

Peer Review

Review of: "Franciscana's (*Pontoporia blainvillei*) Diving and Surface Times Through Drone Monitoring"

Ann Weaver¹

1. Maples Center for Forensic Medicine, University of Florida, United States

This is a review of the short communication for Baretto et al., (2024). Franciscana's (*Pontoporia blainvillei*) diving and surface times through drone monitoring submitted by Ann Weaver (annstats54@gmail.com). My review addresses clarity, originality, and contribution to the field.

I first want to say, "Congratulations!" on the obvious amount of field effort that you put in: N = 1655 drone surveys is a lot of work!! Nicely done!

I found this fascinating. Like all good science, this research raises many questions for me. I know this is a journal Note, but a few additions could address questions that arise in the reader's mind.

Clarity. I found the article easy to read and engaging for a scientific report.

Originality. Parts of the study are not original, and some are. Several studies have documented the diving and surface behavior of cetaceans, so although such data make useful comparisons across behavioral states, age-class, etc., this is not new. It is also not a new fact that surface times are shorter than dive times.

However, in my view, this work is original for three reasons. One, there appears to be little data on franciscana dolphins. Two, their time grows short as they are also in serious danger of population depletion from human threats. Three, this study is also original because it is the first to use drones on franciscana dolphins.

Drones as Field Tools. You must have learned quite a bit from your 1655 drone flights. Consider adding a short discussion of the benefits and liabilities of drones as research tools. In the view of the research team, did the drone change the dolphins' behavior? If so, how so? What is the resolution of the drone? For example, I videotaped bottlenose dolphins at SeaWorld, but the resolution of my camera was too

poor. I could identify the dolphins by sight at poolside but could not identify them in the videos. You touched briefly on 'high resolution' but may feel justified in adding a conservative comment on what high resolution versus low resolution drone footage can yield in terms of data. The manuscript would also be enhanced by indicating the height of the drone over the water and reinforcing the idea that turbidity made it very hard for the drone pilot to anticipate where a dolphin would surface (a frustrating problem in my study area). This brief discussion would benefit researchers considering adding drones to their field efforts.

Contribution to the field. I see five contributions. One, the main contribution is the species' dire need for legal protection as per their status as vulnerable (IUCN Red List) to critically endangered (Brazilian Red List).

Two, the study presents novel data on surfacing behaviors. Novel data always contribute to the knowledge base but are especially important for an endangered population with too few data on its natural history.

Three, another contribution of this study to the field is that franciscana dolphins represent an extreme set of adaptations important to study from an ecological standpoint alone (the only river dolphins that inhabit saltwater estuaries versus freshwater rivers, reach a maximum of only 6 feet in length, must employ strategies to offset orca and shark predation, and are probably the smallest cetacean with the longest rostra).

Four, another of this study's contributions rests on the importance of gathering data despite the difficulties of studying franciscana dolphins. This is why, it seems to me, the manuscript would be improved by a short elaboration on the difficulties of fieldwork, which by contrast would help emphasize how much work you all did (and do). All fieldwork on free-ranging cetaceans is hard, but some species are harder than others.

Five, a final potential contribution is the data on surface times. From what I have read and seen, distressed animals pant or breathe heavier than otherwise. Surface patterns may be important as a possible proxy for distress. This could be critical information on an endangered population.

Population estimates and field challenges. I think brief discussions of the answers to the following questions would enhance the manuscript. Please see these questions in the spirit of intrigued curiosity that I offer them rather than interrogation:

Although the abstract refers to “most endangered population of small cetaceans” and “providing valuable insights on refining population estimates,” I did not see an explanation of how these surface/diving data helped refine population estimates.

To emphasize the critical need for significant conservation measures on behalf of this population endangered by human coastal encroachment, add a brief discussion of the 2015 mining waste spill and how it exacerbated gillnet deaths. Is the database sufficient to generate pre- versus post-spill impact comparisons? Have numbers gone up, down, or remained steady? Moreover, consideration of the dire threat of gillnets might warrant a brief discussion of the fact that these little river dolphins live in turbidity levels that demand extra reliance on sonar: Why then do they, most unhappily, get caught in gillnets?

To what extent are the Espirito Santo dolphins physically contiguous with other Franciscana communities? Since DNA showed genetic isolation, I think I can guess the answer.

Why do these dolphins pose considerable difficulties for observational studies? Would you say that they are tougher to study than most cetaceans? Are small boat follows feasible? Can you distinguish individuals by unique markings? Do they always surface using what my ethogram calls a chin up? Can rostral length be broadly used to gauge age and gender? Have you been able to generate a broad breakdown of the population composition (total number of animals, number of females, number of males, reproductive and growth rates, etc.)? These would be intriguing characteristics to most field researchers.

Even without individual recognition, have you been able to discern the patterns of different behavioral states? Was it feasible to broadly classify the 217 surface times and 59 dive times by behavior state? If it wasn't, perhaps you can add a statement about whether the team of observers thinks behavior state matters or that available data are so sparse that the question is premature. I suggest adding brief discussions of 1) the challenges of studying free-ranging franciscana behavior, 2) the definitions of behavior states as available, 3) if the statistics in this paper combined or probably combined different states, and 4) if/why that matters.

The manuscript says franciscana dolphins have a limited behavioral repertoire. Can you briefly explain this? For example, the limits of streamlining mean that bottlenose dolphins exhibit about 110 individual behavior units, so they use the same behaviors in different contexts. To the extent that you can distinguish behavior states, what is the relationship between state and dive times? Can you evaluate behavior states with drones?

Figure 1. You provide a nice explanation of box plots and violin plots. I liked these data and have a few questions related to their variability. Surface times are twice as variable as dive times. On the bottom of the surface time violin plot, the broadest width shows that most surfaces are very brief. Would you say that most franciscana dolphin surfaces are quite quick, with only a few surface times of 30 seconds or more? If so, this has to make it hard on photo-ID photographers. Compared to other studies, is this normal or potentially related to distress? What is the behavior of the dolphins when they linger at the surface, e.g., are they rafting, manipulating food, or heavy breathing to catch their breath? Can you tell from a drone?

The manuscript explains that *foraging* franciscana dolphins spend MORE time at the surface. Really? Why? I ask because it is the opposite among the bottlenose dolphins I study. When they are foraging, dive times are much longer than usual, and surfaces are correspondingly brief (except when they exhibit several short breathing surfaces in a row before submerging again, as if catching their breath).

My background: I am an ethologist. My background includes an intensive 20-year study of free-ranging bottlenose dolphins off west-central Florida and another 5 years of cetacean studies off California, North Carolina, Baja Mexico, and the Bahamas. I also devoted a decade to studying captive primates and have worked with 200 species, mostly mammals. I appreciate this opportunity to comment on your work. Keep going!

Declarations

Potential competing interests: No potential competing interests to declare.