

Reviewer Comments: Miya Warrington

This study established a baseline of avian presence/ occupancy for the Opunohu Valley (an IBA) on Mo'orea in French Polynesia. The authors used automatic recording devices and made 5 minute recordings 30 min before sunset, at sunset, 30 min after sunset for a total of 15 minutes per morning for three mornings in a row (total 45 minutes per site). They did this for three habitat types (5 replicates for each habitat type= 15 sites). Analysis consisted of visually identifying calls in the recording and then counted the number of calls per 5 minute record for each species. Statistical analysis was nested ANOVA, hierarchical models and most importantly using # calls to determine occupancy. They found that there were significantly fewer calls made from native vs. non-native species, and that the native kingfisher calling activity was negatively correlated with the calling activity of non-natives. Native seemed to be calling prior to sunset, while non-natives were less vocal. Three non-native species appeared to be more abundant in agriculture habitats.

I appreciate the baseline avian data for a tropical island in an area of the world where little avian work has been done, and agree that more work needs to be done in tropical areas where we have little understanding of the basic ecology of birds. This study is a nice start to that goal in French Polynesia. I believe that with a little more work on writing and presenting the results and more discussion tying this study to previous tropical studies and the use of automated acoustic surveys that this study would make a nice contribution to the tropical avian literature. Nice work, and I hope to see further work in this system.

Abstract:

Lines 13-19: The first half of the abstract still reads like separate points, stacked one after the other. There needs to be more flow, or a "storyline" that connects each sentence to the next.

Lines 17-18: I suggest changing from "By investigating changes in the abundance and behavior of certain species of birds with environmental change..." to "By examining the relationship between environmental change and bird abundance and behaviours..."

Lines 18-19: "we can gain information to better anticipate potential changes in similar species in the future"... There is a whole lot more you can do with the knowledge of the relationship between environmental change and bird abundance...I suggest you connect your bird survey to more theory such as monitoring population trends of endemic or restricted range species, identifying regions needing protection, assessing habitat/species vulnerability to change (be it anthropogenic activity of changes in abiotic conditions), etc...

Line 19: "Within the region", Please be more specific and state what region you did your study in.

Lines 24-25: "...grey-green fruit dove that was >0.6." change to 'which was'

Lines 25-26: Change to "Native bird calling activity was negatively associated with non-native bird calling activity".

Lines 26-28: Perhaps you can summarize the main results (in ~3 sentences) of detection probability, calling number, and calling association to give the readers an idea of why the native bird populations are at risk

Introduction:

General comments:

This section has reasonably good content, however, I feel like it could benefit from a little more organization. I suggest the authors consider the “story” that they are trying to tell, and organize the paragraph order and information in the paragraphs around it. For example: 1) Humans impact biodiversity through x,y,z activities 2) Oceanic islands have high endemism and are vulnerable segue to bird endemism and importance 3) French Polynesia history and conservation issues, 4) Mo’orea and our study.

Tip: New paragraph= new concept/idea; new sentence = new information.

Also, I think the introduction should make it clear what the hypotheses and predictions are in regards to avian abundance and environmental change/ land use as the authors state that importance of this in both the abstract and earlier in the introduction.

Specific comments:

Lines 31-32: I suggest starting the sentence with biodiversity (which is the topic of importance). “Biodiversity is impacted negatively by human caused alteration of natural habitats through industrialization....” (can combine first two sentences to reduce repetitiveness)

Lines 34-36: a couple more sentences on the ecological consequences of human activity as outlines above (e.g. loss of habitat, edge effects, introduction of exotics, more predators).

Lines 38: Islands tend to high low diversity compared to mainland counterparts.

Lines 40-45: Move later in intro (see general comment about organization). Maybe say something here about endemism in French Polynesia.

Lines 47-53: I’m having a hard time understanding the connection you are trying to make between agriculture in the islands (the information beforehand) and birds in the forest. I think you may be trying to show how birds are important and why you look at them in your study. Perhaps, think of your story again, are you studying birds because they are your conservation focus? Or because they are a good indicator species or both? Birds are ubiquitous and found in many habitat types, and perform many ecosystem services which would be detrimental to the habitats they live in should they disappear. At the same time, some species can be sensitive to habitat changes and as such as “canaries in the coal mine”. Your last sentence 51-53 is very clear, you just need to write this paragraph with slightly different information to support that important last sentence.

Lines 55-62: Clear. Move up to first paragraph?

Lines 64-75: Clear problem statement and justification of study- I like this.

Lines 64-66: Has there been any past studies/ data on the amount of conversion of forests to agriculture? (e.g. published studies, book entries, gov’t reports?, eBird/ citizen science data)

Line 69: of these nine birds are they endemic? Native? Residential terrestrial or migratory?

Line 70: automated acoustic recording units.

Lines 75: Do you have predictions for your study? E.g. relationship between land use and presence/absence of native vs. non-native birds. You mention the importance of environmental change in the abstract and intro.

Methods:

General comments:

This section was generally written clearly. However, there are a few details missing that make it difficult to replicate the study. I highly recommend a figure that has typical calls for all species (of which I believe there are nine) to support the statement of “Because of the wide variety of frequency, duration, and call structure in the different species’ calls, disentanglement of calls was not an issue in the spectrogram analyses (lines 204-206).

Specific comments:

Figure 1: Something didn’t work with imbedding the figure so I can’t see the sites within the sampling box. However, I suggest using different shapes for each site type (e.g. black square, grey circle, white filled triangle) as some readers may print in b&w or are colour-blind, and it is just easier to quickly see differences with different shapes. Also inset map of where your island is in relation to the island chain (something I have personally been asked for in the island systems that I have studied, it is actually quite helpful)

Lines 94: terrestrial residential?

Lines 111-112: What year was the satellite imagery taken (Google earth usually has this info available).

Line 125: Can you please add details on how you defined the canopy cover types (e.g. what is considered moderate, did you visually assess % cover or use a densiometer or ?

Line 138, can you please add a detection range for the Songmeter Pro.

Line 144: At what height did you put the recording unit?

Lines 156-157: How many vocalizations/ bird calls were excluded because of unsure species identification?

Lines 168-169: More spectrogram settings? FFT length, time overlap.

Lines 169-170: I don’t find this sentence to be very clear. Are you trying to say that how you defined a “single vocalization” differed for each species (the paragraph below)

Lines 172-206: This are nice descriptions, but I think readers would find it easier if you could make a figure with a “typical” call exemplar for each species (one graph, label each vocalization-species)- that way the reader can see how similar/ dissimilar vocalization are among different species (you comment lines 204-206)

Lines 209: maybe change to number of calls or call counts; “call frequency” can be interpreted as frequency (Hz) of call rate (# calls/unit time).

Lines 209-242 (stats and occupancy modelling)- reasonable clear.

Results:

General comments: There are many nice results here, however I feel that the reporting can be made clearer (as specific comments below). I like the occupancy models.

Specific comments:

Lines 246-256: You are using the term “cue” now. Why? Earlier you refer to calls. Please decide on which term is most appropriate (Signals? Cues? Calls? Songs? Vocalizations?) and be consistent- it is confusing. I also found the reporting of these results unclear as there are no units associated with all the numbers. (e.g. 200 cues per 5 minutes?; 0.6 what? calls/minute?) It would clearest if you had a standardized calls/unit time comparison for all species or habitat type depending on what exactly you are trying to show the reader. I see that you use calls of each species per 5 minute survey, so if that is what you are reporting please make that clear in the results text. I suggest a table would make these results clearest (row= species, column for # calls for the three habitat types- maybe can combine this table with the p-values in table 1).

Figure 2: Calls of each species per 5 minute survey. Nice, but I think table would make results clearer.

Lines 245-262 (Results for Average Calling Number)- I like the reporting on habitat associations, I think that is very useful. The first paragraph (lines 246-256) has a lot of numbers and it is hard to see what the main patterns are. I think this paragraph needs to be tightened to make the main patterns/results clearer. (Also, this was your nested ANOVAs right? I think I would like to see some more statistical reporting such as F-valued, df).

Table 1 caption: This needs to be a stand alone caption, such as “the effect of habitat association on number of calls...”

Lines 264-271 (Hierarchal Clustering Results): nice

Lines 275-271: Just state the actual p-value of the grey-green fruit dove.

Lines 273-292: Occupancy Modeling Results. I like the occupancy modelling, however, I still feel that I would have liked to know the differences in # call detected between categories (e.g. # calls per canopy cover type for each species). I don't think this is strictly necessary, though...but it does allow the reader to put the number of calls (detections) per species as a result of canopy cover, or get a better idea of the difference in detections between native and non-native.

Discussion

General comments: this section needs to be better organized for flow and tightened up. However, lots of good concepts and discussion point. I also feel like there needs to be more discussion connecting this study to past studies on a) using acoustic units as a proxy for bird presence/abundance as no ground-truth visual/acoustic surveys was used in conjunction to these acoustic surveys and using acoustic surveys is relatively new and there is debate over the effectiveness in relation to point counts and/or transects. I also think you should consider discussing the downside of only having sampled three days, and only a three 5 minute recordings close to sunset.

There also needs to be discussion on the conservation/ ecological issues of the two native species, and again tie this to previous tropical studies where native doves (e.g. Doves in Madagascar, Grenada) or kingfishers or (other freshwater piscivorous birds) have been studied.

Specific comments:

Lines 3-16-317: References?

Lines 319-323: I would like to see more discussion on the relationship between # calls per unit time and actual number of callers, as you suggest that more calls = more birds. Consider also # of calls may also vary seasonally with differences in timings of breeding activity, as well as the # of call types within a species vocal repertoire.

Line 341: parentheses missing at the end of 'Bulbul'

Line 336-348: Is it not also possible that there are less kingfishers present (not just present and not calling) due to displacement from non-native species?

Lines 351-367: Birds can also be quite active in the later afternoon and prior to dusk. Do you think that you may have detected more species had you done surveys at dusk, or a different calling pattern in non-native species versus native species.

Line 384: The ref doesn't really seem to support this statement. Do you mean to say native tropical species in French Polynesia (it is true that tropical studies are less studied in relation to temperate species, but your ref is not a review on the number of tropical vs. temp studies).

Lines 383-399: there are a lot of bits of information in these two paragraphs but rather they seem cobbled together rather than organized like with like. A suggestion: a paragraph on kingfisher prior knowledge, potential habitats, conservation issues etc... and then a second paragraph on the dove.

Lines 406: acoustic competition/ interference.

Lines 416-422: yes, I agree!