. As discussed below, this belief is wrong. Thus, while some YBCU populations have decreased, these decreases have not been as drastic as portrayed in the proposed rule, while other areas with YBCU populations have not been considered.

At the same time, the Service has ignored the conservation status of the YBCU in the rest of North America. According to the Service's map of the species' historic breeding range, YBCU occupy all or substantial portions of 39 states and Puerto Rico – nearly two-thirds of the continental United States. In contrast to the West, this portion of the country contains large tracts of forests and other vegetation that support breeding cuckoos. Yet there is no discussion of the historic and current status of YBCU in the central and eastern United States in the Proposed Listing Rule, and no explanation of why the substantially smaller YBCU population west of the Rocky Mountains is important to the remainder of the species.

Boiled down, most of the western United States lacks suitable habitat and has never supported breeding YBCU populations. The Service's rationale is simply that the western United States is a large area. Proposed Listing Rule at 61629. The conservation status of the YBCU taxon has not been evaluated by the agency, and no attempt has been made to analyze "the discrete population segment's importance to the taxon to which it belongs." DPS Policy, 61 Fed. Reg. at 4725.

The ranges of many species in North America have contracted significantly over the past 200 years. The fact that a species' range has contracted, however, does not mean that the species is threatened with extinction, nor does it mean that a population is significant simply because it occupies a portion of the species' range – even if it is a large area. As the Ninth Circuit has explained:

> A species with an exceptionally large historic range may continue to enjoy healthy population levels despite the loss of a substantial amount of suitable habitat. Similarly, a species with an exceptionally small historical range may quickly become endangered after the loss of even a very small percentage of suitable habitat.

Defenders of Wildlife v. Norton, 258 F.3d 1136, 1143 (9th Cir. 2001) (*"Norton"*); *see also Nat'l Ass'n of Home Builders*, 340 F.3d at 848-49 (citing and following *Norton* in holding that the Service failed to articulate a reasoned basis for concluding that the loss of the Arizona pygmy-owl population would result in a significant gap in the range of the taxon).

The New Mexico district court, in rejecting a challenge to the Service's determination that the Rio Grange cutthroat trout is not eligible for listing, similarly explained:

> A listing may be made only if ... habitat loss or degradation renders a species "endangered." Thus, it is possible to conclude that 99% of a species historic range may be lost, yet the species will still be thriving in the 1% that is left, in sufficient numbers and sufficient health, and will still be sufficiently protected from natural and manmade threats, that no listing is necessary in order to preserve the species. Indeed, that is what the FWS found in this case.

Center for Biological Diversity v. Norton, 411 F.Supp.2d 1271, 1280 (D. N.M. 2005) (vacated pursuant to settlement). Like the Ninth Circuit in *Norton*, the court also rejected the argument that significance is determined by the amount or size of the lost range, explaining that "[i]f raw size of the range were the only determinative factor, virtually every non-domestic species of wildlife in North America would be listed." *Id.* at 1281.

The same reasoning applies here. There are large numbers of YBCU and YBCU habitat throughout much of the continental United States and Mexico. However, most of the western United States lacks suitable habitat and has never supported breeding YBCU populations. In addition, as WestLand explains, the Service has exaggerated historic population levels by relying on extrapolated estimates of YBCU populations and has miscalculated the number of breeding YBCU pairs.. WestLand Comments at 15-19. Under these circumstances, a contraction of the species' range will have little impact on the continued viability of the YBCU taxon, which will

continue to be widespread and secure throughout a significant portion of its breeding range in North America.

The bottom line is that the ESA protects species, not geographic areas. To satisfy the DPS Policy's significance requirement, the loss of range – the "gap" – must be important to the taxon as a whole, not simply large. The Service has failed to provide any scientific basis for such a finding in this case.

2. The Western YBCU Population Does Not Differ Markedly from Other Populations of the Species in its Genetic Characteristics.

The Service's other justification is significance factor (4), i.e., the population segment "differs markedly from other populations of the species in its genetic characteristics." DPS Policy, 61 Fed. Reg. at 4725. However, rather than discussing the genetic studies on the YBCU, the Service claims that the western YBCU population is significant to the taxon because:

> Data collected from publications and other sources demonstrate the existence of morphological and physiological differences between yellow-billed cuckoos in the east and west.

Proposed Listing Rule at 61629. These morphological and physiological differences include such factors as wing and tail size, egg size, juvenile bill color, adult bill color, and timing of migration. *Id.* at 61629-30. According to the Service, these differences provide "indirect evidence" that there are genetic differences between eastern and western cuckoos. *Id.* at 61630. Furthermore, in its concluding paragraph on the significance requirement, the agency stated that the western YBCU population "is important to the taxon to which it belongs" because it "differs markedly from other yellow-billed cuckoo populations *in morphology* (western yellow-billed cuckoos are larger)." *Id.* (emphasis added).

Under the fourth significance factor, however, a population segment must differ *markedly* from other populations of the species in its *genetic* characteristics, not in its morphological or behavioral characteristics. *See Nat'l Ass'n of Home Builders*, 340 F.3d at 850-51 (discussing the fourth significance factor in the DPS Policy). Potential genetic differences based on tail and wing size, egg size and similar characteristics are insufficient to satisfy this requirement, as the Ninth Circuit held in *Nat'l Ass'n of Home Builders*:

> [T]he [Service] only found that potential (i.e., possible) genetic differences exist between the western and eastern pygmy-owl populations [based on morphological differences].... The fourth significance factor, however, requires not only actual genetic differences, but that those actual genetic differences be appreciable. In this case, the [Service] was not even sure if the genetic differences between the eastern and western pygmy-owl

> populations were actual, let alone appreciable.... Moreover, the only genetic study conducted on the pygmy-owls found "very little genetic difference" between the Texas and northeastern Mexico pygmy-owls.... This study did not evaluate genetic differences between western and eastern pygmy-owls, and the finding of "low levels of genetic variation" among eastern pygmy-owls certainly does nothing to show that genetic differences between the western and eastern pygmy-owls are more than just a possibility.

340 F.3d at 851 (citations omitted).[5]

In this case, two genetic studies have been performed by research laboratories which determined that there are no marked genetic differences between eastern and western cuckoos. These studies are summarized in the proposed rule:

> Fleischer [2001, pp. 14-16] examined two neutral regions of the mitochondrial DNA (Control Region and ATPase subunit 8 regions) and found no genetic structure that separated eastern from western yellow-billed cuckoos, or supported subspecies or evolutionarily significant unit (for example, a species, a subspecies, or a distinct population) status for the species....
>
> Farrell (2006, pp. 9-32) reexamined the subspecies status of western yellow-billed cuckoo mitochondrial DNA with a larger geographic distribution of samples representative of overall species range with focused sampling effort on the zones of contact between the eastern and western populations. Farrell's (2006, pp. 33-44) results revealed only limited genetic divergence between eastern and western populations of yellow-billed cuckoo and concluded that the sequences used were not sufficiently variable to detect genetic differentiation within this species.

Id. at 61625.[6] Incredibly, the Service's discussion of the fourth significance factor failed to even mention these genetic studies. *See* Proposed Listing Rule at 61629-30. Notably, the study by Dr. Fleischer, who is the head of the Molecular Genetics Laboratory of the Smithsonian Institution, was funded by the Service. His study was peer reviewed by three professionals in the

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[5] In classifying the Arizona pygmy-owl population as a DPS, the Service relied on reports describing differences in plumage and coloration between pygmy-owls in Texas and pygmy-owls in Arizona. *Id.*

[6] The Service also noted that a third YBCU genetic study has been performed, which reached a different conclusion than Fleischer. That study was rejected because it "was done with a very small sample of specimens that did not cover the range of either the eastern or western yellow-billed cuckoo." *Id.*

field of population genetics, or knowledgeable of the life history and distribution of the yellow-billed cuckoo in North America (Dr. George Barrowclough, Dr. Susan Haig and Dr. Oliver Ryder), all of whom agreed that there was a general lack of differentiation between the eastern and western populations of yellow-billed cuckoo. *See 12-Month Finding for a Petition To List the Yellow-Billed Cuckoo (Coccyzus americanus) in the Western Continental United States*, 66 Fed. Reg. 38611, 38617-18 (July 25, 20010 ("12-Month Finding").

As WestLand explains in its comments, there is no evidence to suggest that morphological differences identified in the Proposed Listing Rule, including egg characteristics and bill color, differ markedly between eastern and western YBCU. *See* WestLand Comments at 8-10 (egg characteristics), 10-12 (bill coloration), 12-13 (body size). WestLand also explains that the Service has inappropriately interpreted the results presented by Franzreb and Laymon (1993) and has overstated the predictive capability of their findings. *Id.* at 14-15. In short, the statistical approach taken by Franzreb and Laymon erroneously began with the a-priori assumption that the eastern and western YBCU populations are distinct groups and used a strongly unbalanced sample size, which skewed the results.

Moreover, the Service's 12-Month Finding on the YBCU listing petition presents data that appear to refute the behavioral and genetic differences now being asserted. In that notice, the Service explained:

> In our 90-day finding for this petition (65 FR 8104), 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 (not genetic differences). We believe this remains as one hypothesis for timing of breeding* ....
>
> Other differences between yellow-billed cuckoos in the proposed western DPS and eastern yellow-billed cuckoos exist and provide additional evidence of discreteness. For example, western yellow-billed cuckoos have larger egg size and weight (mass in grams), with thicker egg shells than the eastern yellow-billed cuckoo (Hughes 1999). *This difference may correlate with potential higher egg water loss from hotter, dryer conditions in the west than the east (not genetic differences)....*
>
> Eastern juveniles have been reported to have yellow bills (Oberholser and Kincaid 1974), while western juveniles in California are reported to have all black bills (Franzreb and Laymon 1993). *However, since bill color in juveniles changes from grayish, to yellow and black around the age of 60 days*

> *(Hughes 1999), this reported difference needs to be verified, taking into account juvenile age....*
>
> Western adult yellow-billed cuckoos have been reported to have an orange lower mandible, while eastern adults have a yellow lower mandible (Franzreb and Laymon 1993; S. Laymon, *in. litt.* 2000). *No scientific data are available to verify this, and the reported difference has not been the subject of a published scientific study....*
>
> Western adults, on average, are larger and heavier than eastern adult birds.... *However, as discussed by Banks (1988, 1990), and in our 90-day administrative finding, the differences are not strong, and may be clinal.*

12-Month Finding, 66 Fed Reg. at38621-22 (emphasis added). Given that very little new information has been presented in the Proposed Listing Rule, the Service appears to have simply disregarded its previous analysis and has decided to rely on speculation about potential genetic and behavioral differences.

In sum, the Service has not provided credible scientific evidence demonstrating that the western YBCU population is significant to the YBCU taxon. The Service has not shown that the loss of the western population will result in a significant gap in the range of the taxon because the agency ignored the substantially larger eastern population and looked only at the raw area within the western population's historic boundary. Likewise, the Service has not shown that the western YBCU population differs markedly from other YBCU populations in its genetic characteristics. Instead, the agency ignored the genetic studies on the eastern and western YBCU populations and relied on indirect – and scientifically questionable – evidence of potential genetic differences, which is insufficient to establish the existence of *marked* genetic differences, as required by the DPS Policy. *See Nat'l Ass'n of Home Builders*, 340 F.2d at 850-51.

D. The Threats to the Western YBCU Population Are Greatly Exaggerated.

As shown above, the western YBCU population is neither discrete nor significant to the viability of the YBCU taxon. Therefore, it is not a vertebrate population that can be listed under the ESA. In addition, the Service has mischaracterized the species' breeding habitat and grossly overstated the loss of riparian habitat in the Southwest. According to the Service, "[t]he western yellow-billed cuckoo currently nests almost exclusively in low to moderate elevation riparian woodlands that cover 50 acres (ac) (20 hectares (ha)) or more within arid to semiarid landscapes ..." and "require[s] large blocks of riparian habitat for breeding." Proposed Listing Rule at 61633; *see also id.* at 61643 ("[D]uring the breeding season, the habitat of the western yellow-billed cuckoo consists of expansive blocks of riparian vegetation containing trees of various ages, including in particular larger, more mature trees used for nesting and foraging."). At the same time, the Service asserts that "[t]he decline of the western yellow-billed cuckoo is primarily

the result of riparian habitat loss and degradation," and that in Arizona, "past riparian habitat losses are estimated to be about 90 to 95 percent." *Id.* at 61643.

The reality, however, is much different. The Service has significantly overstated the loss of riparian habitat in the western United States while ignoring the fact that YBCU occupy a much wider range of habitat than assumed in the Proposed Listing Rule. In fact, many of the YBCU locations identified in Arizona are ephemeral and intermittent drainages and small creeks that cannot support extensive tracts of riparian vegetation, which underscores that the Service has both misinterpreted the range of habitats available to and used by the YBCU while also overstating threats to the species.

1. The Service Has Overstated the YBCU's Dependence on Large Blocks of Native Riparian Vegetation.

The Proposed Listing Rule identifies a large number of locations in Arizona at which YBCU have been reported or are likely to occur. *See* Proposed Listing Rule at 61639. Many of these locations either lack permanent water (e.g., drainage features in canyons or ephemeral washes) or consist of small streams and creeks that aren't capable of supporting large, dense blocks of riparian vegetation due to their small size, lack of sufficient water and other physical features (e.g., shallow bedrock and confining canyon walls). Apparently, the authors of the Proposed Listing Rule made no effort to evaluate these locations and determine whether they are consistent with Service's description of the YBCU's required breeding habitat.

The Altar Valley, for example, is identified as having an YBCU population greater than 10 pairs. *Id.* This valley is located in southern Arizona and is bisected by a large ephemeral wash called Altar Wash, which drains this arid watershed. The Altar Wash travels north approximately 40 miles, at which point it merges with another large wash called Brawley Wash southeast of Tucson. The Altar Valley contains areas with xeroriparian vegetation, such as mesquite, and some isolated cottonwoods, but is incapable of supporting large blocks of riparian vegetation due to the area's low precipitation and lack of permanent water. Yet this area supports a population of breeding YBCU.

Additional discussion and analysis on this point is provided by WestLand. WestLand Comments at 20-21. WestLand explains that in the Southwest and northern Mexico, YBCU are regularly observed in locations with limited riparian habitat, and often contain Madrean evergreen woodland, semidesert grassland, Sonoran desertscrub (Arizona upland), and Petran montane coniferous forest – not the large riparian systems that are the focus of the Proposed Listing Rule. Moreover, in Mexico, YBCU have been documented in tropical deciduous forest, thornscrub, desertscrub, and upland Sonoran desert communities. As WestLand points out, the species' ability to use a much broader range of habitat types has serious implications for the reliability of the Service's threats analysis as well as the agency's assertion that birds in the western YBCU population use different habitat than birds in the eastern YBCU population:

> The Proposed Rule considers YBCU breeding habitat to consist mostly of large tracts of riparian forest dominated by cottonwood vegetation. Survey and detection data along smaller riparian systems and upland drainages that do not support expansive blocks of riparian vegetation are not incorporated into FWS' analysis, likely resulting in overly-stated declines in western YBCU. The fact that breeding YBCU have been demonstrated to use a much broader range of habitat types than FWS has assumed in the Proposed Rule indicates that purported differences in habitat use between eastern and western YBCUs do not constitute strong evidence that a western DPS of YBCU is discrete or biologically and ecologically significant to the species. Broader habitat use also suggests that the conclusions by the Proposed Rule that loss of riparian habitat and isolation of habitat patches are threats to a western DPS of YBCU are overstated.

Id. at 24.

In short, the Service has mischaracterized the YBCU's nesting habitat by assuming that the species nests exclusively in large blocks of riparian vegetation along larger rivers and streams. The available information in fact demonstrates that the YBCU nests in a much broader array of habitat types, including smaller stands of xeroriparian and upland vegetation along small creeks and drainages with little water. Consequently, there is far more suitable and potential habitat for YBCU than indicated in the Proposed Listing Rule, undermining the Service's threats analysis as well as its treatment of western YBCUs as a DPS.

2. Reliable Studies Demonstrate that Riparian Habitat Has Substantially Increased In the Southwest.

In the Proposed Listing Rule, the Service claimed that Arizona has lost 90 to 95 percent of its riparian habitat. Proposed Listing Rule at 61643. This claim is made in support of the Service's contention that there are threats to YBCU's habitat that support its listing According to the agency, very little riparian vegetation remains in the Southwest, thus eliminating most suitable breeding areas for YBCU. The proposed rule also contains a lengthy list of water and land uses allegedly responsible for these extraordinary riparian habitat losses, including the construction and operation of dams, surface water diversions, groundwater pumping, levees and flood control structures, bank stabilization within river channels and floodplains, transportation system improvements such as bridges and abutments, sand and gravel mining along rivers, and agricultural activities, including livestock grazing. Proposed Listing Rule at 61643-54.

However, the Service's assertion that Arizona has lost "90 to 95 percent" of its riparian habitat is patently false. It is equivalent to an urban legend that has no basis in fact, but continues to be repeated without reliable evidence to support it.

In their seminal text on long-term changes in riparian vegetation in the Southwest, *The Ribbon of Green* (University of Arizona Press 2007), hydrologists Robert H, Webb and Stanley A. Leake and botanist Raymond M. Turner have debunked the claim that Arizona has lost 90 to 95 percent of its riparian habitat. As the authors note in their introduction, this myth has been traced to a single paper on changes in cottonwood galley forests adjacent to a segment of the lower Colorado River. Prior to *The Ribbon of Green*, no one has attempted to systematically assess long-term changes in riparian vegetation along major rivers and streams in the region.

Using repeat photography at gaging stations and other locations with historic records, combined with research on historic reports, USGS flow data, and past floods and other significant events, Webb, Leake and Turner document changes in vegetation along southwestern rivers and streams, at elevations below 5,000 feet, that in some cases go back 140 years. The authors show that woody riparian vegetation has increased – sometimes dramatically – on almost every river system in the Southwest since the early twentieth century. *The Ribbon of Green* at 387-412 (summarizing changes in woody riparian vegetation). They explain: "In general, riparian vegetation has had either an increase (49 percent) or a large increase (24 percent) in comparisons involving all years ...." *Id.* at 388. Furthermore, "[w]oody riparian vegetation had increases in density and biomass in 73 percent of the [photographic] views and no change in 15 percent of the views." *Id.* at 387. The only areas with overall decreases were along the lower Colorado River where reservoirs are now present, the Santa Cruz River at Tucson, the Salt and Gila Rivers above their confluence, and the Mohave River downstream of Barstow, California. *Id.* at 388.

In terms of changes for selected woody riparian species, Fremont cottonwood increased in 59 percent of the views and decreased in only 24 percent of the views. *Id.* at 388. Black willow increased in 80 percent of the views, decreased in 10 percent and remained unchanged in 10 percent. *Id.* at 390. Coyote willow increased in 76 percent of the views, and seepwillow increased in 84 percent of the views. *Id.* at 390, 393. Mesquite increased in 61 percent of the views. *Id.* at 393. Non-native tamarisk increased in 88 percent of the views, but these increases generally occurred in mixtures with native species. Only a few sites had dense stands consisting only of tamarisk, which are located at reservoir deltas and river reaches where salinity is high. *Id.* at 393, 407.

The authors also noted that "[i]t is difficult to find evidence that cottonwood-willow stands were once extensive in the region, with the exception of the Colorado River delta in Mexico." *Id.* at 407. Instead, cottonwood-willow stands have been increasing:

> Abundant evidence suggests that [cottonwood-willow stands], or cottonwood along with other species such as Arizona ash, has increased, for example, along the San Pedro River and its tributaries, Havasu Canyon, the Virgin River, the Gila River between Coolidge and Ashurst-Hayden Dams, tributaries of the Santa Cruz River, the Bill Williams River, and the Mojave River.

Id. Thus, on a regional scale, riparian habitat has been increasing – dramatically in some locations – despite the panoply of threats alleged in the Proposed Listing Rule.

The Service has specifically discussed four locations in Arizona where multi-year YBCU surveys have been conducted: The Bill Williams River delta, upper San Pedro River, Sonoita Creek and Verde River. Webb, Leake and Turner evaluated each of these locations in detail and determined that woody riparian vegetation has increased significantly at each of them. *Id.* at 181-84 (Bill Williams River), 226-37 (San Pedro River), 274-77 (Sonoita Creek), 302-10 (Verde River). The authors noted, for example, that "[i]n the delta of the Bill Williams River, riparian vegetation has increased considerably, blocking several views upstream from Lake Havasu." *Id.* at 181. They also noted that the "increases in riparian vegetation [along the San Pedro River] are so large that they have been documented with satellite imagery." *Id.* at 226.

To paraphrase Mark Twain, reports of widespread losses of riparian habitat in the Southwest have been greatly exaggerated. In fact, woody riparian vegetation has increased along most rivers and streams in the region, as Webb, Leake and Turner document in *The Ribbon of Green*. Therefore, even if the YBCU is erroneously treated as a riparian obligate species (*see* WestLand Comments at 20-21), the amount of available riparian habitat has increased, eliminating the destruction of habitat as a basis to list the western YBCU population as threatened.

3. The Service's Proposed Rule Is Inconsistent with the Service's Recent Designation of Critical Habitat for the Southwestern Willow Flycatcher, Which Demonstrates that Large Segments of Riparian Habitat Exist in the Southwest.

The increases in riparian habitat documented in *The Ribbon of Green* are reinforced by the Service's recent designation of critical habitat for the southwestern willow flycatcher. *See Designation of Critical Habitat for Southwestern Willow Flycatcher*, 78 Fed. Reg. 344, 345-46 (Jan. 3, 2013) ("SWFL CH Rule"). The flycatcher is a small, insect-eating, neotropical migrant bird that breeds in the western United States throughout much of the range of the western YBCU population. *Id.* at 345-46 (background discussion on the flycatcher).

Like the YBCU, the flycatcher "builds nests, and forages where mosaics of relatively dense and expansive growths of trees and shrubs are established, near or adjacent to surface water or underlain by saturated soil." *Id.* at 346. Because of the substantial overlap in the range of the flycatcher and the YBCU, and the close similarity between the habitat used by these species for nesting and foraging, the Service's recent critical habitat designation for the flycatcher is relevant to the proposed listing of the western YBCU population. As explained below, the Service has determined that there are *over 2,000 miles* of rivers and streams with riparian habitat suitable for flycatchers. Many of these areas are capable of supporting YBCU, and in fact include rivers identified in the Proposed Listing Rule as being occupied by YBCU.

Under the ESA, critical habitat for a species must contain the "physical or biological features ... essential to the conservation of the species." 16 U.S.C. § 1532(5)(A)(i); *see also* 16 U.S.C. § 1532(5)(A)(ii). In designating critical habitat for the flycatcher, the Service identified the following two components as the primary constituent elements ("PCEs") of the physical and biological features essential to the conservation of the flycatcher:

> (i) *Riparian vegetation.* Riparian habitat along a dynamic river or lakeside, in a natural or manmade successional environment (for nesting, foraging, migration, dispersal, and shelter) .... and some combination of:
>
> (A) Dense riparian vegetation with thickets of trees and shrubs that can range in height from about 2 m to 30 m (about 6 to 98 ft). Lower-stature thickets (2 to 4 m or 6 to 13 ft tall) are found at higher elevation riparian forests and tall-stature thickets are found at middle- and lower-elevation riparian forests; and/or
>
> (B) Areas of dense riparian foliage at least from the ground level up to approximately 4 m (13 ft) above ground or dense foliage only at the shrub or tree level as a low, dense canopy; and/or
>
> (C) Sites for nesting that contain a dense (about 50 percent to 100 percent) tree or shrub (or both) canopy (the amount of cover provided by tree and shrub branches measured from the ground); and/or
>
> (D) Dense patches of riparian forests that are interspersed with small openings of open water or marsh or areas with shorter and sparser vegetation that creates a variety of habitat that is not uniformly dense....
>
> (ii) *Insect prey populations.* A variety of insect prey populations found within or adjacent to riparian floodplains or moist environments ....

SWFL CH Rule at 501. By law, these features must be present when the area is designated as critical habitat. "The Service may not cast a net over tracts of land with the mere hope that they will develop PCEs and be subject to designation." *Cape Hatteras Access Pres. All. v. Dep't of Interior*, 344 F.Supp.2d 108, 122-23 (D. D.C. 2004); *see also Home Builders Ass'n of N. Cal. v. U.S. Fish and Wildlife Serv.*, 268 F.Supp.2d 1197, 1214-16 (E.D. Cal. 2002).

Thus, the areas proposed and ultimately designated as critical habitat for the flycatcher consist of riparian land adjacent to rivers, lakes and streams with relatively dense and expansive blocks of trees and shrubs.

The Service initially published a proposed rule in which 2,090 stream miles were proposed for designation in Arizona, southern California, southern Colorado, southern Nevada, New Mexico and southern Utah. *See Designation of Revised Critical Habitat for Southwestern Willow Flycatcher,* 76 Fed. Reg. 50542, 50561-62 (August 15, 2011). In total, over 500,000 acres of land was identified as containing riparian habitat capable of supporting flycatchers. WestLand Resources, Inc., *General Comments on the 2011 Proposal To Designate Critical Habitat For Southwestern Willow Flycatcher* (Oct. 2011) (on file in Docket No. FWS-R2-ES-2011-0053).[7] All of the proposed critical habitat is located within the breeding range of the YBCU and includes rivers and streams reported to be used by YBCU, including the Kern River, Santa Clara River, Santa Ana River, San Luis Ray River, Colorado River, Bill Williams River, Virgin River, Verde River, Salt River, Santa Cruz River, San Pedro River, Gila River, San Francisco River, San Juan River, and Rio Grande. *See id.* at 50598-629 (descriptions and maps of proposed critical habitat).

In the final rule, areas were excluded from the flycatcher's critical habitat under ESA Section 4(b)(2), 16 U.S.C. § 1533(B)(2), primarily because these areas are already protected under various land management and conservation plans. SWFL CH Rule at 347, 385-87 (table), 389. These excluded areas totaled nearly 800 stream miles and included, for example, the middle and lower Colorado River segments, which were excluded based on the Lower Colorado River Multi-Species Conservation Plan and tribal management plans. *Id.* at 373-74. Other river and stream segments likewise were excluded based on habitat conservation plans, tribal management plans and similar conservation plans and strategies under which riparian habitat would be protected and conserved. *Id.* at 389-462.[8]

Consequently, of the 2,090 stream miles proposed as critical habitat for the flycatcher – which contain blocks of dense riparian vegetation suitable for the species' breeding and foraging requirements – 1,227 stream miles were designated as critical habitat and another 860 stream miles were determined to be adequately protected under current land management or conservation plans.

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[7] The lateral extent of the flycatcher's critical habitat is the "riparian zone," which is "the area surrounding the select river segment that is directly influenced by river functions." *Designation of Revised Critical Habitat for Southwestern Willow Flycatcher*, 76 Fed. Reg. at 50557, 50558.

[8] An additional 64 stream miles were excluded from the final critical habitat designation based on conservation plans developed by military installations under the Sikes Act, 16 U.S.C. § 670a. *Id.* at 381-84. Other minor adjustments were made to the proposed critical habitat based on correcting mapping errors and similar mistakes (e.g., excluding developed areas). *See id.* at 347-49.

In short, the recent critical habitat designation for the southwestern willow flycatcher demonstrates, consistent with *The Ribbon of Green*, that extensive riparian habitat exists on rivers and streams in the Southwest, including rivers occupied by YBCU during the summer breeding season. Furthermore, the YBCU uses a wider array of habitats, including smaller stands of xeroriparian and upland vegetation along small creeks and drainages with limited water, as indicated by the locations of YBCU in the proposed rule and as discussed in WestLand's comments. Consequently, there is substantially more suitable and potential habitat for YBCU than indicated in the Proposed Listing Rule, eliminating the loss of habitat as a legitimate threat to the species.

4. Additional Comments Regarding Alleged Threats to the YBCU.

According to the Service, the primary threat to the western YBCU population is the loss of riparian habitat caused by "altered hydrology resulting from decades of dam construction, channelization, water extraction, and other activities." Proposed Listing Rule at 61656. The other threat emphasized by the Service is the generic factor "Other Natural or Manmade Factors Affecting Its Continued Existence." *Id.* at 61659-61; *see* 16 U.S.C. § 1533(A)(1)(E). As explained by the Service:

> As noted in Factor A, habitat for the western yellow-billed cuckoo has been modified and curtailed, resulting in *only remnants of formerly large tracts of native riparian forests,* many of which are no longer occupied by western yellow-billed cuckoos. Despite recent efforts to protect existing, and restore additional, riparian habitat in the Sacramento, Kern, and Colorado Rivers, and other rivers in the range of the western yellow-billed cuckoo, these efforts offset *only a small fraction of historical habitat that has been lost.*

Id. at 61661 (emphasis added). As a result of this purported riparian habitat loss, the YBCU can only exist in "small and widely separated habitat patches," which, the Service argues, exacerbates other threats to the species, such as the use of pesticides in agricultural fields. *Id.*

Again, this analysis is based on several obvious errors, i.e., the assumptions that YBCU require large blocks of riparian habitat, that most riparian habitat in the West has been destroyed, and that much of the remaining riparian habitat is located in agricultural areas. The first two errors are discussed above, and the third error should be obvious, had the Service actually investigated the status of riparian habitat in the Southwest rather than assuming that virtually no riparian habitat exists.

Furthermore, in discussing this threat, the Service has relied heavily on anecdotal evidence from California, and in particular the Sacramento and San Joaquin River Valleys, rather than investigating YBCU habitat use and available riparian habitat throughout the species' range.

This "California-centric" focus is a problem throughout the rule. We suggest that a broader analysis be conducted which considers the entire range of the YBCU rather than focusing on habitat losses in the Central Valley.

Finally, we also note that the Service's analysis of Factor D, "The Inadequacy of Existing Regulatory Mechanisms," ignores the ESA. Proposed Listing Rule at 61656-59. This omission is problematic. Rivers and streams are habitat for numerous listed species throughout the West, and many of them have been designated as critical habitat for those species. The most obvious example is the southwestern willow flycatcher, discussed previously. Other listed species in Arizona include the Gila chub, Gila topminnow (no critical habitat), humpback chub, loach minnow, razorback sucker, spikedace, Sonora chub, Virgin River chub and woundfin. In addition, two highly aquatic snakes, the northern Mexican gartersnake and narrow-headed gartersnake, are currently proposed for listing.

The foregoing list is not complete. Obviously, there are many more listed species that occupy rivers and streams within the range of the YBCU (e.g., the Rio Grande silvery minnow). The point, however, is that in evaluating the adequacy of existing regulatory mechanisms, the Service should have identified all listed aquatic and riparian species within the range of the western YBCU population, and evaluated whether the conservation mechanisms for these species, including ESA Sections 7 and 9, will provide protection for YBCU habitat. It is rather incredible that the Service would ignore the statute it administers.

It is apparent that the Service has acted arbitrarily and unlawfully in treating YBCU in the western United States and Mexico as a DPS. It is also apparent that the Service has failed to conduct a thorough and objective review of the relevant scientific and commercial data, and instead has relied on speculation to justify the proposed listing of this group of cuckoos. Therefore, the Service should determine that the western population of the YBCU is not eligible for listing and issue a notice withdrawing the Proposed Listing Rule.

If you have questions or require any additional information, please feel free to contact me.

Sincerely,

FENNEMORE CRAIG, P.C.

Norman D. James

COMMENTS ON THE 2013 PROPOSAL BY U.S. FISH AND WILDLIFE SERVICE TO LIST THE WESTERN DISTINCT POPULATION SEGMENT OF THE YELLOW-BILLED CUCKOO (COCCYZUS AMERICANUS) AS THREATENED

Prepared for:

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Prepared by:

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FIGURES

(*follow text*)

1. INTRODUCTION

On October 3, 2013, the U.S. Fish and Wildlife Service (FWS) published a proposed rule (the Proposed Rule; FR 78 61622-61665) to propose the listing of the yellow-billed cuckoo (*Coccyzus americanus;* YBCU) in the western portions of the United States, Canada, and Mexico as threatened. On behalf of the Arizona Mining Association, WestLand Resources, Inc. (WestLand) has reviewed the Proposed Rule and the scientific data available that informs the findings and approach of the Proposed Rule. In our analysis we provide additional data and evidence that were not considered in the Proposed Rule. As outlined below, these data clearly indicate that YBCU that nest in the western portions of the United States are not a distinct population segment (DPS) as defined by FWS and thus are not eligible for listing as threatened in accordance with the requirements of the Endangered Species Act.

In this document, we first identify issues with the conclusion reached in the Proposed Rule that western YBCUs constitute a discrete DPS. Specifically,

- the Proposed Rule incorrectly concludes that breeding populations of eastern and western YBCUs are *markedly* separated by topography and unsuitable habitat, and
- the Proposed Rule does not use the best available science and misinterprets the available data to conclude that the difference in migratory timing between eastern and western YBCUs constitutes a *marked* genetic difference.

Next, we discuss several issues with the analyses and interpretation of the available scientific data presented in the Proposed Rule that are used to determine that a western DPS of YBCU is significant. These issues include:

- the Proposed Rule provides a misleading discussion of the available genetic data on YBCU,
- the Proposed Rule incorrectly concludes that egg width and length differ between western and eastern YBCUs and does not rely on the best scientific data available to conclude that differences in egg mass and eggshell thickness reflect differences in genetics,
- the Proposed Rule incorrectly concludes that juvenile bill color differs between western and eastern YBCUs and does not rely on the best scientific data available to conclude that differences in bill color reflect differences in genetics, and
- the Proposed Rule relies on analyses with statistical flaws and does not use the best scientific data available to conclude that body size differences reflect differences in genetics.

We also examine the available scientific data that the Proposed Rule uses to determine that western YBCU populations are low and declining throughout the range of the purported western DPS. Specifically:

- the Proposed Rule miscalculates the number of breeding pairs, improperly compares survey data, and inappropriately relies on extrapolated results to conclude that numbers of YBCUs have severely declined in western North America, and

- the Proposed Rule's analysis of YBCU in Mexico does not provide sufficient information to properly analyze the population dynamics and threats to habitat use of a purported western DPS of YBCU.

Finally, we consider flaws in the Proposed Rule's analysis of habitat use by western YBCUs. Specifically:

- The Proposed Rule does not use the best available science regarding habitat use of YBCU to conclude that habitat use differs *markedly* between eastern and western YBCUs an to analyze threats to western YBCU habitat.

We discuss each of these issues in more detail below.

2. ISSUES RELATED TO THE ANALYSIS OF THE DISCRETENESS OF A WESTERN DPS OF YBCU

The Proposed Rule relies on two main characteristics in the analysis of whether or not a purported western DPS of YBCU constitutes a discrete DPS: Geographic separation of western and eastern YBCUs and behavioral differences in migratory timing (Proposed Rule, pgs. 61627-61629). Our review indicates that the Proposed Rule neither used the best available science nor critically evaluated the scientific information used to arrive at these conclusions.

2.1 THE PROPOSED RULE INCORRECTLY CONCLUDES THAT BREEDING POPULATIONS OF EASTERN AND WESTERN YBCUS ARE MARKEDLY SEPARATED BY TOPOGRAPHY AND UNSUITABLE HABITAT

The Proposed Rule concludes that the height of the Rocky Mountains and the large areas of unsuitable habitat serve as a barrier that separates eastern and western breeding populations of YBCU. The Proposed Rule concludes that the area between the Rio Grande and Pecos River separates eastern and western YBCU in the Southwest because this area "*consists entirely of areas of unoccupied, unsuitable habitat for breeding yellow-billed cuckoos*" (Proposed Rule, pg. 61627). This statement is inconsistent with prior findings by FWS where they "*recognize that yellow-billed cuckoos within the described DPS are not wholly isolated from eastern yellow-billed cuckoo populations by the Rocky Mountain cres in west Texas, and to a lesser extent, further north*" (FWS 2001, pg. 38618). Several lines of evidence bring into question the conclusion by the Proposed Rule that eastern and western YBCUs are *markedly* separated from one another. This evidence includes reports of breeding YBCU in the areas between the Rio Grande and Pecos River, reports of western YBCU in Nebraska and eastern Colorado, direct evidence that YBCU move between the Rio Grande and Pecos River during the breeding season, and the possibility that eastern YBCU double breed in northwestern Mexico. In combination, these sources of evidence clearly demonstrate that there is not a marked geographic separation between western and eastern YBCUs.

The Proposed Rule identifies an area between western and eastern YBCU populations that separate the western DPS from other populations of YBCU (Proposed Rule, pgs. 61627-61628). In southern New Mexico and west Texas, this area specifically includes the "*Sangre de Cristo Mountains and Sacramento Mountains in central and southern New Mexico, the Guadalupe Mountains and Delaware Mountains on the Texas-New Mexico border, and the Davis Mountains, Del Norte Mountains, and Santiago Mountains in western Texas south to the Chisos Mountains in the Big Bend National Park on the border with Mexico*" (Proposed Rule, pg. 61627). However, detections of YBCU in June, July, and August are reported by eBird in most of the mountain ranges identified by the Proposed Rule. The Texas Breeding Bird Atlas identifies probable YBCU breeding in areas that include the Guadalupe Mountains, Davis Mountains, Del Norte Mountains, Santiago Mountains, Chalk Mountains, and the Chisos Mountains. In addition, confirmed breeding of YBCU have been reported in the Glass Mountains, which are also within the area between the Rio Grande and Pecos River (Fantina 1997).

Movement studies also provide strong evidence that YBCU breeding populations are not geographically separated by the physical barriers identified by the Proposed Rule. A YBCU tracked across an annual cycle bred along the middle Rio Grande in New Mexico, but used habitat along the Pecos River during a period in June, during the breeding season for eastern YBCUs along the Pecos (Kendrick 2012). Direct movement between the Pecos and Rio Grande rivers during the breeding season is a clear indication that this physical barrier does not preclude movement between western and eastern populations. Moreover, the tracked YBCU could have interacted with eastern YBCU breeding along the Pecos River, suggesting that there is a potential genetic exchange between populations. The fact that the only western YBCU that has been tracked across an annual cycle moves between eastern and western populations suggests that this type of movement may be relatively common. A similar overlap between eastern and western YBCUs is reported in Nebraska and eastern Colorado (Scharf 2001), although details, such as the time of year of the overlap, are lacking. Nevertheless, these data indicate that movement and genetic exchange between eastern and western YBCU breeding populations are not precluded by a geographic barrier.

The Proposed Rule does not analyze or discuss fully the available scientific data that suggests eastern YBCUs may migrate to southwestern North America to breed following breeding in eastern North America. Stable isotope data and abundance indices provide support for the hypothesis that at least some breeding YBCU in northwestern Mexico are eastern YBCUs double-breeding in western North America (Rohwer et al. 2009, 2012). Although data for double-breeding in YBCU remains inconclusive (see Rohwer and Wood 2013), the possibility remains that eastern YBCU double breed in western North America. This possibility would allow for the exchange of genetic information between eastern and western populations, and indicate that there is no geographic barrier between western and eastern YBCU. If eastern and western YBCUs readily move between eastern and western North America, then a western DPS of YBCU cannot be considered discrete from other populations of YBCU. Despite this possibility, and the consequences that these data have on understanding the discreteness of a western DPS of YBCU, these data are not fully discussed in the Proposed Rule.

2.2 THE PROPOSED RULE DOES NOT USE THE BEST AVAILABLE SCIENCE AND MISINTERPRETS THE AVAILABLE DATA TO CONCLUDE THAT THE DIFFERENCE IN MIGRATORY TIMING BETWEEN EASTERN AND WESTERN YBCU CONSTITUTES A MARKED GENETIC DIFFERENCE

The Proposed Rule relies heavily on the notion that differences in migratory timing between eastern and western YBCUs are 1) significant and 2) "*can only have developed as an evolved trait*" (Proposed Rule, pg. 61630). FWS neither analyzes nor discusses the available evidence that indicates that YBCUs could arrive earlier to the Southwest than is reported by the Proposed Rule, but may not be detected because of sampling bias. Furthermore, the Proposed Rule fails to acknowledge that migratory behavior is under both genetic and environmental control, and that phenotypic plasticity may buffer any genetic changes in migratory traits. Thus, the conclusion in the Proposed Rule that differences in migratory timing must reflect genetic differences is inappropriate, as environmental factors also influence migratory timing.

Although many authors report a difference in the timing of arrival to breeding grounds between eastern and western YBCU (e.g., Franzreb and Laymon 1993, Hughes 1999), some data indicate that western YBCUs could arrive in the Southwest much earlier than suggested by these authors. In particular, Hamilton and Hamilton (1965) provide data that indicate that when western YBCUs arrive to the Southwest they utilize upland habitats for weeks before moving to riparian breeding habitats. Published survey protocols for YBCU require that surveys not start until mid-June (e.g., Halterman et al. 2011). Further, surveyor effort is typically focused on riparian areas rather than upland areas during spring migration in the Southwest (e.g., Cerasale and Guglielmo 2010). Consequently, YBCU may arrive to the Southwest much earlier than thought, and simply not be detected because of temporal and spatial sampling bias. Detections compiled by e-Bird do not support this hypothesis, but they may also be subject to similar observer bias. Moreover, tracking data from the only western YBCU that has been followed throughout an annual cycle indicate that during spring migration, western YBCU use habitats in eastern North America and overlap temporally with breeding eastern YBCU (Sechrist and Best 2012). Thus, western YBCU may arrive to North America considerably sooner than currently thought, but use habitat that overlaps with breeding YBCU in eastern North America, and thus are not detected by observers as western YBCUs. As such, the difference in timing of spring migration between western and eastern YBCUs may not be as dramatic as suggested in the Proposed Rule.

Migration timing is subject to environmental factors such that a difference in timing of arrival to breeding grounds is not necessarily a reflection only of genetic differences between eastern and western YBCUs. The Proposed Rule cites Creswell et al. (2011) to conclude that the difference in timing of migration "*can only have developed as an evolved trait*" (Proposed Rule, pg. 61630). However, the Proposed Rule fails to discuss the role of phenotypic plasticity in the expression of migratory traits. Migratory traits may differ by individual or populations because of reactions to environmental factors that "*serve as a buffer against selection by effectively hiding genetic variation in the face of environmental variation*" (Creswell et al. 2011). Thus, differences in migratory timing can be due to environmental factors, such as food availability or climate variables, rather than genetic factors. Relatively low repeat abilities of spring

arrival across years within individuals are observed in some species of avian migrants, and lend credence to this possibility (Pulido 2007).

Empirical examples of such phenotypic plasticity in the arrival timing of avian migrants are quite prevalent in the literature. The arrival of American redstarts (*Setophaga ruticilla*) to breeding grounds is modulated by conditions on the wintering grounds; birds arrive later to breeding grounds as a result of drier conditions in the Caribbean (Stubbs and Marra 2007). Moreover, differences in timing of arrival between populations can be a result of different weather conditions experienced at separate wintering grounds (Stubbs and Marra 2007). Annual variation in timing of arrival in individual barn swallows (*Hirundo rustica*) is correlated with environmental conditions on the wintering grounds; favorable conditions during the winter are correlated with earlier arrival date (Saino et al. 2004). Environmental conditions *en route* to breeding grounds are also known to exert significant effects on arrival timing in migrants (e.g., Robson and Barriocanal 2011). Furthermore, the body condition of individual birds is a strong predictor of arrival at breeding grounds. Migrants that winter in suboptimal habitats arrive to breeding grounds later than those that winter in optimal habitat (e.g., Marra and Holmes 2001, Norris et al. 2004, Norris 2005, Studds and Marra 2005, 2007) and those that are born earlier or breed earlier arrive earlier to breeding grounds the following year (Sternberg and Grinkov 2006, Gunnarsson et al. 2005).

These data do not indicate that any of the identified environmental factors are necessarily responsible for migratory timing differences between eastern and western YBCUs. Rather, they illustrate that migration timing is flexible, can be dependent on environmental factors, and that differences in the timing of spring migration are not necessarily a reflection of genetic differences, bringing into question the assumption of the Proposed Rule.

The available data also suggest that YBCU breeding is tied to environmental conditions, such as variability in food resources (e.g., Nolan and Thompson 1975). Consequently, YBCU in western North America may arrive to breeding grounds considerably earlier than breeding commences to assess food availability and respond to the highly variable food resources on which they depend. Their use of upland habitats for weeks before breeding commences (Hamilton and Hamilton 1964) lends credence to the possibility that YBCU in western North America may arrive earlier than previously thought to the breeding grounds and continually assess changing environmental conditions before breeding at times of peak food availability. Moreover, the differential timing of breeding reported by Hamilton and Hamilton (1965) between YBCU breeding in California and Arizona suggests that adjustments by YBCU to variable environmental conditions may be responsible for the variability observed in the timing of breeding in YBCU across North America. Because of the annual variability in the food resources of YBCU, timing of breeding and spring migration is likely not under complete genetic control. Some level of phenotypic plasticity in the timing of breeding and migration, as is seen in irruptive avian migrants, is likely responsible for variation in these traits in YBCU.

3. ISSUES RELATED TO THE DETERMINATION IN THE PROPOSED RULE THAT A PURPORTED WESTERN DPS OF YBCU IS SIGNFICIANT

The Proposed Rule relies on two main considerations to determine that the western DPS of YBCU is biologically and ecologically significant to YBCU as a species: 1) evidence that the complete loss of the western DPS would result in a significant gap in the range of YBCU and 2) claims that a suite of four purported genetic characteristics differ markedly between eastern and western populations (Proposed Rule, pgs. 61629-61630). Little data is provided to support the first of these considerations. Evidence that a complete loss of the western DPS would result in a significant gap in the range of YBCU is limited to a simplistic analysis of the range of YBCU that does little to inform specifically how western YBCUs are biologically and ecologically significant to YBCU as a species.

In the sections that follow, we focus on the evidence presented in the Proposed Rule to support the conclusion that western and eastern YBCUs differ markedly in genetic characteristics. The available scientific data discussed by the Proposed Rule do not provide strong evidence to conclude that egg characteristics, bill color, and body size differ markedly between eastern and western populations of YBCU. Further, the scientific literature provides ample evidence that the minor differences actually observed are explained by environmental factors rather than genetic differences. [The conclusion by FWS that migratory timing in YBCU provides evidence that eastern and western populations differ markedly is discussed above in Section 2.2.]

3.1. THE PROPOSED RULE PROVIDES A MISLEADING DISCUSSION OF THE AVAILABLE GENETIC DATA ON YBCU

The Proposed Rule provides a short discussion of the available genetic studies of eastern and western YBCUs (Proposed Rule, pg. 61625), but does not provide necessary details from these studies that fully informs the analysis of genetic differentiation between YBCU populations. Briefly, FWS reports that Fleischer (2001) did not find genetic differences in two portions of the mitochondrial genome (Proposed Rule, pg. 61625). Rohwer et al. (2012) indicate that this analysis was based on a relatively large sample size: 26 eastern and 40 western YBCU. The Proposed Rule indicates that Pruett et al. (2001) found genetic differences between eastern and western YBCUs based on analysis of a different region of the mitochondrial genome (Proposed Rule, pg. 61625). However, this analysis was based on only five eastern and three western YBCUs (Rowher et al. 2012). The Proposed Rule also reports that Farrell (2006) did not find substantial genetic differences in mitochondrial DNA between eastern and western YBCU (Proposed Rule, pg. 61625). Importantly, the null results reported by Farrell (2006) were based on an analysis of the same region of mitochondrial DNA as Pruett et al. (2001). However, despite a much larger and more geographically dispersed dataset, Farrell (2006) could not replicate the results reported by Pruett et al. (2010). In addition, Rohwer et al. (2012) report that Dr. Fleischer could not replicate the results reported by Pruett et al. (2001).

The failure by independent efforts to replicate the results of Pruett et al. (2001) cautions strongly against their use to inform genetic differences between eastern and western YBCUs. The conclusion that there is no evidence of genetic differentiation between eastern and western YBCUs is also in agreement with

prior conclusions by FWS. In the 12-month finding for the petition to list the western YBCU, FWS discussed in detail genetic findings in YBCU and review of these findings by experts to conclude that all the reviewers "*agreed that there was a lack of differentiation between the eastern and western populations of yellow-billed cuckoo*" (FWS 2001, pg. 38618). Some reviewers suggested that nuclear markers may reveal more subtle differences, but FWS (2001) provides no data to inform this speculation. Nevertheless, the Proposed Rule improperly uses the conflicting results between Pruett et al. (2001) and Fleischer (2001) and Farrel (2006) to imply that future genetic studies using microsatellite markers are likely to reveal differing genetic structure between western and eastern YBCU populations (Proposed Rule, pg. 61625), and thus be supportive of the determination that a DPS for western YBCU is significant. This interpretation is, at best, a tenuous inference. The best available scientific data, two studies that were unable to replicate the study by Pruett et. al. (2001), argues strongly that there is not a substantive genetic difference between the purported western DPS of YBCU and the eastern population of YBCU.

In principle, FWS is correct in stating that "*microsatellite markers that have higher mutation rates…would better determine more subtle genetic differences*" than mitochondrial DNA (Proposed Rule, pg. 61625). However, the Proposed Rule fails to discuss fully the context behind the use of microsatellite markers. The high mutation rate of microsatellite markers makes them useful in studies of population genetics because they can readily detect genetic population structure (e.g., Balloux and Lugon-Moulin 2002). Because of their rapid mutation rate, microsatellites are also used extensively for assigning parentage to individuals (e.g., Dawson et al. 1997). Simply because microsatellites can detect subtle genetic differences does not mean that these genetic differences provide evidence for the existence of a subspecies or DPS. Extensive analysis of the significance and context of genetic difference is required. Substantial genetic differentiation between populations requires some restriction in gene flow, which would likely be detected by mitochondrial markers (e.g., Ball and Avise 1992). The Proposed Rule speculates that more rigorous genetic testing in the future will support distinction of a western DPS. Such speculation neither represents "the best available scientific information" nor represents existing evidence of a genetic difference between western and eastern populations of YBCU.

Despite finding no direct evidence of genetic differentiation between eastern and western YBCUs, the Proposed Rule uses the "conflicting" genetic results described above to imply that morphological and behavioral differences reflect the subtle genetic differences between eastern and western YBCUs that mitochondrial DNA could not. FWS (2001) provides a rationalization for the lack of genetic differentiation, as FWS states "*believe[s] that the existing western discrete population segment of yellow-billed cuckoos may represent an early stage of evolutionary differentiation*" (FWS 2001, pg. 38622). The Proposed Rule, however, provides no evidence to support this speculative conclusion but insists that morphological data provide evidence that eastern and western YBCUs differ markedly in genetic characteristics. In the sections below, we address some of the issues with the assumption that morphological differences reflect genetic differentiation between eastern and western YBCUs.

3.2. THE PROPOSED RULE INCORRECTLY CONCLUDES THAT EGG WIDTH AND LENGTH DIFFER BETWEEN WESTERN AND EASTERN YBCUS AND DOES NOT RELY ON THE BEST SCIENTIFIC DATA AVAILABLE TO CONCLUDE THAT DIFFERENCES IN EGG MASS AND EGGSHELL THICKNESS REFLECT DIFFERENCES IN GENETICS

The Proposed Rule cites a species description for YBCU, Hughes (1999), to argue that the eggs of western YBCUs are longer, wider, heavier, and thicker than eggs of eastern YBCUs (Proposed Rule, pg. 61629). Instead of reporting the actual measurements or these egg characteristics, however, the Proposed Rule reports findings in percentages (i.e., "*western YBC have 7.1 percent thicker eggshells"* Proposed Rule, pg. 61629). This approach is misleading to the public and decision-makers, and does not accurately reflect the data presented by the sources cited in Hughes (1999). A review of the range of actual measurements of egg length and width indicates considerable overlap between eastern and western populations. Actual measurements are only provided for egg length and width by the sources used by Hughes (1999) and measurements of eggshell thickness and egg mass provided by Schönwetter (1967) appear to be calculations, and are thus estimated[1].

A critical review of the available scientific data illustrates that even if egg dimensions were found to differ between populations, these differences are not necessarily a consequence of genetic differentiation. Although there is some evidence to suggest that egg structure can evolve rapidly in birds (e.g., Stein and Badyaev 2011), eggshell structure is also quite flexible. The Proposed Rule, however, ignores the well-established literature that demonstrates that phenotypic plasticity in egg structure and environmental influences on egg structure are prevalent across a wide range of avian species. Several studies also demonstrate that diet has a substantial effect on egg structure; calcium availability and habitat quality influence egg volume and eggshell thickness in a variety of avian species (e.g., Bebout and Hempleman 1993, Weimer and Schmidt 1998, Tilgar et al. 1999, Reynolds 2001, Hargitai et al. 2013). Female nutritional condition, influenced by environmental factors, is also associated with variation in egg structure (Hargitai et al. 2011). Female age is related to changes in eggshell thickness and other egg structure characteristics (e.g., Massaro and Davis 2004). Phenotypic flexibility in egg structure has also been shown directly in chickens in relation to altitude; when switched to high elevations, females change the structure of their eggs, including laying thinner eggshells (Hempleman et al. 1992, 1993). Exposure to environmental toxins, such as DDT, is a classic example of how environmental factors are known to affect egg structure by the thinning of eggshells (e.g., Ratcliffe 1970, Lincer 1975, Grier 1982, Blus 1984).

Even if differences in egg structure were demonstrated to be completely genetically controlled, FWS incorrectly concludes that the larger eggs and thicker shell are "*evolved traits[s] that would help yellow-billed cuckoos in the west to cope with potential higher egg water loss in the hotter, drier, conditions of western North America*" (Proposed Rule, pg. 61629). Although larger and thicker eggs could be evidence of genetic adaptation to environmental conditions in the Southwest, this conclusion is not necessarily true. For example, eggshells are thicker and eggs are heavier in house finches (*Haemorhous mexicanus*) in Alabama than in house finches in southern Arizona (Stein and Badyaev 2011). Thus, the assumption by

[1] Note that Laymon and Halterman (1987) report an average eggshell thickness, but no measurements of variance.

FWS that egg differences in YBCU likely provide some adaptive value to reduce egg water loss is not appropriate without empirical data, and does not reflect the best available science.

Further discussion of the differences in egg dimension provided in the proposed rule is provided below.

3.2.1. Egg Length and Width

As Hughes (1999) reports, the available data clearly show that length of eggs overlap considerably between western and eastern YBCUs. Schönwetter (1967) reports a mean egg length of 30.6 mm (range 27.4-34.6 mm) in eastern YBCU and mean length of 30.8 mm (range 27.4-35.5 mm) in western YBCUs. According to Hughes (1999), Bent (1940) reports a mean length of 30.7 mm (range 29.58-33.2 mm) for eastern YBCUs and a mean length of 31.1 mm (range 27.5-35.5mm) in western YBCUs. Yet, despite the considerable overlap in egg length between eastern and western YBCUs, FWS calculates a percent difference of 1.2 percent in the mean length and 0.6 percent in the mean width to conclude that these characteristics differ markedly between eastern and western YBCU.

Data from the measurement of the length and width of individual eggs are not available. However, because means and ranges are provided for these measurements, we can calculate a *t*-test to compare these data under the assumption that data are normally distributed and thus, standard deviation is one-quarter of the range (Ott and Longnecker 2010). Under these statistical assumptions, there is no statistically significant difference between eastern and western YBCUs in either egg length or width, regardless of which dataset, Schönwetter (1967) or Bent (1940) is used (*t*-tests, all $P>0.07$). Even if our statistical assumptions are not valid, the reported differences between eastern and western YBCUs in egg dimensions are so small given the relatively large sample size (N=160 for data presented by Schönwetter 1967), that these differences likely have little biological meaning. Large sample sizes and small absolute differences can result in difference in morphological variables that have no meaningful biological significance (e.g., Banks 1990).

Egg dimensions are also known to vary considerably within and among populations and within clutches of avian migrants. In fact, intra-clutch and intra-population variation of eggshell structure can be considerably higher than the percent difference in mean egg length and width reported by the Proposed Rule to distinguish eastern and western populations of YBCU (e.g., Massaro and Davis 2005, Ruuskanen et al. 2011, Hargitai 2011, 2013, Morales et al. 2013). The substantial overlap in measurements, the small difference in mean values reported, and the non-significant statistical differences in egg structure between eastern and western YBCU clearly illustrate that the assertion in the Proposed Rule that differences in egg width and length differ markedly between eastern and western YBCUs is not justified.

3.2.2. Egg Mass and Eggshell Thickness

The Proposed Rule reports that eggs of YBCU in western North America are 3.2 percent heavier and 7.1 percent thicker than YBCU in eastern North America (Proposed Rule, pg. 61629). Hughes (1999) cites Schönwetter (1967) to report the mass of fresh eggs and eggshell thickness in eastern and western

populations of YBCU pre-DDT[2]. Schönwetter (1967) does report means and ranges of some egg parameters that were measured, including egg length, egg width, and the mass of dried eggshells[3], however, fresh egg mass and eggshell thickness were not actually measured, and appear to have been calculated from other measurements. Consequently, the small differences in egg mass and eggshell thickness between eastern and western populations of YBCU reported by Hughes (1999) are not based on actual measurements of these characteristics.

In addition, the Proposed Rule reports percent differences in the characteristics from the calculated values reported by Hughes (1999) rather than the actual numbers reported by Hughes (1999). As a result, the 7.1 percent difference in eggshell thickness reported by the Proposed Rule actually equates to a difference of 0.01 mm in calculated eggshell thickness (western populations = 0.14 mm; eastern populations = 0.13 mm [Schönwetter 1967, Hughes 1999]). Similarly, the 3.2 percent difference in egg mass reported by the Proposed Rule equates to a 0.3 g difference in calculated egg mass (western populations = 9.4 g; eastern populations = 9.1 g [Schönwetter 1967, Hughes 1999]). The manner in which these data are presented in the Proposed Rule creates the false impression that differences in egg mass and eggshell thickness are larger than data indicate. Based on a critical review of the available scientific information, there is no evidence to suggest that egg mass and eggshell thickness differ markedly between eastern and western YBCUs, and that the small reported differences are biologically-significant.

3.3. THE PROPOSED RULE INCORRECTLY CONCLUDES THAT JUVENILE BILL COLOR DIFFERS BETWEEN WESTERN AND EASTERN YBCUS AND DOES NOT RELY ON THE BEST SCIENTIFIC DATA AVAILABLE TO CONCLUDE THAT DIFFERENCES IN BILL COLOR REFLECT DIFFERENCES IN GENETICS

The Proposed Rule cites differences in juvenile and adult bill color as an example of the marked difference in genetic characteristics between eastern and western YBCUs. A review of the available scientific data, however, does not support the conclusion that bill color differs between eastern and western YBCUs. The Proposed Rule also fails to discuss the available scientific data that indicate that environmental factors can have a substantial influence on bill color.

3.3.1. Juvenile Bill Color

Available scientific data indicate that juvenile bill color does not differ between eastern and western YBCUs. The Proposed Rule cites Oberholser and Kincaid (1974) as evidence that juvenile YBCUs in the eastern North America have yellow bills and references Franzreb and Laymon (1993) as evidence that juvenile YBCUs in the western North America have black bills. Neither of these sources contains empirical data to support their conclusions. The former is a species account that does not provide explicit citations for the data presented. The latter provides a simple statement at the end of the document that states "*young cuckoos in California have all-black bills for at least three weeks after leaving the nest, whereas juveniles in the east are said to have yellow bills (Oberholser and Kincaid 1974)*" (Franzreb and Laymon 1993, pg. 26). Yet, no data are provided by Franzreb and Laymon (1993) to support their

[2] Laymon and Halterman (1987) is also cited, but provides no data on eastern populations for a direct comparison.
[3] Note that Hughes (1999) misreports the range of dry eggshell mass reported by Schönwetter (1967).

observations of YBCU in California, and the juxtaposition with eastern birds is suspect given the lack of data provided by Oberholser and Kincaid (1974). FWS (2001) acknowledges the lack of empirical evidence to support differences in juvenile bill color when it states that "*since bill color in juveniles changes from grayish, to yellow and black around the age of 60 days (Hughes 1999), this reported difference needs to be verified, taking into account juvenile age*" (FWS 2001, pg. 38622). Why the Proposed Rule's conclusion differs from the conclusions of FWS (2001), despite no additional information, is unclear.

Hughes (1999) does not report a difference in juvenile bill color, but does report the findings of Potter (1980) concerning juvenile YBCUs in eastern North America. Potter (1980) reports that juvenile YBCU in North Carolina "*look exactly like the adults except for their short tails…and the absence of yellow on the slightly stubby bill. The lower mandible is mostly light gray, becoming slightly darker toward the tip. The light gray areas appear to correspond to the parts of the mandibles that will become yellow later in the summer*" (Potter 1980, pg. 24). Later in the summer, the author observed a juvenile YBCU that had a bright yellow and black bill (Potter 1980). Consequently, Hughes (1999) reports that bills of juvenile YBCU become yellow about the age of 60 days. This result is also reflected in Sibley (2000), who distinguishes "young juveniles" from other "juveniles." According to Sibley (2000), the former "briefly lacks yellow on bill" while the latter has a "mostly yellow bill."

The fact that juvenile YBCUs in eastern North America develop yellow bill coloring several weeks after fledging contrast with the conclusions of Franzreb and Laymon (1993) that juveniles of eastern and western YBCU populations differ in bill color. The authors found that the bills of YBCU in California are black for at least three weeks after leaving the nest, indicating that they did not observe birds older than approximately 30 days[4]. This information is not reported by the Proposed Rule. The fact that Franzreb and Laymon (1993) did not observe older fledglings, however, is consistent with findings in eastern juvenile YBCUs; yellow bills do not develop until several weeks after fledging (Potter 1980). Thus, the available scientific literature indicates that bill color in juvenile YBCUs in both eastern and western North America is black, and yellow coloration develops several weeks after fledging. The Proposed Rule, however, does not include data presented by Hughes (1999) or Potter (1980), and thus erroneously concludes that juvenile bill color in YBCU differs between western and eastern populations, when in fact available data indicate that juvenile bill color does not differ between western and eastern YBCU.

3.3.2. Adult Bill Color

There are no data provided by the Proposed Rule, and we found none in the scientific literature, to support the conclusion that adult bill color differs between eastern and western YBCUs Further, the scientific literature contains many studies (some are cited below) that illustrate that bill color is strongly influenced by environment and thus, absent corroborating experimental or specific genetic data, is not a recommended indicator of genetic differences between populations.

[4]Hughes (1999) reports that nestling YBCs fledge at age 7 to 9 days.

The Proposed Rule cites Franzreb and Laymon (1993) and a letter written by Laymon to FWS (Laymon 2000) to conclude that the color of the lower mandible in adults distinguishes western and eastern YBCU. As discussed above, Franzreb and Laymon (1993) provide no empirical evidence to support their claim of this difference in bill color between eastern and western YBCU. The data presented by Laymon's letter to FWS is not known to us, but to our knowledge data to support this claim has not been published in scientific journals. Neither Pyle (1997) nor Hughes (1999) mentions this distinction, and the Proposed Rule provides no empirical evidence to support the assertions made by Franzreb and Laymon (1993) and Laymon (2000). Moreover, regarding the hypothetical differences in adult bill color proposed by Franzreb and Laymon (1993), FWS (2001) states that "*no scientific data are available to verify this, and the reported difference has not been the subject of a published scientific study*" (FWS 2001, Proposed Rule pg. 38622). Why the Proposed Rule's conclusion differs from the conclusion of FWS (2001), despite no new evidence, is unclear.

Although variation in bill color in known to occur across avian populations (e.g., Burley et al. 1992), such variation is not necessarily a consequence of genetic differentiation. Bill color is subject to environmental conditions, including diet. In particular, carotenoid coloration, such as most yellow and red feather and bill coloration, have low heritabilities, meaning that coloration is more sensitive to environmental factors than to genetic inheritance (Roulin and Ducrest 2013). Indeed, environmental influence on bill color has been well documented in a wide range of avian families. These environmental factors that influence bill color include the availability of dietary carotenoids, body condition, environmental stress, and immune activity (McGraw et al. 2004, Blount et al. 2003, Faivre et al. 2003, Alonso-Alvarez et al. 2004, McGraw and Ardia 2004, Eraud et al. 2007, Smith et al. 2007, Hill et al. 2009, Navarro et al. 2010, Barbosa et al. 2012). Moreover, bill color can change extremely rapidly, i.e., within days (Ardia et al 2010, Rosen and Tarvin 2006), indicating that bill color is a particularly plastic trait. For example, manipulation of dietary carotenoids changes the yellow bill coloration of the American goldfinch (*Spinus tristis*) and the red bill coloration of the zebra finch (*Taeniopygia guttata*) (Alonso-Alvarez et al. 2004, Rosenthal et al. 2012). The prevalence of carotenoids in the food available to gentoo penguins (*Pygoscelis papua*) is correlated with bill color (Barbosa et al. 2012). Thus, the variation in bill color purported by Franzreb and Laymon (1993) can be influenced by environmental factors and does not constitute strong evidence for genetic differences between eastern and western YBCUs

3.4. THE PROPOSED RULE RELIES ON ANALYSES WITH STATISTICAL FLAWS AND DOES NOT USE THE BEST SCIENTIFIC DATA AVAILABLE TO CONCLUDE THAT BODY SIZE DIFFERENCES REFLECT DIFFERENCES IN GENETICS

The Proposed Rule suggests that wing length, tail length, bill size, and bill depth of YBCU vary to such an extent that the combination of these traits separates YBCUs from eastern and western populations (Proposed Rule, pg. 61629). These morphological metrics are purported to be genetically-based characteristics that differ markedly between populations. However, there is ample evidence in the scientific literature that indicates that environmental factors influence body size characteristics. Furthermore, use of plumage measurements should be viewed with caution because of the influence of age and feather wear. We also show that the statistical analyses performed by Franzreb and Laymon (1993) needs to be viewed with some skepticism because they do not account for the effect of unbalanced

sample size in their analysis. The differences in body size reported by FWS are not strong evidence to justify the conclusion that a western DPS of YBCU is biologically and ecological significant to the species. Additionally, this assumption is inconsistent with previous conclusions presented by FWS (2001) that the purported size differences between eastern and western YBCU "*are not strong, and may be clinal. We believe that these differences merit further analysis, with greater sample sizes and using a greater number of morphological characteristics*" (FWS 2001, pg. 38622). Further discussion of these factors is provided below.

3.4.1. Cautions on the Use of Plumage Measurements

The use of wing length and tail length as indicators of differences in body size or condition has been explicitly cautioned against because of the influence of wear and age on feathers. For example, wing length in individual birds changes as an individual ages (Leverton 1989, Omerod and Taylor 1990), and tail length is also influenced by wear (Franzreb and Laymon 1993). Moreover, measurements of wing length can change with environmental conditions during measurement; high humidity can result in longer wing length measurements (Leverton 1989). Despite the caution suggested in the scientific literature, the Proposed Rule relies heavily on differences in wing length and tail length to conclude that western YBCUs are markedly different than eastern YBCUs.

3.4.2. Environmental Variation and Body Size Measurements

The Proposed Rule does not discuss or analyze the available data that indicates that body size metrics are influenced by environmental factors. In particular, temperature and food availability during development appear to influence bill and tarsus length (Rhymer 1992, Leafloor et al. 1998). Diet quality during development also has a significant influence on body size (e.g., Boag 1987). Moreover, intra-clutch variation in bill shape is significantly influenced by hatching order, as well as time of year that breeding takes places (Sockman et al. 2012). This pattern is also seen in relation to brood size (De Kogel 1997) whereby individuals that develop as part of larger broods have smaller wings, tarsi, and bill depth. As such, differences in size components of birds are not necessarily regulated entirely by genetics, as is concluded by the Proposed Rule. Rather, environmental factors can have substantial effects on body size components such as wing length, tarsus, and bill length and depth.

In addition to the effects of environmental factors on structural size during development, bill size and shape can change seasonally in birds in relation to foraging activity. For example, bill length and depth vary considerably between seasons in nuthatches (*Sitta europaea*). These differences are attributed to differential bill wear as a result of variation in foraging behavior (Matthysen 1989). Foraging on seeds and increased foraging activity is correlated with bill wear (Matthysen 1989). Moreover, changes in bill shape lag switches in diet, i.e., environmental effects on bill shape during the winter are reflected during the spring and summer (Matthysen 1989). YBCU also have seasonal variation in diet; Hughes (1999) reports that they eat seeds more frequently in the winter, and changes in bill morphology could be influenced by diet during other periods of their life cycle, although evidence for this possibility is lacking.

3.4.3. Statistical Issues with Discriminate Analysis

The Proposed Rule relies on the findings of Franzreb and Laymon (1993) to conclude that separation of eastern and western populations of YBCU is supported by morphological differences. Specifically, Franzreb and Laymon (1993) used a discriminant analysis in an attempt to split eastern and western YBCUs into distinguishable groups. The authors concluded that substantial differences in body size, i.e., wing length, tail length, bill length, and bill depth, between eastern and western YBCUs exist and the discriminant function correctly categorizes 74.6 to 89.6 percent of individuals. The Proposed Rule interprets this as "*evidence that the discrete population segment differs markedly from other population of the species in its genetic characteristics*" (Proposed Rule, pg. 61630).

Notwithstanding the inappropriate assumption that differences in morphology equate to genetic differences and the caution that should be taken when interpreting differences in feather measurements (see above), the Proposed Rule inappropriately interprets the results presented by Franzreb and Laymon (1993) and overstates the predictive capability of their findings. Specifically, the statistical approach taken by Franzreb and Laymon (1993) assumes *a priori* that eastern and western YBCU are two biologically-relevant and distinct groups. Thus, the results do not explicitly test for the existence of a western DPS. Furthermore, Franzreb and Laymon (1993) did not correct their analyses to account for the strong influence that unbalanced sample sizes have of the correct categorization of individuals.

Given an assumed number of groups, discriminant function analysis will combine the variables of interest (i.e., wing length, tail length, bill length, and bill depth) to best categorize these measurements into the two groups that were assumed *a priori*. This analysis will split data into two groups regardless of whether or not these groups are actually biologically-relevant. Thus, the discriminant analyses described by Franzreb and Laymon (1993) do not constitute direct evidence that there are two groups of YBCU that differ markedly. Rather the analyses simply provide evidence that some linear combination of morphological measurements can be used to distinguish between the two groups assumed to already exist by the authors. The statistical test used by Franzreb and Laymon (1993) to determine the statistical significance of the discriminant function, Wilk's lambda, does not test for a significance of the groups, but rather tests if the variables identified, i.e., wing length, tail length, bill length, bill depth, contribute to the discriminant function. The authors do not provide information, such as the performance of a discriminant function that categorizes individuals into three or more groups, which would allow for a comprehensive understanding of the biological significance of the two assumed groups. For example, assuming that more groups exist may reveal that the difference in body measurements in YBCU is clinal, as is seen in several species of birds in North America (e.g., James 1970, 1983, 1991, Aldrich and James 1991). Consequently, the results presented by Franzreb and Laymon (1993) and the conclusion that there are two groups of YBCU are, at least in part, a function of the *a priori* assumption by the authors rather than evidence that eastern and western YBCUs differ markedly in body size measurements.

The predicted categorization of individuals into eastern and western groups is also inappropriately interpreted and overstated by Franzreb and Laymon (1993). The authors neglected to control for the improvement of the classification over random chance. In discriminant analysis, unbalanced sample sizes are a serious problem because the probability of correctly grouping an individual by chance increases as

the difference in sample sizes among groups increases (Titus et al. 1984, White and Ruttenberg 2007). In Franzreb and Laymon (1993), the groups had sample sizes of 136 eastern males and 59 western males, and 120 eastern females and 48 western females. This disparity provides for unknown posterior chances of correct categorization which can lead to prediction rates that are biased high (Titus et al. 1984).

Statistical corrections are available (e.g., Cohen's Kappa; Titus et al. 1984) to interpret more appropriately the results of discriminant analyses. Cohen's Kappa corrects for the elevated chance of correctly categorizing individuals by chance because of unbalanced sample sizes. This metric is interpreted as a percent increase in correct classification over chance (Titus et al. 1984). We calculated Cohen's Kappa for the results presented by Franzreb and Laymon (1993) and found that in females, the discriminant analysis increased the correct classification to groups by 72 percent over chance alone, but by only 56 percent over chance alone in males. Thus, the statements by Franzreb and Laymon (1993) and the Proposed Rule that morphological measurements can correctly categorize nearly 86-90 percent of YBCU is overstated, and the results presented by Franzreb and Laymon (1993) cannot be considered conclusive evidence of a marked difference among eastern and western.

4. ISSUES RELATED TO YBCU POPULATION TRENDS

The Proposed Rule concludes that western YBCU populations are small and declining based on analyses of historic YBCU survey data and observations. Our review of FWS' analysis and the available survey data revealed several flaws in the analysis and interpretation of available data that likely overestimated the purported population declines. In particular, the Proposed Rule miscalculates numbers of breeding YBCU, improperly compares survey data, and relies on extrapolated results in the analysis of population trends of YBCU in western North America. Moreover, the data presented in the Proposed Rule suggest that FWS does not have adequate information on YBCU in northwestern Mexico to analyze properly the population dynamics and threats to western YBCUs. Given that FWS believes that half of the breeding population of western YBCUs occurs in Mexico, better information on the population status of YBCU in Mexico is imperative before a comprehensive and substantial analysis can be completed of population trends, potential threats, and the biological and ecological significance of western YBCUs.

4.1. THE PROPOSED RULE MISCALCULATES THE NUMBER OF BREEDING PAIRS, IMPROPERLY COMPARES SURVEY DATA, AND INAPPROPRIATELY RELIES ON EXTRAPOLATED RESULTS TO CONCLUDE THAT NUMBERS OF YBCUS HAVE SEVERELY DECLINED IN WESTERN NORTH AMERICA

The analysis of YBCU population trends in western North America presented in the Proposed Rule is flawed and likely overestimates the decline of western YBCU. Specifically, the Proposed Rule inappropriately uses survey data derived from the extrapolation of YBCU detections across un-surveyed areas to compare baseline numbers of YBCU with current surveys of YBCU that use different survey protocols that are more conservative in their estimation of the number of breeding pairs. Miscalculations by the Proposed Rule also artificially inflate the estimates of baselines numbers of YBCU that were present along rivers in the Southwest. Moreover, the Proposed Rule does not appear to include evidence of breeding YBCU in smaller riparian areas in Arizona in its estimate of the current number of breeding

pairs purported to exist. Consequently FWS' conclusion that the number of breeding pairs of western YBCU is low and has dropped precipitously in the Southwest is likely exaggerated. Below, we discuss these issues by state in the southwestern U.S. These states support the bulk of known breeding habitat for YBCU and the largest populations of western YBCU in the U.S.

California

The Proposed Rule claims that YBCU in California historically numbered approximately 15,000 pairs (Proposed Rule, pg. 61637). However, FWS (1985), the source of this estimate, based this conclusion on an inappropriate extrapolation of survey data. As stated by FWS (1985), the estimate of 15,000 pairs is an "educated guess" based on the amount of riparian habitat thought to have historically occurred in California and the amount of YBCUs present in 1977 and 1985 in remaining riparian habitat within California. FWS (1985) simply multiplied the density of YBCU in 1977 and 1985 in a limited area along the Sacramento River by the estimated acreage of forested habitat in the Sacramento Valley. No apparent attempt was made to account for annual variation in YBCU survey numbers. No analyses were performed to inform the assumption that all historic riparian forest in Sacramento Valley was suitable habitat for YBCU. No analyses were performed to test the assumption that the quality of all historic riparian habitat in the Sacramento Valley was equal to the quality surveyed in 1977 and 1985. No analyses were performed to test the assumption that the density of YBCU was equal across all historic riparian habitat. As stated in Grinnel and Miller (1994) the species was only "common" to "fairly common" in a "few most-favorable localities" suggesting that the species was never abundant throughout riparian forests in California. Clearly, the resulting estimate of a minimum of 15,000 pairs in California is highly speculative and likely an overestimate of the number of YBCU that were historically present in California. Consequently, although declines in YBCU breeding pairs likely occurred in California, the magnitude of decline from historic numbers is likely severely overstated in the Proposed Rule.

Arizona

The analysis and discussion of survey data from Arizona by the Proposed Rule is subject to similar issues with the extrapolation of survey results. At the Bill Williams River Delta, the Proposed Rule reports an estimate of 57 breeding pairs of YBCU during the mid-1970s. This estimate is based on an extrapolation from surveys conducted along the lower Colorado River in 1975 and 1976; "*Since 1974, B.W. Anderson, R.D. Ohmart and their co-workers have been censusing bird densities along the Lower Colorado River. By extrapolation of their data, they estimated a population of 244 cuckoos between Davis Dam and the Mexican border (Anderson pers. comm.) and an additional 114 near the mouth of the Bill Williams River (Ken Rosenberg pers. comm.)*" (Gaines and Laymon 1984, pg. 71). Note that Gaines and Laymon (1984) report detections of YBCU, not breeding pairs. FWS apparently divided extrapolated numbers of cuckoos by 2 to calculate the breeding pairs reported in the Proposed Rule. No justification is provided by the Proposed Rule for the implicit assumption of this calculation that all YBCU are breeding and sex ratio is equal, despite the fact that unmated males are reported in populations of western YBCU (Laymon and Halterman 1989). Thus, the number of pairs in the 1970s reported by Gaines and Laymon (1984) is not the number of YBCU pairs detected at the Bill Williams River, but rather an extrapolated value from the number of YBCU detections and some measure of survey effort. The number of detections and level of survey effort used to extrapolate the number of breeding pairs along the Bill Williams River in the 1970s,

however, are not reported by Gaines and Laymon (1984). Surveys conducted by Gaines and Laymon in 1977 do provide insight into the degree of extrapolation that may have been performed by Anderson and Rosenberg. At 16 sites throughout the lower Colorado River, Gaines and Laymon (1984) report 64 detections of YBCU, which were interpreted to support the extrapolation of Anderson and Rosenberg of 358 breeding pairs. Thus, moderate detections of YBCU were likely extrapolated to large estimates of breeding pairs by assuming that some proportion of un-surveyed areas were occupied at similar densities to occupied areas. Although Gaines and Laymon (1984) state that they found no evidence that suitable habitat was unoccupied, they provide no data to support this claim, and do not test the assumption that YBCU densities were equal throughout surveyed and un-surveyed riparian habitat.

Later surveys along the Bill Williams River are not comparable to the extrapolation reported by Gaines and Laymon (1984). These later surveys used more intensive protocols that were conservative in the estimation of breeding and did not extrapolate results to un-surveyed areas (e.g., Halterman 2003, Johnson et al. 2008, McNeil et al. 2013). Consequently, the number of breeding pairs estimated by these surveys will likely be lower for a given number of detections than if detections were extrapolated to un-surveyed areas. Thus, the purported decline in YBCU along the Bill Williams from 57 extrapolated pairs in the mid-1970s to 9 to 23 pairs in 2011 may simply be a result of differing survey protocols; extrapolation estimates are likely to be biased high, and more conservative protocols are likely to underestimate the number of breeding YBCU at a given site[5].

Similarly, along the lower Colorado River, the Proposed Rule compares extrapolated estimates of breeding YBCU in the mid-1970s reported by Gaines and Laymon (1984) to recent surveys that used protocols that are more conservative in the estimation of breeding pairs (e.g., Johnson et al. 2008, McNeil et al. 2012). Moreover, the Proposed Rule incorrectly includes YBCU at the Bill Williams River Delta in estimates of YBCU breeding pairs along the lower Colorado River. As stated above, FWS apparently halved the number of extrapolated detections provided by Gaines and Laymon (1984) to calculate the number of breeding pairs in the mid-1970s. For the lower Colorado River, however, the Proposed Rule appears to have totaled YBCU estimates from the Bill Williams River Delta (114 extrapolated YBCU) and the lower Colorado River (244 extrapolated YBCU) to arrive at an estimate, following an assumed arithmetic error[6], of 180 breeding pairs (Proposed Rule, pg. 61640). Gaines and Laymon (1984), however, only report an extrapolated estimate of 244 YBCU for the lower Colorado River. Thus, even if we assume an equal sex ratio and that all YBCU were breeding, the correct extrapolated number of breeding pairs along the lower Colorado River in the mid-1970s is 122. Surveys in 2012 estimated 30-61 YBCU breeding territories along the lower Colorado River, exclusive of the Bill Williams River (McNeil et al. 2012). Consequently, the assumed decline of YBCU breeding pairs along the lower Colorado River is exaggerated not only because of the extrapolation of surveys in the 1970s, but also by the inclusion of data from the Bill Williams River in these extrapolated estimates.

Along the upper San Pedro River, the Proposed Rule reports data from YBCU surveys from 2001 to 2007 that do not indicate a declining population. However, the Proposed Rule also reports observations of

[5] Note that to our knowledge, detection probability, which could affect the estimation of the number of YBC breeding pairs, is not incorporated into either the extrapolation methods reported by Gaines and Laymon (1984) or the estimation of breeding pairs in more recent protocols.
[6] By this method, 358 total YBC dived by 2 equals 179 breeding pairs.

YBCU from southwestern willow flycatcher (SWFL; *Empidonax traillii extimus*) surveys conducted along the San Pedro River in 2001, 2002, and 2009 to conclude that a long-term downward trend exists for YBCU along the San Pedro River. There are several issues with these data that indicate that this conclusion is inappropriate. First survey effort and observer ability likely differed among these surveys, as is admitted by the Proposed Rule (Proposed Rule, pg. 61640), and comparison among them to infer trends is not appropriate. Second, the temporal dataset (2001, 2002, 2009) is not of sufficient temporal length to provide strong evidence of any long-term trend, particularly considering the high degree of annual fluctuation in YBCU numbers reported by Halterman (2007) along the San Pedro River. Third, the use of observations during callback surveys for another species to infer long-term downward trends in YBCU is inappropriate; surveyors were not specifically looking for, and presumably were not conducting callback surveys for YBCU during SWFL surveys. Furthermore, protocol-level surveys for SWFL (Sogge et al. 2010) are not conducted throughout the breeding season of YBCU, as is required by protocols for YBCU surveys (e.g., Halterman et al. 2011). The combination of these issues creates the perception that the Proposed Rule arbitrarily decided which data to use in order to overstate the decline in YBCU populations in western North America.

The result of the issues related to the estimation and presentation of YBCU trends in Arizona calls into the question the conclusion that *"[YBC] populations in Arizona have declined 70 to 80 percent over the last 30 years, with recent declines since approximately 2000 at some of the largest populations (for example, San Pedro River)*" (Proposed Rule, pg. 61640). Because of the extrapolation issues and mistakes in the interpretation of survey data, it is likely that this decline is overstated. In addition, it appears that the Proposed Rule does not include known populations of YBCU in riparian oak woodland in other, smaller riparian areas, such as oak-dominated drainages in the Patagonia Mountains (WestLand 2013), as well as potential populations in at least some of the many locations in Arizona identified by the Proposed Rule to contain breeding YBCUs (Proposed Rule, pg. 61639). These issues suggest that the numbers of YBCU purported to currently breed in Arizona are inaccurate and are likely higher than reported by the Proposed Rule.

New Mexico

The analysis and discussion of survey data from New Mexico by the Proposed Rule suffers from the same issues of extrapolation as data from California and Arizona. For survey data along the Rio Grande, The Proposed Rule cites estimates provided by Howe (1986) that 315 pairs of YBCU were present in the 1980s (Proposed Rule, pg. 61640-41). Howe (1986) uses data from Hink and Ohmart (1984) to calculate this estimate. Hink and Ohmart (1984) use survey data from a limited portion of the Rio Grande and extrapolate these data across un-surveyed portions of the river to calculate a total number of YBCU present. This likely overestimate the number of YBCUs present in 1984. Surprisingly, FWS argues that data from survey efforts are not directly comparable between 2006 and 2010 along the Rio Grande because of differing survey protocols (Proposed Rule, pg. 61641), but implicitly concludes that the extrapolated estimate provided by Howe (1986) is directly comparable to current estimates of YBCU[7]. This direct comparison results in the conclusion by FWS that current surveys "*have documented a sizable population, but many fewer that the 315 pairs estimated for this region in 1984*." (Proposed Rule, pg.

[7] Note that the current estimate of breeding pairs along the middle Rio Grande River is 121 (Ahlers et al. 2013)

61641). The use of extrapolated data from 1984 as a direct comparison with current data is thus arbitrary; FWS does not directly compare data from the 2000's which suggests an increasing population, yet uses extrapolated estimates to conclude that current numbers are far below YBCU numbers from 1984.

4.2. THE PROPOSED RULE'S ANALYSIS OF YBCU IN MEXICO DOES NOT PROVIDE SUFFICIENT INFORMATION TO PROPERLY ANALYZE THE POPULATION DYNAMICS AND THREATS TO HABITAT USE OF A PURPORTED WESTERN DPS OF YBCU

Based on limited survey data from Sonora, Mexico, the Proposed Rule concludes that YBCU breed at higher densities in Sonora than in the U.S., but estimate that 150 to 250 pairs of YBCU occur in Sonora because Arizona is twice the size of Sonora (Proposed Rule, pg. 61642). No comparison of the relative area of suitable habitat is incorporated into the analysis presented by the Proposed Rule. In Chihuahua, Mexico, the Proposed Rule provides no data or citations to support its claim that habitat in this state is sparse, and that the primary river system has a "*high density of nonnative tamarisk and little regeneration of willows and cottonwoods due to extremely heavy grazing*" (Proposed Rule, pg. 61642). The conclusions of the Proposed Rule that only a small YBCU population occurs in this state appear to be based on a single observation from e-Bird and an untested assumption that little habitat exists in Chihuahua. In Sinaloa, Mexico, the Proposed Rule estimates that there are 150 to 250 breeding pairs of YBCU based on the existence of two records in the e-Bird database and presumably some information on habitat availability. The Proposed Rules estimates that there are few breeding YBCU in western Durango, Mexico, but the only information provided to inform this estimate is that of three observations of YBCU from e-Bird. How such disparate estimates are calculated based on one to three observations of YBCU from e-Bird is unclear.

Despite the paucity of data provided by the Proposed Rule to support estimates of YBCU numbers in Mexico, the Proposed Rule concludes that 330 to 530 breeding pairs of YBCU occur in northwestern Mexico. This estimate is approximately half of the 680 to 1,025 total breeding pairs of western YBCUs purported to exist (Proposed Rule, pg. 61642). Given that such a large percentage of western YBCU are thought to occur in northwestern Mexico, understanding the population dynamics of YBCU in this region is imperative towards informing the population trends, the threats to the habitat, and the biological and ecological significance of a western DPS of YBCU. Yet, based on the information provided in the Proposed Rule, FWS knows extremely little about YBCU in Mexico, too little, in our opinion, to provide the robust and comprehensive analysis of the biology of western YBCUs required to support the proposed listing of the western DPS of YBCU.

5. ISSUES RELATED TO HABITAT USE BY WESTERN YBCU

The habitat types used by western YBCUs play a major role in the Proposed Rule's analysis of the discreteness, significance, status, and threats to a western DPS of YBCU. The Proposed Rule concludes that a difference in habitat use between western and eastern YBCU is evidence that the western populations of YBCUs are discrete from other populations (Proposed Rule, pg. 61628). The Proposed Rule also contends that this difference in habitat use is a genetically-controlled trait that supports the conclusion that eastern and western YBCUs differ markedly in genetic characteristics (Proposed Rule, pg.

61628). The discussions of the population trends of YBCU, current status of YBCU populations in the Southwest, and threats to western YBCU habitat presented in the Proposed Rule rely heavily on the assumption that western YBCUs occur mostly in large tracts of lowland riparian forest (Proposed Rule, pgs. 61634-61662). Below we discuss the available evidence that indicates that western YBCU habitat use is wider than FWS assumes and the implications that this evidence has on the conclusions of the Proposed Rule.

Habitat Use by Western YBCUs

The description of habitat use and needs of the western YBCU provided in the Proposed Rule focuses primarily on the riparian woodlands that are believed to be used most heavily by YBCU (Proposed Rule, pg. 61633-61634). YBCU habitat is described by the Proposed Rule as "*low to moderate elevation riparian woodlands that cover 50 acres (ac) (20 hectares [ha]) or more within arid to semiarid landscapes (Hughes 1999)*" (Proposed Rule, pg. 61633). FWS concludes that large tracts of riparian vegetation dominated by cottonwood are particularly important to YBCU, but a variety of other riparian tree species can be habitat components (Proposed Rule, pgs. 61633-61634). Although the Proposed Rule does reference Russell and Monson (1998), Short (1974), and Flesch (2012) as reporting examples of western YBCU breeding, or potentially breeding, in tropical deciduous forest, thornscrub, desertscrub, and upland Sonoran desert communities, the implications of these data are not acknowledged.

The Proposed Rule also identifies a multitude of canyons and drainages in Arizona where YBCU have been observed during the breeding season or breeding is probable (Proposed Rule, pg. 61639). These drainages support some riparian vegetation, but the dominant biotic communities in these areas include Madrean evergreen woodland, semidesert grassland, Sonoran desertscrub (Arizona upland), and Petran montane coniferous forest (Brown and Lowe 1980). WestLand biologists have visited a number of the areas identified and, based on our experience, many do not support the large tracts of riparian vegetation dominated by cottonwood species thought by FWS to be most closely associated with breeding YBCU in western North America.

Analysis of the records of YBCU in the areas between the Rio Grande and Pecos River in Texas and New Mexico also indicate that breeding YBCU in western North America use habitats that differ substantially from the large riparian zones described in the Proposed Rule. As discussed in Section 2.1., detections of YBCU in June, July, and August are reported by eBird in most of the mountain ranges in western Texas between the Rio Grande and Pecos River, and evidence of breeding is reported from many. In the discussion of geographic separation between eastern and western populations of YBCU, the Proposed Rule considers these mountain ranges to be void of suitable YBCU habitat because much of the area "*consists of internal ephemeral drainages that are not connected to any major river systems and have no riparian habitat*" (Proposed Rule, pg. 61628). Thus, evidence of breeding in the drainages in west Texas that support little riparian habitat clearly represents a broader habitat use by western YBCUs than considered by the Proposed Rule. Further, these locations are consistent with locations in Arizona where YBCU have been observed during the breeding season.

Implications of a Broader Definition of Habitat Use by Western YBCUs

The Proposed Rule concludes that differences in habitat use between eastern and western YBCUs constitute evidence that western YBCUs are discrete from other populations of YBCU. The evidence discussed above that identifies several different habitat types used by western YBCUs (tropical deciduous forest thornscrub, Arizona upland, Madrean evergreen woodland, and small drainages with limited riparian vegetation) indicates that they are flexible in their habitat use. Furthermore, the broad use of habitat types by western YBCUs indicates that any difference in habitat use between eastern and western YBCUs is not necessarily a reflection of genetic differentiation between these populations. Rather, differences in habitat use between eastern and western YBCUs may largely be a consequence of the availability of suitable habitat. Deciduous hardwood forests, for example, are not used by YBCU in western North America because they are not available, not because western YBCUs cannot exploit these habitats due to behavioral or genetic constraints. As such, differing habitat use by western and eastern YBCUs does not provide strong evidence that western YBCUs constitute a DPS that is either discrete from other populations of YBCU or biologically and ecologically significant to the species as a whole.

Broader flexibility in habitat use by western YBCUs also has implications for the analysis of threats to the proposed DPS. The Proposed Rule focuses much of its discussion of threats to the DPS on habitat destruction and isolation (Proposed Rule, 61643-61662), and concludes that the combination of "*present or threatened destruction, modification, or curtailment of its habitat or range*" (Factor A) and "*other natural or manmade factors affecting its continued existence*" (Factor E), which includes isolation of habitat patches, are sufficient to propose the western DPS as threatened. This conclusion, however, is heavily influenced by the focus of the Proposed Rule on the analysis of habitats along larger rivers that support large tracts of riparian vegetation, to which western YBCUs are assumed to require. Evidence that YBCU breed in smaller riparian areas of considerably different vegetation composition and extent suggest that this analysis likely overestimated the effects that present or future threats to riparian habitats along large rivers in the Southwest have on western YBCU populations. Moreover, the fact that western YBCU readily breed across the Southwest in smaller riparian areas that support a wide range of vegetation types suggests that western YBCUs may not be as affected by edge effects or as isolated from adjacent populations as is assumed by the Proposed Rule's analysis of threats associated with Factor E (Proposed Rule, pg. 61659). Thus, the assumption by the Proposed Rule that western YBCUs are highly restricted in their habitat use likely results in the overstatement of threats to the western DPS.

6. CONCLUSION

After review of the Proposed Rule and the available scientific information on the ecology and natural history of YBCU and other bird species, we have found a number of substantive issues that raise questions about the conclusions related to the discreteness and significance of a western DPS of YBCU, the population declines of western YBCUs, and the threats to YBCU habitat. We summarize these issues and the findings of our review below.

Discreteness of a Western DPS

The conclusion by the Proposed Rule that western YBCUs are discrete from YBCUs in eastern North America relies on the assertion that 1) eastern and western YBCUs are markedly separated by geographic distance and large expanses of unsuitable habitat and that 2) the timing of spring migration differs markedly between eastern and western YBCU (Proposed Rule, pgs. 61628-61629). An analysis of the available scientific data indicates that FWS neither used nor critically evaluated the best available science to arrive at these conclusions.

Our analysis of the available data indicates that YBCUs can move between eastern and western breeding grounds easily and that there are numerous detections of YBCU and evidence of breeding YBCU in the areas purported by FWS to be of unsuitable habitat that geographically separates eastern and western breeding areas. The fact that the single YBCU individual tracked throughout an annual cycle moved between eastern and western breeding areas suggests that movement between eastern and western populations may be relatively common. Moreover, there is a possibility that eastern YBCUs double breed in northwestern Mexico. The combination of these data illustrate that the FWS's conclusion that eastern and western YBCU are markedly separated by geography is not an accurate reflection of the available scientific data.

The available scientific data also indicate that YBCU in western North America could arrive much earlier to the Southwest than previously thought and may not be readily detected. A preponderance of research clearly illustrates that response to environmental factors, such as habitat quality, weather conditions, and individual body condition, influence migratory timing. Thus, the assertion that differences in migratory timing between eastern and western YBCUs can only represent marked genetic differences is not an accurate interpretation of the available scientific data.

Significance of a Western DPS

The Proposed Rule concludes that the western DPS of YBCU is biologically and ecologically significant to the YBCU as a species because 1) loss of western YBCUs would result in a significant gap in the range of YBCU, and 2) western YBCUs differ markedly in its genetic characteristics from eastern YBCUs. The Proposed Rule's assessment of whether or not the loss of western YBCUs would result in a significant gap in the species' range is simplistic, and contains little analysis of the biological and ecological significance of western YBCU to the species as a whole. The Proposed Rule's analyses of the morphological and behavioral traits used to conclude that western and eastern YBCU differ markedly in their genetic characteristics are flawed, and do not accurately reflect the available scientific data.

Because of the paucity of data and analyses provided by the Proposed Rule to support the conclusion that a gap in the range of YBCU from the loss of a western DPS would be of biological and ecological significance to YBCU as a species, our analyses focused largely on data provided by FWS to demonstrate that western YBCUs differ markedly from eastern YBCUs in genetic characteristics. A review of the data provided by FWS and the available scientific literature clearly indicates that the conclusion that egg characteristics and bill color differ markedly between eastern and western YBCUs is unfounded. Data used to support the conclusion that morphological measurements of YBCU differ markedly between

eastern and western North America are subject to statistical issues that caution against the strong conclusions presented by the Proposed Rule. Moreover, the prevalence of scientific studies that demonstrate that egg characteristics, morphological traits, and migratory traits can be influenced substantially by environmental factors clearly illustrate the flawed assumption that any difference in these traits between eastern and western YBCUs are due to genetic differences.

Population Status and Trends of a Western DPS

The Proposed Rule analyzed the available survey data and records of YBCU and concluded that the total population of western YBCU is small and declining. Our review of FWS' analysis and the available survey data revealed several flaws in the analysis and interpretation of available data that likely overestimate the purported population declines. The Proposed Rule compares extrapolated data of YBCU breeding pairs in the 1970s and 1980s to estimates of breeding pairs from vastly different survey protocols from recent periods. The extrapolation of data from earlier periods requires assumptions, such as equal densities of YBCU in surveyed and un-surveyed riparian vegetation, which are likely to be invalid and inflate estimates of YBCU. In contrast, more recent YBCU survey protocols are more conservative in their estimation of pairs of breeding YBCU, and are likely to estimate much fewer breeding pairs. The direct comparison of these survey results by FWS to infer population declines is thus inappropriate, and results in a biased conclusion by the Proposed Rule that YBCU in the western U.S. are declining severely. The untested assumptions and mathematical errors in the analysis of survey data by FWS likely augment the exaggeration of population declines of YBCU in western North America. Moreover, the Proposed Rule's analysis focuses on large riparian systems in the Southwest, and largely ignores smaller ephemeral and intermittent riparian areas that are known to support YBCUs, yet do not contain large blocks of mature cottonwood vegetation commonly thought to be required by YBCU. This evidence of expanded habitat use by western YBCUs suggests that considerably more breeding pairs of YBCU may exist than indicated by the Proposed Rule.

Paucity of Data from Mexico

The Proposed Rule's analysis of YBCU records and habitat use in Mexico clearly indicates that little information on YBCU in Mexico is known. Nevertheless, the Proposed Rule concludes that half of the known breeding pairs of western YBCU breed in northwestern Mexico. Given the lack of data from Mexico, considerably more study of the ecology and natural history of YBCU in Mexico is required before the discreteness, significance, and population trends of a western DPS of YBCU can by fully analyzed.

Habitat Use

The Proposed Rule considers YBCU breeding habitat to consist mostly of large tracts of riparian forest dominated by cottonwood vegetation. Survey and detection data along smaller riparian systems and upland drainages that do not support expansive blocks of riparian vegetation are not incorporated into FWS' analysis, likely resulting in overly-stated declines in western YBCU. The fact that breeding YBCU have been demonstrated to use a much broader range of habitat types than FWS has assumed in the Proposed Rule analyses indicates that purported differences in habitat use between eastern and western

YBCUs do not constitute strong evidence that a western DPS of YBCU is discrete or biologically and ecologically significant to the species. Broader habitat use also suggests that the conclusions by the Proposed Rule that loss of riparian habitat and isolation of habitat patches are threats to a western DPS of YBCU are overstated.

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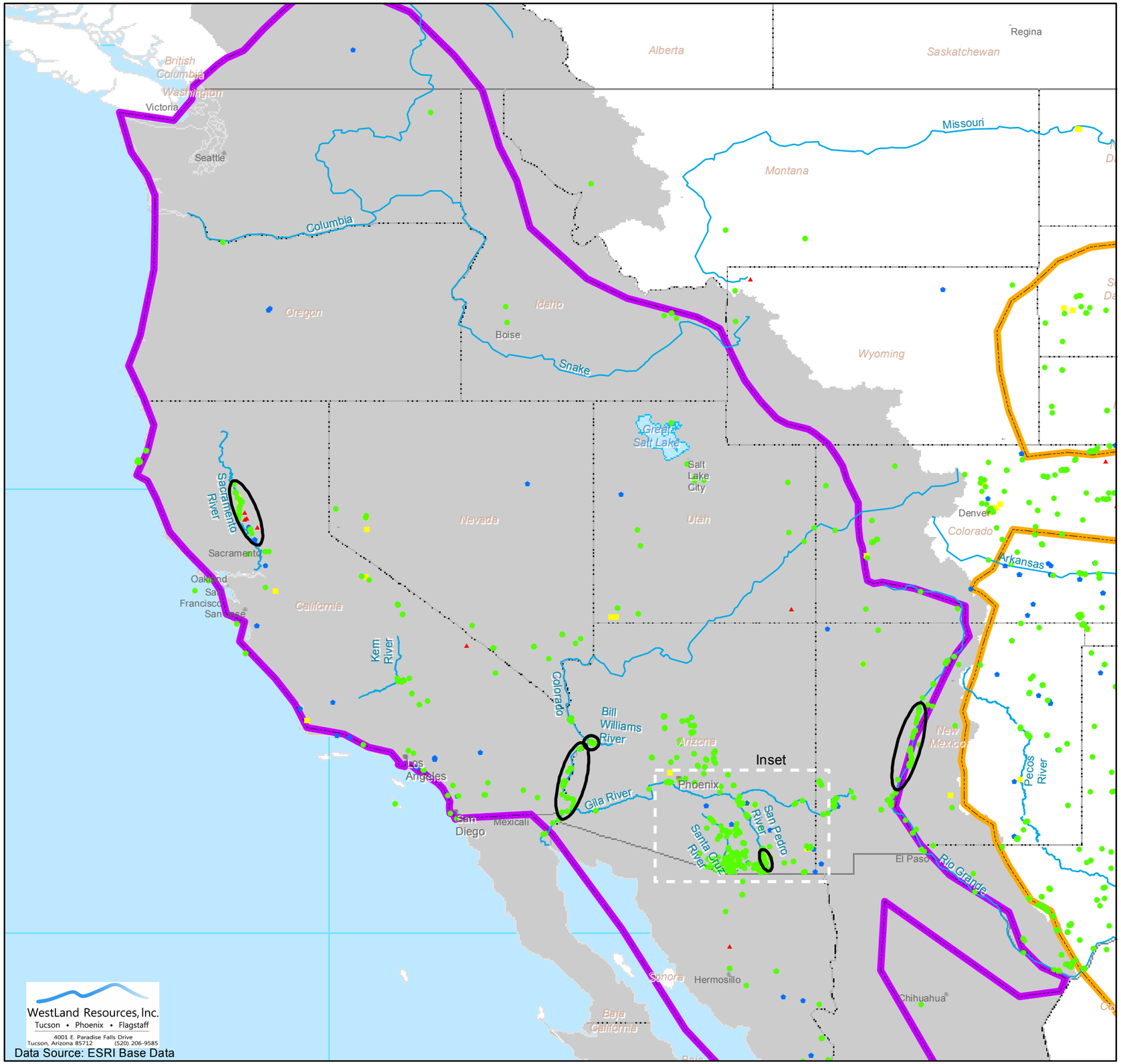
FIGURES



Detections of YBCU in the western North America between June and August (1970 to present) (source: http://www.ebird.org accessed November 18, 2013) [Note ebird was created in 2002 and data presented are expected to be temporally biased and geographically biased by the areas individuals choose to bird watch]

- 1970-1979
- 1980-1989
- 1990-1999
- 2000-present

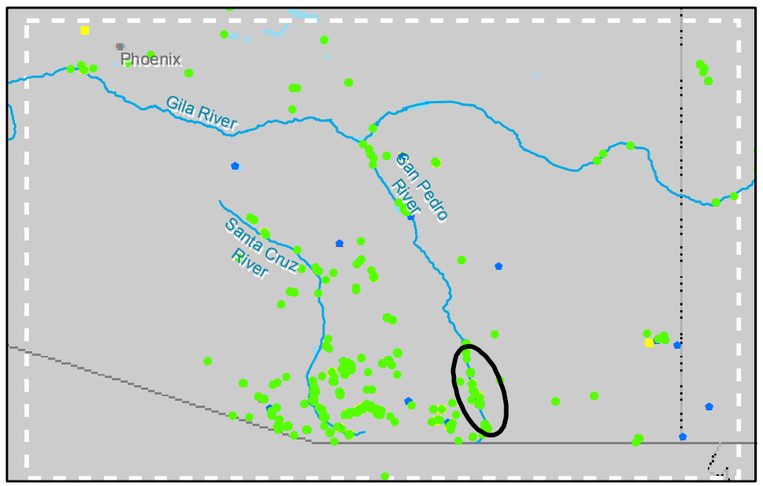
Approximate locations of riparian areas that are the main focus of analysis provided in the Proposed Rule. These areas are limited to the larger tracts of riparian vegetation and do not represent the full range of habitats used by YBCU in the western North America. These areas, as indicated here, present only a partial picture of the known distribution and habitat selection of YBCU in the western U.S.

Approximate range of the proposed Western DPS of YBCU

Approximate historical breeding ranges of eastern and western YBCU as presented in the Proposed Rule based on AOU 1957 checklist. (Digitized from the proposed rule.)

Eastern Range

Western Range



N

0 100 200 Miles

Comments on the U.S. Fish and Wildlife Service's Proposal to List the Western Distinct Population Segment of the Yellow-billed Cuckoo (*Coccyzus americanus*) as Threatened.

Locations of YBC (1970-present) in the Western US during the breeding season (June-August) and the areas that are the focus of the Proposed Rule's analyses

Figure 1