

Impact case study (REF3)

Institution: University of Exeter		
Unit of Assessment: UoA7 Earth Systems and Environmental Sciences		
Title of case study: The creation of Africa's largest network of marine protected areas		
Period when the underpinning research was undertaken: 2008 - present		
Details of staff conducting the underpinning research from the submitting unit:		
Name(s):	Role(s) (e.g. job title):	Period(s) employed by submitting HEI:
Dr Kristian Metcalfe	Lecturer in Marine Conservation Science	2013 – present
Prof Brendan Godley	Professor of Conservation Science	2003 – present
Dr Stephen Pikesley	Associate Research Fellow	2016 – present
Dr Matthew Witt	Associate Professor in Natural Environment	2007 – present
Period when the claimed impact occurred: 2014 - 2017		
Is this case study continued from a case study submitted in 2014? N		
1. Summary of the impact (indicative maximum 100 words)		
<p>Research into the spatial distribution of marine biodiversity and ocean resource users conducted by the University of Exeter, in partnership with the government of Gabon, has underpinned the creation of 9 new marine parks and 11 aquatic reserves covering 56,000 km². This has resulted in the creation of Africa's largest network of marine protected areas that will safeguard globally significant populations of marine vertebrates and fisheries resources, as well as increasing the proportion of Gabon's waters under formal protection from < 1% in 2012 to 26% in 2017. This far exceeds efforts in 42 more economically developed nations, as well as international commitments for countries to protect 10% of their waters by 2020. Gabon is now leading international efforts to increase protection to 30% by 2030.</p>		
2. Underpinning research (indicative maximum 500 words)		
<p>Gabon sits in the highly dynamic transition zone between the Guinea and Benguela Current Large Marine Ecosystems - making this some of the most productive coastal and offshore waters in the world. This globally significant marine region hosts several important populations of marine vertebrates (many of which are covered by the Convention on Migratory Species - CMS, and Convention on International Trade in Endangered Species - CITES) as well as pelagic and demersal fisheries resources that are poorly protected and heavily exploited. Historically this region has been poorly studied, however, since 2008, a team of multidisciplinary researchers from the University of Exeter, supported by ~£1.5 million of grant funding from the UK Darwin Initiative has conducted research in partnership with national implementing agencies to build the evidence base required to underpin changes in environmental policy and increase protection of marine biodiversity and fisheries resources.</p> <p>To achieve these goals Exeter researchers have employed a range of cutting-edge technologies and novel methods to fill data gaps and characterise the spatial ecology, distribution and population status and threats to marine vertebrates that were previously considered '<i>Data Deficient</i>' by the International Union for the Conservation of Nature (IUCN). This included large-scale coastal and aerial surveys, satellite tracking, at-sea surveys, and species distribution modelling [3.1; 3.2; 3.3]. These studies have revealed, amongst other things, that Gabon hosts the world's largest nesting colony for the leatherback turtle with an estimated 28,551 breeding females [3.1] and the largest nesting</p>		

colony in the Atlantic for the olive ridley sea turtle with an estimated 4,800 breeding females [3.2]. This research was fundamental in highlighting the inadequate scope of existing marine protected area networks to protect these populations - which are highly migratory and exposed to significant pressure from small-scale **and** industrial fisheries [3.4; 3.5].

This team of researchers also employed a range of interdisciplinary methods to fill gaps in ocean observation data and **map the social and economic interests of different user groups, such as small-scale fishers and shipping – which are often poorly represented in decision making processes due to a perceived lack of data**. This included analysing large-scale satellite derived vessel tracking data sets (e.g. Vessel Monitoring System - VMS and Automatic Identification System data - AIS), participatory mapping, GPS tracking, and socioeconomic surveys to provide detailed information on spatiotemporal patterns of human activity and resource dependency [3.4; 3.5; 3.6]. These studies demonstrated amongst other things, that ocean user-groups are highly dependent on access to shallow coastal and nearshore waters [3.6] – with these data being used to support the identification of community and industrial fishing zones, thereby contributing to efforts to protect local livelihoods and secure access to fisheries resources.

The data from this body of research were provided to the government of Gabon and national implementing agencies in the form of marine spatial planning databases that were incorporated into spatial prioritisation analyses to support comprehensive marine reform, **underpinning recommendations for the designation of new MPAs, community and industrial fishing zones in Gabon**.

3. References to the research (indicative maximum of six references)

Since 2008, the **University of Exeter have led on or co-authored 19 scientific publications** in high quality peer reviewed journals focused on increasing knowledge and awareness on marine biodiversity and ocean-user groups to support decision making in the Gulf of Guinea, a data poor region. Below are a selection of key papers focused on Gabon (**Case study authors are highlighted in bold**):

- 3.1. Witt, M.J.**, Baert, B., Broderick, A.C., Formia, A., Fretey, J., Gibudi, A., MOUNGUENGUI, G.A.M., MOUSSOUNDA, C., NGOUSSONO, S., PARNELL, R.J., ROUMET, D., SOUNGUET, G.-P., VERHAGE, B., ZOGO, A. & **Godley, B.J.** (2009) Aerial surveying of the world's largest leatherback turtle rookery: A more effective methodology for large-scale monitoring. *Biological Conservation*, 142, 1719-1727. <https://doi.org/10.1016/j.biocon.2009.03.009>
- 3.2. Metcalfe, K.**, Agamboué, P.D., Augowet, E., Boussamba, F., Cardiec, F., Fay, J.M., Formia, A., Kema Kema, J.R., Kouerey, C., Mabert, B.D.K., Maxwell, S.M., Minton, G., MOUNGUENGUI, MOUNGUENGUI, G.A., MOUSSOUNDA, C., MOUKOUMOU, N., MANFOUMBI, J.C., NGUEMA, A.M., NZEGOUÉ, J., PARNELL, R.J., DU PLESSIS, P., SOUNGUET, G.-P., TILLEY, D., VERHAGE, S., VILJOEN, W., WHITE, L., **Witt, M.J.** & **Godley, B.J.** (2015) Going the extra mile: Ground-based monitoring of olive ridley turtles reveals Gabon hosts the largest rookery in the Atlantic. *Biological Conservation*, 190, 14-22. <https://doi.org/10.1016/j.biocon.2015.05.008>
- 3.3. Pikesley, S.K.**, Maxwell, S.M., Pendoley, K., Costa, D.P., Coyne, M.S., Formia, A., **Godley, B.J.**, Klein, W., Makanga-Bahouna, J., Maruca, S., Ngouessono, S., Parnell, R.J., Pemo-Makaya, E., **Witt, M.J.** (2013) On the front line: integrated habitat mapping for olive ridley sea turtles in the southeast Atlantic. *Diversity and Distributions*, 19, 1518-1530. <https://doi.org/10.1111/ddi.12118>
- 3.4. Fossette, S.**, **Witt, M.J.**, Miller, P., Nalovic, M.A., Albareda, D., Almeida, A.P., Broderick, A.C., Chacón-Chaverri, D., Coyne, M.S., Domingo, A., Eckert, S., Evans, D., Fallabrino, A., Ferraroli, S., Formia, A., Giffoni, B., Hays, G.C., Hughes, G., Kelle, L., Leslie, A., López-Mendilaharsu, M., Luschi, P., Prosdocimi, L., Rodriguez-Heredia,

S., Turny, A., Verhage, S., **Godley, B.J.** (2014) Pan-Atlantic analysis of the overlap of a highly migratory species, the leatherback turtle, with pelagic longline fisheries. *Proceedings of the Royal Society B: Biological Sciences* 281. <https://doi.org/10.1098/rspb.2013.3065>

3.5. Pikesley, S.K., Agamboue, P.D., Bayet, J.P., Bibang, J.N., Bonguno, E.A., Boussamba, F., Broderick, A.C., Coyne, M.S., Plessis, P.D., Faure, F.E., Fay, J.M., Formia, A., **Godley, B.J.**, Kema Kema, J.R., Mabert, B.D.K., Manfoumbi, J.C., Asseko, G.M., **Metcalfe, K.**, Minton, G., Nelms, S., Ngouessono, S., Nzegoue, J., Ogandanga, C., Oliwina, C.K.K., Otsagha, F., Parnell, R.J., Gnandji, M.S., Sounguet, G.-P., Wada, M., White, L., **Witt, M.J.** (2018) A novel approach to estimate the distribution, density and at-sea risks of a centrally placed mobile marine vertebrate. *Biological Conservation*, 221, 246-256. <https://doi.org/10.1016/j.biocon.2018.03.011>

3.6. Cardiec, F., Bertrand, S., **Witt, M.J.**, **Metcalfe, K.**, **Godley, B.J.**, McClellan, C., Vilela, R., Parnell, R. J. & Le Loc'h, F. (2020) "Too Big To Ignore": A feasibility analysis of detecting fishing events in Gabonese small-scale fisheries. *PLoS ONE*, 15(6), e0234091. <https://doi.org/10.1371/journal.pone.0234091>

4. Details of the impact (indicative maximum 750 words)

In Gabon, growing awareness that marine biodiversity and ecosystems were poorly protected, and facing significant pressure led to the creation of *Gabon Bleu* - a national program launched by the Gabonese Government in 2012 to enhance the protection of marine biodiversity and promote sustainable use of fisheries resources.

The University of Exeter have been credited with playing a significant role in supporting *Gabon Bleu*, contributing available data on marine biodiversity and ocean-user groups, as well as undertaking spatial analyses that helped underpin the implementation of **9 new marine parks and 11 aquatic reserves covering 56,000 km²** in June 2017 (*Décret N°00161/PR*) [5.1; 5.2; 5.3; 5.4; 5.5; 5.6; 5.7].

First announced by the President of Gabon in November 2014, the 2017 legislation **increased the proportion of Gabon's waters under formal protection from <1% in 2012 to 26% in 2017** (Figure 1). As the President noted, "*with the remainder of the exclusive economic zone (EEZ) divided into **community and commercial fishing zones**, and oil exclusion zones where industrial fishing is not allowed close to strategic infrastructure*" [5.4].

From a regional perspective, this makes Gabon **the first Central African Nation to protect its marine resources with the establishment of a comprehensive network of marine protected areas**; and the **first country in the region to develop a zoning plan for its entire exclusive economic zone, or EEZ** [5.1; 5.2; 5.3].

Process and beneficiaries: Exeter research played a key role in increasing national awareness and institutional capacity; with Senior Technical Advisor for *Gabon Bleu*, Dr Richard Parnell writing [5.5] "*...collaborative research carried out on marine vertebrates and artisanal and industrial fisheries..., for which we previously did not have the capacity or baseline data, was transformative...*", which as noted by Wildlife Conservation Society Country Program Director Gaspard Abitsi [5.6] was the result of "*...contributing significant research expertise to address national priorities by embedding researchers within national implementing agencies to provide valuable training and scientific evidence...*".

Nature and significance of the impact on the environment: Key to the creation of this new network of marine protected areas was the scientific evidence behind it; with Gabon's Minister for Forests, the Sea and the Environment, and former Director of the Gabonese National Parks Agency (ANPN), Professor Lee White writing [5.7] "*Through their published work....staff from the University of Exeter played a pivotal role in supporting the Gabon Bleu team to design this comprehensive network of marine protected areas*" with this long-term

partnership fundamental to “ensuring that scientific evidence and international best practice has underpinned new legislation that has increased protection of the natural environment”.

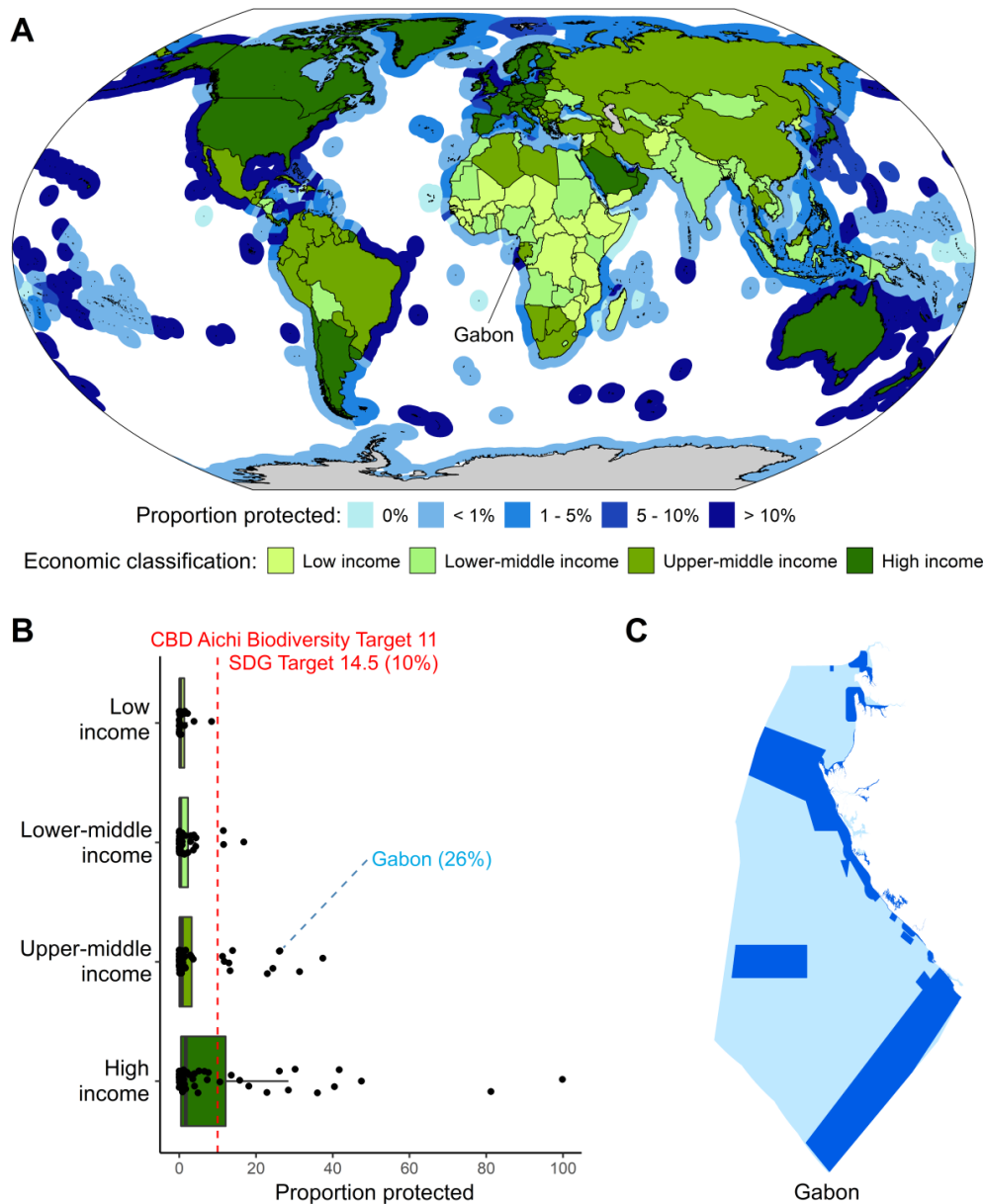


Figure 1 Global marine protected area estate: (A) proportion of protected area coverage within areas under national jurisdiction (exclusive economic zones; EEZ) in 2018; (B) the relationship between the proportion of each countries EEZ area (including overseas territories or dependencies) protected in 2018 and their World Bank economic classification; and (C) Gabon’s network of marine and coastal protected areas (dark blue) formally designated within its EEZ in 2017.

Extent and reach of impact: From a global perspective **Gabon’s MPA network, which now covers 26% of its waters far exceeds efforts in 42 more economically developed (high-income) nations;** as well as international commitments outlined by the Convention on Biological Diversity (CBD) Aichi Biodiversity Target 11, and UN Sustainable Development (SDG) Goal 14.5 that call for countries to protect at least 10% of their waters by 2020 and 2030, respectively (Figure 1). **As a result of this success Gabon is now celebrated as a global exemplar [5.7] and is at the forefront of international efforts to increase protection of the global ocean to 30% by 2030.**

In addition, the comprehensive nature of the team's research activities in Gabon means that these data are also being used to address other key conservation challenges, with Wildlife Conservation Society Country Program Director Gaspard Abitsi writing [5.6] *"The University of Exeter's research has also been instrumental in enhancing fisheries management....contributing to implementation of fisheries zones, revision of the fisheries licensing process and infractions (Arrêté n° 00009/MAEPSA/SG/DCAG; Arrêté N°00022/MAEPSA/SG/DGPA),.....a ban on discards (Arrêté N°00040/MAEPSA/SG/DGPA), and the legal requirement to deploy turtle exclude devices (TEDs) on all shrimp trawlers (Arrêté N°00026/MAEPSA/SG/DGPA)"*.

5. Sources to corroborate the impact (indicative maximum of 10 references)

International announcements and press releases detailing the Government of Gabon's announcement and implementation of its new network of marine protected areas:

5.1. * National Geographic (2014) <https://blog.nationalgeographic.org/2014/11/12/a-massive-new-marine-protected-area-network-in-gabon/>

5.2. * Wildlife Conservation Society Press Release (2014) <https://gabon.wcs.org/en-us/Wild-Places/Gabons-Coast-Ocean.aspx>

5.3. * Wildlife Conservation Society Press Release (2017) <https://newsroom.wcs.org/News-Releases/articleType/ArticleView/articleId/10114/Gabon-Announces-Vast-Marine-Protected-Area-Network-at-UN-Ocean-Conference.aspx>

* *Press releases and statements that credit the University of Exeter or research by Exeter.*

5.4. IUCN World Parks Congress (2014) Speech by The President of Gabon Ali Bongo Ondimba <https://wpc.wcs.org/News/ctl/ArticleView/mid/25749/articleId/2752/SPEECH-President-Ali-Bongo-Ondimba-of-Gabon-announces-decision-to-create-a-new-marine-protected-area-network-at-the-2014-IUCN-World-Parks-Congress-in-Sydney-Australia-November-12-2014.aspx> (text version of speech)

Corroborating sources letters of support detailing the University of Exeter's contribution to Gabon's efforts to enhance institutional capacity and support national implementing agencies to protect the marine environment:

5.5. Dr Richard Parnell – Senior Technical Advisor (Gabon Bleu / Congo Marin) Wildlife Conservation Society (WCS).

5.6. Gaspard Abitsi – Country Program Director, Wildlife Conservation Society (WCS) Libreville, Gabon.

5.7. Professor Lee White – Gabon's Minister for Forests, the Sea and the Environment, and former Executive Director of Gabonese National Parks Agency (Agence Nationale des Parcs Nationaux - ANPN)