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of

March 7, 2013

Angela Matz
U.S. Fish and Wildlife Service
Fairbanks Field Office
101 12th Avenue, Room 110
Fairbanks, AK 99701

Dear Ms. Matz:

Thank you for the opportunity to review the February 13, 2014 Draft Species Status Assessment Report (SSA) for the Yellow-billed Loon (*Gavia adamsii*), prepared by the U.S. Fish and Wildlife Service (FWS or Service) Listing Review Team. We appreciate the Service's thorough review. We offer the following specific comments, suggested changes or additions, and other clarifications, which we request the Service to address in the final draft of the review.

General Comments

The Service evaluated both the current and future viability of yellow-billed loons. We agree with the Service's assessment that the current status of yellow-billed loons is not cause for concern and the probability of their extinction is low, as evidenced by a long-term, stable to increasing trend in the Arctic Coastal Plain aerial survey; high adult survival; widespread intercontinental breeding and wintering ranges; and a lack of quantifiable population-level threats to the species. We agree with the Service that stressors listed in the SSA have had no measurable negative effect on the viability of yellow-billed loons.

Insufficient information is available on both the species biology and ecology to evaluate and predict with any certainty the future viability of the species in terms of resiliency, redundancy, and representation or by other recognized criteria. Although we agree that environmental change will occur, it is difficult, if not impossible, given current knowledge, to accurately predict the response of yellow-billed loon populations without a better understanding of how the climate will change over time, how the habitat will change in response to changing climate, and how the loon population will respond to

changing habitat. Changes have occurred in their Arctic and marine habitats over the past 25 years, with no evidence of associated population change.

The scientific basis for suggesting that yellow-billed loons will experience reduced ability to adapt to change beyond 25 years is unclear. The evaluation of the future viability of yellow-billed loons lacks data to support the suggestions of low adaptability and low ecological diversity, and is based on conjecture rather than through quantifiable or objective scientific processes. Biological parameters that lend themselves to at least some quantifiable analysis support the current lack of population-level threats, but limited empirical evidence or quantifiable analysis is used to analyze future viability or to support statements such as “the species has low ecological diversity.”

The results suggesting possible low genetic diversity from the analysis of microsatellites presented in the SSA are quite preliminary and based on a small sample from a limited portion of the species’ breeding range. The Service suggests that these “very preliminary” findings indicate possible low adaptability of the species to uncertain future changes, but offers limited empirical evidence in support of this suggestion. This is the basis for their conclusion that the long-term viability of yellow-billed loons may be reduced. The SSA should acknowledge that the future population trajectory, especially over the long term, is simply unknown.

We appreciate the Service’s thorough review of the data on the subsistence harvest of yellow-billed loons. We agree that the data do not support a finding that current levels of subsistence harvest are a population-level threat, nor do they confirm or support the Service’s interpretation of the 2009 subsistence harvest data.

Based on the information presented in the SSA, the Department does not believe a listing of this species or any DPS thereof under the ESA is warranted or can be justified at this time.

Specific Comments and Suggestions

Our comments and suggested changes or additions to specific SSA report sections follow below, on a page-by-page basis:

Page 7 (Taxonomy):

Current text: “The yellow-billed loon . . . is the largest of the five loon species.”

Comment: The Common Loon (*Gavia immer*) is the largest loon species. See:

<http://www.briloon.org/uploads/documents/LoonCenter/ADKLoon/Yellow-billedLoons040413.pdf>

The State includes the same statement in some of its YBLO literature as well, and will be correcting this error.

Page 8, second paragraph:

Current text: "(Schmidt et al. 2014, p. 13)"

Comment: Not included in Literature Cited.

Page 8, last paragraph:

Current text: "Probability of yellow-billed loon presence on a lake increases with the absence of Pacific loons."

Comment: The phrasing implies Pacific Loons exclude Yellow-billed Loons. In fact, Yellow-billed loons are dominant, and exclude Pacific Loons. See:

Haynes, T. B., J. A. Schmutz, M. S. Lindberg, K. G. Wright, B. D. Uher-Koch, and A. E. Rosenberger 2014. Occupancy of Yellow-billed and Pacific Loons: evidence for interspecific competition and habitat-mediated co-occurrence. Paper presented at the 2014 annual meeting of the Pacific Seabird Group, Juneau, AK.

Haynes et al. (in press) concluded that:

[Y]ellow-billed loons were strong competitors and negatively influenced the occupancy of Pacific loons by excluding them from potential breeding lakes. Pacific loon occupancy was conditional on the presence of yellow-billed loons, with Pacific loons having almost a tenfold decrease in occupancy probability when yellow-billed loons were present and a threefold decrease in colonization probability when yellow-billed loons were present in the current or previous year.

See attachment: Haynes_et_al_Loon_Competition_Model...docx; this reference should be included and analyzed in the final SSA.

Page 8, last sentence:

Current text: ". . . indicating that the resources . . . were heavily utilized by competing species."

Comment: Co-occurrence doesn't necessarily mean "resources were heavily utilized by competing species". As lake size increases, behavioral exclusion between territorial species will decrease, with co-occurrence more likely. Large lakes with convoluted shorelines are also more likely to harbor both species because there are more potential nest sites, and lines of sight between nest sites are reduced.

Haynes et al (in press) also state that, "habitat characteristics which facilitate visual and spatial separation of territories can reduce competitive interactions and promote species co-occurrence," i.e., habitat mediated co-occurrence.

See Attachment: Haynes_et_al_Loon_Competition_Model...docx

Page 9, second paragraph:

Current text: "Hatching occurs after . . . incubation, which is done by both sexes."

Suggested change: Break into two sentences, e.g., “Hatching occurs after . . . incubation. Incubation duties are shared equally by both sexes.”

Page 9, second paragraph, last sentence:

Current text: “. . . the family may move between natal and brood-rearing lakes.”

Comment: Consider clarifying that for such movement between lakes, a connecting waterway is required, as the adults cannot walk overland, and the young cannot fly.

Page 9, third paragraph:

Current text: “Small fish, such as ninespine sticklebacks . . . and least cisco . . . are thought to be the main food of chicks in Alaska . . . Other freshwater prey available . . . include Alaska blackfish . . .”

Comment: In the ACP, Haynes et al. (submitted) estimated a 0.52 (se 0.05) occupancy probability for least cisco, a 0.97 (se 0.01) occupancy probability for ninespine stickle back, and a 0.76 (se 0.05) occupancy probability for Alaska blackfish. Multiple persistence measures for tolerance to harsh conditions for these species were noted, including the presence of migratory and resident populations, and wide and rapid dispersal.

See attachment: Haynes_etal_FreshwaterBiology...pdf ; this reference should be included and analyzed in the final SSA.

Page 10, last paragraph (Breeding [Summer] Range):

Current text: “Preferred habitats in remote, relatively undisturbed areas may result in a timid species – one that is easily displaced from normal activities when disturbed.”

Comment: This statement would benefit from a citation.

Page 10, last sentence:

Current text: “Individuals of both species . . .”

Suggested change: Unclear; clarify which two species are included in “both.”

Page 13 (Genetic Diversity):

Current text: [reference to Talbot et al. (2014)]

Comment: The conclusions in this report feature prominently in the draft Species Status Assessment Report, but it appears to be an unpublished report that is not readily available; please post it somewhere for readers.

We urge caution in highlighting low genetic diversity as a "problem" for the species at this stage. Subsequent peer review and further research may result in revision to that preliminary conclusion. Yet once this conclusion is published in the Status Assessment, even as qualified, it tends to take on "known fact" status and will likely be reported on other websites (IUCN, BirdLife International, American Bird Conservancy, Audubon), possibly without the same qualification.

Moreover, this “very preliminary” finding of low genetic diversity figures prominently in the Service’s hypothesis that “representation” may pose a long-term threat to yellow-billed loons. The presumed low genetic diversity, combined with low ecological diversity, theoretically would make yellow-billed loons less adaptable in the face of change. This emphasis on “low genetic diversity” overstates the findings in Talbot, et al., which concludes (emphases added):

Preliminary results from the cross-species screening suggest that allelic diversity was low in Yellow-billed Loons relative to the Pacific Loon, *although the comparison is based on comparative analysis of only 6 individuals . . .* Analyses to ascertain whether genetic diversity in Yellow-billed Loon populations are suggestive of historical population bottlenecks [as has been surmised in other species] . . . *failed to uncover any signature of recent population fluctuations – either population decline or expansion – in either population.* These preliminary reports fail to support a hypothesis that a recent severe bottleneck is responsible for the low levels of allelic diversity observed at these loci in Yellow-billed Loons across the populations. *Further analyses are necessary to determine the likely cause of comparatively lower levels of genetic diversity relative to congeners and whether the low level of genetic diversity at these neutral microsatellite markers reflect low levels of genetic diversity in functional genes.*

It is premature to rely on these very preliminary results as a fundamental element in a hypothesis regarding long-term and uncertain threats to the species.

Page 13, second paragraph under Genetic Diversity:

Current text: “Finally, they reported low overall genetic diversity in the 48 individuals . . .”

Comment: This seems to be a key finding that is carried forward in the summary and conclusions. As such, it would be helpful to put these numbers in some context. What would be a “normal” or average number of expected alleles, or expected “heterozygosity”? How low is “low”?

Page 14, first paragraph:

Current text: “We can assume . . . large aquatic piscivorous birds who are unable to walk on land . . .”

Suggested change: Suggest modifying the highlighted text to emphasize the connection between the need for open water *because* they can’t walk on land. As written, it’s easy to miss that phrase, and all migratory birds require sufficient food to survive the winter and return to their breeding grounds. That yellow-billed loons cannot walk on land, are large, or eat fish, does not amend this requirement. Also, should read as “birds **that** are unable to walk on land.”

Page 14, third paragraph:

Current text: “Annual survival estimates . . . for adult nesting yellow-billed loons . . . was 0.9116.”

Suggested change: Annual survival rates of 0.92 seem quite high. Perhaps identify what factor stands out in Joel’s modeling as most limiting population growth in this species (breeding propensity, chick production, fledgling survival, sub-adult survival).

Page 14, last paragraph:

Current text: “Stressors that reduce productivity . . . may further constrain K-selected species’ recovery potential.”

Comment: For K-selected species, adult mortality is typically far more important than annual productivity, as noted on page 15. It is harder for them to recover, yes; but they are also less likely to decline sharply, as adult survival is typically high.

Page 15, first full sentence:

Current text: “The population impact of threats . . . year of otherwise high productivity.”

Comment: An odd statement. If environmental factors are such that productivity is low in a given year, it cannot be a year of high productivity "otherwise".

Page 15, last paragraph:

Current text: “Possible low genetic diversity . . . plus low ecological diversity (limited, specific breeding habitats) . . .”

Comment: Loons, like most bird species, have specific habitats they breed in, and of course, all habitat is limited. The report has not yet made the case that the ecological diversity (needs definition) of the YBLO breeding habitat is low, or that availability of nesting habitat limits population size.

At a glance, their breeding habitat is widely distributed across the arctic, on two continents, in habitat that is extensive and far less impacted by development than most birds that breed in the temperate latitudes and migrate to the tropics. This isn't to say they won't be adversely affected, perhaps seriously, if their Arctic habitat changes substantially due to climate change. But that is distinct from claims of low ecological diversity and nesting habitat that is limiting.

Alternatively, as Haynes et al (in press) suggests, an environment where potential negative change is ameliorated by potential positive change, as may occur in the ACP:

Hydrographic processes on the Arctic Coastal Plain are thermokarst-dependent, dynamic, and poorly described; however, in a warming Arctic, there may be a general expansion of lake surface area (Riordan et al. 2006) and a decrease in winter ice thickness, leading to an increase in overwintering habitat for fishes (Arp et al. 2012). If smaller lakes become larger and contain more prey resources, lakes formerly suitable only for Pacific loons may become suitable for yellow-billed loons. If breeding habitat is a limiting factor for yellow-billed loons, under these changing conditions, we may expect that yellow-billed loons will increase their colonization probability and there may be more co-occurrence and multi-nest lakes. Somewhat paradoxically to the general increase in surface area expected for many lakes, lateral lake drainage may also increase (Jones et al. 2009) by which large lakes, formerly suitable for yellow-billed loons, may drain entirely or partially becoming unsuitable for nesting or only suitable for Pacific loons. In this regard, we may expect both the colonization and extinction probabilities for yellow-billed loons to increase with a changing landscape due

to a changing climate. Future occupancy probabilities of Pacific loons will depend on the rate at which small thermokarst lakes are formed as well as the population and occupancy dynamics of yellow-billed loons. Although it is difficult to predict the implications of a warming climate on loon occupancy, interspecific competition between yellow-billed and Pacific loons will play a major role in determining the future distribution of breeding loons on the Arctic Coastal Plain. Physical changes to lake systems due to climate change may not only impact their suitability as breeding habitat for loon species, but also competitive interactions and chances of co-occurrence, an indirect effect that merits consideration for any model predicting changes in bird occupancy due to an altered climate.

Page 16, first bullet; last bullet:

Current text: “Remote northern breeding areas with large lakes . . .”

Comment: These factors are addressed in the conclusions section of Haynes et al. (in press); this information should be incorporated into the final draft.

Page 16, last bullet:

Current text: “. . . (the species has low ecological diversity . . .)”

Suggested change: This measure should be quantified in some way.

Page 17 (Population Estimates):

Current text: “ The global breeding population size . . . with 3,000-4,000 thought to breed in Alaska.”

Suggested change: Please clarify if this estimate has been adjusted to include "loons not detected, and loons not present on the breeding grounds in mid-June" (next paragraph). If there has been an adjustment, please indicate what expansion factor was used.

Page 19 (Canada):

Current text: “3.1.3 Canada”

Comment: International boundaries and differing management regimes may be considered a basis for identifying a distinct population segment (DPS). Has the Service evaluated the Alaska population of YBLO a DPS for listing purposes?

Page 22, last paragraph (Alaska – ACP)

Current text: “. . . it is possible the total population could decline without being detected . . .”

Comment: There are a number of factors that limit our ability to detect change, and not just decreases. For the reasons listed, we could miss a real change, miss a real increase, or declare an increase or decrease that is not true. In sum, however, we are quite fortunate to have the level of survey effort (in time and space) to say as much as we do. It is a relatively well-surveyed species, at least on the ACP.

Page 24, first sentence (Summary of Current Species Conditions):

Current text: “. . . an imprecise estimate but one that is very likely accurate within an order of magnitude.”

Suggested change: Does this mean it could be an order of magnitude lower (1,600-3,200) as well as an order of magnitude higher (160,00-320,000)? We certainly have greater precision than this. We suggest you broaden the range, if necessary, to likely encompass the true population value. But don't make it so broad it becomes meaningless (e.g., 1,600-320,000).

Page 24, first paragraph, last sentence:

Current text: “These estimates generally correspond in magnitude to . . .”

Suggested change: Consider replacing for clarity: “are generally met by . . .”

Of course, any PVA would apply to the functional biological population. Limiting a PVA to the Alaska birds only because of a political boundary that is unrecognizable to the loons would be inappropriate. The global population that mixes well exceeds the rule-of-thumb thresholds.

Page 24, second paragraph, first sentence:

Current text: “There is a possible but anecdotally documented range contraction . . .”

Suggested change: It would be useful to convey the relative weight these ecological correlates deserve (e.g., range contraction versus population size, versus population trend, etc.). Below is a good paper:

O'Grady, J. J., Reed, D. H., Brook, B. W., & Frankham, R. (2004). What are the best correlates of predicted extinction risk?. *Biological Conservation*, 118(4), 513-520.

Page 24, second paragraph:

Current text: “Comparing regions within the species' broad wintering range, for example . . .”

Comment: We would highlight this issue over the potential genetic issues, which are very preliminary and at this stage seem more speculative and distant (in time) as a threat to the species' viability.

Page 26, first paragraph (Chapter 4)

Current text: “The most important stressors are those that could affect the limited and specific breeding habitats that yellow-billed loons use . . .”

Comment: An argument could be made that the extensive development and pollution issues on the western wintering grounds potentially pose a greater near-term threat, while the longer-term threat may be climate change as it affects nesting habitat in the more distant future. We would urge some caution before discounting the Yellow Sea and South China Sea issues as possibly important.

Page 26 (Breeding habitat):

Current text: “4.1.1 Breeding habitat”

Suggested additions: Other good sources for this section include:

Rouse, W. R., Douglas, M. S., Hecky, R. E., Hershey, A. E., Kling, G. W., Lesack, L., & Smol, J. P. (1997). Effects of climate change on the freshwaters of arctic and subarctic North America. *Hydrological Processes*, 11(8), 873-902.

Schindler, D. W., & Smol, J. P. (2006). Cumulative effects of climate warming and other human activities on freshwaters of arctic and subarctic North America. *AMBIO: A Journal of the Human Environment*, 35(4), 160-168.

Page 26, third paragraph:

Current text: “Climate change may result in specific changes to yellow-billed loon breeding habitats, including lake drainage or disappearance”

Comment: Haynes et al. (in press) states that new habitat for YBLO is likely to be formed during this process as well.

Page 26, middle of third paragraph:

Current text: “These mechanisms may affect the Western Alaska breeding population”

Suggested change: It would be helpful to suggest the percentage of the species’ nesting habitat that is likely to be affected by coastal erosion (lake draining) and saltwater intrusion. Is it 0.1%, 1%, 10%? Give the reader a feel for the magnitude of the issue.

Page 26, end of third paragraph:

Current text: “A reasonable assumption is that as lakes dry, their depth decrease, and therefore they are more likely to freeze to the bottom, becoming inhospitable to fish on which yellow-billed loons depend.”

Comment: Haynes et al. (submitted) states that fish have multiple strategies for resilience that may offset this factor.

Page 27, last paragraph:

Current text: “For example, increased open water at the expense of ice cover”

Suggested change: Delete; duplicates previous sentence.

Page 30 (Climate Change Summary):

Current text: The species’ low ecological diversity combined with their possible low genetic diversity, results in relatively low adaptability”

Suggested change: As previously noted, the issue of low ecological and low genetic diversity would benefit from some quantification and context. We believe there are more immediate threats on their wintering grounds, especially off Asia, that could pose threats and should receive greater emphasis.

Page 32 (Arctic marine habitats)

Current text: “Non-nesting and breeding yellow-billed loons . . .”

Suggested change: Estimate the percentage of the ACP population that uses the offshore areas for foraging. We would presume 50-75%, thinking some breeders forage exclusively on brood-rearing lakes, but that is a guess.

Page 33 (Research Activities):

Current text: “Researchers seeking to understand the life history of yellow-billed loons have implanted 63 [birds] . . .”

Suggested change: What is the mortality rate (or lost signal rate) on this sample? Does it exceed the annual mortality among non-transmittered birds? We agree there is no population-level effect, and some mortality is expected and acceptable. Nonetheless, if we have some results, it would be appropriate to report those in this section.

Page 51, last paragraph (Commercial Fishing Bycatch):

Current text: “Bycatch is likely to occur in extensive gill net fisheries that overlap with wintering yellow-billed loons . . .”

Suggested change: If known, describe the location and extent of "extensive gill net fisheries" that overlap with the wintering range. In North America, the gill net fisheries occur in summer. It may be different elsewhere, but quantification or a citation would help.

Page 53, first full paragraph:

Current text: “In conclusion, current data of contaminant concentrations in yellow-billed loons indicate . . . reduction in productivity – a common ecological mechanism for contaminant effects on birds.”

Suggested change: While direct effects of pollution on loons may be low (in terms of contaminant loading), there are concerns with effects on the entire trophic structure in these waters, not to mention unsustainable fishing (including forage fish). That concern should be more fully described in the Status Assessment Report.

For example, see:

Caddy, J. F. (1993). Toward a comparative evaluation of human impacts on fishery ecosystems of enclosed and semi-enclosed seas. *Reviews in Fisheries Science*, 1(1), 57-95.

Zhao, X., Hamre, J., Li, F., Jin, X., & Tang, Q. (2003). Recruitment, sustainable yield and possible ecological consequences of the sharp decline of the anchovy (*Engraulis japonicus*) stock in the Yellow Sea in the 1990s. *Fisheries Oceanography*, 12(4-5), 495-501.

Page 59, last paragraph (Resiliency):

Current text: “Certain intrinsic aspects of yellow-billed loon ecology and demography, including . . . adult survival . . .”

Suggested change: Insert "high" adult survival (else the "low and variable" would carry through)

Page 60, first sentence (Representation):

Current text: “We evaluated representation (the ability of a species to adapt to changing environmental conditions) through yellow-billed loon genetic and ecological diversity.”

Suggested change: "Representation" is a term we are unfamiliar with in this context (ability of a species to adapt to changing environmental conditions). Please include a reference one could go to for further clarification. It would be good to have a citation that references the 3 R terms (resilience, redundancy and representation) as established metrics for evaluating extinction risk.

Page 60, third sentence (Representation):

Current text: “Their Arctic breeding range is already exhibiting effects of climate change, resulting in hydrological changes that may end with widespread lake drying and drainage”

Suggested change: Needs citation, as above; also, change may result in new suitable lakes being developed.

Page 60, last sentence (Representation):

Current text: “. . . very preliminary indications of possible low genetic diversity”

Suggested change: With the many qualifiers (preliminary, possible, may, may) this is weakened to the point of non-usefulness. Unless and until further evidence reinforces this concern, other issues are of more concern.

Page 60 (Uncertainty):

Current text: “Uncertainty”

Suggested change: This brief paragraph adds little. Everything is uncertain to some extent. It might be useful to order the information into categories of more or less certain. But to end with this note might suggest to some that all of the preceding, which to our eyes is pretty thorough, objective, and defensible, warrants little confidence.

Page 61 (Conclusion):

Current text: “Conclusion”

Suggested change: A conclusion section might start with this sentence, but this is logically the place to summarize many of the other findings. For example, the fact that the warranted-but-precluded 12-month finding, which was based on reports of unsustainable harvest, has been investigated and revised to where we no longer feel that is having a population-level effect. That is a very significant finding, and a conclusion that should be highlighted. We recommend going through the report and developing a series

of "bullets" that capture the report's conclusions, at least for sections 3.3 (current species condition) and 4.14 (summary of causes and effects).

We look forward to continuing to work closely with your agency as you finalize the status assessment for the yellow-billed loon. We continue to believe that working collaboratively with the Service will maximize the chance to develop workable and successful conservation strategies for species of concern. If you have any questions, please feel free to contact me by either email at douglas.vincent-lang@alaska.gov or by phone at (907) 267-2339.

Respectfully,



Doug Vincent-Lang
Division Director/State ESA Coordinator

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