October 14, 2014

To: Field Supervisor
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Subject: Request for Peer Review of the August 15, 2014, Proposed Rule to designate critical habitat for the western distinct population segment of the yellow-billed cuckoo (*Coccyzus americanus*)

Reference Number: FWS-R8-ES-2013-0011

PEER REVIEW COMMENTS:

I have reviewed the proposed rule to designate critical habitat for the western yellow-billed cuckoo (*Coccyzus americanus*) distinct population segment (DPS) (hereafter referred to as the "the proposed rule"). Overall, I found the proposed rule to be scientifically comprehensive, well-justified, and thorough in its evaluation. In my comments I seek to address issues of importance to the USFWS and, where applicable, augment certain aspects of various issues presented in the proposed rule. Please note that I organized my comments in nine parts corresponding to the USFWS peer review request letter's nine areas of concern/questions (see Parts 1-9 below, in bold type).

I have published several articles in peer-reviewed journals on the habitat characteristics, the habitat dynamics of the yellow-billed cuckoo, and the potential expansion of habitat on the Sacramento River in California. A list of the publications that are *not* cited in the proposed rule is in Part 7 (below) and may be of value to an amended version of the proposed rule or future recovery planning documents (if the proposed rule is adopted).

As requested, a copy of my Curriculum Vitae (CV) is attached to this review. In addition, I am willing to serve on a recovery planning team in the future if the western yellow-billed cuckoo DPS is listed as threatened and my services are needed by the USFWS.

Review Issues/Questions Parts 1-9:

1. **Are the Service's descriptions, analyses, biological findings, and conclusions accurate, logical, and supported by the data and information in the proposed rule; especially in regards to the species' biology, habitat use?**

   The conclusions in the proposed rule are reasonable and logical based on the data presented. The habitat units are well-described and defensible, though several areas of potential habitat in the Sacramento Valley were not identified (see question #4, below for specifics).

2. **Have we accurately described the biological or ecological requirements of the species? Is the scientific foundation of the proposed rule fundamentally sound? Can the scientific foundation be strengthened, and if so, how?**

   The biological and ecological requirements of the species have been accurately described. The scientific foundation of the proposed rule is sound.

   I would like to reiterate some additional detail (from my review of the proposed listing rule) regarding the ecological keystone process of river channel meander on the Sacramento River that *maintains* the feeding and reproductive habitat of the western yellow-billed cuckoos in their summer range, which is applicable to many other low-gradient rivers in western DPS area. The result of river engineering projects, such as water diversions, channelization, and riverbank revetment projects (i.e. riprap), creates an ecological cascade process that affects yellow-billed cuckoos. This ecological cascade is described in several of my journal articles and book chapters. The essential argument is as follows. Riprap (channel revetment), water impoundments from dams, and water diversions to irrigation districts alter timing, frequency, and magnitude of river channel flows and ultimately decrease stream power in the channel that has reduced the ability of the river channel to meander (erode and deposit along its margins) by 79% (see Fremier et al et al. 2014; article #2 in part 7 below); this, in turn, leads to a reduction of new land (floodplain) production through the geomorphic processes of progressive bend migration and channel cut-off that, hence, either precludes the existence of, or reduces the extent of, new pioneer plant communities (such as the cottonwood-willow plant association) that through primary succession colonize the newly established floodplain lands; this then results in a reduction of critical feeding and reproductive habitat important to the survival of western yellow-billed cuckoos. This ecological cascade is especially pronounced in portions of the river where channelization and bank revetment (i.e. riprap) is pervasive, which is increasing every year. The cumulative impacts of each aspect of this ecological cascade is quantified in Fremier et al. (2014) [article #2, in part 7, below]) and contributes to the degradation of western yellow-billed cuckoo habitat. As such, even if natural flows are restored to create stream power, the presence of riprap will still disrupt the geomorphic processes that creates new land for the habitat to form upon. The key to sustaining the habitat for the western yellow-billed cuckoo is maintaining an on-going process of new land creation and flow patterns conducive to colonization of cottonwood and willow.

   Given the discussion above, conservation reserve areas on the Sacramento River and elsewhere need to target land acquisition on both sides of the river channel constituting both cut banks and the <u>laterally adjacent</u> point bars to allow for the keystone process of river meander to operate. Unfortunately, the parcels owned by the USFWS that make up much of the Sacramento

River National Wildlife Refuge (NWR) are located on just one side of the river thus preventing conservation of the meander belt which is so crucially important to conservation of the western yellow-billed cuckoo habitat and maintenance of the habitat over time.

3. **Are there instances in the proposed rule where a different, yet equally reasonable and scientifically-sound conclusion might be drawn? If any instances are found where this is the case, please provide specifics.**

   I found no instances in the proposed rule where another reasonable conclusion could have been drawn, given the scientific evidence presented.

4. **Do the proposed habitat units cover the appropriate areas for the species and are they sufficient in number and extent? Should areas that are not currently occupied by the species be included as additional critical habitats?**

   The proposed habitat units cover many areas where cuckoos presently occur. However, areas where cuckoos are not currently occupying habitats are likely to be colonized in the near future with floodplain restoration. In the Sacramento River system several potential habitat areas were not identified. These sites include: (1) the Yolo Bypass, especially in the Putah Creek Sinks, where extensive willow and cottonwood communities are found; (2) the Cache Creek Settling Basin, where extensive cottonwood and willow communities are present; (3) more areas in the Sutter Bypass than are currently identified; and (4) future levee setbacks along the Sacramento River from River Mile 84 to 144 to meet flood control needs for the Sacramento Valley.

   A pervasive threat on many river systems throughout the developed world, including but not limited to the Sacramento River in California, is the routine design of open channel flood control channels with inappropriately smooth roughness coefficients (i.e. Manning's *n* values that are too small). Flood control engineers minimize flood control channel footprints by maximizing channel depth (with high levees or flood walls), minimizing channel width, and minimizing roughness coefficients. The effects of this approach are to over-scour floodplains (due to high flow velocities from increased depth and decreased width) and to require systematic removal of woody riparian vegetation that regenerates on floodplains to maintain the excessively "smooth" roughness coefficients. This translates into floodplains devoid of riparian vegetation that could be used for habitat. This is the topic of a paper I recently published (see Greco and Larsen, 2014; article #1, in part 7, below). The proposed rule does not address this issue as a threat despite its ubiquitous nature in highly-engineered river systems; however, it could be a highly technical topic that is more appropriate to recovery planning.

5. **Are the proposed exclusions appropriate? Are the proposed exclusions sufficiently protected and managed to provide habitat for the species?**

   I was not able to evaluate the exclusion areas outside the Sacramento Valley.

6. **Did the Service accurately describe the analyses, studies, and literature that are referenced in the proposed rule, and did the Service use the best available science to support its assumptions, arguments, and biological conclusions? If any instances are found where the best available science was not used, please provide the specifics.**

   Yes, in the proposed rule the Service accurately described the analyses in scientific studies and in the literature. In my comments I have sought to enhance some of the discussions with literature from my own work and others.

7. **Are there any significant peer-reviewed scientific papers that the proposed rule omits from consideration that would enhance the scientific quality of the document? Please identify any such papers.**

   There are two papers I have authored or co-authored that are applicable to the proposed rule that were not cited and may be of value to adding to the proposed rule where appropriate, or used in recovery planning documents if the proposed rule is adopted.

   (1) Greco, S. E., and E. W. Larsen. 2014. Ecological design of multifunctional open channels for flood control and conservation planning. Landscape and Urban Planning 131:14-26. DOI: 10.1016/j.landurbplan.2014.07.002

   (2) Fremier, A. K., E. H. Girvetz, S. E. Greco, and E. W. Larsen. 2014. Quantifying process-based mitigation strategies in historical context: separating multiple cumulative effects on river meander migration. PLOS ONE. DOI: 10.1371/journal.pone.0099736
   Available on-line at:
   http://www.plosone.org/article/info%3Adoi%2F10.1371%2Fjournal.pone.0099736#pone-0099736-g003

8. **Are there parts of the proposed rule that need additional detail or explanation? Are there parts that are superfluous, or that could be condensed?**

   Various portions of the proposed rule could be enhanced with additional explanation and detail, I saw no areas of the proposed rule that were superfluous or would benefit from being condensed.

   A distinction should be made between active restoration efforts versus process-based restoration efforts. "Active" restoration is typically thought of as a horticulture-based approach to re-establishing natural plant communities, where people design and install propagated plants to recreate a desired plant community. Alternatively, "process-based" restoration is an approach that seeks to re-establish natural processes to establish natural plant communities, using techniques such as naturalized flow regimes, channel meander processes, and natural plant recruitment timing/events that are commensurate with a site's potential. Although active restoration can "jump start" succession and achieve desired states rapidly, in the long-term this is an unsustainable approach to solely rely upon. In the long-term process-based restoration

should be sought to continually create the habitats required by the western yellow-billed cuckoo.

9. **Are scientific uncertainties clearly identified and characterized, and are the potential implications of the uncertainties for the technical conclusions clear?**

   Yes, the proposed rule identifies and characterizes scientific uncertainties and the potential implications of those uncertainties.