Journal of Raptor Research

Advancing the science, conservation, and understanding of birds of prey

Journal of Raptor Research 59(4):jrr2539
doi: 10.3356/jrr2539

A Call for Better Estimates of Philippine Eagle Population Size

Jayson C. Ibañez,[1,2*] Luke J. Sutton,[3] Munir Z. Virani,[4] and Christopher J. W. McClure[5]

[1]*Philippine Eagle Foundation, Philippine Eagle Center, Malagos, Baguio District, Davao City 8000 Philippines*
[2]*University of the Philippines in Mindanao, Bago Oshiro, Mintal District, Davao City 8000 Philippines*
[3]*RaptorLab, Home Park, Ashburton, Devon TQ13 7BE UK*
[4]*Mohamed Bin Zayed Raptor Conservation Fund, PO Box 35665, Abu Dhabi UAE*
[5]*The Peregrine Fund, 5668 W. Flying Hawk Lane, Boise, ID 83712 USA*

KEY WORDS: *abundance*; *density*; *monitoring*; *occupancy*; *persecution*; *rarity*.

The extinction risk of the Philippine Eagle (*Pithecophaga jefferyi*) has been described as one of the most important bird conservation issues of our time (Collar et al. 1999, Bueser et al. 2003, McClure et al. 2023). Estimates of population size for this species thus affect conservation prioritizations and should be appropriately interpreted and scientifically calculated. In their recent letter, Collar and Berryman (2025) misinterpreted the estimates of past studies and presented unsubstantiated estimates of population size for the Philippine Eagle. Here, we clarify the interpretation of past population estimates, caution against the use of Collar and Berryman's (2025) numbers, and call for further research on this critically endangered species.

The main thesis of Collar and Berryman's (2025) letter seems to be that two previously published estimates of Philippine Eagle population size (Bueser et al. 2003, Sutton et al. 2023) are unrealistically high. Bueser et al. (2003) estimated 82–233 pairs on Mindanao, and Sutton et al. (2023) estimated 318–447 pairs range-wide. However, these studies did not intend to produce the best, or most likely estimate of population size. Both studies calculated potential population size by dividing the estimated amount of habitat needed per breeding pair by the estimated amount of habitat available. Their methodologies therefore estimated the maximum number of pairs that the available habitat could hold at full occupancy. The authors of both studies were explicit in this. Specifically, Bueser et al. (2003) referred to their estimate as a "maximum" and Sutton et al. (2023) stated six times that they estimated the "potential" breeding population. Indeed, Sutton et al (2023) stated: "... we stress that our global estimate of 392 pairs (784 mature individuals) is the *potential* breeding population size ..." Sutton et al. (2023) even italicized the word "potential" to be explicit. These studies therefore produced estimates that were explicitly high by definition. It is therefore inappropriate to consider past population estimates as overly optimistic when they were intended to be maxima. Collar and Berryman's (2025) concerns thus seem to be based on a misunderstanding of past estimates.

There are many anecdotes that persecution has caused some otherwise suitable Philippine Eagle habitat to be vacant (Collar and Berryman 2025). It is thus likely that the real population level of Philippine Eagles is lower than the maxima presented in previous studies (Bueser et al. 2003, Sutton et al. 2023). Collar and Berryman's (2025) assertion that lower estimates of breeding pairs would be more realistic is therefore true but unsurprising because by definition the maxima generally should be higher than the most likely estimates.

Collar and Berryman (2025) also challenge assumptions made by previous studies. Sutton et al. (2023) assumed that the density of Philippine Eagles on Mindanao, where the eagles are best studied, is the same on other islands. This assumption was made because of a lack of data from other islands. Collar and Berryman (2025) challenge this assumption using

* Corresponding author: ibanez.jayson@gmail.com

anecdotes and unsuitable analysis of citizen science data. Indeed, their analysis of eBird data violates best practices, ignores uncertainty, and risks bias (Johnston et al. 2021). Collar and Berryman's (2025) results therefore do not justify a rejection of the assumption of equal density, but instead should spur more research into the ecology of the Philippine Eagle on islands other than Mindanao.

Collar and Berryman (2025) also attempt to derive a "realistic" number of breeding Philippine Eagles (64 pairs) that does not assume maximum habitat occupancy or equal density across islands. Such an estimate is certainly needed, but the methods used by Collar and Berryman (2025) do not provide justifiable results that could be used for prioritizing conservation action. They simply multiplied their calculated maximum number of breeding pairs by arbitrary proportions (i.e., 1.00, 0.75, 0.50, and 0.25), then multiplied the resulting numbers by the same proportions representing hypothetical ratios of eagle density on Luzon versus that on Mindanao. Collar and Berryman's (2025) estimates are therefore simply maximum estimates that have been reduced by arbitrary proportions. These authors then suggest that prudent conservationists should act as if the lowest estimate that they produced (64 pairs) is the true population level for the species. We disagree that it is prudent to operate as if there are only 64 pairs of Philippine Eagles. To assume so without evidence risks misplaced priorities, especially if other species have science-based and less intentionally pessimistic estimates of population size. In fact, we do not recommend the use of Collar and Berryman's (2025) estimates for use in conservation prioritization. We posit that conservationists should recognize that the unknown true number of breeding Philippine Eagles is probably lower than the previously published maxima. Regardless of this actual number, Philippine Eagles need conservation action.

Prior studies have already spurred scientific research into the abundance, distribution, and conservation of the Philippine Eagle. Ongoing field expeditions are testing the predictions of Sutton et al. (2023) and have already identified nests in areas claimed previously to be vacant. Such confirmatory surveys are a critical feedback loop between science and action. We will continue systematic surveys for the Philippine Eagle across its range. These surveys and additional research are critical to producing scientifically robust estimates that can be used for management and prioritization.

ACKNOWLEDGMENTS

We appreciate constructive conversations with Todd Katzner about the rarity of the Philippine Eagle.

LITERATURE CITED

Bueser, G. L. L., K. G. Bueser, D. S. Afan, D. I. Salvador, J. W. Grier, R. S. Kennedy, and H. C. Miranda (2003). Distribution and nesting density of the Philippine Eagle *Pithecophaga jefferyi* on Mindanao Island, Philippines: what do we know after 100 years? Ibis 145:130–135.

Collar, N. J., and A. J. Berryman (2025). Uncertainty and precaution in estimating the population size of the Philippine Eagle. Journal of Raptor Research 59:jrr2484. doi:10.3356/jrr2484.

Collar, N. J., N. A. D. Mallari, B. R. Tabaranza, and M. Crosby (1999). Threatened Birds of the Philippines. Bookmark Inc., Manila, Philippines.

Johnston, A., W. M. Hochachka, M. E. Strimas-Mackey, V. Ruiz Gutierrez, O. J. Robinson, E. T. Miller, T. Auer, S. T. Kelling, and D. Fink (2021). Analytical guidelines to increase the value of community science data: An example using eBird data to estimate species distributions. Diversity and Distributions 27:1265–1277.

McClure, C. J. W., I. Berkunsky, E. R. Buechley, L. Dunn, J. Johnson, J. McCabe, S. Oppel, B. W. Rolek, L. J. Sutton, and R. Gumbs (2023). Conserving the evolutionary history of birds. Conservation Biology 37:e14141. doi:10.1111/cobi.14141.

Sutton, L. J., J. C. Ibañez, D. I. Salvador, R. L. Taraya, G. S. Opiso, T. L. P. Senarillos, and C. J. W. McClure (2023). Priority conservation areas and a global population estimate for the critically endangered Philippine Eagle. Animal Conservation 26:684–700. doi:10.1111/acv.12854.

Received 30 April 2025; accepted 4 August 2025