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Clarification on protected area management efforts in Madagascar during periods of heightened uncertainty and instability

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ABSTRACT

In early May 2022, Eklund and colleagues published an article in Nature Sustainability in which they attempted to demonstrate that the early 2020 lockdown imposed in Madagascar by the emerging COVID-19 pandemic had a direct impact on Protected Areas (PAs), with an increase in the number of fires, which then stabilized once the lockdown was over. The authors, undoubtedly in good faith but based on an incomplete understanding of the situation on the ground, were attempting to draw the attention of the international community and donors to the need to maintain and strengthen PA management efforts. Their contribution, while highlighting a real and urgent need, does not, however, do justice to Madagascar's PA managers, who, in collaboration with the populations living in the vicinity of parks and reserves, maintained and in some instances increased efforts to ensure the integrity of parks and reserves during the COVID-19 period. Following the publication of this paper, we contacted the authors as well as the editors of Nature Sustainability in a collegial effort to draw their attention to the errors identified in the analysis and to point out how this led to a misinterpretation of what actually transpired during the lockdown. We submitted a carefully worded and argued rebuttal for possible publication in Nature Sustainability, which we regarded as justified given the nature and significance of the considerations we had carefully presented. Unfortunately, after several exchanges with the editor and indirectly with the authors, during which we made an honest and concerted effort to explain the problems identified and their reputational implications for PA managers in Madagascar, the journal ultimately declined to publish our response, to our considerable surprise. In order to ensure that these issues are shared with the diverse stakeholder groups involved in conservation and PA management, in Madagascar and elsewhere, we feel that it is our duty to draw attention to their potential consequences, rather than adopting the questionable strategy of sitting back and hoping they will somehow self-correct themselves (see Vazire 2019).

RÉSUMÉ

Début mai 2022, Eklund et ses collègues publiaient un article dans Nature Sustainability dans lequel ils ont tenté de démontrer que le confinement de début 2020 imposé à Madagascar par la pandémie naissante du COVID-19 a eu un impact direct sur les aires protégées (AP) avec une augmentation du nombre de feux qui s'est stabilisée dès la fin du confinement. Les auteurs, certainement de bonne foi mais sur la base d'une compréhension incomplète de la situation sur le terrain, tentaient d'attirer l'attention de la communauté internationale et des bailleurs sur la nécessité de maintenir et renforcer les efforts de gestion dans les AP. Leur contribution, même si elle souligne un besoin réel et urgent ne fait en revanche pas justice aux gestionnaires des AP qui, en collaboration avec les populations riveraines des AP, ont maintenu, parfois accru leurs efforts pour maintenir l'intégrité des AP pendant la période COVID-19. Suite à la publication de l'article,

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INVESTING IN A SUSTAINABLE NATURAL ENVIRONMENT FOR FUTURE GENERATIONS OF HUMANS, ANIMALS AND PLANTS OF MADAGASCAR

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nous avons contacté les auteurs ainsi que les éditeurs de Nature Sustainability dans un effort collégial pour attirer leur attention sur les erreurs identifiées dans leur analyse et pour souligner la msure dans laquelle elles ont mené à une interprétation totalement erronée de la situation qui prévalait pendant le confinement. Nous avons soumis une réfutation soigneusement formulée et argumentée à Nature Sustainability que nous estimions largement justifiée compte tenu de la nature et de l'importance des considérations présentées, mais après plusieurs échanges avec le rédacteur en chef et indirectement avec les auteurs au cours desquels nous présentions de manière honnête et concertée les problèmes que nous avions identifiés avec leurs les implications sur la réputation des gestionnaires des AP à Madagascar, le journal a finalement refusé de publier notre réponse, à notre grand étonnement. Pour nous assurer que ces questions soient partagées avec tous les acteurs et parties prenantes impliqués dans la conservation et la gestion des AP, à Madagascar et ailleurs, nous estimons qu'il est de notre devoir d'attirer l'attention sur les problèmes que nous avons identifiés ainsi que sur leurs conséquences éventuelles plutôt que d'attendre que les problèmes se règlent d'eux-mêmes (voir Vazire 2019).

INTRODUCTION

It has been purported that Madagascar's protected areas (PAs) experienced a dramatic spike in fire events during the period of government-imposed COVID-19 lockdown from March to July 2020 (Eklund et al. 2021). In this study, the authors suggested that the reason for increased fires in 16 PAs in the western part of the country was a lack of management during that period, which was rendered impossible due to the consequences of Madagascar's government-imposed COVID-19 lockdown. However, while PAs were indeed officially closed to all visitors during that time, management activities not only continued, but were in fact intensified. Although the modeling utilized by Eklund et al. (2022) is robust, other key elements of the methodology they used are problematic, involving data compilation and validation, as well as park manager consultations, which led to ill-informed and erroneous conclusions.

Madagascar's terrestrial protected area network covers some 11% of its surface. Of the 114 PAs, 43 in IUCN categories I, II and IV are officially managed by a parastatal organization, Madagascar National Parks (MNP), while management of the others involves a mixed regime linking NGOs and local communities, mostly corresponding to IUCN categories V and VI (Dudley et al. 2010). Thirteen PAs are referred to as 'orphan sites' because, although they are the responsibility of the Ministry of Environment and Sustainable Development, they benefit from little or no actual management (Gardner et al. 2018, Rafanoharana et al. 2021). Here we provide clarification with regard to the 43 PAs currently managed by MNP and the five orphan sites that previously were under MNP management. MNP has a centralized management approach utilizing a standardized protocol across its network, which provides transparent management and curation of data across all the PAs under its umbrella. It is important to note that all five orphan PAs in western and northern Madagascar experienced an increase in the number of fires from March to July 2020, even though their management has remained unchanged for several years; they did not benefit from any management efforts either before or during the 2020 lockdown period. Management—or lack thereof—therefore cannot be invoked as a causal mechanism for changes in fire incidences in these five orphan PAs.

MAJOR ERRORS IDENTIFIED AND OUR RESPONSES

DATA COLLECTION. When attempting to analyze the cause of a perceived change, it is important that the veracity of the data used be carefully checked. The World Database of Protected Areas (UNEP-WCMC and IUCN 2020) used by Eklund et al. (2022) serves information on PA boundaries as officially reported by governments. In Madagascar, however, park managers utilize updated and corrected shapefiles showing official PA borders, as formally established by decree (Table 1). By applying this corrected and updated resource, it can be seen that many fires detected by the sensor Visible Infrared Imaging Radiometer Suite (VIIRS) used to monitor fires amongst other features (Elvidge et al. 2017) in western Madagascar were in fact situated outside official PA limits. The areas indicated in the WDPA are inflated because they include outer buffer zones, the so-called "zone de protection". In seven PAs, the number of fires in the outside buffers accounted for 1257 fires, therefore increasing the total number of fires wrongly reported for these PAs by more than 50% (Table 1).

In 2020, deforestation decreased substantially at the national level, and this was especially the case in PAs when compared with 2019 (i.e., prior to the COVID-19 pandemic) (Figure S1). Most of Madagascar's remaining undisturbed forests occur in PAs, which are primarily surrounded by anthropogenic grassland and degraded forests, formations that are highly susceptible to fire. The forest cover in the "zone de protection" is always lower than the forest cover within the network of PAs in Madagascar (Rafanoharana et al. 2021). In many cases, the outer buffers of PAs, including in the seven PAs reported in Table 1, the "zone de protection" is mostly dominated by grasslands.

VALIDATION OF COLLECTED DATA. In order to assure accurate data for their analyses, Eklund et al. (2022) should have consulted practitioners involved in the day-to-day management of PAs, including those utilizing GIS-based tools and who are aware of the details and consequences of the COVID-19 lockdown and PA closures. MNP has 30 management units comprising local offices and full-time staff, which remained fully operational during the lockdown to ensure continuous management and patrolling. MNP agents were granted an exemption from travel restrictions, and while the PAs were closed to visitors in 2020, patrols were proactively intensified at most sites to strengthen protection (MNP 2019, 2020). In Kirindy Mite and Ankarafantsika NPs, prescribed fires have increased the number of fires remotely detected. Prescribed burning was used as a management practice in most large NPs in the dry biome from February to April/May and cannot be distinguished or qualified as such with satellite information. Prescribed burning was enhanced during 2020 in anticipation of increased drought and modeled fire risk (Prasetya et al. 2019, Harrington et al. 2021, Figure 1). These intentional burns were conducted in grasslands within the PAs to reduce fuel loads and to preclude fires from entering the forests, a priority element in MNP's management strategy to safeguard forest biodiversity.

Table 1. Protected areas managed by MNP as reported by the World Database on Protected Areas (https://www.protectedplanet.net/) pointing to errors which over report the number of foresee by Eklund et al. in 2022 (*surplus fires out of total fires reported by Eklund et al. 2022)

Protected areas	Management	IUCN category	Decree	Area per decree in km²	Errors in WDPA	Fires reported by Eklund et al. in March–July 2020 * outside PAs	prescribed burns
Ambohijanahary	orphan	IV	N. 58-08 on 28 Oct. 1958	247.5	fine as is with reported area of 243.02 km² (1)	./.	./.
Andranomena	MNP	IV	N. 58-13 on 28 Oct. 1958	64.2	includes the external buffer with reported area of 207.29 km²; the external buffers overlap the Menabe Antimena PA (2)	27 / 102 (26.5%)	./.
Ankarafantsika	MNP	II	N. 2015-730 on 21 Apr. 2015	1365.13	includes the external buffer with reported area of 1695.33 km² (3)	52 / 234 (22.2%)	2
Bemaraha	MNP	II	N. 2011-498 on 6 Sep. 2011	1577.1	Two PAs - Tsingy de Bemaraha Strict Nature Reserve with reported area of 1520.0 km² (4) - Bemaraha with its outer buffer as "Zone de protection" with reported area of 2316.31 km² (5)	694 / 1884 (36.8%)	./.
Bemarivo	orphan	IV	GI RS on 10 Sep. 1956	115.75	fine as is with reported area of 120.46 km² (6)	./.	./.
Corridor forestier Bongolava	NGO	V	N. 2015-790 on 18 Apr. 2015	605.89	fine as is with reported area of 605.9 km² (7)	./.	./.
Kasijy	orphan	IV	GI RS 10 Sep. 1956	198	fine as is with reported area of 229.56 km² (8)	./.	./.
Kirindy Mite	MNP	II	N. 2015-735 on 21 Apr. 2015	1563.50 (including 282.5 marine)	given as a marine PA, including for its terrestrial biggest portion, and also includes the external buffer with reported area of 2374.03 km² (9)	326 / 1211 (26.9%)	367 / 1211 (30.3%)
Mahavavy Kinkony	NGO	V	N. 2015-718 on 21 Apr. 2015	3020.0 for its terrestrial part	given as a marine PA, including for its terrestrial biggest portion with reported area of 3509.28 km² (10)	./.	./.
Mangoky Ihotry	NGO	V	N. 2015-719 on 21 Apr. 2015	4261.46	fine as is with reported area of 4265.76 km² (11)	./.	./.
Marotandrano	MNP	IV	N. 56-208 on 20 Feb. 1956	422	includes the external buffer with reported area of 671.19 km² (12)	16 / 21 (76.2%)	./.
Menabe Antimena	NGO	V	N. 2015-762 on 28 Apr. 2015	2103.12 (including 293.1 marine)	with reported area of 2094.61 km² (13)	./.	./.
Montagne d'Ambre	MNP	II	N. 2015-776 on 28 Apr. 2015	305.38	includes the external buffer with reported area of 586.7 km² (14)	51 / 65 (78.5%)	./.
Ranobe PK32	orphan	Not defined	N. 2015-808 on 5 May 2015	1685	Reported as a marine protected area with reported area of 1685.0 km²	./.	./.
Tampoketsa Analamaitso	orphan	IV	N. 58-14 on 28 Oct. 1958	171.5	fine as is with reported area of 225.62 km²	./.	./.
Zombitse Vohibasia	MNP	II	N. 97-1454 on 18 Dec. 1997	368.03	includes the external buffer with reported area of 806.72 km²	91 / 163 (55.8%)	./.

(1) https://www.protectedplanet.net/5030; (2) https://www.protectedplanet.net/5040; (3) https://www.protectedplanet.net/1299; (4) https://www.protectedplanet.net/26653; (5) https://www.protectedplanet.net/303702; (6) https://www.protectedplanet.net/5031; (7) https://www.protectedplanet.net/352244; (8) https://www.protectedplanet.net/5033; (9) https://www.protectedplanet.net/303700; (10) https://www.protectedplanet.net/352248; (11) https://www.protectedplanet.net/555697877; (12) https://www.protectedplanet.net/5035; (13) https://www.protectedplanet.net/352251; (14) https://www.protectedplanet.net/2314; (15) https://www.protectedplanet.net/555549460; (16) https://www.protectedplanet.net/5036; (17) https://www.protectedplanet.net/20273

MNP uses VIIRS alerts to map fire locations for swift deployment of tactical management in response to potential fire threats. To verify incoming fire alerts, MNP employs both VIIRS and Moderate Resolution Imaging Spectroradiometer (MODIS), and patrols then conduct verification and surveillance, equipped with SMART tools (https://smartconservationtools.org/) to apply GPS coordinates to track the evolution of each fire. These units can either operate as a mixed brigade with police officers in charge, as park rangers with MNP agents in charge, or as a 'Comité Local du Parc—CLP' with committee members from local communities in charge (Bodonirina et al. 2018, MNP 2019). Collectively, variously composed patrols walked 170,046 km in 2019 and 215,478 km in 2020 within the 43 PAs managed by MNP (MNP 2019, 2020 in litt., https://smartconservationtools.org/). In addition to using MODIS for operational fire management, MNP also employs it for global fire monitoring related to a key conservation indicator: reducing the area burnt within PAs. MODIS provides information on the area impacted by each fire and assists in identifying severity as well as the type of ecosystem that has been affected (i.e., forest or grassland). In Ankarafantsika national park, for example, similar numbers of fire hotspots were observed in grasslands and forests, but almost twice as much area was burned in grasslands (Figure 1). The conclusions by Eklund et al. (2022) are flawed because the authors overestimated the size of the PAs, were unaware of the

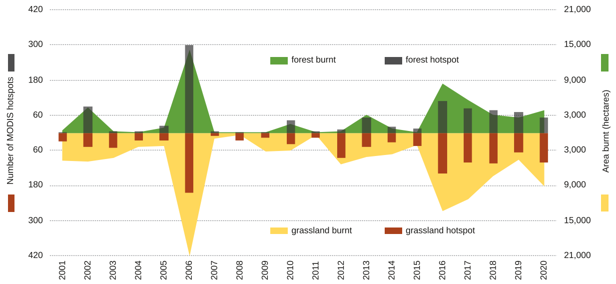

Figure 1. Burnt areas by fires in Ankarafantsika national park and number of MODIS (https://modis.gsfc.nasa.gov/data/dataprod/mod14.php) fire hotspots reported from 2001 to 2020.

existence of prescribed fires, and misinterpreted the lockdown as a halt in PA management. Most of these errors could have been avoided by involving PA managers in the discussion.

EXPANDED CONSULTATION WITH PROTECTED AREA MANAGERS. Based on a quick Google Scholar search in August 2022 using the key words “World Database of Protected Areas” and “shapefile*”, there were over 40 environmental sciences-related articles published in international peer-reviewed journals in 2022 alone that relied on the boundaries provided by the WDPA. This highlights a potentially critical problem. While it is not possible to assess the impact of using potentially inaccurate PA boundaries, our example clearly shows (Supplementary Table 1) that significantly different results would be obtained and therefore substantially different interpretations formulated when using accurate data on PA limits. An effort is being made to ensure continuous improvement of the WDPA (Bingham et al. 2019), but this relies exclusively on information provided by governments. It is therefore imperative that users double check the veracity of PA boundaries and shapefiles, regardless of the source. Similarly, reviewers should flag this potential risk when the WDPA is used for studies that rely on accurate PA boundaries.

REFERENCES

Bingham, H. C., Juffe Bignoli, D., Lewis, E., MacSharry, B., Burgess, N. D., et al. 2019. Sixty years of tracking conservation progress using the World Database on Protected Areas. Nature Ecology & Evolution 3: 737–743. <https://doi.org/10.1038/s41559-019-0869-3>

Bodonirina, N., Reibelt, L. M., Stoudmann, N., Chamagne, J., Jones, T. G., et al. 2018. Approaching local perceptions of forest governance and livelihood challenges with companion modeling from a case study around Zahamena National Park, Madagascar. Forests 9: 624. <https://doi.org/10.3390/f9100624>

Dudley, N., Parrish, J. D., Redford, K. H. andStolton, S. 2010. The revised IUCN protected area management categories: the debate and ways forward. Oryx 44, 485–490. <https://doi.org/10.1017/S0030605310000566>

Eklund, J., Jones, J. P. G., Räsänen, M., Geldmann, J., Jokinen, A.-P., et al. 2022. Elevated fires during COVID-19 lockdown and the vulnerability of protected areas. Nature Sustainability 5: 603–609. <https://doi.org/10.1038/s41893-022-00884-x>

Elvidge, C. D., Baugh, K., Zhizhin, M., Hsu, F. C. and Ghosh, T., 2017. VIIRS night-time lights. International Journal of Remote Sensing 38, 21: 5860–5879. <https://doi.org/10.1080/01431161.2017.1342050>

Gardner, C. J. Nicoll, M. E., Birkinshaw, C., Harris, A., Lewis, R. E., et al. 2018. The rapid expansion of Madagascar's protected area system. Biological Conservation 220: 29–36. <https://doi.org/10.1016/j.biocon.2018.02.011>

Harrington, L. J., Wolski, P., Pinto, I., Ramarosandratana, A. M., Barimalala, R., et al. 2021. Attribution of Severe Low Rainfall in Southern Madagascar, 2019–21 (World Weather Attribution, 2021). Available online <https://www.worldweatherattribution.org/wp-content/uploads/ScientificReport_Madagascar.pdf>

Prasetya, T. A. E., Devi, R. M., Fitrahanjani, C., Wahyuningty, T. and Muna, S. 2022. Systematic assessment of the warming trend in Madagascar's mainland daytime land surface temperature from 2000 to 2019. Journal of African Earth Science 189: 104502. <https://doi.org/10.1016/j.jafrearsci.2022.104502>

Rafanoharana, S. C., Andrianambinina, F. O. D., Rasamuel, H. A., Rakotoarijaona, M. A., Ganzhorn, J. U. et al. 2021. Exemplifying deforestation processes in four protected areas in Madagascar. Forests 12: 1143. <https://doi.org/10.3390/f12091143>

UNEP-WCMC (UN Environment Programme World Conservation Monitoring Centre) and IUCN 2020. The World Database on Protected Areas (WDPA). Available online <https://www.protectedplanet.net>

Vazire, S. 2019. A toast to the error detectors. Nature 577: 9. <https://doi.org/10.1038/d41586-019-03909-2>

SUPPLEMENTARY INFORMATION

Figure S1. Deforestation from 2017 to 2021 according to Global Forest Watch with a tree canopy density (TCD) > 30% and deforestation in protected areas (PAs) IUCN categories I, II and IV, and PAs IUCN categories V and VI. (left for total areas, right in percentage; according to Global Forest Watch https://www.globalforestwatch.org/dashboards/country/MDG/)