ANNOTATED BIBLIOGRAPHY

Protected Area Downgrading, Downsizing and Degazettement (PADDD) Literature

Version 1.1. Updated August 2020.
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DOI: 10.5281/zenodo.3973671

This annotated bibliography provides brief introductions to peer-reviewed publications from the PADDDtracker initiative, which define, document, and assess protected area downgrading, downsizing, and degazettement (PADDD), legal changes that temper restrictions, shrink boundaries, and eliminate protected areas. We summarize the core publications here authored by our team (listed in reverse chronological order), and list additional key references, while acknowledging that hundreds of other publications have cited or used data from PADDDtracker and contributed additional analyses. If you are interested in the full-text versions of these publications or wish to contribute to the list with summaries of additional, relevant publications, please email paddd.team@gmail.com.

Peer-reviewed publications

12. Keles, D., Delacote, P., Pfaff, A., Qin, S., & Mascia, M. B. (2020). **What Drives the Erasure of Protected Areas? Evidence from across the Brazilian Amazon**. *Ecological Economics*, *176*, 106733. https://doi.org/10.1016/j.ecolecon.2020.106733

To investigate PADDD risk, Keles et al. examined enacted and proposed PADDD events in the Brazilian Amazon. Building on Tesfaw et al. 2018, this analysis used a framework to consider bargaining between development and conservation agencies and applies logistic regression. Results demonstrate that the risk of PADDD was higher for protected areas that were closer to roads and cities, larger, and with higher internal deforestation rates. Policy implications of this study include the following: (1) limit cumulative impacts of downsizings; (2) enhance PA performance through improved management and enforcement to reduce deforestation; and (3) consider durability of other area-based conservation systems. This study provides further evidence about variation in PADDD risk by context and site.

11. Thieme, M. L., Khrystenko, D., Qin, S., Golden Kroner, R. E., Lehner, B., Pack, S., Tockner, K., Zarfl, C., Shahbol, N., & Mascia, M. B. (2020). **Dams and protected areas: Quantifying the spatial and temporal extent of global dam construction within protected areas**. *Conservation Letters*, *2020*, e12719. https://doi.org/10.1111/conl.12719

Large hydropower dams can fragment ecosystems, restrict species movements and sediment flows, and have detrimental impacts on livelihoods; such dams can occur even within protected areas and may drive PADDD events. This study examined the relationship between protected areas, dams, and PADDD by combining global datasets and examining their overlaps in space and time. The analysis found that more than 500 dams are planned or under construction within protected areas, and at least 1,200 large dams are currently located within protected areas. This methodology can be applied to other global infrastructure databases to detect candidate PADDD events and point to development risks within protected areas. This study suggests that environmental safeguards should preclude development of dams within or adjacent to PAs and prioritize dams within PAs for possible removal and restoration. Findings of this study were covered in Mongabay and Yale Environment 360.

10. Qin, S., R.E. Golden Kroner, C. Cook, A.T. Tesfaw, R. Braybrook, Rowan, C.M. Rodriguez, C. Poelking, M.B. Mascia. (2019). **Protected area downgrading, downsizing, and degazettement as a threat to iconic protected areas**. *Conservation Biology, 33*(6), 1275–1285. https://onlinelibrary.wiley.com/doi/abs/10.1111/cobi.13365

Qin et al. identified 23 enacted and proposed PADDD events in UNESCO World Heritage and Man-and-Biosphere Sites, highlighting that iconic protected areas are not immune to PADDD. The authors examined the context and consequences of PADDD events in four iconic PAs (Yosemite National Park, Arabian Oryx Sanctuary, Yasuní National Park, and Virunga National Park) to illuminate the complexity of settings and mechanisms associated with PADDD events. These four case studies underscored the diversity of pressures and processes that lead to PADDD events and the importance of comprehensive PADDD records for addressing knowledge gaps in the relationship between development pressures and PADDD impacts. These insights reveal the need for more regional and country-level descriptive PADDD studies as well as research on risks, social and ecological impacts, and contextual factors associated with PADDD. Strategies to address the issues associated with PADDD include improved tracking and reporting of PADDD events, increased transparency of PADDD policy processes, and mitigation of negative impacts from PADDD. The authors emphasize that collaboration between researchers, policy makers, and civil society is crucial to long-term conservation and sustainable development goals. This study is summarized in a Google Earth story map.

9. Golden Kroner, R.E., Qin, S., Cook, C., Pack, S., Krithivasan, R., Bonilla, O.D., Cort-Kansinally, K.A., Coutinho, B., Feng, M., Martinez Garcia, M.I., He, Y., Kennedy, C., Lebreton, C., Ledezma, J.C., Lovejoy, T.E., Luther, D., Parmanand, Y., Ruíz-Agudelo, C., Yerena, E., Zambrano, V.M., and Mascia, M.B. 2019. **The uncertain future of protected lands and waters.** *Science, 364*(6443), 881–886. https://science.sciencemag.org/content/364/6443/881

In this publication, Golden Kroner et al. presented the most comprehensive global review of the extent, patterns, trends, and proximate causes of PADDD events to date. The authors conducted systematic archival research to document PADDD events in the United States and the nine countries that share the Amazon, and combined results with PADDD records collected systematically, opportunistically and through crowd-sourcing for an additional 66 countries. Between 1892 and 2018, 73 countries enacted at least 3,749 PADDD events in 3,048 protected areas. Collectively, these PADDD events have affected an area approximately the size of Mexico, removing protections from 519,857 km^2 and tempering restrictions in an additional 1,659,972 km^2. Most enacted PADDD events were related to industrial-scale resource extraction and development (62%), suggesting that PADDD is often incompatible with efforts to conserve biodiversity. The U.S. and Brazil are contemporary hotspots of PADDD, demonstrating the increasingly uncertain future of protected areas in these countries. The U.S. government introduced 90% of PADDD proposals since 2000. In Brazil, 48% of enacted and proposed PADDD events occurred between 2010 and 2017. The authors highlight the need for policies and processes that sustain protected areas and incentivize their permanence. Findings from this publication were featured in CNN, Popular Science, The Guardian, and Rolling Stone among other outlets.

8. Tesfaw, A. T., Pfaff, A., Golden Kroner, R. E., Qin, S., Medeiros, R., & Mascia, M. B. (2018). **Land-use and land-cover change shape the sustainability and impacts of protected areas.** *Proceedings of the National Academy of Sciences*, *115*(9), 2084–2089. https://doi.org/10.1073/pnas.1716462115

To advance understanding of the relationship between PADDD and land use and land cover change, Tesfaw et al. proposed and tested a bargaining framework for describing PADDD risks and deforestation impacts. The authors hypothesized that based on variations in conservation costs and development benefits across the landscape of a protected area, bargaining between development agencies and conservation agencies could determine where PADDD events occur. Using this framework, they examined

PADDD events associated with hydropower and rural settlements in the state of Rondônia in Brazil to assess PADDD risk factors, risk differences by proximate cause, and impacts of PADDD on tree cover loss. Protected areas that were less effective at curtailing deforestation were more likely to be degazetted or downsized, while more effective sites were more likely to maintain protections. Results suggested that protected area effectiveness is an important consideration when conservation agencies bargain with development agencies over land use. Additionally, findings revealed that different proximate causes of PADDD were associated with different risk factors. Overall, results highlight the importance of accounting for PADDD in evaluations of protected areas to prevent biased sampling and subsequent overestimations of protected area impacts. Findings from this publication were featured in BBC Brasil.

7. Cook, C. N., Valkan, R. S., Mascia, M. B., & McGeoch, M. A. (2017). **Quantifying the extent of protected-area downgrading, downsizing, and degazettement in Australia**. *Conservation Biology*, *31*(5), 1039–1052. https://doi.org/10.1111/cobi.12904

Cook et al. placed PADDD events in the context of gains in protection to assess protected area network dynamics. The authors identified every parcel of land where protected status was gained, lost, or changed within the Australian terrestrial protected area network between 1997 and 2014. This assessment marked the first comprehensive investigation of PADDD in a developed country and the first assessment of protected area network dynamics, exploring both increases and decreases in protection. The results revealed a highly dynamic network with 5,233 changes in area or level of protection over 17 years. While the overall area protected within the network increased, 1,500 PADDD events were identified that were mostly associated with downgrading of protections. The most frequent proximate cause of downsizing and degazettement events was land claims for indigenous groups, while the most frequent proximate cause of downgrading events was infrastructure and extractive activities. Collectively, these PADDD events affected more than one-third of the Australian terrestrial protected area network. The authors highlight the need for high-quality spatial data and improved data standards to enable measures of global conservation progress that are more meaningful than total area protected.

6. Golden Kroner, R. E., Krithivasan, R., & Mascia, M. B. (2016). **Effects of protected area downsizing on habitat fragmentation in Yosemite National Park (USA), 1864 - 2014.** *Ecology and Society*, *21*(3). https://doi.org/10.5751/ES-08679-210322

To advance understanding of the relationship between PADDD and biodiversity, Golden Kroner et al. conducted a case study in Yosemite National Park (USA). Their analysis explored the effects of downsizing events on the fragmentation of habitat, a significant factor in the global loss of biodiversity. Through a review of historical documents, Golden Kroner et al. identified two excisions and five additions to Yosemite National Park between 1905 and 1937 which collectively reduced its size by 30%. Authors compared protected, never-protected, and downsized lands at three spatial scales to determine the effect of downsizing events on fragmentation by roads. The analyses used four habitat fragmentation metrics (road density, fragment area-to-perimeter ratio, fragment area, and fragment density) and revealed that downsized lands were more severely fragmented than protected lands and comparable to never-protected lands. Lands were less fragmented where downsizes had been reversed relative to lands where downsizes were not reversed. Overall, results suggested that protected area downsizing may contribute to habitat fragmentation, reversals to PADDD may confer ecological benefits, and highlighted that even iconic protected areas are vulnerable to downsizing. Furthermore, these findings underscored the need for assessments of conservation interventions to include PADDD to ensure unbiased estimates of impact. An article in Mongabay featured findings from this publication.

5. Symes, W. S., Rao, M., Mascia, M. B., & Carrasco, L. R. (2016). **Why do we lose protected areas? Factors influencing protected area downgrading, downsizing and degazettement in the tropics and subtropics.** *Global Change Biology*, *22*(2), 656–665. https://doi.org/10.1111/gcb.13089

Symes et al. examined the influence of global economic, demographic, and geographic factors on the spatial occurrence of PADDD events to advance understanding of the influence of these risk factors. Specifically, the authors used 6 different models to analyze the influence of local population density, spatially explicit GDP, agricultural rent, altitude, and protected area size on the probability of occurrence of an enacted PADDD event. This analysis was conducted using a dataset spanning 110 years containing 342 enacted PADDD events from 44 countries in the tropics and subtropics. Across all models, larger protected areas were associated with higher probability of PADDD. In all but one model, the relationship between protected area size and probability of PADDD was stronger for lands near higher population densities and this interaction was more influential on the probability of downsizing than on downgrading or degazettement. Additionally, all but one of the models revealed a small but significant positive relationship between PADDD and altitude, suggesting that protected areas in upland locations are more vulnerable to PADDD. The authors propose that the influence of protected area size is likely a result of larger protected areas containing more exploitable land and potential resources. Maintaining protections for larger protected areas likely presents a larger opportunity cost, on average. The authors conclude by highlighting the need for systematic conservation planning processes to consider protected area robustness in the design of optimal protected area networks. This research was featured in Asian Scientist.

4. Pack, S. M., Ferreira, M. N., Krithivasan, R., Murrow, J., Bernard, E., & Mascia, M. B. (2016). **Protected area downgrading, downsizing, and degazettement (PADDD) in the Amazon.** *Biological Conservation*, *197*, 32–39. https://doi.org/10.1016/j.biocon.2016.02.004

Brazil contains one-third of the world's tropical forests and is home to the world's largest protected area network, yet scattered evidence suggests widespread PADDD occurring throughout Brazil. To advance understanding of PADDD in Brazil, Pack et al. documented extent, patterns, trends, and proximate causes of Brazilian PADDD events between 1900 and 2014 and evaluated the impacts of PADDD on short-term deforestation rates. They identified 67 enacted PADDD events which were primarily associated with hydropower (39%) and rural human settlements (20%). Collectively, these PADDD events affected 112,477 km^2 of protected areas and removed protections entirely from 95,764 km^2, representing 6% of Brazil's potential terrestrial protected area estate. The authors also identified 27 active PADDD proposals as of 2014, which put 60,555 km^2 of protected lands at risk. Results revealed that there was no significant change in short-term deforestation rates following enacted PADDD events. While these findings appear to contradict the results of Forrest et al. (2014), the authors propose that the different motivations for PADDD in Brazil may explain this discrepancy. Most Brazilian sites included in the deforestation analysis were associated with hydropower development, whereas sites identified by Forrest et al. in Peru and Malaysia were mostly associated with agriculture or forestry. The authors highlighted the benefits of a potential standardized PADDD reporting system to improve transparency as well as institutionalization of policies governing PADDD to parallel those that govern protected area establishment. Additionally, they advise conservation planners to consider PADDD in the design of protected area networks to ensure their permanence. Findings from this paper were featured in The Guardian.

3. Forrest, J. L., Mascia, M. B., Pailler, S., Abidin, S. Z., Araujo, M. D., Krithivasan, R., & Riveros, J. C. (2015). **Tropical Deforestation and Carbon Emissions from Protected Area Downgrading, Downsizing, and Degazettement (PADDD).** *Conservation Letters*, *8*(3), 153–161. https://doi.org/10.1111/conl.12144

Forrest et al. assessed impacts of PADDD on deforestation and forest carbon emissions and explored the implications of PADDD for Reducing Emissions from Deforestation and Forest Degradation (REDD+) policies. REDD+ policies are intended to reduce forest carbon emissions and conserve biodiversity by means of donor countries compensating developing countries for emission reductions achieved through forest conservation and restoration. The authors examined the impacts of PADDD on tropical deforestation and forest carbon emissions in three REDD+ priority countries: Democratic Republic of the Congo (DRC),

Malaysia, and Peru. They documented 174 enacted and 9 proposed PADDD events in these countries occurring between 1900 and 2011, which affected an area of over 48,000 km^2. Forrest et al. estimated deforestation rates and determined the quantity and economic value of lost and at-risk forest carbon in PADDDed, protected, and never-protected areas. Deforestation and forest carbon emissions in PADDDed forests substantially exceeded rates in protected areas and slightly exceeded rates in never-protected areas. The authors conclude that PADDD dynamics should be considered in carbon flux estimations and policy responses as PADDD poses significant risks to forest carbon stocks. They propose that Parties to the United Nations Framework Convention on Climate Change could monitor and report on the permanence and deforestation rates of protected areas as part of the Warsaw Framework for REDD+.

2. Mascia, M. B., Pailler, S., Krithivasan, R., Roshchanka, V., Burns, D., Mlotha, M. J., Murray, D. R., & Peng, N. (2014). **Protected area downgrading, downsizing, and degazettement (PADDD) in Africa, Asia, and Latin America and the Caribbean, 1900–2010.** *Biological Conservation*, *169*, 355–361. https://doi.org/10.1016/j.biocon.2013.11.021

Mascia et al. examined the geographic patterns, temporal trends, and proximate causes of PADDD in Africa, Asia, and Latin America and the Caribbean (LAC). Collectively, these three regions contain most global conservation priorities and over 70% of all protected lands and waters. Additionally, this paper explored the implications of PADDD for attainment of the Convention on Biological Diversity (CBD) protected area coverage targets for 2020. To conduct this investigation, the authors reviewed United Nations lists of protected areas (1962 -2009), explored published documents reporting PADDD, and consulted subject matter experts. They identified 543 instances of PADDD in 57 countries enacted between 1900-2010 which collectively affected 503,591 km^2 of protected areas. PADDD was spatially heterogenous across Africa, Asia, and LAC. Overall, downsizing was the most common PADDD event (60.8%) followed by degazettement (27.6%) and downgrading (11.6%). Approximately 20% of the areas affected by PADDD were affected more than once and 5.5% of the 543 PADDD events were partially or fully reversed. While proximate causes of PADDD varied, industrial-scale natural resource extraction and development (oil and gas, forestry, mining, industrial agriculture, industrialization, and infrastructure) led to 37.5% of PADDD events, local land pressures and land claims led to 18.1% of PADDD events, and comprehensive revisions of PA systems led to 13.8% of PADDD events. PADDD prevented at least four countries (Kenya, Namibia, Rwanda, and Uganda) from meeting CBD Aichi target 11. While a small fraction of PADDD events were associated with efforts to bolster biodiversity conservation, the proximate causes of most PADDD events suggested compromises between conservation targets and other policy goals.

1. Mascia, M. B., & Pailler, S. (2011). **Protected area downgrading, downsizing, and degazettement (PADDD) and its conservation implications.** *Conservation Letters*, *4*(1), 9–20. https://doi.org/10.1111/j.1755-263X.2010.00147.x

Mascia and Pailler (2011) defined protected area downgrading, downsizing, and degazettement (PADDD), and provided a foundational understanding of the implications of PADDD for conservation science and policy. Through a review of published literature and media reports, authors identified 89 historic instances of PADDD enacted between 1900 and 2009 in 27 countries, and 18 proposed PADDD events in at least 12 countries between 2009 and 2010. Proximate causes of PADDD events varied but centered around industrial-scale resource extraction and development and local pressures and land claims. PADDD can occur in areas of global importance for biodiversity, significantly shrink protected areas, and drastically temper legal restrictions. Case studies of PADDD in South America and India highlighted protected areas as dynamic governance regimes susceptible to political and social pressures. PADDD challenges established conservation assumptions, including those that underlie the global framework to reduce greenhouse gas emissions from deforestation and forest degradation (REDD+). Mascia and Pallier highlighted the need for resilient conservation strategies, further research, and continued investment in protected areas despite their limitations. This publication received media coverage in Mongabay.

Data release

- Conservation International and World Wildlife Fund. 2019. PADDDtracker.org Data Release Version 2.0 (May 2019). Arlington, VA: Conservation International. Washington, DC: World Wildlife Fund. DOI: 10.5281/zenodo.3371733 https://zenodo.org/record/3371733#.Xx8ggJ5Kg2w

Additional key references

Media

- Golden Kroner, R.E. 2020. Rolling back environmental protections under cover of the pandemic. *Scientific American.* https://www.scientificamerican.com/article/rolling-back-environmental-protections-under-cover-of-the-pandemic/

Selected media coverage of PADDD research can be found here: *https://www.padddtracker.org/media*

Peer-reviewed publications and technical reports

1. Albertazzi, S., and Bini, V. 2019. **Politica e deforestazione in Kenya: I risultati della Commisiione Ndung'u nella regione del South West Mau**. *Geography Notebooks* 2:1. https://www.ledonline.it/index.php/Geography-Notebooks/article/viewFile/1722/1197

2. Arima, E. (2016). **What Drives Downsizing of Protected Areas?: A Case Study of Amazon National Park.** *Journal of Latin American Geography*, *15*(2), 7–31. https://doi.org/10.1353/lag.2016.0013

3. Bacon, E., Gannon, P., Stephen, S., Seyoum-Edjigu, E., Schmidt, M., Lang, B., Sandwith, T., Xin, J., Arora, S., Adham, K. N., Espinoza, A. J. R., Qwathekana, M., Prates, A. P. L., Shestakov, A., Cooper, D., Ervin, J., Dias, B. F. de S., Leles, B., Attallah, M., Mulongoy, J., Gidda, S. B. (2019). **Aichi Biodiversity Target 11 in the like-minded megadiverse countries.** *Journal for Nature Conservation*, *51*, 125723. https://doi.org/10.1016/j.jnc.2019.125723

4. Barasa, M. N., Moinani, A., & Ong'au, E. (2020). **A Critical Analysis of Emerging Attitudes from the Mau Forest Restoration Discourse in Kenya**. http://41.89.196.16:8080/xmlui/handle/123456789/994

5. Bernard, E., Penna, L. A. O., & Araújo, E. (2014). **Downgrading, Downsizing, Degazettement, and Reclassification of Protected Areas in Brazil: Loss of Protected Area in Brazil.** *Conservation Biology*, *28*(4), 939–950. https://doi.org/10.1111/cobi.12298

6. Borges, S., Souza, F., Moreira, M., & Camargo, Y. (2019). **Alterar limites e categorias de áreas protegidas é necessariamente ruim? Um estudo de caso em duas unidades de conservação estaduais da Amazônia brasileira.** *Novos Cadernos NAEA*, *22*(2), Article 2. https://doi.org/10.5801/ncn.v22i2.3954

7. Correia, R. A., Jepson, P., Malhado, A. C. M., & Ladle, R. J. (2018). **Culturomic assessment of Brazilian protected areas: Exploring a novel index of protected area visibility**. *Ecological Indicators*, *85*, 165–171. https://doi.org/10.1016/j.ecolind.2017.10.033

8. de la Cruz-Hernández, J. A., Ávila-Akerberg, V., Rivera Herrejón, M. G., Vizcarra Bordi, I. (2016). **La desincorporación, disminución de categoría o de superficie en áreas protegidas (fenómeno paddd)**

y su efecto en el manejo de recursos forestales en un ejido del Nevado de Toluca, México. *Teoría y Praxis*, *19,* 95-118. https://doi.org/10.1017/S0376892916000424.

9. Depraz, S., Sanial, E., Catalán, A. K. R., & Rojas, A. S. (2016). **Less protection for better conservation? A politicised relationship between a city and its protected area in the vicinity of Nevado de Toluca (Mexico)**. *Articulo – Revue de Sciences Humaines*, (16). https://doi.org/10.4000/articulo.3261

10. Dorji, T., Linke, S., & Sheldon, F. (2019). **Half century of protected area dynamism in the country of Gross National Happiness, Bhutan**. *Conservation Science and Practice*, *1*(7), e46. https://doi.org/10.1111/csp2.46

11. Espichán Mariñas, M. Á. (2013). **La conservación de las áreas naturales protegidas y los fenómenos PADDD (degradación, reducción y degazzettement de áreas naturales protegidas)**. *Desde el Sur. Revista de Ciencias Humanas y Sociales de la Universidad Científica del Sur*, 35–47. https://doi.org/10.21142/DES-0501-2013-35-47

12. Fernández-Llamazares, Á., Helle, J., Eklund, J., Balmford, A., Mónica Moraes, R., Reyes-García, V., & Cabeza, M. (2018). **New law puts Bolivian biodiversity hotspot on road to deforestation**. *Current Biology: CB*, *28*(1), R15–R16. https://doi.org/10.1016/j.cub.2017.11.013

13. Fuller, C., Ondei, S., Brook, B. W., & Buettel, J. C. (2020). **Protected-area planning in the Brazilian Amazon should prioritize additionality and permanence, not leakage mitigation**. *Biological Conservation*, *248*, 108673. https://doi.org/10.1016/j.biocon.2020.108673

14. Golden Kroner, R.E. 2018. **Investigating impermanence: the case of Parque Nacional Cerros de Amotape**. *Texas A&M* Applied Biodiversity Science Perspectives Series, Volume 7, p 48-53. https://oaktrust.library.tamu.edu/bitstream/handle/1969.1/172974/PS8_Golden-Kroner.pdf?sequence=1

15. Hockings, M., Dudley, N., Ellio, W., Napolitano, M., MacKinnon, K., Pasha, M., Phillips, A., Woodley, S., Appleton, M., Chassot, O., Galliers, C., Golden Kroner, R., Hopkins, J., Jackson, W., Jonas, H., Mumba, M., Plowright, R., Rao, M., Redford, K., Robinson, J., Rodriguez, C.M., Sandwith, T., Spenceley, A., Stevens, C., Tabor, G., Troeng, S., Wilmore, S., and Yang, A. (2020). **Editorial essay: COVID-19 and protected and conserved areas**. *PARKS*. 18. DOI: 10.2305/IUCN.CH.2020.PARKS-26-1MH.en

16. Huang, Y., Fu, J., Wang, W., & Li, J. (2019). **Development of China's nature reserves over the past 60 years: An overview**. *Land Use Policy*, *80*, 224–232. https://doi.org/10.1016/j.landusepol.2018.10.020

17. Kukkonen, M. O., & Tammi, I. (2019). **Systematic reassessment of Laos' protected area network**. *Biological Conservation*, *229*, 142–151. https://doi.org/10.1016/j.biocon.2018.11.012

18. IUCN ESARO (2020). **Closing the gap. The financing and resourcing of protected and conserved areas in Eastern and Southern Africa**. Nairobi, Kenya: IUCN ESARO; BIOPAMA. https://portals.iucn.org/library/node/49045

19. Laue, J. E., & Arima, E. (2016). **What Drives Downsizing of Protected Areas?: A Case Study of Amazon National Park**. *Journal of Latin American Geography*, *15*(2), 7–31. https://doi.org/10.1353/lag.2016.0013

20. Lebreton, C. (2018). **National Park Declassification in Mexico: Between Propaganda, Legitimisation and Bargaining**. *Conservation and Society*, *16*(3), 268. https://doi.org/10.4103/cs.cs_17_37

21. Lee-Ashley, M., Rowland-Shea, J., and Richards, R., 2019. **The Green Squeeze: America's Nature Crisis**. *Center for American Progress.* https://www.americanprogress.org/issues/green/reports/2019/10/22/476220/the-green-squeeze/

22. Lewis, E., MacSharry, B., Juffe-Bignoli, D., Harris, N., Burrows, G., Kingston, N., & Burgess, N. D. (2019). **Dynamics in the global protected-area estate since 2004**. *Conservation Biology*, *33*(3), 570–579. https://doi.org/10.1111/cobi.13056

23. López Sandoval, M., Gerique, A., & Pohle, P. (2017). **What Is Behind Land Claims? Downsizing of a Conservation Area in Southeastern Ecuador**. *Sustainability*, *9*(9), 1519. https://doi.org/10.3390/su9091519

24. López, S., López-Sandoval, M. F., Gerique, A., & Salazar, J. (2020). **Landscape change in Southern Ecuador: An indicator-based and multi-temporal evaluation of land use and land cover in a mixed-use protected area**. *Ecological Indicators*, *115*, 106357. https://doi.org/10.1016/j.ecolind.2020.106357

25. Ma, Z., Chen, Y., Melville, D. S., Fan, J., Liu, J., Dong, J., Tan, K., Cheng, X., Fuller, R., Xiao, X., Li, B. (2019). **Changes in area and number of nature reserves in China: China's Nature Reserves**. *Conservation Biology.* https://doi.org/10.1111/cobi.13285

26. Mackelworth, P., Holcer, D., & Fortuna, C. M. (2013). **Unbalanced governance: The Cres-Lošinj special marine reserve, a missed conservation opportunity**. *Marine Policy*, *41*, 126–133. https://doi.org/10.1016/j.marpol.2012.12.017

27. Marton-Lefevre, J. (2014). **Planet at the crossroads**. *Science*, *346*(6209), 525–525. https://doi.org/10.1126/science.1261787

28. Maxwell, S. L., Cazalis, V., Dudley, N., Hoffmann, M., Rodrigues, A. S. L., Stolton, S., Visconti, P., Woodley, S., Maron, M., Strassburg, B. B. N., Wenger, A., Jonas, H. D., Venter, O., & Watson, J. E. M. (2020). **Area-Based Conservation in the 21st Century**. *BiorXiv.* https://doi.org/10.20944/preprints202001.0104.v1

29. Montalvo Mancheno, C. S., Zazanashvili, N., & Beruchashvili, G. (2017). **Effectiveness of the network of protected areas of the South Caucasus at representing terrestrial ecosystems after the dissolution of the Soviet Union**. *Environmental Conservation*, *44*(2), 158–165. https://doi.org/10.1017/S0376892916000424

30. Nature Uganda (2011). **The Economic Valuation of the Proposed Degazettement of Mabira Central Forest Reserve. Nature Uganda Kampala**. http://www.natureuganda.org/downloads/Mabira/mabira%20degazettement%20report.pdf

31. Naughton-Treves, L., & Holland, M. B. (2019). **Losing ground in protected areas?** *Science*, *364*(6443), 832–833. https://doi.org/10.1126/science.aax6392

32. Prasniewski, V. M., Szinwelski, N., Sobral-Souza, T., Kuczach, A. M., Brocardo, C. R., Sperber, C. F., & Fearnside, P. M. (2020). **Parks under attack: Brazil's Iguaçu National Park illustrates a global threat to biodiversity**. *Ambio.* https://doi.org/10.1007/s13280-020-01353-5

33. Richards, R. 2018. **Measuring conservation progress in North America**. *Center for American Progress.* https://www.americanprogress.org/issues/green/reports/2018/12/04/461705/measuring-conservation-progress-north-america/

34. Roberts, K. E., Valkan, R. S., & Cook, C. N. (2018). **Measuring progress in marine protection: A new set of metrics to evaluate the strength of marine protected area networks**. *Biological Conservation*, *219*, 20–27. https://doi.org/10.1016/j.biocon.2018.01.004

35. Sloan, S., Campbell, M. J., Alamgir, M., Engert, J., Ishida, F. Y., Senn, N., Huther, J., & Laurance, W. F. (2019). **Hidden challenges for conservation and development along the Trans-Papuan economic corridor**. *Environmental Science & Policy, 92*, 98–106. https://doi.org/10.1016/j.envsci.2018.11.011

36. Twesigye, B. 2008. **Lessons from Citizen Activism in Uganda: Saving Mabira Forest**. SAAIA Occasional Papers Series, Number 7. https://media.africaportal.org/documents/SAIIA_Occasional_Paper_no_7.pdf

37. Turner, P. (2017). **Report on potential mechanisms through which areas recognised for their conservation value may be downsized or degazetted that may be of relevance for Ecologically or Biologically Significant Areas (EBSAs).** Secretariat of the Global Ocean Biodiversity Initiative (GOBI). https://www.cbd.int/doc/c/3f16/14e9/dd57dec2817ff0be39651eca/ebsaem-2017-01-gobi-submission1-en.pdf

38. Villén-Pérez, S., Mendes, P., Nóbrega, C., Gomes Córtes, L., & De Marco, P. (2018). **Mining code changes undermine biodiversity conservation in Brazil**. *Environmental Conservation*, *45*(1), 96–99. https://doi.org/10.1017/S0376892917000376

39. Vos, A., Clements, H. S., Biggs, D., & Cumming, G. S. (2019). **The dynamics of proclaimed privately protected areas in South Africa over 83 years**. *Conservation Letters*, e12644. https://doi.org/10.1111/conl.12644

40. Walters, G., Ngagnia Ndjabounda, E., Ikabanga, D., Biteau, J. P., Hymas, O., White, L. J. T., Ndong Obiang, A.M., Ndong Ondo, P., Jeffery, K.J., Lachenaud, O., Stévart, T. (2016). **Peri-urban conservation in the Mondah forest of Libreville, Gabon: Red List assessments of endemic plant species, and avoiding protected area downsizing**. *Oryx*, *50*(3), 419–430. https://doi.org/10.1017/S0030605315000204

41. WWF-Brazil. (2019). **PADDD trends in Brazilian Amazon protected areas: Mapping the risk of protected area downgrading, downsizing and degazettement in the biome.** https://www.wwf.org.br/?72342/PADDD-trends-in-the-Brazilian-Amazon